LEBANON CITY COUNCIL AGENDA

December 13, 2023
3:30 PM Executive Session
6:00 Regular Session

Santiam Travel Station
750 3rd Street, Lebanon, Oregon

Mayor Kenneth E. Jackola

Council President Michelle Steinhebel *Councilor Wayne Dykstra* *Councilor Carl Mann*
Councilor Jeremy Salvage *Councilor Kim Ullfers* *Councilor Dave Workman*

MISSION STATEMENT

The City of Lebanon is dedicated to providing exceptional services and opportunities that enhance the quality of life for present and future members of the community.

3:30 PM - EXECUTIVE SESSION – CALL TO ORDER *Executive Sessions are closed to the public due to the highly confidential nature of the subject. It is unlawful to discuss anything outside of the Executive Session. Final action/decisions are to be made in open session.*

Per ORS 192.660(2)(a) To consider the employment of a public officer, employee, staff member or individual agent. (City Manager)

6:00 PM - REGULAR SESSION – CALL TO ORDER

FLAG SALUTE

ROLL CALL

CONSENT CALENDAR *The following item(s) are considered routine and will be enacted by one motion. There will not be a separate discussion of these items unless a Councilor so requests. In this case, the item(s) will be removed from the Consent Calendar and considered separately.*

AGENDA	Lebanon City Council Agenda – December 13, 2023
BOARD MINUTES	Planning Commission – October 18, 2023
COUNCIL MINUTES	November 8, 2023 Regular & Executive Sessions
	November 17, 2023 Executive Session
DECLARATION	Arbor Day

PUBLIC COMMENTS *Citizens may address the Council by filling out a testimony/comment card prior to speaking and handing it to the City Recorder. Each citizen is provided up to 5 minutes to provide comments to the Council. The Council may take an additional two minutes to ask clarifying questions. The City Recorder will accept and distribute written comments at a speaker's request. Public comments can also be submitted by email to city.recorder@lebanonoregon.gov prior to 2:00 PM on December 13. The City Recorder will distribute comments to the Mayor and Council prior to the meeting.*

PRESENTATION

- Small Municipalities Advocacy Coalition Membership – Sean Tate

PUBLIC HEARING

1) **Development Code Amendment to Address RV Parks and RVs as Caretaker Dwellings (DCA-23-01)**
   Presented by: Kelly Hart, Community Development Director
   Approval/Denial by ORDINANCE BILL NO. 2023-21, ORDINANCE NO. 3016

REGULAR SESSION

2) **Psilocybin Update**
   Presented by: Kelly Hart, Community Development Director
   DISCUSSION

3) **Recreational Trails Grant Agreement**
   Presented by: Ron Whitlatch, Interim City Manager
   Approval/Denial by MOTION

4) **American Rescue Plan Act Funds**
   Presented by: Brandon Neish, Finance Director
   Approval/Denial by MOTION

5) **Fluoridation of Municipal Water Supply**
   Presented by: Ron Whitlatch, Interim City Manager
   Approval/Denial by MOTION

6) **Property Acquisition (1185 Airport Road)**
   Presented by: Ron Whitlatch, Interim City Manager
   Approval/Denial by MOTION

7) **Letter of Support - ENTEK**
   Presented by: Ron Whitlatch, Interim City Manager
   Approval/Denial by MOTION

8) **City Manager's Report**
   Presented by: Ron Whitlatch, Interim City Manager
   DISCUSSION

ITEMS FROM COUNCIL

PUBLIC/PRESS COMMENTS *An opportunity for citizens and the press to comment on items of city business.*

NEXT SCHEDULED COUNCIL MEETING

- January 10, 2024 Regular Session (6:00 PM)

EXECUTIVE SESSIONS *Executive Sessions are closed to the public due to the highly confidential nature of the subject. It is unlawful to discuss anything outside of the Executive Session. Final action/decisions are to be made in open session.*

- *Per ORS 192.660(2)(h) To consult with counsel concerning the legal rights and duties of a public body with regard to current litigation or litigation likely to be filed.*
- *Per ORS 192.660(2)(i) To review and evaluate the employment-related performance of the chief executive officer of any public body, a public officer, employee or staff member who does not request an open hearing. (City Attorney)*
- *Per ORS 192.660(2)(d) To conduct deliberations with persons designed by the governing body to carry on labor negotiations.*
- *Per ORS 192.660(2)(a) To consider the employment of a public officer, employee, staff member or individual agent. (City Manager)*

REGULAR SESSION

9) City Manager Contract Authorization
Presented by: Ron Whitlatch, Interim City Manager
MOTION

ADJOURNMENT

If you cannot attend the meeting, but wish to address the Council under Public Comments or for a Public Hearing electronically, click HERE to register in advance for the meeting. You will receive a confirmation email containing information about joining the meeting. Attendees will need to register to receive the link to the meeting. Please register ONLY if you wish to address the Council. You will be called in the order received. If you want to watch or listen to the meeting, please click this link to do so on YouTube: *https://www.youtube.com/live/MzXjTZ2v*

City Council meetings are recorded and available on the City's YouTube page at https://www.youtube.com/user/CityofLebanonOR *The meeting location is accessible to persons with disabilities. A request for an interpreter for the hearing impaired or for other accommodations for persons with disabilities should be made at least 48 hours before the meeting to the City Recorder at 541.258.4905.*

*Executive Session

Per ORS 192.660(2)(a) To consider the employment of a public officer, employee, staff member or individual agent.

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Consent Calendar

Board/Committee Commission Minutes

City of Lebanon

Planning Commission

Meeting Minutes
October 18, 2023

Members Present: Vice-Chair Gerig-Knurowski, Commissioners Dave McClain, Tina Breshears, Karisten Baxter, Marcellus Angellford, Mike Miller, Shyla Malloy and Don Fountain.

Staff Present: Community Development Director Kelly Hart, Engineering Director Ron Whitlatch and City Attorney Tre Kennedy.

1. CALL TO ORDER/FLAG SALUTE

Vice-Chair Gerig-Knurowski called the meeting of the Lebanon Planning Commission to order at 6:00pm at the Santiam Travel Station. The meeting was also provided on Zoom for a virtual platform, and live streamed on YouTube.

2. ROLL CALL

Roll call was taken. Chair Robertson was excused.

3. APPROVAL OF MEETING MINUTES

September 20, 2023 – approved as written

4. CITIZEN COMMENTS – *None*

5. COMMISSION REVIEW

A. Planning File CPMA-23-03, ZMA-23-03, AR-23-04, CU-23-03 – Proposed development and operation of a car wash facility for the property located on the east side of S Santiam Highway, west of Burdell Blvd., and north of Walgreens in the Highway Commercial (Z-HCM) zone. (12S 02W 15BD, Tax Lot 1000, 911 Airport Road)

City Attorney Kennedy read the hearing procedures into the record. Vice-Chair Gerig-Knurowski asked whether any commissioners had a conflict of interest, bias, or ex-parte communication.

Commissioner Angellford indicated that he owned property on Airport Road in the

general vicinity, but it's not directly adjacent to the subject site. City Attorney Kennedy asked a series of questions and determined that Commissioner Angellford did not have any financial gain or loss for his property associated with the improvement of the subject property. Commissioner Angellford indicated an ability to review the application based on the decision criteria and did not need to recuse himself.

Seeing no additional declarations, Vice-Chair Gerig-Knurowski opened the public hearing and asked for staff to provide a report.

Director Hart provided a summary of the report, the overall decision criteria and the proposed actions to be taken by the Planning Commission.

Vice-Chair Gerig-Knurowski asked if there were any comments or questions from the commission.

Commissioner Malloy asked whether the operator could change the hours of operation from those proposed after approval. Director Hart answered in the affirmative.

Commissioner Angellford asked why a dedicated left turn lane on the north leg of Stoltz Hill Road was not required or designed.

Director Whitlatch responded that a Transportation Impact Analysis (TIA) was conducted for the proposed development, and concluded the development did not trigger the requirement. The City agrees there are advantages to having the left turn leg but cannot require it of the developer. The City is still working on acquiring property to complete the signal, and the land needed to build the left turn lane is not owned by the city or the current applicant.

Vice-Chair Gerig-Knurowski asked whether the TIA addressed the full development potential of the street. Director Whitlatch identified the TIA considered the full build-out potential.

Commissioner Breshears asked about the truck route. Director Hart responded a truck could enter from either driveway and directed specific questions to the applicant.

Vice-Chair Gerig-Knurowski asked why the signal for the intersection was delayed. Director Whitlatch indicated the city was still in the process of acquiring the necessary right-of-way to complete the signal.

Commissioners discussed the merits of the two written public comments received. Commissioner Angellford indicated he did not want to go against the wishes of the neighborhood, but it is unclear whether the letter from the Applegate Landing HOA was actually representing all the residents, a portion of, or just the one person who signed the letter. Commissioner McClain indicated that every property owner has the right to free market. Director Hart indicated that it is unknown how many people in the HOA are represented in the comment letter, and it is best to simply evaluate the letter based on the content.

Vice-Chair Gerig-Knurowski asked whether the improvements associated with the

TIA were paid by the applicant, or the City. Director Whitlatch indicated the applicant was the responsible party.

Commissioner Malloy asked about the impacts on the change of traffic to the convenience store on the southern end of the intersection. During the Applicant testimony, it was disclosed the applicant owned the existing convenience store and it was planned to be demolished if this project moved forward.

Seeing no additional comments, the public hearing was opened

Laura LaRoque, Udell Engineering and Brian Vandetta, Udell Engineering spoke as applicant representatives. Laura LaRoque provided a general project overview on how the project met the decision criteria. Brian Vandetta provided an overview of the intersection and street infrastructure improvements, and clarified the turning radius and intersection design to demonstrate how a tanker truck could maneuver the site.

Commissioner Fountain asked whether the tanker trucks would be turning onto Stoltz Hill to access the site. Brian Vandetta responded that the trucks could enter the site from either Stoltz Hill Road driveway, or Airport Road.

Brian Vandetta further clarified that the applicant owns the subject property, and all of the residential lots on the west side of Stoltz Hill Road, part of the Applegate Landing HOA, and his client was never contacted or made aware of a meeting of the HOA to discuss this matter, and wanted to make it clear that the letter did not reflect his client's position.

Vice-Chair Gerig-Knurowski opened the hearing to the public to speak in favor or against the project. Seeing none, the public hearing was closed. All discussion was left to the commission and staff.

Commissioner Breshears indicated the applicant testimony was helpful to address circulation concerns.

Vice-Chair Gerig-Knurowski indicated an appreciation of the double buffering with a fence and landscaping provided.

Vice-Chair Gerig-Knurowski asked whether there were any additional questions. Seeing no questions or concerns, Vice-Chair Gerig-Knurowski asked for a motion.

Commissioner Malloy moved to recommend approval of the Comprehensive Plan and Zoning Map Amendments, and to approve the Administrative Review and Conditional Use Permit based on the written findings and conditions.

Commissioner Breshears seconded the motion.

The motion passed 8-0.

B. <u>CU-23-04</u> – Proposed development and operation of a car wash facility for the property located on the east side of S Santiam Highway, west of Burdell Blvd., and north of Walgreens in the Highway Commercial (Z-HCM) zone. (12S 02W 23B, Tax Lot 100)

Vice-Chair Gerig-Knurowski opened the public hearing, had the City Attorney read into the record the raise it or waive it provisions for basis of appeal, and asked whether there was any conflicts of interest, bias, or ex parte communication to report. Seeing none, Staff was asked to provide a report.

Director Hart provided a summary of the report, and how the project met the decision criteria.

Vice-Chair Gerig-Knurowski asked if there were any comments or questions from the commission. Seeing none, the public hearing was opened for comment.

Raul Woerner, CSA Planning, represented the applicant. Mr. Woerner provided a general project overview and how the project met the decision criteria, commenting on circulation, landscaping treatments, and noise mitigation for the vacuum stations.

Commissioner McClain asked how many of these facilities has the applicant operated in the past. Mr. Woerner indicated he's assisted with six previous facilities, but it is also a nationwide chain.

Commissioner McClain asked how long the development would take. The applicant responded they would be operating within a year.

Raul Woerner closed his comments by stating that the car wash facility does recycle water.

No further public comments were provided. The hearing was closed.

Seeing no questions or concerns, Vice-Chair Gerig-Knurowski asked for a motion.

Commissioner Malloy moved to approve the conditional use permit based on the findings written and conditions in the staff report.

Commissioner Fountain seconded the motion.

The motion passed 8-0.

6. COMMISSION BUSINESS & COMMENTS

Director Hart provided an overview of items from the City Council meeting in October, specifically, the City Council moved to opt-out of psilocybin facilities and send it to voter referral. However, Council also directed staff to work with the Planning Commission to develop a time, place, and manner ordinance to have in place, in case the voters choose to allow psilocybin facilities. In addition, Director Hart reviewed another council agenda item regarding RV Parks. Council directed staff to draft an

ordinance to amend the development code to prohibit private RV park operations in the city. It is the goal to have this processed and ready for Planning Commission consideration at the November Planning Commission meeting.

Commissioner Angellford brought up visibility and safety concerns at the intersection of Vaughan Lane and S Main Road and wanted to discuss the process of addressing the code to ensure development design changes to address the concern in the future. Discussion between staff and the Planning Commission regarding options for code changes and process/timing of the changes was had. At the conclusion of the discussion, the Planning Commission consensus was to consider the intersection visibility concerns as part of the larger code changes that is planned over the next 1.5 years.

ADJOURNMENT:

There being no further business, the meeting was adjourned at 7:17 pm.

[Meeting minutes prepared by Kelly Hart, Community Development Director]

Council Minutes

LEBANON CITY COUNCIL
MINUTES - DRAFT
November 8, 2023

Council Present — Mayor Kenneth Jackola, Council President Michelle Steinhebel, Councilors Wayne Dykstra, Carl Mann, Jeremy Salvage, Kim Ullfers and Dave Workman

Staff Present — City Attorney Tré Kennedy, Interim City Manager Ron Whitlatch, City Recorder Julie Fisher, Police Chief Frank Stevenson, Community Development Director Kelly Hart, Public Works Director Jason Williams and IT Director Brent Hurst

Media Present — Sarah Brown, Lebanon Local

CALL TO ORDER Mayor Jackola called the meeting to order at 6:00 p.m. in the Santiam Travel Station Board Room.

ROLL CALL All Councilors were present.

CONSENT CALENDAR *Councilor Workman moved, Councilor Dykstra seconded, to approve the Consent Calendar as presented. The motion passed unanimously.*

AGENDA	Lebanon City Council Agenda – November 8, 2023
BOARD MINUTES	Library Advisory Committee – August 8, 2023
	Parks, Trees & Trails Advisory Committee – July 19, 2023
	Planning Commission – September 20, 2023
COUNCIL MINUTES	October 11, 2023 Work & Regular Sessions

PUBLIC COMMENTS

Laura LaRoque spoke in favor of Accessory Dwelling Unit Systems Development Charge (SDC) fee waivers to encourage this type of development.

Frederick Vinson appealed to the Council and community for a homeless shelter.

Robert Gulley expressed appreciation to the those at St. Martin's Church. He feels that there should be consolidation in providing services to the homeless. He also asked about regulations for warming shelters and wondered how they can better serve those who use them.

Corbin Tolen spoke about his concerns with fluoride in City water. He requested Council discussion on allowing citizens to vote on the issue.

Lindsay Pehrson conveyed her concerns with fluoride in City water and requested that this be put on the ballot. She will be sending a request to Council to look at the City's water quality.

Edda King spoke about the health benefits of water fluoridation and feels that the City should focus on other issues. She added that the group who wants this placed on the ballot did not get enough or stopped collecting signatures.

Tana Nicholson spoke about sewer runoff in front of their house and negative effects of fluoride in the water.

PRESENTATIONS

Annual Risk Report

Darrin Godfrey and Xander Darcy, HUB International Northwest LLC, reviewed the risk report [available in the Council packet].

Councilor Ullfers questioned the large increase in property and liability insurance premiums even with the lack of property losses since 2018 (with the exception of 2020-21). Mr. Godfrey said that premiums are based on many factors – property values have increased, and the City is taking on the losses and risks associated with a pooled program.

Republic Services

Julie Jackson, Municipal and Community Relations Manager, presented information on the annual Refuse Rate Index, which is based on the Consumer Price Index, fuel cost and disposal costs. The calculated adjustment for January 1, 2024 is 1%. She also provided an update on staffing, low-income assistance, and recycling events. She will be back at the beginning of the year with information on how much the low-income assistance program is being used.

In response to Councilor Salvage's question about event reminders, Ms. Jackson said that Republic Services utilizes call blasts, printed cards, and the Chamber reader board, but they will look at other ways of getting the word out regionally.

City Attorney Kennedy shared that Republic Services has been generous in working with Linn County and residents on the Porter Street cleanup.

Ms. Jackson said that Republic Services will continue to approve the Soup Kitchen's grant.

Lebanon Chamber of Commerce

Rebecca Grizzle, Chamber President CEO, requested a transient room tax contract amendment for an allocation change – increase funding for operation of the Visitors Center from $35,000 to $42,000 per year and decrease funding for administration of tourism grants from $50,000 to $43,000 per year.

Ms. Grizzle explained for Councilor Workman that this would not affect tourism grant requests as they have declined.

Responding to Councilor Salvage's question, Ms. Grizzle said that the request for increased funding is due to rising costs for all expenses.

PUBLIC HEARING

1) Comprehensive Plan Map Amendment & Zone Map Amendment (CPMA-23-03 & ZMA-23-03)

Mayor Jackola opened the public hearing at 7:06 p.m. City Attorney Kennedy reviewed public hearing quasi-judicial procedures. There were no Councilor declarations of ex parte contact, bias or conflicts of interest and no objections to the notice sent out or to the jurisdiction of this body to hear and consider this case.

Community Development Director Hart presented a request to amend the Comprehensive Plan Map and Zoning

Map designation to Mixed Use for a 1.11-acre parcel at 911 Airport Road. The staff report provides analysis of the required review criteria and recommended findings in support of the application.

Community Development Director Hart confirmed for Councilor Steinhebel that the traffic light will be installed and operational before the new commercial use would be granted occupancy. Regarding the traffic light, Interim City Manager Whitlatch explained for Councilor Ullfers that the City is still working through that process. Community Development Director Hart explained for Councilor Workman that traffic impact analyses includes impacts to surrounding intersections.

Councilor Salvage asked whether the development must go before the Planning Commission and City Council if the zone change is approved. Community Development Director Hart said that the development proposal was processed concurrently with the zone change. The Planning Commission reviewed the development and identified that it is Development Code compliant contingent upon Council's approval of the zone change.

Mayor Jackola asked for the applicant's testimony.

Laura LaRoque, Udell Engineering & Land Surveying, representing the property owner and developer, briefly went over the application and made herself available for questions.

There were no comments in favor of the application. Mayor Jackola asked for comments in opposition.

Mary Ann Raschke asked why a gas station is being put in when everyone wants electric vehicles. Mayor Jackola said that this development is being put in by a private party.

Mayor Jackola closed the public hearing at 7:17 p.m. City Attorney Kennedy read the title of ORDINANCE BILL NO. 2023-20, ORDINANCE NO. 3015. ***Councilor Ullfers moved, Councilor Workman seconded, to APPROVE ORDINANCE BILL NO. 2023-20, ORDINANCE NO. 3015, A BILL FOR AN ORDINANCE AMENDING THE LEBANON COMPREHENSIVE PLAN MAP AND ZONING MAP DESIGNATION TO ESTABLISH THE MIXED-USE DESIGNATION FOR THE 1.11 ACRE PROPERTY (12S-02W-15BD, TAX LOT 1000) FILE CPMA-23-03, ZMA-23-03; SONA ATHWAL. The motion passed unanimously.***

REGULAR SESSION

2) Repealing Resolution No. 2022-28 and Approving Republic Services Rate Increases

Interim City Manager Whitlatch brought forth a resolution for a 1% Republic Services rate increase to be effective January 1, 2024. The franchise agreement states that rates shall be approved by the City Council by resolution.

Interim City Manager Whitlatch confirmed for Councilor Salvage that this equates to about a $0.25-$0.43 increase depending on the size of the cart.

City Attorney Kennedy read the title of RESOLUTION NO. 2023-18. ***Councilor Ullfers moved, Councilor Steinhebel seconded, to APPROVE RESOLUTION NO. 2023-18 A RESOLUTION REPEALING RESOLUTION 2022-28 AND APPROVING REPUBLIC SERVICES RATE INCREASES. The motion passed unanimously.***

3) Lebanon Chamber of Commerce Tourism Agreement

Interim City Manager Whitlatch presented the Chamber's request to adjust the tourism agreement due to Visitors Center operation cost increases. This would increase funding for operation of the Center ($7,000) and reduce funding for administering of tourism grants ($7,000) resulting in a net zero change.

Councilor Salvage moved, Councilor Mann seconded, to APPROVE THE REVISED LEBANON CHAMBER OF COMMERCE TOURISM AGREEMENT. The motion passed unanimously.

4) Accessory Dwelling Unit Systems Development Charges (SDC)

Community Development Director Hart recommended approval of an ordinance amending Chapter 13.12 Section 110 language to reduce fees for all SDCs for accessory dwelling units to 40% of the SDC rate for single family dwellings. She edited the ordinance: *13.12.110(E) – Accessory Dwelling Units (ADUs), are giving a 60% reduction of the Water, Sanitary Sewer, Transportation, Parks, and Storm Drainage charges for Single Family Dwellings*.

City Attorney Kennedy read the title of ORDINANCE BILL NO. 2023-19, ORDINANCE NO. 3014. *Councilor Ullfers moved, Councilor Dykstra seconded, to APPROVE ORDINANCE BILL NO. 2023-19, ORDINANCE NO. 3014, A BILL FOR AN ORDINANCE AMENDING SECTION 110 OF CHAPTER 13.12 SYSTEM DEVELOPMENT CHARGES – EXEMPTIONS OF THE LEBANON MUNICIPAL CODE AS AMENDED. The motion passed unanimously.*

5) Fluoride Discussion

Public Works Director Williams presented history and information on fluoride in the City's drinking water system. Interim City Manager Whitlatch added that Council discussion in 2016 resulted in continued use of fluoride in the new water treatment plant system. Environmental Protection Agency dosing standards are followed.

Public Works Director Williams confirmed that the fluoride chemical feed pump system is in a self-contained room and that staff wears respirators and Tyvek suits when working with fluoride. There is a cost for this equipment, but they are used for different functions as well.

Councilor Workman asked for the cost to the water treatment plant and throughout the City as a result of using fluoride. Public Works Director Williams said that he can get the chemical injection system replacement cost.

Public Works Director Williams explained to Mayor Jackola that the City tries to loop distribution mains together, but it has no control past the meter.

Mayor Jackola and Councilors Dykstra, Mann, Salvage and Workman felt that this should be put on the ballot so citizens can decide whether they want the City's water fluoridated.

Councilors Steinhebel spoke against removing fluoride from the water or referring it to the voters. She is not trying to cut voters out of the process but feels that voters are involved when electing their Councilors who sometimes have to make hard decisions. There is also a voter initiative process in place. If the Council decides to refer this to the voters, she asked that it be in November 2024 since May elections generally only garner about a 15%-20% turnout. She is fine with pausing fluoridation in the interim.

Councilor Ullfers agreed with Councilor Steinhebel. The Council was voted into office to lead, and leaders have to make tough decisions. He thinks referring it to the voters sets a precedent and questioned where to draw the line. Fluoridation was passed twice by Council and the initiative process failed because there was not enough signatures.

City Attorney Kennedy reminded the Council to consider, if referred to the voters, whether this will come down to individuals doing their own research or whether this will come down to who finances a better campaign.

There was discussion about the procedure to start the initiative process.

Councilor Workman moved, Councilor Steinhebel seconded, to REQUEST THAT STAFF BRING BACK A MEMORANDUM REGARDING PROCEEDING WITH A COUNCIL-INITIATED BALLOT MEASURE TO REMOVE FLUORIDE FROM THE WATER SYSTEM FOR THE NOVEMBER 2024 BALLOT. The motion passed unanimously.

6) City Manager's Report – Interim City Manager Whitlatch provided updates:

- Kudos was given to the Building department. Lebanon is one of the ten top cities per capita for building permit issuances and ensuring timely delivery.
- Lebanon Downtown Association (LDA) provided information on their 501(c)(3) status and budget. They are working on one more document. Councilor Steinhebel expressed concern about releasing the quarterly motel tax funds and asked that the new Board make their request in person. Interim City Manager Whitlatch said that funds will not be released until after LDA's presentation.
- Public Works Director Williams spoke about the water quality issue, which is the result of a court injunction requiring the Corps of Engineers to release water from Green Peter Reservoir. To deal with this, staff is increasing how the plant is operating. There is some cloudiness, but the water is safe to drink.

  Interim City Manager Whitlatch added that if Lebanon did not have the new water treatment plant, the City would likely be under a boil-water notice. Staff spoke about expensive membrane replacement and many other costs. There was also discussion about keeping citizens informed.

ITEMS FROM COUNCIL

Councilor Steinhebel shared that there will be a discussion with the Department of Environmental Quality and Oregon Health Authority on ENTEK's Cleaner Air risk assessment at the library on November 30 from 5:00-7:00 p.m.

Councilor Ullfers commended Public Works staff for their traffic control work at 2nd and Mary Streets.

Mayor Jackola thanked City Attorney Kennedy for his hard work on cleaning up the Porter Street area.

PUBLIC/PRESS COMMENTS

Melissa Peterson read information on concerns with fluoride in City water.

Alisa Triglia said that fluoridation is a big concern for her. She asked whether this would be brought before the voters or whether the Council would be making the decision. She has also noticed changes in the water's color and smell for the past couple of weeks. Councilor Steinhebel briefly spoke about the voter initiative process.

City Attorney Kennedy clarified for Lebanon Local's Sarah Brown that the fluoride issue will be brought back as an action item at the next meeting since it was on tonight's agenda as discussion only.

NEXT SCHEDULED COUNCIL MEETING

- December 13, 2023 Regular Session (6:00 p.m.) & Executive Session

Mayor Jackola called for a recess at 8:26 p.m. before adjourning for Executive Session at 8:37 p.m..

EXECUTIVE SESSION

Executive Sessions are closed to the public due to the highly confidential nature of the subject. It is unlawful to discuss anything outside of the Executive Session. Final action/decisions are to be made in open session.

Council Present Mayor Kenneth Jackola, Council President Michelle Steinhebel, Councilors Wayne Dykstra, Carl Mann, Jeremy Salvage, Kim Ullfers and Dave Workman

Staff Present City Attorney Tre Kennedy, Interim City Manager Ron Whitlatch, City Recorder Julie Fisher, and Human Resources Director Angela Solesbee.

Media Present Sarah Brown, Lebanon Local

City Attorney Kennedy read the Executive Session announcement.

Per ORS 192.660(2)(a) To consider the employment of a public officer, employee, staff member or individual agent (City Manager).

No Council decisions were made in Executive Session.

ADJOURNMENT – The meeting was adjourned at 9:30 p.m.

[Minutes prepared by Donna Trippett, Deputy City Recorder]

Minutes Approved by the Lebanon City Council on this 13th day of December 2023.

Kenneth E. Jackola, Mayor ☐
Michelle Steinhebel, Council President ☐

ATTESTED:

Julie Fisher, City Recorder

LEBANON CITY COUNCIL
Executive Session Minutes
November 17, 2023

City Council Present Mayor Kenneth Jackola, Council President Michelle Steinhebel, Councilors Wayne Dykstra, Carl Mann, Jeremy Salvage, Kim Ullfers and Dave Workman

Staff Present City Attorney Tre Kennedy, City Recorder Julie Fisher, Human Resource Manager Angela Solesbee

Mayor Jackola called the Executive Session to order at 9:00 p.m.

Executive Sessions are closed to the public due to the highly confidential nature of the subject. It is unlawful to discuss anything outside of the Executive Session. Final action/decisions are to be made in open session.

City Attorney Tre' Kennedy read the Executive Session Announcement.
Per ORS 192.660(2)(a) To consider the employment of a public officer, employee, staff member or individual agent. (City Manager).

The Council conducted interviews for the position of City Manager.

ADJOURNMENT

Mayor Jackola adjourned the work session at 12:19 p.m.

[Minutes prepared by Julie Fisher, City Recorder]

Minutes Approved by the Lebanon City Council on this 13th day of December, 2023

Kenneth E. Jackola, Mayor ☐
Michelle Steinhebel, Council President ☐

ATTESTED:

Julie Fisher, City Recorder

Declaration

CITY OF LEBANON

"Arbor Month"

DECLARATION

WHEREAS, trees in the City of Lebanon contribute significantly to the beauty of our landscape; and

WHEREAS, recognizing moreover that trees provide many valuable environmental services such as shade in summer, carbon fixation, oxygen production, soil erosion reduction, more favorable groundwater recharge, and habitat for many forms of other plant and animal life; and

WHEREAS, also noting that our aging shade tree population is succumbing to increasing pest damage, and storm damage causing loss or disfigurement; and

WHEREAS, new tree planting is not compensating for these losses;

WHEREAS, recognizing that it is a good and worthy thing for residents to plant trees for the benefit of present and future generations.

NOW, THEREFORE, the City of Lebanon declares April as Arbor Month and encourages tree planting; and it notes with pleasure that there will be an annual Arbor Day celebration and an assessment of our roadside tree planting with a view to replacing any failed trees, and an assessment of potential new sites where planting could be beneficial;

And it encourages other residents to plant and care for trees at this time.

_____

Kennth Jackola, Mayor

In witness whereof, I here unto cause the great seal of the City of Lebanon to be affixed on this 13th day of December 2023.

_____

Julie Fisher, CMC, City Recorder

Citizen Comments

From: City Councilor Michelle Steinhebel
To: Adam Kirkpatrick; Julie Fisher
Cc: Donna Trippett; Dr. Molly Slack, D.D.S.; Kurt Ferre; Edda Zerkel King; [redacted]
Subject: Re: Water fluoridation.
Date: Thursday, November 9, 2023 2:54:23 PM
Attachments: image002.png
Outlook-Logo for e.png

Hello, Dr. Kirkpatrick,
Thank you for re-sending this information. I am including our new city recorder, Julie Fisher, on this email so she can include this information in public comment.
I encourage you and others to attend our next city council meeting on Monday, Dec. 13 at 6 p.m. at the Santiam Travel Station, 750 S. Third St. in Lebanon. Near the beginning of our meetings we have a public comment period where each commenter has up to 5 minutes to speak. At the Dec. 13th meeting, council will be considering (and likely voting on) putting this on the ballot for the November 2024 election.

I support fluoride in our municipal water supply, but I am not a medical professional. I believe it would be most impactful for council and our community to hear from health care providers like yourself on this issue, and I hope you will be able to attend.

In gratitude,

Michelle Steinhebel
City Councilor, Ward III
City of Lebanon | 925 Main Street | Lebanon OR 97355
VM: (541) 258-4983

From: Adam Kirkpatrick [redacted]
Sent: Thursday, November 9, 2023 2:47 PM
To: Kim Scheafer <kscheafer@ci.lebanon.or.us>; City Councilor Michelle Steinhebel <msteinhebel@ci.lebanon.or.us>
Cc: Donna Trippett <dtrippett@ci.lebanon.or.us>; Dr. Molly Slack, D.D.S. [redacted]; Kurt Ferre [redacted]; Edda Zerkel King [redacted]; [redacted]

[redacted]
Subject: Re: Water fluoridation.

Caution! This message was sent from outside your organization.

Hello again! It seems as though the issue of water fluoridation has come up again and I just wanted to make sure this information is still being considered. I have personally seen the major benefits of water fluoridation and also the negative effects in communities that don't have it. As an oral health provider here in Lebanon I just want the best for the members of our community and I feel that removing fluoride from the water would have a major negative impact on oral health. If you need me to resend the copious, well researched information from credible sources I am happy to. Or, if you need anything else, please let me know. Have a great day!
--
Adam Kirkpatrick, DDS
[redacted]

On Thu, May 4, 2023 at 4:47 PM Adam Kirkpatrick [redacted] wrote:

> Hello all, hope you're doing well! I just wanted to pass along some information that I thought might be helpful. The city of Dallas, TX just recently had the issue of water fluoridation come up and The American Fluoridation Society's Communications Director, Steve Slott, wrote an excellent rebuttal to some of the concerns. I have attached that here. Thank you for your consideration and for working hard for our city.
> --
> Adam Kirkpatrick, DDS
> [redacted]
>
> On Tue, Mar 14, 2023 at 7:25 AM Adam Kirkpatrick [redacted] wrote:
>
> > Of course, here you go. Have a great day!
> > --
> > Adam Kirkpatrick, DDS
> > [redacted]
> >
> > On Tue, Mar 14, 2023 at 6:55 AM Kim Scheafer <kscheafer@ci.lebanon.or.us> wrote:
> >
> > > Dr. Kirkpatrick – I just noticed that the email I received only had your letter and not the attachments that you mentioned were attached in your letter. When you have a chance could you forward those to me?
> > >
> > > Thank you.
> > >
> > > Kim

Kim Scheafer, MMC
City Recorder
925 S. Main Street, Lebanon, OR 97355
Tel: 541.258.4264
Fax: 541.258.4954

kim.scheafer@lebanonoregon.gov
www.lebanonoregon.gov

From: Adam Kirkpatrick [redacted]
Sent: Monday, March 13, 2023 3:51 PM
To: City Councilor Michelle Steinhebel <msteinhebel@ci.lebanon.or.us>
Cc: Dr. Molly Slack, D.D.S. [redacted]; Kim Scheafer <kscheafer@ci.lebanon.or.us>; Nancy Brewer <nbrewer@ci.lebanon.or.us>
Subject: Re: Water fluoridation.

Thanks!
--
Adam Kirkpatrick, DDS
[redacted]

On Mon, Mar 13, 2023 at 3:13 PM City Councilor Michelle Steinhebel <msteinhebel@ci.lebanon.or.us> wrote:

> Hi Dr. Kirkpatrick,
>
> Thank you for sending this along. A quick note though: this hasn't been formally added to the agenda just yet, but we did receive a request from a constituent to discuss its removal. I have CC'ed our City Recorder Kim Scheafer and City Manager Nancy

Brewer on this email.

Kim, can you please pass this along to council and include it in the council packet as comments for our April meeting?

Thank you,
Michelle

Michelle Steinhebel
City Councilor, Ward III
City of Lebanon | 925 Main Street | Lebanon OR 97355
VM: (541) 258-4983

From: Adam Kirkpatrick [redacted]
Sent: Monday, March 13, 2023 12:28 PM
To: City Councilor Michelle Steinhebel <msteinhebel@ci.lebanon.or.us>
Cc: Dr. Molly Slack, D.D.S. [redacted]
Subject: Water fluoridation.

Hey Michelle-

I've included a letter and some information regarding water fluoridation. Would you mind getting this to the correct people? I know Molly Slack feels the same way and I do on this issue and asked that I include her name as well in recommending we keep water fluoridation. Thanks!
--
Adam Kirkpatrick, DDS
[redacted]

Presentation

Small Municipalities Advocacy Coalition Membership

Sean Tate

Agenda Item 1

925 S. Main Street
Lebanon, Oregon 97355

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MEMORANDUM

Community Development

To: Mayor Jackola and City Council Date: November 16, 2023

From: Kelly Hart, Community Development Director

Subject: DCA-23-01 – Proposal to Modify Development Code to address RV Parks and Recreational Vehicles as Caretaker Dwellings

I. INTRODUCTION

In November 2022, the City Council was approached by a private business owner requesting consideration to amend the code to allow for recreational vehicles to be utilized as caretaker dwellings associated with certain mini-storage uses. In February 2023, staff presented Council with an evaluation of the proposal, possible concerns, and how to mitigate them. At the conclusion of the meeting, the City Council directed staff to draft an amendment to the Development Code to allow for recreational vehicles to be utilized as caretaker dwellings for mini-storage facilities when there are no permanent structures associated with the use (e.g., recreational vehicle storage lots, etc.).

The RV Park land use request was previously presented to Council in 2018 as a discussion item, with a report identifying the City only authorizes publicly owned RV parks and asked Council whether they wanted to consider a change to the code to authorize privately owned RV parks. The discussion identified a number of concerns regarding fire safety, property maintenance issues over time, demands on code enforcement, and tenancy issues when people do not vacate after their reservation period ends. Based on the concerns raised, Council directed staff to not pursue a code amendment. As such, it was perceived that the only RV parks authorized in the City were publicly owned RV parks, and privately owned RV parks were prohibited.

In September 2023, a property owner approached the City to determine whether Recreational Vehicle Parks were a permitted use. It was determined that the development code authorized the use in the Highway Commercial zone, subject to a Conditional Use Permit. In October 2023, staff presented the issue back to Council to clarify the record and obtain any direction. The City Council, noting similar concerns identified in 2018, directed staff to pursue a code amendment to remove the code language allowing privately owned RV Parks in the City.

The following amendment addresses the changes to the relevant sections of the Lebanon Development as it relates to the two issues.

II. CURRENT REPORT

Recreational Vehicle Park Use Amendments:

Currently in the Development Code (LDC), the Recreational Vehicle (RV) Park use is listed as a Class III Commercial Use for privately owned parks, as well as a Class II Public Use when it is publicly owned park. The proposed code amendment would remove all reference to the Class II Public Use for publicly owned parks, maintain the Class III Commercial Use designation, include a line in the commercial land use tables for each zone listing the use as not permitted, and include the definition of a Recreation RV Park.

For publicly owned RV parks, Lebanon Municipal Code (LMC) Section 12.12.050 (Camping in designated city parks) authorizes camping, including the use of recreational vehicles, at designated campsites in the city. A designated campsite is a City of Lebanon property improved and designated for camping within specified site areas subject to a reservation, time limit, and payment of a fee as established by city council resolution.

As publicly owned RV parks are already addressed in the municipal code, it is not necessary to establish a separate use designation between publicly and privately owned RV parks in the development code.

With the proposed changes in Exhibit A, the effect would be to clarify that Recreational Vehicle Parks are a Class III Commercial Use in the Development Code, and not permitted in any zone.

Recreational Vehicles as Caretaker Dwellings:

Based on the initial City Council discussion in February 2023, the following factors were determined to be the basis of direction for the development code updates:

1. An eligible site to utilize a recreational vehicle caretaker dwelling should be limited to the mini warehouse use where there are no permanent primary use structures or structures intended for occupancy built on-site
2. The site shall have the ability for the recreational vehicle to connect to sewer and water service on-site.
3. A permit should be issued for the recreational vehicle caretaker dwelling
4. The permit should be tied to the recreational vehicle being utilized as the caretaker dwelling
5. The permit should be an annual permit and include an inspection by the Building Official to ensure appropriate connection mechanisms are in place for sewer discharge and water hook-up.

In evaluating the code, it was identified that addressing all code aspects associated with the mini-warehouse use was necessary to create consistency in the code in regard to terms (i.e., mini-storage, mini-warehouse, self-storage, etc.), and amend the definition to better reflect the overall purpose of the use to include the outdoor storage component for boats, trailers, and recreational vehicles.

In addition, it is also proposed to lower the impact classification for the use from Class III to Class II. Currently, outside the Industrial zone, mini-storage facilities are subject to a Conditional Use Permit as a Class III use. For Conditional Use Permits, the use is evaluated regarding traffic, access, noise, vibration, exhaust/emissions, light glare, erosion, odor, dust, visibility, safety, and aesthetic considerations. Generally, mini-storage facilities are low to negligible impact on the consideration areas and are not a high intensity use requiring extensive conditioning of the development to mitigate impacts. As such, it is proposed to downgrade the use classification. As a Class II Use Impact, the permitting requirement would be reduced to an Administrative Review approved at the Planning Official level, and appeal would be considered before the Planning Commission.

Based on Council direction, and the code evaluation, several sections of the development code are proposed to be amended:

1. Chapter 16.03 would be amended to reflect the classification change and the allowance for the recreational vehicle caretaker use
2. Chapters 16.05, 16.06, 16.07, 16.08, 16.09, and 16.10 would be amended to reflect the adjusted name “Self-Serve Storage Facilities” and classification change in the commercial land use tables for each zone
3. Chapter 16.19 would be amended to include the Recreational Vehicle Caretaker Dwelling Temporary Use Permit requirements, and
4. Chapter 16.32 would be amended to update the definition of the use.

The proposed text for the Code Amendment is included as Exhibit A of this staff report.

III. RECOMMENDATION

1. The City Council:

    a. Conduct a public hearing; and

    b. Adopt the proposed Ordinance amending various chapters of the Lebanon Development code regarding RV Parks and Recreational Vehicles as Caretaker Dwellings.

A BILL FOR AN ORDINANCE AMENDING THE CITY OF LEBANON DEVELOPMENT CODE REGARDING RV PARKS AND RVs AS CARETAKER DWELLINGS	**)**	**ORDINANCE BILL NO. 2023-21** **ORDINANCE NO. 3016**

WHEREAS, the Planning Commission for the City of Lebanon conducted a hearing on November 15, 2023 regarding Planning File No. DCA-23-01 and made findings recommending certain amendments to the Development Code of the City of Lebanon regarding the prohibition of Recreational Vehicle Parks as a tourist use as defined in ORS 446.310, and to authorize recreational vehicles as caretaker dwellings associated with outdoor private storage facilities; and

WHEREAS, the City Council, pursuant to the provisions of the Lebanon Development Code, after appropriate notice given, has conducted a hearing to take testimony, hear arguments and to consider all the evidence concerning such proposed Development Code amendments, such hearing being conducted on December 13, 2023; and

WHEREAS, the City Council has considered all relevant evidence and deliberated.

NOW, THEREFORE, the City of Lebanon ordains as follows:

Section 1. In addition to the findings referred to above, the City Council does hereby adopt and find those matters contained in Exhibit “B” which is incorporated herein by this reference as if fully set forth at this point.

Section 2. Based upon the findings adopted herein, the Lebanon Development Code is hereby amended by the modified language as specified in Exhibit “A”, which is incorporated herein by this reference as if fully set forth at this point.

Section 3. Said Exhibit “A” shall be attached to, and become a part of, the Lebanon Development Code upon entry of this order.

Passed by the Lebanon City Council by a vote of _____ for and _____ against and approved by the Mayor this 13th day of December 2023.

CITY OF LEBANON, OREGON

_____

Kenneth E. Jackola, Mayor ☐

Michelle Steinhebel, Council President ☐

ATTESTED BY:

_____

Julie Fisher, City Recorder

Exhibit "A"
Amendments to the Lebanon Development Code regarding Recreational Vehicle Parks and Recreational Vehicles as Caretaker Dwellings under certain circumstances

Addressing Recreational Vehicle Parks:

The following sections shall be amended as follows:

16.03.060.B Public Uses with Class II Impacts

Remove "Recreational Vehicle (RV) Parks" as a listed use in the table.

16.05.050 Commercial Uses Allowed in the Residential Zones

Amend Table 16.05-3: Commercial Land Uses Allowed in Residential Zones to **include** the following row in the table under Commercial Uses with Class III Impacts:

Use Categories	Z-RL	Z-RM	Z-RH
Commercial Uses with Class III Impacts			
Recreational Vehicle (RV) Parks	N	N	N

16.05.070 Public Uses Allowed in the Residential Zones

Remove "Publicly Owned RV Parks" as a listed use in Table 16.05-5

16.06.060 Commercial Uses Allowed in the Mixed-Use Zone

Amend Table 16.06-3: Commercial Land Uses Allowed in Mixed-Use Zone to **include** the following row in the table under Commercial Uses with Class III Impacts:

Use Categories	Z-MU
Commercial Uses with Class III Impacts	
Recreational Vehicle (RV) Parks	N

16.06.080 Public Uses Allowed in the Mixed Use Zone

Remove "Publicly Owned RV Parks" as a listed use in Table 16.06-5

16.07.060 Commercial Uses Allowed in the Neighborhood Mixed Use Zone

Amend Table 16.07-3: Commercial Land Uses Allowed in the Neighborhood Mixed-Use Zone to **include** the following row in the table under Commercial Uses with Class III Impacts:

Use Categories	Z-NMU
Commercial Uses with Class III Impacts	
Recreational Vehicle (RV) Parks	N

16.07.080 Public Uses Allowed in the Neighborhood Mixed-Use Zone

Remove "Publicly Owned RV Parks" as a listed use in Table 16.07-5

16.08.060 Commercial Uses Allowed in the Commercial Zones

Amend Table 16.08-3: Commercial Land Uses Allowed in the Commercial Zones to **include** the following row in the table under Commercial Uses with Class III Impacts:

Use Categories	Z-NCM	Z-CCM	Z-HCM
Commercial Uses with Class III Impacts			
Recreational Vehicle (RV) Parks	N	N	N

16.08.080 Public Uses Allowed in the Commercial Zones

Remove "Publicly Owned RV Parks" as a listed use in Table 16.08-5

16.09.060 Commercial Uses Allowed in the Industrial Zone

Amend Table 16.09-3: Commercial Land Uses Allowed in the Industrial Zone to **include** the following row in the table under Commercial Uses with Class III Impacts:

Use Categories	Z-IND West of 5thStreet	Z-IND East of 5thStreet
Commercial Uses with Class III Impacts		
Recreational Vehicle (RV) Parks	N	N

16.09.080 Public Uses Allowed in the Industrial Zone

Remove "Publicly Owned RV Parks" as a listed use in Table 16.09-5

16.10.060 Commercial Uses Allowed in the Public Use Zone

Amend Table 16.10-3: Commercial Land Uses Allowed in the Public Use Zone to **include** the following row in the table under Commercial Uses with Class III Impacts:

Use Categories	Z-PU
Commercial Uses with Class III Impacts	
Recreational Vehicle (RV) Parks	N

16.10.080 Public Uses Allowed in the Public Use Zone (Z-PU)

Remove "Publicly Owned RV Parks" as a listed use in Table 16.10-5

16.32.020 Meaning of specific words and terms

Add the following definition:

Recreation RV Park. Means any area designated by the person establishing, operating, managing or maintaining the same for picnicking, overnight camping with a recreational vehicle by the general public or any segment of the public. "Recreation park" includes but is not limited to areas open to use free of charge or through payment of a tax or fee or by virtue of rental, lease, license, membership, association, or common ownership and further includes, but is not limited to, those areas divided into two or more lots, parcels, units or other interests for purposes of such use.

Addressing Caretaker Dwellings

The following Sections shall be amended:

16.02.030 Legal Framework

Amend the following section:

H.2 Other Approved Uses. Other uses may be approved through such processes as: (a) ministerial reviews; (b) administrative review procedures, (c) conditional use review, and (d) planned development review. Examples of these uses include, but are not limited to, the following: a bed and breakfast in a residential zone would require a ministerial review; a medical or dental clinic in the central business commercial zone (Z-CCM) would require an administrative review; ~~mini-storage units~~ an auto repair shop would require a conditional use hearing in a highway commercial zone (Z-HCC); a twenty-five or more acre commercial development in a highway commercial zone (Z-HCC) would require a planned development hearing; and, a large subdivision in the residential mixed density (Z-RM) zone would require a subdivision development process and hearing. Some of these procedures or reviews require public hearings and all require notice.

16.03.040 Commercial Uses

Amend the following sections:

B. ***Commercial Uses with Class II Impacts***

Add "Self-Serve Storage Facility" as a listed use

C. ***Commercial Uses with Class III Impacts***

Remove "Mini-Storage Units" as a listed use

I. ***Self-Serve Storage Facilities***

1. **Characteristics:** Self-Service Storage uses provide separate storage areas for individual or business uses. The storage areas are designed to allow private or secured access by the tenant for storing personal property.
2. **Accessory Uses:** Accessory uses may include security and leasing offices. ~~Living quarters for one resident manager per site are allowed~~ One caretaker dwelling may be allowed per site as an accessory use. For open air facilities with no permanent primary use structure or structure intended for occupancy, a Recreational Vehicle may be authorized as a caretaker dwelling as a temporary use, subject to a Temporary Use Permit. ~~Other living quarters are subject to the regulations for Residential Uses.~~ Use of the storage areas for sales, service and repair operations, or manufacturing is not considered accessory to the Self-Service Storage use. The rental of trucks or equipment is not considered accessory to a Self-Service Storage use.

16.05.050 Commercial Uses Allowed in the Residential Zones

Table 16.05-3 Commercial Land Uses Allowed in Residential Zones			
(See pages 10-12 of Chapter 16.03 for further details and listings regarding Commercial Uses)			
Use Categories	**Z-RL**	**Z-RM**	**Z-RH**
Commercial Uses with Class I Impacts:			
Offices with a floor area less than 1,000 sqft	**N**	**AR**	**AR**
Commercial Uses such as Stores (15,000 square feet or less) Selling Groceries, Printed Material, Books & Videos, Pharmaceuticals, Stationery, and Arts & Crafts; and Laundromats Tanning; Hair and Personal Care Services	**N**	**AR**	**AR**
Other Commercial Uses with a floor area less than 2,000 sqft, such as Parcel Service Stores, Photocopy and Blueprint Services, Photographic Studios, Convenient Stores; Restaurants, Cafes, Delicatessens (Food & Beverage Sales without drive up facilities), Tailors and Seamstresses	**N**	**AR**	**AR**
Commercial Uses with Class II Impacts:			
Other Commercial Uses with a floor area less than 2,000 sqft per use such as Educational, Arts and Training Facilities	**N**	**CU**	**AR**
Other Commercial Uses such as, Indoor Continuous Activities like Health Clubs, Gyms, Membership Clubs; Exhibition and Meeting Areas; Laundry Drop Off Facilities, Dry Cleaners; Lodges; Medical, Optical and Dental Labs; Stores (greater than 15,000 sqft) Selling Groceries, Pharmaceuticals, Printed Material, Stationery, Books, & Videos, Arts & Crafts; Tanning, Hair, and Personal Care Services	**N**	**CU**	**CU**
Other Commercial Uses such as, Hotels; Entertainment; Indoor Continuous Activities like Theaters, Bowling Alleys, Skate Rinks, and Game Arcades, Pool Halls, Indoor Firing Ranges; Food & Beverage Sales with drive up facilities; Financial Institutions (with drive up operations); Liquor Stores (OLCC License), Taverns & Bars, Stores (greater than 15,000 sqft) Selling, Leasing, or Renting Furniture, Appliances, Garden Supplies, Home Improvements, Household Products, Plants; Laundromats; Drive-Up/Drive-In/Drive-Through (Drive-Up Windows, Kiosks, ATM's, similar uses/facilities), and self-serve storage facilities.	**N**	**N**	**N**
Commercial Uses with Class III Impacts:			
Parking Lot (when not an accessory use)	**N**	**CU**	**AR**
Other Commercial Uses such as Auto Sales and Services, Commercial Centers, Breweries, Distilleries, and Wineries (less than 5,000 sq ft); Mini-Storage Units, Outdoor Amphitheaters Sales or Leasing of Consumer Vehicles Including Passenger Vehicles, Motorcycles, Light and Medium Trucks, & Other Recreational Vehicles, Shopping Mall.	**N**	**N**	**N**
Other Class III Uses	**N**	**N**	**N**
Key: OP = Outright Permitted Building Permit issued after a site review); MR = Ministerial Review; AR = Permitted with Administrative Review; CU = Conditional Use approval required (Chapter 16.21); N =Not permitted; * = Number of Units following an AR or CU designation. Also see Table 16.05-1: Characteristics of Major Land Use Actions Matrix -- Projects in a Residential Zone Requiring a Planned Development Review (Chapter 16.24).			

16.06.060 COMMERCIAL USES ALLOWED IN THE MIXED USE ZONE

Table 16.06-3: Commercial Land Uses Allowed in the Mixed Use Zone	
Land Uses	***Mixed Use Zone (Z-MU)***
(See pages 10-12 of Chapter 16.03 for further details and listings regarding Commercial Uses)	
Commercial Uses with Class I Impacts:	
Offices	**AR**
Commercial Uses such as Stores (15,000 square feet or less) Selling Groceries, Printed Material, Books & Videos, Pharmaceuticals, Stationery, and Arts & Crafts; and Laundromats Tanning; Hair and Personal Care Services	**AR**
Other Commercial Uses with a floor area less than 2,000 sqft, such as Parcel Service Stores, Photocopy and Blueprint Services, Photographic Studios, Convenient Stores; Restaurants, Cafes, Delicatessens (Food & Beverage Sales without drive up facilities), Tailors and Seamstresses	**AR**
Commercial Uses with Class II Impacts:	
Other Commercial Uses such as, Educational, Arts and Training Facilities; Indoor Continuous Activities like Health Clubs, Gyms, Membership Clubs; Exhibition and Meeting Areas; Laundry Drop Off Facilities, Dry Cleaners; Lodges; Medical, Optical and Dental Labs; Stores (greater than 15,000 sqft) Selling Groceries, Pharmaceuticals, Printed Material, Stationery, Books, Books, & Videos, Arts & Crafts, Hair, Tanning, and Personal Care Services, and self-serve storage facilities.	**AR**
Other Commercial Uses such as, Hotels; Entertainment; Indoor Continuous Activities like Theaters, Bowling Alleys, Skate Rinks, and Game Arcades, Pool Halls, Indoor Firing Ranges; Food & Beverage Sales with drive up facilities; Food Pods, Financial Institutions (with Drive Up Operations); Liquor Stores (OLCC License), Taverns & Bars; Stores (greater than 15,000 sqft) Selling, Leasing, or Renting Furniture, Appliances, Garden Supplies, Home Improvements, Household Products, Plants; Laundromats; Drive-Up/Drive-In/Drive-Through (Drive-Up Windows, Kiosks, ATM's, similar uses/facilities)	**CU**
Commercial Uses with Class III Impacts:	
Parking Lot (when not an accessory use) Parking Structure	**AR** **CU**
Commercial Uses such as Auto Sales and Services, Gas (Filling) Stations, Commercial Centers, Breweries, Distilleries, and Wineries (less than 5,000 sq ft); ~~Mini-Storage Units,~~ Outdoor Amphitheaters Sales or Leasing of Consumer Vehicles Including Passenger Vehicles, Motorcycles, Light and Medium Trucks, and Other Recreational Vehicles, Shopping Mall.	**CU**
Other Class III Uses	**N**
Key: OP = Outright Permitted (Building Permit issued after a site review); MR = Ministerial Review; AR = Permitted with Administrative Review; CU = Conditional Use approval required (Chapter 16.21); N =Not permitted; * = Number of Units following an AR or CU designation. Also see Table 16.06-1: Characteristics of Major Land Use Actions Matrix -- Projects in the Mixed Use Zone Requiring a Planned Development Review (Chapter 16.23).	

16.07.060 Commercial Uses Allowed in the Neighborhood Mixed-Use Zone (Z-NMU)

Table 16.07-3: Commercial Land Uses Allowed in the Neighborhood Mixed-Use Zone	
(See pages 10-12 of Chapter 16.03 for further details and listings regarding Commercial Uses)	
Commercial activity shall not occupy more than 5,000 square feet in any single structure.	
Use Categories	
Commercial Uses with Class I Impacts:	
Offices	**AR**
Commercial Uses such as Stores Selling Groceries, Printed Material, Books & Videos, Pharmaceuticals, Stationery, and Arts & Crafts; and Laundromats Tanning; Hair and Personal Care Services	**AR**
Other Commercial Uses, such as Parcel Service Stores, Photocopy and Blueprint Services, Photographic Studios, Convenient Stores; Restaurants, Cafes, Delicatessens (Food & Beverage Sales without drive up facilities), Tailors and Seamstresses	**CU**
Commercial Uses with Class II Impacts:	
Other Commercial Uses such as Educational, Arts and Training Facilities, Health Clubs Medical, Optical and Dental Labs, Food & Beverage Sales with drive up facilities; Drive-Up/Drive-In/Drive-Through (Financial Institutions with Drive Up Operations, Drive-Up Windows, Kiosks, ATM's, similar uses/facilities)	**CU**
Other Commercial Uses such as, Entertainment, Indoor Continuous Activities like Theaters, Gyms, Membership Clubs, Bowling Alleys, Skate Rinks, and Game Arcades; Pool Halls, Indoor Firing Ranges; Exhibition and Meeting Areas, Hotels, Laundry Drop Off Facilities, Liquor Stores (OLCC License) Taverns & Bars; Lodges; Stores Selling, Leasing, or Renting: Furniture, Appliances, Garden Supplies, Home Improvements, Household Products, Plants, self-serve storage facilities	**N**
Commercial Uses with Class III Impacts:	
Parking Lot (when not an accessory use)	**N**
Breweries (5,000 square feet or less)	**CU**
Gas (Filling) Stations	**CU**
Other Commercial Uses such as Auto Sales and Services, Commercial Centers, Breweries (larger than 5,000 square feet), Distilleries, and Wineries; ~~Mini-Storage Units,~~ Outdoor Amphitheaters Sales or Leasing of Consumer Vehicles Including Passenger Vehicles, Motorcycles, Light and Medium Trucks, & Other Recreational Vehicles, Shopping Mall.	**N**
Other Class III Uses	**N**

Key: OP = Outright Permitted (Building Permit issued after a site review); MR = subject to Ministerial Review; AR = Permitted with Administrative Review; CU = Conditional Use approval required (Chapter 16.21); N =Not permitted; * = Number of Units following an AR or CU designation. Also see Table 16.07-1: Characteristics of Major Land Use Actions Matrix -- Projects in a NMU Zone Requiring a Planned Development Review (Chapter 16.23).

16.08.060 Commercial Uses Allowed in the Commercial Zones

Table 16.08-3: Commercial Land Uses Allowed in Commercial Zones			
Land Uses	**Z-NCM**	**Z-CCM**	**Z-HCM**
(See pages 10-12 of Chapter 16.03 for further details and listings regarding Commercial Uses)			
Commercial Uses with Class I Impacts:			
Offices	**AR**	**OP**	**OP**
Commercial Uses such as Stores (15,000 square feet or less) Selling Groceries, Printed Material, Books & Videos, Pharmaceuticals, Stationery, and Arts & Crafts; and Laundromats Tanning; Hair and Personal Care Services	**AR**	**MR**	**MR**
Other Commercial Uses with a floor area less than 2,000 sqft, such as Parcel Service Stores, Photocopy and Blueprint Services, Photographic Studios, Convenient Stores; Restaurants, Cafes, Delicatessens (Food & Beverage Sales without drive up facilities), Tailors and Seamstresses	**AR**	**MR**	**MR**
Commercial Uses with Class II Impacts:			
Other Commercial Uses such as Educational, Arts and Training Facilities, Entertainment, Indoor Continuous Activities like Theaters, Health Clubs, Gyms, Membership Clubs, Bowling Alleys, Skate Rinks, and Game Arcades; Pool Halls, Indoor Firing Ranges; Exhibition and Meeting Areas, Food & Beverage Sales with drive up facilities, Financial Institutions (with Drive Up Operations), Hotels, Laundry Drop Off Facilities, Liquor Stores (OLCC License), Food Pods, Lodges; Medical, Optical and Dental Labs, Stores Selling, Leasing, or Renting Furniture, Appliances, Garden Supplies, Home Improvements, Household Products, Plants Commercial Uses such as Stores (greater than 15,000 square feet) Selling Groceries, Pharmaceuticals, Printed Material, Stationery, Books, & Videos, Hair, Tanning, and Personal Care Services, and Laundromats, and self-serve storage facilities	**N**	**AR**	**AR**
Drive-Up/Drive-In/Drive-Through (Drive-Up Windows, Kiosks, ATM's, similar uses/facilities)	**CU** (Assure pedestrian oriented access with vehicular access subordinated)		**AR**
Commercial Uses with Class III Impacts:			
Parking Lot (when not an accessory use	**N**	**AR**	**AR**
Breweries without food service (5,000 square feet or less)	**N**	**AR**	**AR**

Other Commercial Uses such as Auto Sales and Services, Commercial Centers; Breweries, Distilleries, and Wineries; Mini-Storage Units, Outdoor Amphitheaters Sales or Leasing of Consumer Vehicles Including Passenger Vehicles, Motorcycles, Light and Medium Trucks, and Other Recreational Vehicles, Shopping Mall.	**N**	**N**	**AR**
Other Class III Commercial Uses	**N**	**N**	**CU**
Key: OP = Outright Permitted (Building Permit issued after a site review); MR = Ministerial Review; AR = Permitted with Administrative Review; CU = Conditional Use approval required (Chapter 16.21); N =Not permitted; * = Number of Units following an AR or CU designation. Also see Table 16.08-1: Characteristics of Major Land Use Actions Matrix -- Projects in a Commercial Zone Requiring a Planned Development Review (Chapter 16.23).			

16.09.060 Commercial Uses Allowed in the Industrial Zone

Table 16.09-3: Commercial Land Uses Allowed in the Industrial Zone		
Land Uses	**Z-IND West of 5th Street**	**Z-IND East of 5th Street**
(See pages 9-12 of Chapter 16.03 for further details and listings regarding Commercial Uses)		
Commercial Uses with Class I Impacts:		
Offices	**N**	
Commercial Uses such as Stores (15,000 square feet or less) Selling Groceries, and Pharmaceuticals, Stationery, Arts & Crafts; and Laundromats (15,000 square feet or less)	**CU**	**N**
Commercial Uses such as Stores (15,000 square feet or less) Selling Printed Material, Books, & Videos; Tanning; Hair and Personal Care Services	**CU**	**N**
Other Commercial Uses such as Parcel Service Stores, Photocopy and Blueprint Services, Photographic Studios, Tailors and Seamstresses	**N**	
Other Commercial Uses such as Restaurants, Cafes, Delicatessens, Mini-Marts.	**CU**	
Commercial Uses with Class II Impacts:		
Other Commercial Uses such as Entertainment, Indoor Continuous Activities like Theaters, Membership Clubs, Bowling Alleys, Skate Rinks, and Game Arcades; Pool Halls, Exhibition and Meeting Areas, Hotels, Laundry Drop Off Facilities, Liquor Stores (OLCC License), Lodges; Stores Selling, Leasing, or Renting Furniture, Appliances, Garden Supplies, Home Improvements, Household Products, Plants); Stores (greater than 15,000 sqft) Selling Groceries, Pharmaceuticals, Printed Material, Stationery, Books, & Videos, Arts & Crafts, Hair, Tanning, and Personal Care Services, and Laundromats	**N**	
Other Commercial Uses such as Educational, Arts and Training Facilities, Gyms, Health Clubs, Indoor Firing Ranges; Fast Food & Beverage Sales (with drive up facilities), Food Pods, Financial Institutions (with Drive Up Operations), Medical, Optical and Dental Labs	**CU**	
Other Commercial Uses such as Drive-Up/Drive-In/Drive-Through (Drive-Up Windows, Kiosks, ATM's, similar uses/facilities)	**CU**	
Other Commercial Uses such as stand alone Large Scale Retail Stores (a minimum of 75,000 square feet of floor space), not including grocery stores or malls.	**N**	
Commercial Uses with Class III Impacts:		
Parking Lot (when not an accessory use)	**N**	
Breweries, Distilleries, and Wineries without food service	**AR**	
~~Mini-Storage Units (including RV Storage)~~ Self-Serve Storage Facilities	**OP**	
Other Commercial Uses such as Auto Sales and Services, Commercial Centers, Outdoor Amphitheaters Sales or Leasing of Consumer Vehicles Including Passenger Vehicles, Motorcycles, Light and Medium Trucks, and Other Recreational Vehicles, Shopping Mall.	**N**	

Other Commercial Uses such as Gas (Filling) Stations	**CU**
Other Class III Uses	**N**
Race Tracks (Auto, Horse, Dog, Bike, Motorcycle, Boat, etc.)	**CU**
Key: OP = Outright Permitted (Building Permit issued after a site review); MR = Ministerial Review; AR = Permitted with Administrative Review; CU = Conditional Use approval required (Chapter 16.21); N =Not permitted; * = Number of Units following an AR or CU designation. Also see Table 16.09-1: Characteristics of Major Land Use Actions Matrix -- Projects in an Industrial Zone Requiring a Planned Development Review (Chapter 16.23).	
For the most part, the only commercial uses allowed in the Industrial Zone are those that provide services primarily to the industries and the employees of the industries. In general, the exceptions are those commercial uses whose size and scope of operations are commensurate with industrial uses.	

16.10.060 Commercial Uses Allowed in the Public Use Zone (Z-PU)

Table 16.10-3: Commercial Land Uses Allowed in the Public Use Zone	
(See pages 10-12 of Chapter 16.03 for further details and listings regarding Commercial Uses)	
Land Uses	
Commercial Uses with Class I Impacts:	
Offices	**N**
Commercial Uses such as Restaurants, Cafes, Delicatessens (Food & Beverage Sales without drive up facilities), on public property as an accessory to a public use	**AR**
Commercial Uses such as Stores (less than 15,000 square feet) Selling Groceries, Pharmaceuticals, Printed Material, Stationery, & Videos, Arts & Crafts, Hair, Tanning, and Personal Care Services, and Laundromats	**N**
Other Commercial Uses such as Parcel Service Stores, Photocopy and Blueprint Services, Photographic Studios, Tailors and Seamstresses	**N**
Commercial Uses with Class II Impacts:	
Other Commercial Uses such as Educational, Arts and Training Facilities, Food & Beverage Sales (with drive up facilities)	**N**
Other Commercial Uses such as, Entertainment, Indoor Continuous Activities like Theaters, Health Clubs, Gyms, Membership Clubs, Bowling Alleys, Skate Rinks, and Game Arcades; Pool Halls, Indoor Firing Ranges; Exhibition and Meeting Areas, Financial Institutions (with Drive Up Operations), Hotels, Laundry Drop Off Facilities, Liquor Stores (OLCC License), Lodges; Medical, Optical and Dental Labs, Stores Selling, Leasing, or Renting Furniture, Appliances, Garden Supplies, Home Improvements, Household Products, Plants; Stores (greater than 15,000 sqft) Selling Groceries, Pharmaceuticals, Printed Material, Stationery, & Videos, Arts & Crafts, Hair, Tanning, and Personal Care Services, ~~and~~ Laundromats, and self-serve storage facilities	**N**
Drive-Up/Drive-In/Drive-Through (Drive-Up Windows, Kiosks, ATM's, similar uses/facilities)	**N**
Commercial Uses with Class III Impacts:	
Parking Lot (when not an accessory use)	**N**
Micro Breweries (5,000 square feet or less)	**N**
Other Commercial Uses such as Auto Sales and Services, Commercial Centers, Micro Breweries (larger than 5,000 square feet), Distilleries, and Wineries; ~~Mini-Storage Units,~~ Outdoor Amphitheaters Sales or Leasing of Consumer Vehicles Including Passenger Vehicles, Motorcycles, Light and Medium Trucks, & Other Recreational Vehicles, Shopping Mall.	**N**
Other Commercial Uses with class III Impacts.	**N**
Key: OP = Outright Permitted (Building Permit issued after a site review); MR = Ministerial Review; AR = Permitted with Administrative Review; CU = Conditional Use approval required (Chapter 16.21); N =Not permitted; * = Number of Units following an AR or CU designation. Also see Table 16.10-1: Characteristics of Major Land Use Actions Matrix -- Projects in a Public Use Zone Requiring a Planned Development Review (Chapter 16.23).	

16.19.110 Temporary Uses

A. Purpose

The purpose of these regulations is to provide standards for the establishment of temporary businesses and similar uses within the City.

B. Permitted Uses

Where allowed, the following temporary uses shall be permitted subject to the following limitations and requirements:

1. Tree and Fireworks

Christmas tree or fireworks sales are permitted subject to the following:

a. The sales shall be allowed in Commercial zones and those properties containing public or semi-public uses, such as schools, churches, regardless of the underlying zone.

b. Such uses located within Residential zones shall not operate beyond 9:00 PM.

c. The specific activity is located within the City for no more than 90 days in a calendar year.

d. The operator of a temporary use shall obtain all permits required by other agencies.

e. The required parking for the primary uses on the same lot is not reduced below Ordinance requirements and the use does not block driveways, driveway entrances, or parking aisles.

f. The activity conforms to all signage requirements in Chapter 16.18.

g. The activity conforms to all setback requirements of the zone.

h. The operator of a temporary use shall provide the required information, pay the applicable fee, obtain and display the required temporary business permit.

2. Commercial Activities

Amusement and recreational services and retail sales and services are permitted in all Commercial zones, subject to the following:

a. The business may be operated from a vehicle or temporary structure.

b. A site and/or address shall not contain more than one vendor at a time. For the purpose of this Section a “site and/or address” may contain several tax lots under the same or similar ownership, or contain one or more permanent business on a single or multiple parcels (e.g., a shopping center).

c. The business may occupy no more than 300 square feet of an area on a given site and/or address. An exemption to this limitation shall be permitted for amusement and carnival types of activities, provided, the use complies with the remaining provisions in this subsection.

d. The specific activity is located within the City for no more than 90 days in a calendar year.

e. The operator of a temporary use shall obtain all permits required by other agencies.

f. The required parking for the primary uses on the same lot is not reduced below Ordinance requirements and the use does not block driveways, driveway entrances or parking aisles.

g. The activity conforms to all signage requirements in Chapter 16.18.

h. The activity conforms to all setback requirements applicable to zone.

i. The operator of a temporary use shall provide the required information, pay the applicable fee, obtain and display the required temporary business permit.

3. Mobile Food Preparation Units

Mobile Food Preparation Units are permitted in all commercial zones, subject to the following:

a. Through a Temporary Use Permit, a maximum of one Mobile Food Preparation Unit may be permitted on a fully improved site and/or address defined in item 2.b of this subsection. If more than one Mobile Food Preparation Unit operates on a site and/or address, the use shall be subject to the regulation and permitting requirements for Food Pods in Section 16.08.100.E of the Lebanon Development Code.

b. The business may be operated from a vehicle, cart or trailer with wheels, or temporary structure. Except for electrical service, the vehicle or structure shall be self-contained. This requirement specifically prohibits connections to the City water and/or sewer system.

c. The Mobile Food Preparation Unit may occupy no more than 300 square feet of area and shall be kept in good repair and maintained in a safe and clean condition.

d. The Mobile Food Preparation Unit is limited to 365 days at a given site and/or address with an unlimited number of 365-day extensions. Each extension shall require a new permit.

e. The required parking for the primary uses on the same lot shall not be reduced below Ordinance requirements and the use does not block driveways, driveway entrances, parking aisles, walkways or sidewalks.

f. The activity conforms to all signage requirements in Chapter 16.18.

g. The activity conforms to all setback requirements applicable to the zone.

h. Prior to obtaining a temporary use permit, the applicant shall show evidence of obtaining the necessary permits from Linn County Department of Health Services for the operation of a Mobile Food Preparation Unit. In addition, the operator shall obtain all permits and required inspections by other agencies, including the Lebanon Fire District.

i. The Mobile Food Preparation Unit operator shall provide the required information, pay the applicable fee, and obtain and display the required temporary business permit.

