

The Fluoridation War: a Scientific Dispute or a Religious Argument?

Ernest Newbrun, DMD, PhD

Abstract

Communal water fluoridation is not considered controversial by the vast majority of the scientific community; however, politically it has persisted as an issue that many legislators and community leaders have avoided because of an aura of dispute. It has been a battleground for vigorous opposition by a very small but outspoken minority who have fought it with the dedication of religious zealots. This paper reviews the nature of the opposition, who they are, the broad thrust of their arguments, some of the specific issues they have raised, and their techniques. [J Public Health Dent 1996;56(5):246-52]

Key Words: AIDS, antifuoridationists, cancer, courts, dental caries, effectiveness, community water fluoridation, safety.

When I was invited to participate in this symposium celebrating the 50th anniversary of controlled communal water fluoridation at Grand Rapids, Michigan, I was asked to discuss the opposition to this measure. Fortunately, I was given carte blanche on how to address this topic and I confess the title is of my own choosing. Professor Donald McNeil has referred to "the fight for fluoridation" and described it as "America's longest war" (1). He went on to state that "a few things remain constant in America—death, taxes, baseball, and since 1950, widespread, often successful efforts by a passionate minority to keep fluoride out of public drinking water" (1).

Health professionals and biomedical researchers see water fluoridation as a scientific issue, and almost all agree that questions about its efficacy and safety were more than adequately settled long ago. Opponents, however, object to fluoridation on philosophical principles concerning the rights of individuals to freedom of choice on health matters. With the exception of some Christian Scientists, few oppose it on strictly religious grounds, but many of those opposed to fluoridation are willing to fight with the dedication of religious zealots—hence the title of my lecture. In this review I will exam-

ine the nature of the opposition, who they are, the broad thrust of their arguments, some of the specific issues they have raised, and their techniques.

The Antifuoridationists

When Trendley Dean, Philip Jay, and John Knutson met with the mayor of Grand Rapids 50 years ago to gain his approval for a water fluoridation experiment, no opposition existed to becloud the issue (2). However, complaints of ill effects due to water fluoridation were reported shortly after January 1, 1945, the official starting date. These complaints included: "Since they've been adding fluoride in our drinking water I have been gaining weight rapidly," and "Bathing in fluoridated water is causing a rash all over my body." Owing to delays in delivery of the equipment, fluoridation did not actually start in Grand Rapids until January 25, yet the complaints preceded the implementation of water fluoridation! Initially the complaints came from isolated individuals, but eventually there grew to be an organized network of hard-core opposition to this public health measure, not only at a local level, but at national and international levels. This opposition is not altogether surprising from a historical perspective, as there

was opposition in the 1920s to pasteurization of milk and immunization of children against diphtheria and smallpox. Similarly, at the turn of the last century there existed fierce opposition to chlorination of the drinking water. More recently, gene splicing and organ transplantation have encountered some hostility. In all of these cases, the opposition perceives these procedures not as advances in public health and preventive medicine, but rather as "tampering with nature" and as forced medication.

At a national level, the antifuoridationists include the National Health Federation, the Center for Health Action, Citizens for Health, and the Safe Water Association. Their activities are detailed elsewhere (3,4). The *National Fluoridation News* was published quarterly "in the interest of all organizations and individuals concerned with keeping our drinking water free of chemicals not needed for purification" and was illustrated with clever cartoons ridiculing academia, the health establishment, government, and industry for their endorsement of fluoridation. In addition, local "pure water" associations have been organized to prevent fluoridation, their name itself being something of a misnomer as there are over 40 different chemicals, apart from fluoride, that are commonly used in water treatment plants to make water potable (5).

It is important to distinguish people who have voted against this measure in referenda but have not been active opponents from those in the much smaller but extremely vociferous group who are the real "antifuoridationists." According to most opinion surveys conducted between 1952 and 1977, the antifuoridationists constituted about 10 to 20 percent of the US population (6). In a more recent survey of parents' attitude toward fluoridated

drinking water, 10 percent disapproved, 78 percent approved and 12 percent did not know or refused to answer (7) (Figure 1). Disapproval ranged from 4 percent in communities that were already fluoridated to 16 percent in communities that were not.

