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Ballot Measure 26-151

City Club of Portland (Portland, Or.)

A City Club Report on Ballot Measure 26-151

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CITY OF PORTLAND MEASURE 26-151: Fluoridation of Portland Drinking Water Supply

Executive Summary

Measure 26-151 requires Portland to fluoridate the City's drinking water supply at the levels recommended by the Centers for Disease Control and Prevention or the Oregon Health Authority, and is intended to reduce tooth decay and promote oral health.

Proponents of Measure 26-151 point to the health benefits of water fluoridation, including reducing cavities in all age groups, particularly with people of lower incomes who may be unable to afford adequate dental care. The cost of water fluoridation in Portland is estimated to be about $5 million in start-up project costs and $500,000 annually. Proponents maintain that decreased dental costs for all citizens and improved dental health make this a wise investment. Proponents rely on over 65 years of experience in other localities that have benefitted from fluoridated water, and on research demonstrating that fluoridation is safe and effective.

Opponents of Measure 26-151 raise concerns about possible long-term negative health effects from ingesting fluoride and suggest alternative means of reducing tooth decay. These include fluoride applications like tablets, toothpastes and rinses, as well as changes in diet. Opponents also argue that there may be adverse environmental effects from adding fluoride to the drinking water. Additionally, opponents argue against water fluoridation because Portland residents who do not want fluoridated water will have little choice but to accept it if the measure passes. Finally, opponents argue that communities that buy their water from Portland will not have an opportunity to vote on the measure.

RECOMMENDATIONS

Majority Recommendation

The majority recommends voting for Measure 26-151 because of the prevalence of dental health issues in Portland and the proven effectiveness of water fluoridation in substantially reducing the incidence of tooth decay. The general scientific consensus and 65 years of experience in other communities demonstrate that fluoride is safe at the recommended level (0.7 ppm [parts per million]) that will be implemented in Portland's water supply, and that this is an effective way to reduce dental cavities and to promote dental health in an equitable manner. Water fluoridation would provide a great health benefit to the Portland community.

The majority recommends a "YES" vote on Measure 26-151.

Minority Recommendation

The minority recommends voting against measure 26-151 because of the potential overexposure to fluoride for some members of the population that may occur at the recommended level of 0.7 ppm in drinking water. The minority feels that fluoridating the public water supply will be done without the informed consent of some portion of the Portland population. Further, the minority believes that fluoride, used to reduce cavities, is best administered in a doctor's or dentist's office where an individual's questions and concerns can be answered by a health care professional. Lastly, for those who wish to restore water back to its original state, filtration systems are very expensive and not economically practical for many Portlanders.

The minority recommends a "NO" vote on Measure 26-151.

City Club members will vote on this report on Friday, April 19, 2013. Until the membership vote, City Club of Portland does not have an official position on this report. The outcome of this vote will be reported in the City Club Bulletin, dated Thursday, April 25, 2013 and online at www.pdxcityclub.org.

Introduction

Ballot Measure 26-151 will appear on the ballot as follows:

CAPTION

Fluoridation of Portland Drinking Water Supply

QUESTION

Shall Portland fluoridate its drinking water supply?

SUMMARY

Portland supplies drinking water to city residents and businesses and to several other municipalities and water districts outside Portland. Portland currently does not add fluoride to its drinking water supply.

This measure requires Portland to fluoridate its drinking water supply. The measure requires fluoridation at the levels recommended by the Centers for Disease Control and Prevention or the Oregon Health Authority intended to reduce tooth decay and promote oral health. The measure is a referral of an Ordinance adopted by the Council. Although the Ordinance requires fluoridation of Portland's drinking water supply by March 1, 2014, the actual date of implementation of fluoride will depend on the effective date of this measure. The fluoride must meet standards of the American Water Works Association. The measure requires record-keeping related to quantities of water treated and the type and amounts of fluoride used. The measure also requires the City to conduct tests for fluoride in treated and untreated water in accordance with state and federal recommendations.

The measure funds fluoridation through water user fees.

Background

Explanation of Measure 26-151

Portland City Ordinance 185612

On September 12, 2012, the Portland City Council unanimously adopted Ordinance 185612, authorizing and directing the Portland Water Bureau to add fluoride to the City of Portland's public water supply by March 1, 2014, following over seven hours of testimony by proponents and opponents of the Ordinance. The Ordinance required the Water Bureau to begin fluoridating the city water supply as follows:

a. The Portland Water Bureau is authorized and directed to devise and implement a program to fluoridate the City of Portland's public drinking water supply to the optimal levels beneficial to reduce tooth decay and promote good oral health as recommended by the Centers for Disease Control and Prevention or the Oregon Health Authority. Any fluoride compound used for this purpose shall meet the standards of the American Water Works Association.

b. Funds necessary for fluoridation shall be paid for through water user fees.

c. The Water Bureau shall make a preliminary report to the Council prior to the Council's final decisions on the Fall Budget Monitoring Process. The report shall include a general outline of a fluoridation program and a preliminary estimate of the financial resources required to implement such a program.

d. The Water Bureau shall design and implement a fluoridation program so that the City's water is effectively fluoridated no later than March 1, 2014.

e. The Water Bureau shall keep an accurate record of the type and amount of fluoride compound introduced and the quantities of water treated. The Water Bureau shall conduct and keep records of tests for fluoride compound in the treated and untreated waters in accordance with engineering and administrative recommendations for water fluoridation from the Centers of [sic] Disease Control or as otherwise required by the Oregon Health Authority.

Referral of the Ordinance to Voters as a Ballot Measure

Opponents of fluoridating the public water supply succeeded in referring the Ordinance to voters by petition, asking that the issue be placed on the May 2014 ballot. By resolution passed on December 20, 2012, however, the City Council referred the Ordinance to the voters for the May 21, 2013 election. The ballot measure asks voters to accept or reject the following question: Shall Portland fluoridate its drinking water supply? A "yes" vote will mean that Portland's water supply will be fluoridated at the recommended level, and a "no" vote will mean that Portland's water supply will remain unfluoridated.

How Water Fluoridation and Fluoride Work

Fluoride is a mineral that exists naturally in rocks, soil, and nearly all water supplies at varying levels.[1, 2] According to the Centers for Disease Control and Prevention (CDC), at the proper level in drinking water, fluoride reduces the incidence of tooth decay in both adults and children.[3] This level is reached when a public water system adjusts — by increasing or lowering — the naturally occurring level of fluoride in the water.[2] If the ballot measure passes, fluoride will be added into Portland's water system to achieve a 0.7 ppm level.[4] The current fluoridation levels in Portland's water system vary depending on a number of factors, with a maximum detected level of .17 ppm.[4, 5, 6]

Fluoride works to reduce dental cavities in two ways - systemically and topically. Systemically, fluoride is ingested, usually through fluoridated water or fluoride tablets or drops.[2] If fluoride is ingested when teeth are developing, the fluoride becomes incorporated in the tooth structure and can prevent cavities.[2] Fluoridated water also has topical effects. Fluoride mixes with saliva, which constantly surrounds the teeth and helps destroy the bacteria that cause tooth decay.[2] Fluoride applied topically, such as in water, rinses or toothpaste, is incorporated also into the enamel, making teeth more resistant to cavities.[2]

History of Water Fluoridation in the United States

In the early 1900s, a dentist named Frederick McKay began investigating the cause of what was then called "Colorado brown stain," which produced mottled but also decay resistant teeth.[2, 7] After additional studies, it was established that the cause was fluoride.[2] In the 1930s and early 1940s, the U.S. National Institutes of Health published several epidemiological studies suggesting that a fluoride concentration of about 1 ppm was associated with substantially fewer cavities, and that it did not cause more severe forms of dental fluorosis.[2] In 1945, a controlled fluoridation experiment began in Grand Rapids, Michigan. The study results, published in 1950, showed significant reduction of cavities.[7]

Fluoridation became an official policy of the U.S. Public Health Service by 1951, and by 1960 water fluoridation had become widely used in the United States, reaching about 50 million people.[7] By 2010, 73.9% of the U.S. population on public water systems was receiving fluoridated water, with 3.3% of that population receiving naturally occurring fluoride.[8] In 2010, 22.6 % of Oregonians received fluoridated water, which placed Oregon 48th in the rankings of states in terms of the percentage of people who receive fluoridated water.[8] Only Hawaii and New Jersey had lower percentages of their populations who received fluoridated water. [8] Portland is currently among a handful of major U.S. cities, including Albuquerque, Tucson, and Wichita, that do not fluoridate their water supplies or have naturally occurring fluoridated water supplies.[9]

Portland's Fluoridation History and City Club's Past Positions

The City Club has consistently supported fluoridation. As far back as 1955, in its "Report on Fluoridation of the Public Water Supply," a City Club Research Committee concluded that the fluoridation of public water supplies as a public health measure had been as thoroughly investigated as any public health measure ever proposed. It also found that the overwhelming weight of dental, medical and other scientific opinion in the United States and Great Britain confirmed fluoridation of public water supplies as a safe and economical way of cutting the incidence of dental cavities by at least one-half. The Committee found "no competent evidence in conflict with this overwhelming weight of scientific opinion." The Committee also concluded that fluoridation of water supplies was not a substitute for dental care. However, fluoridation with or without dental care achieves a substantial reduction in cavities unobtainable by other means. The Committee recommended fluoridation of the Bull Run water for Portland.