4. Recreational Vehicle Caretaker Dwelling Associated with Certain Self-Service Storage Facilities.

A Recreational Vehicle may be used as a Caretaker Dwelling associated with certain Self-Serve Storage Facilities, subject to the following:

a. Eligible Facilities: A recreational vehicle may be utilized as a caretaker dwelling for open air facilities with no permanent structure intended for occupancy, subject to a Temporary Use Permit.

b. A maximum of one recreational vehicle may be utilized as a caretaker dwelling per site.

c. The recreational vehicle may only be used as a dwelling for the caretaker. No business activities associated with the self-service storage facility may occur within the vehicle.

d. Temporary Use Permit would be issued to the owner of the recreational vehicle with application submittal approval by the property owner.

e. Sewer and Water Service: The caretaker recreational vehicle shall be able to connect to a sewer system to appropriately discharge the grey and black water from the vehicle in a

manner that would not result in site contamination. Water service shall also be available for the recreational vehicle to connect for service while residing on the site.

f. Site Inspection: Prior to approval of a Temporary Use Permit, the Building Official shall inspect the site to ensure appropriate utility connections are available, and the recreational vehicle for the caretake can appropriately connect to the sewer system as required.

C. Other Temporary Uses

~~4~~1. Temporary Construction Facilities

Mobile offices, temporary power equipment and temporary structures used by personnel and to store equipment during construction, provided the structures are located on the construction site and not used as dwellings. There is no restriction as to the zoning.

~~5~~2. Yard Sales and Auctions

Yard sales or auctions in any zone, provided there are not more than four sales in a calendar year, with each sale not to exceed three consecutive days. Merchandise and signs shall remain on private property. This Section does not limit the number of times, or duration, that public agencies may conduct sales or auctions regard agency land, equipment, supplies or other materials.

~~**6. Additional Permitted Temporary Uses**~~

~~The City Council may, by resolution, authorize additional permitted temporary uses during a specific event or festival and set forth reasonable types of uses, appropriate zones for such uses, and any time restrictions the Council finds necessary to protect the health, safety and welfare of the public.~~

16.32.020 Meaning of Specific Words and Terms

Amend the following definition:

~~**MINI-WAREHOUSE:**~~ **SELF-SERVE STORAGE FACILITY:** A facility including ~~building or group of buildings in~~ a controlled-access and fenced compound that contains varying sizes of individual, compartmentalized~~,~~ ~~and controlled-access~~ stalls or lockers and limited ~~solely~~ to the storage of a customer's personal property, goods, ~~or~~ wares, or recreational vehicles, boats, or trailers. The facility could include a building or group of buildings, or an open air facility for the storage of recreational vehicles, boats, trailers, or similar items. A caretaker dwelling may be included as an accessory use. Also known as mini-storage facilities.

EXHIBIT B
LEBANON CITY COUNCIL FINDINGS
Planning File No. DCA-21-02

I. NATURE OF THE APPLICATION

This matter comes before the Lebanon City Council on the application of the City of Lebanon to amend the Lebanon Development Code.

II. BACKGROUND INFORMATION

The City wishes to amend the Lebanon Development Code to adopt code amendments related to prohibiting recreational vehicle parks in the City and permitting recreational vehicles as caretaker dwellings for certain commercial uses. Exhibit "A." contains the specific code amendments.

III. PUBLIC HEARINGS

A. Planning Commission Action

A public hearing was held on this application before the Lebanon Planning Commission on November 15, 2023. At that hearing, City Planning File No. DCA-23-01 was made a part of the record. Notice of the hearing was published consistent with the requirements in Chapter 16.20 of the Lebanon Development Code for a legislative review process. No objection was raised as to jurisdiction, conflicts of interest, or to evidence or testimony presented at the hearing.

At the conclusion of the hearing, the Planning Commission deliberated on the issue and voted to recommend the City Council adopt the proposed amendments to the Lebanon Development Code. The Commission found the proposed changes consistent with the applicable decision criteria.

B. City Council Action

The City Council conducted a public hearing to consider the application on December 13, 2023. At that hearing, City Planning File No. DCA-23-01 was made a part of the record. Notice of the hearing was published consistent with the requirements in Chapter 16.20 of the Lebanon Development Code for a legislative review process. No objection was raised as to jurisdiction, conflicts of interest, or to evidence or testimony presented at the hearing. At the conclusion of the hearing, the City Council found the proposed code amendments were consistent with the applicable decision criteria and approved the Ordinance.

IV. FINDINGS OF FACT-GENERAL

The Lebanon City Council, after careful consideration of the testimony and evidence in the record, adopts the following General Findings of Fact:

A. The applicant is the City of Lebanon.

B. The proposal includes amendments to the Lebanon Development Code related to prohibiting recreational vehicle parks in the City and permitting recreational vehicles as caretaker dwellings for certain commercial uses. Exhibit "A." contains the specific code amendments.

C. The decision to approve or deny shall be based on criteria contained in the Lebanon Development Code: Chapter 16.28 – Comprehensive Plan and Development Code Text Amendments.

V. APPLICATION SUMMARY

A. The proposal includes amendments to the Lebanon Development Code related to to prohibiting recreational vehicle parks in the City and permitting recreational vehicles as caretaker dwellings for certain commercial uses. Exhibit "A." contains the specific code amendments.

B. The Department sent out notice of the Code amendments to affected agencies and the Department of Land Conservation (DLCD). No comments have been received.

VI. CRITERIA AND FINDINGS

Chapter 16.28 of the Lebanon Development Code establishes the procedures and criteria for amending the text of both the Comprehensive Plan and Development Code.

A. Section 16.28.010 identifies the purpose of text amendments while Section 16.28.020 identifies the various types of amendments. The proposed changes involve only the text of the Development Code; amendments to the Comprehensive Plan are not required.

B. Section 16.28.030 identifies those agents authorized to initiate a text amendment. Conforming to provisions in this Section; staff initiated this action to comply with State requirements.

C. Section 16.28.040 requires the City Recorder to maintain records of all changes to the Development Code. This administrative process requires City compliance.

D. Sections 16.28.050 and 16.28.060 require all proposed amendments to the Comprehensive Plan Text shall be consistent with Oregon's Statewide Planning Goals, and with all adopted facility plans, including the Transportation System Plan. These Sections do not apply, as the proposal does not amend the Comprehensive Plan.

E. Section 16.28.070 requires Development Code amendments to be consistent with the City's Transportation System Plan.

FINDING: City staff has the authority to require applicants to conduct a Traffic Impact Study or Analysis for any new use (LDC Section 16.12.010.B and Section 16.20.110).

The work must indicate the proposed use complies with the adopted TSP or mitigation measures are available to ensure compliance. The amendments do not change these requirements. Further, the proposed amendment does not change functional classifications or performance standards for transportation routes.

F. Section 16.28.080 outlines the process for text amendments. This is a legislative action pursuant to Chapter 16.20 and requires hearings before both the Planning Commission and City Council. The Commission reviews the request and makes recommendation to the Council. The final decision on this matter rests with the City Council. For the record, the Commission hearing and process comply with the requirements for a legislative action.

G. Specific decision criteria are contained in Section 16.28.090. The City may approve a Development Code Amendment application if it satisfies the relevant Decision Criteria: Oregon Department of Land Conservation and Development administrative rules, applicable Statewide Planning Goals, applicable provisions of the Lebanon Comprehensive Plan, and any other applicable and relevant facility or special area plans, specific projects or goals adopted by the City.

FINDING: The following provides support for the criteria:

1. DLCD Administrative Rules – The Oregon Administrative Rules address a variety of issues including development on farmland, provisions for needed housing, requirements to expand an urban growth boundary, meeting natural resource planning requirements and similar issues. Based on the submitted staff review, and that the DLCD did not identify specific Administrative Rules for the City to consider, it is concluded that there are no Administrative Rules that are specifically applicable to the proposed Code amendment.

2. Statewide Planning Goals – Compliance with the Statewide Goals is noted as follows:

   Goal 1 - Citizen Involvement: The development code amendment process follows the legislative review process. A Post Acknowledgement Plan Amendment was filed with DLCD on October 16, 2023. A public notice was issued on October 25, 2023 to all interested parties and was published in the local newspaper to advertise the Planning Commission public hearing scheduled for November 17, 2021. At the November 15, 2023 Planning Commission meeting, the Planning Commission held a public hearing to solicit public comment and made a recommendation for Council to approve the proposed code amendments. In compliance with state law, a public notice will be issued 20 days prior to the City Council public hearing with information on how the public may participate in the City Council public hearing process and the recommendation made by the Planning Commission. The City Council public hearing is scheduled for December 13, 2023. By following the legislative review process, the City is consistent with the intent of the Goal. In addition to the legislative review process, the City Council initiated the amendment process based on direct community input during a Council meeting.

Goal 2, Land Use Planning: The proposal includes modifications to the development code to allow for a recreational vehicle to be utilized as a caretaker dwelling in certain circumstances, and to address Council's position to not permit recreational vehicle parks in the City. Goal 2 requires each local government to have and follow a comprehensive land use plan and implement regulations and allows for exceptions to one of the land use goals when it finds that unique circumstances warrant a local override of the statewide goal to create a better outcome. The proposal is consistent with the City's adopted Comprehensive Plan as justified in further findings, and no exceptions are proposed.

Goal 3, Agricultural Lands: The proposal does not involve or affect farmland. An exception to this goal is not required.

Goal 4, Forest Lands: The proposal does not involve or affect identified forestland. An exception to this goal is not required.

Goal 5, Open Spaces, Scenic and Historic Areas, and Natural Resources: The proposed changes to the Code do not alter existing regulations that affect identified historic, cultural, or natural resources within Lebanon. This code amendment does not eliminate code requirements and overlay zones regarding protection of historical or natural resources.

Goal 6, Air, Water and Land Resource Quality: Nothing in this amendment establishes or promotes land uses that adversely affect air, water, or resource quality issues. Within the code amendment, language is included to ensure the proposed use of a recreational vehicle as a caretaker dwelling would have the facilities available to avoid site contamination.

Goal 7, Natural Hazards: The Code amendment does not alter development requirements for natural hazard areas; these remain in force.

Goal 8, Recreational Needs: The proposed changes do not create uses that increase demand on or adversely affect recreational opportunities or involve land identified for recreational purposes.

Goal 9, Economic Development: The proposed amendments do not affect economic development activities within the City. The amendment provides an opportunity to reduce permitting requirements and increase opportunities for properties in transition to allow an interim use with minimal site improvements required. For recreational vehicle parks, it is determined that the economic benefit received from potential increase in property tax and transient lodging tax does not outweigh the potential costs associated with enforcement and police service increases. A City is authorized to identify specific uses to allow or prohibit for economic development to ensure a healthy workforce and quality of life for the community, supporting Goal 9.

Goal 10, Housing: The proposed amendments do not affect housing supply or location, or the City's ability to meet identified housing needs. The development code amendments would amend commercial activity in the city, and therefore not an

impact on the opportunity for housing development in the City.

Goal 11, Public Facilities and Services: Any new use allowed by the amendments must still comply with existing public facility requirements. The amendment does not affect the City's ability to provide public services.

Goal 12, Transportation: The proposed Code revisions do not create a significant increase in uses or activities beyond the existing anticipated build out that affect the City's transportation facilities. The proposed amendments do not result in an increase in uses that would result in a change in the adopted transportation plan, nor increase in use beyond the existing anticipated build out of the City's transportation system.

Goal 13, Energy Conservation: The amendments are neutral regarding energy matters.

Goal 14, Urbanization: The proposed amendments address urban uses within an urban environment.

Goals 15 to 19, Willamette River Greenway, Estuarine Resources, Coastal Shores, Beaches and Dunes, Ocean Resources: The proposals do not involve land within the Willamette Greenway or coastal areas.

In general, the proposed amendments are consistent with Goal provisions, or the amendments do not directly affect Goal provisions.

1. Lebanon Comprehensive Plan – The Comprehensive Plan consists of ten Chapters with each Chapter addressing specific land use issues such as housing or natural resources. Each Chapter is reviewed below:

   - Chapter 1: Introduction - This introductory Chapter describes the Comprehensive Plan, its relationship to the Statewide Land Use Goals, the Citizen Involvement program and key terminology. As introductory provisions, this Chapter does not directly apply to the proposed text amendments.

   - Chapter 2: Natural Environment – The Chapter address goals and policies related to the City's natural environment.

     This Chapter does not apply, as the Code amendments do not establish new regulations involving wetlands, wildlife habitat or other resources identified as requiring preservation or protection.

   - Chapter 3: Urbanization – This Chapter provides the basic framework for future urban development within the City, including public facility provisions and annexations.

     This Chapter does not apply, as the proposed Code amendments do not affect, reduce, or otherwise alter provisions for urban development within the

community. The code amendments are an alteration of commercial use regulations in areas in which commercial use is already permissible and does not change the zoning classification of any property.

- Chapter 4: Land Use – This Chapter details the goals and policies to assure the City provides different types of land within City limits that are suitable for a variety of uses.

  This Chapter does not directly apply as the proposal Code amendments do not modify or alter existing zoning designation of land, and thereby, the City's ability to provide different types of land, of suitable size and quantity, to meet a variety of development needs. However, the code amendments support:

  P-32: Require that upon development of property in a commercial or industrial zone that abuts a residential zone, the developer must provide an effective buffer to be used to minimize or mitigate impacts to the abutting residential property.

- Chapter 5: Economic Development – This Chapter addresses trends affecting both population growth and economic development.

  The amendments do not directly impact economic development. The amendments include clarification on the City's regulations regarding RV parks and provides an opportunity for recreational vehicles to be utilized as caretaker dwellings when associated with self-storage facilities with no structures. The code amendments do provide an expanded opportunity for transitional commercial uses with the storage facilities.

- Chapter 6: Housing – This Chapter establishes the City's Goals and Policies related to Housing.

  The code amendments regulate business operations of particular commercial uses in zones that authorize commercial uses. The code amendments will not impact or limit the production of housing.

- Chapter 7: Community Friendly Development & Preservation of Historic Resources - This Chapter focuses on policies creating a built environment suitable for the needs of a diverse population through a variety of uses scaled for the pedestrian, and capable of accommodating the automobile and mass transit.

  Policies in this Chapter focus on design elements to improve density and housing options while encouraging mixing or combining land uses (residential, commercial, industrial, public) to increase urban livability. Therefore, this Chapter does not directly apply to the request.

- Chapter 8: Transportation – This Chapter addresses the transportation needs of the City with an emphasis of creating a variety of transportation options for pedestrians, bicyclists, vehicles and mass transit.

The amendments do not change functional classifications or performance standards for transportation routes.

- Chapter 9: Public Facilities and Service - The City is required by State law to plan and develop a timely, orderly, and efficient arrangement of public facilities and services to serve development.

  Uses allowed by the amendments do not prohibit or restrict the ability to provide necessary public services.

- Chapter 10: Plan Implementation, Amendment, and Land Use Planning Coordination – This Chapter establishes procedures for amending the Comprehensive Plan Map and Zoning Map.

  This Chapter does not apply as the proposal amends only the Development Code text; there are no changes to the Comprehensive Plan or Zoning maps.

2. Other Facility Plans or Projects - In reviewing other documents, Department staff did not identify any plans or policies that apply to the proposed Code amendments.

VII. CONCLUSION

Based on the above findings, the City Council concludes the proposed amendments to the Development Code are consistent with the applicable decision criteria.

Agenda Item 2

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MEMORANDUM

Community Development

To: Mayor Jackola and City Council
Date: November 28, 2023
From: Kelly Hart, Community Development Director
Subject: Psilocybin Follow-up Discussion

I. INTRODUCTION

In October 2023, a work session was held with the City Council to review the Oregon Health Authority regulatory framework for the permitting and operation of psilocybin facilities. Throughout the work session, a number of questions were posed requiring follow-up, as well as a request to see a map of "exclusion areas" per State regulations. At the conclusion of the work session, Council directed staff to prepare the necessary materials to forward an opt-out/prohibition ballot measure to the voters, and develop a time, place, and manner ordinance in the circumstance the voters choose to authorize psilocybin facilities.

The purpose of this agenda report is to provide additional information based on the outstanding questions, provide the requested maps, and identify a general framework for the time, place, and manner (TPM) ordinance.

II. CURRENT REPORT

Additional research has been conducted to address the outstanding questions posed by the City Council at the work session. Below includes the documented questions, and responses:

1. What does 200 grams of psilocybin analyte look like?

   Based on research, one gram of dried mushroom contains approximately 10 milligrams (mg) of psilocybin. There are 200,000 mg in 200 grams of dried mushrooms, which is the equivalent of 1,600 cups of dried mushrooms. As a visual representation this would be approximately a 10 x 10 grid of one gallon milk jugs, or a 5ft x 5ft x 1ft cube.

2. What is a standard dose of psilocybin?

   Per Oregon Administrative Rules (OARs), a maximum allowed dose per session (including initial and secondary if requested as part of the same session) is 50 mgs. The minimum duration of administration sessions is determined based on the dosing:

- Clients consuming less than 2.5 mg of analyte – minimum duration of 1 hour
- 2.5-5 mg – 1 hour
- 5-10 mg – 2 hours
- 10-25 mg – 4 hours
- 25-35 mg – 5 hours
- 35-50 mg – 6 hours

3. What is the cost for psilocybin and administration sessions?

   The cost of the psilocybin product is set by the manufacturers, plus a 15% State tax. The cost for administration services is set by each individual service center or facilitator (if an independent contractor). Below is an example of pricing structures from four service centers:

   - Inner Trek – Portland
     - $850 for group administration session
     - $1,500 for individual administration session
     - Scholarships/Financial Assistance available on a limited basis
     - https://www.instagram.com/reel/C0K28ybN2p8/?igshid=MzRlODBiNWFlZA%3D%3D (Instagram video from the Oregonian to show the interior of a facility)
   - Omnia Group – Ashland
     - $900 room rental + $5.50/mg of psilocybin + 15% tax, plus facilitator fee ($1,000 - $2,500)
       - Starting price – approximately $2,000 per session
   - EPIC Healing – Eugene
     - Facilitator cost ranges from $1,600 – $2,800
     - Psilocybin product cost (all in, including manufacturer cost, facility cost, and tax) – 10mg-$172.50, 15mg-$258.75, 20mg-$345.00, 25mg-$431.25, 30mg-$517.50, 35mg-$603.75
   - Inner Guidance Services – Albany
     - Facilitation sessions range from $999 - $2,200 based on dose administered and duration of scheduled session
     - Psilocybin product cost – 10mg-$57.86, 25mg-$179.69
     - Scholarships/Financial Assistance available on a limited basis

4. How is the 15% tax on psilocybin allocated?

   The entirety of the 15% tax is remitted to the State. Per the ORS, the "15% tax is administered to "further the purposes of (a) providing the [Oregon Health] authority with moneys sufficient to administer and enforce the psilocybin program, (b) not providing the authority with moneys that exceed, together with fees collected under ORS 475A.210-722, the cost of administering and enforcing."

5. What are the restrictions for people eligible to use psilocybin?

   Psilocybin may only be administered to persons 21 years or older and does not require a prescription or medical referral. As part of the required preparation session, prior to the administration of the psilocybin, the facilitator will ask a number of screening questions to help determine whether the client should move forward with the administration session.

6. Is there anything in the State regulations that restricts a client's future use of the service center facilities if they fail to follow the support or transportation plans?

   No. The OARs do not restrict client patronage. Individual service centers have the ability to set their own standards and may choose to refuse service if protocols are not followed. It is in the Service Center's best interest to ensure the clients follow the support and transportation plan to maintain their license in good standing.

7. Would the City Council sign off on psilocybin licenses in a similar system to OLCC liquor licenses?

   Chapter 5.10 of the LMC establishes the City procedures for liquor license recommendations. An application is submitted, the City investigates, and applications receiving a favorable recommendation from the reporting departments associated with the city investigation will be scheduled as a consent calendar item on the city council agenda. As part of a TPM ordinance, the City can choose to set up a similar process for psilocybin applications.

8. Is there a measurement of intoxication while under the influence of psilocybin?

   According to the Police Department, there is no way to quantify psilocybin impairment since it is essentially a food that you digest. Psilocybin impairment should be quite noticeable in a person but not as easy to classify like when you see a drunk person. It is assumed that nobody with an untrained eye could look at someone and say, "they look like they're on psilocybin." Strange/odd behavior will be prevalent because the person will likely be confused and struggle with memory issues. Synesthesia (see sounds/hear colors) is common which will make communication difficult and may lead to paranoia. A dazed and confused appearance will be the most common, but again not to the point someone will classify it.

   Per ORS 813.010, a person is defined under the influence of intoxicant for the purposes of a DUI as:

   - Has 0.08 percent of more by weight of alcohol in the blood;
   - Is under the influence of intoxicating liquor, cannabis, psilocybin, a controlled substance or inhalant;

- Is under the influence of any combination of intoxicating liquor, cannabis, psilocybin, a controlled substance or inhalant; or
- Within two hours after driving a vehicle and without consuming alcohol in the intervening time period, 0.08 percent or more by weight of alcohol in the blood system.

Time, Place and Manner Ordinance Framework – At the work session, a question was posed regarding what such an ordinance would address. Staff is still in the initial research phase for the development of a TPM Ordinance. Below is a brief overview of the initial proposed framework, based on initial Council input, and analysis of adopted Ordinances from other cities.

Time:

- Establish operation time limits in consultation with the police department and applicant through a conditional use permit.
- Consider stipulating that there shall be no overnight stays at the service center, restricting the "resort style" operation.

Place:

- State restrictions:
  - 1,000 feet from public/private schools that provide K-12 education
- Additional Buffer restrictions:
  - 1,000 feet from commercial childcare facilities (Kinder Care, Boys and Girls Club, etc.)
  - 1,000 feet between psilocybin service centers or production facilities
- Zoning Restrictions:
  - Only authorize in the Highway Commercial and the Industrial Zones
    - Prohibited in all residential zones, Mixed Use, Neighborhood Commercial, and Central Business (downtown) zones.

Manner:

- Establish defined criteria for "safe release of clients"
  - "Psilocybin Service Centers shall not release individuals after an administration session unless they are released into the care of a Sober Adult. "Sober Adult" means an individual at least 21 years of age who has not undergone any psilocybin treatment for at least 24 hours and does not appear to be under the influence of any other intoxicant (intoxicating liquor, cannabis, psilocybin, a controlled substance, or an inhalant.)"
- Restrict Weapons/Firearms
  - "Weapons and Firearms Prohibited. Psilocybin business owners shall enact and enforce rules prohibiting clients from bringing or possessing any weapons or firearms on the premises during the client's treatment session. "Weapon" is defined as follows: any firearm; any knife having a blade that

projects or swings into position by force of a spring or by centrifugal force and commonly known as a switchblade knife, any dirk, any dagger, or any ice pick; sling shot, metal knuckles, or nunchaku sticks; or any similar instrument by the use of which injury could and is designed to be inflicted upon the person or property of any other person."
    - This would not restrict psilocybin facilities from maintaining weapons/firearms on-site but would prohibit clients from bringing them to the facility.

- Liability Insurance Requirements
    - "Liability Insurance Required. Psilocybin Service Centers shall secure and maintain commercial general and professional liability insurance with limits of not less than $2 million per incident and $3 million aggregate for claims arising out of, but not limited to, bodily injury and property damage incurred in the course of operating in the City. The insurance may not include an exclusion for psilocybin-related claims."

- Require a Conditional Use Permit and a Psilocybin License

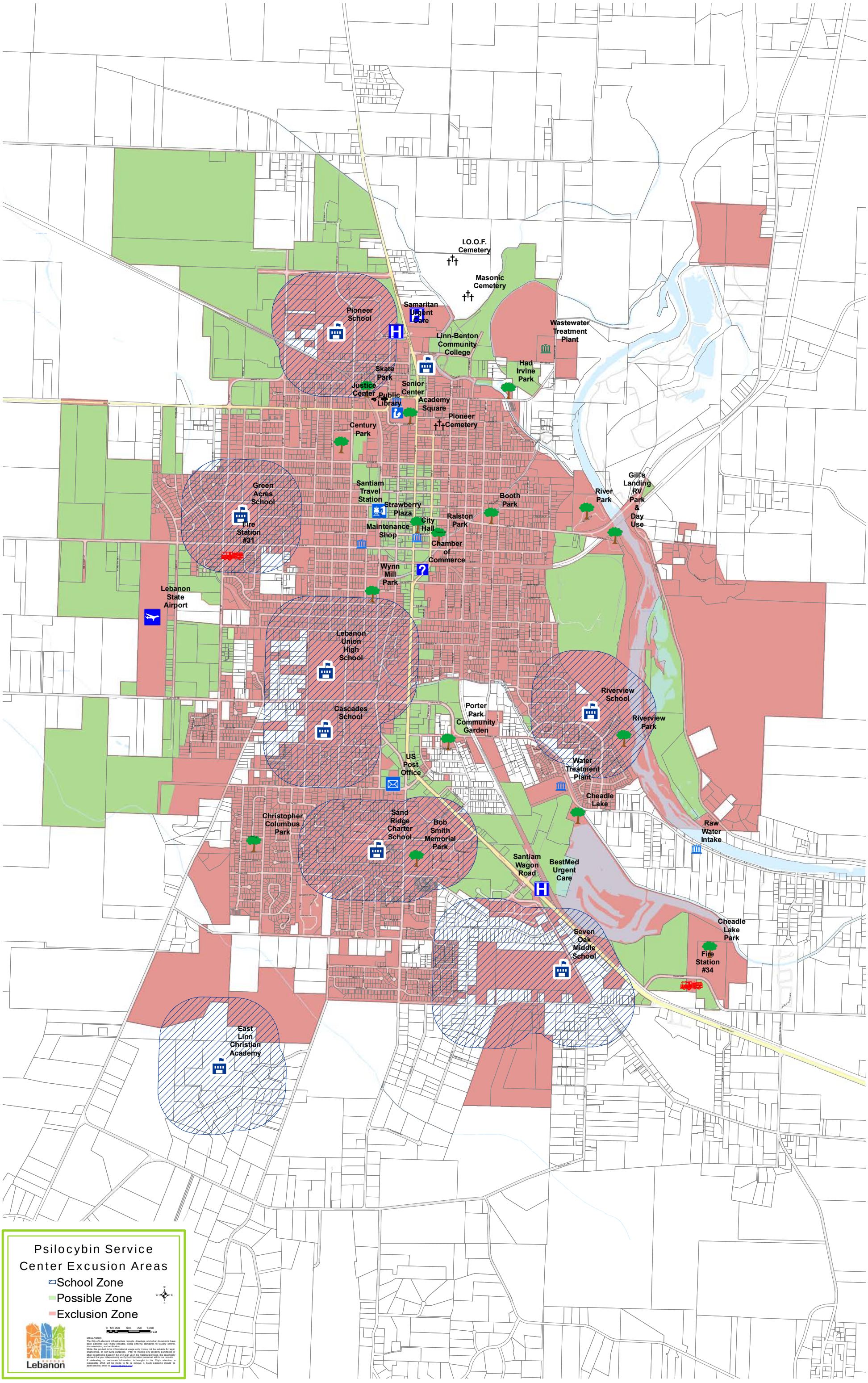
Included as attachments are two maps: (1) a map identifying all the exclusion areas based on the State regulations, and (2) a map identifying all the exclusion areas based on current proposed TPM ordinance language.

Staff will continue to research and evaluate the appropriate TPM restrictions and present a draft Ordinance to the Planning Commission by mid spring 2024, with the goal of presenting the Ordinance for Council consideration by early summer to provide an extended review period prior to the adoption time frame of October 2024.

III. RECOMMENDED ACTION

Receive and file the report. Provide staff with any additional direction.

State Exclusion Areas



Time, Place and Manner Ordinance Exclusion Areas

I.O.O.F. Cemetery
Masonic Cemetery
Samaritan Urgent Care
Pioneer School
Wastewater Treatment Plant
Linn-Benton Community College
Had Irvine Park
Skate Park
Senior Center
Public Library
Academy Square
Justice Center
Pioneer Cemetery
Century Park
Boys and Girls Club
Santiam Travel Station
Strawberry Plaza
Maintenance Shop
City Hall
Ralston Park
Booth Park
River Park
Gill's Landing RV Park & Day Use
Green Acres School
Fire Station #31
Chamber of Commerce
Wynn Mill Park
Lebanon State Airport
Lebanon Union High School
Cascades School
Riverview School
Porter Park Community Garden
Riverview Park
US Post Office
Water Treatment Plant
Cheadle Lake
Raw Water Intake
Christopher Columbus Park
Sand Ridge Charter School
Bob Smith Memorial Park
Santiam Wagon Road
BestMed Urgent Care
Kidco
Seven Oak Middle School
Cheadle Lake Park
Fire Station #34
East Linn Christian Academy

Psilocybin Time, Place, & Manner Ordinance

- School/Day Care Zone
- TPM Allowed
- TPM Exluded

Lebanon

0 125 250 500 750 1,000 Feet

DISCLAIMER:
The City of Lebanon's infrastructure records, drawings, and other documents have been gathered over many decades, using differing standards for quality control, documentation, and verification.
While this product is for informational usage only, it may not be suitable for legal, engineering, or surveying purposes. Prior to making any property purchases or other investments based in full or in part upon the material provided, it is specifically advised that you independently verify the information contained within our records.
If misleading or inaccurate information is brought to the City's attention, a reasonable effort will be made to fix or remove it. Such concerns should be addressed by email to gis@cityoflebanon.org.

File: V:\Maps\SpecialProjects\PsilocybinTPM_11x17.pdf

Updated: October 26, 2023

Agenda Item 3

925 S. Main Street
Lebanon, Oregon 97355
TEL: 541.258.4923
www.lebanonoregon.gov

MEMORANDUM

Engineering Services

To: Mayor Jackola and City Council

Date: December 1, 2023

From: Ron Whitlatch, Engineering Services Director

Subject: **OPRD – Recreational Trails Program Grant Agreement / RTP22-011**
West River Trail Extension - River Park
Project No. 22713

I. INTRODUCTION

The city was awarded the 2022 Recreational Trails Program Grant that a was applied for in October 2022 for the West River Trail Extension Project. The project includes constructing approximately 2,160 feet of a ten-foot-wide asphalt multi-use trail extending to the West River Trail to the north. The proposed project is located adjacent to River Park on property the City of Lebanon acquired from the City of Albany in March of 2023.

The total project cost is estimated at $297,486.00. The agreement provides funds from OPRD not exceeding $158,943.00 (53.43 percent) leaving the city's match at $138,543.00 (46.57%). Staff intends to use $22,300.00 in donated funds and Parks SDCs for the remaining $116,243.00.

II. RECOMMENDATION

This memo requests a City Council motion to accept the grant and appoint Ron Whitlatch, Interim City Manager as an authorized signer on the Agreement and all other documents related to Grant Number RT22-011.

This document has been approved by the Lebanon City Council and signed on this 13th day of December 2023.

Kenneth E. Jackola, Mayor ☐

Michelle Steinhebel, Council President ☐

ATTESTED BY:

Julie Fisher, City Recorder

Oregon Parks and Recreation Department

Recreational Trails Program Grant Agreement

THIS AGREEMENT ("Agreement") is made and entered into by and between the State of Oregon, acting by and through its Oregon Parks and Recreation Department, hereinafter referred to as "OPRD" or the "State" and the **City of Lebanon**, hereinafter referred to as the "Grantee". Together, State and Grantee are hereinafter referred to as the "Parties" or individually as a party.

OPRD Grant Number:	**RT22-011**	
Project Title:	**West River Trail Extension**	
Project Description:	Construct an approximately 2,160-foot-long by 10 feet wide asphalt multi-use trail, extending the West River Trail to the north. Install benches, wayfinding signage, and garbage containers. The Project is further described in the Project Scope and Budget included as Attachment B.	
Grant Funds / Maximum Reimbursement:	**$158,943.00**	**(53.43%)**
Grantee Match Participation:	**$138,543.00**	**(46.57%)**
Total Project Cost:	**$297,486.00**	

Grant Payments / Reimbursements: Grant Funds are awarded by the State and paid on a reimbursement basis, and only for the Project described in this Agreement, and the original Project Scope and Budget included as Attachment B. To request reimbursement, Grantee shall use OPRD's online grant management system accessible at oprdgrants.org. The request for reimbursement shall include documentation of all project expenses including, when applicable, documentation confirming project invoices have been paid. The request must also include documentation for all match expenses, as eligible under and in compliance with the rules, policies, and guidelines for the Recreational Trails Program, which may be found at https://www.oregon.gov/oprd/GRA/Pages/GRA-rtp.aspx. Grantee may request reimbursement as often as monthly for expenses incurred to date. Grantee must request reimbursement at least every six months. Grantee may request advance payments, which OPRD, in its sole discretion, may provide.

State Fiscal Year-End Request for Reimbursement: Grantee must submit a Progress Report and a Reimbursement Request to OPRD for all Project expenses, if any, accrued up to June 30, of each state fiscal year. The State Fiscal Year-End Reimbursement Request must be submitted to OPRD by August 15th of each year, 45 days after June 30.

Reimbursement Terms and Matching Funds: The total project cost is estimated at **$297,486.00**. Subject to and in accordance with the terms and conditions of this Agreement, OPRD shall provide Grant Funds to Grantee for the project in an amount not to exceed **$158,943.00** or **53.43** percent of the total eligible project costs, whichever is less, for eligible costs. Grantee shall provide Match Funds for the Project in an amount not less than **46.57** percent of the total eligible Project Costs.

Progress Reports: After OPRD issues the Notice to Proceed, Grantee shall report to OPRD regarding the status and progress of the project on a quarterly basis, as follows:

For the period beginning January 1, ending March 31:	report is due April 30
For the period beginning April 1, ending June 30:	report is due July 31
For the period beginning July 1, ending September 30:	report is due October 31
For the period beginning October 1, ending December 31:	report is due January 31

Progress Reports shall be submitted using OPRD's online grant management system accessible at oprdgrants.org.

Agreement Period: The effective date of this Agreement is the date on which it is fully executed by the Parties unless noted otherwise on the Notice to Proceed letter. Unless otherwise terminated or extended, the Project shall be completed ("Project Completion Date") by **December 31, 2025.** This Agreement shall expire on the date final

reimbursement payment is made by OPRD to Grantee. No grant funds shall be available for any expenditures incurred after the Project Completion Date.

Retention: OPRD shall disburse up to 75 percent of the Grant Funds to Grantee on a cost reimbursement basis upon approval of invoices submitted to OPRD. OPRD will disburse the remaining Grant Funds owing to Grantee under this Agreement, if any, upon approval by OPRD of the completed Project, the final progress report, and the final reimbursement request.

Final Report: Grantee must submit a final progress report, a final reimbursement request and digital pictures of the completed project site to OPRD within 45 days of the Project Completion Date. OPRD may, at its sole discretion, conduct appropriate inspections of the Project within a reasonable time following submission of the Final Report. Grantee shall assist OPRD and cooperate fully to the satisfaction of OPRD with all inspections that OPRD conducts.

Publicity: Grantee shall make every effort to acknowledge and publicize OPRD's participation and assistance with the Project. Grantee agrees to place a sign(s) at the Project location acknowledging program support. Grantee also agrees to maintain the signs throughout the useful life of the Project.

Agreement Documents: Included as part of this Agreement are:

Attachment A: Standard Terms and Conditions
Attachment B: Project Scope and Budget
Attachment C: Form FHWA-1273
Attachment D: Federal Requirements
Attachment E: Insurance Requirements
Attachment F: Inadvertent Discovery Plan for Cultural Resources

In the event of a conflict between two or more of the documents comprising this Agreement, the language in the document with the highest precedence shall control. The precedence of each of the documents is as follows, listed from highest precedence to lowest precedence: this Agreement without Attachments; Attachment A; Attachment D, Attachment C, Attachment E, Attachment F, and Attachment B.

Contractor or Sub-Recipient Determination: In accordance with the State Controller's Oregon Accounting Manual, policy 30.40.00.102, OPRD's determination is that:

[X] Recipient is a sub-recipient; OR [ ] Recipient is a contractor

Federal Award Identification information required by 2 CFR 200.332(a)(1):

(i) Subrecipient Name: **City of Lebanon**
(ii) Subrecipient Unique Entity Identifier (UEI): **CYQDGL51W7A8**
(iii) Federal Award Identification Number (FAIN): **41RT22011**
(iv) Federal Award Date: **November 20, 2023**
(v) Sub-Award Period of Performance Start and End Date: **Date of execution – December 31, 2025**
(vi) Total Amount of Federal Funds Obligated by this Agreement: **$158,943.00**
(vii) Total Amount of Federal Funds Obligated to the Subrecipient by the pass-through entity including this Agreement: **$158,943.00**
(viii) Total Amount of Federal Award committed to the Subrecipient by the pass-through entity: **$158,943.00**
(ix) Federal Award Project Description: **Construct an approximately 2,160-foot-long by 10 feet wide asphalt multi-use trail, extending the West River Trail to the north. Install benches, wayfinding signage, and garbage containers.**
(x) Name of Federal awarding agency, pass-through entity, and contact information for awarding official of the pass-through entity:
  a. Name of Federal awarding agency: **U.S. Department of Transportation Federal Highway Administration**
  b. Name of pass-through entity: **Oregon Parks and Recreation Department**
  c. Contact information for awarding official of the pass-through entity: **Lisa Sumption, Director, (503)986-0660**
(xi) CFDA Number and Name: **20.219, Recreational Trails Program**
(xii) Is Award Research and Development (R&D): **No**
(xiii) Indirect cost rate for the Federal Award: **0%**

Contact Information: A change in the contact information for either party is effective upon providing notice to the other party:

Grantee Administrator	Grantee Billing Contact	OPRD Contact
Ron Whitlatch	Ron Whitlatch	Jodi Bellefeuille, RTP Coordinator
City of Lebanon	City of Lebanon	Oregon Parks & Rec. Dept.
925 Main Street	925 Main Street	725 Summer ST NE STE C
Lebanon, OR 97355	Lebanon, OR 97355	Salem, OR 97301
541-258-4269	541-258-4269	503-856-6316
rwhitlatch@ci.lebanon.or.us	rwhitlatch@ci.lebanon.or.us	jodi.bellefeuille@oprd.oregon.gov

THE PARTIES, by execution of this Agreement, hereby acknowledge that each Party has read this Agreement, understands it, and agrees to be bound by its terms and conditions.

GRANTEE

By:_____
Signature

_____
Printed Name

_____
Title

_____
Date

Oregon Department of Justice (ODOJ) approved for legal sufficiency for grants exceeding $150,000:

Approved for legal sufficiency by Sr. AAG Nathan Karman
By: *by email dated May 15, 2023*
ODOJ Authorization

STATE OF OREGON
Acting By and Through Its
OREGON PARKS AND RECREATION DEPT.

By:_____
Stefanie Coons, Deputy Director of Administration

_____
Date

APPROVAL RECOMMENDED

By:_____
Michele Scalise, Manager, Grants & Community Programs

_____
Date

By:_____
Jodi Bellefeuille, RTP Grant Coordinator

_____
Date

Attachment A – Standard Terms and Conditions

Oregon Parks and Recreation Department
Recreational Trails Program Grant Agreement

1. **Compliance with Law:** Grantee shall comply with all federal, state and local laws, regulations, executive orders and ordinances applicable to the Agreement or to implementation of the Project, including without limitation, Title 23 U.S.C Section 206, Federal Highway Administration (FHWA) Recreational Trails Program Guidance, FHWA Form-1273 (Attachment C), OPRD's Recreational Trails Program Grant Manual (as updated), OPRD's Grant Reporting and Reimbursement Instructions (as updated), 2 CFR Part 200, and federal, state, and local program guidelines. This section shall survive termination or expiration of this Agreement.

2. **Insurance; and Workers Compensation Laws:** All employers, including Grantee, that employ subject workers who provide services in the State of Oregon shall comply with ORS.656.017 and provide the required Worker's Compensation coverage, unless such employers are exempt under ORS 656.126. Employer's liability insurance with coverage limits of not less than $500,000 must be included. Grantee shall ensure that it and each of its subgrantee(s), contractor(s), and subcontractor(s) complies with the insurance requirements provided in Attachment E.

3. **Amendments:** This Agreement may be amended only by a written amendment to the Agreement, executed by the Parties.

4. **Expenditure Records:** Grantee shall document, maintain and submit records to OPRD for all Project expenses in accordance with generally accepted accounting principles, and in sufficient detail to permit OPRD to verify how Grant Funds were expended. These records shall be retained by the Grantee for at least six years after the Agreement terminates. If there are unresolved audit questions at the end of the six-year period, Grantee shall retain the records until the questions are resolved. The Grantee agrees to allow OPRD, Oregon Secretary of State auditors, the United States Department of Transportation, the Federal Highway Administration and any of their duly authorized representatives access to all records related to this Agreement for audit and inspection and monitoring of services. Such access will be during normal business hours, or by appointment. Grantee shall ensure that each of its subgrantees and subcontractors complies with these requirements. This section shall survive termination or expiration of this Agreement.

5. **Equipment:** Equipment is defined as tangible personal property having a useful life of more than one year and per-unit acquisition cost of $5,000 or more. Equipment pre-approved to be purchased with Recreational Trails Program Grant funds, if any, must be used as described in the Project Agreement throughout the Equipment's useful life and in accordance with 2 CFR 200.313. The Grantee will maintain Equipment records in compliance with 2 CFR 200.313(d)(1). Within 90 days of purchase the Equipment records must be submitted to OPRD using the "RTP Equipment Record Form", available on the OPRD website. The Grantee will take physical inventory of the Equipment at least every two years and submit the updated Equipment records to OPRD until the Equipment value is below $5,000 or the Equipment is disposed of. The Grantee will not sell or dispose of the Equipment without prior approval from OPRD and the Federal Highway Administration. This section shall survive termination or expiration of this Agreement.

6. **Use of Project Property:** Grantee warrants that the land within the Project boundary shall be dedicated and used for a period of no less than 25 years from the completion of the Project. Grantee agrees to not change the use of, sell, or otherwise dispose of the land within the Project boundary, except upon written preapproval by OPRD. If the Project is located on land leased from the federal government, the lease shall run for a period of at least 25 years after the date the Project is

completed. If the Project is located on land leased from a private or public entity, other than the federal government, the lease shall run for a period of at least 25 years after the date the Project is completed, unless the lessor under the lease agrees that, in the event the lease is terminated for any reason, the land shall continue to be dedicated and used as described in the Project Application for a period of at least 25 years after the date the Project is completed. This section shall survive termination or expiration of this Agreement.

7. **Inspection of Equipment and Project Property:** Grantee shall permit authorized representatives of State, the Secretary of State, or their designees to perform site reviews of the Project, and to inspect all Equipment, real property, facilities, and other property purchased by Grantee as part of the Project, and any transportation services rendered by Grantee.

8. **Public Access:** The Grantee shall allow open and unencumbered public access to the completed Project to all persons without regard to race, color, religious or political beliefs, sex, national origin or place of primary residence. This section shall survive termination or expiration of this Agreement.

9. **Contribution:** If any third party makes any claim or brings any action, suit or proceeding alleging a tort as now or hereafter defined in ORS 30.260 ("Third Party Claim") against a party (the "Notified Party") with respect to which the other party ("Other Party") may have liability, the Notified Party must promptly notify the Other Party in writing of the Third Party Claim and deliver to the Other Party a copy of the claim, process, and all legal pleadings with respect to the Third Party Claim. Either party is entitled to participate in the defense of a Third Party Claim, and to defend a Third Party Claim with counsel of its own choosing. Receipt by the Other Party of the notice and copies required in this paragraph and meaningful opportunity for the Other Party to participate in the investigation, defense and settlement of the Third Party Claim with counsel of its own choosing are conditions precedent to the Other Party's liability with respect to the Third Party Claim.

   With respect to a Third Party Claim for which the State is jointly liable with the Grantee (or would be if joined in the Third Party Claim), the State shall contribute to the amount of expenses (including attorneys' fees), judgments, fines and amounts paid in settlement actually and reasonably incurred and paid or payable by the Grantee in such proportion as is appropriate to reflect the relative fault of the State on the one hand and of the Grantee on the other hand in connection with the events which resulted in such expenses, judgments, fines or settlement amounts, as well as any other relevant equitable considerations. The relative fault of the State on the one hand and of the Grantee on the other hand shall be determined by reference to, among other things, the parties' relative intent, knowledge, access to information and opportunity to correct or prevent the circumstances resulting in such expenses, judgments, fines or settlement amounts. The State's contribution amount in any instance is capped to the same extent it would have been capped under Oregon law if the State had sole liability in the proceeding.

   With respect to a Third Party Claim for which the Grantee is jointly liable with the State (or would be if joined in the Third Party Claim), the Grantee shall contribute to the amount of expenses (including attorneys' fees), judgments, fines and amounts paid in settlement actually and reasonably incurred and paid or payable by the State in such proportion as is appropriate to reflect the relative fault of the Grantee on the one hand and of the State on the other hand in connection with the events which resulted in such expenses, judgments, fines or settlement amounts, as well as any other relevant equitable considerations. The relative fault of the Grantee on the one hand and of the State on the other hand shall be determined by reference to, among other things, the parties' relative intent, knowledge, access to information and opportunity to correct or prevent the circumstances resulting in such expenses, judgments, fines or settlement amounts. The Grantee's contribution amount in any instance is capped to the same extent it would have been capped under Oregon law if it had sole liability in the proceeding.

   Grantee shall take all reasonable steps to cause its contractor(s) that are not units of local government as defined in ORS 190.003, if any, to indemnify, defend, save and hold harmless the State of Oregon and its officers, employees and agents ("Indemnitee") from and against any and all

claims, actions, liabilities, damages, losses, or expenses (including attorneys' fees) arising from a tort (as now or hereafter defined in ORS 30.260) caused, or alleged to be caused, in whole or in part, by the negligent or willful acts or omissions of Grantee's contractor or any of the officers, agents, employees or subcontractors of the contractor ("Claims"). It is the specific intention of the parties that the Indemnitee shall, in all instances, except for Claims arising solely from the negligent or willful acts or omissions of the Indemnitee, be indemnified by the contractor from and against any and all Claims.

10. **Condition for Disbursement:** Disbursement of grant funds by OPRD is contingent upon OPRD having received sufficient funding, appropriations, limitations, allotments, or other expenditure authority sufficient to allow OPRD, in the exercise of its reasonable administrative discretion, to make the disbursement and upon Grantee's compliance with the terms of this Agreement.

11. **No Third Party Beneficiaries.** OPRD and Grantee are the only parties to this Agreement and are the only parties entitled to enforce its terms. Nothing in this Agreement gives, is intended to give, or shall be construed to give or provide any benefit or right, whether directly or indirectly, to a third person unless such a third person is individually identified by name herein and expressly described as intended beneficiary of the terms of this Agreement.

12. **Repayment:** In the event that the Grantee spends Grant Funds in any way prohibited by state or federal law, or for any purpose other than the completion of the Project, the Grantee shall reimburse the State for all such unlawfully or improperly expended funds. Such payment shall be made within 15 days of demand by the State. This section shall survive termination or expiration of this Agreement.

13. **Termination:** This Agreement may be terminated by mutual consent of both parties, or by either party upon a 30-day notice in writing, delivered by certified mail or in person to the other party's contact identified in the Agreement. On termination of this Agreement, all accounts and payments will be processed according to the financial arrangements set forth herein for Project costs incurred prior to date of termination. Full credit shall be allowed for reimbursable expenses and the non-cancelable obligations properly incurred up to the effective date of the termination.

14. **Governing Law:** The laws of the State of Oregon (without giving effect to its conflicts of law principles) govern all matters arising out of or relating to this Agreement, including, without limitation, its validity, interpretation, construction, performance, and enforcement. Any party bringing a legal action or proceeding against any other party arising out of or relating to this Agreement shall bring the legal action or proceeding in the Circuit Court of the State of Oregon for Marion County. Each party hereby consents to the exclusive jurisdiction of such court, waives any objection to venue, and waives any claim that such forum is an inconvenient forum. In no event shall this section be construed as a waiver by the State of Oregon of any form of defense or immunity, whether sovereign immunity, governmental immunity, immunity based on the eleventh amendment to the Constitution of the United States or otherwise, from any claim or from the jurisdiction of any court. This section shall survive termination or expiration of this Agreement.

15. **Entire Agreement:** This Agreement constitutes the entire Agreement between the parties relating to the Project. No waiver, consent, modification or change of terms of this Agreement shall bind either party unless in writing and signed by both parties. Such waiver, consent, modification or change, if made, shall be effective only in the specific instance and for the specific purpose given. There are no understandings, Agreements, or representations, oral or written, not specified herein regarding this Agreement. The Grantee, by signature of its authorized representative on the Agreement, acknowledges that the Grantee has read this Agreement, understands it, and agrees to be bound by its terms and conditions.

16. **Notices:** Except as otherwise expressly provided in this Agreement, any communications between

the parties hereto or notices to be given hereunder shall be given in writing by personal delivery, facsimile, email, or mailing the same, postage prepaid, to Grantee contact or State contact at the address or number set forth in this Agreement, or to such other addresses or numbers as either party may hereinafter indicate. Any communication or notice delivered by facsimile shall be deemed to be given when receipt of the transmission is generated by the transmitting machine, and to be effective against State, such facsimile transmission must be confirmed by telephone notice to State Contact. Any communication by email shall be deemed to be given when the recipient of the email acknowledges receipt of the email. Any communication or notice mailed shall be deemed to be given when received, or five days after mailing.

17. **Counterparts:** This agreement may be executed in two or more counterparts (by facsimile or otherwise), each of which is an original and all of which together are deemed one agreement binding on all parties, notwithstanding that all parties are not signatories to the same counterpart.

18. **Severability:** If any term or provision of this agreement is declared by a court of competent jurisdiction to be illegal or in conflict with any law, the validity of the remaining terms and provisions shall not be affected, and the rights and obligations of the parties shall be construed and enforced as if this Agreement did not contain the particular term or provision held to be invalid.

RTP Grant Agreement – Attachment B
Project Scope and Budget
RT22-011, West River Trail Extension

Project Scope:
Construct an approximately 2,160-foot-long by 10 feet wide asphalt multi-use trail, extending the West River Trail to the north, in River Park in the City of Lebanon at the approximate location identified in Grantee's proposal ("Proposed Location & Site Plan"). Install benches, wayfinding signage, and garbage containers.

Budget Summary:

Grant Funds/Maximum Reimbursement	$158,943.00 (53.43%)
Grantee Match Participation	$138,543.00 (46.57%)
Total Project Cost	$297,486.00

Project Budget:

Expense Item	Cost or Valuation
Mobilization	$36,897.00
Erosion control	$15,607.00
General excavation	$21,000.00
Site clearing and grubbing	$8,227.00
Subgrade geotextile fabric	$7,200.00
Aggregate base	$38,880.00
Level 3 hot mix asphalt concrete (HMAC)	$135,200.00
Surveying consultant	$7,500.00
Engineering	$20,000.00
Trailside benches (at least 3)	$4,500.00
Garbage containers (at least 2)	$2,250.00
Wayfinding signage (at least 3)	$225.00
Total Project Cost	**$297,486.00**

Source of Match:

Source	Amount
City of Lebanon	$116,243.00
Donated funds	$22,300.00
Total Match	**$138,543.00**

ATTACHMENT C

Federal Form FHWA-1273

FHWA-1273 -- Revised July 5, 2022

REQUIRED CONTRACT PROVISIONS
FEDERAL-AID CONSTRUCTION CONTRACTS

I. GENERAL

1. Form FHWA-1273 must be physically incorporated in each construction contract funded under title 23, United States Code, as required in 23 CFR 633.102(b) (excluding emergency contracts solely intended for debris removal). The contractor (or subcontractor) must insert this form in each subcontract and further require its inclusion in all lower tier subcontracts (excluding purchase orders, rental agreements and other agreements for supplies or services). 23 CFR 633.102(e).

The applicable requirements of Form FHWA-1273 are incorporated by reference for work done under any purchase order, rental agreement or agreement for other services. The prime contractor shall be responsible for compliance by any subcontractor, lower-tier subcontractor or service provider. 23 CFR 633.102(e).

Form FHWA-1273 must be included in all Federal-aid design-build contracts, in all subcontracts and in lower tier subcontracts (excluding subcontracts for design services, purchase orders, rental agreements and other agreements for supplies or services) in accordance with 23 CFR 633.102. The design-builder shall be responsible for compliance by any subcontractor, lower-tier subcontractor or service provider.

Contracting agencies may reference Form FHWA-1273 in solicitation-for-bids or request-for-proposals documents, however, the Form FHWA-1273 must be physically incorporated (not referenced) in all contracts, subcontracts and lower-tier subcontracts (excluding purchase orders, rental agreements and other agreements for supplies or services related to a construction contract). 23 CFR 633.102(b).

2. Subject to the applicability criteria noted in the following sections, these contract provisions shall apply to all work performed on the contract by the contractor's own organization and with the assistance of workers under the contractor's immediate superintendence and to all work performed on the contract by piecework, station work, or by subcontract. 23 CFR 633.102(d).

3. A breach of any of the stipulations contained in these Required Contract Provisions may be sufficient grounds for withholding of progress payments, withholding of final payment, termination of the contract, suspension / debarment or any other action determined to be appropriate by the contracting agency and FHWA.

4. Selection of Labor: During the performance of this contract, the contractor shall not use convict labor for any purpose within the limits of a construction project on a Federal-aid highway unless it is labor performed by convicts who are on parole, supervised release, or probation. 23 U.S.C. 114(b). The term Federal-aid highway does not include roadways functionally classified as local roads or rural minor collectors. 23 U.S.C. 101(a).

II. NONDISCRIMINATION (23 CFR 230.107(a); 23 CFR Part 230, Subpart A, Appendix A; EO 11246)

The provisions of this section related to 23 CFR Part 230, Subpart A, Appendix A are applicable to all Federal-aid construction contracts and to all related construction subcontracts of $10,000 or more. The provisions of 23 CFR Part 230 are not applicable to material supply, engineering, or architectural service contracts.

In addition, the contractor and all subcontractors must comply with the following policies: Executive Order 11246, 41 CFR Part 60, 29 CFR Parts 1625-1627, 23 U.S.C. 140, Section 504 of the Rehabilitation Act of 1973, as amended (29 U.S.C. 794), Title VI of the Civil Rights Act of 1964, as amended (42 U.S.C. 2000d et seq.), and related regulations including 49 CFR Parts 21, 26, and 27; and 23 CFR Parts 200, 230, and 633.

The contractor and all subcontractors must comply with: the requirements of the Equal Opportunity Clause in 41 CFR 60-1.4(b) and, for all construction contracts exceeding $10,000, the Standard Federal Equal Employment Opportunity Construction Contract Specifications in 41 CFR 60-4.3.

Note: The U.S. Department of Labor has exclusive authority to determine compliance with Executive Order 11246 and the policies of the Secretary of Labor including 41 CFR Part 60, and 29 CFR Parts 1625-1627. The contracting agency and the FHWA have the authority and the responsibility to ensure compliance with 23 U.S.C. 140, Section 504 of the Rehabilitation Act of 1973, as amended (29 U.S.C. 794), and Title VI of the Civil Rights Act of 1964, as amended (42 U.S.C. 2000d et seq.), and related regulations including 49 CFR Parts 21, 26, and 27; and 23 CFR Parts 200, 230, and 633.

The following provision is adopted from 23 CFR Part 230, Subpart A, Appendix A, with appropriate revisions to conform to the U.S. Department of Labor (US DOL) and FHWA requirements.

1. Equal Employment Opportunity: Equal Employment Opportunity (EEO) requirements not to discriminate and to take affirmative action to assure equal opportunity as set forth under laws, executive orders, rules, regulations (*see* 28 CFR Part 35, 29 CFR Part 1630, 29 CFR Parts 1625-1627, 41 CFR Part 60 and 49 CFR Part 27) and orders of the Secretary of Labor as modified by the provisions prescribed herein, and imposed pursuant to 23 U.S.C. 140, shall constitute the EEO and specific affirmative action standards for the contractor's project activities under this contract. The provisions of the Americans with Disabilities Act of 1990 (42 U.S.C. 12101 et seq.) set forth under 28 CFR Part 35 and 29 CFR Part 1630 are incorporated by reference in this contract. In the execution of this contract, the contractor agrees to comply with the following minimum specific requirement activities of EEO:

a. The contractor will work with the contracting agency and the Federal Government to ensure that it has made every good faith effort to provide equal opportunity with respect to all of its terms and conditions of employment and in their review of activities under the contract. 23 CFR 230.409 (g)(4) & (5).

b. The contractor will accept as its operating policy the following statement:

> "It is the policy of this Company to assure that applicants are employed, and that employees are treated during employment, without regard to their race, religion, sex, sexual orientation, gender identity, color, national origin, age or disability. Such action shall include: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship, pre-apprenticeship, and/or on-the-job training."

2. EEO Officer: The contractor will designate and make known to the contracting officers an EEO Officer who will have the responsibility for and must be capable of effectively administering and promoting an active EEO program and who must be assigned adequate authority and responsibility to do so.

3. Dissemination of Policy: All members of the contractor's staff who are authorized to hire, supervise, promote, and discharge employees, or who recommend such action or are substantially involved in such action, will be made fully cognizant of and will implement the contractor's EEO policy and contractual responsibilities to provide EEO in each grade and classification of employment. To ensure that the above agreement will be met, the following actions will be taken as a minimum:

a. Periodic meetings of supervisory and personnel office employees will be conducted before the start of work and then not less often than once every six months, at which time the contractor's EEO policy and its implementation will be reviewed and explained. The meetings will be conducted by the EEO Officer or other knowledgeable company official.

b. All new supervisory or personnel office employees will be given a thorough indoctrination by the EEO Officer, covering all major aspects of the contractor's EEO obligations within thirty days following their reporting for duty with the contractor.

c. All personnel who are engaged in direct recruitment for the project will be instructed by the EEO Officer in the contractor's procedures for locating and hiring minorities and women.

d. Notices and posters setting forth the contractor's EEO policy will be placed in areas readily accessible to employees, applicants for employment and potential employees.

e. The contractor's EEO policy and the procedures to implement such policy will be brought to the attention of employees by means of meetings, employee handbooks, or other appropriate means.

4. Recruitment: When advertising for employees, the contractor will include in all advertisements for employees the notation: "An Equal Opportunity Employer." All such advertisements will be placed in publications having a large circulation among minorities and women in the area from which the project work force would normally be derived.

a. The contractor will, unless precluded by a valid bargaining agreement, conduct systematic and direct recruitment through public and private employee referral sources likely to yield qualified minorities and women. To meet this requirement, the contractor will identify sources of potential minority group employees and establish with such identified sources procedures whereby minority and women applicants may be referred to the contractor for employment consideration.

b. In the event the contractor has a valid bargaining agreement providing for exclusive hiring hall referrals, the contractor is expected to observe the provisions of that agreement to the extent that the system meets the contractor's compliance with EEO contract provisions. Where implementation of such an agreement has the effect of discriminating against minorities or women, or obligates the contractor to do the same, such implementation violates Federal nondiscrimination provisions.

c. The contractor will encourage its present employees to refer minorities and women as applicants for employment. Information and procedures with regard to referring such applicants will be discussed with employees.

5. Personnel Actions: Wages, working conditions, and employee benefits shall be established and administered, and personnel actions of every type, including hiring, upgrading, promotion, transfer, demotion, layoff, and termination, shall be taken without regard to race, color, religion, sex, sexual orientation, gender identity, national origin, age or disability. The following procedures shall be followed:

a. The contractor will conduct periodic inspections of project sites to ensure that working conditions and employee facilities do not indicate discriminatory treatment of project site personnel.

b. The contractor will periodically evaluate the spread of wages paid within each classification to determine any evidence of discriminatory wage practices.

c. The contractor will periodically review selected personnel actions in depth to determine whether there is evidence of discrimination. Where evidence is found, the contractor will promptly take corrective action. If the review indicates that the discrimination may extend beyond the actions reviewed, such corrective action shall include all affected persons.

d. The contractor will promptly investigate all complaints of alleged discrimination made to the contractor in connection with its obligations under this contract, will attempt to resolve such complaints, and will take appropriate corrective action

within a reasonable time. If the investigation indicates that the discrimination may affect persons other than the complainant, such corrective action shall include such other persons. Upon completion of each investigation, the contractor will inform every complainant of all of their avenues of appeal.

6. Training and Promotion:

a. The contractor will assist in locating, qualifying, and increasing the skills of minorities and women who are applicants for employment or current employees. Such efforts should be aimed at developing full journey level status employees in the type of trade or job classification involved.

b. Consistent with the contractor's work force requirements and as permissible under Federal and State regulations, the contractor shall make full use of training programs (i.e., apprenticeship and on-the-job training programs for the geographical area of contract performance). In the event a special provision for training is provided under this contract, this subparagraph will be superseded as indicated in the special provision. The contracting agency may reserve training positions for persons who receive welfare assistance in accordance with 23 U.S.C. 140(a).

c. The contractor will advise employees and applicants for employment of available training programs and entrance requirements for each.

d. The contractor will periodically review the training and promotion potential of employees who are minorities and women and will encourage eligible employees to apply for such training and promotion.

7. Unions: If the contractor relies in whole or in part upon unions as a source of employees, the contractor will use good faith efforts to obtain the cooperation of such unions to increase opportunities for minorities and women. 23 CFR 230.409. Actions by the contractor, either directly or through a contractor's association acting as agent, will include the procedures set forth below:

a. The contractor will use good faith efforts to develop, in cooperation with the unions, joint training programs aimed toward qualifying more minorities and women for membership in the unions and increasing the skills of minorities and women so that they may qualify for higher paying employment.

b. The contractor will use good faith efforts to incorporate an EEO clause into each union agreement to the end that such union will be contractually bound to refer applicants without regard to their race, color, religion, sex, sexual orientation, gender identity, national origin, age, or disability.

c. The contractor is to obtain information as to the referral practices and policies of the labor union except that to the extent such information is within the exclusive possession of the labor union and such labor union refuses to furnish such information to the contractor, the contractor shall so certify to the contracting agency and shall set forth what efforts have been made to obtain such information.

d. In the event the union is unable to provide the contractor with a reasonable flow of referrals within the time limit set forth in the collective bargaining agreement, the contractor will, through independent recruitment efforts, fill the employment vacancies without regard to race, color, religion, sex, sexual orientation, gender identity, national origin, age, or disability; making full efforts to obtain qualified and/or qualifiable minorities and women. The failure of a union to provide sufficient referrals (even though it is obligated to provide exclusive referrals under the terms of a collective bargaining agreement) does not relieve the contractor from the requirements of this paragraph. In the event the union referral practice prevents the contractor from meeting the obligations pursuant to Executive Order 11246, as amended, and these special provisions, such contractor shall immediately notify the contracting agency.

8. Reasonable Accommodation for Applicants / Employees with Disabilities: The contractor must be familiar with the requirements for and comply with the Americans with Disabilities Act and all rules and regulations established thereunder. Employers must provide reasonable accommodation in all employment activities unless to do so would cause an undue hardship.

9. Selection of Subcontractors, Procurement of Materials and Leasing of Equipment: The contractor shall not discriminate on the grounds of race, color, religion, sex, sexual orientation, gender identity, national origin, age, or disability in the selection and retention of subcontractors, including procurement of materials and leases of equipment. The contractor shall take all necessary and reasonable steps to ensure nondiscrimination in the administration of this contract.

a. The contractor shall notify all potential subcontractors, suppliers, and lessors of their EEO obligations under this contract.

b. The contractor will use good faith efforts to ensure subcontractor compliance with their EEO obligations.

10. Assurances Required:

a. The requirements of 49 CFR Part 26 and the State DOT's FHWA-approved Disadvantaged Business Enterprise (DBE) program are incorporated by reference.

b. The contractor, subrecipient or subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The contractor shall carry out applicable requirements of 49 CFR part 26 in the award and administration of DOT-assisted contracts. Failure by the contractor to carry out these requirements is a material breach of this contract, which may result in the termination of this contract or such other remedy as the recipient deems appropriate, which may include, but is not limited to:
(1) Withholding monthly progress payments;
(2) Assessing sanctions;
(3) Liquidated damages; and/or
(4) Disqualifying the contractor from future bidding as non-responsible.

c. The Title VI and nondiscrimination provisions of U.S. DOT Order 1050.2A at Appendixes A and E are incorporated by reference. 49 CFR Part 21.

11. Records and Reports: The contractor shall keep such records as necessary to document compliance with the EEO requirements. Such records shall be retained for a period of three years following the date of the final payment to the contractor for all contract work and shall be available at reasonable times and places for inspection by authorized representatives of the contracting agency and the FHWA.

a. The records kept by the contractor shall document the following:

(1) The number and work hours of minority and non-minority group members and women employed in each work classification on the project;

(2) The progress and efforts being made in cooperation with unions, when applicable, to increase employment opportunities for minorities and women; and

(3) The progress and efforts being made in locating, hiring, training, qualifying, and upgrading minorities and women.

b. The contractors and subcontractors will submit an annual report to the contracting agency each July for the duration of the project indicating the number of minority, women, and non-minority group employees currently engaged in each work classification required by the contract work. This information is to be reported on Form FHWA-1391. The staffing data should represent the project work force on board in all or any part of the last payroll period preceding the end of July. If on-the-job training is being required by special provision, the contractor will be required to collect and report training data. The employment data should reflect the work force on board during all or any part of the last payroll period preceding the end of July.

III. NONSEGREGATED FACILITIES

This provision is applicable to all Federal-aid construction contracts and to all related construction subcontracts of more than $10,000. 41 CFR 60-1.5.

As prescribed by 41 CFR 60-1.8, the contractor must ensure that facilities provided for employees are provided in such a manner that segregation on the basis of race, color, religion, sex, sexual orientation, gender identity, or national origin cannot result. The contractor may neither require such segregated use by written or oral policies nor tolerate such use by employee custom. The contractor's obligation extends further to ensure that its employees are not assigned to perform their services at any location under the contractor's control where the facilities are segregated. The term "facilities" includes waiting rooms, work areas, restaurants and other eating areas, time clocks, restrooms, washrooms, locker rooms and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing provided for employees. The contractor shall provide separate or single-user restrooms and necessary dressing or sleeping areas to assure privacy between sexes.

IV. DAVIS-BACON AND RELATED ACT PROVISIONS

This section is applicable to all Federal-aid construction projects exceeding $2,000 and to all related subcontracts and lower-tier subcontracts (regardless of subcontract size), in accordance with 29 CFR 5.5. The requirements apply to all projects located within the right-of-way of a roadway that is functionally classified as Federal-aid highway. 23 U.S.C. 113. This excludes roadways functionally classified as local roads or rural minor collectors, which are exempt. 23 U.S.C. 101. Where applicable law requires that projects be treated as a project on a Federal-aid highway, the provisions of this subpart will apply regardless of the location of the project. Examples include: Surface Transportation Block Grant Program projects funded under 23 U.S.C. 133 [excluding recreational trails projects], the Nationally Significant Freight and Highway Projects funded under 23 U.S.C. 117, and National Highway Freight Program projects funded under 23 U.S.C. 167.

The following provisions are from the U.S. Department of Labor regulations in 29 CFR 5.5 “Contract provisions and related matters” with minor revisions to conform to the FHWA-1273 format and FHWA program requirements.

1. Minimum wages (29 CFR 5.5)

a. All laborers and mechanics employed or working upon the site of the work, will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act (29 CFR part 3)), the full amount of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the contractor and such laborers and mechanics.

Contributions made or costs reasonably anticipated for bona fide fringe benefits under section 1(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of paragraph 1.d. of this section; also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in 29 CFR 5.5(a)(4). Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein: Provided, That the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classification and wage rates conformed under paragraph 1.b. of this section) and the Davis-Bacon poster (WH–1321) shall be posted at all times by the contractor and its subcontractors at the site of the work in a prominent and accessible place where it can be easily seen by the workers.

b.(1) The contracting officer shall require that any class of laborers or mechanics, including helpers, which is not listed in the wage determination and which is to be employed under the contract shall be classified in conformance with the wage determination. The contracting officer shall approve an additional classification and wage rate and fringe benefits therefore only when the following criteria have been met:

(i) The work to be performed by the classification requested is not performed by a classification in the wage determination; and

(ii) The classification is utilized in the area by the construction industry; and

(iii) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.

(2) If the contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and the contracting officer agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken shall be sent by the contracting officer to the Administrator of the Wage and Hour Division, U.S. Department of Labor, Washington, DC 20210. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

(3) In the event the contractor, the laborers or mechanics to be employed in the classification or their representatives, and the contracting officer do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), the contracting officer shall refer the questions, including the views of all interested parties and the recommendation of the contracting officer, to the Administrator for determination. The Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

(4) The wage rate (including fringe benefits where appropriate) determined pursuant to paragraphs 1.b.(2) or 1.b.(3) of this section, shall be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.

c. Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.

d. If the contractor does not make payments to a trustee or other third person, the contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, Provided, That the Secretary of Labor has found, upon the written request of the contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the contractor to set aside in a separate account assets for the meeting of obligations under the plan or program.

2. Withholding (29 CFR 5.5)

The contracting agency shall upon its own action or upon written request of an authorized representative of the Department of Labor, withhold or cause to be withheld from the contractor under this contract, or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to Davis-Bacon prevailing wage requirements, which is held by the same prime contractor, so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees, and helpers, employed by the contractor or any subcontractor the full amount of wages required by the contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee, or helper, employed or working on the site of the work, all or part of the wages required by the contract, the contracting agency may, after written notice to the contractor, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased.

3. Payrolls and basic records (29 CFR 5.5)

a. Payrolls and basic records relating thereto shall be maintained by the contractor during the course of the work and preserved for a period of three years thereafter for all laborers and mechanics working at the site of the work. Such records shall contain the name, address, and social security number of each such worker, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in section 1(b)(2)(B) of the Davis-Bacon Act), daily and weekly number of hours worked, deductions made and actual wages paid. Whenever the Secretary of Labor has found under 29 CFR 5.5(a)(1)(iv) that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in section 1(b)(2)(B) of the Davis-Bacon Act, the contractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs.

b.(1) The contractor shall submit weekly for each week in which any contract work is performed a copy of all payrolls to the contracting agency. The payrolls submitted shall set out accurately and completely all of the information required to be maintained under 29 CFR 5.5(a)(3)(i), except that full social security numbers and home addresses shall not be included on weekly transmittals. Instead the payrolls shall only need to include an individually identifying number for each employee (e.g., the last four digits of the employee's social security number). The required weekly payroll information may be submitted in any form desired. Optional Form WH–347 is available for this purpose from the Wage and Hour Division Web site. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors. Contractors and subcontractors shall maintain the full social security number and current address of each covered worker, and shall provide them upon request to the contracting agency for transmission to the State DOT, the FHWA or the Wage and Hour Division of the Department of Labor for purposes of an investigation or audit of compliance with prevailing wage requirements. It is not a violation of this section for a prime contractor to require a subcontractor to provide addresses and social security numbers to the prime contractor for its own records, without weekly submission to the contracting agency.

(2) Each payroll submitted shall be accompanied by a “Statement of Compliance,” signed by the contractor or

subcontractor or his or her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:

(i) That the payroll for the payroll period contains the information required to be provided under 29 CFR 5.5(a)(3)(ii), the appropriate information is being maintained under 29 CFR 5.5(a)(3)(i), and that such information is correct and complete;

(ii) That each laborer or mechanic (including each helper, apprentice, and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in 29 CFR part 3;

(iii) That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of work performed, as specified in the applicable wage determination incorporated into the contract.

(3) The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH–347 shall satisfy the requirement for submission of the "Statement of Compliance" required by paragraph 3.b.(2) of this section.

