Updating the Economic Analysis of Community Water Fluoridation

70th Anniversary Fluoridation Celebration
American Dental Association
Chicago, IL

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September 11, 2015
Disclaimer

While this presentation intends to provide information about the status of the study it is conducting, the opinions presented here do not necessarily reflect those of The Pew Charitable Trusts.
What I’ll Cover

Background – current sources of economic claims
Pew’s update of 2001 economic analysis
Limitations of economic claims and concerns
Plea to tailor economic claims to circumstances, (especially attempts to discontinue CWF)
Fluoridation is an Investment

"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.

Dr Vivek H. Murthy
U.S. Surgeon General (2014 – Present)
Works Over the Entire Lifespan

“Fluoridation is the single most effective public health measure to prevent tooth decay and improve oral health over a lifetime, for both children and adults.”

David Satcher, MD, PhD
There is No Better Investment

“Fluoridation is the single most important commitment a community can make to the oral health of its children and to future generations.”

Dr. C. Everett Koop
Why it’s Important to consider CWF an Investment

• Initial Costs of CWF are High
• Policymakers are aware of costs of installing and maintaining necessary equipment and operating water plants,
• Are unaware of cost of treating cavities.
• Overly simplistic Wichita example:
  – Mayor balked at $2M estimate to begin CWF.
  – Total cost of fillings or basic restorative dental treatments for residents covered by BC-BS, Delta Dental and Medicaid was approximately $18 million in one recent year.
Fluoridation is **Cost-effective**

- Cost-effective means we can measure the cost to prevent a cavity. The cost of CWF is less than that of other preventive methods.
- *Avoiding just one filling would pay for fluoridation for a family of four for over 30 years* (in many communities).
Fluoridation is Cost-Saving

Every $1 invested in water fluoridation

Saves $38 in unnecessary dental costs
How was 38:1 ROI derived?

• In 2001, CDC researchers determined that CWF was cost-SAVING over a wide range of assumptions, even for small communities.

• Under typical conditions, annual per-person cost savings in fluor’d communities ranged from $16 in very small communities (<5,000) to nearly $19 for larger communities (>20,000).

• Takes into account:
  – costs of installing and maintaining necessary equipment and operating water plants,
  – the expected effectiveness of fluoridation,
  – estimates of expected cavities in non-fluoridated communities,
  – cost of treating cavities,
  – and time lost visiting the dentist for treatment.
How was $1:$38 derived?

- For larger communities of more than 20,000 people (where 80% of persons in the U.S. with fluoridated water live), where it had cost about 50 cents per person to fluoridate, every $1 invested yielded approximately $38 savings in dental treatment costs.

- Unfortunately, many proponents of CWF have used this statistic to describe expectations for communities where the costs to fluoridate are much higher.

- Where costs are higher, the ROI is lower, but still very good.
What’s Wrong with 1:38?

• CWF is great. We don’t need to exaggerate its benefits.

• Our credibility is what gives us an edge over opponents; we should not undermine one another with claims that can’t be supported.

• Recently, CDC has revised its estimates, removing reference to a single value, now claiming returns of $4 for very small & $27 for very large systems.
Pew’s Interest

- Cost of CWF vulnerable to claims that it was outdated.
- 2001 analysis based upon data from 1980s in just one state, Florida.
- Those costs much different than were being experienced in communities newly fluoridating in 2000s.
Methods of update follow previous studies

An Economic Evaluation of Community Water Fluoridation

Susan O. Griffin, PhD; Kari Jones, PhD; Scott L. Tomar, DMD, DrPH

Abstract

Objective: The purpose of this research was to assess the local cost savings resulting from community water fluoridation, given current exposure levels to other fluoride sources. Methods: Adopting a societal perspective and using a discount rate of 4 percent, we compared the annual per person cost of fluoridation with the cost of averted disease and productivity losses. The latter was the product of annual dental caries increment in nonfluoridated communities, the rate of averted disease in the presence of lower caries incidence. Therefore, the purpose of this research is to determine if reduction in cost of restorative care due to averted disease still exceeds the program costs of water fluoridation, and, if not, to measure its

