

September 19, 2014

To: Megan Foreman, Policy Director
Oral Health Kansas

From: Matt Jacob, Director of Communications & Outreach
Children's Dental Health Project

RE: Fluoridation Cost Impact Analysis for Salina, Kansas

This cost impact analysis for community water fluoridation was prepared by the Children's Dental Health Project (CDHP). This analysis was compiled based on a variety of local, state and national data. As you know, CDHP is an independent, nonprofit organization that monitors research and advises policymakers on oral health issues. For many years, we have provided technical assistance to states through a grant from the Centers for Disease Control and Prevention (CDC). This memorandum includes footnotes that outline the data sources used for our analysis.

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Cost Impact Analysis for Salina, Kansas

Background

Fluoride is a mineral that exists naturally in nearly all water supplies but usually at a concentration that is too low to prevent tooth decay. This explains why so many U.S. communities choose to fortify their water with additional fluoride.¹ U.S. Surgeons General—regardless of the president who appointed them—have consistently recommended fluoridated water as a safe, effective way to reduce the rate of tooth decay.² Only six months ago, one of Britain's leading health agencies issued its findings: "This report provides further reassurance that water fluoridation is a safe and effective health measure."³ The Centers for Disease Control and Prevention report that fluoridated water reduces tooth decay by approximately 25 percent over a person's lifetime.⁴ State and local governments are understandably interested in knowing whether the programs and services they fund provide real return on investment. Fortunately, there have been a number of studies on the financial impact of fluoridation.

A Savings Overview

Community water fluoridation is the most cost-effective health measure for preventing decay.⁵ This practice saves money in two ways. First, it saves money for families who would otherwise have to pay for more frequent fillings and other dental treatments.⁶ Second, it saves money for taxpayers. In fact, a Texas study confirmed that the state saved \$24 *per child, per year* in Medicaid costs for children because of the cavities that were prevented by drinking fluoridated water.⁷ A similar study

of Medicaid-enrolled children in Louisiana found that kids living in non-fluoridated communities were three times more likely than those in fluoridated areas to be treated in a hospital operating room for dental conditions.⁸

Fluoride varnish, fluoride-rinse programs and other forms of fluoride also provide cavity-prevention benefits, but research commissioned by the Robert Wood Johnson Foundation in the 1980s found that water fluoridation was the most cost-effective form of fluoride for preventing tooth decay in children.⁹

Cost Impact Analysis for Salina

Fluoridation has been shown through decades of research to reduce the rate of tooth decay—even in an era when fluoride toothpaste is widely used. By reducing the rate of cavities, fluoridation can reduce the need for fillings or more costly dental treatments. Of course, these treatments and their costs can vary significantly, based on the severity of a patient’s dental problems.

Based on recent data from the American Dental Association, we estimate that the average cost of filling a cavity in a Kansas dental office is \$155.¹⁰ Fillings are only one type of dental treatment to repair the structure of a tooth that is damaged by tooth decay. Sometimes, a dental crown is needed to repair a tooth that was damaged by decay and filled many years earlier.¹¹ The average cost of placing a dental crown is \$917.¹²

In some instances, extensive tooth decay or abscesses can prompt people to seek care in hospital emergency rooms (ERs). Earlier this year, one Midwestern state found that the average hospital charge for an ER dental visit was \$1,103, and the cost jumped to \$46,174 if the condition was serious enough to warrant an overnight hospital stay.¹³ Given the high costs of treating dental conditions in ERs, Kansas communities should explore ways to reduce the number of children and adults who require kind of care.

Salina residents are highly likely to spend significantly more money on dental treatment costs if fluoridation ends. The following analysis explains why.