(4) The falsification of any of the above certifications may subject the contractor or subcontractor to civil or criminal prosecution under 18 U.S.C. 1001 and 31 U.S.C. 231.

c. The contractor or subcontractor shall make the records required under paragraph 3.a. of this section available for inspection, copying, or transcription by authorized representatives of the contracting agency, the State DOT, the FHWA, or the Department of Labor, and shall permit such representatives to interview employees during working hours on the job. If the contractor or subcontractor fails to submit the required records or to make them available, the FHWA may, after written notice to the contractor, the contracting agency or the State DOT, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.

4. Apprentices and trainees (29 CFR 5.5)

a. Apprentices (programs of the USDOL).

Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Office of Apprenticeship Training, Employer and Labor Services, or with a State Apprenticeship Agency recognized by the Office, or if a person is employed in his or her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Office of Apprenticeship Training, Employer and Labor Services or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice.

The allowable ratio of apprentices to journeymen on the job site in any craft classification shall not be greater than the ratio permitted to the contractor as to the entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated above, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the contractor's or subcontractor's registered program shall be observed.

Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeymen hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination.

In the event the Office of Apprenticeship Training, Employer and Labor Services, or a State Apprenticeship Agency recognized by the Office, withdraws approval of an apprenticeship program, the contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

b. Trainees (programs of the USDOL).

Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration.

The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration.

Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the

corresponding journeyman wage rate on the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed.

In the event the Employment and Training Administration withdraws approval of a training program, the contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

c. Equal employment opportunity. The utilization of apprentices, trainees and journeymen under this part shall be in conformity with the equal employment opportunity requirements of Executive Order 11246, as amended, and 29 CFR part 30.

d. Apprentices and Trainees (programs of the U.S. DOT).

Apprentices and trainees working under apprenticeship and skill training programs which have been certified by the Secretary of Transportation as promoting EEO in connection with Federal-aid highway construction programs are not subject to the requirements of paragraph 4 of this Section IV. 23 CFR 230.111(e)(2). The straight time hourly wage rates for apprentices and trainees under such programs will be established by the particular programs. The ratio of apprentices and trainees to journeymen shall not be greater than permitted by the terms of the particular program.

5. Compliance with Copeland Act requirements. The contractor shall comply with the requirements of 29 CFR part 3, which are incorporated by reference in this contract as provided in 29 CFR 5.5.

6. Subcontracts. The contractor or subcontractor shall insert Form FHWA-1273 in any subcontracts and also require the subcontractors to include Form FHWA-1273 in any lower tier subcontracts. The prime contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all the contract clauses in 29 CFR 5.5.

7. Contract termination: debarment. A breach of the contract clauses in 29 CFR 5.5 may be grounds for termination of the contract, and for debarment as a contractor and a subcontractor as provided in 29 CFR 5.12.

8. Compliance with Davis-Bacon and Related Act requirements. All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR parts 1, 3, and 5 are herein incorporated by reference in this contract as provided in 29 CFR 5.5.

9. Disputes concerning labor standards. As provided in 29 CFR 5.5, disputes arising out of the labor standards provisions of this contract shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor set forth in 29 CFR parts 5, 6, and 7. Disputes within the meaning of this clause include disputes between the contractor (or any of its subcontractors) and the contracting agency, the U.S. Department of Labor, or the employees or their representatives.

10. Certification of eligibility (29 CFR 5.5)

a. By entering into this contract, the contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in the contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

b. No part of this contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

c. The penalty for making false statements is prescribed in the U.S. Criminal Code, 18 U.S.C. 1001.

V. CONTRACT WORK HOURS AND SAFETY STANDARDS ACT

Pursuant to 29 CFR 5.5(b), the following clauses apply to any Federal-aid construction contract in an amount in excess of $100,000 and subject to the overtime provisions of the Contract Work Hours and Safety Standards Act. These clauses shall be inserted in addition to the clauses required by 29 CFR 5.5(a) or 29 CFR 4.6. As used in this paragraph, the terms laborers and mechanics include watchmen and guards.

1. Overtime requirements. No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic in any workweek in which he or she is employed on such work to work in excess of forty hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of forty hours in such workweek. 29 CFR 5.5.

2. Violation; liability for unpaid wages; liquidated damages. In the event of any violation of the clause set forth in paragraph 1 of this section, the contractor and any subcontractor responsible therefor shall be liable for the unpaid wages. In addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the clause set forth in paragraph 1 of this section, in the sum currently provided in 29 CFR 5.5(b)(2)* for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of forty hours without payment of the overtime wages required by the clause set forth in paragraph 1 of this section. 29 CFR 5.5.

* $27 as of January 23, 2019 (See 84 FR 213-01, 218) as may be adjusted annually by the Department of Labor; pursuant to the Federal Civil Penalties Inflation Adjustment Act of 1990).

3. Withholding for unpaid wages and liquidated damages. The FHWA or the contacting agency shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld, from any moneys payable on account of work performed by the contractor or subcontractor under any such contract or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same prime contractor, such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in paragraph 2 of this section. 29 CFR 5.5.

4. Subcontracts. The contractor or subcontractor shall insert in any subcontracts the clauses set forth in paragraphs 1 through 4 of this section and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in paragraphs 1 through 4 of this section. 29 CFR 5.5.

VI. SUBLETTING OR ASSIGNING THE CONTRACT

This provision is applicable to all Federal-aid construction contracts on the National Highway System pursuant to 23 CFR 635.116.

1. The contractor shall perform with its own organization contract work amounting to not less than 30 percent (or a greater percentage if specified elsewhere in the contract) of the total original contract price, excluding any specialty items designated by the contracting agency. Specialty items may be performed by subcontract and the amount of any such specialty items performed may be deducted from the total original contract price before computing the amount of work required to be performed by the contractor's own organization (23 CFR 635.116).

a. The term “perform work with its own organization” in paragraph 1 of Section VI refers to workers employed or leased by the prime contractor, and equipment owned or rented by the prime contractor, with or without operators. Such term does not include employees or equipment of a subcontractor or lower tier subcontractor, agents of the prime contractor, or any other assignees. The term may include payments for the costs of hiring leased employees from an employee leasing firm meeting all relevant Federal and State regulatory requirements. Leased employees may only be included in this term if the prime contractor meets all of the following conditions: (based on longstanding interpretation)

(1) the prime contractor maintains control over the supervision of the day-to-day activities of the leased employees;
(2) the prime contractor remains responsible for the quality of the work of the leased employees;
(3) the prime contractor retains all power to accept or exclude individual employees from work on the project; and
(4) the prime contractor remains ultimately responsible for the payment of predetermined minimum wages, the submission of payrolls, statements of compliance and all other Federal regulatory requirements.

b. "Specialty Items" shall be construed to be limited to work that requires highly specialized knowledge, abilities, or equipment not ordinarily available in the type of contracting organizations qualified and expected to bid or propose on the contract as a whole and in general are to be limited to minor components of the overall contract. 23 CFR 635.102.

2. Pursuant to 23 CFR 635.116(a), the contract amount upon which the requirements set forth in paragraph (1) of Section VI is computed includes the cost of material and manufactured products which are to be purchased or produced by the contractor under the contract provisions.

3. Pursuant to 23 CFR 635.116(c), the contractor shall furnish (a) a competent superintendent or supervisor who is employed by the firm, has full authority to direct performance of the work in accordance with the contract requirements, and is in charge of all construction operations (regardless of who performs the work) and (b) such other of its own organizational resources (supervision, management, and engineering services) as the contracting officer determines is necessary to assure the performance of the contract.

4. No portion of the contract shall be sublet, assigned or otherwise disposed of except with the written consent of the contracting officer, or authorized representative, and such consent when given shall not be construed to relieve the contractor of any responsibility for the fulfillment of the contract. Written consent will be given only after the contracting agency has assured that each subcontract is evidenced in writing and that it contains all pertinent provisions and requirements of the prime contract. (based on long-standing interpretation of 23 CFR 635.116).

5. The 30-percent self-performance requirement of paragraph (1) is not applicable to design-build contracts; however, contracting agencies may establish their own self-performance requirements. 23 CFR 635.116(d).

VII. SAFETY: ACCIDENT PREVENTION

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

1. In the performance of this contract the contractor shall comply with all applicable Federal, State, and local laws governing safety, health, and sanitation (23 CFR Part 635). The contractor shall provide all safeguards, safety devices and protective equipment and take any other needed actions as it determines, or as the contracting officer may determine, to be reasonably necessary to protect the life and health of employees on the job and the safety of the public and to protect property in connection with the performance of the work covered by the contract. 23 CFR 635.108.

2. It is a condition of this contract, and shall be made a condition of each subcontract, which the contractor enters into pursuant to this contract, that the contractor and any subcontractor shall not permit any employee, in performance of the contract, to work in surroundings or under conditions which are unsanitary, hazardous or dangerous to his/her health or safety, as determined under construction safety and health standards (29 CFR Part 1926) promulgated by the Secretary of Labor, in accordance with Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C. 3704). 29 CFR 1926.10.

3. Pursuant to 29 CFR 1926.3, it is a condition of this contract that the Secretary of Labor or authorized representative thereof, shall have right of entry to any site of contract performance to inspect or investigate the matter of compliance

with the construction safety and health standards and to carry out the duties of the Secretary under Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C. 3704).

VIII. FALSE STATEMENTS CONCERNING HIGHWAY PROJECTS

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

In order to assure high quality and durable construction in conformity with approved plans and specifications and a high degree of reliability on statements and representations made by engineers, contractors, suppliers, and workers on Federal-aid highway projects, it is essential that all persons concerned with the project perform their functions as carefully, thoroughly, and honestly as possible. Willful falsification, distortion, or misrepresentation with respect to any facts related to the project is a violation of Federal law. To prevent any misunderstanding regarding the seriousness of these and similar acts, Form FHWA-1022 shall be posted on each Federal-aid highway project (23 CFR Part 635) in one or more places where it is readily available to all persons concerned with the project:

18 U.S.C. 1020 reads as follows:

"Whoever, being an officer, agent, or employee of the United States, or of any State or Territory, or whoever, whether a person, association, firm, or corporation, knowingly makes any false statement, false representation, or false report as to the character, quality, quantity, or cost of the material used or to be used, or the quantity or quality of the work performed or to be performed, or the cost thereof in connection with the submission of plans, maps, specifications, contracts, or costs of construction on any highway or related project submitted for approval to the Secretary of Transportation; or

Whoever knowingly makes any false statement, false representation, false report or false claim with respect to the character, quality, quantity, or cost of any work performed or to be performed, or materials furnished or to be furnished, in connection with the construction of any highway or related project approved by the Secretary of Transportation; or

Whoever knowingly makes any false statement or false representation as to material fact in any statement, certificate, or report submitted pursuant to provisions of the Federal-aid Roads Act approved July 11, 1916, (39 Stat. 355), as amended and supplemented;

Shall be fined under this title or imprisoned not more than 5 years or both."

IX. IMPLEMENTATION OF CLEAN AIR ACT AND FEDERAL WATER POLLUTION CONTROL ACT (42 U.S.C. 7606; 2 CFR 200.88; EO 11738)

This provision is applicable to all Federal-aid construction contracts in excess of $150,000 and to all related subcontracts. 48 CFR 2.101; 2 CFR 200.326.

By submission of this bid/proposal or the execution of this contract or subcontract, as appropriate, the bidder, proposer, Federal-aid construction contractor, subcontractor, supplier, or vendor agrees to comply with all applicable standards, orders or regulations issued pursuant to the Clean Air Act (42 U.S.C. 7401-7671q) and the Federal Water Pollution Control Act, as amended (33 U.S.C. 1251-1387). Violations must be reported to the Federal Highway Administration and the Regional Office of the Environmental Protection Agency. 2 CFR Part 200, Appendix II.

The contractor agrees to include or cause to be included the requirements of this Section in every subcontract, and further agrees to take such action as the contracting agency may direct as a means of enforcing such requirements. 2 CFR 200.326.

X. CERTIFICATION REGARDING DEBARMENT, SUSPENSION, INELIGIBILITY AND VOLUNTARY EXCLUSION

This provision is applicable to all Federal-aid construction contracts, design-build contracts, subcontracts, lower-tier subcontracts, purchase orders, lease agreements, consultant contracts or any other covered transaction requiring FHWA approval or that is estimated to cost $25,000 or more – as defined in 2 CFR Parts 180 and 1200. 2 CFR 180.220 and 1200.220.

1**. Instructions for Certification – First Tier Participants:**

a. By signing and submitting this proposal, the prospective first tier participant is providing the certification set out below.

b. The inability of a person to provide the certification set out below will not necessarily result in denial of participation in this covered transaction. The prospective first tier participant shall submit an explanation of why it cannot provide the certification set out below. The certification or explanation will be considered in connection with the department or agency's determination whether to enter into this transaction. However, failure of the prospective first tier participant to furnish a certification or an explanation shall disqualify such a person from participation in this transaction. 2 CFR 180.320.

c. The certification in this clause is a material representation of fact upon which reliance was placed when the contracting agency determined to enter into this transaction. If it is later determined that the prospective participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the contracting agency may terminate this transaction for cause of default. 2 CFR 180.325.

d. The prospective first tier participant shall provide immediate written notice to the contracting agency to whom this proposal is submitted if any time the prospective first tier participant learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances. 2 CFR 180.345 and 180.350.

e. The terms "covered transaction," "debarred," "suspended," "ineligible," "participant," "person," "principal," and "voluntarily excluded," as used in this clause, are defined in 2 CFR Parts 180, Subpart I, 180.900-180.1020, and 1200. “First Tier Covered Transactions” refers to any covered transaction between a recipient or subrecipient of Federal funds and a participant (such as the prime or general contract). “Lower Tier Covered Transactions” refers to any covered transaction under a First Tier Covered Transaction (such as subcontracts). “First Tier Participant” refers to the participant

who has entered into a covered transaction with a recipient or subrecipient of Federal funds (such as the prime or general contractor). "Lower Tier Participant" refers any participant who has entered into a covered transaction with a First Tier Participant or other Lower Tier Participants (such as subcontractors and suppliers).

f. The prospective first tier participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency entering into this transaction. 2 CFR 180.330.

g. The prospective first tier participant further agrees by submitting this proposal that it will include the clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transactions," provided by the department or contracting agency, entering into this covered transaction, without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions exceeding the $25,000 threshold. 2 CFR 180.220 and 180.300.

h. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. 2 CFR 180.300; 180.320, and 180.325. A participant is responsible for ensuring that its principals are not suspended, debarred, or otherwise ineligible to participate in covered transactions. 2 CFR 180.335. To verify the eligibility of its principals, as well as the eligibility of any lower tier prospective participants, each participant may, but is not required to, check the System for Award Management website (https://www.sam.gov/). 2 CFR 180.300, 180.320, and 180.325.

i. Nothing contained in the foregoing shall be construed to require the establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of the prospective participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

j. Except for transactions authorized under paragraph (f) of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency may terminate this transaction for cause or default. 2 CFR 180.325.

* * * * *

2. Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion – First Tier Participants:

a. The prospective first tier participant certifies to the best of its knowledge and belief, that it and its principals:

(1) Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participating in covered transactions by any Federal department or agency, 2 CFR 180.335;.

(2) Have not within a three-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State, or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property, 2 CFR 180.800;

(3) Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State or local) with commission of any of the offenses enumerated in paragraph (a)(2) of this certification, 2 CFR 180.700 and 180.800; and

(4) Have not within a three-year period preceding this application/proposal had one or more public transactions (Federal, State or local) terminated for cause or default. 2 CFR 180.335(d).

(5) Are not a corporation that has been convicted of a felony violation under any Federal law within the two-year period preceding this proposal (USDOT Order 4200.6 implementing appropriations act requirements); and

(6) Are not a corporation with any unpaid Federal tax liability that has been assessed, for which all judicial and administrative remedies have been exhausted, or have lapsed, and that is not being paid in a timely manner pursuant to an agreement with the authority responsible for collecting the tax liability (USDOT Order 4200.6 implementing appropriations act requirements).

b. Where the prospective participant is unable to certify to any of the statements in this certification, such prospective participant should attach an explanation to this proposal. 2 CFR 180.335 and 180.340.

3. **Instructions for Certification - Lower Tier Participants:**

(Applicable to all subcontracts, purchase orders, and other lower tier transactions requiring prior FHWA approval or estimated to cost $25,000 or more - 2 CFR Parts 180 and 1200). 2 CFR 180.220 and 1200.220.

a. By signing and submitting this proposal, the prospective lower tier participant is providing the certification set out below.

b. The certification in this clause is a material representation of fact upon which reliance was placed when this transaction was entered into. If it is later determined that the prospective lower tier participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the department, or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.

c. The prospective lower tier participant shall provide immediate written notice to the person to which this proposal is submitted if at any time the prospective lower tier participant learns that its certification was erroneous by reason of changed circumstances. 2 CFR 180.365.

d. The terms "covered transaction," "debarred," "suspended," "ineligible," "participant," "person," "principal," and "voluntarily excluded," as used in this clause, are defined in 2 CFR Parts 180, Subpart I, 180.900 – 180.1020, and 1200. You may contact the person to which this proposal is

submitted for assistance in obtaining a copy of those regulations. “First Tier Covered Transactions” refers to any covered transaction between a recipient or subrecipient of Federal funds and a participant (such as the prime or general contract). “Lower Tier Covered Transactions” refers to any covered transaction under a First Tier Covered Transaction (such as subcontracts). “First Tier Participant” refers to the participant who has entered into a covered transaction with a recipient or subrecipient of Federal funds (such as the prime or general contractor). “Lower Tier Participant” refers any participant who has entered into a covered transaction with a First Tier Participant or other Lower Tier Participants (such as subcontractors and suppliers).

e. The prospective lower tier participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency with which this transaction originated. 2 CFR 1200.220 and 1200.332.

f. The prospective lower tier participant further agrees by submitting this proposal that it will include this clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transaction," without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions exceeding the $25,000 threshold. 2 CFR 180.220 and 1200.220.

g. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant is responsible for ensuring that its principals are not suspended, debarred, or otherwise ineligible to participate in covered transactions. To verify the eligibility of its principals, as well as the eligibility of any lower tier prospective participants, each participant may, but is not required to, check the System for Award Management website (https://www.sam.gov/), which is compiled by the General Services Administration. 2 CFR 180.300, 180.320, 180.330, and 180.335.

h. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

i. Except for transactions authorized under paragraph e of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment. 2 CFR 180.325.

* * * * *

Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion--Lower Tier Participants:

1. The prospective lower tier participant certifies, by submission of this proposal, that neither it nor its principals:

(a) is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participating in covered transactions by any Federal department or agency, 2 CFR 180.355;

(b) is a corporation that has been convicted of a felony violation under any Federal law within the two-year period preceding this proposal (USDOT Order 4200.6 implementing appropriations act requirements); and

(c) is a corporation with any unpaid Federal tax liability that has been assessed, for which all judicial and administrative remedies have been exhausted, or have lapsed, and that is not being paid in a timely manner pursuant to an agreement with the authority responsible for collecting the tax liability. (USDOT Order 4200.6 implementing appropriations act requirements)

2. Where the prospective lower tier participant is unable to certify to any of the statements in this certification, such prospective participant should attach an explanation to this proposal.

* * * * *

XI. CERTIFICATION REGARDING USE OF CONTRACT FUNDS FOR LOBBYING

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts which exceed $100,000. 49 CFR Part 20, App. A.

1. The prospective participant certifies, by signing and submitting this bid or proposal, to the best of his or her knowledge and belief, that:

a. No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

b. If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.

2. This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by 31 U.S.C. 1352. Any person who fails to file the required certification shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure.

3. The prospective participant also agrees by submitting its bid or proposal that the participant shall require that the language of this certification be included in all lower tier

subcontracts, which exceed $100,000 and that all such recipients shall certify and disclose accordingly.

XII. USE OF UNITED STATES-FLAG VESSELS:

This provision is applicable to all Federal-aid construction contracts, design-build contracts, subcontracts, lower-tier subcontracts, purchase orders, lease agreements, or any other covered transaction. 46 CFR Part 381.

This requirement applies to material or equipment that is acquired for a specific Federal-aid highway project. 46 CFR 381.7. It is not applicable to goods or materials that come into inventories independent of an FHWA funded-contract.

When oceanic shipments (or shipments across the Great Lakes) are necessary for materials or equipment acquired for a specific Federal-aid construction project, the bidder, proposer, contractor, subcontractor, or vendor agrees:

1. To utilize privately owned United States-flag commercial vessels to ship at least 50 percent of the gross tonnage (computed separately for dry bulk carriers, dry cargo liners, and tankers) involved, whenever shipping any equipment, material, or commodities pursuant to this contract, to the extent such vessels are available at fair and reasonable rates for United States-flag commercial vessels. 46 CFR 381.7.

2. To furnish within 20 days following the date of loading for shipments originating within the United States or within 30 working days following the date of loading for shipments originating outside the United States, a legible copy of a rated, ‘on-board’ commercial ocean bill-of-lading in English for each shipment of cargo described in paragraph (b)(1) of this section to both the Contracting Officer (through the prime contractor in the case of subcontractor bills-of-lading) and to the Office of Cargo and Commercial Sealift (MAR-620), Maritime Administration, Washington, DC 20590. (MARAD requires copies of the ocean carrier's (master) bills of lading, certified onboard, dated, with rates and charges. These bills of lading may contain business sensitive information and therefore may be submitted directly to MARAD by the Ocean Transportation Intermediary on behalf of the contractor). 46 CFR 381.7.

ATTACHMENT A - EMPLOYMENT AND MATERIALS PREFERENCE FOR APPALACHIAN DEVELOPMENT HIGHWAY SYSTEM OR APPALACHIAN LOCAL ACCESS ROAD CONTRACTS (23 CFR 633, Subpart B, Appendix B)
This provision is applicable to all Federal-aid projects funded under the Appalachian Regional Development Act of 1965.

1. During the performance of this contract, the contractor undertaking to do work which is, or reasonably may be, done as on-site work, shall give preference to qualified persons who regularly reside in the labor area as designated by the DOL wherein the contract work is situated, or the subregion, or the Appalachian counties of the State wherein the contract work is situated, except:

a. To the extent that qualified persons regularly residing in the area are not available.

b. For the reasonable needs of the contractor to employ supervisory or specially experienced personnel necessary to assure an efficient execution of the contract work.

c. For the obligation of the contractor to offer employment to present or former employees as the result of a lawful collective bargaining contract, provided that the number of nonresident persons employed under this subparagraph (1c) shall not exceed 20 percent of the total number of employees employed by the contractor on the contract work, except as provided in subparagraph (4) below.

2. The contractor shall place a job order with the State Employment Service indicating (a) the classifications of the laborers, mechanics and other employees required to perform the contract work, (b) the number of employees required in each classification, (c) the date on which the participant estimates such employees will be required, and (d) any other pertinent information required by the State Employment Service to complete the job order form. The job order may be placed with the State Employment Service in writing or by telephone. If during the course of the contract work, the information submitted by the contractor in the original job order is substantially modified, the participant shall promptly notify the State Employment Service.

3. The contractor shall give full consideration to all qualified job applicants referred to him by the State Employment Service. The contractor is not required to grant employment to any job applicants who, in his opinion, are not qualified to perform the classification of work required.

4. If, within one week following the placing of a job order by the contractor with the State Employment Service, the State Employment Service is unable to refer any qualified job applicants to the contractor, or less than the number requested, the State Employment Service will forward a certificate to the contractor indicating the unavailability of applicants. Such certificate shall be made a part of the contractor's permanent project records. Upon receipt of this certificate, the contractor may employ persons who do not normally reside in the labor area to fill positions covered by the certificate, notwithstanding the provisions of subparagraph (1c) above.

5. The provisions of 23 CFR 633.207(e) allow the contracting agency to provide a contractual preference for the use of mineral resource materials native to the Appalachian region.

6. The contractor shall include the provisions of Sections 1 through 4 of this Attachment A in every subcontract for work which is, or reasonably may be, done as on-site work.

ATTACHMENT D

Federal Requirements

1. **Compliance with Law:** Grantee shall comply with all federal, state and local laws, regulations, executive orders and ordinances applicable to the Agreement or to implementation of the Project, including without limitation 23 USC 206 and ORS 390.980 which makes funds available for the purposes of the Oregon Recreation Trails System Act. Without limiting the generality of the preceding sentence, Grantee shall, in its performance of its obligations under this Agreement and implementation of the Project, comply with the following laws and regulations:
    - 23 U.S.C. 206 Recreational Trails Program
    - 23 U.S.C. 104 (h), Recreational Trails Program Apportionments
    - 23 U.S.C. 106, Project Approval and Oversight
    - 23 U.S.C. 114, Convict Labor
    - FHWA Recreational Trails Program Guidance: located at https://www.fhwa.dot.gov/environment/recreational_trails/guidance/rtp9908_toc.cfm
    - 40 U.S.C 3141-3148, The Davis-Bacon & Related Acts
    - Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970
    - 2 CFR Part 200 Uniform Administrative Requirements, Cost Principles, and Audit Requirements for Federal Awards, *as supplemented by* 2 CFR Part 1201 for Awards by the U.S. Department of Transportation
    - 2 CFR 1201
    - 23 CFR 1.36, Compliance with other Federal Laws and Regulations
    - 23 CFR 771, Environmental Requirements
    - 23 CFR 635.410 Buy America, as further described below
    - 41 U.S.C. § 4712, Enhancement of Contractor Protection from Reprisal for Disclosure of Certain Information

2. **Required Contract Provisions for Federal-Aid Construction Contracts:** Form FHWA-1273 must be physically incorporated in each construction contract funded with Grant Funds provided under this Agreement. The contractor (or subcontractor) must insert Form FHWA-1273 in each subcontract and further require its inclusion in all lower tier subcontracts. See Attachment C: Form FHWA-1273.

3. **Buy America – as of August 16, 2023, this section only applies to RTP projects if the "Total Project Cost" shown on Page 1 and in Attachment B is $500,000 or more**: 23 CFR 635.410 is applicable to steel, iron and manufactured goods used in a "federal-aid highway construction project" including the Project funded under this Agreement. Based on the definitions of "construction" in 23 U.S.C. 101 and "project", the Buy America provisions apply to steel and iron permanently incorporated in a project funded by RTP when the total value of these materials exceeds $2,500. Documentation of Buy America compliance is required to be obtained and retained with the Grantee's grant records.

4. **Build America, Buy America Act – as of August 16, 2023, this section only applies to RTP projects if the "Total Project Cost" shown on Page 1 and in Attachment B is $500,000 or more:** As required by Section 70914 of the Bipartisan Infrastructure Law (also known as the Infrastructure Investment and Jobs Act), P.L. 117-58, on or after May 14, 2022, none of the funds under a federal award that are part of Federal financial assistance program for infrastructure may be obligated for a project unless all of the iron, steel, manufactured products, and construction materials used in the project are produced in the United States, unless subject to an approved waiver. The requirements of this section must

be included in all contracts, subcontracts and purchase orders for work or products under this program. Recipients of an award of Federal financial assistance are hereby notified that none of the funds provided under this award may be used for a project for infrastructure unless:

a. unless subject to the $2,500 threshold described in item 3, all iron and steel used in the project are produced in the United States—this means all manufacturing processes, from the initial melting stage through the application of coatings, occurred in the United States;

b. unless subject to FHWA's General Applicability Waiver of Buy America Requirements for Manufactured Products, all manufactured products used in the project are produced in the United States —this means the manufactured product was manufactured in the United States; and the cost of the components of the manufactured product that are mined, produced, or manufactured in the United States is greater than 55 percent of the total cost of all components of the manufactured product, unless another standard for determining the minimum amount of domestic content of the manufactured product has been established under applicable law or regulation; and

c. all construction materials are manufactured in the United States—this means that all manufacturing processes for the construction material occurred in the United States. The Buy America preference only applies to articles, materials, and supplies that are consumed in, incorporated into, or affixed to an infrastructure project. As such, it does not apply to tools, equipment, and supplies, such as temporary scaffolding, brought to the construction site and removed at or before the completion of the infrastructure project. Nor does a Buy America preference apply to equipment and furnishings, such as movable chairs, desks, and portable computer equipment, that are used at or within the finished infrastructure project, but are not an integral part of the structure or permanently affixed to the infrastructure project.

5. **Audit Clause**: Subrecipients receiving federal awards in excess of $750,000 in the Subrecipient's fiscal year are subject to audit conducted in accordance with the provisions of 2 CFR part 200, subpart F. Subrecipient, if subject to this requirement, shall, upon request, at Subrecipient's own expense submit to Agency a copy of, or electronic link to, its annual audit subject to this requirement covering the funds expended under this Agreement and shall submit or cause to be submitted to Agency the annual audit of any subrecipient(s), contractor(s), or subcontractor(s) of Subrecipient responsible for the financial management of funds received under this Agreement.

6. **Debarment and Suspension.** Recipient certifies that it is not listed, and shall not permit any person or entity to be a subcontractor if the person or entity is listed, on the non-procurement portion of the General Service Administration's "List of Parties Excluded from Federal Procurement or Nonprocurement Programs" in accordance with Executive Orders No. 12549 and No. 12689, "Debarment and Suspension". (See 2 CFR Part 180.) This list contains the names of parties debarred, suspended, or otherwise excluded by agencies, and contractors declared ineligible under statutory authority other than Executive Order No. 12549. Subcontractors with awards that exceed the simplified acquisition threshold shall provide the required certification regarding their exclusion status and that of their principals prior to award.

ATTACHMENT E

Insurance Requirements

GENERAL.

Grantee shall require in its first tier contracts (for the performance of work on the Project) with entities that are not units of local government as defined in ORS 190.003, if any, to: i) obtain insurance specified under TYPES AND AMOUNTS and meeting the requirements under ADDITIONAL INSURED, "TAIL" COVERAGE, NOTICE OF CANCELLATION OR CHANGE, and CERTIFICATES OF INSURANCE before performance under the contract commences, and ii) maintain the insurance in full force throughout the duration of the contract. The insurance must be provided by insurance companies or entities that are authorized to transact the business of insurance and issue coverage in the State of Oregon and that are acceptable to the Oregon Parks and Recreation Department ("OPRD"). Grantee shall not authorize work to begin under contracts until the insurance is in full force. Thereafter, Grantee shall monitor continued compliance with the insurance requirements on an annual or more frequent basis. Grantee shall incorporate appropriate provisions in the contracts permitting it to enforce compliance with the insurance requirements and shall take all reasonable steps to enforce such compliance. In no event shall Grantee permit work under a contract when Grantee is aware that the contractor is not in compliance with the insurance requirements. As used in this section, "first tier" means a contract in which the Grantee is a party.

TYPES AND AMOUNTS.

i. **WORKERS COMPENSATION**. Insurance in compliance with ORS 656.017, which requires all employers that employ subject workers, as defined in ORS 656.027, to provide workers' compensation coverage for those workers, unless they meet the requirement for an exemption under ORS 656.126(2). Employers liability insurance with coverage limits of not less than $500,000 must be included.

ii. **COMMERCIAL GENERAL LIABILITY.**
Commercial General Liability Insurance covering bodily injury, death, and property damage in a form and with coverages that are satisfactory to OPRD. This insurance shall include personal injury liability, products and completed operations. Coverage shall be written on an occurrence form basis, with not less than the following coverage amounts:
Bodily Injury, Death and Property Damage:
$1,000,000 per occurrence (for all claimants for claims arising out of a single accident or occurrence).

ADDITIONAL INSURED. The Commercial General Liability Insurance must include the State of Oregon, OPRD, its officers, employees and agents as Additional Insureds but only with respect to the activities to be performed under the contract. Coverage must be primary and non-contributory with any other insurance and self-insurance.

"TAIL" COVERAGE. If any of the required insurance policies is on a "claims made" basis, such as professional liability insurance, either "tail" coverage or continuous "claims made" liability coverage must be maintained, provided the effective date of the continuous "claims made" coverage is on or before the effective date of the contract, for a minimum of 24 months following

the later of : (i) the contractor's completion and Grantee's acceptance of all services required under the subagreement or, (ii) the expiration of all warranty periods provided under the contract. Notwithstanding the foregoing 24-month requirement, if the contractor elects to maintain "tail" coverage and if the maximum time period "tail" coverage reasonably available in the marketplace is less than the 24-month period described above, then the contractor may request and OPRD may grant approval of the maximum "tail " coverage period reasonably available in the marketplace. If OPRD approval is granted, the contractor shall maintain "tail" coverage for the maximum time period that "tail" coverage is reasonably available in the marketplace.

NOTICE OF CANCELLATION OR CHANGE. The contractor or its insurer must provide 30 days' written notice to Grantee before cancellation of, material change to, potential exhaustion of aggregate limits of, or non-renewal of the required insurance coverage(s).

CERTIFICATE(S) OF INSURANCE. Grantee shall obtain from the contractor a certificate(s) of insurance for all required insurance before the contractor performs under the contract. The certificate(s) or an attached endorsement must specify: i) all entities and individuals who are endorsed on the policy as Additional Insured and ii) for insurance on a "claims made" basis, the extended reporting period applicable to "tail" or continuous "claims made" coverage.

ATTACHMENT F

ARCHAEOLOGICAL INADVERTENT DISCOVERY PLAN (IDP)

Archaeological materials are the physical remains of the activities of people in the past. This IDP must be followed should any archaeological sites, objects, or human remains be found. Archaeological materials are protected under Federal and State laws and their disturbance can result in criminal penalties.

This document pertains to the work of the Grantee, including any and all individuals, organizations, contractors, or companies associated with the Project.

WHAT MAY BE ENCOUNTERED

Archaeological material may be found during any ground-disturbing activity. If encountered, all excavation and work in the area MUST STOP. Archaeological objects vary and can include evidence or remnants of historic-era and pre-contact activities by humans. Archaeological objects can include but are not limited to:

- **Stone flakes**, **arrowheads**, **stone tools**, **bone or wooden tools**, **baskets**, **beads**.
- Historic building materials such as **nails**, **glass**, **metal** such as cans, barrel rings, farm implements, **ceramics**, **bottles**, **marbles**, **beads**.
- Layers of **discolored earth** resulting from hearth fire
- Structural remains such as **foundations**
- **Shell** Middens (mounds)
- **Human skeletal remains** and/or **bone fragments** which may be whole or fragmented.

If in doubt call it in.

DISCOVERY PROCEDURES: WHAT TO DO IF SOMETHING IS FOUND

1. Stop ALL work in the vicinity of the find
2. Secure and protect area of inadvertent discovery with 30 meter/100 foot buffer—work may continue outside of this buffer
3. Notify Project Manager and Grantee
4. Project Manager will need to contact a professional archaeologist to assess the find.
5. If archaeologist determines the find is an archaeological site or object, contact SHPO. If it is determined to *not* be archaeological, work may continue.

HUMAN REMAINS PROCEDURES

1. If it is believed the find may be human remains, stop ALL work.
2. Secure and protect area of inadvertent discovery with 30 meter/100 foot buffer, then work may continue outside of this buffer with caution.
3. Cover remains from view and protect them from damage or exposure, restrict access, and leave in place until directed otherwise. **Do not take photographs. Do not speak to the media**.
4. Notify:
    - Project Manager
    - Grantee

- Contracted Archaeologist (if applicable)
- Oregon State Police - **DO NOT CALL 911** 503-378-3720
- SHPO (State Historic Preservation Office) 503-986-0690
- LCIS (Legislative Commission on Indian Services) 503-986-1067
- Appropriate Native American Tribes (as provided by LCIS)

5. If the site is determined not to be a crime scene by the Oregon State Police, do not move anything! The remains should continue to be *secured in place* along with any associated funerary objects, and protected from weather, water runoff, and shielded from view.
6. Do not resume any work in the buffered area until a plan is developed and carried out between the State Police, SHPO, LCIS, and appropriate Native American Tribes, and you are directed that work may proceed.

CONFIDENTIALITY

The Grantee and employees shall make best efforts, in accordance with federal and state law, to ensure that its personnel and contractors keep the discovery confidential. The media, or any third-party member or members of the public are not to be contacted or have information regarding the discovery, and any public or media inquiry is to be reported to Grantee. Prior to any release, the responsible agencies and Tribes shall concur on the amount of information, if any, to be released to the public.

To protect fragile, vulnerable, or threatened sites, the National Historic Preservation Act, as amended (Section 304 [16 U.S.C. 470s-3]), and Oregon State law (ORS 192.501(11)) establishes that the location of archaeological sites, both on land and underwater, shall be confidential.

Agenda Item 4

925 S. Main Street
Lebanon, Oregon 97355

TEL: 541.258.4212
brandon.neish@lebanonoregon.gov
www.lebanonoregon.gov

MEMORANDUM

Finance Department

To: Mayor Jackola and City Council

December 13, 2023

From: Brandon Neish, Finance Director

Subject: Remaining American Rescue Plan Act (ARPA) Funds

I. INTRODUCTION

In March 2021, the United States Congress passed the American Rescue Plan (2021) which allocated money, in part, to local governments across the country for specific reasons. These reasons included:

- Replacing lost public sector revenue
- Responding to public health and economic impacts of COVID-19
- To restore and bolster public sector capacity, or;
- For capital expenditures limited to broadband, water, and/or sewer infrastructure

The City of Lebanon received $3,475,676 in ARPA funds with the direction that it must be encumbered (committed) by December 31, 2024 and spent by December 31, 2026. To-date, the City has committed and spent $3.0 million on the Westside Interceptor sewer expansion project, $75,000 for cybersecurity and remote work enhancements, and $130,404 on retention bonuses to employees. This leaves a balance of $270,272 to allocate.

II. CURRENT REPORT

The City needs to determine what to do with the additional funding and ensure it is encumbered by the December 31, 2024 deadline. During the COVID era, the City did not overall see a decline in revenue which eliminates that option. Some suggestions such as utilizing the funds for the unhoused have been broached but the requirements are very specific stating that the funding can be used for "programs or services to support long-term housing security."

Also part of this discussion are the funds previously utilized. An issue was discovered related to the employee retention bonuses when reviewing past expenditures and reports. The rules surrounding retention bonuses issued under the ARPA guidelines specified that any premiums could not be distributed to employees earning more than 150% of the state's average wage. In 2022, the average annual wage in Oregon was $62,680 which would limit bonuses to those making less than $94,020 per year. Twelve employees received the $1,000 bonus who did not qualify according to the final

rule on ARPA funds issued by the U.S. Treasury. The excess expenditure that does not qualify totaled $15,869 which needs to be returned to the overall allocation for redistribution. This increases the ”unspent” allocation to $286,141.

One option is to allocate the remaining funds for sewer capital. This could include work necessary at the Wastewater Treatment Plant, sewer lines and capacity, sewer lateral replacements, and more. Allocating these funds to sewer projects would add to a budget that is already constrained and improve infrastructure in need of repair.

Recently, the U.S. Treasury issued new rules that would allow the ARPA funds to be spent on street projects not previously included in the original rules. Based on the unallocated amount, staff believes these funds could aid in one street project but would likely not stretch beyond that.

III. RECOMMENDATION

Staff recommends that the City Council allocate, by motion, the unallocated ARPA funds toward sewer infrastructure.

Additionally, since it was not formally completed previously, staff also needs a motion allocating $75,000 of the total allocation to cybersecurity improvements. This was discussed during the February 9, 2022 City Council meeting in the City Managers report but no official motion was made (that staff has been able to locate). For record purposes, this motion should be separate from the motion recommended above.

Agenda Item 5

925 S. Main Street
Lebanon, Oregon 97355

TEL: 541.258.4202
www.ci.lebanon.or.us

MEMORANDUM

City Manager's Office

Date: December 13, 2023

To: Mayor Jackola and City Council
From: Ron Whitlatch, Interim City Manager
Subject: Fluoridation of the City's Water Supply

I. INTRODUCTION

During the November 8, 2023, City Council meeting, the Council discussed fluoridation of the City's water supply. Public Comments were heard. After much discussion, a motion was made to bring the issue back to the Council as an agenda item for a vote on whether or not to refer the item to the voters. Staff has included several options below, however the Council could choose an action not listed.

III. RECOMMENDATION

1. **Motion to authorize the City Manager to place the item on the November ballot to remove fluoride from the surface water treatment process** (The City Manager would work with the City Attorney and City Recorder to draft a ballot title and a public hearing would be held); or

2. **Motion to authorize the City Manager to place an item during a special election to remove fluoride from the surface water treatment process** (The City Manager would work with the City Attorney and City Recorder to draft a ballot title and a public hearing would be held); or

3. Do nothing and continue the practice of fluoridation of the City's water supply – opponents would have to gather signatures to have the issue placed on the ballet.

Agenda Item 6

925 S. Main Street
Lebanon, Oregon 97355
TEL: 541.258.4923
www.lebanonoregon.gov

MEMORANDUM

Engineering Services

To: Mayor Jackola and City Council

Date: November 22, 2023

From: Ron Whitlatch, Interim City Manager

Subject: Property Acquisition – 1185 Airport Road

I. INTRODUCTION

The cities adopted 2018 Transportation System Plan identifies the intersection of 12th Street and Airport Road as a possible future location of a traffic signal or roundabout. The property located at the northeast corner of said intersection (1185 Airport Road - 12S02W15BC01600) was listed for sale on November 4, 2023 for $334,990.00. At the November 8, 2023, City Council meeting, Council authorized City Staff to make an offer on the property. Based on the market analysis done by the Gillott Home Team that came back between $316,000 and $336,000, City staff made an offer of $324,900. The seller countered at $329,900. City staff countered at $327,400 which was accepted by the seller.

II. RECOMMENDATION

This memo requests a City Council motion to approve the purchase of 1185 Airport Road and appoint Ron Whitlatch, Interim City Manager as an authorized signer on all real estate and financial documents related to 1185 Airport Road.

This document has been approved by the Lebanon City Council and signed on this 13th day of December 2023.

_____

Kenneth E. Jackola, Mayor ☐

Michelle Steinhebel, Council President ☐

ATTESTED BY:

_____

Julie Fisher, City Recorder

OREF

Sale Agreement # **1185-111123**

RESIDENTIAL

BUYER'S COUNTEROFFER No. One

This is a counteroffer to Seller's Counteroffer No. **One**.

Buyer(s) **Undisclosed**

Seller(s) **Tony Lopez**

Property Address or Tax ID # **1185 S Airport Rd, Lebanon, OR 97355**

(the "Property")

1. AGREEMENT TO PURCHASE: Buyer agrees to purchase the real and personal property upon the terms and conditions set forth in the Sale Agreement and subsequent counteroffers where applicable, except as modified as follows:

Sales price to be $327,400

Escrow to be First American Title with Theresa Markham.

Seller will not install new kitchen counters.

Seller will leave woodstove insert as-is and buyer responsible for removal.

All other terms to remain the same.

For additional provisions, see Addendum

All remaining terms and conditions of the Sale Agreement (and other counteroffer(s), where applicable), not otherwise modified, are approved and accepted by Buyer. Time is of the essence. This Buyer's Counteroffer shall automatically expire on **November 16, 2023** at **6:00** ☐ a.m. ☒ p.m. (the "Counteroffer Deadline") if not accepted within that time. This Buyer's Counteroffer may be accepted by Seller only in writing. However, Buyer may withdraw this offer before the Counteroffer Deadline at any time prior to Seller's transmission of signed acceptance.

Buyer acknowledges receipt of a completely filled-in copy of Seller's Offer and Buyer's Counteroffer, and all subsequent counteroffers where applicable, which Buyer has fully read and understands. Buyer acknowledges Buyer has not relied on any oral or written statements of any Seller or of any Agent(s) that are not expressly contained in the Sale Agreement as amended.

Buyer Ron Whitlatch Date 11/15/2023 _____ a.m. _____ p.m. ←
Undisclosed

Buyer _____ Date _____ _____ a.m. _____ p.m. ←

2. SELLER'S RESPONSE: Seller has reviewed the Seller Representations made in the Seller Representations section and elsewhere in the Sale Agreement and will promptly correct, in writing, any inaccurate representations. *(select only one)*

[ ] Seller accepts Buyer's Counteroffer.
[ ] Seller does not accept Buyer's Counteroffer AND Seller has attached to this agreement Seller's Counteroffer.
[ ] Seller rejects Buyer's Counteroffer.

Seller acknowledges receipt of signed copies of the Sale Agreement and all subsequent counteroffers, including this Buyer's Counteroffer, where applicable, which Seller has read and fully understands.

Seller _____ Date _____ _____ a.m. _____ p.m. ←
Tony Lopez

Seller _____ Date _____ _____ a.m. _____ p.m. ←

This offer was Delivered by Seller's Agent to Seller for signature on (*insert date*) _____ at _____ a.m. _____ p.m

Note: If delivery/transmission occurs after the Counteroffer Deadline identified above, it will not become binding upon Seller and Buyer unless the parties agree to extend said Deadline by an Addendum, Counteroffer, or other writing, jointly signed by the parties. The parties' failure to do so shall be treated as a rejection under Seller's Response above, and this transaction shall be automatically terminated.

Buyer's Agent **Laura Gillott / Katy Tacy** Seller's Agent **Michael Kosmicki**

Gillott Home Team-Keller Williams Realty Mid-Willamette, 266 East Grant Street Lebanon OR 97355 Phone: (541) 451-2211 Fax: (541) 570-1866 **1185 S Airport Rd, Katy Tacy**

OREF

Sale Agreement # **1185-111123**

RESIDENTIAL

SELLER'S COUNTEROFFER No. 1

This is a counteroffer to the [X] Sale Agreement or [ ] Buyer's Counteroffer No. _____.

Buyer(s) **Ron Whitlatch**

Seller(s) **Tony Lopez**

Property Address or Tax ID # **1185 S. Airport Rd, Lebanon, Or 97355**

_____ (the "Property")

1. AGREEMENT TO SELL: Seller agrees to sell the real and personal property upon the terms and conditions set forth in the Sale Agreement and subsequent counteroffers where applicable, except as modified as follows:

1) Sales price to be $329,900. 2) Escrow to be First American Title with Theresa Markham. 3) Seller will not install new kitchen counters. 4) Seller will leave woodstove insert as-is and seller responsible for removal. 5) All other terms to remain the same.

_____ For additional provisions, see Addendum _____

All remaining terms and conditions of the Sale Agreement (and other counteroffer(s) where applicable), not otherwise modified, are approved and accepted by Seller. Time is of the essence. This Seller's Counteroffer shall automatically expire on **November 16, 2023** at **5** [ ] a.m. [X] p.m. (the "Counteroffer Deadline") if not accepted within that time. This Seller's Counteroffer may be accepted by Buyer only in writing. However, Seller may withdraw this counteroffer before the Counteroffer Deadline at any time prior to Buyer's transmission of signed acceptance.

Seller acknowledges receipt of a completely filled-in copy of Buyer's Offer and Seller's Counteroffer, and all subsequent counteroffers where applicable, which Seller has fully read and understands. Seller acknowledges Seller has not relied on any oral or written statements of any Buyer or of any Agent(s) that are not expressly contained in the Sale Agreement as amended. Seller has reviewed the Seller Representations made in the Sale Agreement and will promptly correct, in writing, any inaccurate representations.

Seller DocuSigned by: Tony Lopez **Tony Lopez** Date 11/15/2023 _____ a.m. _____ p.m. ←

Seller _____ Date _____ _____ a.m. _____ p.m. ←

2. BUYER'S RESPONSE (*select only one*):

[ ] Buyer accepts Seller's Counteroffer.

[X] Buyer does not accept Seller's Counteroffer AND Buyer has attached to this agreement Buyer's Counteroffer.

[ ] Buyer rejects Seller's Counteroffer.

Buyer acknowledges receipt of signed copies of the Sale Agreement and all subsequent counteroffers, including this Seller's Counteroffer, where applicable, which Buyer has fully read and understands.

Buyer Authority Ron Whitlatch 11/15/23 **Ron Whitlatch** Date _____ _____ a.m. _____ p.m. ←

Buyer _____ Date _____ _____ a.m. _____ p.m. ←

This offer was Delivered by Buyer's Agent to Buyer for signature on (*insert date*) _____ at _____ a.m. _____ p.m

Note: If delivery/transmission occurs after the Counteroffer Deadline identified above, it will not become binding upon Seller and Buyer unless the parties agree to extend said Deadline by an Addendum, Counteroffer, or other writing, jointly signed by the parties. The parties' failure to do so shall be treated as a rejection under Buyers Response above, and this transaction shall be automatically terminated.

Buyer's Agent **Laura Gillott/ Katy Tacy** Seller's Agent **Michael Kosmicki**

LINES WITH THIS SYMBOL ← REQUIRE A SIGNATURE AND DATE

RE/MAX Integrity - Albany, 2910 Santiam HWY Albany OR 97322 Phone: **5419184020** Fax: **5419184065** **Tony Lopez**
Michael Kosmicki

Agenda Item 7

925 S. Main Street
Lebanon, Oregon 97355

TEL: 541.258.4905
www.ci.lebanon.or.us

MEMORANDUM

Administrative Services

To: Mayor Jackola and City Council

Date: December 5, 2023

From: Ron Whitlatch, Interim City Manager

Subject: **Support Letter for ENTEK**

I. INTRODUCTION

Attached is a request from ENTEK to make comment on an upcoming Environmental Protection Agency (EPA) rulemaking under the Toxic Substances Control Act. ENTEK has indicated that the trichloroethylene (TCE) rulemaking and proposed for battery separator manufacturing would severely impact their ability to operate. The proposed letter of support (attached) has more details as it pertains to the request.

II. RECOMMENDATION

A motion can be made to have Mayor Jackola sign the attached letter in support of ENTEK.

Mayor's Office
925 S. Main Street
Lebanon, Oregon 97355

TEL: 541.258.4904
kjackola@ci.lebanon.or.us
https://www.ci.lebanon.or.us

December 13, 2023

Via Regulations.gov and Electronic Mail

Gabriela Rossner
Office of Pollution Prevention and Toxics
U.S. Environmental Protection Agency
1200 Pennsylvania Ave NW
Washington DC 20460
rossner.gabriela@epa.gov
TCE.TSCA@epa.gov

Re: EPA Docket EPA-HQ-OPPT-2020-0642 - City of Lebanon Comment Supporting TSCA Exemption for ENTEK's Trichloroethylene Use in Battery Separator Manufacturing

Dear Ms. Rossner:

On behalf of the City of Lebanon, Oregon, I write to comment on the Environmental Protection Agency's (EPA) pending rulemaking under the Toxic Substances Control Act (TSCA), in strong support of a broad Section 6(g) exemption for ENTEK's use of trichloroethylene (TCE) in its battery separator production at its Lebanon, Oregon manufacturing plant.

We understand that EPA's TCE rulemaking and proposed exemption for battery separator manufacturing as currently drafted would so seriously interfere with ENTEK's ability to operate as to threaten the plant's viability. That outcome would be devastating, not only for the nation's access to ENTEK's battery separators but also for our community.

ENTEK currently employs over 450 people at its Lebanon, Oregon plant. It is one of the largest private employers in the city and provides an important source of tax revenue to fund critical public services in the city and the larger community. In short, ENTEK provides hundreds of stable, well-paying job opportunities for our residents and gives back to the community in multiple ways.

EPA in its proposed rule voices particular concern about TCE in wastewater discharged to publicly owned treatment works (POTWs). ENTEK's plant has for years discharged its wastewater to the City of Lebanon's POTW subject to a wastewater discharge permit from

the City of Lebanon's Engineering Services, current Permit No. ENTEK 2020-1. The permit, through its volatile organic compound limit, restricts how much TCE can be discharged. ENTEK's discharge does not present any concern with respect to the POTW's ability to satisfy its permit requirements under the Clean Water Act, nor has ENTEK's discharge led to any problems regarding worker exposure or other interference with POTW operations or conditions. ENTEK is in full compliance with of its permit and a dependable, responsive member of our regulated community.

We appreciate the opportunity to submit these comments. Please contact me if you have questions or would like additional information about ENTEK's important role in our community.

Sincerely,

Kenneth Jackola, Mayor

Agenda Item 8

CITY MANAGER'S REPORT
Reporting period: November 2023

I. A. ADMINISTRATION – Ron Whitlatch, Interim City Manager

- City Manager Recruitment process is continuing to move forward. Director Team and Community Member interviews will be held on December 7th. City Council will hold interviews on December 13th Executive Session prior to the regularly scheduled City Council Meeting.
- Attended several meetings in regard to the ongoing water quality issues associated with the Green Peter Reservoir Drawdown. At the current time, it is unknow what, if any resolution may happen.
- The City of Lebanon and City of Albany entered into a Memorandum of Agreement (MOA) for operations of Cheadle Lake and its potential impact to the Albany Santiam Canal in March 2022. As part of the memorandum, Lebanon agreed to placing no weir boards (which raises the lake level) in the out fall to the lake. After a year of operation and multiple complaints about low lake levels, Lebanon Staff placed a couple of weir boards in the outfall box in order to keep water in the lake for recreation and to provide necessary water to the entire ecosystem. This has caused Albany Staff some concern. We hope to meet with them in the coming weeks and (as the MOA Allows for) discuss changing some of the conditions of the MOA to better fit the needs of Cheadle Lake while also maintaining the integrity of the canal/lake berm.
- Holding regular Department Director Meeting (every two weeks) to keep moving priorities forward.
- Had a meeting with Build Lebanon Trails to discuss future trails and funding opportunities.
- Participated in the State of the City at the Lebanon Chamber Forum on December 1st.
- Working with the League of Oregon Cities to identify shovel ready infrastructure projects for housing. The Legislature will be meeting in early 2024 to discuss the possibility of providing cities with grants to complete infrastructure for housing.

B. HUMAN RESOURCES – Angela Solesbee, HR Director

- Recruitment:
  - Library Assistant On-Call – Posting closed 11/29. Applicants under review.
  - Communications Specialist – Posting opened 11/20 until filled.
  - Accountant – Posting opened 11/22 until filled.
  - Police Officer – Position posted on 9/13 open until filled. 4 candidates interviewed on 11/29.
  - City Manager - Position posted on 9/13 open until filled. 2 candidates moving forward. Interviews scheduled for 12/7 and 12/13. Community meet & greet scheduled for 12/7.
  - Communications Specialist – Posting closed on 5/25. New employee starting on 12/4.
- Benefits:
  - End of year benefit audits/reconciliation under way.
- Classification and Compensation:
  - Ongoing - Work has begun on adding/expanding the working conditions/physical requirements to the JD's. JD's are actively being updated as changes/updates are identified.
- Training and Development:
  - November Safety training – Preventing Cold Related Illnesses
  - December Safety training – Slips, Trips, Falls

- November All Employee training – None
- December All Employee training – Resilience and Stress Management

- Performance Management:
  - Assessing and testing the electronic performance evaluation tool under way. Process on hold until after 1st of the year.
  - 34 evaluations are past due as of 11/29/2023
    - 3 in Finance
    - 8 in City Manager's Office (Director Evals)
    - 7 in Public Works
    - 15 in Police Department
    - 1 in SC/LINX
- Other:
  - ADP Learning module on hold.

II. CITY RECORDER – Julie Fisher, City Recorder

- Compiled and Prepared the City Council Agenda and Packet
- Minutes: November 8th Regular Meeting & November 17th Executive Session
- Maintained and sent out the Preliminary Agenda Table
- Resolutions: 18 for 2023
- Ordinances: 20 for 2023
- Press Releases: 8
- Public Meeting Notices: 4
- Documents added to ORMS: 148 for a total of 20,118
- Public Records Request: 2
- Records Destruction Certification: 3
- Liquor Licenses Processed: 0
- Contact Us Submissions: 13
- Complied and Prepared City Attorney Evaluation Items for upcoming December Executive Session
- Maintained the City's social media accounts and website updates
  - Continued social media weekly postings on how to contact the City and various Departments
- Maintained the City boards/committee database, tracked terms, and archived minutes.
- Tracked all City agreements/contracts and sent out reminders about ones that are expiring
- Tracked and archived deeds, easements, and rights of way

III. COMMUNITY DEVELOPMENT – Kelly Hart, Director

A. Planning:

- The November Planning Commission (PC) meeting included one land use action:
  - Voted to recommend the City Council approve a Development Code Amendment DCA-23-01 regarding Recreational Vehicle Parks and Recreational Vehicles as Caretaker Dwellings under certain circumstances.
- In November, no projects were approved administratively.
- Staff is currently processing 9 planning applications for 54 projects:
  - AR-23-03, CPMA-23-01, CU-23-02, PLA-23-03, ZMA-23-01 to amend the land use designation to Mixed Use, consolidate the two parcels, and develop a convenience store and gas station on the southwest corner of Airport Road and Stoltz Hill Road (application on hold by applicant till decision on alternative site is complete)
  - A-23-02 to annex a portion of the property at 1880 Gilbert Street (application on hold per applicant to redefine the annexation boundary)

- DCA-23-01 to amend the development code and municipal code to authorize recreational vehicles as caretake dwellings associated with private outdoor storage facilities, and to eliminate recreational vehicle parks as a permitted use in the city. (Public hearing scheduled for December City Council meeting)
- AR-23-07 to modify Planned Development PD-15-06-30 to permit additional mini-storage facilities and RV storage (Under public review till December 1, notice of decision to follow)
- MR-23-01 to permit the first two phases of Planned Development PD-21-01 to develop a mini-storage facility at 225 E Airport Road (application is currently under staff review)

- Housing Production Strategy: MIG has been assigned as the consultant for the code implementation associated with the HPS. Contracts are currently being drafted. The public notification for the DLCD review of the HPS has closed. Two public comments were provided. DLCD will review the comments as part of the final review, with final decision on the HPS anticipated by February 2024.
- Community Development Block Grant (CDBG) Program: The CDBG application has been submitted and is currently under review by the State for the next grant cycle to support the Linn County Housing Rehabilitation Program.
- Psilocybin: A follow-up discussion is scheduled with Council for the December meeting.
- Continuum of Care (CoC) and Multi Agency Coordination (MAC) to address homelessness: The MAC group reviewed the responses from the Request for Proposals for the available funding, and funded the following projects:

Partner Organization	Category	Amount Requested	Amount Awarded
CHANCE (Albany)	42 new low-barrier shelter beds Admin	$270,665 $12,900	Shelter
	Total	$292,565	$17,732
City of Sweet Home (Sweet Home)	Street Outreach 34 new low-barrier emergency shelter beds Rapid Re-Housing Admin	$50,000 $265,000 $310,000 $15,500	Shelter, Rapid Re-Housing, & Admin
	Total	$640,500	$449,093
Crossroads Communities (Lebanon)	Street Outreach 3 new low-barrier emergency shelter beds Rapid Re-Housing Admin	$13,260 $25,000 $115,000 $6,740	Street Outreach, Rapid Re-Housing, & Admin
	Total	$160,000	$136,500

Partner Organization	Category	Amount Requested	Amount Awarded
Creating Housing Coalition (CHC)/Community Outreach Assistance Team (COAT) (Albany)	Street Outreach Rapid Re-housing Admin	$35,000 $90,000 $4,500	Street Outreach, Rapid Re-Housing, & Admin
	Total	$129,500	$129,500
FAC	Street Outreach	$49,920	0
Young Roots	Rapid Re-Housing Admin	$376,093 $18,805	0
	Total	$394,898	0
Jackson Street Youth Services	Street Outreach	$47,619 $2,381	
	Total	$50,000	0
	Total Requested by Partners (non-CSC)	$973,117	
	Total Awarded	$732,825	

Breakdown of Funds Request to OHCS

Category	MAC Budget	Amount Awarded to Partners
Street Outreach	$50,000	$50,000
Emergency Shelter	$950,000.34	$950,000.34
Rapid Rehousing (Partners and CSC)	$632,093.78	$632,093.78
HMIS (CSC)	$50,000	$50,000
Administration (Partners and CSC)	$296,840.13	$296,840.13
Total Award	$1,978,934.25	$1,978,934.25

- Governor's Office Housing Production Framework: The City of Lebanon has been invited to participate in the Governor's Small City Group to discuss housing production, and infrastructure grant and loan programs to assist in the development of the 2024 Legislative Proposal from the Governor's Office.
- Rules Advisory Committee on Housing: The Community Development Director has been selected to participate in the State's Rules Advisory Committee for Housing to develop the Oregon Administrative Rules associated with House Bill 2001 (2023) and House Bill 2889 (2023). This is a multiple year appointment which will provide Lebanon a voice at the table in the development of reasonable housing standards for implementation at the rural level.

B. Building:

- The city processed 41 permits in October. Total fees received were $13,675.34 and valuation of construction was $833,449.52. By comparison, in October 2022, 63 permits were processed. Total fees received were $62,890.02 and valuation of construction was $5,834,287.00.
- The city processed 47 permits in September. Total fees received were $21,154.50 and valuation of construction was $2,866,409.00. By comparison, in September 2022, 51 permits were processed. Total fees received were $20,079.78 and valuation of construction was $1,197,966.00
- A current list of the larger construction sites include:
  - Riverside Banks Subdivision and Duplexes (Williams Street)
  - 78-unit multifamily development (Russell Drive)
  - Lebanon Fire District property (Oak Street)
  - 28-single family dwelling lots - Cheadle Lake Estates (River Road)
  - Chipotle interior renovations and façade improvements (S Santiam Highway)
  - Seven Oaks Middle School Addition (Cascade Drive)
  - Anderlik Manor Renovation (W Grant Street)
  - Panda Express (Airport/Hwy 20)
  - 8-lot subdivision – Cascade Estates (Seven Oaks Lane/Cascade Drive)
  - Weldwood Storage (Weldwood Drive)
  - 12-lot subdivision (Walker & Wassom)
  - 26-lot subdivision – Franklin Grove Estates (Franklin and Russell Drive)

C. Economic Development:

- Economic Opportunities Analysis (EOA): The Economic Development Catalyst, with the Community Development Director has begun the process of implementation of the EOA:
  - Business visitation program: In November, the business visitation program continued. Councilor Salvage and Steinhebel, with the Economic Development Catalyst and the Community Development Director visited Schmizza Public House, and Les Schwab Tires. Each business visit provided insights into the business operations, market trends and projections, and included an open dialogue on opportunities for the City to assist the businesses. Takeaways from the specific meetings included:

- Schmizza Public House: They have seen a significant positive impact regarding the houseless after more recent ordinances have been set in place, they thanked the City and Police Department for the effort and work they have done. They would like to see a step by step guide on the proper way to address the houseless that may be loitering near there place of business. They see a noticeable change in the volume of guests when there are conferences or tournaments in Lebanon, especially during the summer, and see the value of partnering with Boulder Falls to increase tourism and connection to local businesses. The owners are interested in pursuing the development of a City map as well as meeting with other stakeholders interested in tourism.
- Les Schwab Tires: The Manager has been in Oregon for over a year and complimented Lebanon for the close knit community, he is wanting to become more involved with community events like the Strawberry Festival. Les Schwab is doing more business in the community and does not lack applications when it comes to being fully staffed. About half of the employees live in Lebanon and have mentioned excitement over the new restaurants opening soon, Chipotle, specifically. There is room for further expansion of the business, but unfortunately not at their current location. There has been some ongoing issues with houseless individuals and vandalism, but they have been improving. The Economic Development Catalyst will be following up with some resources identified in the meeting.

The business visitation program is anticipated to be a monthly program. At the direction of the Mayor, each month, the business visits will be scheduled based on Ward boundary, and the Councilor representatives for the Ward will be invited to join.

- Industrial Site Readiness: The Economic Development Catalyst is working with a local commercial broker to contact Industrial property owners to identify interest in promoting their site for business recruitment nationally, and to advertise their properties on Oregon Prospector. Multiple property owners have responded to outreach by the Economic Development Catalyst and have agreed to advertise their properties with adjacent properties to create a more marketable site.
- Downtown Building Restoration Program: The Downtown Building Restoration (DBR) Program is underway, all applicants have signed and returned their contracts, and work has begun on a few of the projects. As projects complete different activities associated with their projects, the City is providing payments to contractors in compliance with the contracts. 748 S Main St just completed their façade improvement project.
- The Economic Development Catalyst continues to attend Linn County Commissioner meetings in an effort to be more visible to the county and to represent the interests of Lebanon and the REAL group.
- Broadband Feasibility Study: The Broadband Feasibility Study for Linn, Benton and Lincoln is wrapping up and the report will be shared shortly. The next step is to develop a regional taskforce to actively pursue grants to extend broadband availability. At this juncture, with the City of Lebanon largely being served by broadband, it is believed the County would be the most appropriate agency to develop the taskforce to support the county areas and smaller communities underserved by broadband.

- Workforce Development Initiative: The Economic Development Catalyst is working to organize a meeting between major employers in Lebanon that share childcare related challenges and potentially brainstorm solutions that would be grant eligible. Business Oregon did get additional Childcare funds, but the parameters of the program are not established yet. The Regional Development Officer with Business Oregon will send information as it becomes available.
- Business Registration Initiative: The Director of the Oregon Economic Development Association (OEDA) will be meeting with the Lobbyist for OEDA and State Representative Bynum to discuss the Business Registry Data Bill that was proposed in the 2023 long session but was unable to be brought forward. The goal is to resubmit the bill for the 2024 short session. In the meantime, the Economic Development Catalyst is refining the list of businesses in the 97355 area code for outreach and support purposes.

IV. ENGINEERING SERVICES – Ron Whitlatch, Director

- As time allows, Engineering Staff continues to work on designs for additional small sewer replacement/rehab projects. These include East Ash (between Carlson and Creswell), Fourth Street (between Maple and Grant), and main extension along Division Way. Staff is continuing to receive applications for replacement of sanitary sewer laterals (through the Small Sewer Lateral Replacement Program).
- Kennedy Jenks Engineering (KJE) and City Staff held a meeting on November 17th to discuss several draft chapters of the new Wastewater Treatment Plant Facility Plan. The meeting was used to identify preferred alternatives for different processes within the Wastewater plant as well as to prioritize these. Staff is continuing to complete additional testing to provide data to determine the parameters for the new NPDES Discharge Permit. The Masterplan is scheduled for completion in late spring of 2024. We received word from DEQ that the new NPDES Discharge Permit is now scheduled to be complete in 2025. This is part of the reasoning for slowing the progress on the Master Plan so that we can discuss permit parameters prior to finalization of the Master Plan.
- Trails Update:
  Design of the multi-use path along Airport Road (in conjunction with the Airport Road/Stoltz Hill Signal Project) from Seventh Street to Burkhart Creek will be completed with the signal drawings and incorporated into the overall project. Staff has completed a design for a trail to connect the Old Mill Trail and the River Park Trail in the Gills Landing Parking lot. BLT is currently looking for grants along with donations to complete this project. The City has submitted and will be receiving a Recreational Trails Grant to complete a segment of trail on the Albany Property next to River Park. Design will begin once we have been issued Notice to Proceed. Construction for the Cheadle Lake Extension Trail project is complete. The project was funded by a grant from the State of Oregon.
- Emery & Sons Construction has completed sanitary sewer pipe installation on Crowfoot Road (from South Main to View Lane). We are not sure when the final surfacing (asphalt overlay) will be performed due to weather. They have begun the final leg of the project on South Main Road (from Crowfoot to Joy). Pending weather, we hope to have a majority of the project wrapped up in December. Below is the current financial status of the project. This will be updated to reflect changes/additions that occur during construction.

Approved GMP Values				**Contingencies Used to Date**		
Construction Cost		$18,029,671.95		Contractor Contingency		$254,900.97
Contractor Contingency		$398,026.75		City Contingency		$692,179.00
City Contingency		$995,066.86		**Allowances Spent to Date**		
Contractor Allowances		$1,902,065.32		Trench Foundation		$88,608.34
Total GMP Approved		**$21,324,830.88**		Dewatering		$354,309.11

- Staff has been actively working on our required TMDL update to DEQ. The update was submitted and has been approved by Oregon DEQ. As time allows, we will begin updating the City's Five-Year Matrix and submit it to DEQ for approval. In the coming months, there will also be a big push by DEQ to begin the water temperature requirements for each jurisdiction. The City will not know the impacts of this, if any until the new regulations have been issued. It is possible that the new regulations (which tie into the City's NPDES Permit Update) could require action at the Wastewater Plant in order to mitigate temperature. The TMDL will require more extensive water quality efforts for storm drainage included in future projects and require testing of storm drainage outfalls as well as temperature controls in the near future. In conjunction with the TMDL requirements, Staff will be sending letters to commercial/industrial properties reminding them to have their private catch basins cleaned yearly to help eliminate pollutants from entering drainage ways.
- Staff is finalizing the design and updating the Cost Estimate for the Seventh Street Reconstruction Project (Oak to 'F'). Final drawings have been issued to private utility companies to begin relocation of conflicting utilities this fall. We anticipate advertising the project for bids in December 2023/January 2024. The project is estimated to cost $3.6 million and will take at least 9 months to complete. Prior to construction, Staff will hold a neighborhood meeting for

residents living along Seventh Street to inform them of what to expect, length of construction, and inconveniences associated with it.

- Engineering Staff is currently working on several small projects which include design for drainage pipe replacement on Airport Road at Safeway (existing pipe is undersized leading to flooding in heavy rain events), Sanitary Sewer Extension at US bank/River Center, drainage pipe replacement on Leonard Street, Rapid Flashing Beacon Pedestrian Crossing on South main, updating of our Pre-Treatment Ordinances, multiple sewer lateral replacements, and updating the City's Engineering Design Standards for Development as time and staffing availability allows.
- Staff has received comments back from ODOT for a design approval of several sidewalk access ramps on Grant Street between Park and Second Street. We will be making several revisions in order to satisfy ODOT. Staff is actively designing the waterline replacement and street upgrades on Grant Street between Main Street and Fifth Street. Based on current workload, we anticipate the project going out for bids in early 2024 (this is contingent upon ODOT review time).
- As Staff is available, we are continuing the process to update the City's fiver year Capital Improvement Projects Plan. This effort will likely take several months (being done as Staff time allows) to complete. Staff will bring the completed document to the City Council for approval sometime in 2024.
- The City is preparing for a new Traffic Signal at the intersection of Airport Road and Stoltz Hill Road. This project will also extend waterline and sanitary sewer line on Stoltz Hill Road from Antioch Street to Airport Road, sidewalk and driveway installation, and likely a multi-use path along Airport Road. The Project Team (Kittelson Engineers, Udell Engineering, and City Staff) are moving forward with the final design for the project. The project has been delayed for over a year now due to right-of way needs and ongoing negotiations with a property owner. Linn County is currently in the process of obtaining the needed right-of-way (which is going through imminent domain), while the City is negotiating with the property owner on the north leg of the intersection for a small portion of right-of-way. With the approval of a new Gas Station/Mini-Market on the NW corner of the intersection (along with the removal of the existing Grandpa's Grocery on the SW Corner) staff and consultants will be modifying the design to provide better traffic flow on the SW corner by increasing the radius size. The Project Team will begin finalizing the design, so it is ready to advertise for bids as soon as right of way is obtained and a timeframe for the demolition of Grandpa's Grocery .
- Kittelson Traffic Engineers has completed the design (30%) of a round-about at the Cascade Drive/Weldwood Intersection. We may be asking them to look at granting opportunities for completion of the project in the near future.
- Staton Companies has started the demolition of the Old Water Treatment Plant. They are making good progress and should be done in early 2024. The next step will be to determine use of the property.
- ODOT and City Staff are continuing the study of pedestrian/bicycle safety along HWY 20 and HWY 34 through Lebanon. We have held multiple meetings to discuss bike routes along the highways and alternate routes using City streets. The project is also looking at various intersections and mid-block locations to determine what safety projects could be completed to improve pedestrian and bicycle movements on the highways through Lebanon. Funding for improvements will likely come from ODOT. The final report is now scheduled to be done early 2024.
- Bids for the Rapid Flashing Beacon Project on Tennessee Road (At Beaton Lane) were received in August 2022 with the lowest being over $100,000, which is double the amount that staff had planned for the project. Staff will be preparing the project to advertise for bids again and also adding the Rapid Flashing Beacon to South Main Road for a combined project. Udell Engineering is currently under contract to design the crossing on South Main in the vicinity of Cedar Drive. It is likely this project will be bid in spring of 2024 due to current workload in the Engineering Department. Build Lebanon Trails has also committed $20,000 to this project in an effort to get it done.
- Cheadle Lake Park Utility Extension Project is underway. Northcore USA has been working nights in order to maintain business access during the day along Weirich Road. They have finished installation of waterline on Cascade Drive and Crowfoot Road and are currently installing waterline on Weirich Drive. They have also completed the bore to get the waterline under HWY 20 and the RR Tracks. The project extends waterline from Cascade Drive (in front of Seven Oaks School) along Crowfoot Road, crossing HWY 20 and along Weirich Road to

the park. There is approximately 600 feet of sanitary sewer that is currently being installed along Weirich Road from the main park entrance to the southern property line of the park. The project is scheduled to be complete in January 2024.

