

Fluoride-treated water and the problem of merit goods

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Abstract

This paper inquires into the fluoride treatment of community water in the United States to determine why and how conflicts in the production, consumption, and distribution of merit goods arise and are resolved. Primary and secondary data were employed to analyze statewide and municipality-level fluoridation initiatives in one key “battleground” state. We find that obstacles to successful fluoridation include a unidimensional policy space, high risk premia assigned by the affected population to health and environmental hazards, concerns over government interference with personal health choices, perceived adequacy of fluoride sources, “customer bundling,” and lack of a critical middle ground for consensus-building. The accessibility and social desirability of merit goods, like fluoridated water, cannot therefore be considered as value-free choices. How consumer demand is expressed, how fluoridation costs and benefits are estimated, how conflicts over its provision and production are resolved, and how the merits of science-based policies can be equally recast in terms of their presumed demerits require serious attention on the part of decision-makers in formulating and implementing health promotion policies.

Keywords: Anti-fluoridationists; Customer bundling; Externalities; Fluoridationists; Fluoride; Health promotion; Merit goods; Oral health; Unidimensional policy space; Water fluoridation

Introduction

This is a study about conflict in the production, consumption, and distribution of merit goods exemplified by fluoride-treated water. Specifically, we seek to determine why and how these conflicts arise and are resolved.

In the field of public health, tooth decay continues to be the number one chronic disease in children; it is also a major problem among adults in the United States (ADA, 2005). However, it is a preventable disease. One scientific preventive measure involves the adjustment of naturally-occurring fluoride in public water to the level recommended for optimal oral health.

Public water fluoridation continues to be a raging controversy in the United States. As reported in *TIME*, ‘the practice was voted down in 38 of 79 referendums, from Modesto, Calif. to Worcester, Mass. [between 2000 and 2005]’ (Roosevelt, 2005). Nowhere does it appear to be more contentious than in the state of New Jersey, which offers a Case Study for the purpose of this paper. New Jersey ranks among the

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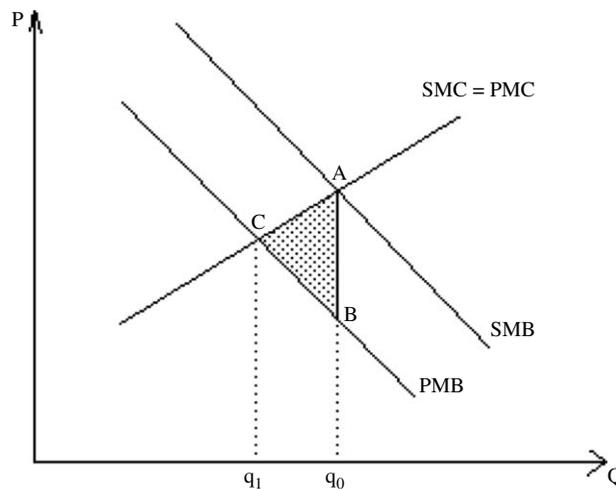
lowest in the 50 states (second only to Hawaii) in terms of the percentage of the state population that drinks fluoride-treated water.

This study is divided into three sections: Part 1 offers an analytical framework for government provision of fluoride-treated public water. Part 2 discusses the key elements and issues in the fluoridation controversy nationwide. Part 3 examines unsuccessful fluoridation initiatives at the local levels of government.

A merit goods approach to water fluoridation

From the standpoint of economic theory, fluoridated water is a public good: (1) the marginal cost of providing fluoride-treated water to an additional customer is practically zero (Pindyck & Rubinfeld, 1989). Once supplied to a household, no extra cost exists in supplying it to others; (2) no individual can be effectively excluded from consuming it (Pindyck & Rubinfeld, 1989). Some people (e.g. non-residents of a community) could also consume fluoridated water without paying for it. In contrast, purchases of private goods, like an automobile, by one customer exclude others from obtaining it.

Merit goods constitute a special category of public goods as well as private goods. In economic theory, merit goods resemble public goods because they create positive externalities, or desirable benefits, to society as a whole. These positive externalities are greater than an individual's utility or benefit, as depicted in Figure 1. Absent a social welfare objective in Figure 1, "government interference with consumer preferences and consumption patterns cannot be justified. On the other hand, if merit goods become too inclusive, the concern is that governmental power becomes unrestrained" (Mendoza, 2008).



Where:

q_0 = socially efficient level of usage

q_1 = free market equilibrium

ABC = loss of welfare due to underproduction

PMC = personal marginal costs

SMC = social marginal costs

Fig. 1. Social marginal benefits (SMB) > Personal marginal benefits (PMB) of merit goods.