The annual, per-household cost of maintaining fluoridation in Salina is an estimated 58 cents per household.¹⁴ Comparing this annual cost with the dental treatment costs cited previously enables us to reach the following conclusions:

- The cost of filling one cavity (\$155) for a Salina resident far exceeds the annual cost per household (58 cents) of fluoridating the community’s drinking water.
- If consuming fluoridated water helped to prevent the need for even three fillings for a Salina household over the next 10 years, the savings (\$465) would exceed the household’s cost (\$6.70) to fluoridate Salina’s drinking water over this same period—saving about \$69 for every dollar spent on fluoridation.¹⁵
- In addition, if fluoridation prevented the need for a member of that Salina household to be given a dental crown over the next 10 years, the money saved (\$917) would be dramatically higher than the household’s cost (\$6.70) to fluoridate the local water system over the same period.
- If fluoridation were to be ceased in Salina, within several years, annual dental treatment expenditures by city residents would likely increase by an estimated \$580,000.¹⁶

Other Costs to Consider

Our analysis only calculated the cost of dental treatments to repair teeth that suffer decay. We did not calculate the financial benefits that might result from fluoridation due to reductions in absenteeism in the workplace or from fewer absences by schoolchildren. For this reason, it is likely that the financial savings for the public and taxpayers would be even higher if a more comprehensive analysis were conducted. This conclusion is based on multiple studies conducted over the past six years. For example, a North Carolina study showed that children with poor dental health were nearly three times more likely to miss school than their healthier peers.¹⁷ Another study revealed that California teens with recent dental pain were four times more likely to earn below-average grades.¹⁸

Because fluoridation also reduces the rate of cavities among adults, a community ceasing this practice is likely to see some impact on their employment prospects and work patterns. Last year, a CNBC story pointed out one of the consequences for adults with unhealthy or missing teeth:

“In America, most people—including employers—make instant judgments based on appearance, including someone’s smile and teeth.”¹⁹

A 2008 study concluded that people with missing teeth “may experience significant barriers to personal and social success.”²⁰ Attempting to project the educational and employment-related impact for Salina would require much more research and substantial time.

Conclusion

Fluoridation is a proven form of cavity prevention that helps people of all ages avoid the pain, cost and other negative impacts of tooth decay. In addition, numerous studies have identified cost savings for dental patients and taxpayers. As this analysis observes, ending fluoridation in Salina is likely to have costly consequences for families and residents.

Sources

¹ “2012 Water Fluoridation Statistics,” Centers for Disease Control and Prevention, <http://www.cdc.gov/fluoridation/statistics/2012stats.htm>.

² For examples, see the following transcripts: Dr. Richard H. Carmona, “Statement on Water Fluoridation,” July 2004, <http://www.nidcr.nih.gov/oralhealth/Topics/Fluoride/StatementWaterFluoridation.htm>, and Dr. David Satcher, “Surgeon General’s Statement on Community Water Fluoridation, 2001,” December 3, 2001, <http://www.cdc.gov/fluoridation/factsheets/sg01.htm>.

³ “Water fluoridation: Health monitoring report for England – 2014,” Public Health England, March 2014, p.6, https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/300202/Water_fluoridation_health_monitoring_for_england_full_report_1Apr2014.pdf.

⁴ “Fluoridation Basics,” Centers for Disease Control and Prevention, July 25, 2013, <http://www.cdc.gov/fluoridation/basics/index.htm>

⁵ Fluoridation’s status as the most-cost effective way to prevent tooth decay was noted by U.S. Surgeon General Richard Carmona in 2004, and it was the conclusion reached in a 2002 report by the National Institute of Dental and Craniofacial Research (NIDCR). For more information, see Dr. Carmona’s statement at <http://www.nidcr.nih.gov/OralHealth/Topics/Fluoride/StatementWaterFluoridation.htm>. The NIDCR’s conclusion can be accessed at http://drc.hhs.gov/report/2_0.htm.

⁶ See: “Lifetime Costs of a Cavity,” Children’s Dental Health Project, 2013, <https://www.cdhp.org/resources/298-lifetime-costs-of-a-cavity-by-delta-dental>.