- Udell Engineering is working on a conceptual master plan for the park which has been reviewed by the Parks, Trees, Trials Committee. The cost estimate for the initial conceptual design was substantially more than we have available in funding. Staff and Udell Engineering will come up with an alternate design with a much more paired down scope, with the focus being on accessibility improvements, backbone utilities, and hopefully a stage/event area. It is likely construction will take place of any improvements will be in 2025.
- Udell Engineering is under contract to provide Engineering Design services for a sanitary sewer line replacement on North Third Street. Staff is working with Udell to determine the best approach to replacing the line since it is located in the alley with very little maneuvering room. The existing line has multiple failures and a substantial amount of infiltration. Once design is complete, Staff will advertise the projects for bids, likely spring/summer of 2024.
- Udell Engineering is currently under contract to provide the Topographic Survey for design of Fifth Street (Tangent to Mary). This project will re-construct this portion of Fifth Street and likely add a traffic signal at the intersection of Fifth and Tangent (assuming it meets warrants and has ODOT approval). We anticipate starting design early next year.

Development:

- Paventy & Brown Orthodontics plans approved for construction. ODOT permit approved. Building interior design modifications are underway.
- McKinney II public improvements complete and accepted. Contractor completing onsite buildings and community room.
- South Main Apartments improvements complete and contractor completing final buildings.
- Dairy Queen site plan approved for construction. Building permits issued to start construction. Developer currently getting bids for the project.
- Plans approved for Hickory Lake Apartments off of Airport Road. Developer waiting on erosion control permit approval.
- Cheadle Lake Estates subdivision public improvements accepted, several homes remaining still under construction.
- New subdivision at Franklin & Russell Streets currently under construction. Subdivision plat signed and approved; contractor bonded public improvements punch list items.
- Plans approved 3-duplexes off 9th Street. Water line extension complete and online. Buildings under construction. Private storm drainage under review with design engineer for modifications. Punch improvement and site punch list provided to the contractor.
- Plans received for Airport Storage of temporary pods to construction a fire water line.
- Plans returned to engineer for revisions for Bate's storage facility on Hansard Ave.
- Plans returned to engineer for revisions for storage facility off of Industrial Way.
- Site and public improvements for new Fire Station approved. Utility crossing on 12th Street complete contractor working onsite. Building under construction and additional off-site work being complete along Oak Street.
- Plans approved for Buckmaster Plumbing new storage building. Contractor working building addition. Improvements schedule for later this year.
- Plans pending approved for half street and utility extension on the corner of Stoltz Hill & Kees Streets. Plans stamped approved and bonded for builder to start home construction.
- Weldwood Dr storage water extension with hydrant constructed and passed testing. Contractor to complete onsite work and final street patch.
- Chipotle Restaurant complete and final occupancy granted.
- Plans approved for new sewer extension along Oak St.
- Plans approved for new Panda Express Building corner of Airport and Hwy 20. All utility crossing complete, final street paving scheduled for night work last week of November.
- Plans approved for new subdivision Madelyn Meadows between Walker & Wassom Street. Contractor working on sewer main extension and excavation of new private street.

- Plans approved for a new apartment complex on the corner of Airport & S 2nd Street. Public improvement permit issued for water extension and hydrant crossing.
- Traffic Impact Analysis for Crowfoot Subdivision under Engineering Service Agreement contract. Traffic counts to be collected once S Main Road & Crowfoot open to traffic.
- Plans received and under review for RV storage facility at Mill Race Station.
- Plans received and under review for sewer main extension for 12th Street for several tax lots north of Airport Rd.

V. FINANCE SERVICES – Brandon Neish, Finance Director

- Accounts Payable:
  - Payments made in November 2023; 237 checks were processed for payments of $3,974,889.48.
- Payroll:
  - Payroll was processed on November 9th and November 24th for all employees. In total, 130 employees were paid during the month of November.
  - There have been three (3) manual checks processed since July 1, 2023 for payroll errors:
    - July 2023:
      - Direct deposit returned (employee entered wrong deposit information).
      - Cash out missed during payroll entry (paperwork was delivered timely).
    - August 2023:
      - No payroll errors identified in August 2023.
    - September 2023:
      - Team leader pay missed. Team Leader due to configuration error with calculation (same issue from May 2023 but missed one individual when fixed then).
    - October 2023:
      - No payroll errors identified in October 2023.
    - November 2023:
      - No payroll errors identified in November 2023.
- Additional:
  - Finance completed the final field audit October 30 – November 3. Necessary workpapers and a final trial balance were provided on-time to the City's auditors. Additional documentation and data has been requested by the auditors which has also been provided. Draft documents are expected by the time the City Council meets next on December 13th.
    - Auditors did raise concerns with the segregation of duties surrounding payroll. Specifically, having the Finance Director with review and edit capabilities for payroll presented an unacceptable risk in their eyes. Staff reviewed options and opted to remove the Finance Director's edit/processing capabilities but maintained the review abilities. At this time, there is no functional backup for Payroll should the Payroll Specialist be out of the office or vacant. This will need to be rectified should the need arise.
  - Accountant Jenny Poff has submitted her resignation. She will be moving on to a new opportunity. We wish Jenny the best of luck with her new position and will miss her work ethic and contributions to the Finance Department. A search for a new Accountant began November 22nd.
  - Finance has been working with the Library on a new point of sale system to make financial transactions easier. Going with Square, the Library has been piloting the new system amongst staff and full training/roll out should occur the first part of December.
  - Four Police Department employees with overpayments have not established means for repayment from the issue identified in April 2023. An agreement between Teamsters and the City for the repayment of wages expires December 31, 2023.

- Utility Billing for November 2023:
  - 6,250 billing statements (including electronics) were mailed November 22nd for a total of $1,086,490 in utility revenue.
  - 43 Owner Lien (past due) notification letters were mailed.
  - On November 9th, 423 phone calls went out to notify customers they have a past due balance.
  - 114 accounts were locked out on November 15th for past due bills.
  - There was a total of 307 service requests: 35 move ins, 114 lock-offs, 6 re-read meters, 94 reconnects, 12 move outs, 22 leak checks, no changed meters, 14 turn ons, 4 turn offs, 3 meter installations, no meter removals, no dead meters, no water quality checks, no pressure tests, no emergency requests, no meter tests, no meter locates and 3 miscellaneous requests.

Utility Billing Data

	Nov-22	Dec-22	Jan-23	Feb-23	Mar-23	Apr-23	May-23	Jun-23	Jul-23	Aug-23	Sep-23	Oct-23	Nov-23
Active Accounts	6,439	6,442	6,445	6,448	6,459	6,459	6,459	6,459	6,459	6,516	6,516	6,555	6,582
Penalty Applied	1,013	976	883	711	953	721	N/A	296	236	265	280	365	234
Lock Offs	125	N/A	118	56	68	68	83	71	74	0	100	73	114

Municipal Court Data

	Nov-22	Dec-22	Jan-23	Feb-23	Mar-23	Apr-23	May-23	Jun-23	Jul-23	Aug-23	Sep-23	Oct-23	Nov-23
Charges Filed	111	45	135	94	134	100	94	129	102	137	166	109	180
Show Cause Issued	39	42	43	43	39	34	43	42	54	48	56	61	55
Licenses Suspensions Issued	18	9	23	17	10	30	22	23	20	38	32	30	20
Warrants Issued	203	102	186	105	159	180	154	144	160	231	203	150	169
Charges Disposed	103	52	114	157	99	168	115	80	137	141	123	121	92

VI. INFORMATION TECHNOLOGY SERVICES – Brent Hurst, Director

A. IT:
- The web site upgrade project continues in collaboration with the City Recorder and other departments.
- The budgeted SCADA upgrade project continues.
- Staff participated in multiple Cyber Security meetings and awareness events during October in Salem and online with MS-ISAC and CISA.
- Staff assisted with Zoom & YouTube Santiam Travel Station (STS) meetings for City Council, Parks, Trees, and Trails, and other staff meetings as requested.
- Worked on upgrading and migrating file server operating systems.
- Progress continues with Lebanon Fire District on the Station 31 construction project.
- Weekly and monthly security and vulnerability patches were completed.
- Staff addressed multiple other routine break-fix issues, equipment replacements, and maintenance renewals for IT.

B. GIS:
- Continued GIS updates for the Sanitary Sewer GIS system upgrade project. This will be a multi-month project like the Water GIS system update completed Spring 2023.
- Work continues with Finance and Public Works to update meter reading routes for City water services.

- Continued Lead & Copper Survey Project Coordination.
- Started a Water Quality Dashboard to be incorporated into the new City web site project Spring 2024.
- Cleaned up and coordinated updated web maps with Engineering and Planning.
- Coordinated new address updates with Community Development and Linn County GIS.
- The monthly tax lot updates from Linn County were completed.

Summary:

- During the past month, IT and GIS closed 291 tickets or work orders. This includes system generated tickets that needed analysis and resolution in addition to end user requests for help.

VII. LIBRARY – Kendra Antila, Director

- With memorial donations in honor of former Friends member Mac McNulty, we recently created the Mac McNulty Imagination Station in the children's area. The Imagination Station is a large table with various manipulatives that encourage imaginative play. It has proven to be a very popular addition to the children's room.
- Additionally, memorial donations in honor of Lebanon elementary school teacher Kathy Pointer allowed us to purchase a new rocking chair for the children's area and multiple books for the Junior collection.

VIII. POLICE – Frank Stevenson, Chief of Police

- For the month of November, the Patrol Division had approximately 1,565 calls for service, issued 41 traffic citations, made 73 arrests, and wrote 181 case reports.
- The Detective Division remains busy. They were assigned ten (10) new cases, assisted on three (3) separate overdoses to locate the supplier, were able to close out one (1) case, and reviewed forty-six (46) DHS referrals where child abuse was reported. Detectives also assisted with one (1) search warrant out of Albany that was narcotic-related.
- Police recruits Garcia, McKinney, Belknap and Hobbs have all began their multiple-month training at Department of Public Safety Standards and Training (DPSST).
- After nearly 5 years with LPD, Communication Specialist Sara Olson resigned and took a job at Coos County.
- This past month, we saw a second resignation of a Communications Specialist, this time due to complications related to the stress of the job.
- Candidate Heather Means has accepted a full-time position as Communication Specialist and will begin with LPD on December 4th; this will fill one of the two vacancies. Heather comes to us as a certified dispatcher with several years of service through the Linn County Sheriff's Office.
- We currently have open recruitment processes underway to fill additional vacancies for both Communication Specialist and Police Officer.
- We will be interviewing four (4) Police Officer candidates on Thursday, November 30th.
- The Community Services Division remains active in the community. This past month, Community Policing staff responded to approximately 81 calls for service which covered a variety of topics (ordinance violations, parking complaints, park patrol, abandoned vehicles/trailers, transient calls and welfare checks).
- Staff continued to work on ODOT grants for distracted driving, DUII, speed and seatbelt violation enforcement.
- Six (6) online Traffic Safety classes were administered.
- K9 Taz has retired after a very honorable career with LPD. K9 Taz came to work for the Lebanon Police Department in 2018. She was initially discovered in an animal shelter in central California but was quickly recognized as having the potential of a working dog and rescued. After specialized training and weekly maintenance training by her handler, K9 Taz has had a colorful career with the Lebanon Police Department. She was deployed over 80 times throughout her career as a drug detection specialist. Because of her work ethic, she aided in the capture of substantial amounts of narcotics, currency, drug delivery evidence and firearms. K9 Taz was utilized by the DEA (Drug Enforcement Agency) on several occasions and assisted the Linn County Drug Team with multiple residential search warrants and vehicle seizures. Her efforts were responsible for numerous jail and prison sentences. In her handler's words, "K9 Taz brought laughter, excitement and smiles to numerous people in the community.

Oftentimes, community members would ask how Taz was doing, always remembering her name and not mine, as her handler". Taz will retire and enjoy being a 'regular' dog at her handler's house, as she can now sleep indoors on the couch and eat whatever she wants.

- With K9 Taz retiring, Lebanon Police was fortunate to get another K9 named 'Oak', donated by the Linn County Sheriff's Office. K9 Oak will be utilized as a patrol dog who will assist in tracking, locating items, and fugitive apprehension. K9 Oak is a three-year old male Dutch Shepherd/Belgian Malinois mix. He recently graduated from a very intensive several-week training in Bend.

IX. PUBLIC WORKS – Jason Williams, Director

A. Collections (Sanitary-Storm)

- Mowing:
  - Maintenance mowing and weed eating, some areas are getting too wet to safely mow for the remainder of the season.
- Manholes:
  - Post-construction inspections on 2 new projects
- Sewer Mains:
  - Cleaned 2350 feet and video inspected 1925 Feet of sanitary sewer main line.
  - Flushed low flow, dead end sewer mains.
- Sewer Laterals:
  - Assisted 5 customers with sewer lateral issues.
  - Video inspected 150 feet of sanitary sewer laterals.
  - 1 cleanout installed.
  - Conducted 1 sewer lateral replacement investigation.
    - 0 -entered program
    - 0 -not eligible or did not require replacement
    - 1 -working with customer to gather more information
    - Note: We were able to get all private laterals to at least a temporary working condition
- Storm:
  - Cleaned ditch inlets and culverts to improve storm water flow.
  - Cleaned catch basins in several problem areas.
  - Completed several rounds of catch basin/curb inlet clearing during rain events.
- Assisted with full system flush for two weeks.
- Monthly equipment checks and maintenance completed.
- Checked River Park RV Dump Station holding tank, and operation of the pump.
- Checked Gill's Landing Pump Station and pump operation.
- Completed fall well meter reads. Worked with one customer to get the well meter re-installed correctly.
- Completed 3 warranty inspections on new and recent projects.
- Assisted with water service orders and other water related issues.
- Removed pump from Strawberry Plaza for the winter.
- Assisted streets department with several street sign issues.
- Made 2 water service repairs.
- Assist with water lock-offs.
- Assist with water meter reads.
- Assist with vactor at Wastewater Treatment Plant.
- Sand was delivered to Sheriff's Substation for sandbags.
- Pumped septic tank at 2391 Porter St. for Linn County.
- Employee passed DEQ Wastewater Collections I certification test.

B. Parks
- Opened, closed, and cleaned parks restroom buildings daily.
- All parks and trails system garbage's checked daily and emptied.
- Mowing as the weather permits.
- Completing daily leaf removal and mulching.
- The trail system is cleaned weekly of leaves and other debris.
- All park and school irrigation systems have been shut down and winterized.
- There has also been an increase in daily vandalism and trash pick-up which has increased the amount of time it takes crews to clean restrooms and complete trash pick-up.
- Installed new park rules signs at all city parks.
- The gazebo at Ralston Park was repainted in preparation for the annual Holidays in the Park event.
- Crews began repainting the floors and walls in all park restrooms.
- Three toilets were broken by vandals at the Bob Smith Memorial Park restrooms, replacement toilets have been received and installed.
- Gills Landing:
  - There were 40 RV park reservations for the month of November.
  - There was 1 shelter rental for the month of November.

C. Streets
- Started annual leaf pickup.
- 1 – day was spent sweeping.
- Installed downtown fall banners.
- Crews graded alley ways and filled potholes throughout town.
- Crews replaced street signs / posts that had been damaged, graffitied, or were faded.
- Placed and removed barricades / stop signs for internal / external projects, and public events.
- Completed vehicle repairs and maintenance.
- Mowed public rights-of-ways, trails, and Cheadle Lake grounds.
- Completed 30 hours of trail maintenance.
- Assisted Distribution Department with water service orders including leak checks, turn-on, emergency shut offs, and water service repairs.
- Assisted with the annual full system flush.
- Completed vehicle and equipment maintenance.
- Crews started installation of thermal at (7) locations through town.

D. Wastewater Treatment Plant
- The Lebanon WWTP is full compliance with our NPDES permit month to date.
- Influent flow for the month is averaging 4.3 MGD.
- A leak repair has been completed on the SBS tank, the repair completed and returned to normal service.
- DEQ has pushed off our permit renewal, we are currently on the schedule for 2025.
- We are in our 23rd out of 24 months of permit renewal sampling now and going well.

E. Water
- The full system annual flush was completed between October 31, 2023, and November 8, 2023.
- Meter reading was completed.
- Daily water service orders including leak checks, locates, taste and quality issues, water samples and other customer concerns continue.
  - Repaired 3 broken water services.
  - 67 locates were completed throughout Lebanon for the month of October.
  - Followed up on water concerns and completed sample testing requested by citizens.
  - Replaced 10 water meters and added radio readers to them

- Changed out failing meter boxes and dead meters.
- Worked on the water maintenance list.
- Vehicle Maintenance.

F. Water Treatment Plant

Production	
Monthly Water Use (Intake Flow Meter)	70.00 MG
Finish Water Produced	64.83 MG
Water Sent to Cheadle Lake	00.00 MG

Water Quality					
Finish Chlorine			**CT Basin Turbidity**		
Min > 0.20 mg/L	Max < 4.00 mg/L	Average ~ 1.00 mg/L	Min	Max < 1.000 NTU	Average
0.76	1.72	1.16	0.007	0.09	0.027
Finish pH			**Filtrate Fluoride (Average of Each Day)**		
Min > 7.00 pH	Max < 9.00 pH	Average	Min	Max < 4.00 mg/L	Average ~ 0.70 mg/L
7.62	8.09	7.79	0.45	1.00	0.60

Maintenance/Operations:

- Due to major turbidity events this month, staff are working continuously to maintain water quality. All samples are testing well within the range of requirements.
- Work is being completed on the new CIP CI2 pump; we are awaiting programing currently.

X. SENIOR SERVICES and LINX – Kindra Oliver, Director

- As of the end of November, LINX Transit has provided over 25,000 rides. Just a few years ago, our average ridership for ten years running was just over 20,000. Our team continues to help meet the growing transportation needs in our community.
- Our Thanksgiving Banquet was a big success, with over 200 seniors and volunteers in attendance. This was our first in-person banquet, since Covid-19. Thank you to the Oaks of Lebanon, Willamette Manor, The Gillott Home Team, Brookdale Heritage Plaza, the Oregon Fiddlers Association and the Lebanon High School Cheer Team for all your help to make this wonderful event happen.
- Our Veterans Recognition Reception was also well-attended and appreciated by all who participated. Thank you to the Lebanon High School JROTC Color Guard, Seven Oak Middle School Leadership class, Linn County Veteran Services and Hazella Bakery for partnering with this event to honor veterans and their families in our community.
- We now have ten I-pads available for use at the Senior Center, during operating hours. Thank you to our IT Department for setting them up and to Cascades West Council of Governments for providing the grant. We will have programming and instruction available each month, as well.
- We have over 40 applications/tags for our Tree of Giving this year, most of which have been adopted/filled by our seniors and groups wanting to help spread holiday cheer this season.
- We have lots of programming planned for December. More details can be found in our monthly newsletter, which is posted on the City website and on the Lebanon Senior Center Facebook page.

*Executive Session

Per ORS 192.660(2)(h) To consult with counsel concerning the legal rights and duties of the public body with regard to litigation or litigation likely to be filed.

* *Executive Sessions are closed to the public due to the highly confidential nature of the subject. It is unlawful to discuss anything outside of the Executive Session.*

*Executive Session

Per ORS 192.660(2)(i) To review and evaluate the employment-related performance of the chief executive officer of any public body, a public officer, employee or staff member who does not request an open hearing.

* *Executive Sessions are closed to the public due to the highly confidential nature of the subject. It is unlawful to discuss anything outside of the Executive Session.*

*Executive Session

Per ORS 192.660(2)(d) To conduct deliberations with persons designated by the governing body to carry on labor negotiations.

* *Executive Sessions are closed to the public due to the highly confidential nature of the subject. It is unlawful to discuss anything outside of the Executive Session.*

*Executive Session

Per ORS 192.660(2)(a) To consider the employment of a public officer, employee, staff member or individual agent.

* *Executive Sessions are closed to the public due to the highly confidential nature of the subject. It is unlawful to discuss anything outside of the Executive Session.*

Agenda Item 9

MEMORANDUM

Administration Services

To: Mayor Jackola and City Council

Date: December 13, 2023

From: Ron Whitlatch, Interim City Manager

Subject: City Manager Contract Authorization

I. INTRODUCTION

To proceed with the recruitment process for the City Manager position, staff has provided several options, although Council can choose an action that is not listed below:

1. **Motion to Authorize the Mayor to Negotiate a Contract for the City Manager Vacancy** (If the Council has consensus on which candidate should move forward the Mayor will begin the negotiation process. A Resolution with the final contract would come to Council for approval)

2. **Motion to Table the Agenda Item for a Specific Time and Date** (If there is no consensus and the Council wishes for further discussion or more information is needed prior to a decision)

3. **Motion to Reopen the Recruitment Process**. (If the Council has consensus that neither candidate should move forward)

II. RECOMMENDATION

No Recommendation

Additional Information Submitted

CITY OF LEBANON
Public Testimony / Comment Card

Name: ADAM KIRKPATRICK

Ward Number: _____ Date: 12/13/23

Address: 40455 HILLTOP DR.

Phone: (541) 974-6666

Subject of Testimony: WATER FLUORIDATION

Position on Issue: ☐ Pro ☐ Con

I represent: ☒ Myself ☐ Other _____

Question for Council: _____

CITY OF LEBANON
Public Testimony / Comment Card

Name: Vanessa Hutnagel

Ward Number: 2 Date: 12/13/23

Address: 157 Elmore Lebanon, OR

Phone: 541-609-8760

Subject of Testimony: Homelessness (Shelter Advocacy)

Position on Issue: ☒ Pro ☐ Con

I represent: ☒ Myself ☒ Other Western) students

Question for Council: support ~~cou~~ for providing homeless shelter

CITY OF LEBANON
Public Testimony / Comment Card

Name: Robert Syner

Ward Number: _____ Date: 12/13/23

Address: 28628 Ridgeway Rd. Sweet Home OR.

Phone: 541-730-0901

Subject of Testimony: Legal Representation

Position on Issue: ☐ Pro ☒ Con

I represent: ☒ Myself ☐ Other _____

Question for Council: Should we really use legal representation that has been fighting against rural Oregon. Representing Oregon Government etc. for over a decade.

CITY OF LEBANON
Public Testimony / Comment Card

Name: Corbin Talen

Ward Number: 1 Date: 12-13-23

Address: 953 Walker Rd

Phone: 541-409-9787

Subject of Testimony: Fluroide

Position on Issue: ☑ Pro ☑ Con

I represent: ☐ Myself ☑ Other _____

Question for Council: Ballot Pro

ADAM KIRKPATRICK
FAMILY DENTISTRY
We're here to make you smile!

Hello Lebanon City Council,

I noticed that the topic of water fluoridation is on the council agenda and wanted to give my opinion as a local professional. As a dentist I have personally seen the HUGE positive effects of fluoridated water on decreasing the amount of tooth decay that people experience. As a business person, removing fluoride will add significantly to my bank account but as a healthcare professional I just can't stand by and let it happen without saying something. It would be a real shame for the oral health of the people of our community and there's a reason why so many dentists and professional oral health organizations stand behind it.

This was even more punctuated for me when I went on a dental mission to the Dominican Republic a couple of years ago. They do not have fluoridated water systems but have all of our unfortunate processed foods and, of course, you can imagine how terrible the problem of tooth decay is for them. What really stuck out to me was that, when treating what looked like a small cavity (if I were to judge it by what I typically see in my office), it opened up into a gigantic cavern that totally decimated the tooth. I believe this is the direct result of not having fluoride incorporated into the teeth while they were developing and thereby leading to a tooth significantly "weaker" and more susceptible to rampant decay. And I saw this same issue repeated in Tanzania on another dental mission I attended.

I have attached a couple of documents that I believe are quite helpful in considering this topic. I would welcome any questions or help in any way I can.

Have a great day!

Sincerely,

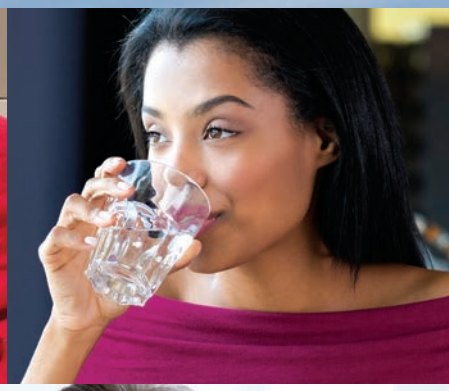
Dr. Adam Kirkpatrick, DDS

(541) 259-2225
270 S. Main St.
Lebanon, OR 97355

Office@kirkpatricksmiles.com
www.kirkpatricksmiles.com

PRACTICAL GUIDE SERIES

Fluoridation Facts



ADA American Dental Association®
America's leading advocate for oral health

Dedication

This 2018 edition of Fluoridation Facts is dedicated to Dr. Ernest Newbrun, respected researcher, esteemed educator, inspiring mentor and tireless advocate for community water fluoridation.

About Fluoridation Facts

Fluoridation Facts contains answers to frequently asked questions regarding community water fluoridation. A number of these questions are responses to myths and misconceptions advanced by a small faction opposed to water fluoridation. The answers to the questions that appear in *Fluoridation Facts* are based on generally accepted, peer-reviewed, scientific evidence. They are offered to assist policy makers and the general public in making informed decisions. The answers are supported by over 400 credible scientific articles, as referenced within the document. It is hoped that decision makers will make sound choices based on this body of generally accepted, peer-reviewed science.

Acknowledgments

This publication was developed by the National Fluoridation Advisory Committee (NFAC) of the American Dental Association (ADA) Council on Advocacy for Access and Prevention (CAAP). NFAC members participating in the development of the publication included Valerie Peckosh, DMD, chair; Robert Crawford, DDS; Jay Kumar, DDS, MPH; Steven Levy, DDS, MPH; E. Angeles Martinez Mier, DDS, MSD, PhD; Howard Pollick, BDS, MPH; Brittany Seymour, DDS, MPH and Leon Stanislav, DDS.

Principal CAAP staff contributions to this edition of Fluoridation Facts were made by: Jane S. McGinley, RDH, MBA, Manager, Fluoridation and Preventive Health Activities; Sharon (Sharee) R. Clough, RDH, MS Ed Manager, Preventive Health Activities and Carlos Jones, Coordinator, Action for Dental Health. Other significant staff contributors included Paul O'Connor, Senior Legislative Liaison, Department of State Government Affairs. In addition to her legal review, Wendy J. Wils, Esq., Deputy General Counsel, Division of Legal Affairs provided greatly to the vision of this publication.

Disclaimer

This publication is designed to answer frequently asked questions about community water fluoridation, based on a summary of relevant published articles. It is not intended to be a comprehensive review of the extensive literature on fluoridation and fluorides or to promote professional advice. Readers must also rely on their own review of the literature, including the sources cited herein and any subsequently published, for a complete understanding of these issues.

American Dental Association
Fluoridation Facts 2018

Executive Summary

- Fluoridation of community water supplies is the single most effective public health measure to prevent tooth decay.
- Throughout more than 70 years of research and practical experience, the overwhelming weight of credible scientific evidence has consistently indicated that fluoridation of community water supplies is safe.
- Studies prove water fluoridation continues to be effective in reducing tooth decay by more than 25% in children and adults, even in an era with widespread availability of fluoride from other sources, such as fluoride toothpaste.
- Because of the important role it has played in the reduction of tooth decay, the Centers for Disease Control and Prevention has proclaimed community water fluoridation (along with vaccinations and infectious disease control) one of ten great public health achievements of the 20th century.
- Community water fluoridation is the controlled adjustment of fluoride that occurs naturally in all water to optimal levels to prevent tooth decay.
- Community water fluoridation benefits everyone, especially those without access to regular dental care. Fluoridation is a powerful tool in the fight for social justice and health equity.
- Simply by drinking water, people can benefit from fluoridation's cavity protection whether they are at home, work or school.
- Water that has been fortified with fluoride is similar to fortifying salt with iodine, milk with vitamin D and orange juice with vitamin C — none of which are medications.
- When compared to the cost of other prevention programs, water fluoridation is the most cost-effective means of preventing tooth decay for both children and adults in the United States. The cost of a lifetime of water fluoridation for one person is less than the cost of one filling.
- For community water systems that serve more than 1,000 people, the economic benefit of fluoridation exceeds the cost. And the benefit-cost ratio increases as the size of the population served increases (largely due to economies of scale). Fluoridation is a cost-saving method to prevent tooth decay.
- According to data from 2014, nearly 75% of the population (3 out of 4 people) in the United States are served by public water systems that are optimally fluoridated.
- Fluoridation has been thoroughly tested in the United States' court system, and found to be a proper means of furthering public health and welfare. No court of last resort has ever determined fluoridation to be unlawful.
- The ADA supports community water fluoridation as a safe, effective, cost-saving and socially equitable way to prevent tooth decay.
- One of the most widely respected sources for information regarding fluoridation and fluorides is the American Dental Association. The ADA maintains Fluoride and Fluoridation web pages at *http://www.ADA.org/fluoride*.

American Dental Association
Fluoridation Facts 2018

Table of Contents

Introduction

Fluoridation Facts has been published by the American Dental Association (ADA) since 1956. Revised periodically, *Fluoridation Facts* answers frequently asked questions about community water fluoridation. In this 2018 edition, the ADA Council on Advocacy for Access and Prevention provides updated information for individuals and groups interested in the facts about fluoridation. The United States now has more than 70 years of extensive experience with community water fluoridation. Its remarkable longevity and success is testimony to fluoridation's significance as a public health measure. In recognition of the impact that water fluoridation has had on the oral and general health of the public, in 1999, the Centers for Disease Control and Prevention (CDC) named fluoridation of drinking water as one of ten great public health achievements of the 20th century.[1,2]

Many organizations in the United States and around the world recognize the benefits of community water fluoridation.

Support for Water Fluoridation

Since 1950, the American Dental Association (ADA) has continuously and unreservedly endorsed the optimal fluoridation of community water supplies as a safe and effective public health measure for the prevention of tooth decay. The ADA's policy is based on the best available scientific evidence on the safety and effectiveness of fluoridation. Since the ADA first adopted policy recommending community water fluoridation in 1950, the ADA has continued to reaffirm its position of support for water fluoridation and has strongly urged that its benefits be extended to communities served by public water systems.[3]

Over the years, additional support has come from numerous U.S. Surgeons General who are the leading spokespersons on matters of public health in the federal government. In 2016, Surgeon General Dr. Vivek H. Murthy in his "Statement on Community Water Fluoridation,"[4] noted:

> Water fluoridation is the best method for delivering fluoride to all members of the community, regardless of age, education, income level or access to routine dental care. Fluoride's effectiveness in preventing tooth decay extends throughout one's life, resulting in fewer — and less severe — cavities. In fact, each generation born over the past 70 years has enjoyed better dental health than the one before it. That's the very essence of the American promise.[4]

In addition to the American Dental Association, the American Medical Association,[5] the American Academy of Pediatrics[6] and the World Health Organization[7] also support community water fluoridation.

Many organizations in the United States and around the world recognize the benefits of community water fluoridation. The ADA has developed a list of "National and International Organizations that Recognize the Public Health Benefits of Community Water Fluoridation for Preventing Dental Decay." Please see the ADA website at ***www.ADA.org/fluoride*** for the most current listing as well as information on reproduction and distribution of the list.

Scientific Information on Fluoridation

The ADA's policies regarding community water fluoridation are based on the best available scientific knowledge. This body of knowledge results from the efforts of nationally recognized scientists who have conducted research using the scientific method, have drawn appropriate balanced conclusions based on their research findings and published their results in refereed (peer-reviewed) professional journals that are widely held or circulated. Studies showing the safety and effectiveness of water fluoridation have been confirmed by independent scientific studies conducted by a number of nationally and internationally recognized scientific investigators. While opponents of fluoridation have questioned its safety and effectiveness, none of their charges has ever been substantiated by scientific evidence.

With the advent of the Information Age, a new type of "pseudo-scientific literature" has developed. The public often sees scientific and technical information quoted in the press, printed in a letter to the editor or distributed via an internet web page. Often the public accepts such information as true simply because it is in print. Yet the information is not always based on research conducted according to the scientific method and the conclusions drawn from research are not always scientifically justifiable. In the case of water fluoridation, an abundance of misinformation has been circulated. Therefore, scientific information from all print and electronic sources must be critically reviewed before conclusions can be drawn. (See Figure 1.) Everyone is entitled to his or her own opinion but not his or her own facts. Pseudo-scientific literature can pique a reader's interest but when read as science, it can be misleading. The scientific validity and relevance of claims made by opponents of fluoridation might be

Figure 1. A Guide to Identifying and Using Trustworthy Information

Question The Author

Actively search for study authors' intellectual and financial conflicts of interest that may have affected the conduct of the study or results interpretation.

Correlation Does Not Imply Causation

The fact that two things happen together does not mean that one necessarily causes the other.

Mice vs. Humans

Wait for studies with human subjects to confirm animal studies' results before considering applying the research findings in practice.

Consider The Big Picture

Identify systematic reviews that comprehensively summarize the evidence instead of using single studies that present only a small part of the big picture.

High Impact Journals

Impact factor and reputation of a journal do not necessarily relate to the quality of the published study in question, so always remain skeptical.

The Right Study Design

Some clinical questions cannot be studied using the classic randomized control (RCT) study design and non-RCT designs may be a suitable alternative

best viewed when measured against criteria set forth by the U.S. Supreme Court.[8]

Additional information about this topic can be found in the Public Policy Section, Question 61.

History of Water Fluoridation

Research into the effects of fluoride began in the early 1900s. Dr. Frederick McKay, a young dentist, opened a dental practice in Colorado Springs, Colorado, and was surprised to discover that many local residents exhibited brown stains on their permanent teeth. Dr. McKay could find no documentation of the condition in the dental literature and eventually convinced Dr. G.V. Black, dean of the Northwestern University Dental School in Chicago, to join him in studying the condition. Through their research, Drs. Black and McKay determined that mottled enamel, as Dr. Black termed the condition, resulted from developmental imperfections in teeth. Drs. Black and McKay wrote detailed descriptions of mottled enamel.[9,10] (Mottled enamel is a historical term. Today, this condition is called dental or enamel fluorosis.)

In the 1920s, Dr. McKay, along with others, suspected that something either in or missing from the drinking water was causing the mottled enamel. Dr. McKay wrote to the Surgeon General in 1926 indicating that he had identified a number of regions in Colorado, New Mexico, Arizona, California, Idaho, South Dakota, Texas and Virginia where mottled enamel existed. Also in the late 1920s, Dr. McKay made another significant discovery — these stained teeth were surprisingly resistant to decay.[10]

Following additional studies completed in the early 1930s in St. David, Arizona[11] and Bauxite, Arkansas,[12] it was determined that high levels of naturally occurring fluoride in the drinking water were causing the mottled enamel. In Arizona, researchers studied in great detail 250 residents in 39 local families and were able to rule out hereditary factors and environmental factors, except for one — fluoride in the water which occurred naturally at levels of 3.8 mg/L to 7.15 mg/L.[11] In Bauxite, H. V. Churchill, chief chemist with the Aluminum Company of America (later changed to ALCOA), was using a new method of spectrographic analysis in his laboratory to look at the possibility that the water from an abandoned deep well in the area might have high levels of aluminum-containing bauxite that was causing mottled teeth. What he found was that the water contained a high level of naturally occurring fluoride (13.7 mg/L). When McKay learned of this new form of analysis and Churchill's findings, he forwarded samples of water from areas where mottled enamel was commonplace to Churchill. All of the samples were found to have high levels of fluoride when compared to waters tested from areas with no mottled enamel.[10]

During the 1930s, Dr. H. Trendley Dean, a dental officer of the U.S. Public Health Service, and his associates conducted classic epidemiological studies on the geographic distribution and severity of fluorosis in the United States.[13] These early studies quantified the severity of tooth decay and dental fluorosis, called mottled enamel at that time, according to fluoride levels in the water. In so doing, it was observed that "at Aurora, IL where the domestic water contained 1.2 ppm of fluoride (F) and where a relatively low tooth decay prevalence was recorded, mottled enamel as an esthetic problem was not encountered."[14] Dean and his staff had made a critical discovery. Namely, fluoride levels of up to 1.0 ppm in drinking water did not cause enamel fluorosis in most people and only mild dental fluorosis in a small percentage of people.[14-16]

In 1939, Dr. Gerald J. Cox and his associates at the Mellon Institute evaluated the epidemiological evidence and conducted independent laboratory studies. While the issue was being discussed in the dental research community at the time, they were the first to publish a paper that proposed adding fluoride to drinking water to prevent tooth decay.[17] In the 1940s, four classic, community-wide studies were carried out to evaluate the controlled addition of sodium fluoride to fluoride-deficient water supplies. The first community water fluoridation program, under the direction of Dr. Dean, began in Grand Rapids, Michigan, in January 1945 with Muskegon, Michigan as the nonfluoridated control community. The other three studies were conducted in the following three pairs of cities with the fluoridated city listed first: Newburgh and Kingston, New York (May 1945); Brantford and Sarnia, Ontario, Canada (June 1945) and Evanston and Oak Park, Illinois (February 1947.)[18-20]

In the 1940s, four classic, community-wide studies were carried out to evaluate the controlled addition of sodium fluoride to fluoride-deficient water supplies.

The astounding success of these comparison studies firmly established the practice of water fluoridation as a practical, safe and effective public health measure to prevent tooth decay that would quickly be embraced by other communities.

The history of water fluoridation is a classic example of a curious professional making exacting clinical observations which led to epidemiologic investigation and eventually to a safe and effective community-based public health intervention which even today remains the cornerstone of communities' efforts to prevent tooth decay.

In addition to the studies noted above, a number of reviews on fluoride in drinking water have been issued over the years. For example, in 1951 the National Research Council (NRC), of the National Academies, issued its first report stating fluoridation was safe and effective. The NRC has continued to issue reports on fluoride in drinking water (1977[21] and 1993[22]) with the most recent review published in 2006.[23] Additional reviews completed over the ten year period from 2007-2017 include:

2017 Australian Government. National Health and Medical Research Council (NHMRC). *Information Paper — Water Fluoridation: Dental and Other Human Health Outcomes.*[24]

2016 O'Mullane DM, Baez RJ, Jones S, Lennon MA, Petersen PE, Rugg-Gunn AJ, Whelton H, Whitford GM. *Fluoride and Oral Health.*[25]

2016 American Water Works Association. *Water Fluoridation Principles and Practices.* AWWA Manual M4. Sixth edition.[26]

2015 Water Research Foundation. *State of the Science: Community Water Fluoridation.*[27]

2015 The Network for Public Health Law. *Issue Brief: Community Water Fluoridation.*[28]

2015 Ireland Health Research Board. *Health Effects of Water Fluoridation: An Evidence Review.*[29]

2015 U.S. Department of Health and Human Services Federal Panel on Community Water Fluoridation. *U.S. Public Health Service Recommendation for Fluoride Concentration in Drinking Water for the Prevention of Dental Caries.*[30]

2014 Public Health England. *Water Fluoridation: Health Monitoring Report for England.*[31]

2014 Royal Society of New Zealand and the Office of the Prime Minister's Chief Science Advisor. *Health Effects of Water Fluoridation: a Review of the Scientific Evidence.*[32]

2013 U.S. Community Preventive Services Task Force. The Guide to Community Preventive Services. *Preventing Dental Caries: Community Water Fluoridation.*[33]

2011 European Commission of the European Union Scientific Committee on Health and Environmental Risks (SCHER). *Fluoridation.*[34]

2008 Health Canada. *Findings and Recommendations of the Fluoride Expert Panel.*[35]

2007 Australian Government. National Health and Medical Research Council *A Systematic Review of the Efficacy and Safety of Fluoridation; Part A: Review Methodology and Results.*[36]

Water Fluoridation as a Public Health Measure

Throughout decades of research and more than 70 years of practical experience, fluoridation of public water supplies has been responsible for dramatically improving the public's oral health. In 1994, the U.S. Department of Health and Human Services (HHS) issued a report which reviewed public health achievements.[37] Along with other successful public health measures such as the virtual eradication of polio and reductions in childhood blood lead levels, fluoridation was lauded as one of the most economical preventive interventions in the nation.[37]

Because of the important role fluoridation has played in the reduction of tooth decay, the Centers for Disease Control and Prevention proclaimed community water fluoridation one of ten great public health achievements of the 20th century.[1, 2] Other public health achievements included in the 1999 announcement were vaccinations (which have been responsible for the elimination of polio in the Americas), recognition of tobacco use as a health hazard and the decline in deaths from coronary heart disease and stroke. In 2000, U.S. Surgeon General Dr. David Satcher issued the first ever Surgeon General

report on oral health, *Oral Health in America: a Report of the Surgeon General*.[38] In the report, Dr. Satcher stated that community water fluoridation continues to be the most cost-effective, practical and safe means for reducing and controlling the occurrence of tooth decay in a community. Additionally, Dr. Satcher noted that water fluoridation is a powerful strategy in efforts to eliminate health disparities among populations. Studies have shown that fluoridation is the most significant strategy employed to reduce disparities in tooth decay.[38-42]

Additional information about this topic can be found in the Public Policy Section, Question 59.

Because of the important role fluoridation has played in the reduction of tooth decay, the Centers for Disease Control and Prevention proclaimed community water fluoridation one of ten great public health achievements of the 20th century.[1, 2]

In the 2003 *National Call to Action to Promote Oral Health*,[43] U.S. Surgeon General Dr. Richard Carmona called on policymakers, community leaders, private industry, health professionals, the media and the public to affirm that oral health is essential to general health and well-being. Additionally, Dr. Carmona urged these groups to apply strategies to enhance the adoption and maintenance of proven community-based interventions such as community water fluoridation.

Writing in *Public Health Reports* in 2010, Surgeon General Dr. Rebecca Benjamin noted that, "Community water fluoridation continues to be a vital, cost-effective method of preventing dental caries."[44]

In a 2015 Surgeon's General Perspective[45] issued to coincide with the release of the updated USPHS recommendation on fluoride levels in drinking water to prevent tooth decay, Surgeon General Dr. Vivek H. Murthy stated, "As Surgeon General, I encourage all Americans to make choices that enable them to prevent illness and promote well-being. Community water fluoridation is one of the most practical, cost-effective, equitable, and safe measures communities can take to prevent tooth decay and improve oral health."[45]

Established by the U.S. Department of Health and Human Services (DHHS), Healthy People 2020[46] provides a science-based, comprehensive set of ambitious, yet achievable, ten-year national objectives for improving the health of the public. Included under oral health is an objective to expand the fluoridation of public water supplies. Objective 13 states that at least 79.6% of the U.S. population served by community water systems should be receiving the benefits of optimally fluoridated water by the year 2020.[47] In 2014, the CDC indicated that 74.4% of the U.S. population on public water systems, or a total of 211.4 million people, had access to fluoridated water.[48]

After more than four years of additional research and review following the initial notice of intent, in 2015 the DHHS announced that the U.S. Public Health Service had made a final recommendation on the fluoride level in drinking water[30] that updated and replaced the 1962 Drinking Water Standards related to community water fluoridation. In this guidance, the optimal concentration of fluoride in drinking water of 0.7 mg/L (milligrams per liter) was defined as "the concentration that provides the best balance of protection from dental caries while limiting the risk of dental fluorosis."[30]

Additional information about this topic can be found in the Safety Section, Question 19.

Water Fluoridation's Role in Reducing Tooth Decay

Water fluoridation has played a significant role in improving oral health. Numerous studies and reviews have been published making fluoridation one of the most widely studied public health measures in history. Fluoridation of community water supplies is the single most effective public health measure to prevent tooth decay. Studies show that community water fluoridation prevents at least 25 percent of tooth decay in children[49] and adults,[50] even in an era with widespread availability of fluoride from other sources, such as fluoride toothpaste. Fluoridation helps to prevent, and in some cases, reverse tooth decay across the life span. Increasing numbers of adults are retaining their teeth throughout their lifetimes due in part to the benefits they receive from water fluoridation. Dental costs for these individuals are likely to have been reduced and many

hours of needless pain and suffering due to untreated tooth decay have been avoided. By preventing tooth decay, community water fluoridation has been shown to save money, both for families and the health care system. The return on investment for community water fluoridation varies with size of the community, and in general, increases as the community size increases. Community water fluoridation is cost-saving, even for small communities.

Additional information about this topic can be found in the Cost Section, Question 68.

Fluoridation of community water supplies is the single most effective public health measure to prevent tooth decay. Studies show that community water fluoridation prevents at least 25 percent of tooth decay in children and adults, even in an era with widespread availability of fluoride from other sources, such as fluoride toothpaste.

Community water fluoridation is a most valuable public health measure because:

- Optimally fluoridated water is accessible to the entire community regardless of socioeconomic status, educational attainment or other social variables.[51]
- Individuals do not need to change their behavior to obtain the benefits of fluoridation.
- Frequent exposure to small amounts of fluoride over time makes fluoridation effective through the life span in helping to prevent tooth decay.[52]
- Community water fluoridation is more cost-effective and cost-saving than other forms of fluoride treatments or applications.[53,54]

Tooth decay is caused by sugars in snacks, food and beverages being converted into acid by the bacteria in dental plaque, a thin, sticky, colorless deposit on teeth. The acid attacks the tooth enamel (the hard surface of the tooth) or root surface. After repeated attacks, the enamel or root surface loses minerals (demineralization) and the acids and bacteria penetrate the dentin and finally the pulp. The soft tissue of the pulp contains nerves and blood vessels. Once the decay enters the pulp, it becomes infected and without treatment, the infection progresses and travels into the surrounding tissues. It can enter the bloodstream and potentially spread the infection to other parts of the body which can be life-threatening.

Additional information about this topic can be found in the Benefits Section, Question 2.

There are a number of factors that increase an individual's risk for tooth decay:[54-59]

- Recent history of tooth decay
- Elevated oral bacteria count
- Inadequate exposures to fluorides
- Exposed roots
- Frequent intake of sugar/sugary foods and sugar-sweetened beverages
- Poor or inadequate oral hygiene
- Decreased flow of saliva
- Deep pits and fissures on the chewing surfaces of teeth

Exposure to fluoride is a key component in any recommended decay prevention strategy; however, the use of fluoride alone will not prevent all tooth decay. In formulating a decay prevention program, in additional to consuming fluoridated tap water, a number of intervention strategies may be considered such as improved daily home care, reducing sugar in the diet, placement of dental sealants and prescription strength fluoride toothpaste for home use and professionally applied topical treatments.

Ongoing Need for Water Fluoridation

Because of the risk factors for tooth decay noted previously, many individuals and communities still experience high levels of tooth decay. Although water fluoridation demonstrates an impressive record of effectiveness and safety, only 74.4% of the United States population on public water supplies in 2014 received fluoridated water containing protective levels of fluoride.[48] Unfortunately, some people continue to be confused about this effective public health measure. If the number of individuals drinking fluoridated water is to increase, the public must be accurately informed about its benefits and safety.

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Benefits

1. What is fluoride?

Answer.
Fluoride is a naturally occurring mineral that can help prevent tooth decay.

Fact.
The element fluorine is abundant in the earth's crust as a naturally occurring fluoride compound found in rocks and soil.[1] As ground water moves through the earth, it passes over rock formations and dissolves the fluoride minerals that are present, releasing fluoride ions that are naturally occurring fluoride in the rocks. This increases the fluoride content of the water. The concentration of fluoride in ground water (e.g., wells, springs) varies according to such factors as the depth at which the water is found and the quantity of fluoride-bearing minerals in the area.

Fluoride is present at varied concentrations in all water sources including rainwater and the oceans. For example, the oceans' fluoride levels range from 1.2 to 1.4 mg/L.[2] In the United States, the natural level of fluoride in ground water varies from very low levels to over 4 mg/L.[3] In comparison, the fluoride concentrations in surface water sources such as lakes and rivers is very low. For example, the water analysis completed by the city of Chicago for the year 2016 lists the range for Lake Michigan's natural fluoride level as 0.11 to 0.13 mg/L.[4]

2. How does fluoride help prevent tooth decay?

Answer.
Tooth decay begins when the outer layer of a tooth loses some of its minerals due to acid produced by bacteria in dental plaque breaking down the sugars that we eat. Fluoride protects teeth by helping to prevent the loss of these minerals and by restoring them with a fluoride-containing mineral that is more resistant to acid attacks. In other words, fluoride protects teeth by reducing demineralization and enhancing remineralization. Fluoride also works to hinder bacterial activity necessary for the formation of tooth decay.

Fact.
One of fluoride's main mechanism of action is its ability to prevent or delay the loss of minerals from teeth.[5,6] Cavities start to form when minerals are lost due to acid attacks from bacteria in dental plaque (a soft, sticky film that is constantly forming on teeth). Bacteria grow rapidly by feeding on the sugars and refined carbohydrates that we consume. This process of losing minerals is called demineralization.

Fluoride's second mechanism of action is called remineralization, which is the reversal of this demineralization process.[6,7] Teeth gain back the minerals lost during acid attacks through remineralization but with an important difference. Some of the hydroxyapatatite crystal lost is replaced with fluorapatite. This fluoride-rich replacement mineral is even more resistant to acid attacks than the original tooth surface.[6]

Studies indicate fluoride has a third mechanism of action that hinders the ability of bacteria to metabolize carbohydrates and produce acids.[5] It can also hinder the ability of the bacteria to stick to the tooth surface.[8]

Fluoride and minerals, including calcium and phosphate, are present in saliva[6,8] and are stored in dental plaque. To halt the formation of tooth decay or rebuild tooth surfaces, fluoride must be constantly present in low concentrations in saliva and plaque.[6] Frequent exposure to small amounts of fluoride, such as that which occurs when drinking fluoridated water, helps to maintain the reservoir of available fluoride in saliva and plaque to resist demineralization and enhance remineralization.[6,9] In other words, drinking fluoridated water provides the right amount of fluoride at the right place at the right time. Fluoride in water and water-based beverages is consumed many times during the day, providing frequent contact with tooth structures and making fluoride available to fluoride reservoirs in the mouth. This helps explain why fluoride at the low levels found in fluoridated water helps to prevent tooth decay.[6]

Additionally, studies have concluded that fluoride ingested during tooth formation becomes incorporated into the tooth structure making the teeth more resistant to acid attacks and demineralization.[10-14] In particular, this pre-eruptive exposure to fluoride, before the teeth come into the mouth during childhood, can play a significant role in preventing tooth decay in the pits and fissures of the chewing surfaces, particularly of molars.[6,15,16] Sources of fluorides in the United States that provide this pre-eruptive effect include fluoridated water and dietary fluoride supplements as well as fluoride present in foods and beverages. Additionally, young children often swallow substantial percentages of the fluoride toothpaste and other fluoride-containing dental products which adds to their intake of fluoride. Originally, it was believed that fluoride's action was exclusively pre-eruptive, meaning the benefit occurred only during tooth formation, but by the mid-1950s there was growing evidence of the importance of fluoride's important roles in demineralization and remineralization.[11]

Pre-eruptive effects are sometimes called systemic, while post-eruptive effects are called topical. These terms refer to different things. Pre- and post-eruptive refer to the timing of fluoride benefits while systemic and topical refer to the mode of administration or source of fluoride. Defining the effects of fluoride from a specific source as solely systemic or topical is not entirely accurate. For example, water fluoridation provides both a systemic (during tooth development) and topical effect (at the time of ingestion strengthening the outside of the tooth).

Today it is understood that the maximum reduction in tooth decay occurs when both effects are combined, that is when fluoride has been incorporated into the tooth during formation and when it is available at the tooth surface during demineralization and remineralization. Water fluoridation works in both ways to prevent tooth decay.[8,11,13,15,16]

Today it is understood that the maximum reduction in tooth decay occurs when both effects are combined, that is when fluoride has been incorporated into the tooth during formation and when it is available at the tooth surface during demineralization and remineralization. Water fluoridation works in both ways to prevent tooth decay.

3. What is water fluoridation?

Answer.

Water fluoridation is the controlled adjustment of the natural fluoride concentration in community water supplies to the concentration recommended for optimal dental health. Fluoridation helps prevent tooth decay in children and adults.

Fact.

In 2015, the U.S. Department of Health and Human Services (HHS), using the best available science, established the recommended concentration for fluoride in the water in the United States at 0.7 mg/L.[17] This level effectively reduces tooth decay while minimizing dental fluorosis.

The level of fluoride in water is measured in milligrams per liter (mg/L) or parts per million (ppm). When referring to water, a concentration in milligrams per liter is identical to parts per million and the notations can be used interchangeably. Thus, 0.7 mg/L of fluoride in water is identical to 0.7 ppm. The preferred notation is milligrams per liter.

At 0.7 mg/L, there are seven-tenths of one part of fluoride mixed with 999,999.3 parts of water. While not exact, the following comparisons can be of assistance in comprehending 0.7 mg/L:

- 1 inch in approximately 23 miles
- 1 minute in approximately 1000 days
- 1 cent in approximately $14,000.00
- 1 seat in more than 34 Wrigley Field baseball parks (seating capacity 41,268)

The following terms and definitions are used in this publication:

- **Community water fluoridation** is the controlled adjustment of the natural fluoride concentration in water up to 0.7 mg/L, the level recommended for optimal dental health. Other terms used interchangeably are water fluoridation, fluoridation and optimally fluoridated water. Optimal levels of fluoride can be present in the water naturally or by adjusted means.

- **Sub-optimally fluoridated water** is water that naturally contains less than the optimal level (below 0.7 mg/L) of fluoride. Other terms used are nonfluoridated water and fluoride-deficient water.

Additional information on this topic can be found in this Section, Question 6.

The level of fluoride in water is measured in milligrams per liter (mg/L) or parts per million (ppm). When referring to water, a concentration in milligrams per liter is identical to parts per million and the notations can be used interchangeably. Thus, 0.7 mg/L of fluoride in water is identical to 0.7 ppm. The preferred notation is milligrams per liter.

4. How much fluoride is in your water?

Answer.

If your water comes from a public/community water supply, the options to learn the fluoride level of the water include contacting the local water supplier or the local/county/state health department, reviewing the Consumer Confidence Report (CCR) issued by your local water supplier, and using the Centers for Disease Control and Prevention's internet based "My Water's Fluoride." If your water source is a private well, it will need to be tested and the results obtained from a certified laboratory.

Fact.

The fluoride content of the local public or community water system can be obtained by contacting the local water supplier or the local/county/state health department. The name of your water system might not be the same as the name of your community.

In 1999, the U.S. Environmental Protection Agency (EPA) began requiring water suppliers to make annual drinking water quality reports accessible to their customers. Available prior to July 1 each year for the preceding calendar year, these Consumer Confidence Reports (CCRs), or Water Quality Reports,[18] can be mailed to customers, placed in the local newspaper or made available through the internet. To obtain a copy of the report, contact the local water supplier. If the name of the community water system is unknown, contact the local health department.

There are two sites on the internet that supply information on water quality of community water systems. The online source for Water Quality Reports or CCRs is the EPA website[19] at: ***https://ofmpub.epa.gov/apex/safewater/f?p=136:102***. Additionally, the Centers for Disease Control and Prevention's (CDC) fluoridation website, "My Water's Fluoride,"[20] is available at: ***https://nccd.cdc.gov/DOH_MWF/Default/Default.aspx***. The website allows consumers in currently participating states to learn the fluoridation status of their water system. It also provides information on the number of people served by the water system, the water source, and if the water system is naturally fluoridated or adjusts the fluoride level in the water supply.[20]

The EPA does not have the authority to regulate private drinking water wells. However, the EPA recommends that private well water be tested once a year.[21] For

the most accurate results, a state certified laboratory that conducts drinking water tests should be used for fluoride testing. For a list of state certified laboratories, contact the local, county or state water/health department.

The EPA does not specifically recommend testing private wells for the level of fluoride. However, if a household with a private well has children under 16 years of age, their health professionals will need to know the fluoride level of the well water prior to consideration of prescription of dietary fluoride supplements[8] or to counsel patients about alternative water sources to reduce the risk of fluorosis if the natural fluoride levels are above 2 mg/L.

Dietary fluoride supplements (tablets, drops or lozenges) are available only by prescription and are intended for use by children ages six months to 16 years living in nonfluoridated areas and at high risk of developing tooth decay. Your dentist or physician can prescribe the correct dosage.[8]

Additional information on this topic can be found in this Section, Question 12 and in the Safety Section, Questions 21, 27, 28 and 29.

5. What additives are used to fluoridate water supplies in the United States?

Answer.
Sodium fluoride, sodium fluorosilicate and fluorosilicic acid are the three additives approved for use in community water fluoridation in the United States. Sodium fluorosilicate and fluorosilicic acid are sometimes referred to as silicofluoride additives.

Fact.
The three basic additives used to fluoridate water in the United States are: 1) sodium fluoride which is a white, odorless material available either as a powder or crystals; 2) sodium fluorosilicate which is a white or yellow-white, odorless crystalline material and 3) fluorosilicic acid which is a white to straw-colored liquid.[22]

Water fluoridation began in the U.S. in 1945 with the use of sodium fluoride; the use of silicofluorides began in 1946 and by 1951, they were the most commonly used additives.[23] First used in the late 1940s, fluorosilicic acid is currently the most commonly used additive to fluoridate communities in the United States.[24] To ensure the public's safety, regardless of where the additives are manufactured, they should meet safety standards for water treatment in the U.S.[22] Specifically, additives used in water fluoridation should meet standards of the American Water Works Association (AWWA). With respect to NSF/ANSI certification, fluoride additives are considered no different than other water additives. Fluoride additives, like any other water additive should also meet NSF/ANSI Standards.[22] In the United States, the authority to regulate products for use in drinking water, including additives used to fluoridate community water systems, rests with individual states. In 2013, AWWA reported that 47 states had adopted the NSF/ANSI Standard 60 which specifies the product quality with validation supplied by independent certification entities.[22]

To ensure the public's safety, regardless of where the additives are manufactured, they should meet safety standards for water treatment in the U.S.

Additional information on the topic of fluoride additives can be found in the Fluoridation Practice section of this publication and at the CDC's fluoridation website, "Water Operators and Engineers" at ***https://www.cdc.gov/fluoridation/engineering/index.htm***.

6. Is there a difference in the effectiveness between naturally occurring fluoridated water (at optimal fluoride levels) and water that has fluoride added to reach the optimal level?

Answer.
No. The dental benefits of optimally fluoridated water occur regardless of the fluoride's source.

Fact.
Fluoride is present in water as "ions" or electrically-charged atoms.[25] These ions are the same whether acquired by water as it seeps through rocks and sand or added to the water supply under carefully controlled conditions.

It has been observed that the major features of human fluoride metabolism are not affected by the three fluoride additives used in community water fluoridation nor are they affected by whether the fluoride is present naturally or added to drinking water.[26] In more simple terms, there is no difference chemically between natural and adjusted fluoridation.

When fluoride is added under controlled conditions to fluoride-deficient water, the dental benefits are the same as those obtained from naturally fluoridated water. Fluoridation is merely an increase of the level of the naturally occurring fluoride present in all drinking water sources to the level recommended for optimal dental health.

Fluoridation is merely an increase of the level of the naturally occurring fluoride present in all drinking water sources to the level recommended for optimal dental health.

For example, a fluoridation study conducted in the Ontario, Canada, communities of Brantford (optimally fluoridated by adjustment), Stratford (optimally fluoridated naturally) and Sarnia (fluoride-deficient), revealed much lower decay rates in both Brantford and Stratford as compared to nonfluoridated Sarnia. There was no observable difference in the decay-reducing effect between the naturally occurring fluoride and adjusted fluoride concentration water supplies, proving that dental benefits were similar regardless of the source of fluoride.[27]

Some individuals use the term "artificial fluoridation" to imply that the process of water fluoridation is unnatural and that it delivers a foreign substance into a water supply when, in fact, all water sources contain some fluoride. The fluoride ion released in water is the same regardless of the source[25] and is metabolized (processed) by the body in the same way no matter what the source.[26] Community water fluoridation is a natural way to improve oral health.

7. Is water fluoridation effective in helping to prevent tooth decay?

Answer.

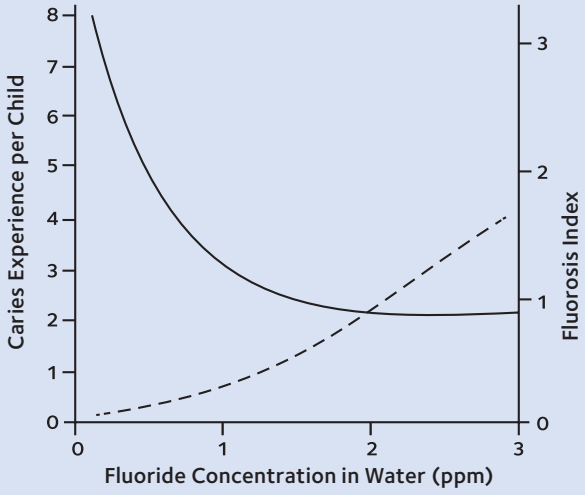
Yes. According to the best available scientific evidence, community water fluoridation is an effective public health measure for preventing, and in some cases, reversing tooth decay, in children, adolescents and adults. With hundreds of studies published in peer-reviewed, scientific journals, fluoridation is one of the most studied public health measures in history and it continues to be studied today.

Fact.

The effectiveness of fluoride in drinking water to prevent tooth decay has been documented in the scientific literature for over 70 years. Before the first community fluoridation program began in 1945, epidemiologic data from the 1930s and 1940s were collected and analyzed.[28-30] What began as research to learn what caused "Colorado Brown Stain" (dental fluorosis) led to the discovery of strikingly low tooth decay rates associated with fluoride in drinking water at approximately 1 ppm (mg/L). Figure 2 shows the results of early research by Dr. H. Trendley Dean noting the relationship between children's experience with tooth decay (solid line), dental fluorosis (dotted line) and the fluoride concentration in drinking water.[28,29]

Additional information on this topic can be found in the Introduction Section.

Figure 2. Dean's Graph
Relationships of tooth decay experience (solid line), dental fluorosis index (dashed line) and the fluoride concentration of drinking water.[28,29]



Since that time, hundreds of studies have been done, including a number of systematic reviews which continue to show fluoride's effectiveness in helping to prevent tooth decay. A systematic review is an analysis of studies that identifies and evaluates all of the evidence with which to answer a specific, narrowly focused question. It entails a systematic and unbiased review process that locates, assesses and combines high quality evidence from a collection of scientific studies to obtain a comprehensive, valid and reliable review on a specific topic. Systematic reviews provide the highest level of scientific evidence about a specific research question. Below is a discussion of major reviews of community water fluoridation, beginning with two systematic reviews published in 2017 and 2013, respectively, demonstrating that water fluoridation is effective in reducing tooth decay.

On November 9, 2017, the Australian Government's National Health and Medical Research Council (NHMRC) released the *NHMRC Public Statement 2017 — Water Fluoridation and Human Health in Australia*[31] recommending community water fluoridation as a safe, effective and ethical way to help reduce tooth decay. Based on a comprehensive review of the evidence, published in 2016, and the translation of that evidence into the *NHMRC Information Paper — Water Fluoridation: Dental and Other Human Health Outcomes,*[32] published in 2017, the Public Statement notes that the NHMRC found that water fluoridation reduces tooth decay by 26% to 44% in children and adolescents, and by 27% in adults. Additionally, it notes that recent Australian research found that access to fluoridated water from an early age is associated with less tooth decay in adults. The Statement notes that NHMRC supports Australian states and territories fluoridating their drinking water supplies within the range of 0.6 to 1.1 mg/L.[31]

Established by the U.S. Department of Health and Human Services in 1996, the Community Preventive Services Task Force develops and disseminates guidance on which community-based health promotion and disease prevention intervention approaches work, and which do not work, based on available scientific evidence. The Task Force issues findings based on systematic reviews of effectiveness and economic evidence. The Guide to Community Preventive Services ("The Community Guide") is a collection of evidence-based findings of the Community Preventive Services Task Force and is designed to assist decision makers in selecting interventions to improve health and prevent disease.[33]

The Community Guide reviews are designed to answer three questions:

1. What has worked for others and how well?

2. What might this intervention approach cost, and what am I likely to achieve through my investment?

3. What are the evidence gaps?[33]

In a 2013 update of the evidence, the Community Preventive Services Task Force continued to recommend community water fluoridation to reduce tooth decay, noting that cavities decreased when fluoridation was implemented and that cavities increased when fluoridation was stopped, as compared to communities that continued fluoridation.[33]

A summary of systematic reviews by the Oral Health Services Research Centre at the University Dental School in Cork, Ireland, published in 2009, reviewed results from three systematic reviews, all of which were published between 2000 and 2007. The summary of results concluded that the best available scientific evidence demonstrated that water fluoridation was an effective community-based method to prevent tooth decay, especially for the disadvantaged who bear the greatest burden of disease.[35]

A meta-analysis (a type of systematic review that seeks to determine a statistical estimate of an overall benefit based on the results of the collection of studies included in the review), which was published in 2007 in the Journal of Dental Research, demonstrated the effectiveness of water fluoridation for preventing tooth decay in adults. Twenty studies representing over 13,500 participants were included in the analysis. Of the 20 studies, nine examined the effectiveness of water fluoridation. The review of these studies found that fluoridation prevents approximately 27% of tooth decay in adults.[36]

Besides systematic reviews, significant additional studies conducted since the initiation of water fluoridation in 1945, also have demonstrated the effectiveness of water fluoridation in reducing the occurrence of tooth decay.

- In Grand Rapids, Michigan, the first city in the world to fluoridate its water supply, a 15-year landmark study showed that children who consumed fluoridated water from birth had 50-63% less tooth decay than children who had been examined during the original baseline survey completed in nonfluoridated Muskegon, Michigan.[37]

- In 1985, the National Preventive Dentistry Demonstration Program[38] analyzed various types and combinations of school-based preventive dental services to determine the cost and effectiveness of these types of prevention programs. Ten sites from across the nation were selected. Five of the sites had fluoridated water and five did not. Over 20,000 second and fifth graders participated in the study over a period of four years. Students were examined and assigned by site to one or a combination of the following groups:
    - biweekly in class brushing and flossing plus a home supply of fluoride toothpaste and dental health lessons (ten per year);
    - in-class daily fluoride tablets (in nonfluoridated areas);
    - in-school weekly fluoride mouthrinsing;
    - in-school professionally applied topical fluoride;
    - in-school professionally applied dental sealants, and
    - a control.[38]

After four years, approximately 50% of the original students were examined again. The study affirmed the value and effectiveness of community water fluoridation. At the sites where the community water was fluoridated, students had substantially fewer cavities, as compared to those sites without fluoridated water where the same preventive measures were implemented. In addition, while sealants were determined to be an effective prevention method, the cost of a sealant program was substantially more than the cost of fluoridating the community water, confirming fluoridation as the most cost-effective preventive option.[38]

- In another review of studies conducted from 1976 through 1987 and published in 1989,[39] data for different age groups were separated into categories by the types of teeth present in the mouth. The results demonstrated a 30-60% reduction in tooth decay in primary teeth, a 20-40% reduction in the mixed dentition (having both baby and adult teeth) and a 15%-35% reduction in the permanent dentition (adults and seniors) for those living in fluoridated communities.[39]

- In the United States, an epidemiological survey of nearly 40,000 schoolchildren was completed in 1987.[40] Nearly 50% of the children aged 5 to 17 years who participated in the study were decay free in their permanent teeth, which was a major change from a similar survey conducted in 1980 in which approximately 37% were decay free. This dramatic decline in decay rates was attributed primarily to the widespread use of fluoride in community water supplies, toothpastes, dietary fluoride supplements and mouthrinses. Although decay rates had declined overall, data also revealed that the decay rate was 25% lower in children with continuous residence in fluoridated communities when the data were adjusted to control for exposure to dietary fluoride supplements and topical fluoride treatments.[40]

- In 1993, the results of 113 studies in 23 countries (over half of the studies were from the U.S.) were compiled and analyzed.[41] This review provided effectiveness data for 66 studies of primary teeth and 86 studies of permanent teeth. The analysis of the studies demonstrated a 40-49% decay reduction for primary (baby) teeth and a 50-59% decay reduction for permanent (adult) teeth for those living in fluoridated communities.[41]

- A comprehensive analysis of the first 50 years of community water fluoridation in the United States concluded that "Community water fluoridation is one of the most successful public health disease prevention programs ever initiated."[42] While noting that the difference in tooth decay between optimally fluoridated communities and fluoride-deficient communities was smaller than in the early days of fluoridation, largely due to additional sources of fluoride, the difference was still significant and the benefits for adults should be emphasized. The report ended by noting that water fluoridation is a near-ideal public health measure whose benefits can transcend racial, ethnic, socioeconomic and regional differences.[42]

The systematic reviews and studies noted above provide science-based evidence that, for more than 70 years, fluoridation has been effective in helping to prevent tooth decay.

8. With other sources of fluoride now available, is water fluoridation still an effective method for preventing tooth decay?

Answer.

Yes. Even in an era with widespread availability of fluoride from other sources, studies show that community water fluoridation prevents at least 25% of tooth decay in children and adults throughout the life span.

Fact.

During the 1940s, studies demonstrated that children in communities with optimally fluoridated drinking water had reductions in tooth decay rates of approximately 40% to 60% as compared to those living in nonfluoridated communities.[37,44] At that time, drinking water was the only source of fluoride other than fluoride that occurred naturally in foods.

Increase in the Number of Sources of Fluoride

Fluoride is available today from a number of sources including water, beverages, food, dental products (toothpaste, rinses, professionally applied fluoride foams, gels and varnish and dietary supplements.)[17] As a result of the widespread availability of these various sources of fluoride, the difference between decay rates in fluoridated areas and nonfluoridated areas is somewhat less than several decades ago, yet it is still significant.[17] Studies show that community water fluoridation prevents at least 25% of tooth decay in children and adults throughout the life span.[36,45] The benefits of fluoridation are extended to everyone in a community where they live, work, attend school or play — and it does not require a change of behavior or access to dental care.

