A statement concerning the ethics of water fluoridation was published in a recent issue of the *Journal of the Canadian Dental Association*. The arguments presented in that paper did not constitute what we would consider a complete and systematic account of the scientific and moral issues involved. It is our contention that water fluoridation, by the very nature of the way it is administered, engenders a number of moral dilemmas that do not admit to any easy solution. In this paper, we attempt to elucidate the particular problems posed by this public health initiative, according to the principles of bioethics.

**The Role of Bioethics**

Whether or not water fluoridation reduces dental caries in child populations has been subject to considerable debate. This debate is scientific rather than moral in character and revolves around the validity of the evidence concerning the benefits of adding fluoride to community water supplies. However, even if it were universally accepted that water fluoridation is beneficial and the scientific evidence incontrovertible, it would still have a moral dimension. This moral status arises in the application of water fluoridation in health care policy and public health practice. Attitudes toward public health initiatives are of necessity shaped by values. Bioethics is the study of the moral, social and political problems that arise from biology and the life sciences, and that involve human well-being. Of particular relevance are the core values of autonomy, beneficence and truthfulness.

**Beneficence and Autonomy**

Beneficence denotes the practice of good deeds and signifies an obligation to benefit others or seek their good. How this principle is put into practice depends on whose notion of good is applied. Health policy-makers and professionals, in advocating for the addition of fluoride to drinking water, are making moral decisions about the well-being of individuals and applying their own notions of good. If beneficent acts are to benefit the recipients of the actions, the basis for the goodness of the actions must lie in the values or preferences of autonomous, self-determining individuals. In practice, however, beneficent acts such as water fluoridation tend to be in conflict with autonomy. Since it is effectively impossible for individuals to opt out, fluoridation takes away the freedom to choose.
Advocates of water fluoridation argue that the benefits accruing to society through reductions in dental caries outweigh any harm to individual autonomy. Defenders of autonomy argue that fluoride is available from many sources, and so its benefits can be realized without violating the principle of autonomy. However, this presumes that everyone in society can access these alternative sources. The most vulnerable in society, it is countered, would surely miss out on the benefits of fluoride.

Therefore, considering the benefit that accrues to disadvantaged groups in society, advocates of fluoridation contend that water supplies should be fluoridated on the grounds that everyone, regardless of socioeconomic status, can benefit. The claim here is that water fluoridation promotes social equity. This solution still leaves the conflict of beneficence and autonomy unresolved. In fact, there appears to be no escape from this conflict of values, which would exist even if water fluoridation involved benefits and no risks. However, water fluoridation does involve risks, in the form of increases in the prevalence and severity of dental fluorosis. Moreover, as Coggon and Cooper indicate, those most likely to benefit from water fluoridation are not necessarily those placed at most risk. This complicates considerably any attempt to balance beneficence and autonomy.

Advocates of water fluoridation, in seeking to strike a balance between competing values, are attempting to reconcile irreconcilables: the demands of moral autonomy cannot be made compatible with what could be regarded as the involuntary medication of populations. This situation gives rise to the question of which values concerning the conflict between beneficence and autonomy should inform decision making with respect to water fluoridation: those of health professionals or those of the community?

Truthfulness

An assessment of the ethics of water fluoridation must also take into account the moral issues surrounding scientific inquiry in order for health professionals to be justified in advising or compelling others how to act. This aspect pertains to the principle of truthfulness, whereby health professionals are obligated to tell their patients the truth, for one cannot influence the way others act without first being justified in one’s own beliefs.

The conventional view is that policy-makers are presented with a clear moral choice when weighing the benefits and harms associated with water fluoridation. Historically this may have been the case. The original community trials of water fluoridation indicated a substantial effect. However, over the past 25 years there has been a marked reduction in rates of dental caries among children, such that the benefits of water fluoridation are no longer so clear. Although current studies indicate that water fluoridation continues to be beneficial, recent reviews have shown that the quality of the evidence provided by these studies is poor. In addition, studies that are more methodologically sound indicate that differences in rates of dental decay between optimally fluoridated and nonfluoridated child populations are small in absolute terms.
Canadian studies of fluoridated and nonfluoridated communities provide little systematic evidence regarding the benefits to children of water fluoridation.\(^{14-17}\) Moreover, studies of the benefits to adults are largely absent,\(^9\) and there is little evidence that water fluoridation has reduced social inequalities in dental health.\(^{10}\)

Truthfulness entails a proper appraisal of the benefits and risks. Currently, the benefits of water fluoridation are exaggerated by the use of misleading measures of effect such as percent reductions. The risks are minimized by the characterization of dental fluorosis as a “cosmetic” problem.

Yet a study of the psychosocial impact of fluorosis found that “10 to 17 year olds were able to recognize very mild and mild fluorosis and register changes in satisfaction with the colour and appearance of the teeth.”\(^{18}\) The investigators also stated, “The most dramatic finding was that the strength of association of [fluorosis] score with psycho-behavioural impact was similar to that of overcrowding and overbite, both considered key occlusal traits driving the demand for orthodontic care.” In the absence of a full account of benefits and risks, communities cannot make a properly informed decision whether or not to fluoridate, and if so at what level, on the basis of their own values regarding the balance of benefits and risks.

In the absence of comprehensive, high-quality evidence with respect to the benefits and risks of water fluoridation, the moral status of advocacy for this practice is, at best, indeterminate, and could perhaps be considered immoral.