If provided entirely by the free market (i.e. as a private good) and left to a consumer's ability to pay, merit goods would not be produced in sufficient quantities because consumers fail to appreciate the social benefits resulting from their consumption (Musgrave, 1959). Fluoridated water, like public education and community-sponsored flu vaccination, belongs to this category of private goods. Human society undoubtedly benefits from a healthy and educated population regardless of the level of demand for and consumption of fluoridated water.

Public goods and merit goods make it difficult for the free market to allocate them efficiently, given the free-rider problem (Cornes & Sandler, 1996). Free-riding arises whenever consumers take more than their fair share of a public resource, or alternatively, shoulder less than a fair share of its production costs (Cornes & Sandler, 1996). Free-riding poses an economic problem when it leads to the underproduction or non-production of a good like fluoride-treated water. For example, a for-profit company is unable to devise an efficient system in which households that use fluoridated water in higher quantities are also charged higher fees, because there is no method to supply it without benefitting everyone in the community (or excluding anyone from overconsumption). Hence, governments subsidize or provide fluoride-treated water (directly, or indirectly through contracting arrangements).

Community water fluoridation began in Grand Rapids, Michigan, in 1945 following earlier epidemiologic and laboratory studies that showed how adjusting fluoride levels in water reduces tooth decay. In the 1950s, scientists further determined that one part fluoride to one million parts of water—with minimal variance in warmer or colder areas—was the optimal fluoride level in drinking water. That optimal level remains as the regulatory yardstick for the Centers for Disease Control and Prevention of the U.S. Department of Health and Human Services (DHHS). That optimal level is claimed to provide maximum protection against tooth decay, especially to children below age 13 (fluoridation's primary beneficiaries) as well as older children and adults (Ripa, 1993; Horowitz, 1996).

Fluoridation initiatives increased dramatically in the late 1950s and 1960s. In 2000, DHHS launched *Healthy People 2010*, a nationwide health promotion and disease prevention plan covering the years 2000 to 2010. One key objective calls for at least 75% of the United States population to receive optimal levels of fluoridated water compared to the current rate of 67.3%. To date, over 14.5 million more people nationwide need to gain access to fluoridated water.

Cavity-fighting alternatives, such as fluoride dietary supplements (i.e. tablets/lozenges and drops for smaller children), have not been actively promoted by government agencies because they raise issues of access and effectiveness. In contrast, accessibility of fluoride-treated water derives from breadth of reach, convenience, low production costs, and non-excludability. Its presumed effectiveness derives from strong scientific endorsements and ease of consumption: 'Simply by virtue of drinking water, most people will obtain fluoride. This means that individuals who never go to a dentist, or those who have decay-producing diets due to poverty, ignorance, or preference, still obtain the benefits of fluoride' (Martin, 1991).

Here lies the basic fluoridation dilemma. The objectives of unrestricted access to, and uniform consumption of, fluoride-treated water does not necessarily command popular support and acceptance. Unlike in the case of private goods where market signals (such as prices) indicate consumer preferences, the demand for merit goods is neither easily quantifiable nor immediately verifiable. It depends on the (sometimes elusive) notion of social desirability. The overarching social welfare benefits of merit goods exceed their private benefits, yet their costs—whether real or perceived—can be severely burdensome to certain populations, and need to be addressed by decision-makers.

The fluoridation controversy: key elements and issues

A one-dimensional policy space reflects a single, key source of cleavage, such as that between conservatives and liberals or between rich and poor. Voters' preferences 'are distributed along this single dimension of the political debate, while they have no preferences on any other [related] issues' (Levy, 2002).

Unidimensionalism, in the case of water fluoridation, has been reinforced in the state of New Jersey and many 'hotbed' states by the implicit assumption that the available choices are binary (for or against fluoridation) and bipolar (advocated by two, mutually repellent, forces). That is, local residents have to choose whether or not to fluoridate their drinking water but cannot simultaneously choose among two or more preventive oral health measures, including prescriptive fluoride supplements, fluoride varnish, fluoride mouth rinse, dental sealants, proxy drinking water applications (e.g. magnesium treatment), or some combination of these and other scientifically-approved options (American Academy of Pediatric Dentistry, 2008). Some of the least fluoridated states like Montana—where successive fluoridation referenda have failed—offer a contrast. Grade schools in 38 counties (serving one-third of students) participate in a fluoride mouth rinse program to compensate for Montana's 23% fluoridation rate.