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- ⁷ “Savings from Water Fluoridation: What the Evidence Shows,” Pew Center on the States, 2011, <http://www.dmww.com/upl/documents/library/savings-from-fluoridation.pdf>.
- ⁸ “Water Fluoridation and Costs of Medicaid Treatment for Dental Decay – Louisiana, 1995-1996,” Morbidity and Mortality Weekly Report, Centers for Disease Control and Prevention, September 3, 1999, Vol. 48, No. 34, <http://www.cdc.gov/mmwr/preview/mmwrhtml/mm4834a2.htm>.
- ⁹ J.V. Kumar and M.E. Moss, “Fluorides in Dental Public Health Programs,” *Dental Clinics of North America*, 2008, Vol. 52, <http://www.ncbi.nlm.nih.gov/pubmed/18329450>.
- ¹⁰ The average cost of a filling (\$155) is derived from a two-surface restoration of a tooth, averaging the costs for amalgam (D2150) and composite (D2331) restorations within the region that includes Kansas and six other states. For more information, see p. 47 of the American Dental Association’s 2013 *Survey of Dental Fees*.
- ¹¹ “Dental Crowns: When Is a Crown Needed?” WebMD, accessed on July 8, 2014 at <http://www.webmd.com/oral-health/guide/dental-crowns>.
- ¹² This estimate is based on averaging the procedure code costs for eight types of dental crowns, using cost data for the region that includes Kansas and six other states. For more information, see the American Dental Association’s 2013 *Survey of Dental Fees*.
- ¹³ “The Cost of Dental-Related Emergency Room Visits in Michigan,” Anderson Economic Group LLC, April 3, 2014, commissioned by Delta Dental of Michigan, <http://www.andersoneconomicgroup.com/Portals/0/upload/AEG-Delta%20Dental%20Report%20FINAL%204.4.14.pdf>.
- ¹⁴ Data provided by Salina’s Director of Utilities indicates that the local water system serves approximately 48,500 people, and the average annual cost of maintaining fluoridation over the past eight years (2006-2013) has been \$11,527. The water system anticipates no need to purchase new equipment over the next five years. Based on U.S. census data for Kansas, there are approximately 19,960 households served by the Salina water system. For more information, visit <http://quickfacts.census.gov/qfd/states/20000.html>.
- ¹⁵ The annual household cost for fluoridation was adjusted by an annual inflation rate of 3 percent to reflect potential changes in costs over this 10-year period.
- ¹⁶ In 2012, the Pew Charitable Trusts examined dental claims data for Wichita residents covered by Blue Cross-Blue Shield, Delta Dental and Medicaid, which totaled approximately \$18 million. Our projections for Salina are based largely on the Pew memorandum and also on the 25 percent reduction in tooth decay that the CDC reports from community water fluoridation. (Pew Charitable Trusts memorandum to Wichita businessman Barry Downing, March 12, 2012.)
- ¹⁷ S.L. Jackson et al., Impact of Poor Oral Health on Children’s School Attendance and Performance,” *American Journal of Public Health* (October 2011), Vol. 101, No. 10, 1900-1906, <http://ajph.aphapublications.org/doi/abs/10.2105/AJPH.2010.200915>.
- ¹⁸ “Poor Oral Health Can Mean Missed School, Lower Grades,” Ostrow School of Dentistry of USC, August 2012, <http://dentistry.usc.edu/2012/08/10/poor-oral-health-can-mean-missed-school-lower-grades/>.
- ¹⁹ J. Aleccia, “Bad Teeth, Broken Dreams: Lack of Dental Care Keeps Many Out of Jobs,” CNBC, June 13, 2013, <http://www.thedailybeast.com/articles/2013/06/13/bad-teeth-broken-dreams-lack-of-dental-care-keeps-many-out-of-jobs.html>.
- ²⁰ M.S. Willis, C.W. Esqueda and R.N. Schacht, “Social perceptions of individuals missing upper front teeth,” *Perceptual and Motor Skills*, April 2008, Vol. 106, No. 2, <http://www.ncbi.nlm.nih.gov/pubmed/18556899>.