The opponents of fluoridation are a heterogeneous lot and cannot be described easily. They come in many guises, including some, but certainly not all, of the following: right-wing extremists, misguided environmentalists ("Greens"), chiropractors, elderly persons concerned about the costs of fluoridation, food faddists, and anti-science "naturalists." Other species have emerged, including the self-proclaimed "neutral" who tries to portray an image of dispassionate open-mindedness, but clearly has accepted the opposition's arguments irrespective of whether they have been adequately tested and answered (8-10). Another is the "born-again antifluoridationist" who previously accepted the mainstream belief in the benefits of fluoridation, but has experienced an epiphany so that the scales have fallen from his eyes and he has seen the light (11-13).

Chronology of Opposition Arguments

As would be expected, the nature of the opposition has undergone some changes over the past 50 years (Table 1). In the 1950s, in the heyday of the McCarthy era when Nixon had succeeded in winning elections by Red-baiting his opponents and the Rosenbergs had been convicted of espionage, fluoridation was portrayed as a "Red conspiracy" that would produce "moronic, atheistic slaves" who would end up praying to the communists. Groups such as the John Birch Society and the Ku Klux Klan rallied to oppose fluoridation. In the film "Dr. Strangelove," who can forget Sterling Hayden's hilariously paranoid portrayal of Col. Jack D. Ripper, the demented commander of Burpelson Air Force Base? He was obsessed with "purity and essence of our natural body fluids" and therefore only drank bourbon with distilled water because he did not want his "bodily fluids" violated by fluoridated water, a Communist plot. He was convinced that fluoridated water caused postcoital exhaustion and would have none of it.