The main elements of the raging fluoridation controversy are examined below before proceeding to the community-level experiences of the state of New Jersey. These elements illustrate how the combination of a one-dimensional policy space and binary/bipolar alternatives produces neutral or indifferent 'median' voter-type results that allow for predictable policy outcomes, particularly when scientific knowledge is in question.

The protagonists

Besides conducting public investigations, the United States Congress and other federal agencies have declined to pass national measures requiring (or banning) public water fluoridation. The battle has inevitably shifted to the state and local levels. Its proponents ('fluoridationists') 'typically portray support for fluoridation as coming from responsible professionals, community organizations and citizens' (Martin, 1991). The opposition ('anti-fluoridationists') see themselves as 'ordinary concerned members of the community, whereas support for fluoridation derives from financial and bureaucratic vested interests' (Martin, 1991).

Fluoridationists consist mostly of federal and local government agencies, professional health organizations led by the American Dental Association (ADA) and American Medical Association (AMA), corporate supporters (toothpaste and equipment/supply companies), and professional health and scientific organizations.

Anti-fluoridationists are typically represented in the fluoridation debate nationwide by a diverse collection of citizens' groups. These include anti-fluoridation coalitions/networks, broader health-oriented and environmental associations, and neighborhood advocacy groups. They are often joined by individuals, mostly professionals, who assume advocacy roles. In New Jersey, as in the bottleneck states of Hawaii, Oregon, Montana, Washington, Ohio, Arizona, Alaska and Pennsylvania, we find that health and scientific organizations rarely campaign against water fluoridation.

Bipolarization derives from the solidity of conviction and consistency of forces on both sides of the fluoridation debate. With rare crossovers, one can expect that '[if] these partisans support or oppose fluoridation, they do so on all possible grounds rather than as a balance of advantages and disadvantages'

(Martin, 1991). Bipolar alignments in New Jersey and other states are reinforced by the absence of middle forces, particularly supporters of alternative cavity-fighting policies or measures.

Decision-makers and decision-making venues

Residents' proximity to the decision-making venue(s) and the extent of their decision-making role are crucial factors in fluoridation debates nationwide. Specifically, when the decision is left entirely to community residents through a referendum, or submitted to extensive hearings prior to a vote by the competent authority, we find that it is highly unlikely that water fluoridation will succeed. Data shows that public referenda have rejected fluoridation at least half of the time in the last 20 years (Roosevelt, 2005; Hileman, 2006). In some states like New Jersey, Hawaii, Oregon, Montana, New York and Florida, where solid opposition blocs have been in place for decades, the percentage of failed fluoridation initiatives vis-à-vis the state can reach 75%. Some government agencies have either opposed a referendum, or sought postponement of public hearings until sufficient pro-fluoridation decision-makers are in place to vote. Conversely, once a fluoridation proposal has been introduced, anti-fluoridation groups are likely 'to convince state and local legislative officials to remain neutral' and 'to refer the issue to a public vote, rather than to decide the issue through the legislative process' (Easley, 1999).

The experience of 11 states, Washington D.C. and Puerto Rico—which statutorily mandate fluoridation throughout their jurisdictions—is somewhat different. Several of them successfully enacted legislation in the 1960s and early 1970s when public information and deliberation about the health risks of fluoridation were insufficient. Statutes also vary widely in these places. All municipalities are required to fluoridate in Delaware, Georgia, Illinois, Minnesota, and Nebraska. Virginia and Kentucky achieved statewide fluoridation without specific legislation. Connecticut, Nevada, and South Dakota require fluoridation of water systems that serve a specified threshold population. Some states exempt communities from complying with a statewide mandate if a local referendum rejects fluoridation.

Campaign strategies

Fluoridationists and anti-fluoridationists have employed various public relations and communications strategies ('sloganeering' included) in their campaigns. We find that the main difference usually lies in their sources of financial and logistical support. Fluoridationists in New Jersey, for example, are more likely to receive support from government agencies (e.g. Centers for Disease Control and Prevention grants) and interest groups (ADA, toothpaste and dental supply/equipment companies).

However, the effect of these campaign strategies is mixed. While fluoridationists' strategies range from massive 'educational' campaigns to 'vituperative *ad hominem* attacks' on leading oppositionists, none has succeeded in achieving broad societal acceptance of fluoridation, which today is opposed as vigorously by activist groups as it was in the 1940s (Groth, 2001). Anti-fluoridationists, on the other hand, are often blamed for resorting to 'scare tactics' and citing 'atypical incidents' to attract public attention.