The benefits of fluoridation are extended to everyone in a community where they live, work, attend school or play — and it does not require a change of behavior or access to dental care.

The Diffusion or Halo Effect

The diffusion or "halo" effect occurs because foods and beverages processed in optimally fluoridated cities generally contain higher levels of fluoride than those processed in nonfluoridated communities. This exposure to fluoride in nonfluoridated areas through the diffusion effect lessens the differences in the amount of tooth decay between communities.[39,42,43] The best available national data demonstrate that the failure to account for the diffusion effect results in an underestimation of the total benefit of water fluoridation especially in areas where large quantities of fluoridated beverage and food products are brought into nonfluoridated communities.[46]

Exposure to Fluoridation over the Life Span

Another factor in the difference between decay rates in fluoridated areas and nonfluoridated areas is the high geographic mobility of our society. On a day-to-day basis, many individuals may reside in a nonfluoridated community but spend a significant part of their day in a fluoridated community at work, school or daycare. Additionally, over their lifetime, people tend to move and reside in a number of communities, some with optimally fluoridated water and some without. This mobility makes it increasingly difficult to study large numbers of people who have spent their entire lives in one (fluoridated or nonfluoridated) community.[39] It also means that many individuals receive the benefit of fluoridation for at least some part of their lives. For children who have resided in fluoridated communities their entire lives, studies demonstrated they had less tooth decay than children who never lived in fluoridated communities.[40]

Despite fluoride from a number of other sources, the "halo effect" and the mobility of today's society, studies show that community water fluoridation prevents at least 25% of tooth decay in children and adults throughout the life span.[36,45]

9. What happens if water fluoridation is discontinued?

Answer.

Tooth decay can be expected to increase if water fluoridation in a community is discontinued even if topical products such as fluoride toothpaste and fluoride mouthrinses are widely used.

Fact.

In 2013, using an updated systematic review, the Community Preventive Services Task Force, established by the U.S. Department of Health and Human Services, continued to recommend community water fluoridation to reduce tooth decay, noting that cavities decreased when fluoridation was implemented and that cavities increased when fluoridation was stopped, as compared to communities that continued fluoridation.[34] This confirmed the Task Force's earlier systematic review published in 2002[45] which also noted an increase in tooth decay when fluoridation was halted (a median 17.9% increase in tooth decay during 6 to 10 years of follow-up).

Historical Studies Noting an Increase in Tooth Decay after Discontinuation of Fluoridation

Antigo, Wisconsin, began water fluoridation in June 1949 and ceased adding fluoride to its water in November 1960. After five and one-half years without optimal levels of fluoride, second grade children had a 200% increase in tooth decay experience, fourth graders a 70% increase and sixth graders a 91% increase in decay experience compared with the levels of those of the same ages in 1960. Residents of Antigo re-instituted water fluoridation in October 1965 on the basis of the severe deterioration of their children's oral health.[47]

A study that reported the relationship between fluoridated water and tooth decay prevalence focused on the city of Galesburg, Illinois, a community whose public water supply contained naturally occurring fluoride at 2.2 mg/L. In 1959, Galesburg switched its community water source to the Mississippi River. This alternative water source provided the citizens of Galesburg a sub-optimal level of fluoride at approximately 0.1 mg/L. In the period of time between a baseline survey conducted in 1958 and a new survey conducted in 1961, data revealed a 10% decrease in the percentage of decay free 14-year-olds (oldest group observed), and a 38% increase in mean tooth decay experience. Two years later, in 1961, the water was fluoridated at the recommended level of 1.0 mg/L.[48]

Because of a government decision in 1979, fluoridation in the northern Scotland town of Wick was discontinued after eight years. The water was returned to its sub-optimal, naturally occurring fluoride level of 0.02 mg/L. Data collected to monitor the oral health of Wick children clearly demonstrated a negative health effect from the discontinuation of water fluoridation. Five years after the cessation of water fluoridation, decay in primary (baby teeth) had increased 27%. This increase in decay occurred during a period when there had been a reported overall reduction in decay nationally and when fluoride toothpaste had been widely adopted. These data suggest that decay levels in children can be expected to rise where water fluoridation is interrupted or terminated, even when topical fluoride products are widely used.[49]

In a similar evaluation, the prevalence of tooth decay in 5- and 10-year-old children in Stranraer, Scotland, increased after the discontinuation of water fluoridation. This increase in tooth decay was estimated to result in a 115% increase in the mean cost of restorative dental treatment for decay. These data support the important role water fluoridation plays in the reduction of tooth decay.[50]

Historical Studies and Factors Noting No Increase In Tooth Decay after Discontinuation of Fluoridation

There have been several studies from outside the United States that have not reported an increase in tooth decay following the discontinuation of fluoridation. In all of these, the discontinuation of fluoridation coincided with the implementation of other measures to prevent tooth decay.

In La Salud, Cuba, a study on tooth decay in children indicated that the rate of tooth decay did not increase after fluoridation was stopped in 1990. However, at the time fluoridation was discontinued a new preventive fluoride program was initiated where all children received fluoride mouthrinses on a regular basis and children two to five years of age received fluoride varnish once or twice a year.[51]

In Finland, a longitudinal study in Kuopio (fluoridated from 1959 to 1992) and Jyväskylä (with low levels of natural fluoride) showed little difference in

decay rates between the two communities that are extremely similar in terms of ethnic background and social structure.[52] This was attributed to a number of factors. The dental programs exposed the Finnish children to intense topical fluoride regimes and dental sealant programs. Virtually all children and adolescents used the government-sponsored, comprehensive, free dental care. As a result, the effect of water fluoridation appeared minimal. Because of this unique set of factors, it was concluded that these results could not be replicated in countries with less intensive preventive dental care programs.[52]

No significant decrease in tooth decay was seen after fluoridation was discontinued in 1990 in Chemniz and Plauen, located in what was formerly East Germany.[53] The intervening factors in these communities include improvements in attitudes toward oral health behaviors, and broader availability and increased use of other preventive measures including fluoridated salt, fluoride toothpaste and dental sealants.[53]

A similar situation was reported from the Netherlands. A study was conducted of 15-year-old children in Tiel (fluoridated 1953 to 1973) and Culemborg (nonfluoridated) comparing tooth decay rates from a baseline in 1968 through 1988. The lower tooth decay rate in Tiel after the cessation of fluoridation was attributed in part to the initiation of a dental health education program, free dietary fluoride supplements and a greater use of professionally applied topical fluorides.[54]

In the preceding examples, communities that discontinued fluoridation either found higher tooth decay rates in their children or a lack of an increase that could be attributed to the availability and use of free dental services for all children or the implementation of wide-spread decay prevention programs that require significant professional and administrative support and are less cost-effective than fluoridation.

10. Is tooth decay still a serious problem in the United States?

Answer.

Yes. Tooth decay is an infectious disease that continues to be a significant oral health problem.

Fact.

Good oral health is often taken for granted by many people in the U.S. Yet, while largely preventable, tooth decay, cavities or dental caries (a term used by health professionals) remains a common, debilitating, chronic condition for many children and adults.

Tooth decay begins with a weakening and/or breakdown (loss of minerals) of the enamel (the hard outer layer of teeth) caused by acids produced by bacteria that live in plaque. Dental plaque is a soft, sticky film that is constantly forming on teeth. Eating foods or drinking beverages that contain sugars or other refined carbohydrates allow the bacteria in the plaque to produce acids that attack the enamel. The plaque helps to keep these acids in contact with the tooth surface and demineralization (loss of mineral) occurs. After repeated acid attacks, the enamel can breakdown creating a cavity. Left unchecked, bacteria and acid can penetrate the dentin (the next, inner layer of teeth) and then finally the pulp, which contains nerves and blood vessels. Once the bacteria enter the pulp, the tooth becomes infected (abscessed) and, without treatment, the infection can progress and travel into the surrounding tissues. The infection can enter the bloodstream and potentially spread the infection to other parts of the body which, in rare cases, becomes life-threatening.

Additional information on this topic can be found in this Section, Question 2.

Tooth decay can negatively affect an individual's quality of life and ability to succeed. Tooth decay can cause pain — pain that can affect how we eat, speak, smile, learn at school or succeed at work. Children with cavities often miss more school and receive lower grades than children who are cavity-free.[55] More than $6 billion of productivity is lost each year in the U.S, because people miss work to get dental care.[56]

While cavities are often thought of as a problem for children, adults in the U.S. are keeping their teeth longer (partially due exposure to fluoridation) and this increased retention of teeth means more adults are at risk for cavities — especially decay of exposed root surfaces.[57,58] Tooth root surfaces are covered with cementum (a softer surface than the enamel) and so are susceptible to decay. As Baby Boomers age, root decay experience is expected to increase in future years possibly to the point where older adults experience similar or higher levels of new cavities than do school children.[57]

Additional information on this topic can be found in this Section, Question 11.

Additionally, once an individual has a cavity repaired with a filling (restoration), that filling can break down over time especially around the edges. These rough edges (or margins) can harbor bacteria that start the cavity process over again or leak which allows the bacteria to enter the tooth below the existing filling. These fillings often need to be replaced — sometimes multiple times over decades — each time growing larger to the point where the best restoration for the tooth is a crown that covers the entire tooth surface. Preventing cavities and remineralizing teeth at the earliest stages of decay is very important not only in saving tooth structure but also in reducing the cost for dental care. Community water fluoridation is an effective public health measure that is a cost-saving and cost-effective approach to preventing tooth decay.

Additional information on this topic can be found in the Cost Section, Question 68.

Oral health disparities exist in the United States and have been documented through extensive studies and reviews.[59-61] Despite the fact that millions of people in the U.S. enjoy good dental health, disparities exist for many racial and ethnic groups, as well as by socioeconomic status, sex, age and geographic location.[62] Water fluoridation helps to reduce the disparities in oral health at the community level as it benefits all residents served by community water supplies. In his 2001 Statement on Community Water Fluoridation,[63] former Surgeon General Dr. David Satcher noted:

> ...community water fluoridation continues to be the most cost-effective, practical and safe means for reducing and controlling the occurrence of dental decay in a community...water fluoridation is a powerful strategy in efforts to eliminate health disparities among populations.[63]

Additional information on this topic can be found in the Public Policy Section, Question 59.

Today, the major focus for achieving and maintaining oral health is on prevention. Established by the U.S. Department of Health and Human Services, Healthy People 2020[64] provides a science-based, comprehensive set of ambitious, yet achievable, ten-year national objectives for improving the health of the public. Included under oral health is an objective to expand the fluoridation of public water supplies. Objective 13 states that at least 79.6% of the U.S. population served by community water systems should be receiving the benefits of optimally fluoridated water by the year 2020.[65] Data from the CDC indicate that, in 2014, 74.4% of the U.S. population on public water systems, or a total of 211.4 million people, had access to fluoridated water.[66] Conversely, approximately 25% or more than 72.7 million people on public water systems do not receive the decay preventing benefits of fluoridation.

While cavities are often thought of as a problem for children, adults in the U.S. are keeping their teeth longer (partially due exposure to fluoridation) and this increased retention of teeth means more adults are at risk for cavities — especially decay of exposed root surfaces.

11. Do adults benefit from fluoridation?

Answer.

Yes. Fluoridation plays a protective role against tooth decay throughout life, benefiting both children and adults.

Fact.

While the early fluoridation trials were not designed to study the possible benefits fluoridation might have for adults, by the mid-1950s, it became evident from the results of the first fluoridation trial in Grand Rapids, Michigan, that the beneficial effects of fluoridation were not confined to children drinking the fluoridated water from birth. The fact that a reduction in tooth decay was observed for teeth which had already been calcified or were erupted when fluoridation was started indicated that a beneficial effect could be gained by older age groups.[67, 68] Today it is understood that the maximum reduction in tooth decay occurs when fluoride has been incorporated into the tooth during formation and when it also is available at the tooth surface during demineralization and remineralization. Fluoridation works in both ways to prevent tooth decay.[9,12,14,16,17]

Fluoride and minerals, including calcium and phosphate, are present in saliva[7,9] and are stored in dental plaque (a soft, sticky film that is constantly forming on teeth). To halt the formation of tooth decay or rebuild tooth surfaces, fluoride must be constantly present in low concentrations in saliva and plaque.[7] Frequent exposure to small amounts of fluoride, such as occurs when drinking fluoridated water, helps to maintain the reservoir of available fluoride in saliva and plaque to resist demineralization and enhance remineralization.[7,10] In other words, drinking fluoridated water provides the right amount of fluoride at the right place at the right time. Fluoride in water and water-based beverages is consumed many times during the day, providing frequent contact with tooth structures and making fluoride available to fluoride reservoirs in the mouth. This helps explain why fluoride at the low levels found in fluoridated water helps to prevent tooth decay in teeth after they have erupted.[7]

Additional information on this topic can be found in this Section, Question 2.

While teeth already present in the mouth when exposure to water fluoridation begins receive the benefit of decay protection, studies have indicated that adults who have consumed fluoridated water continuously from birth receive the maximum protection against tooth decay.[10-14]

An Australian study published in 2008 investigating decay experience among Australian Defense Force personnel showed that a longer period of exposure to water fluoridation was associated with lower decay rates in adults between the ages of 17 and 44. Adults who lived at least 90% of their lifetime in communities with fluoridated water had 24% less decay than adults who lived in fluoridated areas for less than 10% of their lifetimes.[69]

A meta-analysis published in 2007 examining the effectiveness of fluoridation for adults found that fluoridation prevents approximately 27% of tooth decay in adults. It included only studies that were published after 1979. The studies were limited to participants who were lifelong residents of communities with fluoridated water and a control group of lifelong residents of communities without fluoridated water.[57]

A study published in 2002 examined the differences in tooth decay patterns between two cohorts of young adults: the first grew up before fluoridation was widely available and the second after fluoridation became more widespread. Comparing data from two different U.S. National Health and Nutrition Examination Surveys (NHANES), NHANES I (1971-1974) and NHANES III (1988-84), results indicated that total tooth decay declined among people aged 45 years and younger. No decline was observed in people aged 46 to 65, a cohort that grew up during the late 40s and early 50s before fluoridation was widely available. This was identified as the major reason this older cohort did not show a decline in tooth decay.[70]

In 1989, a study conducted in the state of Washington found that adults (20-34 years of age) who had a continuous lifetime exposure to fluoridation water had 31% less tooth decay experience compared to similar aged adults with no exposure to fluoridated water. It also concluded that exposure to fluoridation only during childhood has lifetime benefits since adults exposed to fluoridated water only during childhood had decay experience similar to those adults exposed to fluoridated water only after age 14.[71]

An important issue for adults is the prevention of root decay.[57,58] People in the United States are living longer and retaining more of their natural teeth than ever

before — in part due to water fluoridation. Adults with gum recession are at risk for root decay because the root surface, a much softer tooth surface than enamel, becomes exposed to decay-causing bacteria in the mouth as gums recede. Data from the ongoing NHANES survey indicate that root decay experience has declined in recent years among older adults with teeth (ages 65-years and older), decreasing from 46% (NHANES 1988-1994) to 36% (NHANES 1999-2004). However, the prevalence of root decay increases markedly as adults age and escalates more rapidly after age 65. Specifically, the 75-years and older group had 23% greater prevalence of root surface decay than did the 65- to 74-years-old age group.[72] While most studies related to the prevention of root decay focus on professional fluoride treatments such as fluoride varnish, there is evidence that demonstrates fluoridation may have an impact on root decay.[73-75] For example, in Ontario, Canada, lifelong residents of the nonfluoridated community of Woodstock had a 21% higher root surface decay experience than those living in the naturally fluoridated (1.6 ppm) matched community of Stratford.[74] Similarly, Iowa residents more than 40 years of age living long-term in fluoridated communities had significantly less root decay than lifelong residents of nonfluoridated communities (0.56 versus 1.11 surfaces).[75]

Adults in the U.S. are keeping their natural teeth longer — partially due to exposure to water fluoridation. But as adults age with their teeth, it means more teeth will be at risk for tooth decay. It has been suggested in the literature that decay experience for adults could increase to the point where older adults experience similar or higher levels of new cavities than do school children.[35,76,77] It continues to be important to document and acknowledge the effectiveness of fluoridation in preventing tooth decay in adults because virtually all primary preventive dental programs target children and adolescents — with one exception — community water fluoridation. Fluoridation is unique in that it remains the one dental public health measure that reaches all members of a community including young, middle-aged and older adults.[56]

Fluoridation is unique in that it remains the one dental public health measure that reaches all members of a community including young, middle-aged and older adults.

12. Are dietary fluoride supplements effective in helping to prevent tooth decay?

Answer.

Yes. Dietary fluoride supplements can be effective in preventing tooth decay.

Fact.

Dietary fluoride supplements are available only by prescription in the United States and are intended for use by children who are at high risk for developing tooth decay and living in areas where the primary source of water is deficient in fluoride.[8]

Recommendations for health professionals seeking to prescribe dietary fluoride supplements are found in *The Evidence-Based Clinical Recommendations on the Prescription of Dietary Fluoride: A Report of the American Dental Association Council on Scientific Affairs published in 2010*.[8] The report and a *Chairside Guide: Dietary Fluoride Supplements: Evidence-based Clinical Recommendations* can be accessed at ***http://ebd.ADA.org/en/evidence/guidelines/fluoride-supplements***. The current dietary fluoride supplement schedule appears in this section as Table 1.

Additional information on this topic can be found in this Section, Question 13.

As noted in Table 3 of the report, "Clinical recommendations for the use of dietary fluoride supplements:"

> The expert panel convened by the American Dental Association Council on Scientific Affairs developed the following recommendations. They are intended as a resource for dentists and other health care providers. The recommendations must be balanced with the practitioner's professional judgment and the individual patient's needs and preferences.
>
> Children are exposed to multiple sources of fluoride. The expert panel encourages health care providers to evaluate all potential fluoride sources and to conduct a caries risk assessment before prescribing fluoride supplements.

As noted in the recommendations, prior to prescribing dietary fluoride supplements, accurate assessment of the fluoride content of the patient's primary drinking water source(s) should be conducted.[8] The identification of the "primary" sources is sometimes

difficult due to the fact that some patients have multiple sources of drinking water during a typical day. For example, while a patient may have access to drinking water in the home, they often also spend a large part of their day accessing drinking water at day care or school, which could be a different water system. It might be necessary to contact the local, county or state health departments for information on the fluoride content of public water sources or to be referred to a certified laboratory that can provide a fluoride test for private wells.

Additional information on this topic can be found in this Section, Question 4.

The ADA offers information on caries risk assessment[78] on the web at ***http://www.ADA.org/en/member-center/oral-health-topics/caries-risk-assessment-and-management***. It should be noted that dietary fluoride supplements are recommended only for children at high risk for tooth decay.[8] Caries risk assessments should be completed for patients on a regular basis to determine their risk for tooth decay which can change over time.

Dietary fluoride supplements can be effective in helping to prevent tooth decay. To receive the optimal benefit from fluoride supplements, the use of supplements should begin at six months of age and continue daily until the child is 16 years old.[8] However, individual patterns of compliance can vary greatly. For that reason, the report suggests that providers carefully monitor the adherence to the schedule to maximize the therapeutic benefit of supplements in caries prevention. If the health care provider has concerns regarding a lack of compliance to the schedule, it might be best to consider other sources of fluoride exposure for the patient, such as bottled water with fluoride.[8]

While dietary fluoride supplements can be effective in reducing tooth decay, there are a number of factors that can impede their use and resulting therapeutic value:

- Patients/parents/caregivers must have access to a professional health care provider who can provide the necessary assessments and provide prescriptions for the supplements — often repeatedly over time.
- The supplements must be obtained through a pharmacy/pharmaceutical service and refilled as necessary.
- The cost of supplements can be a financial hardship for some individuals.
- The compliance required (a child should take the supplement every day until 16 years of age) to obtain the optimal therapeutic affect often is difficult to achieve.

Table 1. Dietary Fluoride Supplement Schedule for Children at High Caries Risk[8]

Age	Fluoride ion level in drinking water (ppm)*		
	<0.3 ppm	**0.3-0.6 ppm**	**>0.6 ppm**
Birth - 6 months	None	None	None
6 months - 3 years	0.25 mg/day**	None	None
3-6 years	0.50 mg/day	0.25 mg/day	None
6-16 years	1.0 mg/day	0.50 mg/day	None

* 1.0 part per million (ppm) = 1 milligram/liter (mgL) **2.2 mg sodium fluoride contains 1 mg fluoride ion.

Noting the potential obstacles listed above, where feasible, community water fluoridation offers proven decay prevention benefits without the need for access to a health care professional or a change in behavior on the part of the individual. Simply by drinking water at home, school, work or play everyone in the community benefits regardless of socioeconomic status, educational attainment or other social variables.[79] While dietary fluoride supplements can reduce a child's risk of tooth decay, fluoridation extends that benefit to adults in the community. Additionally, the cost of dietary fluoride supplements over an extended period of time can be an economic concern to a family. In looking at overall costs, consideration should be given to the cost per person and the number of people who can benefit from a dietary fluoride supplement or community fluoridation program.[77]

13. The ADA Dietary Fluoride Supplements Schedule 2010 contains the word "none" in specific boxes. Does this mean the ADA does not recommend fluoride for children?

Answer.

No, that would be a misinterpretation of the purpose of the schedule. The schedule reflects the recommended dosage of fluoride supplements based on age and the fluoride level of the child's primary source of drinking water, in addition to what would be consumed from other sources.

Fact.

The dietary fluoride supplement schedule[8] (Table 1.) is just that — a supplement schedule. Children residing in areas where the drinking water is not fluoridated will receive some fluoride from other sources such as foods and beverages. Dietary fluoride supplements are designed for children over six months of age who do not receive a sufficient amount of fluoride from those sources. The dosage amounts in the table reflect the additional amount of supplemental fluoride intake necessary to achieve an optimal anti-cavity effect. To reduce the risk of dental fluorosis, children under six months of age should not take dietary fluoride supplements.

Additional information on this topic can be found in the Safety Section, Question 29.

The dietary fluoride supplement schedule should not be viewed as a recommendation of the absolute upper limits of the amount of fluoride that should be ingested each day. In 2011, the Food and Nutrition Board of the Institute of Medicine developed Dietary Reference Intakes, a comprehensive set of reference values for dietary nutrient values. The values present nutrient requirements to optimize health and, for the first time, set maximum-level guidelines to reduce the risk of adverse effects from excessive consumption of a nutrient. In the case of fluoride, levels were established to reduce tooth decay without causing moderate dental fluorosis.[80]

For example, the dietary fluoride supplement schedule recommends that a two-year-old child at high risk for tooth decay living in a nonfluoridated area (where the primary water source contains less than 0.3 ppm fluoride) should receive 0.25 mg of supplemental fluoride per day. This does not mean that this child should ingest exactly 0.25 mg of fluoride per day total. Instead, a two-year-old child could receive important anti-cavity benefits by taking 0.25 mg of supplemental fluoride a day without causing any adverse effects on health. This child would most probably be receiving fluoride from other sources (foods and beverages) even in a nonfluoridated area and the recommendation of 0.25 mg of fluoride per day takes this into account. In the unlikely event the child did not receive any additional fluoride from food and beverages, the 0.25 mg per day could be inadequate fluoride supplementation to achieve an optimal anti-cavity effect.

Additional information on this topic can be found in the Safety Section, Question 23.

The following statement is correct. "Fluoride supplement dosage levels have been lowered in the past as exposure to fluoride from other sources has increased." Rather than being a problem, as those opposed to the use of fluoride might imply, this is evidence that ADA policy is based on the best available science. The ADA periodically reviews the dosage schedule and issues updated recommendations based on the best available science.

In 1994, a Dietary Fluoride Supplement Workshop, co-sponsored by the ADA, the American Academy of Pediatric Dentistry and the American Academy of Pediatrics, was held in Chicago. Based on a review of scientific evidence, a consensus was reached on a

new dosage schedule developed acknowledging that numerous sources of topical and systemic fluoride are available today that were not available many years ago.[81]

The supplement schedule was reviewed and reissued in December 2010. At that time, the American Dental Association Council on Scientific Affairs (CSA) published evidence-based clinical recommendations for the schedule of dietary fluoride supplements.[8] The evidence-based review recommended that the age stratification established in the ADA's 1994 supplement schedule remain unchanged. The review also recommended that prior to prescribing fluoride supplements, the prescribing provider should assess the patient's risk for cavities and only those at high risk should receive supplements.[8] If at high risk, then the fluoride level of the patient's primary drinking water source should be assessed.[8] It should be noted that an accurate assessment of the patient's primary drinking water source can be difficult due to the various sources of fluoridated water. For example, the patient might not have access to fluoridated water in the home, but may drink fluoridated water while at day care or school. The current dietary fluoride supplement schedule appears as Table 1.[8]

Additional information on this topic can be found in this Section, Question 12.

14. What are salt and milk fluoridation and where are they used?

Answer.

Salt and milk fluoridation are fluoridation methods used to provide community-based fluoridation in countries outside of the United States where various political, geographical, financial or technical reasons prevent the use of water fluoridation.

Fact.

The practice of salt fluoridation began in the 1950s, approximately 10 years after water fluoridation was initiated in the United States.[82] Based on the success several decades earlier of the use of iodized salt for the prevention of goiter, fluoridated salt was first introduced in Switzerland in 1956.[83]

According to a review published in 2013, salt fluoridation is available in a number of countries in Europe but its coverage varies greatly.[82] Germany and Switzerland have attained a coverage exceeding two-thirds of their populations (67% and 85% respectively). In other European countries including Austria, the Czech Republic, France, Slovakia and Spain, salt fluoridation is reportedly used on a very limited scale.[82] Additional countries, such as Hungary, Romania, Slovenia, Croatia and Poland, have considered salt fluoridation but have failed to take action.[84]

European regulations (current as of 2017) permit the addition of fluoride to salt and water.[82] However, it appears that the majority of European countries favor the twice daily use of fluoride toothpaste as the most important measure for improving the public's dental health.[84] In Europe, toothpaste sold over the counter typically contains 1,500 ppm fluoride,[85] while toothpaste in the United States typically contains 1,000 to 1,100 ppm fluoride.[86]

On a historical note, prior to the political changes that occurred in the late 1980s and early 1990s in Europe, water fluoridation was widely available in the German Democratic Republic and the Czechoslovak Republic and to a lesser extend in Poland. With the end of the Communist regimes, efforts related to public health dentistry were largely discontinued. While fluoridation continued in several small towns until 1993, in general, it was abandoned.[84]

In North and South America, salt fluoridation is available in Belize, Bolivia, Colombia, Costa Rica, Dominican Republic, Ecuador, Mexico, Peru, Uruguay and Venezuela. Like in Europe, the extent of salt fluoridation varies between countries. Columbia, Costa Rica, Jamaica, Mexico and Uruguay provide fluoridated salt to nearly their entire populations while there is less coverage in other countries.[82]

In 2013, it was estimated that approximately 60 million people in Europe and 160 million in the Americas had access to fluoridated salt.[82]

The Pan American Health Organization (PAHO), a regional division of the World Health Association (WHO) with responsibilities for health matters in North, South and Central America and the Caribbean, has been active in developing strategies to implement decay prevention programs in the regions of the Americas using water and salt fluoridation.[87] In order to achieve the greatest reduction in tooth decay while minimizing the risk of dental fluorosis, it is advisable that a country implement only one of these two

public health measures — either community water fluoridation or salt fluoridation. The United States has implemented water fluoridation. The U.S. Food and Drug Administration has not approved fluoridated salt for use in the U.S.

Early studies evaluating the effectiveness of salt fluoridation conducted in Columbia, Hungary and Switzerland indicated that fluoride delivered via salt might produce a reduction in tooth decay similar to that seen with optimally fluoridated water.[88,89] When all salt destined for human consumption (both domestic salt and bulk salt that is used by commercial bakeries, restaurants, institutions, and industrial food production) is fluoridated, the decay-reducing effect could be comparable to that of water fluoridation over an extended period of time.[88,89] When only domestic salt is fluoridated, the decay-reducing effect is diminished.[88] Studies conducted in Costa Rica, Jamaica and Mexico in the 1980s and 1990s also showed significant reductions in tooth decay. However, it was noted that these studies did not include other variables that could have contributed to the reductions.[88]

The fact that salt fluoridation does not require a centralized piped water system is of particular value in countries that do not have such water systems. Fluoridated salt is also a very cost-effective public health measure. For example, in Jamaica, where all salt destined for human consumption is fluoridated, the use of fluoridated salt was reported to reduce tooth decay by as much as 84% at a cost of 6 cents per person per year.[87] In some cases, the cost to produce fluoridated salt is so low that for consumers, the cost of fluoridated salt is the same as for nonfluoridated salt.[90]

The implementation of salt fluoridation has unique challenges not incurred with water fluoridation. Sources of salt, the willingness of local manufacturers to produce fluoridated salt or the need to import fluoridated salt would need to be studied. Because fluoridated salt should only be consumed by the public in areas with a naturally low level of fluoride, it would be necessary to completely map the naturally occurring levels of fluoride and devise a plan to keep fluoridated salt out of the areas with moderate to high naturally occurring fluoride (to aid in reducing the risk of dental fluorosis). Additionally, a plan would need to be developed to monitor the fluoride level in urine of those consuming fluoridated salt starting with a baseline before implementation and including follow-up testing on a regular basis. While salt fluoridation typically is not implemented through a public vote, it would be necessary to gain the cooperation of salt manufacturers and institutions of all kinds that would use salt in their food preparation.[89] Additionally, educational efforts would need to be directed at health professionals and health authorities to avoid referendum approaches and identify enabling regulations.[83]

In a number of European countries, consumers have a choice of purchasing either fluoridated or nonfluoridated salt for use in the home. While it has been argued that, unlike water fluoridation, this option to purchase fluoridated or nonfluoridated salt allows for personal choice, studies indicate that fluoridated salt is not as effective a public health measure when only a small portion of the population opts to purchase and use the product.[88] For example, in France, fluoridated salt for home use became available to the consumer by decree in 1986, while nonfluoridated salt remained available for purchase. By 1991, with an aggressive public health campaign, the market share of fluoridated salt was 50% and it reached a high of 60% in 1993. Then the public health campaign ended. By 2003, the market share had decreased to 27%.[82,91] It has been suggested that, in order to be a successful public health measure that effectively reaches those who are disadvantaged, approximately 70% of the population needs to use fluoridated salt. Conversely, usage rates less than 50% should be considered as having minimal effect on public health.[82] While the situation described in Europe allows for personal choice, salt programs in the Americas where all salt destined for human consumption is fluoridated would seem at odds with the issue of personal choice, yet the program is apparently working well with fluoridated salt well accepted by the public.[92]

A number of studies have shown an increase in the occurrence of dental fluorosis in areas where salt fluoridation programs have been implemented. For example, a 2006 cohort study examined the prevalence and severity of dental fluorosis in children before and after the implementation of salt fluoridation in Campeche, Mexico, in 1991.[93] The study showed, that while 85% of the dental fluorosis identified was categorized as very mild, children born in 1990-1992 were more likely to have dental fluorosis than those born in the period 1986-1989[93] A study published in 2009 of children in Jamaica

showed similar results.[94] Jamaica began a fluoridated salt program in 1987. In 1999, an area around St. Elizabeth was found to have a high prevalence of dental fluorosis. Examiners returned in 2006 to re-evaluate students in the area. While their results indicated a slightly reduced tooth decay experience for 6-year-olds in 2006 compared to 6-year-olds in 1999, they also found that 6-year-olds also had a higher prevalence of dental fluorosis in 2006 than the 6-year-olds examined in 1999. In addition to the implementation of salt fluoridation, other factors including the use of increased use of fluoridated toothpaste and mouthrinses could have played a role.[94] However, both of these studies point out the need to carefully monitor fluorides from multiple sources especially when implementing fluoridated salt programs.

Fluoridated milk has been suggested as another alternative to community water fluoridation in countries outside the United States. Studies on the effectiveness of milk fluoridation have been carried out in numerous countries, including but not limited to, Brazil, Bulgaria, China, Israel, Japan, Russia and the United Kingdom.[95] Many of these studies have found milk fluoridation programs to be an efficient and cost-effective method to prevent cavities.[95] For example, a 2001 study of Chilean preschoolers using fluoridated powdered milk and milk derivatives resulted in a 41% reduction in the number of primary decayed missing and filled tooth surfaces as compared to the control group that did not receive fluoridated milk.[96] Additionally, in the same study, the proportion of decay free children increased from 22% to 48% in the study group after four years of implementing the program.[96]

In 2004, the dental health of school children from the northwest of England, who were enrolled in the school milk fluoridation program, was compared to children with similar characteristics who were not consuming fluoridated milk.[97] The average age of the children in the study was 11 years old. In order to participate in the study, participants chosen for the test group were required to have been receiving fluoridated milk for a minimum of 6 years. First permanent molars were examined for tooth decay experience. Results from the study indicated that children consuming fluoridated milk had less tooth decay experience (1.01 DMFT) than the children who did not receive fluoridated milk (1.46 DMFT).[97]

A study of community milk programs in Bulgaria examined children at age 3 and again at age 8.[98] The study indicated that tooth decay experience was substantially lower in the cohort of children who had received fluoridated milk in school for five years compared with the cohorts of children who had received milk in school without fluoride added. At the end of the five-year trial in 2009, tooth decay experience was lower in children who received fluoridated milk (5.61 dmfs and 0.48 DMFS) than in the control community children who received milk with no fluoride (9.41 dmfs and 1.24 DMFS).[98]

In these two examples "dmfs" is the mean number of decayed, missing or filled tooth surfaces on primary (or baby) teeth while "DMFS" is the mean number of decayed missing or filled tooth surfaces on permanent teeth.

Studies completed on milk fluoridation to date largely target children. There has been only a very small number that have looked at the role fluoridated milk might play for adults. These studies have largely examined fluoridated milk and its possible effect on root decay. For example, a study published in 2011 and conducted in Sweden indicated that fluoridated milk could be of value in remineralizing early tooth decay in root surfaces.[99]

It was estimated that as of 2013, more than one million children worldwide were receiving fluoridated milk.[94] The majority of studies conducted have indicated that fluoridated milk is effective in preventing tooth decay under certain conditions. It is most effective if the consumption of fluoridated milk starts before 4 years of age and continues until the permanent teeth are present in the mouth. Most successful programs are conducted through schools where the natural fluoride levels in water are low and children are able to consume fluoridated milk for a minimum of 200 days a year.[95] While these conditions prevent fluoridated milk from being recommended as a public health measure for an entire community, fluoridated milk might be the most appropriate and effective means of fluoride exposure for children in some circumstances.

15. Can the consistent use of bottled water result in individuals missing the benefits of optimally fluoridated water?

Answer.
Yes. The majority of bottled waters on the market do not contain optimal levels (0.7 mg/L) of fluoride.

Fact.
There is not a large body of research regarding the risk for tooth decay associated with the consumption of bottled water. However, a lack of exposure to fluoride could increase an individual's risk for tooth decay. The vast majority of bottled waters do not contain significant amounts of fluoride.[100] Individuals who drink bottled water as their primary source of water could be missing the decay preventive effects of optimally fluoridated water available from their community water supplies. These consumers should seek advice from their dentists about their risk for tooth decay and specific fluoride needs.

While drinking water from the tap is regulated by the U.S. Environmental Protection Agency (EPA), bottled water is regulated by the U.S. Food and Drug Administration (FDA).[101] The FDA has established maximum allowable levels for physical, chemical, microbiological, and radiological contaminants in bottled water.[102]

Individuals who drink bottled water as their primary source of water could be missing the decay preventive effects of optimally fluoridated water available from their community water supplies.

Noting that fluoride can occur naturally in source waters used for bottled water or can be added by a bottled water manufacturer, the FDA has approved standards for the fluoride content of bottled water.[102] However, the FDA regulations require the fluoride content of bottled water to be listed on the label only if fluoride is added during processing.[103] If the fluoride level is not shown on the label of the bottled water, the company can be contacted, or the water can be tested to obtain this information. Most consumers are unaware that the vast majority of bottled waters, especially those treated by distillation or reverse osmosis, are largely fluoride-free. Unknowingly, individuals who drink bottled water as their primary source of water could be missing the decay preventive effects of optimally fluoridated water available from their community water supplies. The American Dental Association supports the labeling of bottled water with the fluoride content to aid consumers in making informed decisions about choices of drinking water.[104]

Recognizing the benefit of fluoride in drinking water, in 2006 the FDA issued the "FDA Health Claim Notification for Fluoridated Water and Reduced Risk of Dental Caries"[105] which states that bottled water meeting the specific standards of identity and quality set forth by FDA, and containing greater than 0.6 mg/L up to 1.0 mg/L total fluoride, can be labeled with the following health claim: "Drinking fluoridated water may reduce the risk of [dental caries or tooth decay]." This health claim is not intended for use on bottled water products specifically marketed for use by infants.[105]

Additional information on this topic can be found in the Safety Section, Question 28.

According to a 2017 press release from the Beverage Marketing Corporation,[106] bottled water surpassed carbonated soft drinks in 2016 to become the largest beverage category by volume in the United States. Per capita consumption of bottled water was approximately 39.3 gallons in 2016, while the average consumption of carbonated soft drinks was approximately 38.5 gallons per person per year. The majority (67.3%) of U.S. bottled water is sold in single-serving PET (polyethylene terephthalate or plastic resin[107]) bottles. Bottled water is also sold via bulk deliveries to homes and offices (approximately 11%) and by retail sales in different sizes of gallon containers (approximately 9%).[106]

Individuals choose to drink bottled water for various reasons. Some find it a calorie-free substitute for carbonated soft drinks or other sugary beverages. Others dislike the taste of their tap water or have concerns about the possible contaminants in their local water supply.

In a small study published in 2012, a convenience sample of caretakers and adolescents at an urban clinic found that 17% drank tap water exclusively, 38% drank bottled water exclusively and 42% drank both. Bottled water was ranked significantly higher

in taste, clarity, purity and safety than tap water. Only 24% of caretakers of children and adolescents knew whether or not fluoride was in their drinking water. The authors concluded that perception of the qualities of water were responsible for choices of drinking water.[108] Similar findings have been echoed in earlier studies.[109-111] Additionally, cultural influences can affect drinking water preferences. In some Latino communities, parents were less likely to give tap water to their children because they believed tap water would make them sick based in part on the fact that many have come to the U.S. from places with poor water quality where water-borne illness was common.[111] Besides missing the decay preventive effects of fluoridated tap water, it has been determined that families spend hundreds of dollars more each year on purchasing water than if they were to consume tap water.[109,111]

16. Can home water treatment systems such as water filters, reverse osmosis and water softeners remove fluoride from drinking water?

Answer.

Some types of home water treatment systems can reduce the fluoride levels in water supplies. Individuals who drink water processed by home water treatment systems as their primary source of water could be losing the decay preventive effects of optimally fluoridated water available from their community water supply.

Fact.

There are many kinds of home water treatment systems including reverse osmosis systems, distillation units, water softeners and water filters such as carafe filters, faucet filters, under the sink filters and whole house filters. There has not been a large body of research regarding the extent to which these treatment systems affect the fluoride content of optimally fluoridated water.

However, it has been consistently documented that reverse osmosis systems and distillation units remove significant amounts of fluoride from the water supply.[112,113] Studies regarding water softeners show clearly that the water softening process does not significantly change fluoride levels.[114,115]

With water filters, the fluoride concentration remaining in the water depends on the type and quality of the filter being used, the status of the filter and the filter's age. Most carbon filters do not remove fluoride. However, some filters containing activated alumina can remove significant amounts of the fluoride. Additionally, some filters containing bone char also can remove significant amounts of fluoride.[113,116] Accordingly, each type of filter should be assessed individually.

Individuals who drink water processed by home water treatment systems as their primary source of water could be losing the decay preventive effects of optimally fluoridated water available from their community water supply. Therefore, it might be necessary to contact the installer, distributor or manufacturer of the water treatment system or water filter in question to determine whether the item removes fluoride. Information regarding the existing level of fluoride in a community's public water system can be obtained by asking a local dentist or contacting the local or state health department or the local water supplier. If the consumer is using a private well, it is suggested that it be tested yearly for fluoride levels.

Additional information on this topic can be found in this Section, Question 4.

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Safety

17. Does fluoride in the water supply, at the levels recommended for the prevention of tooth decay, adversely affect human health?

Answer.

The overwhelming weight of scientific evidence supports the safety of community water fluoridation.

Fact.

For generations, millions of people have lived in areas where fluoride is found naturally in drinking water in concentrations as high or higher than the optimal level recommended to prevent tooth decay. Research conducted among these persons confirms the safety of fluoride in the water supply.[1-5]

As with other nutrients, fluoride is safe and effective when used and consumed as recommended. No charge against the benefits and safety of fluoridation has ever been substantiated by generally accepted scientific knowledge. A number of reviews on fluoride in drinking water have been issued over the years. For example, in 1951[6] the National Research Council (NRC), of the National Academies, issued its first report stating fluoridation was safe and effective. Additional reviews by the NRC followed in 1977[7] and 1993[8] with the most recent NRC review completed in 2006.[9] Additional reviews completed over the ten year period from 2007-2017 include:

2017 Australian Government. National Health and Medical Research Council (NHMRC). *Information Paper — Water Fluoridation: Dental and Other Human Health Outcomes.*[10]

2016 O'Mullane DM, Baez RJ, Jones S, Lennon MA, Petersen PE, Rugg-Gunn AJ, Whelton H, Whitford GM. *Fluoride and Oral Health.*[11]

2016 American Water Works Association. *Water Fluoridation Principles and Practices.* AWWA Manual M4. Sixth edition.[12]

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2015 U.S. Department of Health and Human Services Federal Panel on Community Water Fluoridation. *U.S. Public Health Service Recommendation for Fluoride Concentration in Drinking Water for the Prevention of Dental Caries.*[16]

2014 Public Health England. *Water Fluoridation: Health Monitoring Report for England.*[17]

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2011 European Commission of the European Union Scientific Committee on Health and Environmental Risks (SCHER). *Fluoridation.*[20]

2008 Health Canada. *Findings and Recommendations of the Fluoride Expert Panel.*[21]

2007 Australian Government National Health and Medical Research Council *A Systematic Review of the Efficacy and Safety of Fluoridation; Part A: Review Methodology and Results.*[22]

The overwhelming weight of scientific evidence supports the safety of community water fluoridation.

18. Are additional studies being conducted to determine the effects of fluorides in humans?

Answer.

Yes. Since its inception, fluoridation has undergone a nearly continuous process of re-evaluation. As with other areas of science, additional studies on the effects of fluorides in humans can provide insight as to how to make effective choices for the use of fluoride. The American Dental Association and the U.S. Public Health Service support this on-going research.

Fact.

For more than 70 years, detailed reports have been published on multiple aspects of fluoridation. The accumulated dental, medical and public health evidence concerning fluoridation has been reviewed and evaluated numerous times by academicians, committees of experts, special councils of governments and most of the world's major national and international health organizations. The consensus of the scientific community is that water fluoridation, at the level recommended to prevent tooth decay, safely provides oral health benefits which in turn supports improved general health. The question of possible secondary health effects caused by fluorides consumed in optimal concentrations throughout life has been the object of thorough medical investigations which have failed to show any impairment of general health throughout life.[10-22]

The consensus of the scientific community is that water fluoridation, at the level recommended to prevent tooth decay, safely provides oral health benefits which in turn supports improved general health.

In scientific research, there is no such thing as "final knowledge." New information is continuously emerging and being disseminated. Government agencies, such as the U.S. National Institutes of Health, National Institute of Dental and Craniofacial Research, and others continue to fund fluoride research. One example is the National Toxicology Program's systematic review using animal studies to evaluate potential neurobehavioral effects from exposure to fluoride during development which began in 2015 and continues in 2017.[23]

In 2011, the U.S. Department of Health and Human Services and the U.S. Environmental Protection Agency (EPA) issued a joint press release[24] outlining important steps the respective agencies were taking to ensure that standards and guidelines on fluoride in drinking water continue to ensure the safety of the public while supporting good dental health, especially in children. Those actions resulted in the 2015 report issued by the U.S. Public Health Service[16] regarding the recommended level of fluoride in drinking water and the EPA activity was informational to the 2016 EPA Six-Year Review 3[25] in which the Agency completed a detailed review of drinking water regulations including the regulation for naturally occurring fluoride in water.

19. Why did the U.S. Public Health Service issue a report in 2015 recommending 0.7 milligrams per liter (mg/L) as the optimal level for fluoride in drinking water for all temperature zones in the U.S.?

Answer.

The U.S. Public Health Service (USPHS) updated and replaced its 1962 Drinking Water Standards related to community water fluoridation to establish a single value of 0.7 mg/L as the optimal concentration of fluoride in drinking water. This concentration provides the best balance of protection from tooth decay while limiting the risk of dental fluorosis.[16]

Fact.

The previous U.S. Public Health Service recommendations for optimal fluoride concentrations were based on average ambient air temperatures of geographic areas and ranged from 0.7–1.2 mg/L. In 2011, the U.S. Department of Health and Human Services (HHS) issued a notice of intent in the *Federal Register*[26] proposing that community water systems adjust the amount of fluoride to 0.7 mg/L to achieve an optimal fluoride level.

The new guidance was based on several considerations that included:

- Scientific evidence related to effectiveness of water fluoridation on caries prevention and control across all age groups.
- Fluoride in drinking water as one of several available fluoride sources.
- Trends in the prevalence and severity of dental fluorosis.
- Current evidence on fluid intake in children across various ambient air temperatures.

As part of the process leading to the notice of intent, the U.S. Department of Health and Human Services (HHS) convened a federal interdepartmental, interagency panel of scientists to review the scientific evidence relevant to the 1962 USPHS Drinking Water Standards for fluoride concentrations in drinking water in the United States and to update these recommendations based on current science. Panelists included representatives from the Centers for Disease Control and Prevention, the National Institutes of Health, the U.S. Food and Drug Administration, the Agency for Healthcare Research and Quality, the Office of the Assistant Secretary for Health, U.S. Environmental Protection Agency, and the U.S. Department of Agriculture.[16]

A public comment period followed the publication of the notice of intent during which time more than 19,000 comments were received. The vast majority (more than 18,000) were variations on a letter submitted by an organization opposing community water fluoridation. Comments received were summarized and reported to the full federal panel. The panel then spent several years reviewing each comment in light of the best available science. After completing their extensive review, the panel did not alter the recommendation based on the following:

- Community water fluoridation remains an effective public health strategy for delivering fluoride to prevent tooth decay and is the most feasible and cost-effective strategy for reaching entire communities.
- In addition to drinking water, other sources of fluoride exposure have contributed to the prevention of dental caries and an increase in dental fluorosis prevalence.
- Caries preventive benefits can be achieved and the risk of dental fluorosis reduced at 0.7 mg/L.
- Recent data do not show a convincing relationship between water intake and outdoor air temperature. Thus, recommendations for water fluoride concentrations that differ based on outdoor temperature are unnecessary.[16]

In 2015 the USPHS published a final report establishing guidance for water systems that are actively fluoridating or those that may initiate fluoridation in the future.[16] For community water systems that add fluoride to their water, the USPHS recommends a uniform fluoride concentration of 0.7 mg/L (parts per million [ppm]) for the entire United States to maintain caries (tooth decay) prevention benefits and reduce the risk of dental fluorosis.

The USPHS further noted that surveillance of dental caries (tooth decay), dental fluorosis, and fluoride intake through the National Health and Nutritional Examination Survey will be done to monitor changes that might occur following implementation of the recommendation.[16]

20. What is the recommendation for the maximum level of naturally occurring fluoride in drinking water contained in the 2016 EPA Six-Year Review 3?

Answer.

As established by the U.S. EPA, the maximum allowable level of naturally occurring fluoride in drinking water is 4 milligrams/liter (mg/L or ppm). Under the Maximum Contaminant Level (MCL) standard, if the naturally occurring level of fluoride in a public water supply exceeds the MCL, the water supplier is required to lower the level of fluoride below the MCL — a process called defluoridation. The MCL is a federally enforceable standard.[27] (Additional details regarding the EPA maximum contaminant standards can be found in the Figure 3.)

Fact.

Under the Safe Drinking Water Act (SDWA),[27] the EPA is required to periodically review the existing National Primary Drinking Water Regulations (NPDWRs) "not less often than every 6 years." This review is a routine part of the EPA's operations as dictated by the SDWA.

In April 2002, the EPA announced the results of its preliminary revise/not revise decisions for 68 chemical NPDWRs as part of its first Six-Year Review of drinking water standards.[28] Fluoride was one of the 68 items reviewed. While the EPA determined that it fell under the "Not Appropriate for Revision at this Time" category, the agency asked the National Academies (NA) to update the risk assessment for fluoride. Prior to this time, the National Academies' National Research Council (NRC) completed a review of fluoride for the EPA which was published as "Health Effects of Ingested Fluoride" in 1993.[8]

The National Research Council's Committee on Toxicology created the Subcommittee on Fluoride in Drinking Water[9] which reviewed toxicologic, epidemiologic, and clinical data published since 1993, and exposure data on orally ingested fluoride from drinking water and other sources (e.g., food, toothpaste, dental rinses). Based on these reviews, the Subcommittee evaluated independently the scientific and technical basis of the U.S. Environmental Protection Agency's (EPA) maximum contaminant level goal (MCLG) of 4 milligram per liter (mg/L or ppm) and secondary maximum contaminant level (SMCL) of 2 mg/L in drinking water.

On March 22, 2006, almost three years after work began, the NRC issued a 500-page report titled *Fluoride in Drinking Water — A Scientific Review of the EPA's Standards*[9] to advise the EPA on the adequacy of its fluoride MCLG (maximum contaminant level goal) and SMCL (secondary maximum contaminant level) to protect children and others from adverse effects. (For additional information on the EPA maximum contaminant standards, please refer to Figure 3.) The report contained two major recommendations related to the MCLG:

> In light of the collective evidence on various health end points and total exposure to fluoride, the committee concludes that EPA's MCLG of 4 mg/L should be lowered. Lowering the MCLG will prevent children from developing severe enamel fluorosis and will reduce the lifetime accumulation of fluoride into bone that the majority of the committee concludes is likely to put individuals at increased risk of bone fracture and possibly skeletal fluorosis, which are particular concerns for subpopulations that are prone to accumulating fluoride in their bones.[9]
>
> To develop an MCLG that is protective against severe enamel fluorosis, clinical stage II skeletal fluorosis, and bone fractures, EPA should update the risk assessment of fluoride to include new data on health risks and better estimates of total exposure (relative source contribution) for individuals. EPA should use current approaches for quantifying risk, considering susceptible subpopulations, and characterizing uncertainties and variability.[9]

The 2006 NRC report[9] contained one major recommendation related to the Secondary Maximum Contaminant Level (SMCL):

> The prevalence of severe enamel fluorosis is very low (near zero) at fluoride concentrations below 2 mg/L. From a cosmetic standpoint, the SMCL does not completely prevent the occurrence of moderate enamel fluorosis. EPA has indicated that the SMCL was intended to reduce the severity and occurrence of the condition to 15% or less of the exposed population. The available data indicate that fewer than 15% of children will experience moderate enamel fluorosis of aesthetic concern (discoloration of the front teeth) at that concentration. However, the degree to which moderate enamel fluorosis might go beyond a cosmetic effect to create an adverse psychological effect or an adverse effect on social functioning is not known.[9]

Additionally, the Subcommittee identified data gaps and made recommendations for future research relevant to future revisions of the MCLG and SMCL for fluoride.[9]

It should be emphasized that the 2006 NRC report was not a review of fluoride as used in community water fluoridation. In fact, the 2006 NRC Report in Brief[29] states: "The committee did not evaluate the risks or benefits of the lower fluoride concentrations (0.7 to 1.2 mg/L) used in water fluoridation. Therefore, the committee's conclusions regarding the potential for adverse effects from fluoride at 2 to 4 mg/L in drinking water do not apply at the lower water fluoride levels commonly experienced by most U.S. citizens."[29]

In response to the recommendations noted above from the NRC report, in 2011, the EPA completed and peer-reviewed a quantitative dose-response assessment based on the available data for severe dental fluorosis as recommended by the NRC.[30] Additionally, the EPA completed and peer-reviewed a document on the environmental exposure of children and adults to fluoride and the relative source contribution for water which is needed in order to derive the MCLG from the dose-response assessment.[30] These efforts were being undertaken during Six-Year Review 2 and so no action on fluoride was taken during Six-Year Review 2.

In December 2016, the EPA announced the review results for the Agency's third Six-Year Review (called Six-Year Review 3),[25] in which the Agency completed a detailed review of 76 national primary drinking water regulations. The regulation for naturally occurring fluoride in water was examined as part of this review and is included among the list of regulated contaminants considered to be "Low priority and/or no meaningful opportunity" under "Not Appropriate for Revision at this Time."[25]

The announcement of the results of the EPA's Six-Year Review 3 in the *Federal Register*[31] indicates that, with the reviews of fluoride conducted since the first Six-Year Review (including but not limited to the 2006 NRC report and the EPA Fluoride Risk Assessment and Relative Source Contribution) and noting that other contaminants are of much greater concern, the EPA is recommending that no further action be taken at this time to change the current MCL/MCLG of 4 mg/L (the maximum level of naturally occurring fluoride allowed in drinking water).[31]

21. What is the Secondary Maximum Contaminant Level (SMCL) for naturally occurring fluoride in drinking water established by the EPA?

Answer.

The Secondary Maximum Contaminant Level (SMCL) for naturally occurring fluoride in water is 2 mg/L (or ppm). This is a non-enforceable federal standard.

Fact.

In addition to the MCL, the EPA has established a Secondary Maximum Contaminant Level (SMCL) of 2.0 mg/L and requires consumer notification by the water supplier if the naturally occurring fluoride level exceeds 2.0 mg/L. The SMCL, while not federally enforceable, is intended to alert families that regular consumption of water with natural levels of fluoride greater than 2.0 mg/L by young children could cause moderate to severe dental fluorosis in the developing permanent teeth.[32] The notice to be used by water systems that exceed the SMCL must contain the following points:

1. The notice is intended to alert families that children under nine years of age who are exposed to levels of fluoride greater than 2.0 mg/liter may develop dental fluorosis.

2. Adults are not affected because dental fluorosis occurs only when developing teeth are exposed to elevated fluoride levels.

3. The water supplier can be contacted for information on alternative sources or treatments that will insure the drinking water would meet all standards (including the SMCL).[32]

Figure 3. USEPA Standards and USPHS Recommendation for Fluoride in Drinking Water

U.S. Environmental Protection Agency (EPA) Standards for Fluoride in Drinking Water

The EPA standards for fluoride in drinking water apply to the ***naturally occurring*** fluoride in water. They are the:

- Maximum Contaminant Level Goal (**MCLG**) – 4 mg/L
- Maximum Contaminant Level (**MCL**) – 4 mg/L
- Secondary Maximum Contaminant Level (**SMCL**) – 2 mg/L

MCLG — The MCLG is the level of contaminants in drinking water at which no adverse health effects are likely to occur. This health goal is based solely on possible health risks and exposure over a lifetime with an adequate margin of safety. The current MCLG for fluoride is 4 mg/L and is set at this level to provide protection against the increased risk of crippling skeletal fluorosis.

MCL — The MCL is an enforceable standard which is set as close to the health goal as possible, considering the benefit to the public, the ability of public water systems to detect and remove contaminants using suitable treatment technologies and cost. In the case of fluoride, the MCL is set at the MCLG.

Under the MCL standard, if the naturally occurring level of fluoride in a public water supply exceeds 4 mg/L, the water supplier is required to lower the level of fluoride or defluoridate. Community water systems that exceed the fluoride MCL of 4 mg/L must notify persons served by that system as soon as practical, but no later than 30 days after the system learns of the violation.

SMCL — Secondary standards are non-enforceable guidelines regulating contaminants that may cause cosmetic effects (such tooth discoloration). The EPA recommends secondary standards to water systems but does not require systems to comply. However, states may choose to adopt them as enforceable standards. Tooth discoloration and/or pitting is caused by excess fluoride exposures during the formative period prior to eruption of the teeth in children. The level of the SMCL was set based upon a balancing of the beneficial effects of protection from tooth decay and the undesirable effects of excessive exposures leading to discoloration.

Under the SMCL, if water exceeds 2 mg/L, the water system is to notify consumers that regular consumption of water with fluoride above 2 mg/L, may increase the risk for fluorosis in young (under 9 years of age) children. Community water systems that exceed the fluoride secondary standard of 2 mg/L must notify persons served by that system as soon as practical but no later than 12 months from the day the water system learns of the exceedance.

U.S. Public Health Service (USPHS) Recommendation for Fluoride in Drinking Water

In 2015, the USPHS published a final report establishing guidance for water systems that are actively fluoridating or those that may initiate fluoridation in the future. For community water systems that add fluoride to their water, the USPHS recommends a uniform fluoride concentration of 0.7 mg/L for the entire United States to maintain caries (tooth decay) prevention benefits and reduce the risk of dental fluorosis.

Why is the EPA MCL of 4 mg/L different from the USPHS recommendation of 0.7 mg/L?

The two benchmarks have different purposes and are set under different authorities. The EPA MCL of 4 mg/L is set to protect against risks from exposure to too much fluoride. The USPHS recommended level of fluoride on 0.7 mg/L is set to promote the benefit of fluoride in preventing tooth decay while minimizing the chance for dental fluorosis.

Information Source: EPA Fact Sheet: Questions and Answers on Fluoride. 2011. Available at *https://www.epa.gov/dwsixyearreview/fact-sheet-questions-and-answers-fluoride*

Additional information on these topics can be found in this Section, Questions 19, 20 and 21.

22. Does the total intake of fluoride from air, water and foods in a community in the United States with drinking water fluoridated at the recommended level pose significant health risks?

Answer.

The total intake of fluoride from air, water and foods in a community in the United States with drinking water fluoridated at the recommended level does not pose significant health risks.

Fact.

Fluoride from the Air

The atmosphere normally contains negligible concentrations of airborne fluorides. Studies reporting the levels of fluoride in air in the United States suggest that ambient fluoride contributes very little to a person's overall fluoride intake.[9,30]

Fluoride from Water

For generations, millions of people have lived in areas where fluoride is found naturally in drinking water in concentrations as high as or higher than those recommended to prevent tooth decay. Research conducted among these people confirms the safety of fluoride in the water supply.[1-5]

A ten-year comparison study of long-time residents of Bartlett and Cameron, Texas, where the water supplies contained 8.0 and 0.4mg/L of fluoride, respectively, included examinations of organs, bones and tissues. Other than a higher prevalence of dental fluorosis in the Bartlett residents (8.0 mg/L fluoride), the study indicated that long-term consumption of fluoride from water and food sources (resident average length of fluoride exposure was 36.7 years), even at these levels more than 10 times higher than recommended for tooth decay prevention, resulted in no clinically significant physiological or functional effects.[5]

In the United States, the natural level of fluoride in ground water varies from very low levels to over 4 mg/L. Public water systems in the U.S. are monitored by the Environmental Protection Agency (EPA), which requires that public water systems not exceed a naturally occurring fluoride level of 4 mg/L.[31] The recommended level for fluoride in drinking water in the United States has been established at 0.7 mg/L by the U.S. Public Health Service.[16] This level has been established to reduce tooth decay while minimizing the occurrence of dental fluorosis.

Individuals living in a community with water fluoridation get a portion of their daily fluoride intake from fluoridated water and a portion from dietary sources which would include foods and other beverages. Water and water-based beverages are the chief source of dietary fluoride intake. Conventional estimates are that approximately 75% of dietary fluoride comes from water and water-based beverages.[33,34] When considering water fluoridation, an individual consuming one liter of water fluoridated at 0.7 mg/L receives 0.7 milligram of fluoride.

Fluoride in Foods

In looking at the fluoride content of foods and beverages over time, it appears that fluoride intake from dietary sources has remained relatively constant.[35] Except for products prepared (commercially or by the individual) or cooked with fluoridated water, the fluoride content of most foods and beverages is not significantly different between fluoridated and nonfluoridated communities. When fluoridated water is used to prepare or cook the samples, the fluoride content of foods and beverages is higher. This difference has remained relatively constant over time.[33,35]

Launched in 2004 and updated in 2005, the National Fluoride Database is a comprehensive, nationally representative database of the fluoride concentration in 427 foods across 27 food groups and beverages consumed in the United States.[34] This database for fluoride was designed for use by epidemiologists and health researchers to estimate fluoride intake and to assist in the investigation of the relationships between fluoride intake and human health. The database contains fluoride values for beverages, water, and some lower priority foods.[34]

The fluoride content of fresh solid foods in the United States generally ranges from 0.01 to 1.0 part per million.[35] The foods highest in fluoride are fish and shellfish, reflective of the fluoride found in ocean water, and the presence or absence of bone fragments such as those in sardines.[35] (Fluoride has an affinity for calcified tissues such as bones.) Cereals, baked goods, breads, and other grain products were estimated to have fluoride concentrations between 0.06 and 0.72 ppm. The majority of vegetables (leafy, root, legumes, green or yellow) have a relatively low fluoride concentration (ranging from 0.01 to 0.5 ppm)

with fruits generally having lower concentrations (ranging from 0.01 to 0.2 ppm) than in vegetables. Raisins are one exception in the fruit category with a higher fluoride concentration due to the use of certain pesticides and concentration through drying.[35]

Brewed teas can contain fluoride concentrations of 1 ppm to 6 ppm depending on the amount of dry tea used, the water fluoride concentration and the brewing time.[36] The fluoride value for unsweetened instant tea powder appears very high when reported as a dry powder because this product is extremely concentrated. However, when one teaspoon of the unsweetened tea powder is added to an eight ounce cup of tap water, the value for prepared instant tea is similar to the values reported for regular brewed tea.[34]

Foods and beverages commercially processed (cooked or reconstituted) in cities fluoridated to the recommended level generally contain higher levels of fluoride than those processed in nonfluoridated communities. These foods and beverages are consumed not only in the city where processed, but also are often distributed to and consumed in nonfluoridated areas.[37] This "halo" or "diffusion" effect results in increased fluoride intake by people in nonfluoridated communities, providing them increased protection against tooth decay.[38,39] As a result of the widespread availability of these various sources of fluoride, the difference between tooth decay rates in fluoridated areas and nonfluoridated areas is somewhat less than several decades ago but this difference is still significant. Failure to account for the diffusion effect results in an underestimation of the total benefit of water fluoridation especially in areas where large amounts of fluoridated products are brought into nonfluoridated communities.[38]

The average daily dietary intake of fluoride (expressed on a body weight basis) by children residing in communities with water fluoridated at 1.0 mg/L is 0.05 mg/kg/day (milligram per kilogram of body weight per day).[40] In communities without optimally fluoridated water, average intakes for children are about 50% lower.[40] Dietary fluoride intake by adults in communities where water is fluoridated at 1.0 mg/L averages 1.4 to 3.4 mg/day, and in nonfluoridated areas averages 0.3 to 1.0 mg/day.[40] With the 2015 recommendation that drinking water be fluoridated at 0.7 mg/L, average intakes would be 30% lower in fluoridated communities than when they were fluoridated at 1.0 mg/L.

23. How much fluoride is recommended to maximize the tooth decay prevention benefits of fluoride?

Answer.

As with all nutrients, the appropriate amount of daily fluoride intake varies with age and body weight. Fluoride is safe and effective when used and consumed properly.

Fact.

In 1997, the Food and Nutrition Board of the Institute of Medicine developed a comprehensive set of reference values for dietary nutrient intakes.[40] These new reference values, the Dietary Reference Intakes (DRI), replace the Recommended Dietary Allowances (RDA) which had been set by the National Academy of Sciences since 1941. The new values present nutrient requirements to optimize health and, for the first time, set maximum-level guidelines to reduce the risk of adverse effects from excessive consumption of a nutrient. Along with calcium, phosphorous, magnesium and vitamin D, DRIs for fluoride were established because of its proven preventive effect on tooth decay. (See Table 2 in this Question.)

The Adequate Intake (AI) establishes a goal for intake to sustain a desired indicator of health without causing side effects. In the case of fluoride, the AI is the daily intake level required to reduce tooth decay without causing moderate dental fluorosis. The AI for fluoride intake from all sources (fluoridated water, foods, beverages, fluoride dental products and dietary fluoride supplements) is set at 0.05 mg/kg/day. Using the established AI of 0.05 mg/kg, the amount of fluoride for optimal health to be consumed each day has been calculated by sex and age group (expressed as average weight).[40]

The Tolerable Upper Intake Level (UL) establishes a maximum guideline. The UL is higher than the AI and is not the recommended level of intake. The UL is the estimated maximum intake level that should not produce unwanted effects on health. The UL for fluoride intake from all sources (fluoridated water, foods, beverages, fluoride dental products and dietary fluoride supplements) is set at 0.10 mg/kg/day (milligram per kilogram of body weight per day) for infants, toddlers, and children through eight years of age. For older children and adults, who are no longer at risk for dental fluorosis, the UL for fluoride is set at

Table 2. Reference Intakes for Fluoride			
Food and Nutrition Board of the Institute of Medicine 1997[40]			
Age Group	**Reference Weights kg (lbs)***	**Adequate Intake (mg/day)**	**Tolerable Upper Intake (mg/day)**
Infants 0-6 months	7 (16)	0.01	0.7
Infants 7-12 months	9 (20)	0.5	0.9
Children 1-3 years	13 (29)	0.7	1.3
Children 4-8 years	22 (48)	1.0	2.2
Children 9-13 years	40 (88)	2.0	10.0
Boys 14-18 years	64 (142)	3.0	10.0
Girls 14-18 years	57 (125)	3.0	10.0
Males 19 years and over	76 (166)	4.0	10.0
Females 19 years and over	61 (133)	3.0	10.0
* Value based on data collected during 1988-94 as part of the Third National Health and Nutrition Examination Survey (NHANES III) in the United States.[40]			

10 mg/day regardless of weight. Using the established ULs for fluoride, the amount of fluoride that can be consumed each day to reduce the risk of moderate enamel fluorosis for children through age eight, has been calculated by sex and age group (expressed as average weight).[40] (See Table 2.)

As a practical example, daily intake of 2 mg of fluoride is adequate for a 9- to 13-year-old child weighing 88 pounds (40 kg). This was calculated by multiplying 0.05 mg/kg/day (AI) times 40 kg (weight) to equal 2 mg. At the same time, that 88 pound (40kg) child could consume 10 mg of fluoride a day as a tolerable upper intake level.

Children living in a community with water fluoridation get a portion of their daily fluoride intake from fluoridated water and a portion from dietary sources which would include foods and other beverages. When considering water fluoridation, an individual must consume one liter of water fluoridated at 0.7 mg/L to receive 0.7 milligrams (0.7 mg) of fluoride. Children under six years of age, on average, consume less than one-half liter of drinking water a day.[35] Therefore, children under six years of age would consume, on average, less than 0.35 mg of fluoride a day from drinking optimally fluoridated water (at 0.7 mg/L).

If a child lives in a nonfluoridated area and is determined to be at high risk for tooth decay, the dentist or physician may prescribe dietary fluoride supplements.[41] As shown in Table 1 "Dietary Fluoride Supplement Schedule" (See Benefits Section, Question 12.), the current dosage schedule recommends supplemental fluoride amounts that are below the AI for each age group.[41] The dosage schedule was designed to offer the benefit of decay reduction with a margin of safety to prevent mild to moderate enamel fluorosis. For example, the AI for a child 3 years of age is 0.7 mg/day. The recommended dietary fluoride supplement dosage for a child 3 years of age in a nonfluoridated community is 0.5 mg/day. This provides leeway for some fluoride intake from processed foods and beverages, and other sources.

Tooth decay rates are declining in many population groups because children today are being exposed to fluoride from a wider variety of sources than decades ago.[16] Many of these sources are intended for topical use only; however, some fluoride is ingested inadvertently by children.[42,43] By reducing the inappropriate ingestion of fluoride from toothpaste, the risk of dental fluorosis can be reduced without jeopardizing the benefits to oral health.

For example, it has been reported in a number of studies that young children inadvertently swallow an average of 0.30 mg of fluoride from fluoride toothpaste at each brushing.[44-48] If a child brushes twice a day, 0.60 mg of fluoride could be ingested inappropriately. This could slightly exceed the Adequate Intake (AI) values from Table 2. The 0.60 mg consumption is 0.10 mg higher than the AI value for children 6 to 12 months and is 0.10 mg lower than the AI for children from 1-3 years of age.[40] Although toothpaste is not meant to be swallowed, children could consume the daily recommended Adequate Intake amount of fluoride from toothpaste alone. In order to decrease the risk of dental fluorosis, the American Dental Association (ADA) recommends:[49]

- For children younger than 3 years, caregivers should begin brushing children's teeth as soon as they begin to come into the mouth by using fluoride toothpaste in an amount no more than a smear or the size of a grain of rice (Figure 4). Brush teeth thoroughly twice per day (morning and night) or as directed by a dentist or physician. Supervise children's brushing to ensure that they use the appropriate amount of toothpaste.

- For children 3 to 6 years of age, caregivers should dispense no more than a pea-sized amount (Figure 4) of fluoride toothpaste. Brush teeth thoroughly twice per day (morning and night) or as directed by a dentist or physician. Supervise children's brushing to minimize swallowing of toothpaste.[49]

Additional information on this topic can be found in this Section, Question 29.

Figure 4. Examples of Toothpaste Amounts for Children[49]

For children under three years old, use no more than a smear or grain-of-rice-sized amount of fluoride toothpaste.

For children three to six years old, use only a pea-sized amount of fluoride toothpaste.

It should be noted that the amounts of fluoride discussed here are intake, or ingested, amounts. When fluoride is ingested, a portion is retained in the body and a portion is excreted.

Addition information on this topic can be found in this Section, Question 25.

24. Is there a need for prenatal dietary fluoride supplementation?

Answer.

There is no scientific basis to suggest any need to increase a woman's daily fluoride intake during pregnancy or breastfeeding to protect her health. At this time, scientific evidence is insufficient to support the recommendation for prenatal fluoride supplementation for decay prevention for infants.

Fact.

The Institute of Medicine determined that, "No data from human studies document the metabolism of fluoride during lactation. Because fluoride concentrations in human milk are very low (0.007 to 0.011 ppm) and relatively insensitive to differences in the fluoride concentrations of the mother's drinking water, fluoride supplementation during lactation would not be expected to significantly affect fluoride intake by the nursing infant or the fluoride requirement of the mother."[40]

A 2005 a randomized, double blind study[50] compared the amount of fluoride incorporated into primary teeth exposed to prenatal and post natal fluoride supplements to primary teeth that were exposed to only postnatal fluoride. The study concluded that teeth exposed to prenatal and postnatal fluoride supplements had no additional measurable fluoride other than that attributable to postnatal fluoride alone.[50] This study confirmed the findings of a 1997 randomized, double blind study that evaluated the effectiveness of prenatal dietary supplementation which concluded that the data did not support the hypothesis that prenatal fluoride had a strong decay preventive effect on primary teeth.[51]

25. When fluoride is ingested, where does it go?

Answer.
Much of the ingested fluoride is excreted. Of the fluoride retained, almost all is found in calcified (hard) tissues, such as bones and teeth.