In 1956, the City Club re-endorsed its 1955 stand in favor of fluoridation of Portland's water supply and endorsed a proposed ballot measure requiring fluoridation. The 1956 ballot measure was rejected by the voters. In 1962, in conjunction with the introduction of another ballot measure that would have required fluoridation of the Portland water supply, the City Club re-endorsed the 1955 and 1956 stand in favor of fluoridation. The 1962 ballot initiative was also rejected.

In 1976, opponents of fluoridation proposed state ballot measure 11. A portion of state ballot measure 11 would have made it unlawful for any governmental unit to add fluoride or fluorine-containing compounds to any public water supply system. The City Club recommended a "no" vote on the ballot measure on the grounds that water

districts should retain the option of adding fluoride if the districts complied with state law. State ballot measure 11 did not pass.

In 1978, Portland voters passed a measure requiring fluoridation of the city water supply. In response, opponents proposed a ballot measure to overturn that mandate. The City Council put fluoridation on hold pending the vote on the opponents' ballot measure, which did not occur until 1980. The City Club prepared another report in 1980 to "re-study" the original 1955 study.

The 1980 study supported the 1955 study and added the following conclusions:

- The evidence considered by the Committee indicates that fluoridation in the concentration of approximately 1.0 ppm significantly reduces the incidence of cavities in young people aged 0-15 years.
- Adults whose teeth benefited from fluoride as children experience fewer dental problems throughout their lives.
- No convincing evidence was found by the Committee to support claims made by opponents of fluoridation with respect to deleterious health effects, other than unusual and isolated instances.
- Fluoridation of the public water supply is by far the most cost-effective method of fluoride delivery to the general public.
- The Committee feels the basic issue is whether to give up some degree of personal freedom to achieve a widespread health and economic benefit, or to leave the decision to use fluoride to individual choice.

The City Club research committee recommended upholding the decision to fluoridate the water supply by voting "no" vote on the 1980 ballot measure.

However, Portlanders passed the 1980 ballot measure overturning fluoridation, thereby reversing the City Council's mandate to fluoridate Portland's water supply.

In 2002, at the request of the Tri-County Fluoridation Forum, the City Club Research Board and Board of Governors reviewed the City Club's past positions and the recent scientific information on fluoridation. On April 11, 2002, the City Club passed a resolution affirming the Club's support of fluoridating the Portland public water supply.

In 2013, City Club convened this committee to recommend to the City Club membership a position regarding the May 2013 Ballot Measure 26-151 – Shall Portland fluoridate its drinking water supply? If approved by the City Club membership, this will be the seventh time the City Club has supported water fluoridation in Portland.

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[1] World Health Organization, ed. *Fluoride in Drinking-water* edited by J. Fawell, K. Bailey, Chilton J., E. Dahi, L. Fewtrell and Y. Magara. Geneva, Switzerland, 2006.

[2] American Dental Association. "Statement on the Effectiveness of Community Water Fluoridation." http://www.ada.org/2106.aspx.

[3] Centers for Disease Control and Prevention. "Recommendations for using fluoride to prevent and control dental caries in the United States." *Morbidity and Mortality Weekly Report Recommendations and Report* 50, no. RR-14 (August 17 2001): 1-42.

[4] Portland Water Bureau. "Fluoride Information--Frequently Asked Questions." The City of Portland, http://www.portlandoregon.gov/water/article/411660.

[5] Written and oral testimony to City Club of Portland Ballot Measure Study Committee by David G. Shaff, Administrator, Portland Water Bureau. (February 25, 2013).

[6] Written and oral testimony to City Club of Portland Ballot Measure Study Committee by David Peters, PE, Principle Engineer, Portland Water Bureau (February 25, 2013).

[7] Ripa, L. W. "A half-century of community water fluoridation in the United States: review and commentary." *J Public Health Dent* 53, no. 1 (Winter 1993): 17-44.

[8] Centers for Disease Control and Prevention. "2010 Water Fluoridation Statistics." http://www.cdc.gov/fluoridation/statistics/2010stats.htm.

[9] American Dental Association. "Water fluoridation status of the 50 largest cities in the United States " http://www.ada.org/sections/newsAndEvents/pdfs/Fluoridation_Status_of_50_Largest_U.S._Cities.pdf.

Summary of Arguments Pro and Con

Proponents of Measure 26-151 make the following arguments in support:

- Water fluoridation is a long proven, effective, equitable, and low cost way to improve dental health and reduce dental cavities.
- Fluoridated water reduces dental cavities by at least 25% in children.
- The protective benefits of fluoridated water continue throughout a person's lifetime.
- Compromised dental health in childhood is likely to cause systemic health problems in later life.
- Peer reviewed scientific studies and organizations like the CDC and the American Dental Association (ADA) have concluded that water fluoridation at the recommended level of 0.7 ppm is safe and effective.
- The cost of implementation of water fluoridation as a preventative measure is very low compared with medical costs associated with later treatment of poor dental health.

Opponents of Measure 26-151 make the following arguments in opposition:

- Water fluoridation is not the most economical and effective way to promote dental health.
- Water fluoridation at levels significantly higher than 0.7 ppm has been associated with many serious health issues, such as bone cancer, bone fractures, fluorosis, and brain damage.
- Infants under the age of 6 months should not drink fluoridated water.
- Children and infants will end up ingesting more than the recommended amount of fluoride because of their lower body weights.
- Ingestion of fluoridated water may be unhealthy for vulnerable segments of the population such as people with renal disease or diabetes.
- There is very little reliable scientific evidence on the effects of fluoridation on the environment, and in particular with respect to salmon.
- The Bull Run water is pure and does not need additives.
- Water fluoridation requires medicating an entire population without its informed consent.

Discussion

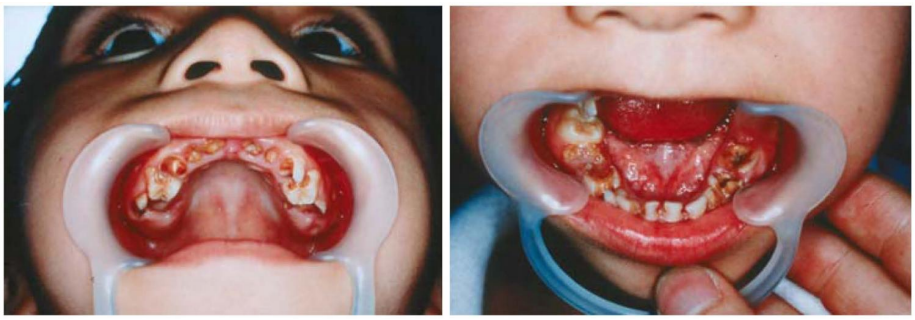
Measure 26-151 is a proposed partial solution to a real problem. Dental health issues are highly prevalent in the Portland area, particularly among residents without access to dental care. The general scientific consensus is that fluoridation at the proposed level is a safe and effective way to reduce the incidence of dental cavities and promote dental health, and poses no threat to the environment.