In the 1960s Rachel Carson, in her

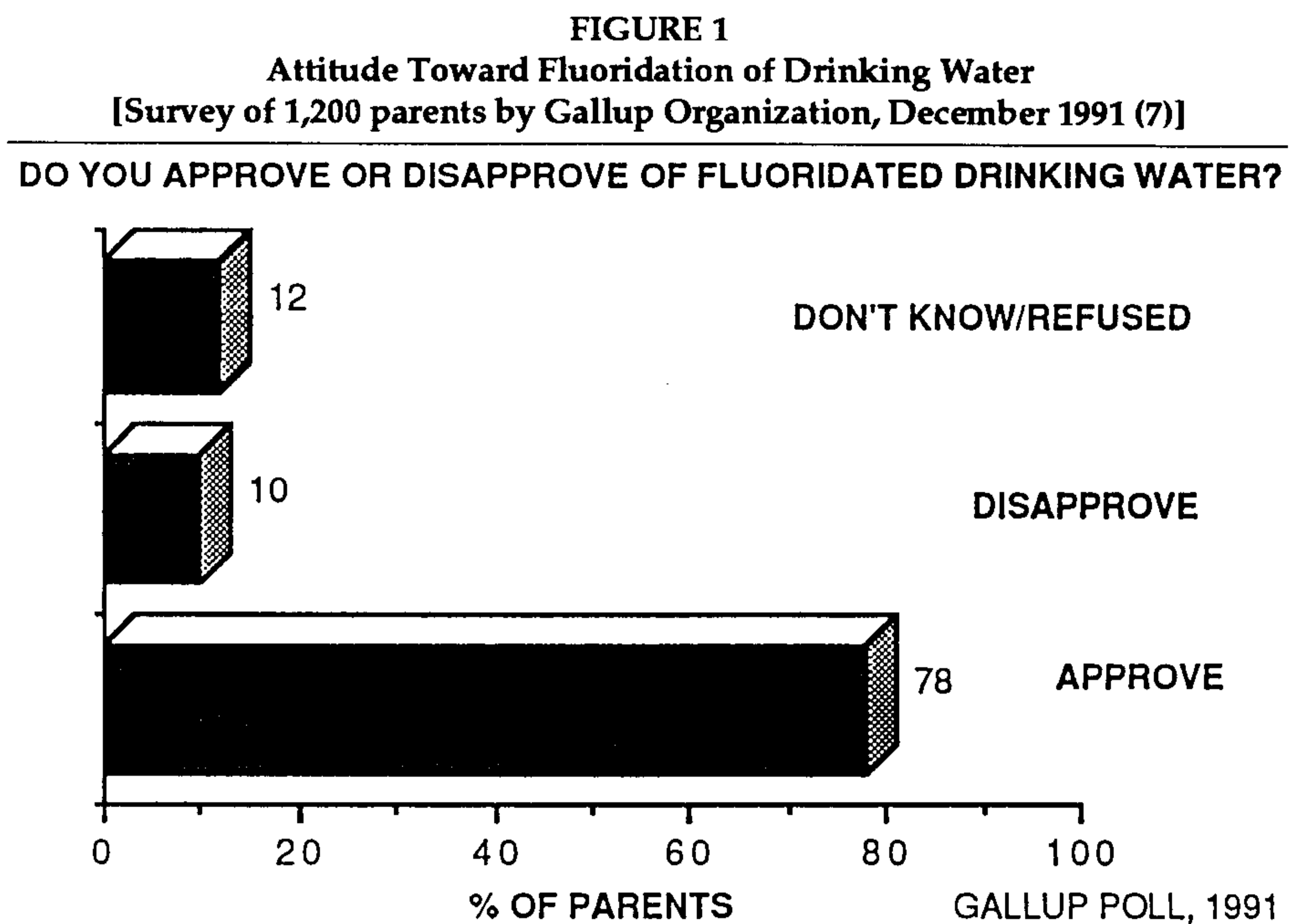


TABLE 1
Chronology of Antifluoridation Propaganda

Period	Antifluoridation Propaganda
1950s	Communist plot
1960s	Environmental concerns, use of buzzwords: toxic waste, pollutant, poison
1970s	Anti-military-industrial complex mood; conspiracy of US government, health establishment, and industry; human cancer
1980s	Aging, Alzheimer's disease, AIDS
1990s	Bone fracture, decreased birth rate, human cancer

book "The Silent Spring," expressed her concerns about the effects of insecticides on wildlife and the foods we eat. Americans became more aware of the problems of unbridled industrial pollution and abuse of insecticides. Accordingly, antifluoridation propaganda switched to environmental concerns, using buzzwords like toxic waste, pollutant, and poison in reference to fluoride.

In the 1970s, in the aftermath of the Vietnam War, the antifluoridationists cashed in on the anti-establishment and anti-military-industrial complex mood of the country. Fluoridation was portrayed as a conspiracy among the US government (Public Health Service), the medical-dental establishment, and industry. The year 1975 was also the time when John Yiamouyiannis, during the Los Angeles referendum, attempted to link water fluoridation with the risk of human cancer (14-16).

By the 1980s, when Americans be-

came more health conscious and were exercising in large numbers, anti-fluoridationists claimed fluoride caused aging, Alzheimer's disease, and AIDS (17,18). Now, in the 1990s, fluoride is charged with being the cause of bone fracture in postmenopausal women and is blamed for the declining birth rate, as well as again being accused of causing cancer. Although I have given some chronological order to the antifluoridation propaganda, clearly some of these tactics have been recycled periodically and some have never gone away. For example, as recently as 1992 an opponent referred to water fluoridation as socialistic mass medication, repeating the term "socialized" in reference to water or medicine five times in the same article (19). Who said McCarthyism is dead?

Arguments of the Opponents

Having lived for the past 34 years in

California, a state that ranks near the bottom (48th) in the nation with respect to percent of the population (18%) enjoying the benefits of water fluoridation, I have been called upon to participate as a scientific expert on fluoridation in several city council or water authority hearings in Los Angeles, Marin County, and the East Bay Municipal Water District, as well as to testify to the California legislature. In addition, I have testified to a committee of the US Congress, in the Queen's Court in Canada, and the Ministry of Health in Chile, and I have submitted written testimony to a Royal Commission in Victoria, Australia. I have debated antifluoridationists on television and radio and appeared on call-in radio programs to answer questions about fluoridation. I have heard or read most of the arguments that the opponents have presented, although I confess I have never heard them specifically claim that fluoridation causes nymphomania and satyriasis, as others have reported (2). I feel I have been in the trenches in this fluoridation war for most of my professional life. Although the specific arguments of the antifluoridationists may change with the *Zeitgeist*, the basic tenets have changed very little over the years. They are as follows: fluoride is a poison and causes deleterious health effects, fluoride is ineffective in preventing decay, fluoridation is costly, and fluoridation interferes with freedom of choice and infringes on individual rights (Table 2).