PREVENTING CHRONIC DISEASE
PUBLIC HEALTH RESEARCH, PRACTICE, AND POLICY

Costs and Savings Associated With Community Water Fluoridation Programs in Colorado

Joan M. O’Connell, PhD, Diane Brunson, RDH, MPH, Theresa Anselmo, RDH, Patrick W. Sullivan, PhD

O’Connell, et al
Prev Chron Dis 2005

Griffin, et al
J Pub Hlth Dent 2001
New Study’s Methods, Part I

- Estimate cost of CWF
  - Update Ringelberg data (Florida, 1980s)
  - Include recent start-ups in other states
  - Include construction, equipment, installation, fluoride additive, labor, maintenance, each annualized as appropriate.
- Estimate increment of caries in persons w/o CWF
  - Based on change in recent decade, NHANES
  - Different estimates of preventive effectiveness.
  - Measure in newly decayed TEETH per year.
- Estimate increment of caries prevented using range of preventive effectiveness
New Study’s Methods, Part II

- Estimate restorative costs of decay not averted over lifetime
  - Replacement restorations are more complex
    - Based on Delta Dental plan data from 5+ states
  - Differentiate initial tx from replacement tx
  - Assume median replacement age 12 yrs
  - Use median U.S. fees
  - Adjust fees for proportion Medicaid
  - Include cost of time to receive treatment
New Study’s Outputs

• Estimate cost savings for typical community of various sizes
• Sensitivity analysis – over what range of assumptions is CWF cost-saving?
New Study Will Not:

- Include cost savings for decay prevented in primary teeth
- Include cost savings for reduced need to replace teeth lost due to decay
- Include cost of more intensive clinical preventive care recommended for persons with root caries

As did the previous studies, we intentionally underestimate the cost savings by ignoring the above issues, which are more complicated to model.
Preliminary Findings

• Cost of fluoridating is
  • 3X higher in small communities,
  • 2.5X higher for systems serving 5-20,000 persons,
  • 2X higher for larger systems than earlier analyses.
• Increment of decay is lower than previous estimates for 18-34 y.o, but higher than previous for 35-64 y.o. And this study recognizes that people continue to receive restorative care over lifespan beyond age 65.
Preliminary Findings

• Cost of simple filling is more than 2X higher than previous analysis.

• We do NOT yet have any estimates of cost savings or ROI for any sized community, but what if the final estimates are as low as CDC’s recent statement of $4 for very small communities and only $27 for very large communities?

• All are great ROIs. None are singularly likely to change position of decision makers.
Challenges and Limitations

- If one believes CWF is not safe, no amount of cost savings trumps that concern.
- Credible information about long-term cost savings as a counterpoint to formidable short-term costs has the potential to increase support for CWF ONLY for the subset of the population who believe it is both effective in reducing decay and safe.
Fluoridation is Supported by Reputable Health Organizations

No widely respected medical and health organizations oppose fluoridation.
Challenges and Limitations

• Recognize that costs and savings accrue to different participants.
• Encourage a “community” perspective.
  • Community – a group of people with diverse characteristics who are linked by social ties, shared common perspectives, and engage in joint action in geographic locations.
Challenges and Limitations

- Ultimately the same people pay for both CWF and treatment in the LONG run, but short term budget/fee/taxation issues have more salience.
- Seek to broaden perspective and accountability of decision-makers.
- Remind their constituents that all parties will lose if low taxes/fees means increased costs are privately incurred by families to treat unnecessary decay.
Preventing “Rollbacks”

• Proponents of CWF often cite 1:38 when more accurate estimate is easily calculated.

• Based on Griffin (2001), base case of $19.12 is the averted treatment costs in 1995 $s, or $30 per person in 2015 $s.

• Anticipated savings from discontinuation is solely cost of fluoride additive; never personnel.

• Typical cost of additive is $0.25 annually per person, but each community considering discontinuing CWF knows precisely its costs. What is cost per person of the additive?

• Knowing these, you can make strong economic arguments to resist “rollback” even without findings of the Pew study.