Scope and Effects of Poor Dental Health

Scope of Problem

Oregon children have one of the worst rates of tooth decay in the country.[1] Untreated dental decay is the most common childhood disease in Oregon and has increased 49% in a five-year period.[1] Tooth decay among children is a major concern, often causing severe pain and infection, which in turn can have negative effects on a child's education, general health, future employment, and self-esteem (Figure 1).[2, 3, 4]

Figure 1. Child with severe acute dental caries[4]



Compared to children just across the river in Washington, where approximately 63% of the population has fluoridated water as opposed to 27% in Oregon, Oregon's children have more than twice the rate of tooth decay.[5, 6] Over 35% of Oregon children have untreated decay, compared to only 15% in Washington.[6]

In 2007, the Oregon Department of Human Services released its 2007 Smile Survey, which was the second in a series of assessments of first through third graders attending Oregon public schools in 2006-2007. Using this data, the Chair of the OHSU Department of Community Dentistry estimated that of this group of children in Multnomah County, 56% had already experienced cavities, and 25% had untreated dental decay (See Table below).[4] Many of these cases led to infected teeth, abscesses and severe pain.[1] In Oregon overall, between 2008 and 2010, the number of dental-related emergency room visits by Medicaid enrollees increased by 31%.[7] In fact, 40% of child emergency room visits at a local Portland hospital are for dental reasons.[2] In the most severe cases, children with multiple dental cavities and endodontic problems can require general anesthetic to correct dental problems.[2, 3, 8]

Table. Oral health status of children in the Portland area[4]

Oral health status of children in the Portland area (2007 smile survey)

	Multnomah	Clackamas-Washington
Experience with caries	56.3%	52.5%
Untreated decay	25.0%	18.7%
Rampant decay	22.8%	11.1%
Needing treatment	24.8%	17.9%
White, non-hispanic	57.5%	70.2%
"Higher income"	16%	46%
Mean free & reduced lunch in schools	49%	32%

Economics of Access to Dental Care

Millions of Americans lack access to affordable dental health services. Many private health insurance plans exclude dental care or require large amounts of cost sharing that put dental care out of the reach for low-income families. Nearly three times as many Americans lack dental coverage as lack general health insurance coverage. Approximately 15% of Americans lack health insurance and 43% lack dental insurance.[9] Employers looking to hold down the rising cost of insurance expense are cutting medical and dental insurance plans.[10] Many middle-class families that have good medical insurance do not have dental insurance.[2] And dental costs can be very high. Even at low cost dental clinics, a single visit costs about $300. [2]

Racial and ethnic minorities, people with disabilities, and low-income families and the elderly are especially hard hit by lack of access to dental care.[11] For example, 59% of low-income adults, as opposed to 36% of higher-income adults, have no access no dental coverage.[11] These underserved populations also face a lack of local providers, transportation, a lack of knowledge of places in their community where the uninsured can find affordable dental care, and perceptions of the lack of importance of dental care.[10] Dental access problems are even greater for low-income adults with chronic health problems, and these unaddressed dental problems can exacerbate their non-dental health problems.[10]

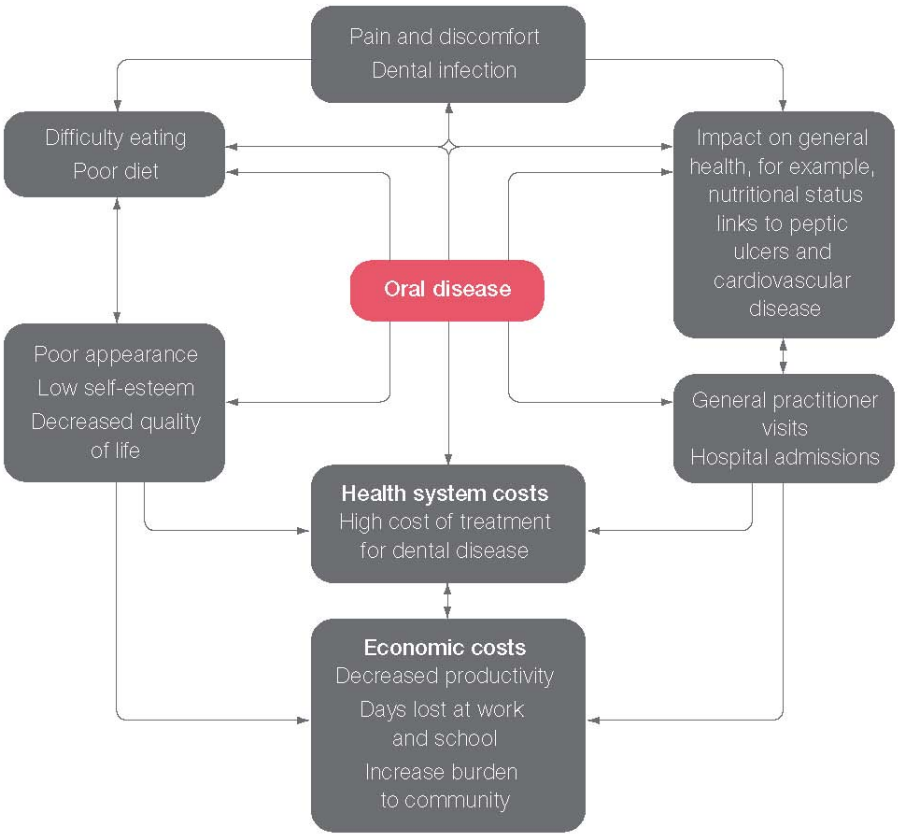
Most state Medicaid plans, including Oregon, currently exclude dental care for adults. As states have more budget concerns due to economic issues, Medicaid services are likely to be reduced even more.[10] Even when an individual may have dental care through Medicaid, access can still be a problem. Many dentists choose not to see Medicaid recipients because of the low rate of reimbursement by the government.[2]

Effects of Dental Diseases

While it is difficult to quantify precise costs and impacts, treating dental decay is expensive both in terms of direct costs, and the indirect costs related to the impact on overall health and missed educational and employment

opportunities (Figure 2).[12]

Figure 2. Impact of oral disease[12]



Decay in a permanent tooth requires a lifetime of treatment and, on average, it will cost about $2,000 over a lifetime to take care of a single cavity.[13] Out-of-pocket dental expenses account for more than one-fourth of all out-of-pocket medical expenses in the United States.[14] Additionally, inpatient hospital treatment for dental problems with Medicaid enrollees is nearly 10 times more expensive than the cost of preventative care delivered in a dentist's office.[7]

As to overall health, poor dental health leads to difficulty eating and can lead to poor diet. In severe cases, there can be negative effects on diabetic conditions and cardiovascular health as well as brain abscesses, endocarditis, blood clots in lungs, and even death in rare cases.[4, 8] Additionally, dental disease can delay needed treatments, such as surgery, chemotherapy and bone marrow transplantation, because dental issues must be addressed first.[8]

Witnesses reported that children often miss school because of dental health issues.[3, 4] One study found that California children missed 874,000 school days in 2007 due to toothaches or other dental problems.[15] Children may also be distracted during school by pain and discomfort due to tooth decay and have poorer academic performance.[4, 7] Additionally, witnesses stated that cosmetic issues associated with poor dental health can lead to low self-esteem for children, which can affect a person for life.[3, 4] Moreover, witnesses stated that in cases with serious dental issues, children require general anesthesia, which is costly and can leave children afraid of dental services.[2, 3]

The effects of poor dental health do not end with childhood. Adults who received inadequate dental care as

children often miss work dealing with the consequences of tooth decay.[16] Nationally, an estimated 164 million hours of work are missed each year because of dental problems.[16] As with children, dental pain can decrease productivity.[4] Research has also shown that it is more difficult for adults who had poor dental health as children to find a good job. People who are missing front teeth are viewed as less intelligent, less trustworthy, and less desirable than people without a gap in their smile.[2, 17]

Effects on Minorities and Lower-Income Individuals

It is well established that minorities and lower-income individuals have disproportianately high occurences of untreated decayed teeth.[18, 19, 20] More than one-third of low-income children have untreated cavities that not only cause pain, but also can contribute to difficulty in eating and lower weight.[18] Medicaid claims show that children from fluoridated water areas had fewer claims for dental work than children from non-fluoridated areas.[21]