Claims that Fluoride is Harmful. Opponents identify fluoride as a poison both specifically as being toxic and generally as being responsible for a wide spectrum of common ills including allergy, birth defects, cancer, and heart disease, as well as rarer conditions such as crib death, immune deficiency, and Gilbert's syndrome (20). Antifluoridation propaganda frequently shows fluoride with a skull and crossbones, labeled poison, ignoring the matter of dosage. When antifluoridationists speak about fluoride, they compare it with lead and arsenic (17,21), rather than with essential elements such as iodine, zinc, or iron, or with Vitamins A and D, which are also toxic in excess. Waldbott, one of the earlier physicians to oppose fluoridation, listed the illnesses attributable to "artificial" fluoridation as: stomach and intestinal, stomatitis, polydipsia,

Antifluoridation Arguments	Profluoridation Answers
Poison	Safe at 0.7-1.2 ppm
Ineffective	15-40% less caries
Delays caries	Less caries at all ages
Costly	Cheap 25¢ (median/person/year) 50¢ (mean/person/year)
Freedom of choice	Individual restraints in the interest of community public health
Individual rights	

Year	Organization	Ref
1957	Commission of Inquiry, New Zealand	25
1968	Royal Commission of Tasmania, Australia	26
1970	World Health Organization, Geneva, Switzerland	27
1976	Royal College of Physicians, London, UK	28
1977	National Academy of Sciences, Washington, DC	29
1977	Commission of Inquiry, Victoria, Australia	30
1982	International Agency for Research on Cancer, Geneva, Switzerland	31
1985	Department of Health, San Francisco, California	32
1985	Working Party (Knox), London, UK	33
1990	State Department of Health, New York	34
1991	National Health and Medical Research Council, Canberra, Australia	35
1991	US Public Health Service (Young), Washington, DC	36

joint pains, migraine-like headaches, visual disturbances, tinnitus, and mental depression (22). Regrettably, all too often these illnesses are reported as anecdotal cases that are not based on randomized clinical trials. Such uncontrolled or poorly controlled observations can be dismissed.

It is beyond the scope of this review to respond to all the health-related claims of antifluoridationists; these have been amply detailed elsewhere (23,24). Reports of independent experts in relevant fields of medicine and epidemiology, as well as scientists and water engineers, have been unanimous that the benefits of water fluoridation far outweigh any potential risks. Data concerning the safety of water fluoridation have been reviewed repeatedly by international, national, state, and local authorities (25-36). Scientists have recently reviewed the results of more than 50 epidemiologic studies on the relation-

ship between fluoride concentrations in the drinking water and the risk of human cancer, as well as animal toxicity data (37). The conclusion of all of these reports has been uniform: there are no significant health risks associated with water fluoridation at an optimal level (Table 3). At optimal fluoride concentration the growth, health, and development of children is normal. Claims of carcinogenicity, teratogenicity, genotoxicity, and the like have not been substantiated under rigorous scientific examination. Mortality rates and other health statistics (other than dental caries) in fluoridated and nonfluoridated communities are similar. No injury from optimally fluoridated water has been proven to date. Dental fluorosis, mostly of the very mild to mild degree, may occur in some of the population, but this is primarily a cosmetic issue and not an adverse health effect.

Claims that Fluoridation is Ineffec-

tive in Caries Reduction. Several opponents have criticized the design, analysis, or conclusions of the studies on communal water fluoridation, implying that water fluoridation is ineffective in caries reduction (13,38,39). Sutton's (39) claim of examiner bias and the need for blind studies has been amply answered by the consistent finding of lower caries prevalence in comparisons of fluoridated with non-fluoridated communities, when examinations of patients or of radiographs were conducted under blind conditions (40-44). Diesendorf (38) considers that the temporal reductions in tooth decay observed in nonfluoridated communities as well as in fluoridated communities cannot be attributed to fluoride, implying that changes in dietary patterns, especially sugar consumption, are responsible.

Unquestionably, decay rates have fallen in nonfluoridated communities, but not to the same extent as in fluoridated ones (45,46). This temporal decrease in caries rates in nonfluoridated communities is primarily due to the widespread use of fluoridated dentifrices, particularly since the 1970s. A recent review of the efficacy of water fluoridation based on surveys conducted in the decade of 1979 to 1989 in Australia, Britain, Canada, Ireland, New Zealand, and the United States concluded that the current data show a consistently and substantially lower caries prevalence in fluoridated communities (47). The effectiveness of water fluoridation has decreased as the benefits of other forms of fluoride have spread to communities lacking optimal water fluoridation; still, even a 20 percent additional reduction of decay due to water fluoridation is substantial.