Direct benefits and positive externalities

Consistency and coherence of arguments presented by the two opposing sides appear to be hallmarks of fluoridation battles across the United States.

Proponents argue that fluoridation is the most effective cavity-fighting measure available to all community residents at the most affordable cost. They typically cite scientific studies of fluoridated communities showing a 35 to 60% reduction in dental caries among children and adults as a result of fluoride consumption by children during their teeth-forming years, and direct contact with teeth and saliva throughout an individual's lifespan (Ripa, 1993). Positive spillover effects include stronger bone structure, reduced periodontal disease, and significant savings in time, effort and money for dental treatment.

In both the United States as a whole and in New Jersey, where tooth decay leads children's diseases, proponents have aggressively promoted the socially desirable ends of fluoridation. New Jersey fluoridationist groups in Bergen, Camden, Gloucester, Morris, and Passaic Counties often quote the United States Surgeon-General's statement that fluoridation allows all community residents 'to enjoy its protective benefit—at home, work, school or play—simply by 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 to receiving fluoridation's health benefits' (Carmona, 2004). The ADA has echoed the Centers for Disease Control and Prevention's pronouncement on water fluoridation as one of the top 10 public health achievements of the twentieth century. Its affiliate, the New Jersey Dental Association (NJDA), is pointed in its criticism of anti-fluoridationists: 'Most of New Jersey's largest cities, including Camden, Newark, Jersey City and Paterson, do not fluoridate their water.... This disproportionately affects the poorest populations in New Jersey who already are fighting an uphill battle when it comes to access to quality healthcare' (NJDA, 2008). The redistributive effects of fluoridation (Griffin *et al.*, 2001; Burt, 2002) have been cited by both the ADA and NJDA in their campaign materials and media endorsements.

Fluoridationists further argue that positive externalities are not limited to income redistribution. The \$38.00 estimated savings in dental treatment for every \$1.00 or less spent by governments in fluoridation is said to produce indirect cost-savings to society in services provided by health departments, community health clinics, health insurance premiums, and other public medical programs which partake of the costs of keeping an individual healthy (NJDA, 2008).

Risks and negative externalities

Most anti-fluoridationists have left unchallenged fluoridation's direct benefits due to the preponderance of scientific evidence and the relative scarcity of supporters from the health community (Martin, 1991). Instead, the socially undesirable consequences of fluoridating public water appear to be more effective in pulling community residents away from the fluoridationist side, and toward either the neutral median or the opposition side of the unidimensional policy space.

Up until 1988, anti-fluoridationists' concerns about the health and environmental risks of fluoride-treated water were easily dismissed by fluoridationists as 'junk science' or 'scare tactics.' That year, *Chemical and Engineering News* became the first professional publication to give credibility to the scientific criticisms of fluoridation, which commanded significant national attention (Hileman, 1988). Since then, various risks—some scientifically-backed and others purely conjectural—have been articulated by anti-fluoridationists. They range from fluorosis (excessive fluoride ingestion resulting in teeth mottling) to a laundry list of adverse health effects, including kidney disease, genetic damage, osteoporosis, Downs' syndrome, AIDS, Alzheimer's disease, pineal gland, nymphomania, and carcinogenesis risks. In effect, they have provided the opposition with vital ammunition it lacked in early fluoridation battles.

After 1988, the health and scientific communities began to pay serious attention to the harmful consequences of water fluoridation. Many more related studies were published, and objectively reported to lay readers by *Chemical and Engineering News*. Some called attention to the contradiction between classifying industrial silico-fluoride byproducts as too hazardous to release into the air and river, and considering them safe and beneficial for treating drinking water, where their intake is unregulated and excessively high and toxic (Groves, 2001). One study (frequently quoted by New Jersey anti-fluoridationists) offered evidence that powerful interests with high financial stakes collude to prematurely terminate honest discussion and investigation into fluoride toxicity (Bryson, 2004). In recent years, a potential link between fluoride and cancer has been raised by several noted scientists based on work done with animal and human subjects (Yiamouyiannis, 1993; McDonagh *et al.*, 2000; Bassin *et al.*, 2006). This added element in fluoridation debates in the United States, has elevated health concerns about the organic contaminants in fluoridated water. Armed with a substantial body of scientific research, the New Jersey Citizens Opposing Forced Fluoridation (NJCOFF), the state's leading anti-fluoridationist organization, has claimed that 'fluoridation chemicals used in public water supplies are waste products of the phosphate fertilizer industry. If the industry wasn't permitted to dump this waste product into our drinking water, they'd have to dispose of it as hazardous waste' (NJSW, 2008).