Benefits Associated with Fluoridation

Along with the identification of tobacco as a health issue and improved maternal and child health, CDC named water fluoridation one of the 10 greatest public health achievements in the 20th century.[22]

Fluoridation Reduces Dental Decay

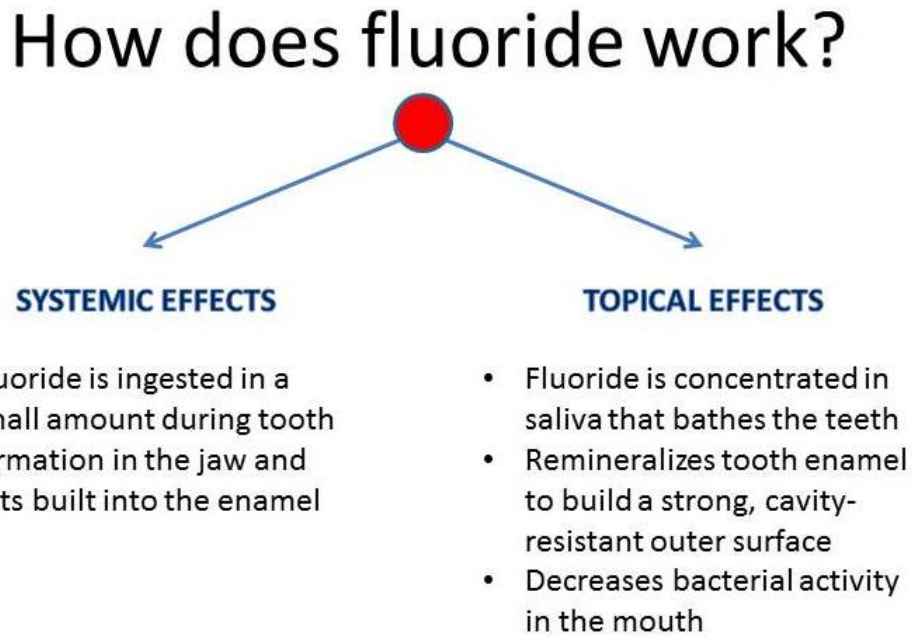
Hundreds of studies of hundreds of thousands of people, both children and adults, over several decades have shown indisputably that fluoridated water decreases dental decay by 25 to 50%.[18, 19, 23, 24, 25, 26, 27, 28] In one study, this correlation was found despite the extensive use of fluoridated toothpaste and easily accessible dental programs.[24] When 129,000 children from both fluoridated and nonfluoridated water areas were seen in dental clinics, those living in nonfluoridated water areas had 30% more cavities.[23] A systematic analysis of 214 studies done worldwide showed a reduction in cavities for those children who drank fluoridated water; this analysis also showed no potential adverse health effects.[25]

CDC's Task Force on Community Preventative Services, which produces the Guide to Community Preventive Service, reviewed 21 studies worldwide and concluded that community water fluoridation is effective in reducing cumulative dental cavities in both children and adults.[18] CDC recommends the use of fluoride in community drinking water at optimal concentrations of 0.7 ppm to prevent cavities and limit fluorosis.[29] The CDC task force concluded "more widespread use of effective population-based interventions can help reduce the morbidity, mortality, and economic burden associated with oral health conditions."

The effects of fluoride are both systemic and topical (Figure 3).[4] The majority of studies of the benefits of fluoride have been done in children and have shown that fluoride has a beneficial systemic effect during tooth formation. When fluoride is ingested in a small amount during tooth formation in the jaw, it actually gets built into the tooth enamel. However, studies have also shown that fluoride has topical effects that can benefit adults as well as children. For instance, topical fluoride can stop the decay process and make the enamel more resistant to future decay. A recent study showed that fluoridated water helps protect adult teeth even if the adult was not exposed to fluoride as a child.[30] It also showed that tooth loss among people ages 65 and older has dropped by 21% since 1961, when fluoridation was widely introduced, and that adults spending more than 75% of their lives in communities with fluoridated water had about 30% less tooth decay than those living for the same duration in areas without treated

water.[30] Also, drinking fluoridated water as a child has decay prevention effects that can last a lifetime. Fluoride can also prevent the decay of tooth roots that become exposed as one ages due to shrinkage of the gums.[28]

Figure 3. Sytemic and topical effects of fluoride[4]



Dental Health Is Important For Overall Health

As mentioned earlier, dental health can affect overall health. Poor dental health is associated with diabetes, inflammation, cardiac disease, and mental health, among other health problems.[8, 31]

Fluoride Reduces Dental Health Disparities

Water fluoridation has been shown to reduce dental health disparities. Lower income people and minorities are the prime beneficiaries of community water fluoridation.[18, 20, 32] A 2002 report on fluoridation and social equity argues that water fluoridation is the most effective and practical method for reducing economic disparities in dental cavities and that there is no other practical way to reduce these disparities in the U.S. "Within the social context of the United States, water fluoridation is probably the most significant step we can take toward reducing the disparities in dental caries." At equal costs, no other program is able to achieve the benefits of water fluoridation.[20]

Asserted Health Risks Associated with Fluoridation

As discussed above, the vast preponderance of scientific data confirms that water fluoridation at a concentration of 0.7 ppm (the proposed level) does not cause any negative health effects. In addition, scientists, regulators, and policy makers assert that 65 years of fluoridating drinking water for large populations in the world have shown consistent and measurable positive health effects and no measurable negative health effects.

Opponents of fluoridation cite several studies that may have identified potential negative health effects from

fluoridation, including but not limited to possible effects on IQ scores, and negative health effects for those with renal, thyroid, and diabetic disease. These studies, however, are based on concentrations several times higher than the recommended 0.7 ppm level and suffer from other defects in study design.

One often cited publication is a review of studies conducted with people in areas with naturally fluoridated water in China and other Asian countries at levels up to 10 times higher than the 0.7 ppm proposed Portland fluoridation level.[33] While these studies showed somewhat lowered IQ scores in children in these areas, the studies have been reviewed extensively by other scientists who found serious defects in study design, including lack of assessment of other toxins in the environment.[19, 34]

Similarly, many other health problems have been attributed to fluoride, but none of the adverse effects, such as bone fractures or renal or thyroid disease, have been substantiated at levels of fluoride comparable to the proposed 0.7 ppm level.[19, 35] Unless the level of fluoride is substantially higher than the proposed Portland level, there are no known negative health effects.[4, 37]

The Department of Health and Human Services recently developed new recommendations for community water fluoridation, lowering the recommended level from 1.2 ppm to 0.7 ppm. This was not done because of any adverse health risks. As explained by the CDC, "sources of fluoride have increased since the early 1960s" and the change was made in recognition "that it is now possible to receive enough fluoride with slightly lower levels of fluoride in water."[36]

Fluorosis

Opponents often cite dental fluorosis as a negative health effect from water fluoridation. Dental fluorosis is a change in the appearance of teeth caused by excess fluoride ingestion during tooth formation. Mild fluorosis, which does not affect health, appears as white stripes on the tooth surface and is usually not readily apparent to the affected person or casual observer.[29] Most dentists and doctors agree that a low prevalence of mild fluorosis is a reasonable trade-off for a substantial reduction in dental cavities.[29] The scientific data shows little if any risk at the proposed 0.7 ppm level of any type of fluorosis, and severe fluorosis would be non-existent at that level.[19, 29, 37]

Vulnerable Populations and Infants Under the Age of 6 Months

While few studies have been done on potentially vulnerable populations, scientists argue that with the millions of people who have been drinking fluoridated water for decades, any negative health effects, even in smaller populations, would have been recognized by now.

Because children weigh less than adults, there is concern that they may ingest more fluoridated water per pound of body weight or, in other words, receive a higher dose of fluoride per day than adults. Recent evidence suggests that feeding infants less than six months old with formula made with fluoridated water on a regular basis may increase the chance of developing very mild or mild enamel fluorosis, a cosmetic condition that is not a health threat. CDC, the American Academy of Pediatrics, and the ADA all say that fluoridated water can be used for preparing infant formula.[38, 39, 40, 41] However, if the infant is exclusively consuming formula reconstituted with fluoridated water, parents can use low-fluoride bottled water some of the time.