Economics of Fluoridation. Opponents have argued that since only a very small fraction (less than 0.1%) of public water supplies is actually drunk, most being used for other purposes such as washing, watering gardens, and flushing toilets, water fluoridation is inherently wasteful. Of course, the same logic also would stop water chlorination as wasteful. The initial outlay for equipment costs of large cities may be quite considerable; however, this is amortized over 20 to 25 years and the cost of an extra building facility, if any, is amortized over 50 years. Operating costs for supplies and water engineers are quite small

when calculated on a per capita basis. In the United States the annual cost of community water fluoridation averages 50¢ per person (25¢ per person median), depending mostly on the size of the community, labor costs, and types of chemicals and equipment utilized. Accordingly, lifetime costs of fluoridation are about \$38, which is less than the \$42 cost of an average two-surface amalgam restoration. Fluoridation remains the most cost-effective caries preventive measure wherever there is an established municipal water system.

Freedom of Choice and Infringement of Individual Rights. To opponents of fluoridation, the issue of freedom of choice and individual rights is sacred and probably the most important single issue on which they all agree. In 1971 an opinion survey on the attitudes of opponents to fluoridation was carried out by the *National Fluoridation News*, which has a circulation of 10,000 (48). Although only 570 responses were received, 97 percent of those responding considered fluoridation "unconstitutional." Objections based upon "philosophical, ethical, or moral beliefs" ranked first in validity and priority and second in importance out of 10 categories. In contrast, "health hazards" ranked eighth in validity and fifth in importance and priority (Table 4). In other words, opponents do not really believe all their own propaganda about the dangers of fluoridation; they use the health risk argument for political purposes to scare the public.

What really turns on the opponents,

motivates them to donate money to their organizations, to participate in massive letter-writing and facsimile-sending campaigns, and to personally lobby legislators is their opposition to government involvement in health care—what they refer to as "mass medication" or government bureaucrats "trampling on your health freedoms." The legal validity of fluoridation has been thoroughly tested in the United States over the past decades and invariably confirmed. The courts have agreed that while the Constitution guarantees the right to protect one's own health, this right is subject to regulation by police power in the interest of the public's health (4). No appellate court in the United States has ruled against fluoridation. In the Netherlands and Scotland, fluoridation has been overturned on legal grounds. It is worth noting that in Scotland Lord Jauncey, the judge, while sustaining the petitioner's plea that fluoridation for the purposes of reducing caries was *ultra vires* the Strathclyde Regional Council, vindicated the safety and effectiveness of water fluoridation (49).

Techniques Used by Opponents

The methods used by the opponents in attempting to block fluoridation have been detailed elsewhere (50,51) and will only be summarized here (Table 5). Let me offer examples of neutralizing politicians, of the big lie, and of reasons for not debating with opponents of fluoridation.

The US Postal Service was urged to issue a postage stamp in 1995 to com-

TABLE 4
Relative Rankings of Grounds for Objections to Fluoridation by Opponents Responding to Survey*

Validity	Importance	Priority
1. Philosophical	1. Ecological	1. Philosophical
2. Ecological	2. Philosophical	2. Ecological
3. Other	3. Common sense	3. Common sense
4. Common sense	4. Lack of benefits	4. Lack of benefits
5. Economic	5. Health hazard	5. Health hazard
6. Lack of benefits	6. Other	6. Other
7. Other damage	7. Economic	7. Political
8. Health hazard	8. Political	8. Economic
9. Religious	9. Other damage	9. Other damage
10. Other	10. Religious	10. Religious

**National Fluoridation News* (48).

memorate the 50th anniversary of water fluoridation—hardly a controversial issue considering that the postal service has issued commemorative stamps for Elvis Presley and Marilyn Monroe, both of whom died of a drug overdose. Other countries have issued postage stamps recognizing water fluoridation. Apparently the members of the US Postal Commission were “neutralized” and have as yet refused to issue a fluoridation commemorative stamp.

In September 1984, Wendy Nelder, a member and at that time president of the San Francisco Board of Supervisors, requested an investigation into fluoridation as a cause of increased risk of AIDS, cancer, and other diseases (18). In a debate on the “Today” television show, she stated that the death rate in fluoridated communities was 300 percent higher than in non-fluoridated ones and subsequently claimed an “overwhelming increase of the death rate from heart disease in fluoridated areas” (52). In a few minutes she was able to present much misinformation that would require a much longer time to refute. Nelder was referring to the Bartlett (8 ppm F)–Cameron (0.4 ppm F) study in Texas of residents who had lifelong exposure to natural fluoride (53). In the ten-year period from 1943 to 1953, 14 persons died in Bartlett whereas only 4 persons died in Cameron, hence the “300 percent” increase (Table 6). What she failed to inform the viewers was that in Bartlett, 15 percent of the population in 1943 and 12 percent of the population in 1953 were older than 70 years of age, while in Cameron during the same time span only 4 percent were older than 70 years of age (Figure 2). No wonder there was a higher death rate in the fluoridated community! Such tricks of lying with statistics are not new (54); nevertheless, the use of uncorrected data, particularly in relation to cancer deaths, is typical of the opposition, and was used most effectively in the Los Angeles referendum in 1975 (55).