Fact.
After ingestion of fluoride, such as drinking a glass of fluoridated water, the majority of the fluoride is absorbed from the stomach and small intestine into the blood stream. This causes a short-term increase in fluoride levels in the blood. Fluoride is distributed through the body by plasma (a component of blood) to hard and soft tissues. Following ingestion, the fluoride plasma levels increase quickly and reach a peak concentration within 20-60 minutes. The concentration declines rapidly, usually approximating the baseline levels within three to six hours, due to the uptake of fluoride by calcified tissues and excretion in urine. In adults, approximately 50% of the fluoride absorbed each day becomes associated with calcified tissues within 24 hours while the remainder is excreted in the urine. Approximately 99% of the fluoride present in the body is in calcified tissues (mainly bone).[52]

Ingested or systemic fluoride becomes incorporated into forming tooth structures. Fluoride ingested regularly during the time when teeth are developing is deposited throughout the tooth structure and contributes to long lasting protection against tooth decay.[53-57]

Additional information on this topic can be found in the Benefits Section, Question 2.

An individual's age and stage of skeletal development will affect the rate of fluoride retention. The amount of fluoride taken up by bone and retained in the body is inversely related to age. A greater percentage of fluoride is absorbed in young bones than in the bones of older adults.[52] However, once fluoride is absorbed into bones, it is released back into plasma (a component of blood) when fluoride levels in plasma fall. This absorption and release cycle continues throughout the life span.[52]

26. Will drinking water that is fluoridated at the recommended level adversely affect bone health?

Answer.
According to the best available science, drinking water that has been fluoridated at the recommended level does not have an adverse effect on bone health.

Fact.
Several systematic reviews have concluded that fluoride at the level used in community water fluoridation has no adverse effect on bone health. A systematic review published in 2000 concluded that there was no clear association between water fluoridation and hip fracture.[59] Twenty-nine studies that looked at the association between bone fracture/bone development and water fluoridation were included in the review. The evidence regarding other types of bone fractures was similar.[59] A systematic review published in 2017[10] concurred with the earlier review concluding that there is evidence that fluoridated water at recommended levels is not associated with bone fracture.[10]

In addition to the systematic reviews, a number of individual studies have investigated the bone health of individuals residing in communities with fluoride in drinking water at the recommended levels and higher than recommended levels. Most of these studies have focused on whether there exists a possible link between fluoride and bone fractures. Additionally, the possible association between fluoride and bone cancer has been studied. None of the studies provide a legitimate reason for altering public health policy regarding fluoridation and bone health concerns.

The following studies, listed in chronological order, add to the body of evidence indicating that there is no association between consumption of optimally fluoridated water and bone fracture.

The Iowa Fluoride Study/Iowa Bone Development Study[60] looked at the association of fluoride intake with bone measures (bone mineral content and bone mineral density) in a cohort of Iowa children. Assessment of the participants' dietary fluoride intake had been ongoing since birth with parents completing detailed fluoride questionnaires at numerous time periods through 15 years of age. These children had combined fluoride intake estimated from a number of sources including water, other beverages, selected

foods, dietary fluoride supplements and fluoride toothpaste. Estimated fluoride intake was noted during different time periods and cumulatively from birth to 15 years of age. The findings indicate that fluoride exposures at typical levels for most U.S. adolescents in fluoridated areas do not have significant effects on bone mineral measures. These findings are generally comparable with those from the analyses of this cohort at age 11 years.[61] During the intervening 4 years, cohort members generally experienced a substantial increase in bone mass accrual. For example, mean whole-body bone mineral content showed mean increases of approximately 61% in females and 96% in males. Despite the acceleration of bone growth near puberty, the associations between fluoride intake and bone outcome measures remained weak and none was significant after adjustment for other variables.[60]

In one of the largest studies of its kind with nearly half a million subjects, Swedish researchers looked at residents' chronic consumption of various levels of fluoride and the risk of hip fracture. All individuals born in Sweden between January 1, 1900 and December 31, 1919, alive and living in their municipality of birth at the time of the start of follow-up, were eligible for the study. Information on the study population was linked to the Swedish health registers. Estimated individual drinking water fluoride exposure was stratified into 4 categories: very low, < 0.3 mg/L; low, 0.3 to 0.69 mg/L; medium, 0.7 to 1.49 mg/L; and high, ≥ 1.5 mg/L. Published in 2013, the researchers found Swedish residents chronically exposed to various levels of fluoride in drinking water did not show any differences in rates of either hip fracture or low-trauma osteoporotic hip fracture due to fluoride exposure.[62]

A study published in 2005 evaluated the bone mineral density levels and rate of bone fracture of 1,300 women living in three separate communities. To be included in the study, the women had to be ambulatory. The ages of the women ranged from 20 years to 92 years. The size and demographics of the three communities were similar. One part of the study looked at whether fluoride was associated with adverse bone-related outcomes. The study measured fluoride serum levels, fluoride exposure, and bone metabolism as related to fluoride exposure and fluoride's interaction with other important bone factors including age, menopause status and medications. The study concluded that long-term exposure to fluoride was not associated with adverse effects on bone health.[63]

A study published in 2001[64] examined the risk of bone fractures, including hip fractures associated with long-term exposure to fluoridated water in six Chinese populations. The water fluoride concentrations ranged from 0.25 to 7.97 mg/L. A total of 8,266 male and female subjects, all of whom were 50 years old or older participated in the study. The results showed an interesting and potentially important finding regarding overall bone fractures. Whereas there appeared to be a trend for higher fracture rates from 1.00 to 4.00 mg/L, the fracture rate in the 1.00 to 1.06 mg/L category was lower than the rate in the category with the lowest fluoride intake (0.25 to 0.34 mg/L). The study concluded that long-term fluoride exposure from drinking water containing 4.32 mg/L or more increases the risk of overall bone fracture, as well as hip fracture, while water fluoride levels of 1.0 to 1.06 mg/L decreased the risk of overall fractures relative to negligible fluoride in water.[64] (Note that 4.32 mg/L is more than six times the fluoride level currently recommended for community water fluoridation in the United States).

While a number of studies reported findings at a population level, both the Hillier and Phipps studies published in 2000, examined risk on an individual, rather than a community basis, taking into account other risk factors such as medications, age of menopause, alcohol consumption, smoking, dietary calcium intake and physical activity. Using these more rigorous study designs, these two studies reported no effect of the risk of hip fracture[65] and no increase in the risk of hip fracture in those drinking fluoridated water,[66] respectively.

According to the best available science, drinking water that has been fluoridated at the recommended level does not have an adverse effect on bone health.

27. What is dental fluorosis or enamel fluorosis?

Answer.

Dental fluorosis is a change in the appearance of the tooth enamel that only occurs when younger children consume too much fluoride, from all sources, over long periods when teeth are developing under the gums.[36] In the United States, most commonly these changes are not readily apparent to the affected individual or casual observer and require a trained specialist to detect. This type of dental fluorosis found in the United States has no effect on tooth function and can make the teeth more resistant to decay.[67] Photographs of mild dental fluorosis can be viewed at *https://www.ADA.org/en/member-center/oral-health-topics/fluoride-topical-and-systemic-supplements*. (Note that mild dental fluorosis is generally less evident than on these photographs. This is because the teeth were dried very well to improve the photography and this makes the mild dental fluorosis stand out, but if the tooth had saliva on it as it usually does, then it would be less noticeable.)

Fact.

The crown of the tooth (the part covered in enamel) is formed under the gums before the teeth erupt. Enamel formation of permanent teeth, other than third molars (wisdom teeth), occurs from about the time of birth until approximately eight years of age.[68] Because dental fluorosis occurs only while teeth are forming under the gums, teeth that have erupted are not at risk for dental fluorosis; therefore, older children and adults are not at risk for the development of dental fluorosis.[69] It should be noted that there are many other developmental changes that affect the appearance of tooth enamel which are not related to fluoride intake. In other words, not all opaque or white blemishes on teeth are caused by fluoride. Furthermore, dental fluorosis occurs among some people in all communities, even in communities that do not have community water fluoridation, or that have a low natural concentration of fluoride in their drinking water.[70-72]

Classification of Dental Fluorosis

Dental fluorosis has been classified in a number of ways. One of the most widely used classifications was developed by Dean in 1942.[73] (See Table 3.)

In using Dean's Fluorosis Index, each tooth in an individual's mouth is rated according to the fluorosis index in Table 3. The individual's dental fluorosis score is based upon the most severe form of fluorosis recorded for two or more teeth. Dean's Fluorosis Index, which has been used since 1942, remains popular for prevalence studies in large part due to its simplicity and the ability to make comparisons with findings from a number of earlier studies.[74]

In 2010, a report by the U.S. National Center for Health Statistics described the prevalence and changes in prevalence and severity of dental fluorosis in the United States and among adolescents between 1986–1987 and 1999–2004.[75] According to the report, in 1999 to 2004, 40.7% of adolescents had dental fluorosis. It should be noted that dental fluorosis can occur not only from fluoride intake from water but also from fluoride products, such as toothpaste, mouthrinses and excessive use of fluoride supplements during the ages when teeth are forming. A 1994 analysis of five studies showed that the amount of dental fluorosis attributable to water fluoridation at 1.0 mg/L was approximately 13%.[76] In other words, at that time the amount of dental fluorosis would have been reduced by only 13% if water was not fluoridated. Now it would be less of a reduction, since fluoridation uses the lower level of 0.7 mg/L. The majority of dental fluorosis in the U.S. is caused by the inappropriate ingestion of fluoride products.[76]

The vast majority of dental fluorosis in the United States is the very mild or mild type. This type of dental fluorosis is not readily apparent to the affected individual or casual observer and often requires a trained specialist to detect. In contrast, the moderate and severe forms of dental fluorosis, characterized by esthetically (cosmetically) objectionable changes in tooth color and surface irregularities, respectively, are not common in the United States. Most investigators regard even the more advanced forms of dental fluorosis as a cosmetic effect rather than a functional adverse effect.[40] In 1993, the U.S. Environmental Protection Agency, in a decision supported by the U.S. Surgeon General, determined that objectionable dental fluorosis is a cosmetic effect with no known health effects.[77] However, in 2003, the EPA requested that the National Research Council (NRC) evaluate the adequacy of its MCLG for fluoride to protect public health. A committee was convened to review recent evidence and eventually developed the 2006 report titled, *Fluoride in Drinking Water — A Scientific Review of the EPA's Standards*.[9] As part of that report, a majority of the committee members found severe dental fluorosis to be an adverse health

effect based on suggestive but inconclusive evidence that severe dental fluorosis (characterized by pitting of the enamel) increased the risk of tooth decay. All members of the committee agreed that the condition damages the tooth and that the EPA standard should prevent the occurrence of this unwanted condition. The prevalence of severe enamel fluorosis is very low below 2 mg/L of fluoride in drinking water in the U.S.[9]

Additional information on this topic can be found in this Section, Questions 20 and 21.

The vast majority of dental fluorosis in the United States is the very mild or mild type. This type of dental fluorosis is not readily apparent to the affected individual or casual observer and often requires a trained specialist to detect.

Limited research on the psychological effects of dental fluorosis on children and adults has been conducted. However, a 2009 literature review that assessed the relationships between perceptions of dental appearance/oral health related quality of life (OHRQoL) and dental fluorosis concluded that very mild to mild dental fluorosis has little impact and in some cases evidence suggested enhanced quality of life with mild dental fluorosis.[78] When evaluating the oral health related quality of life of children by tooth decay (cavities) and dental fluorosis experience, a 2007 study concluded that cavities were associated with a negative impact while mild dental fluorosis had a positive impact on children's and parents' quality of life.[79]

Very mild to mild dental fluorosis has no effect on tooth function and can make the tooth enamel more resistant to decay. A study published in 2009[67] investigated the relationship between dental fluorosis and tooth decay in U.S. schoolchildren. The study concluded that teeth with dental fluorosis were more resistant to tooth decay than were teeth without dental fluorosis. Not only should the cavity preventive benefits of fluoridation be considered when evaluating policy to introduce or retain water fluoridation, but the cavity preventive benefits of mild dental fluorosis should also be considered.[67]

Very mild to mild dental fluorosis has no effect on tooth function and can make the tooth enamel more resistant to decay.

A report published in 2010[75] described the prevalence (total percentage of cases in a population) of dental fluorosis in the United States and discussed the changes in the prevalence and severity of dental fluorosis among adolescents between 1986-1987 and 1999-2004. The report used data from the National Health and Nutrition Examination Survey (NHANES) 1999-2004 and the 1986-1987 National Survey of Oral Health in U.S. School Children. The data represented persons from 6 to 49-years of age and varied races and ethnicities including non-Hispanic black and Mexican-American persons. The oral exams for both surveys were conducted by trained dental examiners and included a dental fluorosis assessment of permanent teeth. The Dean's Fluorosis Index was used to determine the prevalence and severity of dental fluorosis.

The data published in 2010[75] showed that less than one-quarter of persons aged 6-49 in the United States had some form of dental fluorosis. For the remaining three-quarters of persons in this age group, 60.6% were unaffected by dental fluorosis and 16.5% were classified as having questionable dental fluorosis. The percent distribution of the types of dental fluorosis in persons aged 6-49 years observed was:

Very mild fluorosis	16.0%
Mild fluorosis	4.8%
Moderate fluorosis	2.0%
Severe fluorosis	less than 1%

While moderate and severe dental fluorosis comprise less than 3% of dental fluorosis in all persons aged 6-49, the prevalence of moderate or severe dental fluorosis in this age group comprised a very small portion (less than 10%) of the total number of all cases of dental fluorosis. In other words, approximately 90% of all dental fluorosis observed was very mild to mild form.[75]

In regards to dental fluorosis in adolescents, children aged 12-15 years in 1999-2004 had higher prevalence of dental fluorosis compared with the same aged children in 1986-1987.[75]

In reviewing this report,[75] it should be noted that dental fluorosis was not assessed in NHANES 1988-1994 and so it was not possible to compare the NHANES 1999-2002 to the earlier NHANES report. The only other previously collected national data on dental fluorosis were the 1986-1987 National Institute of Dental Research (NIDR) National Survey of Oral Health in U.S. School Children. Differences in study design between NIDR 1986-1987 and NHANES 1999-2002 should be considered when drawing inferences about changes in prevalence and severity of enamel fluorosis.[75] Examples of differences in these two surveys include but are not limited to:

- NIDR survey is a school-based survey while the NHANES is a household survey.
- NHANES did not collect residential histories; NIDR did gather residential histories but it is unknown if NIDR reported dental fluorosis data only for those with a single residence history.
- NIDR collected water samples from schools for fluoride analysis; NHANES did not collect water samples for analysis until the 2013-14 survey cycle.

As defined in Table 3, very mild dental fluorosis is characterized by small opaque, paper-white areas covering less than 25% of the tooth surface. The risk of teeth forming with the very mildest form of dental fluorosis must be weighed against the benefit that the individual will have fewer cavities thus saving dental treatment costs, avoiding patient discomfort and reducing tooth loss.[81,82] In addition, the risk of dental fluorosis can be viewed as an alternative to having tooth decay,[83] which is a disease that causes cosmetic problems, pain, missed school and work, and can lead to infection and, in advanced cases, life-threatening health effects. This is in contrast to dental fluorosis which is not a disease and is not life-threatening.

The risk of teeth forming with the very mildest form of dental fluorosis must be weighed against the benefit that the individual will have fewer cavities thus saving dental treatment costs, avoiding patient discomfort and reducing tooth loss.

Table 3. Dental Fluorosis Classification by H.T. Dean – 1942[75]

Classification	Criteria-Description of Enamel
Normal	Smooth, glossy, pale creamy-white translucent surface
Questionable	A few white flecks or white spots
Very Mild	Small opaque, paper-white areas covering less than 25% of the tooth surface
Mild	Opaque white areas covering less than 50% of the tooth surface
Moderate	All tooth surfaces affected; marked wear on biting surfaces; brown stain may be present
Severe	All tooth surfaces affected; discrete or confluent pitting; brown stain prsent

28. Is it safe to use fluoridated water to reconstitute infant formula?

Answer.
It is safe to use fluoridated water to reconstitute infant formula.

Fact.
Fluoridated water can be used to prepare infant formula. However, if the child is exclusively consuming infant formula reconstituted with fluoridated water, there could be an increased chance of mild dental fluorosis.[86] To lessen this chance, parents can use low-fluoride bottled water some of the time to mix infant formula. These bottled waters are labeled as de-ionized, purified, demineralized, or distilled. However, parents should be aware that using these types of waters exclusively means an infant does not receive the amount of fluoride the Institute of Medicine indicated is required to prevent tooth decay.[40] On the other hand, the exclusive use of nonfluoridated water to reconstitute infant formula will not guarantee that an infant will not develop dental fluorosis. The chance of development of dental fluorosis exists through approximate eight years of age when the permanent teeth are still forming under the gums. Fluoride intake from other sources during this time such as toothpaste, mouthrinse and dietary fluoride supplements also contributes to the chance of dental fluorosis for children living in nonfluoridated and fluoridated communities.[84]

In response to the report of the National Research Council (NRC) *Fluoride in Drinking Water: A Scientific Review of EPA's Standards*[9] in November 2006, and with an abundance of caution, the ADA issued the *Interim Guidance on Fluoride Intake for Infants and Young Children* (Interim Guidance). **The Interim Guidance is no longer current and has been replaced**. Unfortunately, those opposed to fluoridation continue to publicize and use the Interim Guidance in efforts to halt fluoridation.

The *Interim Guidance* was replaced in January 2011 by the ADA *Evidence-Based Clinical Recommendations Regarding Fluoride Intake From Reconstituted Infant Formula and Enamel Fluorosis A Report of the American Dental Association Council on Scientific Affairs.*[84] The report encourages clinicians to follow the American Academy of Pediatrics guidelines for infant nutrition which advocates exclusive breastfeeding until the child is aged 6 months and continued breastfeeding until the child is at least 12 months of age, unless specifically contraindicated. Additionally, the ADA report, designed for use by clinical practitioners, offers the following suggestions to practitioners to use in advising parents and caregivers of infants who consume powdered or liquid concentrate infant formula as the main source of nutrition:[84]

- Suggest the continued use of powdered or liquid concentrate infant formulas reconstituted with optimally fluoridated drinking water while being cognizant of the potential risk of enamel fluorosis development.[89]

- When the potential risk of enamel fluorosis development is a concern, suggest ready-to-feed formula or powdered or liquid concentrate formula reconstituted with water that either is fluoride free or has low concentrations of fluoride.[84]

It should be noted that the Centers for Disease Control and Prevention,[85] as well as other agencies, such as the U.S. Department of Health and Human Services,[86] American Public Health Association,[87] and health departments such as the New York State Health Department[88] provide similar information regarding the use of fluoridated water to reconstitute infant formula.

29. What can be done to reduce the occurrence of dental fluorosis in the U.S.?

Answer.
The vast majority of enamel fluorosis in the United States can be prevented by limiting the ingestion of topical fluoride products (such as toothpaste) and recommending the appropriate use of dietary fluoride supplements — without denying young children the decay prevention benefits of community water fluoridation.

Fact.
Tooth decay has decreased substantially in the United States because more children today are benefitting from access to fluoride which is available from a wider variety of sources than decades ago. Many of these sources are intended for topical use only; however, when they are used, some fluoride is inadvertently swallowed by children.[42,43,89] Inappropriate ingestion of topical fluoride can be minimized, thus reducing the risk for dental fluorosis without reducing decay prevention benefits.

Fluoride Toothpaste

Fluoride toothpastes are effective in helping to prevent tooth decay but have been identified as a major risk factor for enamel fluorosis when used inappropriately.[42,43,89]

In order to decrease the risk of dental fluorosis, the American Dental Association (ADA) recommends:[49]

- For children younger than 3 years, caregivers should begin brushing children's teeth as soon as they begin to come into the mouth by using fluoride toothpaste in an amount no more than a smear or the size of a grain of rice. (See Figure 4 in Question 23.) Brush teeth thoroughly twice per day (morning and night) or as directed by a dentist or physician. Supervise children's brushing to ensure that they use the appropriate amount of toothpaste.

- For children 3 to 6 years of age, caregivers should dispense no more than a pea-sized amount (Figure 4) of fluoride toothpaste. Brush teeth thoroughly twice per day (morning and night) or as directed by a dentist or physician. Supervise children's brushing to minimize swallowing of toothpaste.

The reason for including age information on directions for use for fluoride toothpaste is because it takes into account the ages during which teeth are most susceptible to dental fluorosis (during the time when the teeth are forming under the gums). Additionally, until approximately six years of age, children have not developed the full ability to spit and not swallow toothpaste. Inadvertently swallowing toothpaste during brushing can increase the risk of dental fluorosis. After age eight, the enamel formation of permanent teeth (with the exception of the third molars) is basically complete;[68] therefore, the risk of developing dental fluorosis is over. Because dental fluorosis occurs while teeth are forming under the gums, individuals whose teeth have erupted are not at risk for enamel fluorosis.

Additional information on this topic can be found in this Section, Question 27.

Numerous studies have established a direct relationship between young children brushing with more than a pea-sized amount of fluoride toothpaste and the risk of very mild or mild dental fluorosis in both fluoridated and nonfluoridated communities.[42,43,48,71,89] It was noted that 34% of the dental fluorosis cases in a nonfluoridated community were explained by children having brushed with fluoride toothpaste more than once per day during the first two years of life.[90] In the optimally fluoridated community, 68% of the fluorosis cases were explained by the children using more than a pea-sized amount of toothpaste during the first year of life.[90] However, recognizing that the risk tooth decay can start before a child's first birthday, it is considered important to begin using a fluoride toothpaste when the child's first tooth appears in the mouth.[49]

Dietary Fluoride Supplements

A systematic review published in 2006 concluded that the use of supplements during the first six years of life, and especially during the first three years, is associated with a significant increase in dental fluorosis.[91]

Dietary fluoride supplements should only be prescribed for children at high risk for tooth decay who live in nonfluoridated areas.[41]

Dietary fluoride supplements should be prescribed according to the dosage schedule found in the *Evidence-based Clinical Recommendations on the Prescription of Dietary Fluoride Supplements for Caries Prevention: A Report of the American Dental Association Council on Scientific Affairs published in 2010*.[41] The current dietary fluoride supplement schedule[41] is shown in the Benefits Section, Question 12, Table 1.

Determination of the level of risk for tooth decay is accomplished through the use of a professional caries risk assessment that assists the health provider identify and assess factors that could contribute to the development of cavities.[41] A child's caries (cavity) risk should be assessed on a routine basis because risk status can be affected by changes in the child's development, home conditions, dietary regimen and oral hygiene practices. Additional information on caries risk assessments can be found on the ADA website.[92] Because of the many sources of fluoride in the diet, proper prescribing of fluoride supplements can be complex. It is suggested that all sources of fluoride be evaluated with a thorough fluoride history before supplements are prescribed for a child.[41] This evaluation should include testing of the home water supply if the fluoride concentration is unknown. Families on community water systems should contact their water supplier to ask about the fluoride level. Consumers with private wells should have the water tested yearly to accurately determine the fluoride content.

Additional information on this topic can be found in the Benefits Section, Question 4.

Dietary fluoride supplements can be considered for infants and children aged 6 months to 16 years. Compliance with the daily administration of the supplement will enhance the cavity prevention benefits. Providers should consider and monitor the ability of the caregiver and child to adhere to the schedule. If compliance is an issue, another mode of fluoride delivery should be considered.[41]

Use of Over the Counter Fluoride-Containing Dental Products in the Home

Parents, caretakers and health care professionals should judiciously monitor use of all fluoride-containing dental products by children under age six. As is the case with any therapeutic product, more is not always better. The same is true for most products found in the medicine cabinet; care should be taken to adhere to label directions on fluoride prescriptions and over-the-counter products (e.g., fluoride toothpastes and rinses).

The ADA recommends the use of fluoride mouthrinses, but not for children less than six years of age because they may swallow the rinse.[93] These products should be stored out of the reach of children. Additional information regarding the use of mouthrinses can be found on the ADA website.[93]

Drinking Water That Has Been Fluoridated at the Recommended Levels

In 2015, the U.S. Public Health Service made a recommendation on the level of fluoride to be used in water fluoridation (0.7mg/L) to provide the best balance of protection from tooth decay while limiting the risk of dental fluorosis.[16]

Additional information on this topic can be found in this Section, Question 19.

Drinking Water With High Levels of Naturally Occurring Fluoride

In areas where naturally occurring fluoride levels in ground water are higher than 2 mg/L, the U.S. EPA has recommended that consumers should consider action to lower the risk of dental fluorosis for young children such as providing drinking water from an alternative source.[32]

Families with young children on community water systems should contact their water suppliers to ask about the fluoride level in their drinking water. Consumers with private wells should have the water tested yearly to accurately determine the fluoride content. Consumers should consult with their dentist regarding water-testing results and discuss appropriate dental health care measures.

In homes where young children (with developing permanent teeth) are faced with consuming water with a fluoride level greater than 2 mg/L, families should use an alternative primary water source that contains the recommended level of fluoride for drinking and cooking.[32]

Additional information on this topic can be found in this Section, Question 21.

30. Why is there a warning label on a tube of fluoride toothpaste?

Answer.

The U.S. Food and Drug Administration (FDA) has established regulations for warning labels for a number of over-the-counter items it considers safe and effective including fluoride toothpaste.

Fact.

The FDA has published regulations regarding warning labels for over-the-counter (OTC) drugs in the Code of Federal Regulations (CFR).[94] All the non-prescription drugs covered by these regulations must display the general warning "Keep out of the reach of children" in bold type. The regulations outline three additional warning statements (based on the most likely route of exposure) to be listed on the label in the event the drug is misused. While they vary slightly, they all include the following language: "...get medical help or contact a Poison Control Center right away."[94]

In the CFR, the FDA has outlined the drug categories to be covered by these warning labels.[95] Some of the 26 categories include antacids, allergy treatment products, antiperspirants, cold remedies, ophthalmic products and dentifrices and dental products such as analgesics, antiseptics, etc.[95]

A specific FDA regulation[96] applies to "Anticaries Drug Products for Over-The-Counter Human Use" which provides the exact language for the warning label to be used on "fluoride dentifrice (gel, paste, and powder) products." The regulation requires the following language appear on these products under the heading "Warning":

> "Keep out of reach of children under 6 years of age. [highlighted in bold type] If more than used for brushing is accidentally swallowed, get medical help or contact a Poison Control Center right away."[96]

The over-the-counter (OTC) drugs listed in these regulations are generally recognized as safe and effective by the FDA.[94] Fluoride toothpaste is just one of a long list of OTC products that carries a warning label.

The over-the-counter (OTC) drugs listed in these regulations are generally recognized as safe and effective by the FDA. Fluoride toothpaste is just one of a long list of OTC products that carries a warning label.

While the FDA has required such label language since 1997, the ADA has required manufacturers seeking the ADA Seal of Acceptance to place a label on fluoride toothpaste since 1991 to help ensure proper use and thereby reduce the risk of dental fluorosis. At that time, the ADA required the label to include: "Do not swallow. Use only a pea-sized amount for children under six. To prevent swallowing, children under six years of age should be supervised in the use of toothpaste."

Additionally, to ensure children's safety, the ADA limits the total amount of fluoride allowed in any one tube of ADA-Accepted toothpaste. If a child were to ingest an entire tube of fluoride toothpaste at one time, the total fluoride content of a single tube is not enough to cause a fatal event. In fact, because of some of the (non-fluoride) additives in toothpaste, a child attempting to ingest a tube of toothpaste would most likely vomit before they could eat enough to become seriously ill.

31. Is fluoride, as provided by community water fluoridation, a toxic substance?

Answer.

No. Fluoride in water at the recommended level is not toxic according to the best available scientific evidence.

Fact.

Toxicity is related to dose. While large doses of fluoride could be toxic, it is important to recognize the difference between the effect of a massive dose of an extremely high level of fluoride versus the fluoride level currently recommended for public water systems. Like many common substances essential to life and good health — salt, iron, vitamins A and D, chlorine, oxygen and even water itself — fluoride can be toxic in massive quantities. Fluoride at the much lower recommended concentrations (0.7 mg/L) used in community water fluoridation is not harmful or toxic.[16]

Fluoride at the much lower recommended concentrations (0.7 mg/L) used in community water fluoridation is not harmful or toxic.

The single dose (consumed all at one time) of fluoride that could cause acute fluoride toxicity is 5 mg/kg of body weight (11mg/kg of body weight of sodium fluoride).[97] This dose is considered the probably toxic dose (PTD) which "is defined as the minimum dose that could cause serious or life-threatening systemic signs and symptoms and that should trigger immediate therapeutic intervention and hospitalization."[97] Acute fluoride toxicity occurring from the ingestion of optimally fluoridated water is impossible.[97] With water fluoridated at 1 mg/L, an individual would need to drink five (5) liters of water for every kilogram of body weight. For example, for an adult male (155 pound/70.3 kilogram man), it would require that he consume more than 350 liters (nearly 93 gallons) of water at one time to reach an acute fluoride dose. With optimally fluoridated water now set at 0.7 mg/L, it would take almost 30% more, or nearly 120 gallons (more than 1,900 eight ounce glasses) of water at one time to reach the acute dose.

Chronic fluoride toxicity can develop after 10 or more years of exposure to very high levels of fluoride, levels much higher than what is associated with drinking water fluoridated at recommended levels. The primary functional adverse effect associated with long-term excess fluoride intake is skeletal fluorosis.[40,58] The development of skeletal fluorosis and its severity is directly related to the level and duration of fluoride intake. For example, the ingestion of water naturally fluoridated at approximately 5 mg/L or greater for 10 years or more is needed to produce clinical signs of osteosclerosis (a mild form of skeletal fluorosis that can be seen as a change in bone density on x-rays) in the general population. In areas naturally fluoridated at 5 mg/L, daily fluoride intake of 10 mg/day would not be uncommon.[40] A survey of X-rays from 170,000 people in Texas and Oklahoma whose drinking water had naturally occurring fluoride levels of 4 to 8 ppm revealed only 23 cases of osteosclerosis and no cases of crippling skeletal fluorosis.[98] Evidence of advanced skeletal fluorosis, or crippling skeletal fluorosis, was not seen in communities in the United States where water supplies contained up to 20 mg/L of naturally occurring fluoride.[40,99] In these communities, "daily fluoride intake of 20 mg/day would not be uncommon."[40] Crippling skeletal fluorosis is extremely rare in the United States and is not associated with water fluoridated at the recommended level.[40,58]

Additional information on this topic can be found in this Section, Question 26.

The Environmental Protection Agency (EPA) identifies the most serious hazardous waste sites in the nation. These sites make up the Superfund: National Priorities List (NPL) and are the sites targeted for long-term federal cleanup activities.[100] The Agency for Toxic Substances and Disease Registry (ATSDR) prepares toxicological profiles for hazardous substances that describe the effects of exposure from chemicals found at these sites and acute releases of these hazardous substances.[101] The ATSDR provides answers to the most frequently asked questions about exposure to hazardous substances found around hazardous waste sites and the effects of exposure on human health. The Toxicological Profile for Fluorides, Hydrogen Fluoride and Fluorine indicates that subsets of the population could be unusually susceptible to the toxic effects of fluoride and its compounds at high doses, such as what might be encountered in the cleanup of a chemical spill. However, there are no data to suggest that exposure to the low levels of fluoride associated with community water fluoridation would result in adverse effects in these potentially susceptible populations.[101] The ATSDR's Public Health Statement on Fluorides states that "when used appropriately, fluoride is effective in preventing and controlling dental caries."[102]

While large doses of fluoride could be toxic, it is important to recognize the difference in the effect of a massive dose of an extremely high level of fluoride versus the recommended amount of fluoride found in optimally fluoridated water. The implication that fluoride in large doses and fluoride in trace amounts have the same effect is completely unfounded. Many substances in widespread use are very beneficial in small amounts while toxic in large quantities.

The possibility of adverse health effects from continuous low level consumption of fluoride over long periods has been studied extensively. As with other nutrients, fluoride is safe and effective when used and consumed properly. No charge against the safety of fluoridation has ever been substantiated by generally accepted scientific knowledge. After more than 70 years of research and practical experience, the best available scientific evidence indicates that fluoridation of community water supplies is safe.

After more than 70 years of research and practical experience, the best available scientific evidence indicates that fluoridation of community water supplies is safe.

32. Does drinking water fluoridated at the recommended levels cause or accelerate the growth of cancer?

Answer.

According to the best available scientific evidence, there is no association between cancer rates in humans and drinking water that is fluoridated at the recommended levels.

Fact.

Since community water fluoridation was introduced in 1945, more than 50 epidemiologic studies in different populations and at different times have failed to demonstrate an association between fluoridation and the risk of cancer.[1] Studies have been conducted

in the United States,[103-108] Japan,[109] the United Kingdom,[110-112] Canada[113] and Australia.[114] In addition, over the years, a number of independent bodies from around the world have conducted extensive reviews of the scientific literature and concluded that there is no relationship between fluoridation and cancer.[1,2,4,59,115] At the beginning of the Safety Section in Question 17, a number of recent reviews are listed that have also concluded there is no relationship between fluoridation and cancer.[10,11,13,15-18,20,21] Clearly, the best available science indicates there is no association between fluoridation and cancer.

Clearly, the best available science indicates there is no association between fluoridation and cancer.

Many of the questions about a possible association between fluoride and cancer center around a form of bone cancer called osteosarcoma. This topic is covered in the next question.

In October 2011, the California Office of Environmental Health Hazard Assessment (OEHHA) through its Carcinogen Identification Committee (CIC) determined that fluoride does not cause cancer. The review was part of California's Proposition 65 listing process.[116] Proposition 65 was enacted in 1986 with the intent to protect California citizens and the State's drinking water sources from chemicals known to cause cancer, birth defects or other reproductive harm and to inform citizens about exposure to such chemicals. It requires the Governor to publish, at least annually, a list of chemicals known to the state to cause cancer or reproductive toxicity. The OEHHA administers meetings of the CIC and the list of items to be reviewed through the Proposition 65 process. On May 29, 2009, fluoride was selected by OEHHA for review by the CIC. Due to widespread exposure to fluoride, it was identified as one of five high priority chemicals to be evaluated. A public comment period followed. On July 8, 2011, as the next step in the Proposition 65 process, the CIC released a hazard identification document, "Evidence on the Carcinogenicity of Fluoride and its Salts". It was used by the CIC in its deliberations on whether fluoride should be listed as a carcinogen under Proposition 65. A second public comment period followed. At a public meeting on October 12, 2011, the CIC heard additional testimony and then voted on the question, "Do you believe that it has been clearly shown, through scientifically valid testing according to generally accepted principles, that fluoride causes cancer?" The CIC's vote was unanimous (6-0) that fluoride had not been clearly shown to cause cancer.[117]

On its website, the American Cancer Society (ACS) provides a page titled, "Water Fluoridation and Cancer Risk."[118] In question and answer format, the ACS provides basic information regarding fluoridation as well as information on a number of studies that examined the possible association between fluoridation and cancer — many of which are referenced in the opening paragraph of this Safety Section. Near the bottom of the ACS web page, under the header "Assessments by Expert Groups" is this paragraph:

> The general consensus among the reviews done to date is that there is no strong evidence of a link between water fluoridation and cancer. However, several of the reviews noted that further studies are needed to clarify the possible link.[118]

33. Does fluoridated water cause osteosarcoma?

Answer.
No. The best available scientific evidence shows that fluoridated water does not cause osteosarcoma.

Fact.
In 2016, the American Society of Clinical Oncology estimated that a total of 1,000 people, including 450 children and teens younger than 20, would be diagnosed with osteosarcoma (a form of bone cancer) in the United States during the year. About 2% of all childhood cancers are osteosarcoma which most often affects those between the ages of 10 and 30. Osteosarcoma is about 50% more common in boys than girls. The 5-year survival rate for children and teens with osteosarcoma that is only in one place at the time of diagnosis is 70%.[119]

In 2014, researchers from England published the largest study ever conducted examining the possible association between fluoride in drinking water and risk of osteosarcoma or Ewing sarcoma. Analyzing 2,566 osteosarcoma cases and 1,650 Ewing's sarcoma cases from 1980 to 2005, the study found that higher

levels of natural or adjusted fluoride in drinking water in Great Britain (England, Scotland and Wales) had no impact on the incidence of either osteosarcoma or Ewing's sarcoma in people aged 0-49. Water fluoride levels ranged from near zero to a maximum of approximately 1.26 ppm.[120]

A case-control study[121] published in 2011 found no significant association between the fluoride levels in bone and osteosarcoma risk. Led by a Harvard researcher, the study analyzed fluoride levels in bone samples from 137 patients with primary osteosarcoma and bone samples from 51 patients with other newly-diagnosed malignant bone tumors who served as a control group. Conducted in nine U.S. hospitals over an eight-year period (1993 and 2000), the study was considered the most extensive to date on the issue. The vast majority of fluoride in the body is located in calcified tissue such as bone. The study hypothesized that if chronic exposure to fluoride was a risk factor for osteosarcoma, then those cases would have a significantly higher level of fluoride in bone than the controls. This was not the case. The major advantage of this study was the ability to use actual bone fluoride levels as a measure of fluoride intake rather than estimating fluoride exposure. Focusing on fluoride intake from water as a primary source of fluoride, in earlier studies[122,123] members of the research team noted the difficulty in obtaining accurate information on fluoride levels of drinking water at the subjects' homes. Even when accurate information could be obtained, that information did not reflect actual consumption of water by the study subjects. Funding for the study came from three agencies of the National Institutes of Health — the National Cancer Institute, the National Institute of Environmental Health Sciences and the National Institute of Dental and Craniofacial Research.[121]

The best available scientific evidence shows that fluoridated water does not cause osteosarcoma (a form of bone cancer).

34. Does fluoride, as provided by community water fluoridation, inhibit the activity of enzymes in humans?

Answer.

The best available scientific evidence demonstrates that the recommended levels of fluoride in drinking water, has no effect on human enzyme activity.

Fact.

Enzymes are organic compounds that promote chemical change in the body. The best available scientific evidence has not indicated that water fluoridated at the recommended levels has any influence on human enzyme activity. There are no available data to indicate that, in humans drinking water fluoridated at the recommended levels, the fluoride affects enzyme activities with toxic consequences.[124] The World Health Organization report, *Fluorides and Human Health* states, "No evidence has yet been provided that fluoride ingested at 1 ppm in the drinking water affects intermediary metabolism of food stuffs, vitamin utilization or either hormonal or enzymatic activity."[125]

In 2006, the National Research Council Report stated that the available data were not sufficient to draw any conclusions about potential effects or risks to liver enzymes from low-level long-term fluoride exposures such as those seen with community water fluoridation.[9]

The concentrations of fluoride used in laboratory studies to produce significant inhibition of enzymes are hundreds of times greater than the concentration present in body fluids or tissues.[126] While fluoride could affect enzymes in an artificial environment outside of a living organism in the laboratory, it is unlikely that adequate cellular levels of fluoride to adversely alter enzyme activities would be attainable in a living organism. The two primary physiological mechanisms that maintain a low concentration of fluoride ion in body fluids are the rapid excretion of fluoride by the kidneys and the uptake of fluoride by calcified tissues.[52]

35. Does the ingestion of optimally fluoridated water adversely affect the thyroid gland or its function?

Answer.

The best available scientific evidence indicates optimally fluoridated water does not have an adverse effect on the thyroid gland or its function.

Fact.

A number of systematic reviews completed in the last ten years have looked at a possible association between exposure to fluoride and thyroid function.

In 2017, the Australian National Health and Medical Research Council's systematic review *Information Paper — Water Fluoridation: Dental and Other Human Health Outcomes*[10] concluded, "There is no reliable evidence of an association between water fluoridation and current Australian levels and thyroid function." (Current recommendations for fluoride levels in drinking water in Australia are a range of 0.6 to 1.1 mg/L depending on climate.)[10]

A scientific evaluation of fluoridating agents of drinking water was done by the Scientific Committee on Health and Environmental Risks (SCHER) as requested by the European Commission (EC). The EC is the European Union's (EU) executive body with responsibility to manage EU policy. The final report, *Critical review of any new evidence on the hazard profile, health effects, and human exposure to fluoride and the fluoridating agents of drinking water,* was released in 2011. It stated that "A systematic evaluation of the human studies does not suggest a potential thyroid effect at realistic exposures to fluoride."[20]

In 2015, the *U.S. Public Health Service Recommendation for Fluoride Concentration in Drinking Water for the Prevention of Dental Caries*[16] was released. It referred to the 2006 National Research Council's report, *Fluoride in Drinking Water — A Scientific Review of the EPA's Standards,*[9] stating:

> The 2006 NRC review considered a potential association between fluoride exposure (2-4 mg/L) and changes in the thyroid, parathyroid, and pineal glands in experimental animals and humans. The report noted that available studies of the effects of fluoride exposure on endocrine function have limitations. For example, many studies did not measure actual hormone concentrations, and several studies did not report nutritional status or other factors likely to confound findings. The NRC called for better measurement of exposure to fluoride in epidemiological studies and for further research "to characterize the direct and indirect mechanisms of fluoride's action on the endocrine system and factors that determine the response, if any, in a given individual."[9]

On March 22, 2006, during the press webcast[127] for the release of the 2006 National Research Council (NRC) Report,[9] John Doull, M.D., Ph.D., Professor Emeritus of Pharmacology and Toxicology, University of Kansas Medical Center, Kansas City and Chair of the NRC Committee was asked about the conclusions reached on fluoride and the endocrine system (which includes the thyroid). Dr. Doull replied:

> The Endocrine Chapter (of the NRC Report) is a relatively new chapter. It has not been extensively reviewed previously and our feeling was that we needed to provide a baseline of all the adverse effects and a lot of the systems that hadn't really been looked at very closely. We have a chapter for example on the central nervous system which has not been reviewed in detail previously. We went through all those effects in the endocrine chapter, the thyroid effect, the parathyroid effect, calcitonin to see whether there were sufficient evidence for us to include any of those effects as specific adverse effects at 4 mg/L and the conclusion of our Committee was that those were all things we needed to worry about. Those were all things that we made recommendations for additional research. **But, none of them reached the level where we considered them to be signs of adverse effects at the 4 mg/L level**. (Emphasis added.)[127]

A population-based Canadian study[128] was released in 2017 that examined the association between fluoride exposure and thyroid conditions. Data for the analysis came from Cycles 2 (2009-2011) and 3 (2012-2013) of Statistics Canada's Canadian Health Measures Survey (CHMS). The CHMS' target population is all Canadian residents between the ages of 3 and 79 living in all ten Canadian provinces. It collects health information by an individual in-home interview followed by a clinical exam conducted in a mobile clinic. The researchers' reported findings suggest that, at the population level in Canada, fluoride exposure does not contribute to impaired thyroid functioning during a time when multiple sources of fluoride exposure, including community water

fluoridation, exist. It was additionally noted that the findings could be broadly relevant to other countries with similar populations and water fluoridation.[128]

In 2015, a study was published in which the authors claimed to have found a positive association between fluoride levels in drinking water and hypothyroidism. Drawing immediate criticism, the published critiques noted that a major weakness of this study was the failure to consider a number of potential confounding factors. The only confounders taken into consideration were age, sex and socioeconomic status. While acknowledging that iodine intake is associated with thyroid health, the authors failed to consider iodine as a factor along with the impacts of smoking and medications. The strong conclusion of the paper was not supported by the work of the authors or other published literature.[130-133]

In addition, two studies have explored the association between fluoridated water and cancer of the thyroid gland. Both studies found no association between optimal levels of fluoride in drinking water and thyroid cancer.[106,110]

36. Does water fluoridation affect the pineal gland causing the early onset of puberty?

Answer.
The best available scientific evidence indicates that water fluoridation does not cause the early onset of puberty.

Fact.
The pineal gland is an endocrine gland located in the brain which produces melatonin.[133] Endocrine glands secrete their products into the bloodstream and body tissues and help regulate many kinds of body functions. The hormone, melatonin, plays a role in sleep, aging and reproduction.[134]

A single researcher has published one study in a peer-reviewed scientific journal regarding fluoride accumulation in the pineal gland. The purpose of the study was to discover whether fluoride accumulates in the pineal gland of older adults. This limited study, conducted on only 11 cadavers whose average age at death was 82 years, indicated that fluoride deposited in the pineal gland was significantly linked to the amount of calcium in the pineal gland.[135] It would not be unexpected to see higher levels of calcium in the pineal gland of older individuals as this would be considered part of a normal aging process. As discussed in Question 25, approximately 99% of the fluoride present in the body is associated with hard or calcified tissues.[52] The study concluded fluoride levels in the pineal gland were not indicators of long-term fluoride exposure.[135]

The same researcher had theorized in her 1997 dissertation, portions of which are posted on numerous internet sites opposed to fluoridation, that the accumulation of fluoride in children's pineal glands leads to an earlier onset of puberty. However, the researcher notes in the dissertation that there is no verification that fluoride accumulates in children's pineal glands. Moreover, a study conducted in Newburgh (fluoridated) and Kingston (nonfluoridated), New York found no statistically significant difference between the onset of menstruation for girls living in a fluoridated versus nonfluoridated area.[136] The National Research Council's 2006 report, *Fluoride in Drinking Water: A Scientific Review of EPA's Standards*, stated that a connection between fluoride pineal function in humans remains to be demonstrated."[9]

37. Can fluoride, at the levels found in drinking water that is fluoridated to the recommended levels, alter immune function or produce an allergic reaction (hypersensitivity)?

Answer.
There is no scientific evidence of any adverse effect from fluoridation on any specific immunity, nor have there been any medically confirmed reports of allergic reaction from drinking or being in contact with optimally fluoridated water.

Fact.
There is no scientific evidence linking health conditions related to immune function such as HIV or AIDS (acquired immune deficiency syndrome) with community water fluoridation.[137]

There are no confirmed cases of allergy to fluoride, or of any positive skin testing in human or animal models.[138] A committee of the National Academy of Sciences evaluated clinical reports of possible allergic responses to fluoride in 1977 and stated, "The reservation in accepting (claims of allergic reaction) at face value is the lack of similar reports in much larger numbers of people who have been exposed to considerably more fluoride than was involved in the

original observations."[7] The World Health Organization also judged these cases to represent "a variety of unrelated conditions" and found no evidence of allergic reactions to fluoride.[139,140]

38. Is fluoride, as provided by community water fluoridation, a genetic hazard?

Answer.
The best available scientific evidence indicates that drinking water fluoridated at the recommended levels is not a genetic hazard.

Fact.
Chromosomes are the DNA-containing bodies of cells that are responsible for the determination and transmission of hereditary characteristics. A single chromosome contains many genes which are the functional hereditary units that occupy a fixed location on a chromosome. Many studies have examined the possible effects of fluoride on chromosome damage.

In 1993, the National Research Council (NRC) of the National Academies issued a report[8] that supported the conclusion that drinking optimally fluoridated water is not a genetic hazard. In a statement summarizing its research[8], the NRC stated, "in vitro data indicate that:

1. the genotoxicity of fluoride is limited primarily to doses much higher than those to which humans are exposed,
2. even at high doses, genotoxic effects are not always observed, and
3. the preponderance of the genotoxic effects that have been reported are of the types that probably are of no or negligible genetic significance."[8]

The lowest dose of fluoride reported to cause chromosomal changes in mammalian cells was approximately 170 times that normally found in human cells in areas where drinking water was fluoridated at 1.0 mg/L, which indicates a large margin of safety.[8] (Note that this would be 242 times greater with fluoridation now set at 0.7 mg/L.)

In its subsequent 2006 report,[9] the NRC stated after reviewing the evidence available since its 1993 report, that the weight of evidence from studies on rodents indicated a very low probability that fluoride presents a risk of genetic mutation for humans.[9]

In addition, the 2006 NRC report[9] indicated that the results of human studies related to fluoride and its effect on genotoxicity since its 1993 report are inconsistent and do not strongly indicate the presence or absence of genotoxic potential for fluoride. Continued research and evaluation are recommended.[9]

39. Does fluoride at the levels found in water fluoridation affect human reproduction, fertility or birth rates?

Answer.
According to the best available scientific evidence, water fluoridation does not have an adverse effect on human reproduction, fertility or birth rates.

Fact.
In 2011, the European Commission requested the European Scientific Committee on Health and Environmental Risks (SCHER) perform a critical review of fluoridating agents of drinking water. A portion of that report looked at reproductive issues. The report concluded that there is no new evidence from human studies indicating that fluoride in drinking water influences male and female reproductive capacity.[20]

In its 2006 report,[9] the National Research Council (NRC) indicated that since 1990, the quality and number of reproductive and developmental studies using laboratory animals have improved significantly. These high-quality studies indicate adverse reproductive and developmental effects occur only at levels of fluoride much higher than 4 mg/L.[9] The NRC also indicated that a few studies conducted with human populations have suggested that fluoride might be associated with alterations in reproductive hormones and fertility. However, the report continued on to explain that limitations in study design, such as the lack of control of reproductive variables, make these studies of little value for risk evaluation.[9]

A study examining the relative risk of stillbirths and congenital abnormalities (facial clefts, Down syndrome and neural tube defects) found no evidence that fluoridation had any influence on the rates of congenital abnormalities or stillbirths.[141] The study, conducted in 2003, analyzed data from two population based registries to identify all stillbirths and congenital abnormalities occurring in northeastern England between 1989 and 1998 and compared the rates of stillbirths and

specific congenital abnormalities in fluoridated and nonfluoridated communities. The study found no significant association between the occurrence of stillbirths or specific congenital abnormalities and fluoride levels in drinking water.[141]

40. For women, does drinking water fluoridated at the recommended levels create a risk for their children to be born with Down syndrome?

Answer.

There is no known association between the consumption of drinking water fluoridated at the recommended levels and Down syndrome.

Fact.

All people with Down syndrome have an extra, critical portion of chromosome 21 present in all or some of their cells. This additional genetic material alters the course of development and causes the characteristics associated with Down syndrome. The cause of the extra full or partial chromosome is still unknown. Maternal age is the major factor that has been linked to an increased chance of having a baby with Down syndrome. There is no definitive scientific research that indicates that Down syndrome is caused by environmental factors or the parents' activities before or during pregnancy.[142]

However, those opposed to fluoridation sometimes still assert that consuming fluoridated tap water can cause Down syndrome.

In 2014, the systematic review published by Public Health England reviewed the literature and concluded that there was no evidence of a difference in the rate of Down syndrome in fluoridated and nonfluoridated areas.[17]

A number of studies have looked at this issue in the past. Several are summarized below.

A detailed study of approximately 2,500 children born with Down syndrome was conducted in Massachusetts. A rate of 1.5 cases per 1,000 births was found in both fluoridated and nonfluoridated communities, providing strong evidence that fluoridation does not increase the risk of Down syndrome.[143]

Another large population-based study with U.S. national data relating to nearly 1.4 million births showed no association between water fluoridation and the incidence of congenital malformations including Down syndrome.[144]

A comprehensive study of Down syndrome births was conducted in 44 U.S. cities over a two-year period. Rates of Down syndrome were comparable in both fluoridated and nonfluoridated cities.[145]

41. Does ingestion of water fluoridated at recommended levels have any effect on intelligence (IQ) in children or neurological impact?

Answer.

The best available science-based evidence does not establish a causal relationship between consumption of water fluoridated at recommended levels and lowered intelligence (IQ) or behavioral disorders in children.

Fact.

A number of systematic reviews and individual studies provide evidence that consumption of optimally fluoridated water at levels recommended in the U.S. (0.7 mg/L) does not lower IQ or cause behavior problems in children. The following conclusions from a number of systematic reviews and individual studies support the safety of community water fluoridation.

A number of systematic reviews and individual studies provide evidence that consumption of optimally fluoridated water at levels recommended in the U.S. (0.7 mg/L) does not lower IQ or cause behavior problems in children.

In 2017, the Australian National Health and Medical Research Council's systematic review *Information paper — Water Fluoridation: Dental and Other Human Health Outcomes*[10] concluded, "The evidence from a single study of acceptable quality shows that there is no association between water fluoridation at current Australian levels and the cognitive function of children or adults." (Current recommendations for fluoride levels in drinking water in Australia are a range of 0.6 to 1.1 mg/L depending on climate.)[10]

The report, *Health Effects of Water Fluoridation: An Evidence Review,* issued in 2015 by the Ireland Health Research Board noted,[15] "There was only one study carried out in a non-endemic or CWF area (like Ireland) that examined fluoride and IQ. This was a prospective cohort study (whose design is appropriate to infer causality) in New Zealand. The study concluded that there was no evidence of a detrimental effect on IQ as a result of exposure to CWF (community water fluoridation)."[15]

In 2014, a scientific review, *Health effects of water fluoridation: A review of the scientific evidence,*[18] commissioned by the New Zealand Prime Minister's Chief Science Advisor and the President of the Royal Society of New Zealand concluded: "There is no convincing evidence of neurological effects at fluoride concentrations achieved by CWF."[18]

At the request of the European Commission, the Scientific Committee on Health and Environmental Risks (SCHER) conducted a critical review[20] of any new evidence on the hazard profile, health effects, and human exposure to fluoride and the fluoridating agents of drinking water. Their report of May 2011 reviewed animal and human studies concluding that "there is not enough evidence to conclude that fluoride in drinking water at concentrations permitted in the EU may impair the IQ of children. SCHER also agreed that a biological plausibility for the link between fluoridated water and IQ has not been established."[20]

As noted in the preceding paragraphs, at least three systematic reviews[10,15,18] indicated that there was only one high-quality prospective cohort study that addressed the issue of IQ. Published in 2014, a study[146] conducted in New Zealand followed a group of more than 1,000 people born in the early 1970s and measured childhood IQ at the ages of 7, 9, 11 and 13 years and adult IQ at the age of 38 years. Early life exposure to fluoride from a variety of sources was recorded and adjustments were made for factors potentially influencing IQ. Childhood factors associated with IQ variation included socio-economic status of parents, birth weight and breastfeeding, as well as secondary and tertiary educational achievement, which is associated with adult IQ. This detailed study revealed no evidence that exposure to water fluoridation in New Zealand affects neurological development or IQ. (Recommended levels of fluoride used in New Zealand's fluoridation program range from 0.7 mg/L to 1.0 mg/L.)[146]

Those opposed to water fluoridation have promoted studies that reportedly show fluoridation causes lower intelligence (IQ) in children. The studies cited are often from China, Mexico, India or Iran where social, nutritional and environmental conditions are significantly different from those in the United States. The vast majority of these studies have not been published in peer-reviewed English language journals. The consensus of those who have reviewed these studies is that the quality of these studies does not stand up to scientific scrutiny. The studies are of low quality, have a high risk of bias and use a study design unsuited to prove or disprove theories. They take no or little account of other factors that are known to cause a lowering of IQ (also called confounders) such as nutritional status, socioeconomic status, iodine deficiency and consumption of other harmful elements in ground water (arsenic or lead).

At the request of the U.S. EPA, a report on fluoride in drinking water issued in 2006 by the National Research Council[9] noted that the significance of the Chinese studies reviewed was "uncertain." "Most of the papers were brief reports and omitted important procedural details...Most of the studies did not indicate whether the IQ tests were administered in a blinded manner. Some of the effects noted in the studies could have been due to stress induced by the testing conditions. Without detailed information about the testing conditions and the tests themselves, the committee was unable to assess the strength of the studies."[9]

In England in 2009, the South Central Strategic Health Authority requested an independent critical appraisal of 19 papers and one abstract that reported an association between fluoride in drinking water and IQ in countries outside England. The appraisal[147] noted that the study design and methods used by many of the researchers in these studies had serious limitations. The researchers also exhibited a lack of a thorough consideration of confounding factors as a source of bias in the results. From these studies alone, it was "uncertain how fluoride was responsible for any impairment in intellectual development." Significant differences were noted in conditions between the communities studied and conditions in England. For example, some studies noted high levels of naturally occurring fluoride in drinking water and exposure to fluoride from other sources including the practice of burning high fluoride coal to heat poorly ventilated homes in China. Additionally, in many cases, there were stark differences in other environmental conditions and socioeconomic characteristics.[147]

In November 2016, those opposed to fluoridation filed a legal petition[148] with the U.S. Environmental Protection Agency (EPA) in Washington, D.C. calling for the EPA to ban the addition of fluoridating chemicals to public drinking water on the grounds that a large body of animal, cellular, and human research showed that fluoride is neurotoxic at doses within the range now seen in fluoridated communities in the U.S. (0.7 mg/L). The EPA responded to the petition in February 2017 noting, "After careful consideration, EPA denied the TSCA section 21 petition, primarily because EPA concluded that the petition has not set forth a scientifically defensible basis to conclude that any persons have suffered neurotoxic harm as a result of exposure to fluoride in the U.S. through the purposeful addition of fluoridation chemicals to drinking water or otherwise from fluoride exposure in the U.S."[148] As allowed under the TSCA process, the petitioners filed a lawsuit challenging the EPA ruling in April 2017 in the U.S. District Court for the Northern District of California at San Francisco. In late 2017, a federal judge denied an EPA motion to dismiss the lawsuit.

In 2017 a study from Mexico City[149] received some coverage in the popular press. The authors concluded higher urinary fluoride levels of pregnant women were associated with lower scores on tests of cognitive function in their children. This was an observational study that by definition could only show a possible association between fluoride exposure and IQ — not cause and effect. This small study did not adequately address a number of potential confounders that might explain the possible association such as breast feeding, maternal age, gestational age, birth weight and education as well as exposures to lead, mercury, arsenic and iodine that affect IQ and other measures of cognitive ability. Unlike conditions in the U.S., the pregnant women participating in the study were exposed to varied fluoride levels from naturally occurring fluoride in the water supply (in some cases at levels almost twice as high as the level recommended for community water fluoridation in the U.S.) and fluoridated salt.[149]

Additional research on this topic is underway through the National Toxicology Program's systematic review using animal studies to evaluate potential neurobehavioral effects from exposure to fluoride during development. Initiated in 2015, work continued in 2017.[23]

42. Does drinking fluoridated water increase the level of lead in the blood or cause lead poisoning in children?

Answer.

The best available scientific evidence has not shown any association between water fluoridation and blood lead levels.

Fact.

A number of reviews and data analyses indicate no association between water fluoridation and blood lead levels.

In 2011, the European Commission requested that the European Scientific Committee on Health and Environmental Risks (SCHER) perform a critical review of fluoridating agents of drinking water. The committee concluded that "it is highly unlikely that there would be an increased release of lead from pipes due to hexafluorosilicic acid.[20] Hexafluorosilicic acid is another name for fluorosilicic acid which is one of the additives used to fluoridate water in the U.S.

Additional information on this topic can be found in the Fluoridation Practice Section, Question 49.

A 2006 study analyzed data from the Third National Health and Nutrition Examination Survey (1988-1994) and the 1992 Fluoridation Census to evaluate the relationship between water fluoridation and lead concentrations in children. The study concluded that the results did not support that the silicofluorides used in community water systems caused higher lead concentrations in children.[150]

According to the Centers for Disease Control and Prevention,[151] the average blood lead levels of young children in the U.S. have continued to decline since the 1970s primarily due to lead poisoning prevention laws such as the phase-out of leaded paint and leaded gasoline. The primary remaining sources of childhood lead exposure are deteriorated leaded paint, house dust contaminated by leaded paint and soil contaminated by leaded paint and/or decades of industrial and motor vehicle emissions. Besides exposure to lead paint in older homes, lead water pipes and fixtures also can be found in homes built before 1978. In some areas of the county, folk remedies and pottery also add to lead exposure.[151] Findings from the National Health and Nutrition

Examination Surveys (NHANES) from 1976-1980 to 2003-2008 show that the percentage of children aged 1- to 5-years-old having high lead blood levels (≥10 µg/dL) declined dramatically from 88.2% to 0.9%.[152] During that same time period (1976 to 2008), the percentage of the U.S. population receiving fluoridated water rose from approximately 48.8% to 64.3%.[153] Moreover, in the 1991-1994 NHANES, the overall (all age groups) prevalence of high lead blood levels (≥10 µg/dL) was 2.2% but decreased to 0.7% by the 1999-2002 survey.[151] While antifluoridationists claim that fluoridated water increases lead blood levels in children, the fact is that since 1976 while the use of water fluoridation has increased, the percentage of children in the U.S. with high lead blood levels actually has continued to decreased substantially. This demonstrates that the claim made by those opposed to water fluoridation that fluoride in water increases lead concentrations in children is unfounded. It should be noted that approximately 95% of the primary sources of adult lead exposure are occupational.[154] In general, adult blood lead levels have continued to decline over recent decades due largely to improved prevention measures in the workplace and changes in employment patterns.[154]

Those opposed to water fluoridation sometimes claim that there is an increase in acidity when fluoride is added to water and that the acidic water in the system leaches lead from pipes and fixtures. The process of adding fluoride to water has minimal impact on the acidity or pH of drinking water. Under some water quality conditions, a small increase in the acidity of drinking water that is already slightly acidic can be observed after treatment with alum, chlorine, fluorosilicic acid or sodium fluorosilicate. In such cases, additional water treatment to adjust the pH to neutralize the acid in water distribution systems is standard practice in water plants.[155] Water facilities typically maintain a pH of between 7.0 and 8.0 as standard practice indicating that the water leaving the plant is slightly alkaline and non-acidic.[156]

Despite this information, antifluoridationists continue to exploit their unfounded claims that fluoridation can lead to an increased uptake of lead by children. A 1999 study[157] charged that fluorosilicic acid and sodium silicofluoride did not disassociate completely when added to water systems and could be responsible for lower pH (more acidic) levels of drinking water, leaching lead from plumbing systems and increasing lead uptake by children. In response to the study, scientists from the EPA reviewed the basic science that was the foundation for the claim that silicofluorides leach lead from water pipes and found that many of the chemical assumptions made in the original ecological study were scientifically unjustified.[158] Fluoride additives do disassociate very quickly and completely release fluoride ions into the water. The research from the 1999 study was inconsistent with accepted scientific knowledge and the authors of that study failed to identify or account for those inconsistencies. The EPA scientists discounted the 1999 study and said there were no credible data to suggest any link between fluoridation and lead. Overall, the EPA scientists concluded that "...no credible evidence exists to show that water fluoridation has any quantifiable effects on the solubility, bioavailability, bioaccumulation, or reactivity of lead compounds."[158]

43. Does drinking water fluoridated at recommended levels cause Alzheimer's disease?

Answer.

The best available scientific evidence has not indicated an association between drinking optimally fluoridated water and Alzheimer's disease.

Fact.

Scientists believe the causes of late-onset Alzheimer's, the most common form of the disease, include a combination of age-related brain changes, genetic, lifestyle, and environmental factors. The importance of any one of these factors in increasing or decreasing the risk of developing Alzheimer's could differ from person to person. Early-onset Alzheimer's is less common (fewer than 10% of Alzheimer's cases) with the first signs of the disease typically appearing between an individual's 30s and mid-60s. It is believed to be caused primarily by gene changes passed down from parent to child.[159]

A study published in 1998[160] raised concerns about the potential relationship between fluoride, aluminum and Alzheimer's disease. However, several flaws in the study's experimental design precluded any definitive conclusions from being drawn.[161] Concerns were noted about a number of aspects of the protocol including, but not limited to, the high percentage of the test rodents dying during the study and that

the researchers failing to account for the high levels of aluminum and fluoride in the chow fed to all test rodents.[161] For decades, a small number of researchers have implicated aluminum in the development of late-onset Alzheimer's disease. However, the "Aluminum Hypothesis" has been abandoned by the majority of mainstream scientists.[162]

In 2000, a study[163] investigated the relationships between trace elements in drinking water and the thought processes of 1,016 subjects over the age of 65 living in two rural areas of China. In today's U.S. society, people are very mobile and tend to live in multiple places during their lifetimes. In contrast, the rural residents of China rarely move and so in this study the researchers were able to assume that this elderly population had used the same water and food sources throughout their lifetimes. The researchers evaluated the effects on thought processes of seven elements (cadmium, calcium, fluoride, iron, lead, selenium and zinc) found in the water sources at the two study sites. The study assessed thought processes in three areas (memory, language and attention) using a Chinese translation of the Community Screening Interview for Dementia. Taking into account the effects of the seven trace elements, the authors concluded that fluoride is not significantly related to impairment of thought processes such as is seen in Alzheimer's disease.[163]

44. Does drinking water fluoridated at recommended levels cause or contribute to heart disease?

Answer.

Drinking water fluoridated at recommended levels is not a risk factor for heart disease.

Fact.

The American Heart Association identifies aging, male gender, heredity, cigarette and tobacco smoke, high blood cholesterol levels, high blood pressure, physical inactivity, obesity and diabetes mellitus as major risk factors for cardiovascular disease.[164]

The American Heart Association's website notes: "No evidence exists that adjusting the fluoride content of public water supplies to a level of about one part per million has any harmful effect on the cardiovascular system."[165]

A number of historical studies have evaluated urban mortality in relation to fluoridation status. Researchers from the National Heart, Lung and Blood Institute of the National Institutes of Health examined a wide range of data from communities that had naturally high levels, optimal levels and low levels of fluoride in water. The results of their analysis published in 1972[166] concluded, "Thus, the evidence from comparison of the health of fluoridating and nonfluoridating cities, from medical and pathological examination of persons exposed to a lifetime of naturally occurring fluorides or persons with high industrial exposures, and from broad national experience with fluoridation all consistently indicate no adverse effect on cardiovascular health."[166] Two additional studies were published in 1978. In the first study,[104] the mortality trends from 1950-70 were studied for 473 cities in the United States with populations of 25,000 or more. Findings showed no relationship between fluoridation and heart disease death rates over the 20-year period.[104] In the second study,[105] the mortality rates for approximately 30 million people in 24 fluoridated cities were compared with those of 22 nonfluoridated cities for two years. No evidence was found of any harmful health effects, including heart disease, attributable to fluoridation.[105]

The misinterpretation of the results of a study by those opposed to fluoridation[167] led the opposition to claim that "research highlights the fact that mass fluoride exposure may be to blame for the cardiovascular disease epidemic that takes more lives each year than cancer."[167] In fact, the study published in Nuclear Medicine Communications in January 2012[168] examines the possible benefits of using a sodium fluoride isotope marker in testing to determine the presence of atherosclerosis and risk for coronary disease. In this case, fluoride's affinity for calcified tissue aided in the location of calcium deposited in arterial walls which could be associated with an increased risk of coronary artery disease. The study made no reference to any relationship between the consumption of fluoridated water and heart disease.[168]

45. Is the consumption of water fluoridated at recommended levels harmful to kidneys?

Answer.

Consuming water fluoridated at recommended levels has not been shown to cause or worsen kidney disease.

Fact.

Approximately 60% of the fluoride absorbed daily by adults (45% for children) is removed from the body by the kidneys.[52] Because the kidneys are constantly exposed to various fluoride concentrations, any health effects caused by fluoride would likely manifest themselves in kidney cells. However, several large community-based studies of people with long-term exposure to drinking water with fluoride concentrations up to 8 ppm have failed to show an increase in kidney disease.[5,136,169]

In a report issued in 1993 by the National Research Council (NRC), the Subcommittee on Health Effects of Ingested Fluoride stated that the threshold dose of fluoride in drinking water which causes kidney effects in animals is approximately 50 ppm — more than 12 times the maximum level allowed in drinking water by the Environmental Protection Agency. Therefore, they concluded that "ingestion of fluoride at currently recommended concentrations is not likely to produce kidney toxicity in humans."[8] Furthermore, the NRC report on fluoride in drinking water issued in 2006 concluded that there were no published studies that demonstrate that drinking water fluoridated at recommended levels can damage kidneys. The report further concluded that fluoride concentrations need to be higher than 4 ppm to affect kidney tissues and function.[9]

A review of scientific studies completed in 2007 for Kidney Health Australia (KHA),[170] summarized findings from the recent literature related to the health effects of fluoridated water for people with chronic kidney disease (CKD). The purpose of the review was to provide an up to date summary of studies on the topic so that KHA, the leading organization in Australia that promotes kidney and urinary tract health, could develop a fluoride position paper. The review concluded that while studies on the topic are limited, "there is no evidence that consumption of optimally fluoridated drinking water increases the risk of developing CKD." For those people who have CKD, the report stated that "there is no evidence that consumption of optimally fluoridated drinking water poses any health risks for people with CKD, although only limited studies addressing this issue are available." There is limited evidence that people with advanced CKD (stages 4 or 5) "who ingest substances with a high concentration of fluoride may be at risk of fluorosis." Accordingly, the report recommended that it would be "prudent" for patients with advanced CKD to monitor fluoride intake and avoid fluoride-rich substances. These conclusions are the basis for KHA's position statement on fluoride which was released in 2007.[170] The position statement was updated in 2011 and concluded that "there has been no new published evidence to contradict the 2007 KHA Position Statement."[171]

According to information on their website, the National Kidney Foundation is the leading organization in the U.S. dedicated to the awareness, prevention and treatment of kidney disease. A paper titled *Fluoride Intake in Chronic Kidney Disease* dated April 15, 2008,[172] developed by the National Kidney Foundation (NKF) and posted on the NKF website includes the following points under the header "Analysis and Recommendations":

- Dietary advice for patients with CKD should primarily focus on established recommendations for sodium, potassium, calcium, phosphorus, energy/calorie, protein, fat, and carbohydrate intake. Fluoride intake is a secondary concern.

- Individuals with CKD should be notified of the potential risk of fluoride exposure by providing information on the NKF website including a link to the Report in Brief of the National Research Council and the Kidney Health Australia position paper. The risk is likely greatest in areas with naturally high water fluoride levels.

- The NKF has no position on the optimal fluoridation of water. The oral health of people with CKD is certainly of interest to the NKF, but balancing the overall benefits and risks of fluoride exposure is the primary concern.[172]

Many people with kidney failure depend on hemodialysis (treatment with an artificial kidney machine) for their survival. During hemodialysis, the patient's blood is exposed to large amounts of water each week (280-560 quarts). Therefore, procedures have been designed to ensure that the water utilized in the process contain a minimum of dissolved substances that could diffuse indiscriminately into

the patient's bloodstream.[173] Both KHA and the NKF recommend careful monitoring of hemodialysis systems to ensure proper mechanical function.[170,172] Since the composition of water varies in different geographic locations in the United States, the U.S. Public Health Service recommends dialysis units use techniques such as reverse osmosis and de-ionization to remove excess iron, magnesium, aluminum, calcium, and other minerals, as well as fluoride, from tap water before the water is used for dialysis.[173]

46. What are some of the erroneous health claims made against water fluoridation?

Answer.

From sources such as the internet, newsletters, social media and personal anecdotes in emails, it is frequently claimed that community water fluoridation causes the following adverse health effects:

- AIDS
- Allergic Reactions (e.g.,loss of hair, skin that burns and peels after contact with fluoridated water)
- Accelerated Aging
- Alzheimer's disease
- Arthritis
- Asthma
- Austism
- Behavioral Problems (e.g., attention deficit disorders)
- Bone Disease (e.g.,osteoporosis –increased bone/ hip fractures)
- Cancer (all types including osteosarcoma or bone cancer)
- Chronic Bronchitis
- Colic (acute abdominal pain)
- Cystic Fibrosis
- Down Syndrome
- Emphysema
- Enzyme Effects (gene-alterations)
- Flatulence (gas)
- Gastrointestinal Problems (irritable bowel syndrome)
- Harmful Interactions with Medications
- Heart Disease
- Increased Infant Mortality
- Low Birth Weight for Infants
- Kidney Disease
- Lead Poisonings
- Lethargy (lack of energy)
- Lower IQ scores
- Malpositioned Teeth
- Parkinson's Disease
- Calcification of the Pineal Gland (causing early puberty) (chronic insomnia);
- Reproductive issues (damaged sperm) (reduced fertility)
- Skin Conditions (redness, rash/welts, itching)
- Sudden Infant Death Syndrome (SIDS)
- Thyroid Problems (goiter and obesity due to hypothyroidism)

AND

- Tooth Decay

Fact.