Alternatives to Fluoridation

Ideally, everyone would have good personal dental hygiene, access to professional dental care, and consume very little sugar. If this were true, the occurrence of dental cavities would be relatively low, as would the incidence of disease due to deteriorating or diseased teeth. Numerous studies have demonstrated that the incidence of cavities increases with sugar intake in children.[42, 43, 44] Poor dental hygiene and a cavity-prone diet can result in a high prevalence of cavities, even if the population has fluoridated water.[45]

There are both systemic and topical alternatives to water fluoridation, such as fluoride tablets, rinses, and varnishes, which can be effective in reducing dental cavities. These alternatives, however, rely on voluntary compliance and access. Some of these are available to low-income children through programs implemented in schools, but these are opt-in programs and suffer from irregular participation. They are not as effective as water fluoridation.[4] If water fluoridation is implemented in Portland, the Committee expects many of the school programs with fluoride alternatives to decrease or change focus.[4]

While many European countries do not fluoridate their water, those countries have other systemic alternatives such as fluoridated salt and fluoridated bottled water. Few such alternatives are available in the United States. Also, many of these countries have health care systems that provide universal dental care for their citizens. According to the World Health Organization, (WHO) "Fluoridation of water supplies, where possible, is the most effective public health measure for the prevention of dental decay."[46]

Individual Rights and Informed Consent

If Portland voters pass the ballot measure in favor of fluoridation, Portland residents, and others who receive water from Portland, who are opposed to the addition of fluoride will not have a choice about whether their water supply is fluoridated. A brief discussion of educational programs, available purification systems, and those who purchase water from Portland follows.

If the measure passes, an education program is critical for explaining why adding fluoride to the water is generally beneficial for the community and what options exist for those who do not want to drink fluoridated water. Portland could look to the education campaign used by the Tualatin Valley Water District as a model for ways to communicate effectively with the public.[57]

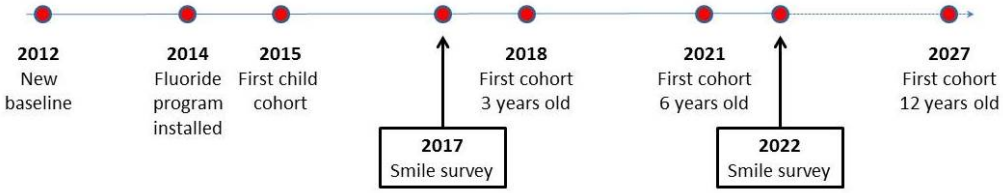
While there are three types of home use water purification systems that can effectively remove fluoride from water, they all are relatively expensive. Reverse osmosis is the most reliable, removing about 95% of the fluoride and costing about $400 per sink to install and about $140 per filter. Filters would need replacing at regular intervals, depending upon a number of factors including water usage and water quality. Distillation systems are also commercially available to remove fluoride from water, but are the most expensive option reviewed.[48]

The Portland Water Bureau supplies water to about 950,000 customers, about 370,000 of which are wholesale customers and not within Portland.[48, 58, 59] The wholesale customers will not have the chance to vote on the ballot measure. While wholesale customers whose local water districts already fluoridate their water, such as the Tualatin Valley Water District, may end up with a cost benefit because they will no longer need to fluoridate their water, there would remain about 25% of Portland Water Bureau customers who currently do not have fluoridated water

and will not have the chance to vote on this ballot measure. These wholesale customers, however, have contracts with the Portland Water Bureau and could potentially seek other sources of water if their end consumers did not want fluoridated water.

If Portland does choose to fluoridate its water in 2014, any measurable effects on the children will only be seen after 6-7 years. This timeline shows that, based on the expected timeline for fluoridation, the first cohort of children to be exposed to fluoride will be born in 2015 (Figure 4).[4] It will only be in 2022 that this first cohort will be participants in the every-5-year Smile Survey. It will be important to continue to monitor the oral health of Portland's children.

Figure 4. Timeline of measurable effects from new fluoridation program[4]



Costs of Fluoridation

The total project cost for fluoridation was estimated at up to $5 million by the City Council, with additional project expenses possible in upcoming budgets. In 2012, the Portland Water Bureau spent approximately $153,000 in personnel and consultant services for the land use review application and initial design before the project was halted in light of the public vote.[47] The yearly cost for operation and maintenance after these start-up costs is estimated to be $500,000 per year.[48] The Portland Water Bureau estimates the monthly cost, not including set-up costs, would be about 25 cents per month, per household.[48]

The rate of return from investment in water fluoridation is very high: data from the 204 million Americans drinking fluoridated water shows that every $1 invested in fluoridation saves $38 in treatment costs for fillings and more serious dental work.[49]

In the United States, water fluoridation is the most cost-effective way to reduce tooth decay in children, and a 2008 review concluded that water fluoridation is the best tool for combating cavities in many countries, particularly among socially disadvantaged groups.[50]

Environmental Effects of Fluoridation

The Portland water supply will essentially be a closed system from the point where fluoride is added until it reaches the end user. Following usage, Portland water will flow through wastewater treatment facilities where the resulting level of fluoride will be diluted to less than 0.2 ppm before it enters the environment.[48] There remains, however, the opportunity for water fluoridated at 0.7 ppm to enter the environment through various sources, which include, but are not limited to: agricultural uses, watering lawns and gardens, washing cars, fire-fighting, water main breaks, and direct discharge into the river during times of heavy rain. Because of this, concerns remain that increased fluoride from non-natural sources may adversely affect the environment.

There is a scarcity of scientific research focusing on the environmental impacts of fluoride in the concentration at which Portland wastewater would enter the environment, and most studies are at least 20 years old. Fluoride accumulates in the environment in a number of different ways. For instance, plants, soil, and the seabed can absorb fluoride. As fluoride levels increase in the ecosystem and people assimilate fluoride from various sources, the need for fluoride in the water system decreases. As a result, the CDC recently reduced the optimal fluoride concentration for drinking water from 1.2 ppm to 0.7 ppm.[36] A summary of environmental effects from fluoridated drinking water follows.

Air Quality

There are no indications that adding fluoride to the drinking water system will cause any airborne effects. The fluoride solution will arrive in liquid form, be diluted further and then added to the water supply.[48]

Groundwater

Fluoride levels in groundwater decrease as water flows deeper underground. A study in Phoenix, Arizona concluded that approximately 40% to 50% of the fluoride was removed as water progressed through the aquifer – the more distance the water travelled, the more fluoride was removed.[51] Thus, fluoride is not concentrated in groundwater with sufficient soil permeation.[52]

Plants

There is no evidence that fluoridated water has any adverse effects on gardens, lawns or plants, although plants do accumulate fluoride.[52]

Fish

The two most studied fish populations are salmon and trout. In a 1989 study, biologists for the National Marine Fisheries Service observed that fluoride levels greater than 0.2 ppm adversely affected the behavior of salmon.[53] That study and conclusion, however, have been criticized as suffering from major internal inconsistencies and other defects.[54] Trout and sturgeon are also affected by higher levels of fluoride. Several sources recommend that fluoride levels be less than 0.4 ppm for these species.[19, 55, 56] As stated above, Portland water will be diluted to less than 0.2 ppm of fluoride before it enters the environment.[48]

Summary

Given the general lack of relevant scientific environmental studies, additional research is warranted to more comprehensively understand the environmental impacts. However, at the fluoride concentrations proposed for the Portland water supply and with the planned wastewater treatment, the Committee does not expect adverse environmental effects based on the scientific studies that have been conducted so far.

End Notes

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[1] Oregon Department of Human Services. "Oregon Smile Survey." http://public.health.oregon.gov/PreventionWellness/oralhealth/Documents/smile_2007.pdf.

[2] Written and oral testimony to City Club of Portland Ballot Measure Study Committee by Michael L. Plunkett, DDS, MPH, Dental Director, CareOregon Community Health, and Assistant Professor, OHSU School of Dentistry (February 20, 2013).

[3] Written and oral testimony to City Club of Portland Ballot Measure Study Committee by Philip Wu, MD, Board-Certified Pediatrician, Portland, Oregon (February 20, 2013).