The suspect chemicals have not been proven entirely guilty beyond reasonable doubt. Yet the concerns those studies collectively raise about their biomedical and environmental hazards have helped anti-fluoridationists typecast fluoride-treated water as a demerit good¹. As illustrated in Figure 2, the production and consumption of a demerit good bears negative consequences to other people and to the general welfare. Demerit goods also "tend to be overconsumed, and hence, overproduced, if left entirely to private suppliers" (Mendoza, 2008). By asserting that it is unhealthy, degrading or otherwise socially undesirable—in the same way that tobacco, alcohol, junk food, recreational drugs, and prostitution are considered demerit goods—anti-fluoridationists have gradually gained considerable parity with fluoridationists, at least with respect to political mobility and interest articulation. In turn, the situation has increasingly bred median voters who find it difficult to choose sides given the scientific evidence and passionate campaigns offered by both.

Legal challenges

Bipolar characterizations of fluoridation as a merit good (preventive health measure) and demerit good (toxic pollutant to the human body and ecosystem) extend to the legal issues attending its controversy. Should unwanted, universal community access to fluoride-treated water be mandated by governments? This question has spawned many lawsuits across the United States. It essentially focuses on two conflicting theories of private choice: an individual's right to privacy versus the police power of governments (Balog, 1997).

We find that legal challenges to fluoridation have consistently failed on appeal to state appellate courts. In upholding fluoridation statutes as a valid exercise of police power, appellate courts have ruled that privacy rights are not absolute and may be infringed, provided public objectives are legitimate and

¹ Economic theory is premised on the assumption that individuals are not the best judge of their welfare with respect to demerit goods, and that government should intervene by way of regulation or legal prohibition to discourage their production, sale and/or consumption.

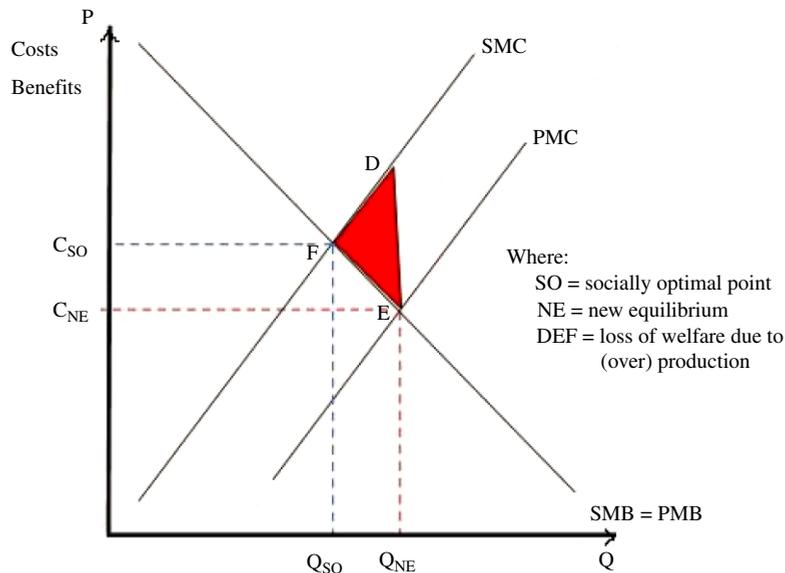


Fig. 2. Social marginal costs (SMC) > Personal marginal costs (PMC) of demerit goods.

the means of enforcement are rationally related. The desirability of fluoridation, or its uncertain effects on personal health, is immaterial under the police power doctrine. A New Jersey Supreme Court decision upholding fluoridation in Somerville Borough² further stressed that ‘the unanimity of appellate state court holdings is matched only by the frequency and persistent regularity with which the United States Supreme Court has declined review’ of fluoridation cases (*Young v. Board of Health*, 1972). Some lawsuits continue to be filed in other states on the grounds that there is no compelling government interest involved to justify regulation of a non-contagious disease (tooth decay). Their indirect benefits to anti-fluoridationists derive from their presumed demonstration effects (e.g. increased campaign intensity and public awareness/interest in their cause).

Unsuccessful fluoridation initiatives at the local government level

New Jersey offers a useful Case Study to illustrate the preceding elements and issues in the water fluoridation debate, particularly at the regional/local community level. A mid-Atlantic state with a population of approximately 8.6 million in 2007, New Jersey ranks first nationwide in terms of population density. It consists of 21 counties and 566 municipalities. Parts of the state strategically lie within the sprawling metropolitan areas of New York and Philadelphia.