As discussed throughout this document, the best available scientific evidence consistently has indicated that fluoridation of community water supplies is safe and effective. The possibility of any adverse health effects from continuous low-level consumption of fluoride has been and continues to be studied extensively. Of the thousands of credible scientific studies on fluoridation, none has shown health problems associated with the consumption of optimally fluoridated water.

Of the thousands of credible scientific studies on fluoridation, none has shown health problems associated with the consumption of optimally fluoridated water.

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Fluoridation Practice

47. Who regulates drinking water additives in United States?

Answer.

The United States Environmental Protection Agency (EPA) regulates drinking water additives.

Fact.

In 1974, Congress passed the Safe Drinking Water Act (SDWA) which protects the public's health by regulating the nation's public drinking water supply.[1] The SDWA, as amended in 1986 and 1996,[1] requires the Environmental Protection Agency (EPA) to ensure the public is provided with safe drinking water.[1] On June 22, 1979, the Food and Drug Administration (FDA) and the EPA entered into a Memorandum of Understanding (MOU) to clarify their roles and responsibilities in water quality assurance.[2] The stated purpose of the MOU is to "avoid the possibility of overlapping jurisdiction between the USEPA and FDA with respect to control of drinking water additives." The two agencies agreed that the Safe Drinking Water Act's passage in 1974 implicitly repealed FDA's jurisdiction over drinking water as a 'food' under the Federal Food, Drug and Cosmetic Act (FFDCA). Under the MOU, EPA enjoys exclusive regulatory authority over drinking water provided by public water systems, including any additives in such water. FDA retains jurisdiction over bottled drinking water under Section 410 of the FFDCA and "over water (and substances in water) used in food or food processing once it enters the food processing establishment."[2]

While drinking water from the tap is regulated by the EPA, bottled water is regulated by the FDA which has established standards for its quality.[2] The FDA has noted that fluoride can occur naturally in source waters used for bottled water or may be added by a bottled water manufacturer. Recognizing the benefit of fluoride in water, the FDA has stated that bottled water that meets specific standards of identity and quality set forth by FDA, and the provisions of the authorized health claim related to fluoride, may be labeled with the following health claim: "Drinking fluoridated water may reduce the risk of [dental caries or tooth decay]."[3]

While drinking water from the tap is regulated by the EPA, bottled water is regulated by the FDA which has established standards for its quality. The FDA has noted that fluoride can occur naturally in source waters used for bottled water or may be added by a bottled water manufacturer. Recognizing the benefit of fluoride in water, the FDA has stated that bottled water that meets specific standards of identity and quality set forth by FDA, and the provisions of the authorized health claim related to fluoride, may be labeled with the following health claim: "Drinking fluoridated water may reduce the risk of [dental caries or tooth decay]."

From time to time, states and communities have had to deal with legislation or ballot initiatives aimed at requiring the approval of the FDA before any agent can be added to community water systems. Often referred to as the Fluoride Product Quality Control Act, Water Product Quality Ordinance or Pure Water Ordinance, the legislation is specifically used by those opposed to water fluoridation as a tool to prevent water systems from providing community water fluoridation. Often this legislation does not specifically

mention fluoride or fluoridation. Those supporting this type of legislation may claim that they are not against water fluoridation but are proponents of pure water and do not want anything added to water that has not been approved by the FDA. On the surface, this may appear to be a "common sense" approach. However, its only real purpose is to defeat efforts to provide water fluoridation. That is because this proposed legislation would require the FDA — which does NOT regulate public water systems — to approve any water additive. By mistakenly (and perhaps craftily) naming the wrong federal agency, the probable outcome is to stop or prevent water fluoridation.

48. What standards have been established to ensure the safety of fluoride additives used in community water fluoridation in the United States?

Answer.

The three fluoride additives used in the U.S. to fluoridate community water systems (sodium fluoride, sodium fluorosilicate, and fluorosilicic acid) meet safety standards established by the American Water Works Association (AWWA) and NSF International (NSF).[4]

The three fluoride additives used in the U.S. to fluoridate community water systems (sodium fluoride, sodium fluorosilicate, and fluorosilicic acid) meet safety standards established by the American Water Works Association (AWWA) and NSF International (NSF).

Fact.

Additives used in water treatment meet safety standards prepared in response to a request by the Environmental Protection Agency to establish minimum requirements to ensure the safety of products added to water for its treatment, thereby ensuring the public's health.[4] Specifically, fluoride additives used in water fluoridation meet standards established by the American Water Works Association (AWWA) and NSF International (NSF).[4] Additionally, the American National Standards Institute (ANSI) endorses both AWWA and NSF standards for fluoridation additives and includes its name on these standards.[4]

The American Water Works Association[5] is an international nonprofit scientific and educational society dedicated to providing total water solutions to assure the effective management of water. Founded in 1881, the AWWA is the largest organization of water supply professionals in the world. The membership represents the full spectrum of the water community: public water and wastewater systems, environmental advocates, scientists, academicians, and others who hold a genuine interest in water. AWWA unites the diverse water community to advance public health, safety, the economy, and the environment.[5]

NSF International,[6] an independent, accredited organization, is dedicated to being the leading global provider of public health and safety-based risk management solutions. Manufacturers, regulators and consumers look to NSF to develop public health standards and certifications that help protect food, water, consumer products and the environment. Its professional staff includes microbiologists, toxicologists, chemists, engineers, and environmental and public health professionals. Founded in 1944 as the National Sanitation Foundation, NSF's mission is to protect and improve global human health.[6]

The American National Standards Institute (ANSI)[7] is a private, non-profit organization that administers and coordinates the U.S. voluntary standardization and conformity assessment system. The Institute's mission is to enhance both the global competitiveness of U.S. business and the U.S. quality of life by promoting and facilitating voluntary consensus standards and conformity assessment systems, and safeguarding their integrity.[7]

The AWWA documents provide manufacturers, suppliers and purchasers with standards for the manufacturing, quality and verification for each of the three fluoride additives listed below. The AWWA standards set the physical, chemical and impurities standards including information on verification of the standard requirements and requirements for delivery.[4]

- ANSI/AWWA B701 Sodium Fluoride
- ANSI/AWWA B702 Sodium Fluorosilicate
- ANSI/AWWA B703 Fluorosilicic Acid[4]

NSF/ANSI Standard 60[4,6] provides for purity of drinking water additives as it limits an additive's contribution of harmful contaminants to drinking water. The Standard also provides for safety assurances from production through distribution to ensure product quality is maintained. Additionally, the Standard requires documentation of the purity of the additives including specific criteria for products imported from other countries. NSF/ANSI Standard 61[4,6] is a related standard that provides guidance for equipment/products used in water treatment plants that come in contact with drinking water. Both NSF/ANSI standards were developed by a consortium of associations including NSF, AWWA, the Association of State Drinking Water Administrators and the Conference of State Health and Environmental Managers with support from the U.S. Environmental Protection Agency.[4]

Fluoride additives, like all of the more than 40 additives typically used in water treatment, are "water grade" additives. All additives used at the water plant are classified as water grade additives meeting NSF Standard 60 requirements. Examples of other "water grade" additives which are commonly used in water plant operations are chlorine (gas), ferrous sulfate, hydrochloric acid, sulfur dioxide and sulfuric acid.[8]

Sometimes antifluoridationists express the view that they are not really opposed to fluoridation, but are opposed to the use of "industrial grade" fluoride additives. They may even go so far as to state that they would support fluoridation if the process was implemented with pharmaceutical grade fluoride additives that were approved by the U.S. Food and Drug Administration (FDA). On the surface, this may appear to be a "common sense" approach. In fact, this is usually a ploy whose only real purpose is to stop fluoridation. First, the EPA, not the FDA, has regulatory authority for additives used in public water systems. Second, and perhaps most importantly, the U.S. Pharmacopeia (USP) monograph on sodium fluoride does not provide for certification of quality by an independent credentialing body.[4,9] Third, the USP and The National Formulary (USP-NF) standards used to formulate prescription drugs are not appropriate for water fluoridation additives as they could actually allow higher levels of contaminants to be introduced into drinking water than is allowed by the current EPA standards.[4,9] According to the CDC:[9]

> The USP does not provide specific protection levels for individual contaminants, but establishes a relative maximum exposure level for a group of related contaminants. Some potential impurities have no restrictions by the USP, including arsenic, some heavy metals regulated by the U.S. EPA, and radionuclides. Given the volumes of chemicals used in water fluoridation, a pharmaceutical grade of sodium fluoride for fluoridation could potentially contain much higher levels of arsenic, radionuclides, and regulated heavy metals than an NSF/ANSI Standard 60-certified product.

Additional information about this topic can be found in this Section, Question 49.

Lastly, USP-grade sodium fluoride product is more likely to result in water plant personnel being exposed to fluoride dust as it is more powder-like than the preferred AWWA-grade sodium fluoride which is crystalline and so minimizes dusting when handled.[4]

Additional information about this topic can be found in this Section, Question 52.

49. Does fluoridating the community water supply raise concerns about lead, arsenic and other toxic contaminants to the water supply?

Answer.

No. The concentrations of contaminants in drinking water as a result of fluoridation do not exceed, but are in fact, well below regulatory standards set to ensure the public's safety.

Fact.

Fluorosilicic acid is used to fluoridate the majority of community water systems in the United States.[10] Because the additive is derived from ore mined from the earth, fluorosilicic acid may contain minute amounts of contaminants such as lead and arsenic. However, existing regulations and standards require that these contaminants, and others, be at levels considered acceptable by the U.S. Environmental Protection Agency when the fluorosilicic acid or other fluoridation additives are diluted to produce optimally fluoridated water.[6] NSF International and the American National Standards Institute (NSF/ANSI) Standard 60 as well as AWWA standards are applicable to all fluoride additives.[4,6]

Testing of fluoride additives provides evidence that the levels of these contaminants do not exceed, but are in fact, well below regulatory standards set to ensure the public's safety. NSF has prepared a detailed fact sheet, *NSF Fact Sheet on Fluoridation Products* (2013)[11] that provides the documented quality of fluoride additives based on product samples analyzed. The NSF reports that the majority of fluoridation products as a class, based on NSF test results, do not add measurable amounts of arsenic, lead, or other heavy metals, or radionuclides to drinking water.[9,11]

50. Have fluoride additives been tested for safety?

Answer.

The claim is sometimes made that no studies on safety exist on the additives used in water fluoridation. This statement is a ruse because the scientific community does not study the health effects of the concentrated additives; studies are done on the health effects of the treated water.

Fact.

A 1999 study[12] charged that fluorosilicic acid and sodium silicofluoride did not disassociate (break down) completely when added to water systems and may be responsible for lower pH (acid) levels of drinking water, leaching lead from plumbing systems and increasing lead uptake by children. Scientists from the U.S. Environmental Protection Agency (EPA) evaluated the disassociation of fluoride additives[13] and concluded that at the typical pH level of drinking water (which is normally slightly alkaline) and the fluoride levels used in drinking water, the fluoride additives quickly and completely broke down to fluoride ions and silica.

Published in 2006,[14] researchers at the University of Michigan verified for the EPA that theoretical predictions that hexafluorosilicate completely hydrolyzed (broke down) when added to water separating into free fluoride ions and silica ions were confirmed. The research demonstrated that there was no hexafluorosilicate that could be measured in the finished water.[14]

While sodium fluoride was the first additive used in water fluoridation, the use of silicofluoride additives (sodium fluorosilicate and fluorosilicic acid) began in the late 1940s. By 1951, silicofluorides had become the most commonly used fluoride additives in water fluoridation.[15] Many of the early studies on the health effects of fluoridation were completed in communities that were using the silicofluoride additives, most generally fluorosilicic acid.[16-21] However, at that time, the additives used to fluoridate were not always identified in research reports. As the body of research on fluoridation grew, it became evident that there were no adverse health effects associated with water fluoridation regardless of which fluoride additive was used. Additionally, over time, a number of comprehensive reviews of the health effects of fluoridation were published. These reviews which support the safety of water fluoridation include many studies conducted in large fluoridated communities which used the silicofluoride additives.[22-29]

There is now more than 70 years of practical experience that lends additional credence to the best available science that concludes that fluoridation is safe.

51. What is the source of the additives used to fluoridate water supplies in the United States?

Answer.

The majority of fluoridation additives used in the United States are derived from the mineral apatite (a component of calcium phosphate).

Fact.

About 95% of the fluoridation additives used in water fluoridation are by-products which come from the processing of calcium phosphate into phosphate fertilizer. About 4% are derived from the processing of calcium fluoride and the remaining 1% derived from the production of high-purity silica.*

In the production of phosphate fertilizer, calcium phosphate ore (which contains apatite) is mixed with sulfuric acid resulting in a calcium sulfate (gypsum) slurry. The gaseous phosphoric acid released from this process is collected by vacuum extraction, condensed and then desiccated (dried) and formed into phosphate fertilizer pellets. Fluoride is a trace constituent (3-7%) of the mineral apatite found in calcium phosphate ore. Silica tetrafluoride is also released as a gas in the creation of the calcium sulfate slurry and is collected by vacuum extraction along with the gaseous phosphoric acid. In about half the phosphate fertilizer plants in the U.S., the silica tetrafluoride gas is condensed and

processed along with the phosphoric acid and becomes a trace component of the phosphate fertilizer. In the other plants, the silica tetrafluoride gas is separated from the phosphoric acid. Roughly 60% of the fluoride recovered from processing calcium phosphate ore is sold for use as fluoridation additives. The fluoridation additive produced by this process is fluorosilicic acid. While most of the product is sold as fluorosilicic acid, some of the product is partially neutralized to sodium fluorosilicate salt and some is fully neutralized to sodium fluoride salt. In the U.S., 77% of the fluoridation additives used are fluorosilicic acid, 15% are sodium fluorosilicate and 8% are sodium fluoride.*

About 4% of the fluoridation additives used are derived from the processing of calcium fluoride into hydrogen fluoride using a gas separation technique to recover the fluorosilicic acid from the hydrogen fluoride.*

About 1% of the fluoridation additives used are derived from the production of high-purity silica. Fluorosilicic acid is produced as part of the purification of the silica.*

**The preceding paragraphs were developed using references 4, 30 through 35 and personal communication from Mr. Kip Duchon, P.E., national fluoridation engineer, CDC.*

From time to time, opponents of fluoridation allege that fluoridation additives are by-products of the phosphate fertilizer industry in an effort to suggest the additives are not safe. By definition, by-products are materials produced as a result of producing something else. In the chemical industry, a byproduct (secondary product) is anything other than the principal product produced. The fact that a product is a secondary product of a manufacturing process should not suggest the item is bad, harmful or a waste product. On the contrary, by-products may have certain characteristics which make them valuable resources. In the production of phosphate fertilizer, the fluoridation additive, fluorosilicic acid, is a by-product along with gypsum.[36] Gypsum is commonly use in manufacturing wall board used in construction. The production of orange juice provides another example of valuable by-products. In addition to orange juice, various by-products are obtained from oranges during juice production that are used in cleaners, fragrances and flavorings.[37]

Fluoridation additives are valuable by-products produced as a result of producing phosphate fertilizer. To ensure the public's safety, additives used in water fluoridation meet standards of the American Water Works Association (AWWA) and NSF International (NSF).[4]

52. Does the process of water fluoridation present unusual safety concerns for water systems and water facility operators?

Answer.

No. With proper monitoring, maintenance, water facility operator training and systems planning, water fluoridation is a safe and reliable process.

Fact.

Water facilities and water facility operators perform a valuable public service by carefully adjusting the level of fluoride in water to improve the oral health of the community. Facilities and personnel are subject to a number of regulations designed to ensure safety.

Employers must conform to Occupational Safety and Health Administration (OSHA) requirements.[38] OSHA's mission is to assure safe and healthful workplaces by setting and enforcing standards, and by providing training, outreach, education and assistance. Under the OSH Act, employers are responsible for providing a safe and healthful workplace. Employers must comply with all applicable OSHA standards.[38]

Additionally, in order to assist in protecting the professionals who produce sustainable supplies of high-quality drinking water, the American Water Works Association publishes detailed guidance on safety and safe working conditions for water plant personnel.[39]

Furthermore, OSHA requires that Safety Data Sheets (SDS), previously known as Material Safety Data Sheets (MSDS), be readily available to all employees for potentially harmful substances handled in the workplace under the Hazard Communication regulation.[40] A SDS may include instructions for the safe use and potential hazards associated with a particular material and are typically made available in the area where the material is stored or used. Information contained in a SDS focuses on the potential hazards of working with the material in an occupational setting. Adherence to the SDS guidelines for handling fluoride additives helps to ensure the

recommended level of fluoride in drinking water flows through the water system while maintaining water operator safety. In the case of fluoride, the potential hazards faced by a water facility employee in dealing with concentrated fluoride additives before they enter the water system are not related to the level of fluoride in water as used by consumers. The information found in the SDS for fluoride additives is not applicable to water with fluoride at the recommended level. Therefore, SDS sheets should not be used by consumers to gauge potential hazards of community water fluoridation.

As part of safety procedures, water facility personnel receive training on the management of the additives in water plants. While the recommended fluoride level found in drinking water has been proven safe, water facility operators and engineers may be exposed to much higher fluoride levels when handling fluoride additives at the water treatment facility.[4] Fluoride additives present risks comparable to other water additives in common use at water facilities, such as hypochlorite, quicklime, aluminum sulfate, sodium hydroxide and ferrous sulfate. In some cases, the fluoride additives are much less dangerous than many other additives, including chlorine gas commonly used in many water plants.[39]

Today's equipment allows water facility personnel to easily monitor and maintain the desired fluoride concentration. Automatic monitoring technology is also available that can help to ensure that the fluoride concentration of the water remains within the recommended range.[4]

It is important that the water facility personnel responsible for monitoring the addition of fluoride to the water supply are appropriately trained and that the equipment used for this process is adequately maintained.[4] With over 70 years of experience and thousands of water systems adding fluoride every day, water facility personnel have an excellent safety record related not only to their personal safety but in providing safe drinking water to their customers.

53. Does fluoridation present difficult engineering problems?

Answer.

No. Adding fluoride products to water is no different than adding other commonly used water treatment additive products using the same equipment and techniques.

Fact.

Fluoride additives used to adjust the fluoride level in drinking water are compatible with other water treatment processes often using the same type of equipment and other standard materials designed for the safe handling of other water treatment additive products in drinking water treatment facilities. Fluoride additives are introduced to the water supply as liquids. There are many control devices, some in use for decades and some newer equipment, that allow water facility personnel to easily monitor and maintain the desired fluoride level as well as levels of other water treatment additives and naturally occurring substances that may be in the water. Automatic monitoring technology is available that can help to ensure that the fluoride concentration of the water remains within the recommended range.[4]

When added to community water supplies, the concentrated fluoride additives become greatly diluted. For example, typically fluorosilicic acid is diluted approximately 315,000 times to reach the recommended target concentration of 0.7 mg/L. The exact dilution factor depends on the concentration of the fluoride additive and the amount of additive being used to reach the concentration of 0.7mg/L. At 0.7mg/L (or 0.7 parts per million), seven-tenths of one part of fluoride is diluted in is diluted in 999,999.3 parts of water. To place this concentration in perspective, the following comparisons can be of assistance.

1 inch in approximately 23 miles
1 minute in approximately 1,000 days
1 cent in approximately $14,000
1 seat in more than 34 Wrigley Field baseball parks (seating capacity 41,268)

With more than 70 years of experience with water fluoridation, there is considerable guidance on sound engineering practices to design, construct, operate and maintain water fluoridation systems. By design, and with proper maintenance and testing, water

systems can provide the recommended level of fluoride within a narrow control range of the target of 0.7mg/L.[41,42] Additional design features such as the use of a day tank (that holds only one day's supply of fluoride) can limit the amount of fluoride that can be added to a water system in a 24-hour period and is the most reliable method to ensure overfeed protection.[4] The State Office of Drinking Water, or similar state agency, will normally establish engineering requirements for safety. Additional standards and references on best engineering practice are available from the American Water Works Association and the Centers for Disease Control and Prevention.[4,43]

54. Does fluoride at levels used in fluoridation corrode water pipes?

Answer.

No. Allegations that fluoridation causes corrosion of water pipes are not supported by the best available scientific evidence.

Fact.

The process of adding fluoride to water has minimal impact on the acidity or pH of drinking water and therefore will not corrode water pipes. Corrosion of drinking water pipes is related primarily to induced electrical current between dissimilar metals. Other contributing factors include the dissolved oxygen concentration, water temperature, acidity/alkalinity (pH), hardness, salt concentration, hydrogen sulfide content and the presence of certain bacteria. Under some water quality conditions, a small increase in the acidity of drinking water that is already slightly acidic may be observed after treatment with alum, chlorine, fluorosilicic acid or sodium fluorosilicate. In such cases, further water treatment to adjust the pH to neutralize the acid for corrosion control in water distribution systems is standard procedure in water plants.[44]

The process of adding fluoride to water has minimal impact on the acidity or pH of drinking water and therefore will not corrode water pipes.

Note that the Water Quality Report or Consumer Confidence Report that all water systems must make available to customers on a yearly basis, may list the pH of the system's finished water.[45] Control of neutral pH (7.0) is essential as part of corrosion control requirements. Water facilities typically maintain a pH of between 7.0 and 8.0 as good practice indicating that the water leaving the plant is slightly alkaline and non-acidic.[46]

55. Does fluoride at levels used in water fluoridation corrode glass, concrete or other surfaces in water plants?

Answer.

No. A correctly engineered and maintained system will not result in damage to the water plant.

Fact.

Fluorosilicic acid in a concentrated form can be corrosive if not correctly handled. The concentrated fluorosilicic acid is 75% water, and 25% fluorosilicic acid. Up to 1% of the fluorosilicic acid can be other acids including hydrogen fluoride. Hydrogen fluoride is volatile near room temperature so it will evaporate from the solution if the system is not properly engineered and maintained. The evaporation process occurs at an extremely slow rate. Less than 1% of fluorosilicic acid will be lost over a month from the evaporation of hydrogen fluoride. However, only a small release of hydrogen fluoride may be very corrosive to concrete, glass, and electrical components.[30]

If a water system is reporting problems with corrosion from evaporating hydrogen fluoride in the storage room or fluoride handling room (i.e. the glass in the facility has become "frosted"), the system is being inadequately maintained. The storage tank and other locations in the fluorosilicic acid feed system may not be sealed or correctly vented and hydrogen fluoride gas can be released (leaked) at those points. All fluoride products storage, handling, and feed systems should be vented to the outside of the building and the system and piping should be pressure tested (low pressure is sufficient) to identify possible locations of leaks. Leaks should be promptly corrected.[30]

With no system leaks and proper venting to outside the building, there will be no corrosion problems.[30]

56. Does fluoridated water harm the environment?

Answer.
No. Scientific evidence supports the fluoridation of public water supplies as safe for the environment and beneficial for people.

Fact.
Fluoride is naturally occurring in the environment and is the 13th most abundant element in the earth's crust. It is found in naturally in all water sources as noted below.[47]

Rain — between 0.1 to 0.2 mg/L
Streams and lakes — between 0.1 to 0.3 mg/L
Groundwaters — between 0.1 to 10 mg/L
Oceans and seawater — between 1.2 to 1.4 mg/L

A comprehensive literature review published in 2004 revealed no negative environmental impacts as a result of water fluoridation.[48] A 1990 study concluded that fluoridation has little or no impact on surrounding aquatic environment or soil.[49] Historically, issues surrounding problems with fluoride and the environment have involved incidents related to serious industrial pollution or accidents.[49]

Under the Washington's State Environmental Protection Act (SEPA), a study was conducted in Tacoma-Pierce County to investigate the environmental consequences of adding optimal levels of fluoride to drinking water. Noting that the amount of fluoride in the water does not reach levels that are harmful to plants or animals, the SEPA study concluded that there are "no probable significant adverse environmental impacts."[50]

There is no evidence that the recommended level of fluoride in drinking water has any adverse effect on gardens, lawns or plants.[50]

Additional information regarding water fluoridation additives and engineering issues can be found on the CDC's fluoridation website, "Water Operators and Engineers" at ***https://www.cdc.gov/fluoridation/engineering/index.htm****.*

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Public Policy

57. What is public health?

Answer.

Public health promotes and protects the health of people and the communities where they live, learn, work and play. Public health measures improve the quality of life for members of the community.

Fact.

Public health has numerous definitions and dimensions. It can encompass issues of research, education, regulation, policy and more. It focuses on the health of entire populations that can vary in size from as small as a local neighborhood to a small-sized community and a large-sized city. It also can focus on populations with a state, national or even global perspective. But how does public health affect our everyday lives? Individuals are touched by public health measures every day without giving them a second thought. For example, garbage pick-up and disposal prevent the spread of disease. The stoplight at a busy intersection protects motorists and pedestrians from injury. Building sidewalks in communities provides the option for people to walk to help control their weight and improve their heart health. Smoke-free laws help prevent lung cancer. All of these are public health in action.

Community water fluoridation is another example of a public health measure.

- Optimally fluoridated water is accessible to the entire community regardless of socioeconomic status, educational attainment or other social variables.[1]
- Individuals do not need to take special action or otherwise change their behavior to obtain the benefits of fluoridation.
- Frequent exposure to small amounts of fluoride over time makes fluoridation effective through the life span in helping to prevent tooth decay.[2]
- Community water fluoridation is more cost-effective and cost-saving than other forms of fluoride treatments or applications.[3, 4]

During the 20th century, the health and life expectancy of persons residing in the United States improved dramatically. Since 1900, the average life span of persons in the United States lengthened by greater than 30 years; 25 years of this gain are attributable to advances in public health. Many notable public health achievements occurred during the 1900s. In a series of reports during 1999, the *Morbidity and Mortality Weekly Report (MMWR)* profiled 10 public health achievements chosen to highlight the contributions of public health and to describe the impact of these contributions on the health and well being of persons in the United States.[5]

Ten Great Public Health Achievements — United States, 1900-1999[5]

- Vaccination
- Motor-vehicle safety
- Safer workplaces
- Control of infectious diseases
- Decline in deaths from coronary heart disease and stroke
- Safer and healthier foods
- Healthier mothers and babies
- Family planning
- Fluoridation of drinking water
- Recognition of tobacco use as a health hazard

In discussing the contribution of fluoridation, the October 22,1999 MMWR[6] noted fluoridation of community drinking water was a major factor responsible for the decline in tooth decay during the second half of the 20th century. Although other fluoride-containing products are available, water fluoridation remains the most equitable and cost-effective method of delivering fluoride to all members of communities, regardless of age, educational attainment, or income level.[6]

58. Is water fluoridation a valuable public health measure?

Answer.

Yes. Community water fluoridation is a public health measure that benefits people of all ages and is a public health program that saves money for families and the health care system. Because fluoridation reaches large numbers of people where they live, learn, work and play, it is more effective than other forms of fluoride delivery. Water fluoridation reaches everyone in the community regardless of age, race, education, income level or access to routine dental care. Because of the important role it has played in the reduction of tooth decay, the Centers for Disease Control and Prevention (CDC) has proclaimed community water fluoridation one of 10 great public health achievements of the 20th century.[5,6]

Community water fluoridation is a public health measure that benefits people of all ages and is a public health program that saves money for families and the health care system.

Fact.

Throughout decades of research and more than 70 years of practical experience, fluoridation of public water supplies has been responsible for dramatically improving the public's oral health status.

It has been said that those who cannot remember the past are condemned to repeat it. As generations pass, details from life in the 1930s and 1940s fade.

The oral health of Americans suffered greatly during the time of the Great Depression and into the era of World War II. There were no public health programs in place that addressed tooth decay and the loss of teeth was viewed as an eventuality. In fact, as World War II approached, those joining the U.S. Army were required to have six back teeth (three on the top and three on the bottom) that opposed each other to serve the function of chewing food and six front teeth (three on the top and three on the bottom) that opposed each other for the purpose of biting into food. The number of men disqualified for dental reasons far exceeded all expectations as "dental disease" became the most common reason for military deferment. One out of eleven registrants examined was disqualified for military service due to dental issues.[7] After Pearl Harbor it was apparent that the manpower needed to fight a global war could be obtained only if dental standards for induction were drastically relaxed. By March 1942, the standards had been revised so that a man who was "well nourished, of good musculature, and free from gross dental infections" but who was completely edentulous (without any teeth) could be inducted if his condition was corrected or could be corrected with dentures.[7]

Because fluoridation reaches large numbers of people where they live, learn, work and play, it is more effective than other forms of fluoride delivery.

In January 1945, a community water fluoridation trial began in Grand Rapids, Michigan followed within months by trials in Newburgh, NY (May 1945), Brantford, Ontario (June 1945) and Evanston, IL (February 1947). Reductions in tooth decay were dramatic leading to the rapid adoption of fluoridation in cities across the U.S. As a result, tooth decay declined sharply during the second half of the 20th century. Tooth loss was no longer considered inevitable.

Former U.S. Surgeon General, Dr. Luther Terry, called fluoridation as vital a public health measure as immunization against disease, pasteurization of milk and purification of water.[8]

Another former U.S. Surgeon General, Dr. C. Everett Koop, wrote:

> ...this preventive measure (fluoridation) is the single most important commitment that a community can make to the oral health of its children and to future generations. I urge all health officials and concerned citizens to join me in supporting this commitment and in the task of achieving water fluoridation for all community drinking water supplies which lack the fluoride content needed for the prevention of dental caries.[9]

In 1999, because of the dramatic role it played in the reduction of tooth decay, the Centers for Disease Control and Prevention (CDC) proclaimed community water fluoridation one of 10 great public health achievements of the 20th century.[5,6]

In May 2000, U.S. Surgeon General Dr. David Satcher issued the first ever Surgeon General's report on oral health titled, *Oral Health in America: A Report of the Surgeon General*.[10] In 2001, Dr. Satcher issued a statement on fluoridation in which he noted:

> ...community water fluoridation continues to be the most cost-effective, practical and safe means for reducing and controlling the occurrence of dental decay in a community...water fluoridation is a powerful strategy in efforts to eliminate health disparities among populations.[11]

In the 2003 *National Call to Action to Promote Oral Health,*[12] U.S. Surgeon General Dr. Richard Carmona called on individuals and groups who are most concerned and in a position to act to apply strategies to enhance the adoption and maintenance of proven community-based interventions such as community water fluoridation.[12] In his 2004 *Statement on Community Water Fluoridation,*[13] Dr. Carmona wrote:

> While we can be pleased with what has already been accomplished, it is clear that there is much yet to be done. Policymakers, community leaders, private industry, health professionals, the media, and the public should affirm that oral health is essential to general health and well-being and take action to make ourselves, our families, and our communities healthier. I join previous Surgeons General in acknowledging the continuing public health role for community water fluoridation in enhancing the oral health of all Americans.[13]

In 2013, U.S. Surgeon General Dr. Regina M. Benjamin wrote:[14]

> ...As Surgeon General I have been working hard to encourage individuals and communities to make healthy choices because I believe it is better to prevent illness and disease rather than treat it after it occurs. Community water fluoridation is one of the most effective choices communities can make to prevent health problems while actually improving the oral health of their citizens... Fluoridation's effectiveness in preventing tooth decay is not limited to children, but extends throughout life, resulting in fewer and less severe cavities. In fact, each generation born since the implementation of water fluoridation has enjoyed better dental health than the generation that preceded it...[14]

U.S. Surgeon General Dr. Vivek H. Murthy issued a video statement supporting community water fluoridation in December 2015.[15] In his video and written statement on fluoridation issued in 2016,[15, 16] Surgeon General Murthy emphasized:

> Our progress on this issue over the past 70 years has been undeniable. But we still have work to do. Because we know that so much of our health is determined by zip code rather than genetic code. That's why creating a culture of disease prevention through community efforts — and ensuring health equity for all — is one of my highest priorities. Community water fluoridation helps us meet these goals; as it is one of the most cost-effective, equitable, and safe measures communities can take to prevent tooth decay and improve oral health.[15,16]

Today, the focus in achieving and maintaining health is on prevention. Established by the U.S. Department of Health and Human Services, Healthy People 2020[17] provides a science-based, comprehensive set of ambitious, yet achievable, ten-year national objectives for improving the health of the public. Included under oral health is an objective to expand the fluoridation of public water supplies. Objective 13 states that at least 79.6% of the U.S. population served by community water systems should be receiving the benefits of optimally fluoridated water by the year 2020.[18] Data from the CDC indicate that in 2014, 74.4% of the U.S. population on public water systems, or a total of 211.4 million people, had access to fluoridated water.[19]

Established by the U.S. Department of Health and Human Services in 1996, the Community Preventive Services Task Force develops and disseminates guidance on which community-based health promotion and disease prevention intervention approaches work, and which do not work, based on available scientific evidence. The Task Force issues findings based on systematic reviews of effectiveness and economic evidence. The Guide to Community Preventive Services ("The Community Guide") is a collection of evidence-based findings of the Community Preventive Services Task Force and is designed to assist decision makers in selecting interventions to improve health and prevent disease.[20]

The Community Guide reviews are designed to answer three questions:

1. What has worked for others and how well?

2. What might this intervention approach cost, and what am I likely to achieve through my investment?

3. What are the evidence gaps?[20]

The Community Preventive Services Task Force recommends community water fluoridation to reduce tooth decay.[21]

Reports have been released by the U.S. Department of Health and Human Services that encourage the use of preventive interventions to improve the overall and oral health of the nation.[22,23] Specific to oral health, two reports issued in 2011 by the Institute of Medicine acknowledge water fluoridation is an effective intervention for the prevention of tooth decay. *Advancing Oral Health in America*[24] referred to water fluoridation as an effective prevention intervention, while *Improving Access to Oral Health Care for Vulnerable and Underserved Populations*[25] acknowledged that evidence regarding community water fluoridation programs continues to validate its effectiveness, safety and cost-saving benefits.

59. Does water fluoridation reduce disparities in dental health?

Answer.

Yes, evidence indicates water fluoridation helps to reduce the disparities in dental health at the community level. Populations with lower socioeconomic status (SES) who live in fluoridated communities have less tooth decay than their peers in nonfluoridated communities.

Fact.

In the first ever Surgeon's General Report on Oral Health issued in May 2000, U.S. Surgeon General David Satcher noted that community water fluoridation is safe and effective in preventing dental caries in both children and adults. Fluoridation benefits all residents served by community water supplies regardless of their social or economic status.[10] In 2001, Dr. Satcher issued a statement on fluoridation in which he noted:

> ...community water fluoridation continues to be the most cost-effective, practical and safe means for reducing and controlling the occurrence of dental decay in a community...water fluoridation is a powerful strategy in efforts to eliminate health disparities among populations.[11]

"...water fluoridation is a powerful strategy in efforts to eliminate health disparities among populations."

Established by the U.S. Department of Health and Human Services, Healthy People 2020 provides a science-based, comprehensive set of ambitious, yet achievable, ten-year national objectives for improving the health of the public and reducing health disparities.[17] Starting with Healthy People 2000, one of the overarching goals of Healthy People has focused on disparities. With Healthy People 2020, that goal was expanded to achieve health equity, eliminate disparities, and improve the health of all groups.[25] Healthy People 2020 provides the following definitions.

> *Health disparity* — a particular type of health difference that is closely linked with social, economic, and/or environmental disadvantage. Health disparities adversely affect groups of people who have systematically experienced greater obstacles to health based on their racial or ethnic

group; religion; socioeconomic status; gender; age; mental health; cognitive, sensory, or physical disability; sexual orientation or gender identity; geographic location; or other characteristics historically linked to discrimination or exclusion.[25]

Health equity — the attainment of the highest level of health for all people. Achieving health equity requires valuing everyone equally with focused and ongoing societal efforts to address avoidable inequalities, historical and contemporary injustices, and the elimination of health and health care disparities.[25]

The association between social class and disparities in dental health has been established through extensive studies and reviews.[26-28] Studies in communities both with and without fluoridated water consistently have shown higher levels of tooth decay in lower socioeconomic groups. Additional studies have evaluated the differences in children's tooth decay experience among socioeconomic groups and the effect that community water fluoridation has had on that experience.[29-35] In areas with water fluoridation, children with low socioeconomic status (SES) had greater cavity experience than those with high SES. However, the tooth decay rates were higher for children with low SES who had no exposure to fluoridation compared to children with low SES who had exposure to fluoridated water.[29-35] These studies demonstrate the positive effects that fluoridation has in reducing oral health disparities.

In 2011, a report by the Institute of Medicine, *Improving Access to Oral Health Care for Vulnerable and Underserved Populations,*[36] acknowledged that evidence regarding community water fluoridation programs continues to validate its effectiveness, safety and cost-saving benefits.

Under the topic "Oral Health," Healthy People 2020 includes an objective to expand the fluoridation of public water supplies. Objective 13 states that at least 79.6% of the U.S. population served by community water systems should be receiving the benefits of optimally fluoridated water by the year 2020.[18] Data from the CDC indicate that in 2014, 74.4% of the U.S. population on public water systems, or a total of 211.4 million people, had access to fluoridated water.[19] Conversely, approximately 25% or more than 72.7 million people on public water systems do not receive the decay preventing benefits of fluoridation — a powerful strategy communities can implement in efforts to eliminate health disparities.

60. Along with the American Dental Association, who supports community water fluoridation?

Answer.

Many organizations, such as the National Dental Association, Hispanic Dental Association, American Academy of Pediatrics, American Medical Association, American Public Health Association and the World Health Organization also have policies that support community water fluoridation.

Many organizations, such as the National Dental Association, Hispanic Dental Association, American Academy of Pediatrics, American Medical Association, American Public Health Association and the World Health Organization also have policies that support community water fluoridation.

Fact.

The American Dental Association (ADA) adopted its original resolution in support of fluoridation in 1950[37] and has repeatedly reaffirmed its position publicly and in its House of Delegates based on its continuing evaluation of the safety and effectiveness of fluoridation.[27]

The National Dental Association (NDA) is the largest and oldest organization of minority oral health professionals in the world.[39] Representing more than 7,000 minority dentists, nationally and abroad,[39] the NDA seeks to provide continued advancement of the highest quality of oral health care and safety for the public.[40] In 2012, the NDA adopted the following position:[40]

It is therefore, the position of the National Dental Association that Community Water Fluoridation is safe, beneficial and cost-effective and should be encouraged and supported under the following conditions:

- Community water supplies should contain the optimal fluoride levels as recommended by the U.S. Public Health Service (a range from 0.7 – 1.2 parts per million)

- Local communities and dental societies should be in agreement with and support the fluoridation project in their communities.

- Appropriate resources monitoring capabilities should be available to ensure that the appropriate water fluoride monitoring infrastructures are in place at all times in the impacted communities.[40]

In a policy position released in 2012,[41] the Hispanic Dental Association (HDA) noted that the HDA mission works toward the elimination of oral health disparities in the Hispanic community and that the benefits of fluoridation are critical to HDA's endorsement. The HDA position statement[41] includes the following item:

> Therefore, it is the position of the Hispanic Dental Association to:
>
> 1. Endorse community water fluoridation in all communities — especially the Hispanic and underserved communities — as a safe, beneficial and cost-effective public health measure based on science for preventing dental caries and to aid in the reduction of oral health disparities.[41]

As part of its core values[42] the American Academy of Pediatrics (AAP) is dedicated to promoting optimal health and wellbeing for every child. With a strong emphasis on policy, advocacy and education,[42] the AAP is a strong advocate for community water fluoridation. In support of water fluoridation[43] the AAP states:

> Water fluoridation is a community-based intervention that optimizes the level of fluoride in drinking water, resulting in preeruptive and posteruptive protection of the teeth. Water fluoridation is a cost-effective means of preventing dental caries, with the lifetime cost per person equaling less than the cost of 1 dental restoration.[43]

The American Medical Association's (AMA) mission is to promote the art and science of medicine and the betterment of public health.[44] Its House of Delegates first endorsed fluoridation in 1951[45] and the AMA reaffirmed its support for water fluoridation in 2011.[46]

The American Public Health Association (APHA) champions the health of all people and all communities and speaks out for public health issues and policies backed by science.[47] It has supported community water fluoridation as a safe and effective public health measure for the prevention of tooth decay since 1950.[48] The APHA reaffirmed its support in 2008 by stating that it strongly endorses and recommends "the fluoridation of all community water systems as a safe and effective public health measure for the prevention of tooth decay."[49]

The goal[50] at the World Health Organization (WHO) is to build a better, healthier future for people all over the world. The WHO, which initially adopted policy recommending the practice of water fluoridation in 1969,[51] reaffirmed its support for fluoridation in 1994[52] stating:

> Providing that a community has a piped water supply, water fluoridation is the most effective method of reaching the whole population, so that all social classes benefit without the need for active participation on the part of individuals.[52]

In 2004, the WHO once again affirmed its support stating that "Water fluoridation, where technically feasible and culturally acceptable, has substantial public health benefits."[53] In 2007, the Sixtieth World Health Assembly adopted *WHA60.17-Oral health action plan for promotion and integrated disease prevention*[54] which urges member states to:

> (4) for those countries without access to optimal levels of fluoride, and which have not yet established systematic fluoridation programmes, to consider the development and implementation of fluoridation programmes, giving priority to equitable strategies such as the automatic administration of fluoride, for example, in drinking-water, salt or milk, and to the provision of affordable fluoride toothpaste;[54]

In 2016, WHO officials wrote:

> The use of fluoride is a major breakthrough in public health. Controlled addition of fluoride to drinking water supplies in communities where fluoride concentration is below optimal levels to have a cariostatic effect began in the 1940s and since then extensive research has confirmed the successful reduction in dental caries in many countries.[55]

Additionally a list of more than 35 organizations with positions/policies supporting community water fluoridation can be viewed on ADA's website at ***www.ADA.org/fluoride*** in the section marked "Fluoridation Links." Each organization is listed with a link to their specific fluoridation position/policy. Below are just a few of the organizations listed on the website.

- American Association of Dental Research
- American Association of Public Health Dentistry
- American Water Works Association
- Association of State and Territorial Dental Directors
- Centers for Disease Control and Prevention
- International Association of Dental Research
- National Institute of Dental and Craniofacial Research

Many organizations in the United States and around the world recognize the benefits of community water fluoridation. The ADA has developed a list of "National and International Organizations that Recognize the Public Health Benefits of Community Water Fluoridation for Preventing Dental Decay." Please see the ADA website at ***www.ADA.org/fluoride*** for the most current listing as well as information on reproduction and distribution of the list.

However, support for fluoridation doesn't end with a list of organizations. In many cases, local newspaper editorial boards support fluoridation. Perhaps the most notable of these efforts occurred when the 2013 Pulitzer Prize for Journalism — Editorial Writing[56] was awarded to Tim Nickens and Daniel Ruth of the *Tampa Bay Times,* St. Petersburg, Florida, for their diligent campaign that helped reverse a decision to end fluoridation of the water supply for the 700,000 residents of the newspaper's home (Pinellas) county. Copies of their 10 editorials from 2012 can be viewed at ***http://www.pulitzer.org/winners/tim-nickens-and-daniel-ruth***.

61. Has the legality of water fluoridation been upheld by the courts?

Answer.

Yes. Fluoridation has been thoroughly tested in the United States' court system, and found to be a proper means of furthering public health and welfare. No court of last resort has ever determined fluoridation to be unlawful. Moreover, fluoridation clearly has been held not to be an unconstitutional invasion of religious freedom or other individual rights guaranteed by the First, Fifth or Fourteenth Amendments to the U.S. Constitution. And while cases decided primarily on procedural grounds have been won and lost by both pro- and anti-fluoridation interests, to ADA's knowledge, no final ruling in any of those cases has found fluoridation to be anything but safe and effective.

Fact.

The legality of fluoridation in the United States has been thoroughly tested in our court systems. Fluoridation is viewed by the courts as a proper means of furthering public health and welfare.[57] No court of last resort has ever determined fluoridation to be unlawful. The highest courts of more than a dozen states have confirmed the constitutionality of fluoridation.[58] In 1984, the Illinois Supreme Court upheld the constitutionality of the state's mandatory fluoridation law, resolving 16 years of court action at a variety of judicial levels.[59] Moreover, the U.S. Supreme Court has denied review of fluoridation cases thirteen times, citing that no substantial federal or constitutional questions were involved.[58]

Fluoridation is viewed by the courts as a proper means of furthering public health and welfare. No court of last resort has ever determined fluoridation to be unlawful.

It has been the position of the American courts that a significant government interest in the health and welfare of the public generally overrides individual objections to public health regulation.[58] Consequently, the courts have rejected the contention that fluoridation ordinances are a deprivation of religious or individual freedoms guaranteed under the Constitution.[58,60] In reviewing the legal aspects of fluoridation, the courts have dealt with this concern by ruling that: (1) fluoride is a nutrient, not a medication, and is present naturally in the environment; (2) no one is forced to drink fluoridated water as alternative sources are available; and (3) in cases where a person believes that fluoridation interferes with religious beliefs, there is a difference between the freedom to believe, which is absolute, and the freedom to practice beliefs, which may be restricted in the public's interest.[61,62]

Fluoridation is the adjustment of the level of a naturally occurring mineral found in water in order to prevent tooth decay. Courts have consistently ruled that water fluoridation is not a form of compulsory mass medication or socialized medicine.[58,61,63] In fact, water that has been fortified with fluoride is similar to fortifying salt with iodine, milk with vitamin D and orange juice with calcium — none of which are medications.

In recent years, challenges to fluoridation have been dismissed for a variety of reasons, including that plaintiffs admitted they could not establish injury by virtue of fluoridation and that state law supporting fluoridation prevailed over local attempts to oppose fluoridation.

Interestingly, pro- and anti- fluoridation interests have each won and lost legal challenges regarding which state or local agency has regulatory authority over fluoridation, which of course varies by state and locality.

State law variances have also led to different rulings on other issues, such as whether downstream end-users of fluoridation must be given an opportunity to vote on whether to fluoridate. While cases decided primarily on procedural grounds have been won and lost by both pro- and anti- fluoridation interests, to the ADA's knowledge no final ruling in any of those cases has found fluoridation to be anything but safe and effective.

For additional information regarding the legal status of community water fluoridation in the United States, refer to *The Fluoride Legislative User Information Database* (FLUID) which is a comprehensive database containing historical information on legal cases decided by U.S. courts. The database also contains current information on federal and state policies regarding community water fluoridation. The website can be accessed at: ***http://fluidlaw.org***.

62. Why does opposition to community water fluoridation continue?

Answer.
Public health controversies sometimes exist regarding public health interventions. In public health there can be tension between "public good" and "individual freedoms." Because public health deals with populations it is all but impossible to resolve issues to achieve approval from 100 percent of the individuals within the population. When looking at fluoridation, some individuals opposed to fluoridation are sincere in their beliefs. Others ignore what constitutes reputable scientific evidence as defined by the vast majority of the scientific community and choose instead to base their beliefs on personal opinions and studies with flawed methodologies.

Fact.
Fluoridation is considered beneficial by the overwhelming majority of the health and scientific communities as well as the general public. A vast body of scientific literature endorses water fluoridation as a safe means of reducing the incidence of tooth decay. Support for fluoridation among scientists and health professionals, including physicians and dentists, is nearly universal. Recognition of the benefits of fluoridation by the American Dental Association, the American Medical Association, the American Academy of Pediatrics, governmental agencies and other national health and civic organizations continues as a result of published, peer-reviewed research.

Fluoridation has a long history of being a political issue, as well as a scientific one, with opposition including activists from both the right and the left of the political spectrum. In the late 40s, opposition to fluoridation began to appear nationwide. Reportedly, one of the first public votes on fluoridation occurred in 1950 in Stevens Point, Wisconsin,[64] when a local activist initiated a campaign to stop the introduction of what he called "poison" into the water system. The campaign quickly moved from being a discussion of the science to a political campaign that included the involvement of a large number of civic groups, unofficial public petitions, calls for a debate, campaign rallies and numerous letters to the editor that "kept typesetters busy preparing for print the thousands of words that poured into the editor's desk." After 1950 when the U.S. Public Health Service and ADA endorsed fluoridation, proponents became more organized in their efforts to promote fluoridation while the opposition capitalized on the political nature of the struggle and used lessons learned in Stevens Point.

Of the small faction that opposes water fluoridation for philosophical reasons, freedom of choice probably is one of the most frequently cited issues. People take the stance that society should not "force" individuals to act in ways that are beneficial to their own health or the health of others. They are opposed to "government interference" in their lives.[65] Some individuals are opposed to community action on any health issue, others are opposed due to environmental or economic concerns and some are opposed because they are simply misinformed.

Opposition to fluoridation has existed since the initiation of the first programs in 1945 and continues today despite over 70 years of practical experience

showing fluoridation to be safe and effective. An article[55] that appeared in the local newspaper shortly after the first fluoridation program was implemented in Grand Rapids, Michigan, noted that the fluoridation program was slated to commence January 1, but did not actually begin until January 25. Interestingly, health officials in Grand Rapids began receiving complaints of physical ailments, including "teeth falling out and enamel peeling off their teeth," attributed to fluoridation from citizens weeks before fluoride was actually added to the water.[66] In 1992 a community in Finland opted to stop their fluoridation program at the end of the year in December. However, it was discontinued at the end of November without the public being told. Public surveys conducted in November and December and again in March the following year revealed the occurrence and mean number of symptoms (the most common being itching and dryness of skin) were fairly similar during the periods of actual and supposed fluoridation indicating the symptoms were not caused by fluoride in the water. Interestingly, those who claimed to be able to taste the fluoride in the water made this claim equally often during actual and supposed fluoridation. A significant reduction in the symptoms occurred after those responding to the surveys became aware that fluoridation had stopped. The authors concluded that the prevalence rates of the symptoms were connected to the psychological rather than the physical effects of exposure to fluoride in water.[67]

Over time, antifluoridation leaders and organizations have come and gone, but their basic beliefs have remained the same. These include: fluoride is toxic and causes numerous harmful health effects; fluoride does not prevent tooth decay; fluoridation is costly; and fluoridation interferes with freedom of choice and infringes on individual rights.

Opinions are seldom unanimous on any scientific subject. In fact, there really is no such thing as "final knowledge," since new information is continuously emerging and being disseminated. As such, the benefit evidence must be continually weighed against risk evidence. Health professionals, decision makers and the public should be cooperating partners in the quest for accountability where decisions are based on proven benefits measured against verified risks.[68] Dentists are a valuable source of accurate information regarding water fluoridation for both their patients and their communities.

63. What are the tactics fluoridation opponents use to provoke opposition to water fluoridation?

Answer.

Fluoridation opponents use numerous tactics to disseminate misinformation and raise the fears of the public about the safety of water fluoridation. Routinely, they use scare techniques,[69] present half-truths, downplay the significance of science-based evidence and use selective reporting of results and studies to support their false allegations.[59]

Fact.

While many of the arguments against fluoridation have remained relatively constant over the years, antifluoridationists have used different approaches that play upon the popular concerns of the public at the time.[65] For example, in the 1950s fluoridation was said to be a Communist plot. With America's growing concern for environmental issues in the 1960s, fluoridation was called pollution. After the Vietnam War in the 1970s, the antifluoridationists capitalized on the popularity of conspiracy theories by portraying fluoridation as a conspiracy between the U.S. government, the dental-medical establishment and industry. As the population became more concerned about their health in the 1980s, antifluoridationists claimed fluoridation caused AIDS and Alzheimer's disease. In the 1990s, claims of hip fractures and cancer were designed to resonate with aging baby boomers. With the new millennium, overexposure and toxicity, in association with lead poisoning, surfaced as common themes. Since the economic crisis of 2008, discussions about the cost of fluoridation are more commonplace. In the 2010s, neurotoxicity became a constant theme with charges of lower IQ and autism. Over the years, none of these approaches have ever really disappeared, but instead are often recycled as antifluoridationists choose which approach will have the greatest effect on the intended audience.[65]

The internet has breathed new life into the antifluoridation effort bringing the antifluoridation message into voters' homes.[71,72] With just a click of the mouse, search engines can locate a large number of websites denouncing fluoridation, which can give the impression that this is a one-sided argument. Individuals who look to the internet as a source of valid and reliable information often fail to recognize that these sites frequently contain personal opinion rather than scientific fact. Newspaper stories,

press releases and letters to the editor are often posted as documentation of the "science" behind antifluoridationists' claims. All too often, the public accepts this type of information as true simply because it is in print. Opposition videos are available from national antifluoridation organizations and are shared at no cost via vehicles such as YouTube making it possible for every campaign to bring an antifluoridationist to the community. Social media such as Facebook and Twitter are used to spread antifluoridation messaging to the public and to assist in organizing local efforts. These venues have allowed the small faction of antifluoridationists to be linked across the country and around the world and promote their message quickly, repeatedly and economically.

Spreading misinformation impacts public policy and costs society in immeasurable ways. The opponents' claims and opinions can escalate to emotional arguments that, in the end, can delay, or prevent the introduction of a water fluoridation program or stop an existing program.[70] More people, especially those involved in policy decisions, need to be better informed about these tactics. In making decisions that affect the health of the community, it is important to distinguish between someone's personal opinion disguised as science and information based on the best available scientific evidence. It is perfectly acceptable to have your own opinion but it is unacceptable to have your own "facts" derived from something less than reputable science.

In making decisions that affect the health of the community, it is important to distinguish between someone's personal opinion disguised as science and information based on the best available scientific evidence.

In 1993 the U.S. Supreme Court issued a landmark decision that many view as likely to restrict the use of information inferred as science in the federal courts and in those state courts which adopt this reasoning. The Court determined that while "general acceptance" is not needed for scientific evidence to be admissible, federal trial judges have the task of ensuring that an expert's testimony rests on a reasonable foundation and is relevant to the issue in question.[73] According to the Supreme Court, many considerations will bear on whether the expert's underlying reasoning or methodology is scientifically valid and applicable in a given case. The Court set out four criteria that judges could use when evaluating scientific testimony:

1. whether the expert's theory or technique can be (and has been) tested, using the scientific method,

2. whether it has been subject to peer review and publication (although failing this criteria alone is not necessarily grounds for disallowing the testimony),

3. its known or potential error rate and the existence and maintenance of standards in controlling its operation and

4. whether it has attracted widespread acceptance within a relevant scientific community, since a known technique that has been able to attract only minimal support may properly be viewed with skepticism.[73]

The scientific validity and relevance of claims made by opponents of fluoridation might be best viewed when measured against these criteria.[73] The techniques used by antifluoridationists are well known and have been discussed at length in a number of published articles that review the tactics used by antifluoridationists.[58,65,68-70,74-77] Examples of a few of the techniques can be viewed in Figure 5.

Figure 5. Opposition Tactics

Targeting Politicians and Community Leaders: Antifluoridation websites contain draft letters to be sent to newspaper publishers, water departments, and community public officials warning them of their "liability" should they support or endorse water fluoridation. Leaders are urged to remain "neutral" and allow fluoridation decisions to be put to a public vote, therefore, relieving the leaders of any and all responsibility in the matter. Antifluoridationists use the time gained to conduct a public referendum to bombard the public with misinformation designed to turn public opinion against fluoridation.

Unproven Claims: Antifluoridationists have repeatedly claimed fluoridation causes an entire laundry list of human illnesses, including AIDS, Alzheimer's disease, cancer, Down Syndrome, genetic damage, heart disease, lower intelligence, kidney disease, osteoporosis and hip fractures. None of these claims has a basis in fact. These allegations are often repeated so frequently during campaigns that the public assumes they must be true. Their appearance in print, even if only in letters to the editor of the local newspaper, reinforces the allegation's credibility. With just a small amount of doubt established, the opposition slogan, "If in doubt, vote it out," often rings true with voters.

Innuendo: The statement, "Fifty years ago physicians and dentists posed for cigarette ads," is an example of innuendo or, more specifically, guilt by association. Even though fluoridation is not mentioned, individuals are expected to make the connection that the medical community changed its position on smoking so it is possible health professionals are wrong about fluoridation, too.

Outdated Studies and Statements from "Experts": Antifluoridation websites often offer a list of "respected medical professionals and scientists" who have spoken out against fluoridation. One of those often quoted is Dr. Charles Gordon Heyd who is noted to be a Past President of the American Medical Association (AMA). What is not disclosed is the source of the quote or that Dr. Heyd was President of the AMA in 1936 – almost ten years before water fluoridation trials began. His decades-old quote certainly does not represent the current AMA position of support for water fluoridation and is characteristic of antifluoridationists' use of items that are out of date. Additionally, antifluoridationists have claimed that fourteen Nobel Prize winners have "opposed or expressed reservations about fluoridation." It should be noted that the vast majority of these individuals were awarded their prizes from 1929 through 1958.

Statements Out of Context: One of the most repeated antifluoridation statements is, "Fluoride is a toxic chemical. Don't let them put it in our water." This statement ignores the scientific principle that toxicity is related to dosage and not just to exposure to a substance. Examples of other substances that can be harmful in the wrong amounts, but beneficial in the correct amounts, are salt, vitamins A and D, iron, iodine, aspirin and even water itself.

Conspiracy Theories: Hardly a fluoridation campaign goes by without those opposed to fluoridation bringing up any number of conspiracy theories about fluoridation. Whether it is the claim that scientists from the original atomic bomb program secretly shaped and guided the early Newburgh, NY, fluoridation trial or that chemtrails are a government plot to spread fluoride, these claims have no basis in fact. Even the belief that fluoridation was a communist plot to destroy America was famously parodied in the 1964 movie Dr. Strangelove. Over the decades, those opposed to fluoridation have used propaganda schemes and conspiracy theories that reflected the social and political environment of the times. Today, "follow the money" is a common theme as the opposition claims that the beverage industry, the companies supplying fluoride additives and others are financially backing researchers, as well as dental and medical groups, who are promoting fluoridation. None of these claims has a basis in fact.

Treating Correlation as Causation: Many people have heard the phrase that "correlation does not imply causation." In other words, just because two events seem to fluctuate in tandem does not prove that they are meaningfully related to one another. For example, statistics show that sales of ice cream increase in warm summer months. Statistics also show that crime goes up in large cities in the summer. However, it would be ludicrous to draw the conclusion that ice cream causes an increase in crime. Yet this is exactly the type of logic exercised in some arguments and studies promoted by those opposed to fluoridation. For example, the opposition often points to Kentucky as having a large portion of the population on public water supplies receiving fluoridated water. And that's correct. In 2014, Kentucky was ranked the number one state in the U.S. as 99.9% of its public water systems were fluoridated. But the opposition also points to the fact that Kentucky suffers from a large number of people who have lost their teeth. They draw the conclusion that this proves fluoridation does not work — without looking at other factors that influence this outcome. For example, while there is a large number of public water systems that are fluoridated, Kentucky has a large rural population that does not have access to public water supplies. Additionally, and perhaps most importantly, Kentucky's population has a high rate of tobacco use which is known to be a risk factor for periodontal (gum) disease which can lead to the loss of teeth.

64. Where can valid, evidence-based information about water fluoridation be found on the internet?

Answer.

There are many reputable sites on the internet that provide information on fluorides and fluoridation including the American Dental Association as well as other reputable health and science organizations and government agencies. These sites provide information that is consistent with the best available scientific evidence.

Fact.

One of the most widely respected sources for information regarding fluoridation and fluorides is the American Dental Association's (ADA) Fluoride and Fluoridation website at *www.ADA.org/fluoride*. (See Figure 6.) From the ADA website individuals can link to other fluoridation websites such as:

- Centers for Disease Control and Prevention at *www.cdc.gov/fluoridation*
- The Community Guide at *https://www.thecommunityguide.org*
- Fluoride Science at *http://fluoridescience.org*

The internet contains numerous sources of information on fluoridation. However, not all "science" posted on the internet is based on scientific fact. Searching the internet for "fluoride" or "water fluoridation" directs individuals to numerous websites. Some of the content found in the sites is scientifically sound. Other less scientific sites look highly technical, but contain information based on science that is unconfirmed or has not gained widespread acceptance. In many cases, the information is largely opinion. While everyone is entitled to their opinion, they are not entitled to make that opinion appear as scientific fact. Commercial interests, such as the sale of water filters, are often promoted.

Today's technology can put the world at your fingertips but search engine technology can influence what is returned in searches. The first time the search for "fluoridation" is made, it is likely that the returns will include both pro- and anti- fluoridation websites. When you click to view a website, the search engine takes note and on subsequent searches for the same term, the search engine will return items similar to what you chose initially. For example, if you choose a pro-fluoridation website initially, the next time you search for "fluoridation," the search engine will likely return a selection of other pro-fluoridation websites for your review. Of course the converse is also true. Clicking on anti-fluoridation websites will allow you to see a search ladened with similar anti-fluoridation sites.

Figure 6. ADA Fluoride and Fluoridation Web Page

FLUORIDATION AT YOUR FINGERTIPS!

http://www.ADA.org/fluoride

- ADA Fluoridation Resources
- ADA Fluoridation Videos
- ADA Fluoridation News Stories
- ADA Policy and Statements
- Links to Additional Fluoridation Websites

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65. Why does community water fluoridation sometimes lose when it is put to a public vote?

Answer.
Voter apathy or low voter turnout due to the vote being held as a special election or in an "off" year, confusing ballot language (a "no" vote translates to support for fluoridation), blurring of scientific issues, the use of scare tactics by those opposed to fluoridation, long campaigns that lead to "fluoridation fatigue," lack of leadership by elected officials and a lack of political campaign skills among health professionals are some of the reasons fluoridation votes are sometimes unsuccessful.

Fact.
The fact is that fluoridation votes in the U.S. are more often successful than not. In 2016, it was common to see those opposed to fluoridation make statements such as "450 communities had rejected fluoridation since 2000" or similar statements using different numbers. What is not made clear is that the number of communities in these statements is a global number. Many of these communities are outside the United States.[78] In fact from 2000 through 2016, more than 515 U.S. communities in 42 states voted to adopt or retain successful fluoridation programs.[79] In the five years from 2012 to 2016, U.S. communities voted in favor of fluoridation programs by a two to one margin.[78,79]

The fact is that fluoridation votes in the U.S. are more often successful than not...In the five years from 2012 to 2016, U.S. communities voted in favor of fluoridation programs by a two to one margin.

Since 2000, nearly 50 million people have been added to the population on public water systems in the United States that enjoys the benefit of optimally fluoridated water.[80] In 2000, 65% of the public on public water systems received fluoridated water.[81] In 2014, the percentage had increased nearly 10% to 74.4% of the population.[19] But despite the continuing growth of fluoridation in this country over the past several decades, millions of people in the U.S. do not yet receive the protective benefit of fluoride in their drinking

Figure 7. Largest Fluoridated Cities

Two cities (Jacksonville, Florida and El Paso, Texas) are naturally fluoridated.*

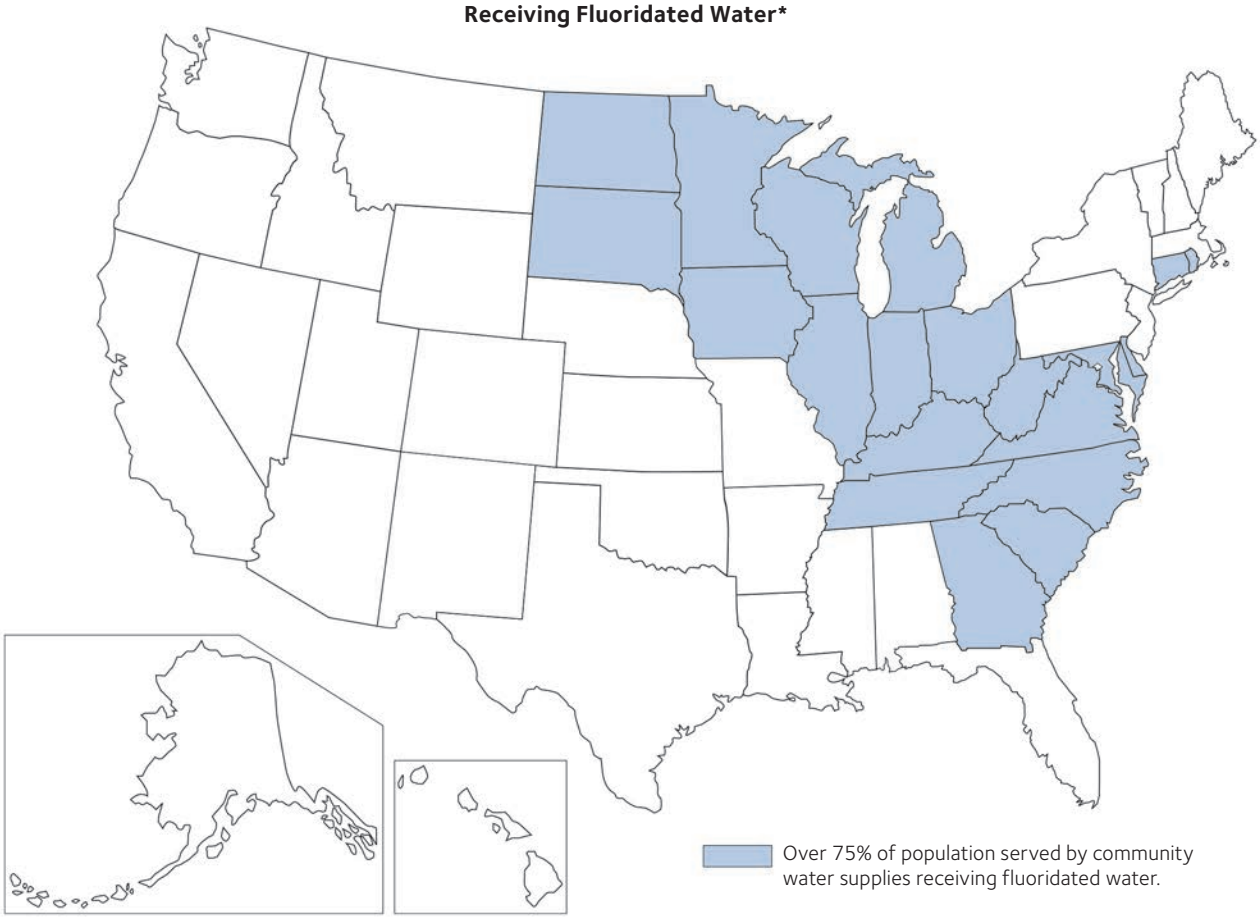
* Data compiled by the American Dental Association and Centers for Disease Control and Prevention/Division of Oral Health. Information current as of October 2017.

water. Centers for Disease Control and Prevention (CDC) data from 2014 indicated more than 25% of the population served by public water systems did not have access to fluoridated water.[19] In 2017, 44 of the 50 largest cities were fluoridated.[82] Of the 44 cities, 42 were fluoridated by adjustment and two had naturally occurring fluoride at the recommended levels (Figure 7). The remaining six largest nonfluoridated cities (in order of population largest to smallest) were: Portland, Oregon; Albuquerque, New Mexico; Tucson, Arizona; Fresno, California; Colorado Springs, Colorado; and Wichita, Kansas. In October 2017, the Albuquerque Bernalillo County Water Utility Authority authorized budget monies to restore fluoridation to their customers. It is estimated that fluoridated water will be available in six to eight months.

In 2010, recognizing the ongoing need to improve health and well-being, the U.S. Department of Health and Human Services revised national health objectives to be achieved by the year 2020.[17] Included under oral health was an objective to significantly expand the fluoridation of public water supplies. Specifically, Objective 13 of Healthy People 2020 states that at least 79.6% of the U.S. population served by community water systems should be receiving the benefits of optimally fluoridated water by the year 2020.[18] This replaced the Healthy People 2010 objective of 75%.[83] As of 2014, twenty states met or exceeded the 2020 objective.[19] (See Figure 8.) Although water fluoridation reaches some residents in every state the coverage is uneven. Data from 2014 indicated that 26 states provided fluoridation benefits to 75% or more of their residents on community water systems while eight states were at or below 50%.[19] (See Figure 9.)

Figure 8. States Meeting National Goal

States Meeting the Healthy People 2020 Goal Of 79.6% of the Population Served by Community Water Supplies Receiving Fluoridated Water*



* Data Source: Centers for Disease Control and Prevention/Division of Oral Health. "National Fluoridation Statistics" 2014. Available at *https://www.cdc.gov/fluoridation/statistics/2014stats.htm*

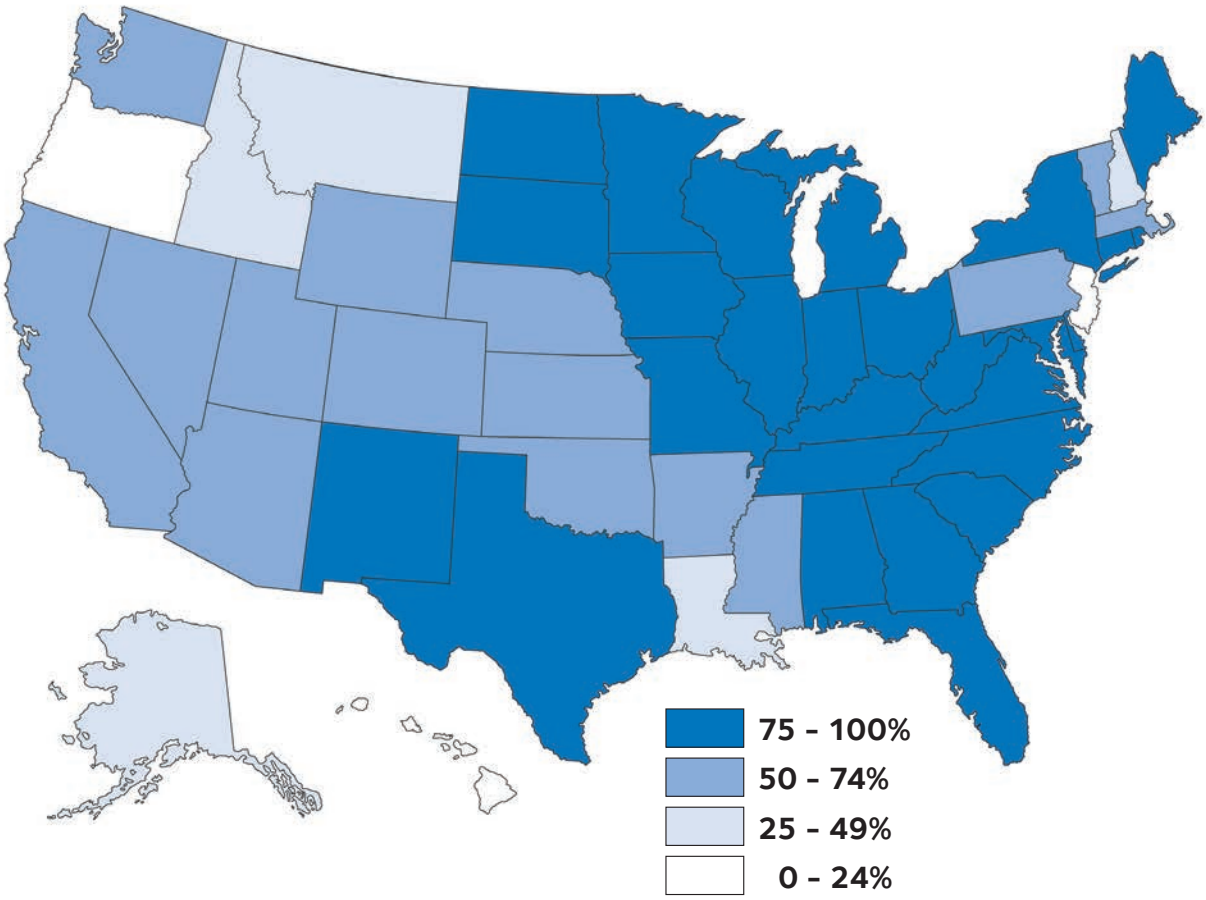
Fluoridation campaigns can vary greatly from community to community. To paraphrase an old saying, "If you've seen one fluoridation campaign, you've seen one fluoridation campaign." A number of factors commonly come into play when fluoridation is put to a public vote and does not succeed. Among those factors are a lack of funding, public and professional apathy, the failure of many legislators and community leaders to take a stand because of perceived controversy, low voter turnout and the difficulty faced by an electorate in evaluating scientific information in the midst of emotional charges by opponents. Voters are often unaware of the fluoride content of their water. Unfortunately, citizens sometimes mistakenly believe their water contains the recommended level of fluoride when, in fact, it does not. On the other hand, people sometimes say they have great teeth and don't need fluoridation when in fact, the major reason they have such good teeth is because they've had the benefit of fluoride in the water their entire lives. And, in some cases, because fluoridation campaigns often become political campaigns, there are political factors that can sway a vote that have nothing at all to do with fluoridation.