[4] Written and oral testimony to City Club of Portland Ballot Measure Study Committee by Eli Schwartz, DDS, MPH, PhD, Chair, Department of Community Dentistry, OHSU (March 6, 2013).

[5] Healthy Kids Healthy Portland. "The Crisis." http://healthykidshealthyportland.org/the-crisis/.

[6] Centers for Disease Control and Prevention. "National Oral Health Surveillance System: Untreated Tooth Decay." http://apps.nccd.cdc.gov/nohss/IndicatorV.asp?Indicator=3.

[7] The PEW Center on the States. "A Costly Dental Destination." In, (2012). Published electronically February 2012. http://www.pewstates.org/uploadedFiles/PCS_Assets/2012/A%20Costly%20Dental%20Destination%281%29.pdf.

[8] Written and oral testimony to City Club of Portland Ballot Measure Study Committee by H. Stacy Nicholson, MD, MPH, Physician-in-Chief, Doernbecher Children's Hospital (March 6, 2013).

[9] Delta Dental. "America's oral health: The role of dental benefits." 2010.

[10] Haley, J., G. Kenney, and J. Pelletier. "Access to affordable dental care: gaps for low-income adults." In *Kaiser Low-Income Coverage and Access Survey*, edited by The Kaiser Commission on the Medicaid and the Uninsured, 2008.

[11] American Dental Association. "State and Community Models for Improving Access to Dental Care For the Underserved—A White Paper." 2004.

[12] Rogers, JG. "Evidence-based oral health promotion resource." Melbourne: Prevention and Population Health Branch, Government of Victoria, Department of Health, 2011.

[13] Delta Dental. "The true cost of a cavity." 2013.

[14] Pryor, C., J. Prottas, B. Lottero, M. Rukavina, and A. Knudson. "The costs of dental care and the impact of dental insurance coverage." Robert Wood Johnson Foundation, 2009.

[15] Pourat, N., and G. Nicholson. "Unaffordable dental care is linked to frequent school absences." UCLA, 2009.

[16] Centers for Disease Control and Prevention. "Oral Health for Adults." http://www.cdc.gov/oralhealth/publications/factsheets/adult.htm.

[17] Willis, M. S., C. W. Esqueda, and R. N. Schacht. "Social perceptions of individuals missing upper front teeth." *Percept Mot Skills* 106, no. 2 (Apr 2008): 423-35.

[18] Truman, B. I., B. F. Gooch, I. Sulemana, H. C. Gift, A. M. Horowitz, C. A. Evans, S. O. Griffin, and V. G.

Carande-Kulis. "Reviews of evidence on interventions to prevent dental caries, oral and pharyngeal cancers, and sports-related craniofacial injuries." *Am J Prev Med* 23, no. 1 Suppl (Jul 2002): 21-54.

[19] Scientific Committee on Health and Environmental Risks. "Critical review of any new evidence on the hazard profile, health effects, and human exposure to fluoride and the fluoridating agents of drinking water." 2010.

[20] Burt, B. A. "Fluoridation and social equity." *J Public Health Dent* 62, no. 4 (Fall 2002): 195-200.

[21] Kumar, J. V., O. Adekugbe, and T. A. Melnik. "Geographic variation in medicaid claims for dental procedures in New York State: role of fluoridation under contemporary conditions." *Public Health Rep* 125, no. 5 (Sep-Oct 2010): 647-54.

[22] Centers for Disease Control and Prevention. "Ten great public health achievements--United States, 1900-1999." *Morbidity and Mortality Weekly Report Recommendations and Report* 48, no. 12 (April 2, 1999): 241-43.

[23] Armfield, J. M. "Community effectiveness of public water fluoridation in reducing children's dental disease." *Public Health Rep* 125, no. 5 (Sep-Oct 2010): 655-64.

[24] Kirkeskov, L., E. Kristiansen, H. Boggild, F. von Platen-Hallermund, H. Sckerl, A. Carlsen, M. J. Larsen, and S. Poulsen. "The association between fluoride in drinking water and dental caries in Danish children. Linking data from health registers, environmental registers and administrative registers." *Community Dent Oral Epidemiol* (Feb 10 2010).

[25] McDonagh, M. S., P. F. Whiting, P. M. Wilson, A. J. Sutton, I. Chestnutt, J. Cooper, K. Misso*, et al.* "Systematic review of water fluoridation." *BMJ* 321, no. 7265 (Oct 7 2000): 855-9.

[26] Stephen, K. W., L. M. Macpherson, W. H. Gilmour, R. A. Stuart, and M. C. Merrett. "A blind caries and fluorosis prevalence study of school-children in naturally fluoridated and nonfluoridated townships of Morayshire, Scotland." *Community Dent Oral Epidemiol* 30, no. 1 (Feb 2002): 70-9.

[27] Rugg-Gunn, A. J., and L. Do. "Effectiveness of water fluoridation in caries prevention." *Community Dent Oral Epidemiol* 40 Suppl 2 (Oct 2012): 55-64.

[28] American Dental Association. "Statement on the Effectiveness of Community Water Fluoridation." http://www.ada.org/2106.aspx.

[29] Centers for Disease Control and Prevention. "Recommendations for using fluoride to prevent and control dental caries in the United States." *Morbidity and Mortality Weekly Report Recommendations and Report* 50, no. RR-14 (August 17 2001): 1-42.

[30] Slade, G. D., A. E. Sanders, L. Do, K. Roberts-Thomson, and A. J. Spencer. "Effects of fluoridated drinking water on dental caries in Australian adults." *J Dent Res* (Mar 1 2013).

[31] Mealey, B. L. "Periodontal disease and diabetes. A two-way street." *J Am Dent Assoc* 137 Suppl (Oct 2006): 26S-31S.

[32] Scher, H. I., T. M. Beer, C. S. Higano, A. Anand, M. E. Taplin, E. Efstathiou, D. Rathkopf*, et al.* "Antitumour

activity of MDV3100 in castration-resistant prostate cancer: a phase 1-2 study." *Lancet* 375, no. 9724 (Apr 24 2010): 1437-46.

[33] Choi, A. L., G. Sun, Y. Zhang, and P. Grandjean. "Developmental fluoride neurotoxicity: a systematic review and meta-analysis." *Environ Health Perspect* 120, no. 10 (Oct 2012): 1362-8.

[34] Bazian, Ltd. "Independent critical appraisal of selected studies reporting an association between fluoride in drinking water and IQ." London, UK, 2009.

[35] Ludlow, M., G. Luxton, and T. Mathew. "Effects of fluoridation of community water supplies for people with chronic kidney disease." *Nephrol Dial Transplant* 22, no. 10 (Oct 2007): 2763-7.

[36] Centers for Disease Control and Prevention. "Community Water Fluoridation: Questions and Answers." http://www.cdc.gov/fluoridation/fact_sheets/cwf_qa.htm.

[37] Denbesten, P., and W. Li. "Chronic fluoride toxicity: dental fluorosis." *Monogr Oral Sci* 22 (2011): 81-96.

[38] Centers for Disease Control and Prevention. "Overview: Infant Formula and Fluorosis." http://www.cdc.gov/fluoridation/safety/infant_formula.htm.

[39] Berg, J., C. Gerweck, P. P. Hujoel, R. King, D. M. Krol, J. Kumar, S. Levy, *et al.* "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." *J Am Dent Assoc* 142, no. 1 (Jan 2011): 79-87.

[40] American Academy of Pediatrics. "Healthy Living: FAQ: Fluoride and Children." http://aaptest.healthychildren.org/English/healthy-living/oral-health/Pages/FAQ-Fluoride-and-Children.aspx?

[41] American Academy of Pediatric Dentistry. "Guideline on Fluoride Therapy." 2012.

[42] Johansson, I., P. L. Holgerson, N. R. Kressin, M. E. Nunn, and A. C. Tanner. "Snacking habits and caries in young children." *Caries Res* 44, no. 5 (2010): 421-30.

[43] Steyn, N. P., and N. J. Temple. "Evidence to support a food-based dietary guideline on sugar consumption in South Africa." *BMC Public Health* 12 (2012): 502.