Another convincing example of why not to debate with opponents of fluoridation comes from San Antonio, where in October 1985, on the eve of a referendum, proponents and opponents of fluoridation participated in a televised debate. The station manager required that all debaters be San Antonio residents, which disqualified Dr.

TABLE 5
Techniques Used by Opponents to Prevent Fluoridation

- Neutralizing politicians: creating the semblance of “controversy” by using massive letter-writing campaigns, telephone calls, and even threats
- The big lie: alleging serious health hazards, including many different diseases attributed to fluoridation
- Half-truths: fluoride is a poison and causes dental fluorosis
- Innuendo: urging fluoridation be delayed until all doubts are resolved
- Statement out of context: citing only a portion of a study and misrepresenting the conclusions
- “Experts” quoted: all doctors are considered equal by viewers of TV or newspaper readers; some dentist, physician, or scientist can always be found who will oppose fluoridation
- Conspiracy gambit: health establishment, government, and industry are in cahoots
- Scare words: pollutant, toxic waste, cancer, artificial, chemical
- Debating the issue: debates give the illusion of scientific controversy, even though the vast majority of health professionals and scientists support fluoridation

FIGURE 2
Comparison of Age Distribution of Population 70 Years and Older in Bartlett (7.6–8.2 ppm F) and Cameron (0.4–0.5 ppm F) [Data from Leone et al. (53)]