Clever use of emotionally charged "scare" propaganda by fluoride opponents creates fear, confusion and doubt within a community when voters consider the use of fluoridation.[84,85]

Defeats of referenda or the discontinuance of fluoridation have occurred most often when a small, vocal and well organized group has used a barrage of fear-inspiring allegations designed to confuse the electorate. In addition to attempts to influence voters, opponents have threatened community leaders with

Figure 9. State Fluoridation Status

Percentage of population on community water systems receiving fluoridated water.*



* Data Source: Centers for Disease Control and Prevention/Division of Oral Health. "National Fluoridation Statistics" 2014. Available at *https://www.cdc.gov/fluoridation/statistics/2014stats.htm*

personal litigation.[86] While no court of last resort has ever ruled against fluoridation, community leaders can be swayed by the threat of litigation due to the cost and time involved in defending even a groundless suit, not to mention threats of political fallout. The American Dental Association (ADA) knows of no cases in which community leaders have been found liable for their pro-fluoridation efforts. In no instance has fluoridation been discontinued because it was proven harmful in any way.[85-87]

Defeats of referenda or the discontinuance of fluoridation have occurred most often when a small, vocal and well organized group has used a barrage of fear-inspiring allegations designed to confuse the electorate.

Adoption of fluoridation is ultimately a decision of state or local decision makers, whether determined by elected officials, health officers or the voting public. Fluoridation can be enacted through state legislation, administrative regulation, ordiance or a public referendum. While fluoridation is not legislated at the federal level, it is legislated at the state and local level. As with any public health measure, a community has the right and obligation to protect the health and welfare of its citizens, even if it means overriding individual objections to implement fluoridation.

Those opposed to fluoridation sometimes comment that "the government is forcing fluoridation" on the community. But who is "the government?" The fact is that since fluoridation is implemented by state or local votes (by city councils or public vote), the people are "the government." Voters elect officials at the

state and local level to act on their behalf. Voters participate directly in public votes on fluoridation.

Each spring as part of the yearly ADA/ASTDD/CDC Community Water Fluoridation Awards program, the ADA, Association of State and Territorial Dental Directors and the CDC Division of Oral Health compile a list of water systems/communities in the United States that have adopted or retained community water fluoridation in the previous year.[88] This list is posted on the ADA website at *http://www.ADA.org/fluoride*. The ADA has also compiled a master list of U.S. communities voting to adopt or retain fluoridation programs dating from 1998 which is also available on the ADA website.[79] From 2000 through 2016, more than 515 U.S. communities in 42 states have voted to adopt or retain fluoridation. The size of these water systems/communities varies greatly — from those with a few thousand residents to the Metropolitan Water District of Southern California which provides fluoridated water to more than 18 million people.[79]

The primary source for technical assistance with fluoridation efforts is the ADA's Council on Advocacy for Access and Prevention (CAAP) at the ADA. Additional support for fluoridation is available from the ADA's Division of Legal Affairs, Division of Communications and Department of State Government Affairs. Dental and health professionals seeking technical assistance can reach CAAP at 312.440.2500.

66. Is community water fluoridation accepted by other countries?

Answer.

According to the British Fluoridation Society,[89] as of November 2012, approximately 377.7 million people in 25 countries worldwide were supplied with water fluoridated by adjustment. Additionally, the number of people receiving naturally fluoridated water at the optimum level is approximately 57.4 million. Worldwide, the estimated number of people with access to optimally fluoridated water is 435.1 million and it continues to grow each year.[89] A second study estimates the number at 437.2 million.[90]

According to the British Fluoridation Society, as of November 2012, approximately 377.7 million people in 25 countries worldwide were supplied with water fluoridated by adjustment.

Fact.

The value of water fluoridation is recognized internationally. Countries and geographic regions with water fluoridated by adjustment include the U.S., Argentina, Australia, Brazil, Brunei, Canada, Chile, China (Special Administrative Region of Hong Kong), Fiji, Guatemala, Guyana, the Irish Republic, Israel, Malaysia, New Zealand, Panama, Papua New Guinea, Peru, Republic of Korea (South Korea), Serbia, Singapore, Spain, the United Kingdom and Vietnam.[89] Major cities (outside the U.S.) with fluoridated water include Adelaide, Auckland, Bilbao, Birmingham, Brisbane, Buenos Aires, Cork, Dublin, Edmonton, Ho Chi Minh City (Saigon), Kuala Lumpur, Melbourne, Newcastle upon Tyne, Perth, Rio de Janeiro, San Paolo, Santiago, Seville, Sydney, Toronto, Wellington and Winnipeg.[89]

Thorough investigations of fluoridation, conducted in a number of countries in addition to the U.S. including Australia, England, Ireland, New Zealand as well as by the European Commission and the World Health Organization, support the safety and effectiveness of water fluoridation.[90-95]

Considering the extent to which fluoridation has already been implemented throughout the world, the lack of documentation of adverse health effects is remarkable testimony to its safety.[91-94, 96] The World Health Organization (WHO) has endorsed the practice of water fluoridation since 1969.[51] In 1994, an expert committee of the WHO published a report which reaffirmed its support of fluoridation as being safe and effective in the prevention of tooth decay, and stated that "provided a community has a piped water supply, water fluoridation is the most effective method of reaching the whole population, so that all social classes benefit without the need for active participation on the part of individuals."[52] In 2004, the WHO once again affirmed its support.[53] In 2007, the Sixtieth World Health Assembly recommended that countries without access to optimal levels of fluoride or systemic fluoridation programs should consider initiating fluoridation programs.[54]

A scientific evaluation of fluoride was conducted by the Scientific Committee on Health and Environmental Risks (SCHER) upon request by the European Commission (EC).[85] The EC is the European Union's (EU) executive body with responsibility to manage EU policy. The Committee was asked to critically evaluate any new evidence on the hazard profile, health effects and human exposure to fluoride. The final report,

Critical review of any new evidence on the hazard profile, health effects, and human exposure to fluoride and the fluoridating agents of drinking water was released in 2011.[95] It stated that exposure to levels of fluoride used for fluoridation of drinking water is not expected to lead to unacceptable risks to the environment. Additionally, the report concluded there was insufficient evidence or no evidence that fluoridation was linked to endemic skeletal fluorosis, osteosarcoma, lower IQs in children, thyroid or reproductive problems.[95]

There are parts of the world where water fluoridation is not common. In some of these instances water fluoridation is not feasible due to the lack of a central water supply, the existence of other more life-threatening health needs, the lack of trained technical personnel or sufficient funds for start-up and maintenance costs. In some cases where water fluoridation has not been implemented, countries have chosen to institute salt fluoridation programs.

67. Is community water fluoridation banned in Europe?

Answer.
No country in Europe bans community water fluoridation.

Fact.
Under European Union (EU) law and regulations, the individual Member States can decide whether to or not to fluoridate water. Members of the European Union (EU) construct their own water quality regulations within the framework of the Drinking Water Directive[97] adopted in 1998 which outlines the quality of water intended for human consumption. They can also decide whether to or not to add fluoride to milk or salt products. There is no EU-wide obligation to add fluoride to any product consumed by humans including water nor is there an EU-wide obligation not to add fluoride to any product including water.[87]

The Directive provides maximum admissible concentrations for many substances, one of which is fluoride. The Directive does not require or prohibit fluoridation; it merely requires that the fluoride concentration in water does not exceed the maximum permissible concentration of 1.5 mg/L.[97]

Many fluoridation systems that used to operate in Eastern and Central Europe did not function properly and when the Iron Curtain fell in 1989-90, fluoridation stopped because of obsolete technical equipment and lack of knowledge as to the benefits of fluoridated water.[88]

Water fluoridation is not practical in some European countries because of complex water systems with numerous water sources. As an alternative to water fluoridation, many European countries have opted for the use of dietary fluoride supplements or salt fluoridation.

Basel, Switzerland is one such example.[98] Those opposed to water fluoridation claimed a large victory when Basel voted to cease water fluoridation in 2003. The facts are that Basel was the lone city with fluoridated water surrounded by communities that used fluoridated salt. In the mid-1990s, trade barriers that had prevented fluoridated salt from being sold to those living in Basel fell and soon it was evident that residents were receiving fluoride from salt as well as through drinking water. The government voted to cease water fluoridation in 2003 in light of availability and use of fluoridated salt in the community. Basel, Switzerland did not stop providing fluoride. Officials simply chose another type of fluoridation — salt fluoridation.[98]

Again, no European country bans fluoridation. It has simply not been implemented for a variety of technical, legal, financial or political reasons.

Those opposed to fluoridation sometimes comment that "97% of western Europe has rejected water fluoridation," although frequently the line becomes "most of Europe has rejected water fluoridation." But what is not mentioned is that there are a number of countries in Europe that have opted to use fluoridated salt or milk fluoridation. (Additional information on this topic can be found in Benefits Section, Question 14.) Letters have appeared on the internet reportedly from officials in foreign countries who comment negatively regarding their country's position on fluoridation. However, from the letters it is apparent the writers are responding to a question that is not publically available and that was designed to illicit a negative response. Additionally the credentials of the respondents do not provide any insight as to what relationship, if any, they have with the governmental bodies who have jurisdiction over fluoridation practices in their respective countries. These letters should not be construed as any country's official position on fluoridation.

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Cost

68. Is water fluoridation a cost-effective and cost-saving method of preventing tooth decay?

Answer.

Yes. When compared to the cost of other prevention programs, water fluoridation is the most cost-effective means of preventing tooth decay for both children and adults in the United States. A number of studies over the past 15 years have attempted to place a specific dollar value on the benefit of fluoridation. These studies, conducted in different years (and therefore using different dollar values), encompassing different communities/populations and different methodologies have two conclusions in common: 1) for systems that serve more than 1,000 people, the economic benefit of fluoridation exceeds the cost and 2) the benefit-cost ratios increased as the size of the populations increase largely due to economies of scale.

Fact.

The cost of community water fluoridation varies for each community depending on the following factors.[1]

1. Size of the community (population and water usage);
2. Number of fluoride injection points where fluoride additives will be added to the water system;
3. Amount and type of equipment used to add and monitor fluoride additives;
4. Amount and type of fluoride additive needed to reach the target fluoride level of 0.7 mg/L; its price, cost of transportation and storage; and
5. Expertise and preferences of personnel at the water plant.

In 2016, a study[2] led by researchers from the Colorado School of Public Health created a model of fluoridation program costs, savings, net savings and return on investment for the 2013 U.S. population with access to optimally fluoridated water systems that served 1,000 or more people. The researchers found that savings associated with individuals avoiding tooth decay in 2013 as a result of fluoridation were estimated at $6.8 billion, or $32.19 per person, for the more than 211 million people who had access to fluoridated water through community water systems serving more than 1,000 people that year. Based on the estimated cost of the systems to fluoridate ($324 million), the net savings from fluoridation was estimated at $6.5 billion and the estimated return on investment (ROI) averaged 20 to 1 across water systems of all sizes (from 1,000 to over 100,000 people with a ROI range of 15.5 to 26.2). However, it was noted that the cost per person to fluoridate can vary significantly among different sizes of communities based on a number of the factors outlined in the previous paragraph. Because of those variables, the researchers urged communities to inform their policy decisions by identifying their specific water system's annual cost and comparing that cost to the annual estimated per person savings ($32.19) in averted treatment costs. The researchers noted that in 2013, while 211 million people had access to fluoridated water, more than 78 million people had access to a public water system that served 1,000 or more people that was not fluoridated. The study findings suggest that if those water systems had been fluoridated, an additional $2.5 billion could have been saved as a result of reductions in tooth decay.[2]

The economic benefits of fluoridation were also reconfirmed in a systematic review[3] conducted in 2013 by the Community Preventive Services Task Force which sought to update their prior review conducted in 2002[4] which also found that fluoridation saved money. The 2013 review concluded that recent

evidence continues to indicate the economic benefit of fluoridation programs exceeds their cost. The review also noted that benefit-cost ratio increases with the population of the community.

Because of the decay reducing effects of fluoride, the need for restorative dental care is typically lower in fluoridated communities. Therefore, an individual residing in a fluoridated community will typically pay for fewer dental restorative services (such as fillings) during a lifetime. A study[5] published in 2005, estimated the cost and treatment savings resulting from community water fluoridation programs in Colorado. The study also estimated the added savings if communities without water fluoridation initiated a fluoridation program. The study estimated a community fluoridation program generated treatment savings through prevented tooth decay of $61 for every $1 spent to fluoridate the community's water. On a state level, results indicated an annual savings of nearly $150 million associated with the water fluoridation programs and projected a nearly $50 million annual savings if the remaining 52 nonfluoridated water systems in Colorado were to implement water fluoridation programs.[5]

There are various types of dental restorations (fillings) commonly used for the initial treatment of tooth decay (cavities) including amalgam (silver) and composite resins (tooth-colored). In the 2016 study noted earlier[2], the most commonly used treatment was a two-surface composite resin restoration in posterior (back) permanent teeth. Considering the fact that in the United States the fee[6] for a two-surface composite resin restoration in a permanent tooth placed by a general dentist typically ranges from $165-$305*, fluoridation clearly demonstrates significant cost savings. An individual can enjoy a lifetime of fluoridated water for less than the cost of one dental filling.

An individual can enjoy a lifetime of fluoridated water for less than the cost of one dental filling.

*The Survey data should not be interpreted as constituting a fee schedule in any way, and should not be used for that purpose. Dentists must establish their own fees based on their individual practice and market considerations. The American Dental Association discourages dentists from engaging in any unlawful concerted activity regarding fees or otherwise.

When it comes to the cost of treating dental disease, everyone pays. Not just those who need treatment, but the entire community — through higher health insurance premiums and higher taxes. Cutting dental care costs by reducing tooth decay is something a community can do to improve oral health and save money for everyone. With the escalating cost of health care, fluoridation remains a community public health measure that saves money and so benefits all members of the community.

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The economic importance of fluoridation is underscored by the fact that the cost of treating dental disease frequently is paid not only by the affected individual, but also by the general public through services provided by health departments, community health clinics, health insurance premiums, the military and other publicly supported medical programs.[7] For example, results from a New York State study published in 2010[8] that compared the number of Medicaid claims in 2006 for cavity-related procedures in fluoridated and nonfluoridated counties showed a 33.4% higher level of claims for fillings, root canals and extractions in nonfluoridated counties as compared to such claims in fluoridated counties.[8]

Fluoridation contributes much more to overall health than simply reducing tooth decay. It prevents needless infection, pain, suffering and loss of teeth and saves vast sums of money in dental treatment cost — particularly in cases where dental care is received through surgical intervention in a hospital or through hospital emergency services.

In a study[9] conducted in Louisiana, Medicaid-eligible children (ages 1-5) residing in communities without fluoridated water were three times more likely than Medicaid-eligible children residing in communities with fluoridated water to receive dental treatment in a hospital and the cost of dental treatment per eligible child was approximately twice as high. In addition

to community water fluoridation status, the study took into account per capita income, population and number of dentists per county.[9]

By preventing tooth decay, fluoridation also plays a role in reducing visits to hospital emergency rooms (ERs) for toothaches and other related dental problems where treatment costs are high. Most hospitals do not have the facilities or staff to provide comprehensive or even emergency dental care. Many patients receive only antibiotics or pain mediation but the underlying dental problem is not addressed. In too many cases, the patient returns to the ER in a few days with the same problem or worse.

School-based dental disease prevention activities such as fluoride mouthrinse or tablet programs, professionally applied topical fluorides, dental health education and placement of dental sealants are beneficial but have not been found to be as cost-effective in preventing tooth decay as community water fluoridation.[10] In 1985, the National Preventive Dentistry Demonstration Program[10] analyzed various types and combinations of school-based preventive dental services to determine the cost and effectiveness of these types of prevention programs. Ten sites from across the nation were selected. Five of the sites had fluoridated water and five did not. Over 20,000 second and fifth graders participated in the study over a period of four years. Students were examined and assigned by site to one or a combination of the following groups:

- biweekly in class brushing and flossing plus a home supply of fluoride toothpaste and dental health lessons (ten per year);
- in-class daily fluoride tablets (in nonfluoridated areas);
- in-school weekly fluoride mouthrinsing;
- in-school professionally applied topical fluoride;
- in-school professionally applied dental sealants, and
- a control.[10]

After four years, approximately 50% of the original students were examined again. The study affirmed the value and effectiveness of community water fluoridation. At the sites where the community water was fluoridated, students had fewer cavities, as compared to those sites without fluoridated water where the same preventive measures were implemented. In addition, while sealants were determined to be an effective prevention method, the cost of a sealant program was substantially more than the cost of fluoridating the community water demonstrating fluoridation as the most cost-effective preventive option.[10]

In an effort to balance budgets, decision makers sometimes make economic choices that amount to being "penny wise and pound foolish." In other words, they cut an expense today that appears to be a sure money saver. But they fail to take a long-term view (or see the big picture) on the consequences of that action. They fail to see how money spent now can provide greater savings in the future. A decision to eliminate funding for a successful community water fluoridation program would be an example of that kind of action. Often decision makers are swayed by the promise of an alternative fluoride delivery system without considering who it will cover (and who it will not cover), how it will be administered and what it will cost. Examples of these alternative fluoride delivery programs include school-based fluoride mouthrinse programs, fluoride supplements, fluoride varnish and other professionally applied topical fluorides. Often dental health education programs including dispensing "free" toothbrushes and fluoridated toothpaste are mentioned as an alternative to fluoridation. All of these programs can be beneficial but are not as cost-effective as fluoridation programs because they typically require additional personnel to facilitate the programs, action on the part of the recipient and have much higher administrative and supply costs. Additionally, these programs typically target only children and so do not provide decay preventing benefits to adults. Fluoridation benefits all members of the community — children and adults — and is more cost-effective.

The CDC's "Health Impact in 5 Years" (HI-5) initiative[11] launched in 2016 highlights community-wide approaches that have evidence reporting 1) positive health impacts, 2) results in five years and 3) cost-effectiveness or cost savings over the lifetime of the population or earlier. Fluoridation is one of the community approaches included in the HI-5 Initiative as it has great potential to help keep people healthy as it reaches all members of a community where they live, learn, work, and play. Documenting the impact

of fluoridation can be challenging partially because the beneficial effect is not immediately apparent.[12] Cost savings from fluoridation would be expected to increase over several years' time. The most notable decrease in tooth decay would be anticipated in young children who received the benefits of fluoridation over their lifetime in both their primary teeth and as their adult teeth begin to appear when the children are approximately six years old. More immediate savings could be realized in recently fluoridated communities as children who had once received fluoride supplements would no longer require these prescriptions which are typically recommended for children from six months to 16 years of age, whose primary drinking water source is not fluoridated and have been determined to be at high risk for tooth decay.

Benefits from the prevention of tooth decay can include:

- freedom from dental pain
- a more positive self-image
- fewer missing teeth
- fewer cases of poorly aligned tooth aggravated by tooth loss
- fewer teeth requiring root canal treatment
- reduced need for crown, bridges, dentures and implants
- less time lost from school or work because of dental pain or visits to the dentist

While some of these types of benefits are difficult to measure economically, they are extremely important.[13,14]

Fluoridation remains the most cost-effective and practical form of preventing tooth decay in the United States and other countries with established municipal water systems. It is one of the very few public health measures that actually saves more money than it costs.[13,15-17]

69. Why fluoridate an entire water system when the vast majority of the water is not used for drinking?

Answer.

It is more practical and less costly to fluoridate an entire water supply than to attempt to treat only the water that will be consumed.

Fact.

Water systems treat all the water supplied to communities to the same high standards, for disinfection, clarity or fluoridation, whether the water is to be used for washing dishes, washing a car, watering lawns, preparing food or drinking. Although not all that water needs to be disinfected, clarified or fluoridated, it is more practical and cost efficient to treat all the water delivered to the customer to the same standard.

Fluoride is only one of more than 40 different chemicals/additives that can be used to treat water in the United States. Many are added for aesthetic or convenience purposes such as to improve the odor or taste, prevent natural cloudiness or prevent staining of clothes or porcelain.[18] The cost of additives for fluoridating a community's water supply is very low on a per capita basis; therefore, it is practical to fluoridate the entire water supply. It would be prohibitively expensive and impractical for a community to have two water systems — one that provided drinking water and another for all other water use (watering lawns, laundry, flushing toilets).

Many organizations that are concerned about water use, conservation and quality support the practice of water fluoridation. For example, the American Water Works Association, an international nonprofit scientific and educational association dedicated to the improvement of drinking water quality and supply, supports the practice of fluoridation of public water supplies.[19]

Cost References

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Fluoridation Facts

Fluoridation Facts contains answers to frequently asked questions regarding community water fluoridation. As ADA's premier resource on fluoridation, the booklet contains information regarding the latest scientific research in an easy to use question and answer format to assist policy makers and the general public in making informed decisions about fluoridation. Over 400 references are used to answer questions related to fluoridation's effectiveness, safety, practice and cost-effectiveness.

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MYTHS & FACTS

Responses to common anti-fluoride claims

For more information, go to iLikeMyTeeth.org

THE TRUTH	OPPONENT'S CLAIM	THE FACTS
Fluoride occurs naturally in water, though rarely at the optimal level to protect teeth.	*"Fluoride doesn't belong in drinking water."*	• It's already there. Fluoride exists naturally in virtually all water supplies and even in various brands of bottled water. If the people making this statement truly believed it, they would no longer drink water or grape juice — or eat shellfish, meat, cheese or other foods that contain trace levels of fluoride. • What's at issue is the amount of fluoride in water. There are proven benefits for public health that come from having the optimal level of fluoride in the water — just enough to protect our teeth. In 2011, federal health officials offered a new recommended optimal level for water fluoridation: 0.7 parts per million. That's our goal: getting just enough to help all of us keep our teeth longer.
Numerous scientific studies and reviews have recognized fluoride as an important nutrient for strong healthy teeth.	*"Adding fluoride is like forcing people to take medication"*	• Fluoride is not a medication. It is a mineral, and when present at the right level, fluoride in drinking water has two beneficial effects: preventing tooth decay and contributing to healthy bones. • U.S. court decisions have rejected the argument that fluoride is a "medication" that should not be allowed in water. The American Journal of Public Health summarized one of these rulings, noting that "fluoride is not a medication, but rather a nutrient found naturally in some areas but deficient in others." • There are several examples of how everyday products are fortified to enhance the health of Americans — iodine is added to salt, folic acid is added to breads and cereals, and Vitamin D is added to milk.
Fluoridation is one of the most cost-effective health strategies ever devised.	*"Our city council can save money by ending fluoridation of our water system."*	• A community that stops fluoridating or never starts this process will find that local residents end up spending *more* money on decay-related dental problems. Evidence shows that for most cities, every $1 invested in fluoridation saves $38 in unnecessary treatment costs. • A Texas study confirmed that the state saved $24 per child, per year in Medicaid expenditures because of the cavities that were prevented by drinking fluoridated water. • A Colorado study showed that water fluoridation saved the state nearly $149 million by avoiding unnecessary treatment costs. The study found that the average savings were roughly $61 per person.

THE TRUTH	OPPONENT'S CLAIM	THE FACTS
Fluoridation is a public health measure where a modest community-wide investment benefits everyone.	*"Fluoridation is a 'freedom of choice' issue. People should choose when or if they have fluoride in their water."*	• Fluoride exists naturally in virtually all water supplies, so it isn't a question of choosing to get fluoride. The only question is whether people receive the optimal level that's documented to prevent tooth decay. • It is completely unrealistic to make water fluoridation a person-by-person or household-by-household choice. The cost efficiency comes from a public water system fluoridating its entire supply. • Maintaining an optimal amount of fluoride in water is based on the principle that decisions about public health should be based on what is healthy for the entire community, not based on a handful of individuals whose extreme fears are not backed by the scientific evidence. • Fluoridation is not a local issue. Every taxpayer in a state pays the price for the dental problems that result from tooth decay. A New York study found that Medicaid enrollees in counties where fluoridation was rare needed 33% more fillings, root canals, and extractions than those in counties where fluoridated water was much more prevalent.
Fluoridated water is the best way to protect everyone's teeth from decay.	*"We already can get fluoride in toothpaste, so we don't need it in our drinking water."*	• The benefits from water fluoridation build on those from fluoride in toothpaste. Studies conducted in communities that fluoridated water in the years after fluoride toothpastes were common have shown a lower rate of tooth decay than communities without fluoridated water. • The CDC reviewed this question in January 2011. After looking at all the ways we might get fluoride — including fluoride toothpaste — the CDC recommended that communities fluoridate water at 0.7 parts per million. Any less than that puts the health of our teeth at risk. • Fluoride toothpaste alone is insufficient, which is why pediatricians and dentists often prescribe fluoride tablets to children living in non-fluoridated areas.
Very high fluoride concentrations can lead to a condition called fluorosis. Nearly all fluorosis in the U.S. is mild. This condition does not cause pain, and does not affect the health or function of the teeth.	*"Fluoridation causes fluorosis, and fluorosis can make teeth brown and pitted."* and *"One-third of all children now have dental fluorosis."*	• Nearly all cases of fluorosis are mild — faint, white specks on teeth — that are usually so subtle that only a dentist will notice this condition. Mild fluorosis does not cause pain, and it does not affect the health or function of the teeth. • The pictures of dark pitted teeth that anti-fluoride opponents circulate show *severe* cases of fluorosis, a condition that is almost unheard of in the U.S. Many of these photos are from India, and the reason is *natural* fluoride levels over there that are dramatically higher than the level used in the U.S. to fluoridate public water systems. Common sense shows how misleading these photos are. Think about it: Do one-third of the children's teeth you see look brown and pitted? No, they don't. • In 2011, the CDC proposed a new level for fluoridation — 0.7 parts per million — that is expected to reduce the likelihood of fluorosis while continuing to protect teeth from decay.

THE TRUTH	OPPONENT'S CLAIM	THE FACTS
Getting enough fluoride in childhood will determine the strength of our teeth over our entire lifetime.	*"Fluoride is especially toxic for small children."*	• According to the American Academy of Pediatrics optimal exposure to fluoride is important to infants and children. The use of fluoride for the prevention and control of cavities is documented to be both safe and effective. • Medical experts disagree with opponents' "toxic" claim. In fact, the American Academy of Family Physicians recommends that parents consider using dietary fluoride supplements for children at risk of tooth decay from ages 6 months through age 16 if their water isn't fluoridated. • Children who drink fluoridated water as their teeth grow will have stronger, more decay resistant teeth over their lifetime. A 2010 study confirmed that the fluoridated water consumed as a young child makes the loss of teeth (due to decay) less likely 40 or 50 years later when that child is a middle-aged adult.
Children who swallow toothpaste are at increased risk of mild fluorosis.	*"There's a warning label on fluoride toothpaste that tells you to 'keep out of reach of children', so fluoride in water must also be a danger."*	• The warning label simply reflects the fact that toothpaste contains roughly 1,000 times as much fluoride per milligram as fluoridated water. Even so, the American Dental Association (ADA) believes the warning label on toothpaste exaggerates the potential for negative health effects from swallowing toothpaste. The ADA has stated that "a child could not absorb enough fluoride from toothpaste to cause a serious problem" and noted that fluoride toothpaste has an "excellent safety record." • Many vitamin labels have similar statements: "Keep out of reach of children." That's because almost anything has the potential for negative health effects if it's left in the hands of unsupervised, young children.
Fluoridated water is safe for babies and young children.	*"Fluoridated water isn't safe to use for babies."*	• The evidence does not support what anti-fluoride groups say. The American Dental Association concludes that "it is safe to use fluoridated water to mix infant formula" and encourages parents to discuss any questions they may have with their dentists and pediatricians. • Although using fluoridated water to prepare infant formula might increase the chance that a child develops dental fluorosis, nearly all instances of fluorosis are a mild, cosmetic condition. Fluorosis nearly always appears as very faint white streaks on teeth. The effect is usually so subtle that only a dentist would notice it during an examination. Mild fluorosis does not cause pain, nor does it affect the function or health of the teeth. • A 2010 study examined the issue of fluorosis and infant formula, and reached the conclusion that "no general recommendations to avoid use of fluoridated water in reconstituting infant formula are warranted." The researchers examined the condition's impact on children and concluded that "the effect of mild fluorosis was not adverse and could even be favorable."

THE TRUTH	OPPONENT'S CLAIM	THE FACTS
Although Americans' teeth are healthier than they were several decades ago, many people still suffer from decay — and the overall impact it has on their lives.	*"Tooth decay is no longer a problem in the United States."*	• Tooth decay is the most common chronic health problem affecting children in the U.S. It is five times more common than asthma. Tooth decay causes problems that often last long into adulthood — affecting kids' ability to sleep, speak, learn and grow into happy and healthy adults. • California children missed 874,000 school days in 2007 due to toothaches or other dental problems. A study of seven Minneapolis-St. Paul hospitals showed that patients made over 10,000 trips to the emergency room because of dental health issues, costing more than $4.7 million. • Poor dental health worsens a person's future job prospects. A 2008 study showed that people who are missing front teeth are viewed as less intelligent and less desirable by employers. • In a 2008 study of the armed forces, 52% of new recruits were categorized as Class 3 in "dental readiness" — meaning they had oral health problems that needed urgent attention and would delay overseas deployment.
Leading health and medical organizations agree: fluoridated water is both safe and effective.	*"Fluoridation causes cancer and other serious health problems."*	• The American Academy of Family Physicians, the Institute of Medicine and many other respected authorities endorse water fluoridation as safe. The Centers for Disease Control and Prevention reports that "panels of experts from different health and scientific fields have provided strong evidence that water fluoridation is safe and effective." • More than 3,200 studies or reports had been published on the subject of fluoridation. Even after all of this research, the best that anti-fluoride groups can do is to claim that fluoride *could* cause or *may* cause one harm or another. They can't go beyond speculating because the evidence simply doesn't back up their fears. • The cancer claim is part of a pattern. According to the American Council on Science and Health, "Historically, anti-fluoride activists have claimed, with no evidence, that fluoridation causes everything from cancer to mental disease." • A 2011 Harvard study found no link between fluoride and bone cancer. This study reviewed hundreds of bone samples, and the study's design was approved by the National Cancer Institute. The study is significant because the National Research Council reported that ***if*** there were any type of cancer that fluoride might possibly be linked to, it would probably be bone cancer (because fluoride is drawn to bones). The fact that this Harvard study found no link to bone cancer strengthens confidence that fluoride is unlikely to cause any form of cancer. • Opponents usually cite a 2006 study when they raise the cancer issue, but they omit the fact that the author of this study called it "an exploratory analysis." Instead of measuring the actual fluoride level in bone, this 2006 study relied on estimates of fluoride exposures that could not be confirmed, which undermines the reliability of the data.

THE TRUTH	OPPONENT'S CLAIM	THE FACTS
Dozens of studies and more than 60 years of experience have repeatedly shown that fluoridation reduces tooth decay.	*"Fluoridation doesn't reduce tooth decay."*	• An independent panel of 15 experts from the fields of science and public health reviewed numerous studies and concluded that fluoridation reduces tooth decay by 29%. • An analysis of two similarly sized, adjacent communities in Arkansas showed that residents without access to fluoridated water had twice as many cavities as those with access to fluoridated water. • In New York, Medicaid recipients in less fluoridated counties required 33% more treatments for tooth decay than those in counties where fluoridated water was prevalent. • The benefits of fluoridation are long-lasting. A recent study found young children who consumed fluoridated water were still benefiting from this as adults in their 40s or 50s. • The Centers for Disease Control and Prevention recognizes fluoridation's effectiveness in preventing tooth decay and cited fluoridated drinking water as one of the "10 great public health achievements of the 20th century." • The European Archives of Pediatric Dentistry published an analysis of 59 studies that concluded that "water fluoridation is effective at reducing [decay] in children and adults."
Millions of people living in Europe are receiving the benefits of fluoride.	*"European countries have rejected fluoridation, so why should we fluoridate water?"*	• Europe has used a variety of programs to provide fluoride's benefits to the public. Water fluoridation is one of these programs. Fluoridated water reaches 12 million Europeans, mostly residents of Great Britain, Ireland and Spain. Fluoridated milk programs reach millions of additional Europeans, mostly in Eastern Europe. • Salt fluoridation is the most widely used approach in Europe. In fact, at least 70 million Europeans consume fluoridated salt, and this method of fluoridation reaches most of the population in Germany and Switzerland. These two countries have among the lowest rates of tooth decay in all of Europe. • Italy has not tried to create a national system of water fluoridation, but the main reasons are cultural and geological. First, many Italians regularly drink bottled water. Second, a number of areas in Italy have water supplies with natural fluoride levels that *already* reach the optimal level that prevents decay. • Technical challenges are a major reason why fluoridated water isn't widespread in Europe. In France and Switzerland, for example, water fluoridation is logistically difficult because of the terrain and because there are tens of thousands of separate sources for drinking water. This is why Western Europe relies more on salt fluoridation, fluoride rinse programs and other means to get fluoride to the public.

THE TRUTH	OPPONENT'S CLAIM	THE FACTS
Community water fluoridation is proven to reduce decay, but it isn't the only factor that affects the rate of tooth decay.	*"There are states with a high rate of water fluoridation that have higher decay rates than states where water fluoridation is less common."*	• Water fluoridation plays a critical role in decay prevention, but other factors also influence decay rates. Researchers often call these factors as "confounding factors." Someone who ignores confounding factors is violating a key scientific principle. A person's income level is a confounding factor in tooth decay because low-income Americans are more at risk for decay than upper-income people. This makes sense because income status shapes how often a person visits a dentist, their diet and nutrition, and other factors. • Comparing different states based solely on fluoridation rates ignores key income differences. For example, West Virginia and Connecticut reach roughly the same percentage of their residents with fluoridated water — 91 percent and 90 percent, respectively. Yet the percentage of West Virginians living below the poverty line is nearly double the percentage of those living in Connecticut. West Virginians are also more likely to get their drinking water from wells, which are not fluoridated to the optimal level. • It's misleading to compare states without considering other, confounding factors. A much more reliable approach is to compare residents of the *same* state who share similar traits, such as income levels. A 2010 study of New York counties did just this and found that people living in areas with fluoridated water needed fewer fillings and other corrective dental treatments.
Community water fluoridation is the most cost-effective way to protect oral health.	*"There are better ways of delivering fluoride than adding it to water."*	• A 2003 study of fluoridation in Colorado concluded that "even in the current situation of widespread use of fluoride toothpaste," water fluoridation "remains effective and cost saving" at preventing cavities. • Studies conducted in communities that fluoridated water in the years after fluoride toothpastes were widely used have shown a lower rate of tooth decay than communities without fluoridated water. • The co-author of a 2010 study stated that research confirms the "the most effective source of fluoride to be water fluoridation." • Water fluoridation is inexpensive to maintain and saves money down the road. The typical cost of fluoridating a local water system is between 40 cents and $2.70 per person, per year — less than the cost of medium-sized latte from Starbucks. • For low-income individuals who are at higher risk of dental problems, fluoride rinses are a costly expense, which is why these products are not the "easy" answer that opponents of fluoridation claim they are.

THE TRUTH	OPPONENT'S CLAIM	THE FACTS
Water fluoridation has been one of the most thoroughly studied subjects, and the evidence shows it is safe and effective.	*"The National Research Council's 2006 report said that fluoride can have harmful effects."*	• The NRC raised the possibility of health concerns about areas of the U.S. where the *natural* fluoride levels in well water or aquifers are unusually high. These natural fluoride levels are two to four times higher than the level used to fluoridate public water systems. • The National Research Council itself explained that its report was not an evaluation of the safety of water fluoridation. • The Centers for Disease Control and Prevention reviewed the NRC report and stated, "The report addresses the safety of high levels of fluoride in water that occur naturally, and does not question the use of lower levels of fluoride to prevent tooth decay."
Anti-fluoride groups cite many "studies" that were poorly designed, gathered unreliable data, and were not peer-reviewed by independent scientists.	*"Studies show that fluoride is linked to lower IQ scores in children."*	• The foreign studies that anti-fluoride activists cite involved fluoride levels that were at least double or triple the level used to fluoridate drinking water in the U.S. It is irresponsible to claim these studies have any real meaning for our situation in the U.S. • British researchers who evaluated these studies from China and other countries found "basic errors." These researchers pointed out that the lower IQs could be traced to other factors, such as arsenic exposure, the burning of high-fluoride coal inside homes and the eating of contaminated grain.
Much of the fluoride used to fluoridate public water systems is extracted from phosphate rock.	*"Fluoride is a by-product from the phosphate fertilizer industry."*	• Much of the fluoride used to fluoridate water is extracted from phosphate rock, and so is phosphoric acid—an ingredient in Coke and Pepsi. After fluoride is extracted from phosphate rock, much of that rock is later used to create fertilizers that will enrich soil. Opponents use this message a lot, maybe because they want to create the false impression that fluoride comes from fertilizer. • Corn produces several useful by-products, including corn oil, cornstarch and corn syrup. Fluoride is one example of many by-products that help to improve the quality of life or health.

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Centers for Disease Control and Prevention

Community Water Fluoridation

Public Health Service Recommendation

What is the Public Health Service (PHS) recommendation for community water fluoridation?

The U.S. PHS Recommendation for Fluoride Concentration in Drinking Water for the Prevention of Dental Caries is science-based guidance on the optimal level of fluoride in community water supplies to prevent tooth decay in children and adults while reducing the risk for children to develop dental fluorosis. Starting in 2015, the recommended level is 0.7 milligrams of fluoride per liter of water. The recommendation is not an enforceable federal regulation. Individual jurisdictions make their own decisions on whether to fluoridate their community's water supplies. Some states, however, mandate fluoridation for communities of a specific size.

Why is 0.7 milligrams per liter the recommended level for water fluoridation?

An optimal level of fluoride in drinking water provides enough fluoride to prevent tooth decay in children and adults while limiting the risk of dental fluorosis, which is the only unwanted health effect of community water fluoridation. Dental fluorosis is a change in the appearance of the dental enamel that occurs in children whose teeth are forming under the gums. The risk of dental fluorosis increases as children ingest higher levels of fluoride. The most common impact of fluorosis is faint white spots on teeth that usually only a dental professional would notice.

National survey data show that prevention of tooth decay can be maintained at the recommended level of 0.7 milligrams of fluoride per liter of drinking water. This recommended level updates and replaces the previously recommended range of 0.7 to 1.2 milligrams per liter.

Why did the Public Health Service (PHS) make a new recommendation for community water fluoridation?

Sources of fluoride have increased since the early 1960s. At that time, nearly all fluoride intake came from drinking water and from food and beverages prepared with fluoridated water. Today, water is one of several sources of fluoride. Other sources include dental products such as toothpaste and mouth rinses, prescription fluoride supplements, and professionally applied fluoride products such as varnish and gels. Because it is now possible to receive enough fluoride with slightly lower amounts of fluoride in water, the PHS developed a new recommendation for the level of fluoride that is to be used in community water fluoridation. See U.S. Public Health Service Recommendation for Fluoride Concentration in Drinking Water for the Prevention of Dental Caries for more information.

How was the updated recommendation developed?

In September 2010, the Department of Health and Human Services convened a panel of scientists from across the U.S. government to review new information related to fluoride intake and to consider a new recommendation for community water fluoridation. The federal panel reviewed the best available information, including changes in the occurrence and severity of tooth decay and of dental fluorosis in U.S. children and adults. The panel also studied the U.S. Environmental Protection Agency's (EPA) scientific assessments of the major sources of fluoride intake and risk of severe dental fluorosis among children. Severe dental fluorosis is rare in the United States. Based on this review, the federal panel proposed

changing the recommended level for community water systems to 0.7 milligrams per liter (the low end of the prior recommended range of 0.7 to 1.2 milligrams per liter). The proposed change was published in the Federal Register. Public comment on the proposed new level was sought—and considered carefully by the Panel—before finalizing the new recommendation. In addition, the proposed recommendation was submitted to a Peer Review Process, a step required by the federal government for influential scientific information.

Page last reviewed: October 10, 2019

Savings from Water Fluoridation:

What the Evidence Shows

Research shows that community water fluoridation offers perhaps the greatest return-oninvestment of any public health strategy. The reduction in just the costs of filling and extracting diseased teeth and time lost from work to get care—not counting reduction in dental pain and discomfort—more than makes up for the cost of fluoridation. In recent decades, the evidence showing savings has grown:

- For most cities, every $1 invested in water fluoridation saves $38 in dental treatment costs.[1]

- A Texas study confirmed that the state saved $24 per child, per year in Medicaid expenditures for children because of the cavities that were prevented by drinking fluoridated water.[2]

- A 2010 study in New York State found that Medicaid enrollees in less fluoridated counties needed 33 percent more fillings, root canals, and extractions than those in counties where fluoridated water was much more prevalent.[3] As a result, the treatment costs per Medicaid recipient were $23.65 higher for those living in less fluoridated counties.[4]

- Researchers estimated that in 2003 Colorado saved nearly $149 million in unnecessary treatment costs by fluoridating public water supplies—average savings of roughly $61 per person.[5]

- A 1999 study compared Louisiana parishes (counties) that were fluoridated with those that were not. The study found that low-income children in communities without fluoridated water were three times more likely than those in communities with fluoridated water to need dental treatment in a hospital operating room.[6]

- By reducing the incidence of decay, fluoridation makes it less likely that toothaches or other serious dental problems will drive people to hospital emergency rooms (ERs)—where treatment costs are high. A 2010 survey of hospitals in Washington State found that dental disorders were the leading reason why uninsured patients visited ERs.[7]

- Scientists who testified before Congress in 1995 estimated that national savings from water fluoridation totaled $3.84 billion each year.

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[7] Washington State Hospital Association, Emergency Room Use (October 2010) 8-12, http://www.wsha.org/files/127/ERreport.pdf, accessed February 8, 2011.

[8] Michael W. Easley, DDS, MP, "Perspectives on the Science Supporting Florida's Public Health Policy for Community Water Fluoridation," Florida Journal of Environmental Health, Vol. 191, Dec. 2005, accessed on March 16, 2011 at http://www.doh.state.fl.us/family/dental/perspectives.pdf.

News Release

American Academy of Pediatrics: Fluoride Remains a Powerful Tool to Prevent Tooth Decay

For Release:

11/30/2020

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Long before a baby's first tooth erupts, the pediatrician can start guiding families on how to develop healthy oral health habits, including optimal use of fluoride to prevent decay

The most common chronic disease of early childhood is responsible for millions of school hours lost each year due to illness -- and it is largely preventable.

Dental caries, or tooth decay, disproportionately affects poor, young, Black and Hispanic

The American Academy of Pediatrics recognizes that pediatricians are uniquely positioned to provide oral health guidance to families and apply fluoride varnish to prevent disease in an updated clinical report, "**Fluoride Use in Caries Prevention in the Primary Care Setting.**" The report, from the AAP Section on Oral Health, marks the first update in recommendations since 2014 and is published in the December 2020 *Pediatrics* (published online Nov. 30).

"Fluoride has consistently been proven effective at preventing tooth decay, which, when left untreated, can lead to pain, loss of teeth and serious infections," said Melinda B. Clark, MD, FAAP, lead author of the report. "Pediatricians can prevent dental disease by applying fluoride varnish, counseling families on nutrition and how to care for their children's teeth and referring to a dentist."

The clinical report helps pediatricians maximize the use of fluoride for caries prevention while minimizing the risk of enamel fluorosis, a largely cosmetic condition that can cause discoloration of the teeth.

The AAP recommends that pediatricians:

- Perform oral health risk assessments on all children at every routine well-child visit beginning at 6 months of age.
- Recommend use of fluoridated toothpaste starting at eruption of the first tooth. A smear or grain of rice sized amount is recommended for children younger than 3 years, and a pea-sized amount of toothpaste is appropriate for most children starting at 3 years of age.
- Apply fluoride varnish according to the recommended periodicity schedule. Fluoride varnish is a proven tool in early childhood caries prevention.
- Know how to determine the concentration of fluoride in a child's primary drinking water and determine the need for systemic supplements.
- Advocate for water fluoridation in the local community.
- Understand indications for silver diamine fluoride and be able to recognize the clinical appearance of teeth treated with silver diamine fluoride, which is a

said. “We encourage parents to talk to their pediatricians about getting fluoride varnish at their well child visit and how much fluoride toothpaste to use for their children.”

For parents, an article in HealthyChildren.org is available: **FAQ: Fluoride and Children**.

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The American Academy of Pediatrics is an organization of 67,000 primary care pediatricians, pediatric medical subspecialists and pediatric surgical specialists dedicated to the health, safety and well-being of infants, children, adolescents and young adults.

Fluoridation

Adding fluoride to public water supplies is a safe and effective way to prevent tooth decay and has played a major role in in improving the public's dental health for more than 70 years.

"Fluoride's effectiveness in preventing tooth decay extends throughout one's life, resulting in fewer—and less severe—cavities," says former Surgeon General Vivek H. Murthy. Read on to learn more about what the

Centers for Disease Control and Prevention (CDC) has proclaimed as one of 10 great public health achievements of the 20th century.

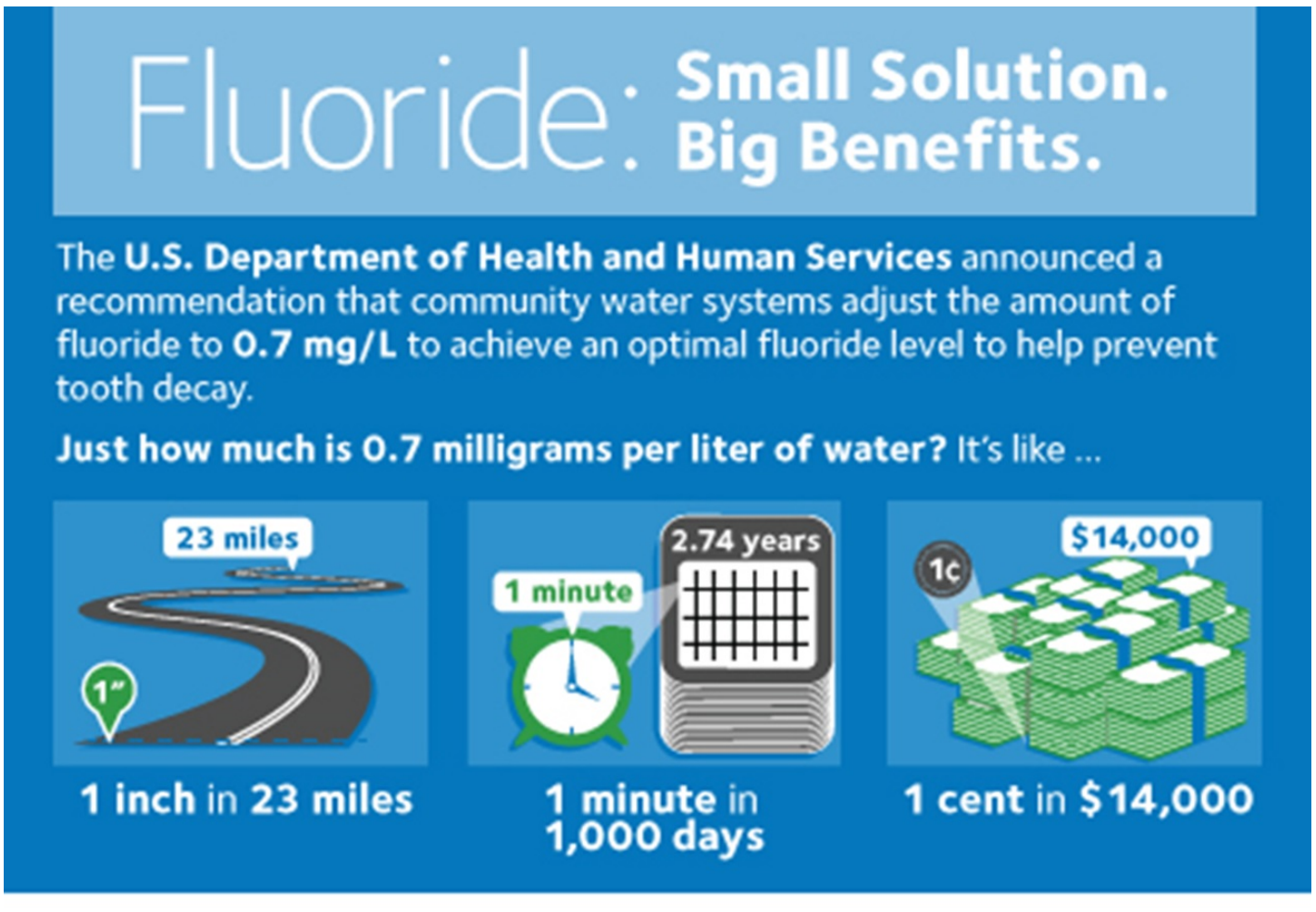
What Is Community Water Fluoridation?

Fluoridation of community water supplies is simply the adjustment of the existing, naturally occurring fluoride in drinking water to an optimal level for the prevention of tooth decay. Think of it this way: Water that has been fortified with fluoride is similar to fortifying milk with Vitamin D, table salt with iodine, and bread and cereals with folic acid.

The number of communities who make the choice to fluoridate their water continues to grow. The latest data show that in 2014, 74.4% of the U.S. population on public water systems, or 211.4 million people, had access to optimally fluoridated water.

How Much Fluoride Is Recommended In Community Water Systems?

It is recommended that community water systems adjust the amount of fluoride to 0.7 milligrams per liter of water. Use the chart below to see what that amount is equivalent to.



ADA American Dental Association®
America's leading advocate for oral health

5 Reasons Why Fluoride in Water is Good for Communities

1. **Prevents tooth decay.** Fluoride in water is the most efficient way to prevent one of the most common childhood diseases – tooth decay. One study has shown that children who live in communities without fluoridation are three times more likely to end up in the hospital to undergo dental surgery.
2. **Protects all ages against cavities.** Studies show that fluoride in community water systems prevents at least 25 percent of tooth decay in children and adults, even in an era with widespread availability of fluoride from other sources, such as fluoride toothpaste. Why fluoride is called nature's cavity fighter.
3. **Safe and effective.** For more than 70 years, the best available scientific evidence consistently has indicated that community water fluoridation is safe and effective. It has been endorsed by numerous U.S. Surgeons General, and more than 100 health organizations recognize the health benefits of water fluoridation for preventing dental decay, including the Centers for Disease Control and Prevention, the American Medical Association, the World Health Organization and the American Dental Association.
4. **Saves money.** When it comes to the cost of treating dental disease, everyone pays. Not just those who need treatment, but the entire community – through higher health insurance premiums and higher taxes. The average lifetime cost per person to fluoridate a water supply is less than the cost of one dental filling.
5. **It's natural.** Fluoride is naturally present in groundwater and the oceans. Water fluoridation is the adjustment of fluoride to a recommended level for preventing tooth decay. It's similar to fortifying other foods and beverages, like fortifying salt with iodine, milk with vitamin D, orange juice with calcium and bread with folic acid.

If you have specific questions about your family's fluoride needs, please contact your family dentist, pediatrician or physician.

Next: Why fluoride is like a superhero in your mouth >>

For additional information on fluoridation visit:

- A Mom's Guide to Fluoride: Learn more about fluoride from the perspective of Dr. Brittany Seymour, a mother and assistant professor at the Harvard School of Dental Medicine
- The ADA's Fluoride and Fluoridation Website: General information on fluoridation
- My Water's Fluoride: Learn if your public water system is fluoridated

Fluoridation FAQs

There is a lot of misinformation in the media about fluoride. Here are science-based answers to questions you may have.

What is fluoride?

Fluoride is nature's cavity fighter and occurs naturally in varying amounts in water sources such as rivers, lakes and even the oceans. Fluoride is naturally present to some extent in certain foods and beverages but the levels vary widely. To help protect teeth from cavities, fluoride is also added to some dental products such as toothpaste.

How does fluoride protect teeth?

Fluoride benefits both children and adults. Here's how:
Before teeth break through the gums (erupt), the fluoride taken in from foods, beverages and dietary supplements makes tooth enamel (the hard surface of the tooth) stronger, making it easier to resist tooth decay. This provides what is called a "systemic" benefit.

After teeth erupt, fluoride helps rebuild (remineralize) weakened tooth enamel and reverses early signs of tooth decay. When you brush your teeth with fluoride toothpaste, or use other fluoride dental products, the fluoride is applied to the surface of your teeth. This provides what is called a "topical" benefit.

In addition, the fluoride you take in from foods and beverages continues to provide a topical benefit because it becomes part of your saliva, constantly bathing the teeth with tiny amounts of fluoride that help rebuild weakened tooth enamel.

What is water fluoridation?

Community water fluoridation is simply the addition of fluoride to drinking water to increase the natural fluoride level up to the recommended level that helps prevent cavities. Almost 75 percent of the U.S. population is served by fluoridated community water systems as of 2012.

Why would communities want to fluoridate tap water?

Communities fluoridate their water supply because it is a cost-effective public health method that helps prevent cavities. The average cost per year for U.S. communities to fluoridate the water ranges from $.50 per person for large communities to $3.00 per person for small communities.

Cavities are caused by a disease called "caries," which is five times more common than asthma and seven times more common than hayfever in 5-to-17-year-olds. The pain from untreated cavities can cause people to lose sleep, have trouble eating, speaking and paying attention at school or work.

A report from the U.S. Surgeon General in 2000 estimated that 51 million school hours are lost per year because of dental-related illness. Without water fluoridation, that number would likely be much higher.

The American Dental Association (ADA) supports community water fluoridation as the single most effective public health measure to prevent tooth decay. Studies prove water fluoridation continues to be effective in reducing dental decay by at least 25% in children and adults, even in the of era widespread availability of fluoride from other sources, such as fluoride toothpaste.

The ADA, the American Medical Association, the World Health Organization and many others support fluoridation of community water supplies. The U.S. Centers for Disease Control and Prevention (CDC) has cited community water fluoridation as one of 10 great public health achievements of the 20th century (along with vaccinations, infectious disease control and motor vehicle safety).

So, by simply drinking fluoridated water, you are doing something good for your oral health.

Is water fluoridation safe? How effective is it in preventing cavities?

Water fluoridation is safe, effective and healthy. Seventy years of research, thousands of studies and the experience of more than 210 million Americans tell us that water fluoridation is effective in preventing cavities and is safe for children and adults.

Is Fluoride, as provided by community water fluoridation, a toxic substance?

No. Fluoride in water at the recommended level is not toxic according to the best available scientific evidence.

Toxicity is related to dose. While large doses of fluoride could be toxic, it is important to recognize the difference between the effect of a massive dose of an extremely high level of fluoride versus the fluoride level currently recommended for public water systems. Like many common substances essential to life and good health - salt, iron, vitamins A and D, chlorine, oxygen and even water itself - fluoride can be toxic in massive quantities.

Fluoride at the much lower recommended concentrations (0.7 mg/L) used in community water fluoridation is not harmful or toxic.

The single dose (consumed at one time) of fluoride that could cause acute fluoride toxicity is 5 mg/kg of body weight (11mg/kg of body weight of sodium fluoride). This dose is considered the probably toxic dose (PTD) which "is defined as the minimum dose that could cause serious or life-threatening systemic signs and symptoms and that should trigger immediate therapeutic intervention and hospitalization." Acute fluoride toxicity occurring from the ingestion of optimally fluoridated water is impossible. With water fluoridated at 1 mg/L, an individual would need to drink five (5) liters of water for every kilogram of body weight. For example, an adult male (155 pound/70.3 kilogram man), it would require that he consume more than 350 liters (nearly 93 gallons) of water at one time to reach an acute fluoride dose. With optimally water now set at 0.7 mg/L, it would take almost 30% more, or nearly 120 gallons (more than 1,900 eight ounce glasses) of water at one time to reach the acute dose.

Sources:

U.S. Department of Health and Human Services. Federal Panel on Community Water Fluoridation. U.S. Public Health Service recommendation for fluoride concentration in drinking water for the prevention of dental caries. Public Health Rep 2015; 130(4):318-331. Article at: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4547570. Accessed August 9, 2010.

Whitford GM. Acute toxicity of ingested fluoride. In Buzalaf MAR (ed): Fluoride and the Oral Environment. Monogar Oral Sci. Basel, Karger. 2011; 22:66-80. Abstract at: https://www.ncbi.nlm.nih.gov/pubmed/21701192. Accessed August 9, 2010.

What is dental enamel fluorosis?

Dental fluorosis is a change in the appearance of the tooth enamel that only occurs when younger children consume too much fluoride, from any source, over long periods when teeth are developing under the gums. Most commonly, these changes are not readily apparent to the affected individual or casual observer and require a trained specialist to detect. The type of fluorosis found in the United States has no effect on tooth function and may make the teeth more resistant to decay.

If fluorosis occurs when teeth are developing, is it okay to use fluoridated water to reconstitute infant formula?

Yes, it is safe to use fluoridated water to mix infant formula. If your baby is primarily fed infant formula, using fluoridated water might increase the chance for mild enamel fluorosis, but enamel fluorosis does not affect the health of your child or the health of your child's teeth. Parents and caregivers are encouraged to talk to their dentists about what's best for their child.

What can I do to decrease the chances that my child's teeth will develop fluorosis?

For infants,

- You can breast feed your child. The American Academy of Pediatrics recommends human milk for all infants (except for the few for whom breastfeeding is determined to be harmful). Breast milk is very low in fluoride. Nursing mothers or pregnant women who drink fluoridated water do not pass on significant amounts of fluoride to their child.
- You can use ready-to-feed formula. This type of formula contains little fluoride and does not contribute significantly to the development of mild dental fluorosis.
- You can use powdered or liquid concentrate formula mixed with water that either is fluoride-free or has low concentrations of fluoride. These bottled waters are labeled as de-ionized, purified, demineralized, or distilled.

Parents and caregivers should consult with their pediatrician or family physician on the most appropriate formula for their child.

The chance of development of fluorosis exists through approximate age eight when the teeth are still forming under the gums. Fluoride intake from other sources during this time such as toothpaste and mouthrinse may also contribute to the chance of fluorosis for children living in non-fluoridated and fluoridated communities.

How can I get the benefits of fluoride and minimize the risk of fluorosis for my child?

Getting the right amount of fluoride is best—not too much and not too little. Your dentist, pediatrician or family physician can help you determine the proper amount of fluoride for your child.

What are the benefits of fluoridated water?

Fluoridated water helps prevent tooth decay in children and adults. Studies prove water fluoridation continues to be effective in reducing tooth decay by at least 25% in children and adults, even in the of era widespread availability of fluoride from other sources, such as fluoride toothpaste. Simply by drinking water, people can benefit from fluoridation's cavity protection whether they are at home, work or school.

Because of its role in the prevention of tooth decay, the Centers for Disease Control and Prevention has proclaimed community water fluoridation as one of ten great public health achievements of the 20th century.

What are the benefits of fluoride toothpaste?

All toothpaste helps remove plaque, a film of bacteria that forms on teeth and gums every day. Plaque can cause gum disease and tooth decay. In addition to helping remove plaque, fluoride toothpaste provides an extra benefit in preventing tooth decay by making tooth enamel stronger.

Should children use fluoride toothpaste?

For children younger than 3 years, parents and caregivers should begin brushing children’s teeth as soon as they begin to come into the mouth by using fluoride toothpaste in an amount no more than a smear or the size of a grain of rice.

For children 3 to 6 years of age, parents and caregivers should dispense no more than a pea-sized amount of fluoride toothpaste.

Teeth should be brushed thoroughly twice a day (morning and night) or as directed by a dentist or physician. Children’s brushing should be supervised to ensure that they use the appropriate amount of toothpaste.

What are the benefits of fluoride mouthrinse?

A mouthrinse with fluoride helps reduce tooth decay by making teeth more resistant to decay. Unless you are advised to do so by a dentist or other health professional, the ADA does not recommend the use of fluoride mouthrinses for children younger than six years old. Many children younger than six have not yet fully developed their swallowing reflex and may be more likely to

swallow fluoride mouthrinse rather than spitting it out.

What are the benefits of dietary fluoride supplements?

Dietary fluoride supplements can be as effective in preventing tooth decay as water fluoridation. With supplements, fluoride is incorporated into the tooth during its formation making the tooth more resistant to decay. In addition, supplements provide a topical benefit as teeth are bathed in fluoride while the lozenges or tablets are chewed. Once the fluoride is absorbed, it will be present in the saliva which delivers fluoride to the tooth surface to help repair the enamel.

Dietary fluoride supplements should be prescribed only for children living in areas without optimal levels of fluoride in their community drinking water and who are at high risk of developing cavities. Talk to your dentist, pediatrician or family physician about your child's specific fluoride needs.

Note: The ADA's dietary fluoride supplement recommendations remain unchanged in light of the new guidelines for community water fluoridation in the U.S. released in April 2015 by the U.S. Public Health Service. The recommendation for fluoride levels in drinking water is newly calibrated at 0.7 milligrams of fluoride per liter of water. The new recommendation, which was supported by the ADA, does not change the ADA Council on Scientific Affairs' systematic review and clinical recommendation for the use of dietary fluoride supplements that was released in 2010.

Where can I find more information about fluoride?

- Read the American Dental Association's *Fluoridation Facts*.
- Review Evidence-Based Clinical Practice Guidelines related to fluoride and fluoridation.
- Visit the Centers for Disease Control and Prevention.
- Visit the American Academy of Pediatrics' Campaign for Dental Health website.

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U.S. Public Health Service recommendation for fluoride concentration in drinking water for the prevention of dental caries

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Surgeon Generals' statements on fluoridation

2016

Over the past 70 years, community water fluoridation has contributed to dramatic declines in both the prevalence and severity of tooth decay, lea Centers for Disease Control and Prevention to name it as one of 10 great public health achievements of the 20th century, alongside immunization planning, tobacco control, and motor vehicle safety.

Water fluoridation is the best method for delivering fluoride to all members of the community, regardless of age, education, income level or acces dental care. Fluoride's effectiveness in preventing tooth decay extends throughout one's life, resulting in fewer – and less severe – cavities. In fact, e generation born over the past 70 years has enjoyed better dental health than the one before it. That's the very essence of the American promise.

Our progress on this issue over the past 70 years has been undeniable. But we still have work to do. Because we know that so much of our health determined by zip code rather than genetic code. That's why creating a culture of disease prevention through community efforts – and ensuring h for all – is one of my highest priorities. Community water fluoridation helps us meet these goals; as it is one of the most cost-effective, equitable, a measures communities can take to prevent tooth decay and improve oral health.

Advocates and community leaders have fought to make water fluoridation a reality in communities throughout our country.

Today, we applaud their efforts. But our work is far from finished, and we will not rest until every community is equipped with the many tools they their residents live healthy,happy lives.

Vivek H. Murthy, M.D., M.B.A.
United States Surgeon General

2013

Welcome to the 2013 National Oral Health Conference. I want to thank you for the leadership and efforts you are providing to the nation in the are health.

As Surgeon General I have been working hard to encourage individuals and communities to make healthy choices because I believe it is better to illness and disease rather than treat it after it occurs. Community water fluoridation is one of the most effective choices communities can make to health problems while actually improving the oral health of their citizens.

One of water fluoridation's biggest advantages is that it benefits all residents of a community—at home, work, school, or play—through the simple drinking fluoridated water. Where water fluoridation is a community-wide intervention, the benefits are not limited by a person's income level or t receive routine dental care. It also is a very cost-effective intervention. A lifetime of cavity prevention can be obtained for less than the cost of one

Fluoridation's effectiveness in preventing tooth decay is not limited to children, but extends throughout life, resulting in fewer and less severe cav each generation born since the implementation of water fluoridation has enjoyed better dental health than the generation that preceded it.

As then-Surgeon General David Satcher noted in Oral Health in America: A Report of the Surgeon General (May 2000), community water fluoridat to be the most cost-effective and practical way to provide protection from tooth decay in a community. The U.S. Centers for Disease Control and P has recognized fluoridation as one of 10 great public health achievements of the 20th Century.

This year marks the 68th anniversary of community water fluoridation.

I join with previous Surgeons General in acknowledging community water fluoridation as an effective public health strategy, and recommend its use and expansion to enhance the oral health of all Americans.

Regina M. Benjamin, MD, MBA
VADM U.S. Public
United States Surgeon General

2004

As noted in Oral Health in America: A Report of the Surgeon General, community water fluoridation continues to be the most cost-effective, equit means to provide protection from tooth decay in a community. Scientific studies have found that people living in communities with fluoridated w fewer cavities than those living where the water is not fluoridated. For more than 50 years, small amounts of fluoride have been added to drinking supplies in the United States where naturally-occurring fluoride levels are too low to protect teeth from decay. Over 8,000 communities are currer the fluoride in their community's water to a level that can protect the oral health of their citizens.

Over 170 million people, or 67 percent of the United States population served by public water supplies, drink water with optimal fluoride levels for decay. Of the 50 largest cities in the country, 43 are fluoridated. Although water fluoridation reaches some residents in every state, unfortunately, are providing these benefits to 75 percent or more of their residents.

A significant advantage of water fluoridation is that all residents of a community can enjoy its protective benefit—at home, work, school, or play— drinking fluoridated water or beverages and foods prepared with it. A person's income level or ability to receive routine dental care is not a barrier fluoridation's health benefits. Water fluoridation is a powerful strategy in our efforts to eliminate differences in health among people and is consis emphasis on the importance of prevention.

The U.S. Centers for Disease Control and Prevention has recognized the fluoridation of drinking water as one of ten great public health achieveme twentieth century. Water fluoridation has helped improve the quality of life in the United States by reducing pain and suffering related to tooth de from school and work, and money spent to restore, remove, or replace decayed teeth. An economic analysis has determined that in most commu $1 invested in fluoridation saves $38 or more in treatment costs. Fluoridation is the single most effective public health measure to prevent tooth de improve oral health over a lifetime, for both children and adults.

While we can be pleased with what has already been accomplished, it is clear that there is much yet to be done. Policymakers, community leader industry, health professionals, the media, and the public should affirm that oral health is essential to general health and well being and take actio ourselves, our families, and our communities healthier. I join previous Surgeons General in acknowledging the continuing public health role for co water fluoridation in enhancing the oral health of all Americans.

Richard H. Carmona, M.D., M.P.H., F.A.C.S.
VADM, USPHS
United States Surgeon General

2001

For more than half a century, community water fluoridation has been the cornerstone of caries prevention in the United States. As noted in my Ma report, Oral Health in America: A Report of the Surgeon General, community water fluoridation continues to be the most cost-effective, practical a means for reducing and controlling the occurrence of tooth decay in a community. In thousands of communities in the United States where natu occurring fluoride levels are deficient, small amounts of fluoride have been added to drinking water supplies with dramatic results. More than 50 y scientific research has found that people living in communities with fluoridated water have healthier teeth and fewer cavities than those living wh water is not fluoridated.

Almost two-thirds of the United States population served by public water supplies consume water with optimal fluoride levels. Of the 50 largest ci country, 43 are fluoridated. A significant advantage of water fluoridation is that anyone, regardless of socioeconomic level, can enjoy these health during their daily lives—at home, work, or at school or play—simply by drinking fluoridated water or beverages prepared with fluoridated water. W fluoridation is a powerful strategy in our efforts to eliminate health disparities among populations. Unfortunately, over one-third of the United Stat population (100 million people) is without this critical public health measure.

The U.S. Centers for Disease Control and Prevention has recognized the fluoridation of drinking water as one of ten great public health achieveme twentieth century. Water fluoridation has helped improve the quality of life in the United States through reduced pain and suffering related to too reduced time lost from school and work, and less money spent to restore, remove, or replace decayed teeth. Fluoridation is the single most effect health measure to prevent tooth decay and improve oral health over a lifetime, for both children and adults.

Water fluoridation continues to be a highly cost-effective strategy, even in areas where the overall caries level has declined and the cost of implem fluoridation has increased. Compared to the cost of restorative treatment, water fluoridation actually provides cost savings, a rare characteristic fo based disease prevention strategies.

While we can be pleased with what has already been accomplished, it is clear that there is much yet to be done. I join previous Surgeons General acknowledging the continuing public health role for community water fluoridation in enhancing the oral health of all Americans.

David Satcher, MD, PhD
United States Surgeon General

Recent Fluoridation Issues

The ADA has endorsed fluoridation of community water supplies as safe and effective for preventing tooth decay since 1950. Items in this section address emerging issues related to community water fluoridation.

New Wave in Fluoridation Tablet System

- Innovations: New community water fluoridation system is a 'game-changer'
- KC Industries' Fluoridation Tablet and Feeder System
- New Fluoride Technology Supports Rural Health

- Letter commending the Environmental Protection Agency (EPA) for its due diligence in reviewing (and denying) a petition to ban the fluoridation of community water supplies (PDF)
- EPA Fluoride Chemicals in Drinking Water; Reasons for Agency Response (PDF)
- Letter from Three Harvard Deans on Support for Fluoridation (PDF)

Comments on Cochrane Review

- CDC Comments on Cochrane Review of Water Fluoridation for the Prevention of Dental Caries (PDF)
- Critique of the review of 'Water fluoridation for the prevention of dental caries' published by the Cochrane Collaboration in 2015 (PDF)

Bone Health

- Talking Points: Talking With Your Patients About Community Water Fluoridation (PDF)

Fluoride Intake and Chronic Kidney Disease

- National Kidney Foundation

Infant Formula and Fluoridated Water

- Evidence-based Clinical Recommendations Regarding Fluoride Intake from Reconstituted Infant Formula and Enamel Fluorosis
- Frequently Asked Questions: Fluoride and Fluoridation

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