New Jersey is a ‘key battleground’ (Lipka, 2004a) in the federal fluoridation campaign because only 16% of residents receive fluoride-treated public water (Figure 3) in contrast to the Centers for Disease Control and Prevention’s goal of making it available to at least 75% of the American population

² This is the only New Jersey appellate court decision on fluoridation to date.



Fig. 3. Fluoridated communities (shaded) in the State of New Jersey.

(Hajna, 2005). New Jersey is also the least-fluoridated state in the continental United States (second only to Hawaii nationwide), although its residents consistently rate access to affordable, quality health care as their most important policy concern (Center for State Health Policy, 2007). Finally, several of New Jersey's counties and municipalities do not receive fluoridated water due to the same major issues encountered by most of the least-fluoridated states, where less than a third of state residents drink fluoridated water (Hawaii, Oregon, Utah, Montana, and California). These issues, as analyzed in this section, include organized opposition to statewide legislation, defeated public referenda, 'customer bundling,' recalled fluoridation policies/measures, policy substitution, and passage of 'pure water' initiatives (Dwore, 1978; Kemmick, 2002; Lamp, 2002; Zimmerman, 2002; Smith, 2004; Roosevelt, 2005; Associated Press, 2007; Colburn & Graves, 2007).

Statewide legislation

Over the past 50 years, the venue for statewide fluoridation efforts in New Jersey has alternated between the Legislature and the Public Health Council, the deciding body for the state's Department of Health and Senior Services (DHSS). Anti-fluoridationists have successfully resisted all proposed statewide mandates largely by recasting and typecasting fluoride-treated water as a demerit good. The most recent legislative attempt came in May 2003 in response to the federal CDC campaign (New Jersey General Assembly, 2003). The General Assembly bill extensively cited the United States

Surgeon-General's report and other studies of the preventive and welfare redistribution effects of fluoridation as a merit good to counter its expected opposition.

The Fluoride Action Network, NJCOFF, and New Jersey Environmental Federation launched a vigorous counter-offensive that this time included letter-writing to state legislators. They held that government had no business forcibly 'mass medicating' the state's population. To avert a clash with these groups, the bill's authors withdrew it after only three weeks. The NJDA and ADA responded by submitting an almost identical, statewide fluoridation proposal to the Public Health Council to accomplish through a regulatory framework what they had failed to do through legislation for decades.

The Public Health Council held public hearings that dragged on for almost two years, beginning in October 2004. Officials of the Centers for Disease Control and Prevention, Environmental Protection Agency (EPA), ADA, NJDA, and private doctors and dentists underscored the direct benefits and positive externalities of fluoride-treated water (Lipka, 2004b). The opposition was spearheaded by a larger coalition of environmentalists, anti-government conservatives and social activists. They argued that: (1) substantial decreases in dental caries seen in the United States and other industrialized countries in the last 50 years have occurred to about the same extent in fluoridated and non-fluoridated jurisdictions alike, which render the 'merit good' aspects of fluoridation irrelevant; (2) fluoridated water carries serious health and environmental risks that its proponents can no longer conceal, ignore, or belittle; (3) residents are 'overexposed' to fluoride in toothpaste, mouthwash, dental treatments, and even beverages bottled in places that have fluoridated water; and (4) government cannot make private health choices on behalf of the governed (Campbell, 2005a).

The Council's vote in April 2005 was repeatedly delayed to accommodate other interested parties. It was persuaded by the New Jersey Sierra Club's director to indefinitely suspend voting pending completion of a fluoride study by the National Research Council (NRC). The Sierra Club is large non-profit organization that has vigorously championed environmental causes, including strong advocacy against the sources and uses of fluoridated water. After two years, it was evident to the Public Health Council that the bipolar debates boiled down to the contentious issue of private choice, as its chairman, Dr Robert Pally, asked, 'Do we decide to put something in the water people may not want to have?' (Lipka, 2005).

The NRC study (NRC, 2006), released in March 2006, discussed the adverse health effects of EPA-approved levels only for naturally-occurring fluoride in tap water. However, the opposition in New Jersey and the least fluoridated states seized the opportunity to cast doubts on the reliability of Centers for Disease Control and Prevention's optimal levels for fluoridated water. As the renewed offensive bred more confusion among the state's residents, more of them gravitated towards the neutral median.