[44] Tinanoff, H., and S. Reisine. "Update on early childhood caries since the Surgeon General's Report.". *Academy of Pediatrics* 9, no. 6 (2009): 396-403.

[45] Hong, C. H., R. A. Bagramian, S. M. Hashim Nainar, L. H. Straffon, L. Shen, and C. Y. Hsu. "High caries prevalence and risk factors among young preschool children in an urban community with water fluoridation." *Int J Paediatr Dent* (Feb 4 2013).

[46] World Health Organization. "Water Flouridation." http://www.who.int/water_sanitation_health/oralhealth/en/index2.html.

[47] Schmidt, B. "Water Bureau has spent $153,000 on fluoride plan: Portland City Hall roundup." *The Oregonian*, 2013.

[48] Portland Water Bureau. "Fluoride Information--Frequently Asked Questions." The City of Portland,

http://www.portlandoregon.gov/water/article/411660.

[49] Centers for Disease Control and Prevention. "Cost Savings of Community Water Fluoridation." http://www.cdc.gov/fluoridation/fact_sheets/cost.htm.

[50] Kumar, J. V. "Is water fluoridation still necessary?". *Adv Dent Res* 20, no. 1 (2008): 8-12.

[51] Food and Agriculture Organization of the United Nations. "Wastewater use case studies." http://www.fao.org/docrep/T0551E/t0551e0b.htm#9.3%20soil%20aquifer%20treatment:%20arizona,%20%20-%20FAO%20Wastewater%20Case%20Studies.

[52] Pollick, H. F. "Water fluoridation and the environment: current perspective in the United States." *Int J Occup Environ Health* 10, no. 3 (Jul-Sep 2004): 343-50.

[53] Damkaer, D.M., and D.B. Dey. "Evidence for fluoride effects on salmon passage at John Day dam, Columbia river, 1982-1986." *International Journal of Fisheries Managment* 9 (1989): 154-62.

[54] Shepard, R.B. "Drinking water fluoridation and salmon." 2006.

[55] Government of British Columbia. "Water Quality: Ambient Water Quality Criteria for Fluoride." http://www.env.gov.bc.ca/wat/wq/BCguidelines/fluoride/fluoridetoo-04.html.

[56] Pimentel, R., and R.V. Bulkley. " Influence of water hardness on fluoride toxicity to rainbow trout ". *Environmental Toxicology and Chemistry* 2 (1983): 381–86.

[57] Tualatin Valley Water District. "Drinking Water Quality." http://www.tvwd.org/your-water/drinking-water-quality.aspx.

[58] Written and oral testimony to City Club of Portland Ballot Measure Study Committee by David G. Shaff, Administrator, Portland Water Bureau. (February 25, 2013).

[59] Written and oral testimony to City Club of Portland Ballot Measure Study Committee by David Peters, PE, Principle Engineer, Portland Water Bureau (February 25, 2013).

Conclusions and Recommendations

Unanimous Conclusions

Your Committee unanimously agrees on the following:

1. Portland has a substantial dental health problem, and we as a community must take steps to address this issue.
2. Poor dental health has serious negative and long-lasting effects, both in terms of overall health and well-being.
3. Adequate dental care is not accessible to a significant portion of Portland's population and affects minorities and low-income individuals disproportionately.

4. The need to provide the Portland community with a method for the reduction of cavities is great and would have long-term benefits for our children, our community, and our economy.
5. Portland's other attempts to stem the serious dental health problems facing the area have not proven completely successful in addressing these issues.
6. While fluoridation of public drinking water in Portland will not address all issues related to access to adequate dental care and reduction of dental disease, it is an effective, low-cost and equally accessible way to improve dental health and reduce dental cavities.
7. While there are no studies showing any negative environmental effects at the fluoride levels that would result in Portland's wastewater, the amount of fluoride entering the environment should be closely monitored to ensure that it is at a level where it will have no negative effects.
8. As part of Portland's implementation of water fluoridation, there should be a concerted education program for Portland residents and others who will receive fluoridated water.

Majority Conclusions

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1. Based on scientific evidence and over 65 years of experience in other fluoridated communities, water fluoridation at a 0.7 ppm level would not cause negative health effects.
2. Based on these same sources, mild fluorosis is a potential health effect only for children under the age of 6 months who are entirely fed by formula created with fluoridated water at levels around 0.7 ppm, and mild fluorosis is only a cosmetic condition.
3. The overall health benefit of water fluoridation greatly outweighs the small risk of mild fluorosis among children under the age of 6 months.

Majority Recommendation

The majority recommends a "yes" vote on Measure 26-151.

Respectfully submitted,

Stuart Campbell

Elizabeth Friedenwald

Jonathan Levine

Muriel Lezak

Jimmy Lindsay

Nan Newell

Ben Petersen

Judith Ramaley

Keith Skille

Kristina Holm, Lead Writer

Angela Wykoff, Chair

Minority Discussion

Fluoride is a Dangerous Chemical

Fluoride is a powerful chemical (fluorine is more reactive than chlorine) and has been associated with serious adverse health effects (severe fluorosis, stage II skeletal fluorosis and bone fractures) at 4 ppm in drinking water.[1] The Department of Health and Human Services in 2011[2] lowered the recommended concentration from a range of 0.7 ppm – 1.2 ppm to 0.7 ppm. This was done to avoid fluorosis and to address the growing evidence that fluoride intake from sources other than drinking water (food, beverages, and toothpaste) is greater than previously thought. In view of these points, the minority believes an abundance of caution should accompany any decision to systemically administer fluoride to the population even at the new recommended level of 0.7 ppm.

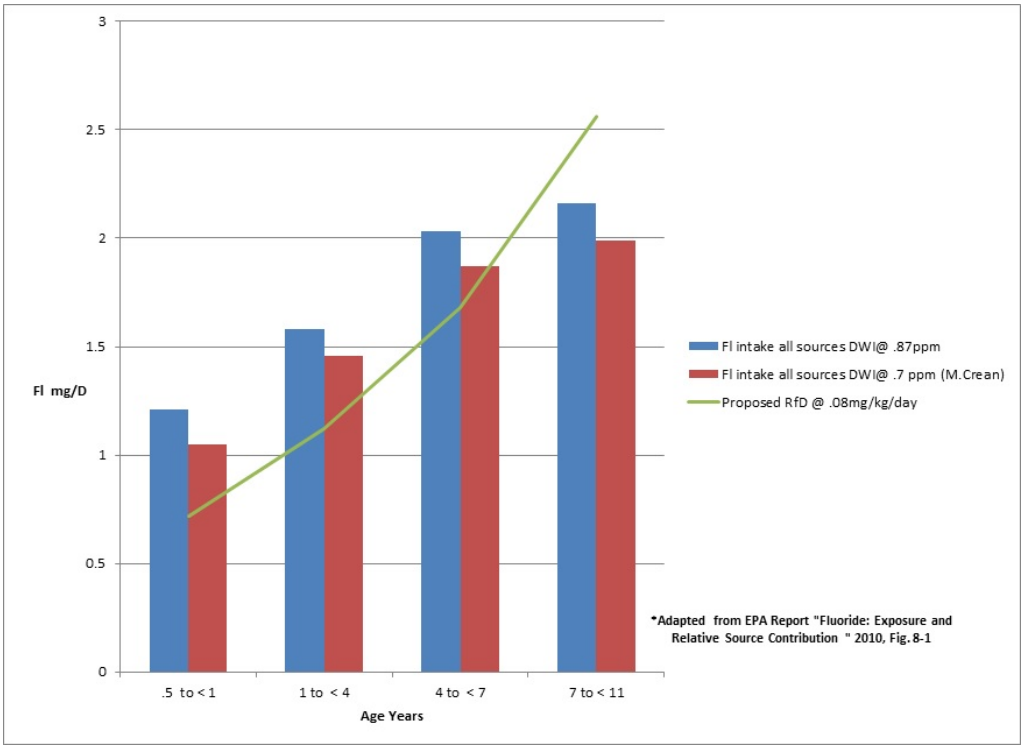
Fluoride Impact on Children under 7

Children under the age of 7 who ingest fluoridated drinking water may be at risk of being overexposed to fluoride. "Dental fluorosis occurs as a result of excess fluoride ingestion during tooth formation."[3] This could potentially lead to dental fluorosis and other unknown adverse health effects.