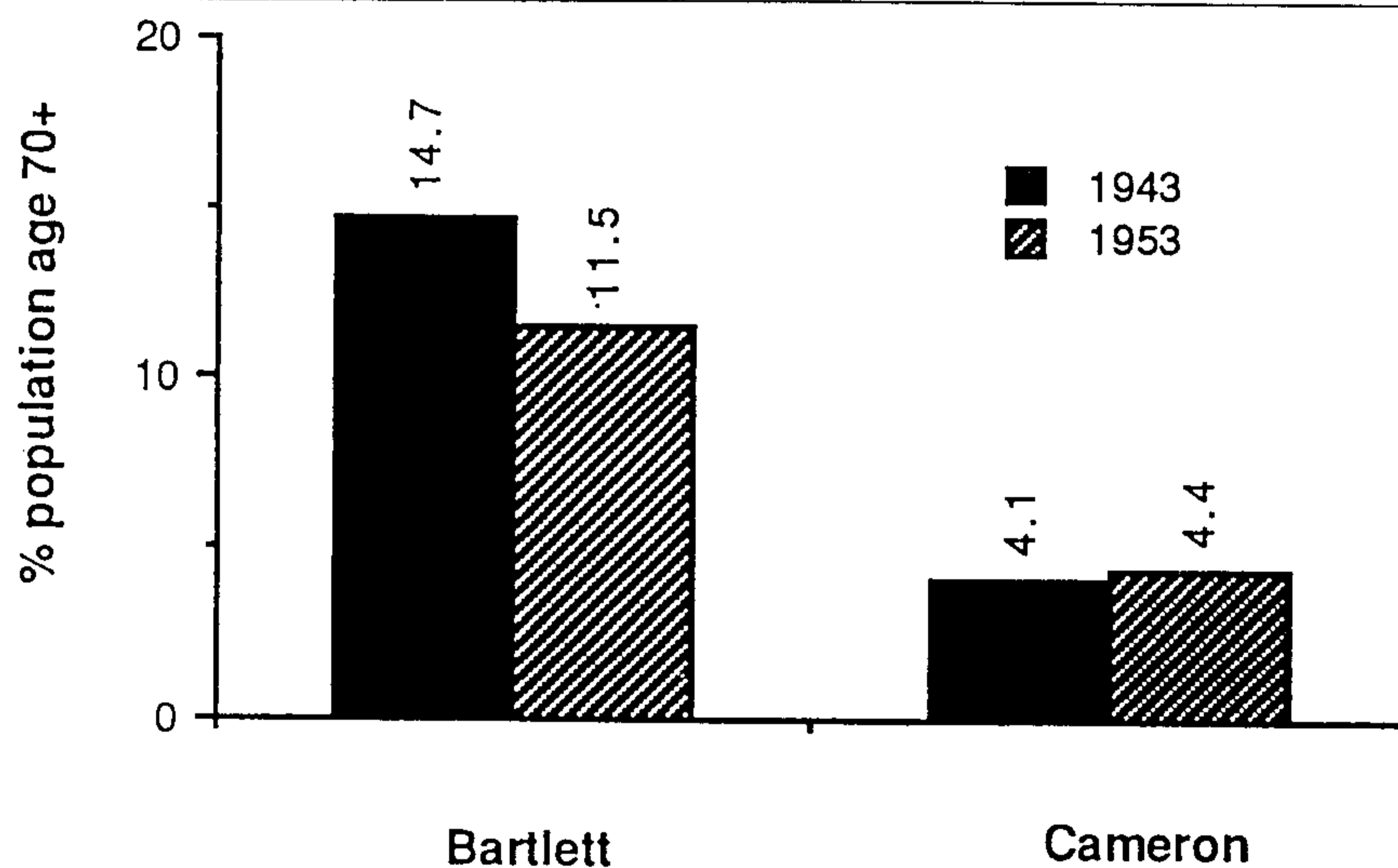


TABLE 6
Number of Participants in 10-year Medical/Dental Study of Residents in Bartlett and Cameron, Texas, with High and Low Levels of Natural Fluoride*

	Bartlett (8 ppm F)	Cameron (0.4 ppm F)
1943	116	121
1953	96	113
Deceased	14	4

*Data from Leone et al. (53).

C. Everett Koop, the prestigious Surgeon General who supported fluoridation. However, John Yiamouyannis, who lives in Ohio, showed up at the station with a San Antonio voter reg-

istration card and was allowed to debate. The antifuoridationists took the night with a barrage of assertions phrased in scare rhetoric that were difficult to refute in 30 seconds or less and

went on to win the referendum (56).

What Motivates the Opponents?

As the opposition is a heterogeneous group of individuals, no single motivating factor accounts for their prodigious hours of work and untiring efforts. A few might be true "fluorophobics" who believe their health is threatened. Some believe that caries can be prevented by good diet and that those who eat sweets and drink sugary beverages deserve what they get. But most oppose fluoridation on philosophical grounds because they perceive it as government intervention in personal health. Of course, most public health measures do affect individuals, as well as entire communities.

Why has fluoridation been singled out as the target for such long-lasting and firm opposition? The ardor of the opponents borders on crusading, similar to that engendered by the opponents of abortion and gun control. Some opponents are probably paranoid and truly believe that a cabal of government, health professionals, and industry is involved in promoting fluoridation. The fact that the aluminum and phosphate fertilizer industries have not provided financial support for fluoridation referenda seems to have escaped their attention. Yet in the American political system there are numerous examples of companies supporting what they perceive to be in their industry's interests (e.g., beer and soft drink manufacturers donating vast sums of money to campaigns against laws that require bottle deposits, or tobacco companies supporting opposition to anti-smoking ordinances). The leading opponents of fluoridation, for the most part, have no record of scientific productivity or research creativity (at least not in peer-reviewed journals), nor have they played a leadership role in their professions. However, their vocal opposition gives them an instant platform—invitations to speak all over the United States, Canada, and elsewhere, and to testify at government hearings and in court cases. In other words, they achieve a recognition and an illusion of power that they would not otherwise enjoy.

Let me conclude by quoting from Nobel Laureate Professor Sir Peter Medawar, who, when he was director of the National Institute for Medical Research in London, was asked his

opinion about fluoridation of the water by the mayor of a large American city (57):

I accordingly put before him the epidemiological evidence, and to help him appreciate the direction in which the evidence tended, I told him that every time an American municipality determined against fluoridation there was a little clamor of rejoicing in the corner of Mount Olympus presided over by Gaptooth, the God of Dental Decay. Of course, the more difficult part of the fluoridation enterprise is not scientific in nature—I mean that of convincing disaffected minorities that the purpose of the proposal is not to poison the populace in the interests of a foreign power or to promote the interests of a local chemical manufacturing company, a big employer of labor.

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