The fierce campaign waged by the bipolar forces upon the resumption of the Public Health Council hearings was unexpectedly halted in July 2006. New Jersey's governor issued a restructuring order that removed the Public Health Council's voting powers and reduced it to a purely advisory agency. Anti-fluoridationists hailed it as a timely victory that came before the Public Health Council vote. They viewed Pally and his fellow members, who were mostly doctors and dentists, as naturally biased toward fluoridation. Fluoridationists called the order a 'power grab' (Campbell, 2005b). Political leaders, however, refrained from issuing statements about it in the face of mounting public criticisms of statewide fluoridation in 2006. The failure of New Jersey's statewide initiative mirrored the more recent experiences of Oregon, Hawaii, Arizona, and Pennsylvania, where proposed legislation was either defeated, withdrawn, or tabled, due to fierce and organized opposition and, consequently, lack of voter support.

Public consultations/referenda

In many ‘hotbed’ communities, fluoridationists see the anti-fluoridationist clamor for ‘home rule’ as a political strategy to confine the debate locally. Local referenda or public consultations offer the opposition, through its ‘grassroots’ approach, a highly-valued opportunity to win public support or at least breed median voters.

New Jersey’s fluoridated water systems are mostly situated in the central and south-central regions ‘where the health department put their efforts’ (James, 1999). As Figure 3 shows, these regions are closer to the state’s only fluoridated city of Trenton, the state capital located in Mercer County. Middlesex, Monmouth, and Mercer Counties together comprise almost 75% of the total fluoridated population in New Jersey (Greenberg, 1992). The northern and southern regions, by and large, do not fluoridate due to stronger oppositionists, lack of political leadership or lack of voter interest in the midst of a bipolarized debate (Regan, 2004). These include the counties of Bergen, Hudson, and Passaic, which form part of the Metropolitan New York Area north of Trenton and constitute 23.8% of New Jersey’s population, and Camden and Gloucester (except for one township) in the south. These counties already represented a combined state population of 9.4%. Most of their local governments have either chosen to leave these jurisdictions non-fluoridated or offered token support to fluoridationist efforts. Local officials also seem more vulnerable to acts of intimidation, such as stuffing dead rats in their mailboxes (Roosevelt, 2005: 62). (Note: fluoride is used for rat poison).

The last public referendum in New Jersey was held by Pequannock Township in 2000. After two years of debates focusing on the accessibility and desirability of fluoridation, its Township Council was persuaded by town officials and dentists to sponsor a non-binding referendum as a gauge of public sentiment; the Township Council chose to make the final decision. The referendum proved to be divisive, as AMA and NJCOFF debated its benefits, risks, and externalities. The result was a narrow 52.2% vote against fluoridation. Pequannock’s Township Council nonetheless considered it as a clear expression of voter preference leading to the demise of the municipal fluoridation effort (Fallon, 2000).

Customer bundling

Unsuccessful fluoridation of the northern town of Westfield, and the southern shore’s Egg Harbor Township, exemplify the critical issue of ‘customer bundling.’ A decision of a single municipality against the desirability of fluoridation adversely affects adjacent municipalities that choose to provide it to their residents, when common, investor-owned suppliers depend on their unanimous consent. Several private suppliers simultaneously serve 40 or more of New Jersey’s 566 municipalities.

In spite of growing public support for a fluoridation ordinance in 1998, Westfield’s Board of Health voted to abandon it after its private supplier advised that they needed to initially secure the consent of all other serviced towns in the eastern water distribution system (Butnick, 1999). Similarly, United Water Resources (the major supplier in Bergen and Hudson counties) indicated it would add fluoride to tap water only if each of the 60 municipalities it serves signed on. Egg Harbor’s Township Council, on the other hand, approved fluoridation in the mid-1990s. However, the New Jersey American Water Company could not implement it after neighboring Galloway Township voted against its own fluoridation resolution following a successful campaign waged by NJCOFF and

the New Jersey Sierra Club (Buccino, 2001). These cases indicate how popular fluoridation initiatives can be aborted when municipalities have different preferences but shared service delivery systems. They also demonstrate how one side in a binary and bipolar debate can capitalize on a structural arrangement like customer bundling to achieve the desired spillover effects on several contiguous communities.

Policy recall

Over 20 municipalities have recalled their existing fluoridation policies or passed ‘pure water’ measures out of growing health and safety concerns. A production ban in one locality spills over to nearby localities when customer bundling exists.