Infants from birth to 6 months old are particularly vulnerable to being overexposed to fluoride if fluoridated water is used to reconstitute baby formula. This is due to their relatively low body weight and high fluid intake. For instance, a 6 month old consuming an average of 2.5 ounces of reconstituted formula per pound of body weight per day, would have a fluoride intake of about .85 mg per day using drinking water fluoridated at .7 ppm. The EPA publishes a safe reference dose (RfD) for fluoride intake. The RfD is an estimate of daily exposure that is likely to be without any appreciable risk of deleterious effects if taken over a lifetime. The current safe RfD would limit intake to about .45 mg of fluoride, almost half the estimated intake of an infant using fluoridated water.

If Portland fluoridates its water, children age 6 months to 7 years may have total fluoride intake that exceeds the EPA proposed RfD. The EPA[4] estimated the total fluoride intake from all sources (including fluoridated drinking water) for various age groups and compared it to the proposed RfD. They determined that the total fluoride intake from all sources for children age 6 months to 7 years would exceed the proposed RfD (Figure 1).[4] In their summary of findings they state "Based on the data collected and evaluated by the Office of Water, it is likely that most children, even those that live in fluoridated communities, can be over-exposed to fluoride at least occasionally."

Figure 1. Estimated daily fluoride intake in all sources vs. proposed reference dose (RfD)



Fluoride and Informed Consent

Currently, products containing fluoride and used for the prevention or reduction of dental cavities such as rinses, toothpaste and prescription fluoride tablets have detailed warnings and information on their packaging to inform users about their proper application. This occurs at the point of use or in a medical setting, which promotes uniform and effective communication. When drinking water is fluoridated, information or warnings about fluoride would be available only to users who access the Water Bureau website, read material provided, or seek information from other sources. Thus, it will lead to many individuals unknowingly consuming an altered product without their informed consent. For those who are aware of added fluoride in drinking water and who want to "opt out," there will be few economical alternatives. Fluoride is a very small ion (smaller than chlorine) and consequently very difficult to remove. The most reliable way to revert the fluoride level back to its naturally occurring background state is reverse osmosis. The cost of the system is considerable. Estimated at $400 per sink installation and $140 per filter, it would be economically difficult for many Portlanders to afford.

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[1] National Academy of Sciences. *Fluoride in Drinking Water: A Scientific Review of EPA's Standards*. The National Academies Press, 2006.

[2] Environmental Protection Agency. "EPA and HHS announce new scientific assessments and actions on fluoride / agencies working together to maintain benefits of preventing tooth decay while preventing excessive exposure " In *News Releases*, 2011.

[3] Denbesten, P., and W. Li. "Chronic fluoride toxicity: dental fluorosis." *Monogr Oral Sci* 22 (2011): 81-96.

[4] Environmental Protection Agency. "Fluoride: exposure and relative sourve contribution analysis." edited by Health and Ecological Criteria Division Office of Water, 2010.

Minority Conclusions

1. Fluoride is a powerful chemical which can cause adverse health effects at 4 ppm in drinking water such as severe dental fluorosis, stage II skeletal fluorosis and bone fractures.
2. Scientific organizations have recognized that we receive fluoride from many sources other than drinking water, and have adjusted the recommended level downward over time.
3. Children under age 7 will be at risk of receiving excess amounts of fluoride which potentially may lead to fluorosis and unknown long term health effects.
4. If fluoridation is implemented in Portland, a chemical will be systemically administered via the drinking water system to the population without its informed consent and solely for preventive health care purposes.
5. Those Portlanders not wishing to consume fluoridated water will be faced with expensive alternatives to remove the fluoride and return the level to its naturally occurring background state.

Minority Recommendation

The minority recommends substituting the Minority Conclusions for the Majority Conclusions, and a "no" vote on Measure 26-151.

Respectfully submitted,

Michael Crean, Vice Chair

Witnesses

Proponents

Kurt Ferré, DDS, President of The Friends of Creston Children's Dental Clinic and Member of the Oregon Dental Association's Government Relations Council

Mike Plunkett, DDS, MPH, Dental Director at CareOregon Inc, Member of Oregon Public Health Advisory Board, The Oregon Health Authority Kids Steering Committee and serves on the State Evidence Review Commission (HERC), Dental Subcommittee.

Alejandro Queral, MS, JD, Program Officer for Northwest Health Foundation

Philip Wu, MD, Board-Certified Pediatrician, Kaiser Permanente, Community Benefit Team Member for Healthy Eating and Active Living (HEAL)

Opponents

Malgosia Cegielski, PhD, Licensed Psychologist, Registered Play Therapist

Jeffrey K. Fryer, PhD, Columbia River Inter-Tribal Fish Commission and Sierra Club Member, Columbia Group

Chair

Char Glenn, MD, Nob Hill Internal Medicine

Kimberly Kaminski, Clean Water Portland and Executive Director, Safe Water Oregon

Jay Harris Levy, DDS, General Dentist

Rick North, Clean Water Portland, Executive Committee Member

Yolanda Whyte, MD, Pediatrician

Neutral

Henry Stacy Nicholson, MD, MPH, FAAP, OHSU[1] Department of Pediatrics Chair and Physician-in-Chief at Doernbecher Children's Hospital

David Peters, P.E., Principal Engineer, Portland Water Bureau

Eli Schwarz, DDS, MPH, PhD, FACD, Chair of the OHSU Department of Community Dentistry

David G. Shaff, Administrator, Portland Water Bureau

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[1] OHSU representatives formally testified in favor of fluoridating Portland's water supply on September 6, 2012, in front of the City Council. They were allowed to take a formal position because this was strictly a legislative action by the City Council. However, under ORS 260.432, OHSU representatives are prohibited from engaging in certain political activities, which would have included taking a formal stance on the City Council's referral of the Ordinance that occurred on December 20, 2012 or any formal stance on the ballot measure itself.

Acknowledgements

Mary Ellen Farr, Research Advisor

Mary Macpherson, Research Advisor

Greg Wallinger, Research and Policy Director

Select Bibliography

American Dental Association. "Statement on the effectiveness of community water fluoridation." http://www.ada.org/2106.aspx.

Bazian, Ltd. "Independent critical appraisal of selected studies reporting an association between fluoride in drinking water and IQ." London, UK, 2009.

Centers for Disease Control and Prevention. "National Oral Health Surveillance System: untreated tooth decay." http://apps.nccd.cdc.gov/nohss/IndicatorV.asp?Indicator=3.

Centers for Disease Control and Prevention. "Oral Health for Adults." http://www.cdc.gov/oralhealth/publications/factsheets/adult.htm.

Centers for Disease Control and Prevention. "Recommendations for using fluoride to prevent and control dental caries in the United States." Morbidity and Mortality Weekly Report Recommendations and Report 50, no. RR-14 (August 17 2001): 1-42.

Choi, A. L., G. Sun, Y. Zhang, and P. Grandjean. "Developmental fluoride neurotoxicity: a systematic review and meta-analysis." Environ Health Perspect 120, no. 10 (Oct 2012): 1362-8.

Oregon Department of Human Services. "Oregon Smile Survey 2007." http://public.health.oregon.gov/PreventionWellness/oralhealth/Documents/....

Portland Water Bureau. "Fluoride information--Frequently Asked Questions." The City of Portland, http://www.portlandoregon.gov/water/article/411660.

Pryor, C., J. Prottas, B. Lottero, M. Rukavina, and A. Knudson. "The Costs of Dental Care and the Impact of Dental Insurance Coverage." Robert Wood Johnson Foundation, 2009.

Ripa, L. W. "A half-century of community water fluoridation in the United States: review and commentary." J Public Health Dent 53, no. 1 (Winter 1993): 17-44.

Scientific Committee on Health and Environmental Risks. "Critical review of any new evidence on the hazard profile, health effects, and human exposure to fluoride and the fluoridating agents of drinking water." 2010. http://ec.europa.eu/health/scientific_committees/environmental_risks/doc...

About the City Club

The mission of City Club is to inform its members and the community in public matters and to arouse in them a realization of the obligations of citizenship.

Additional copies of this report are available online at www.pdxcityclub.org.

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