Jersey City and Hoboken share the United Water Company, which maintains their water pipes and services, although water supply is municipally produced. Both were fluoridated in 1974. Passionate anti-fluoridation campaigns waged by the NJCOFF and local residents based on the presumed desirability of private choice/options and the magnitude of health risks and negative externalities led both cities to hold simultaneous referenda in 1978. The anti-fluoridationists won (Jersey Journal, 2001). Subsequent attempts to re-fluoridate in both cities proved to be unsuccessful.

In ‘unbundled’ communities, public perception of the risks and hazards of merit goods as intolerable could affect their desirability from the consumers’ standpoint. Beach Haven, for example, became the last town in Long Beach Island in southern New Jersey to enact an ordinance declaring its own fluoridation program null and void in April 2007. Adjacent communities had done the same earlier, following well-organized and successful anti-fluoridationist campaigns (Hunter, 2007). The augmentation of non-fluoridated Galloway Township’s water supply with Atlantic City’s fluoridated water sparked controversy in 2001 due to personal mortality and morbidity cases raised by local social activists. Galloway’s Council subsequently chose to ‘err on the side of prudence’. It allowed continued purchase of Atlantic City’s tap water, provided Atlantic City totally bypasses fluoride-treatment.

Policy substitution

With the remote probability that their residents would ever receive fluoridated water, some municipalities have adopted alternative measures to combat tooth decay. Paterson’s grade schools and many similar schools around Bergen, Passaic, and Union Counties voluntarily participate in a weekly fluoride mouth rinse program that has appeased anti-fluoridationist concerns about fluoride ingestion through tap water. Known as ‘Save our smiles,’ this DHSS-funded program has expanded to over 400 schools and 80,000 students statewide. Schools targeted by this department include ‘high-need’ districts and ‘high-risk’ K-Grade 8 children, based on local health department criteria (NJDHSS, 2002). Other non-fluoridated towns have promoted the program, along with fluoride supplements, as a ‘campaign for choice in children’s dental care’.

Several fluoridationists contend that fluoride-treated water is still more effective in fighting tooth decay. That is because substitute policies, like ‘Save our smiles’ and fluoride dietary supplements, tend to restrict fluoride access to certain groups, such as grade school children and higher-income families. However, policy alternatives that eschew binary choices are sometimes the only acceptable ones when unidimensional prescriptions fail to contain polarizations among consumers of merit goods. Therein lies

the most practical contribution of alternative and ‘second-best’ approaches to the current water fluoridation debate.

Conclusion

One of the prevailing myths in the economic theory of merit goods concerns their ‘desirability,’ which is not necessarily a value-free decision. That water fluoridation allows unrestricted access to fluoride, that it entails no additional cost to provide to more than one consumer, and that its social benefits are greater than its private benefits, tells us nothing about its desirability to consumers. An assertion that tooth decay leads children’s diseases in the United States and New Jersey—and that government intervention by fluoridating public water supplies is imperative—does not consider how consumer demand will be expressed, how the costs and benefits of fluoridation will be valued, how conflicts over provision and production will be resolved, or how science-based policies could be recast in terms of their presumed demerits.

A framework based on the spatial dimension of public health policy helps identify and analyze obstacles to fluoridation initiatives. These include adverse health and environmental risks, concerns over alleged government interference with personal health choices, perceived adequacy of fluoride sources, customer bundling, insufficient public interest, voter opposition, and lack of a critical middle force/middle ground for consensus-building. We find that a unidimensional policy space restricted to binary choices easily breeds bipolarization during fluoridation campaigns, and converts them into acrimonious, ‘win-or-lose’ battles. In this sense, the accessibility and social desirability of merit goods become sharply conflicting values.

One may think that value-free, scientific knowledge could settle the conflict between the accessibility and desirability of fluoridated water. However, as this study shows, scientific discovery can be a slow, incremental and inconclusive process. Binary choices help produce unsettled debates about policy benefits and risks. What one side may support as a merit good could be treated as a demerit good by the other. If median public perception of risks and negative externalities are relatively high, that should support a decision against fluoridation; if low, that should help encourage fluoridation.

Finally, this study raises questions about the extent to which scientific knowledge should inform science-based prescriptions, and whether public policy could flow directly from scientific knowledge. A value-laden choice is undeniably involved. Unless policy-makers intend to leave fluoridation decisions entirely to the growing number of disaffected median voters, alternative and second-best approaches deserve to be considered. It is in this context that the fluoridation debate calls attention to the need to balance the political costs and benefits of choices involving merit goods, and to examine these choices in terms of their unintended or spillover consequences.

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