**Conclusion**

These scientific and moral issues must be addressed and resolved if policy and practice with respect to water fluoridation are to be considered ethically sound. Yet it is not clear that this work can be accomplished satisfactorily. The conventional view that the ethical dilemmas posed by water fluoridation can be resolved by balancing the benefits and harms actually begs the question, for it presumes that such a balance can be achieved. The preceding arguments indicate that this view needs to be replaced by a moral account showing an appreciation for the ineradicability of the conflict of values that water fluoridation engenders. They also raise the question of whose values should take precedence when decisions regarding water fluoridation are being made.

Ethically, it cannot be argued that past benefits, by themselves, justify continuing the practice of fluoridation. This position presumes the constancy of the environment in which policy decisions are made. Questions of public health policy are relative, not absolute, and different stages of human progress not only will have, but ought to have, different needs and different means of meeting those needs. Standards regarding the optimal level of fluoride in the water supply were developed on the basis of epidemiological data collected more than 50 years ago. There is a need for new guidelines for water fluoridation that are based on sound, up-to-date science and sound ethics. In this context, we would argue that sound ethics presupposes sound science.
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In a recent CDA member information bulletin entitled “Fluoride and Dentistry,” the following question was posed: “If fluoride is available from many sources, and the prevalence of dental fluorosis among children is increasing, why does CDA continue to support water fluoridation?” In this paper, we take a brief look at this question from an ethical perspective.

Formal ethical reflection and analysis have become expected components of decision making for all health professionals. Ethics is the branch of philosophy that explores value-laden decision making and conduct. Fair and respectful health policy and practice require an understanding of the values that underlie our choices. Decisions made in clinical practice and in public health policy should be a reflection of the values and beliefs of individual decision makers and of society as a whole. Ethically sound health care policy-making requires balancing the potential benefits and harms of all alternatives. Assessing the ethical validity of the CDA policy on water fluoridation therefore requires a consideration of the potential benefits and harms of water fluoridation.

Physical Benefits and Harms

Water fluoridation is known to be one of the greatest public health and disease-preventive measures of all time. Its greatest documented benefit is that, by reducing caries, tooth structure is preserved and much pain, infection, tooth loss and restorative treatments are prevented. Water fluoridation protects everyone [incorrect assumption] and is easy to deliver, [handling a toxic substance like hexafluorosilicic acid is a health risk to those who must handle it] safe, equitable, [the economically disadvantaged are harmed more from dental fluorosis due to poorer diet. 2007 report by Piro? Report that research does NOT support the contention that fluoride has somehow closed the economic divided between the rich and the poor when it comes to cavities] and economically efficient.² [using a toxic waste product IS very cost-efficient]

However, concerns have been raised about the potential harm of water fluoridation. It is possible that fluoridation is causing an increase in prevalence of fluorosis and, it is argued, this is a reason not to support fluoridation. It has also been suggested that fluoride may be an environmental pollutant and may contribute to “multiple chemical sensitivities” syndrome, although these observations are largely anecdotal and are not well documented in the scientific literature.
We would conclude, on the basis of the evidence currently available, that the physical benefits of fluoridation outweigh the harms. However, we would also argue that attention should be paid to the potential harms, and that research should be supported to determine the effect of fluoridation on fluorosis, the health consequences of fluorosis, the impact of fluoridation on the environment, and the effect of fluoridation on multiple chemical sensitivities syndrome.

Economic Benefits and Harms

There are considerable economic benefits associated with water fluoridation. By reducing caries, water fluoridation minimizes the need for restorative dental treatment and thus has an enormous impact on lifetime oral health utilization costs. This is a particularly important benefit for Canadians since most oral health care services are not included in publicly funded health programs. Dental caries can result in serious and sometimes life-threatening infections requiring costly hospital and medical care. Fluoridation reduces these potential costs as well as costs for those provinces whose publicly funded health care system includes dental care for children, seniors and the poor.

Concerns have been raised about the potential negative economic consequences of fluorosis, and the argument made that the economic benefits of water fluoridation may be overestimated since restorative dental treatment may be needed to treat fluorosis. We would conclude that, without further evidence on the acceptability and restorative sequelae of fluorosis, the economic argument in support of fluoridation is stronger than the economic argument against it. However, in order to resolve the uncertainty around economic benefits and harms, research should be supported to compare the economic consequences of fluoridation and fluorosis.

Freedom of Choice

It might be argued that restricting choice about the public source of drinking water is morally wrong because it violates the principle of respect for the autonomy of individuals by taking away their freedom to choose not to consume fluoride. It might also be argued that this violation of autonomy is indefensible given that the benefits of fluoride can be realized in other ways (i.e., those who wish to consume fluoride can rely on other sources such as supplements, fluoride mouth rinses and professionally applied fluorides). However, restricting choice for the entire population may be defended on the basis that it benefits vulnerable populations. Commercially available sources of fluoride and professional dental treatment are costly. Commerically available sources of fluoride and professional dental treatment are costly. [a tube of toothpaste costs less than $1. Dentists and cities could supply this in food hampers for the needy] Not everyone in society can afford these. Yet, regardless of education, socioeconomic status, age, race, or access to professional dental care, everyone can benefit from fluoride simply by drinking fluoridated water. When it is available in public water supplies, fluoride is no longer a
discretionary commodity available only to those who are familiar with its benefits, can afford it and have access to it. [what is needed is oral hygiene education and measurements of prevention such as good nutrition and cleaning – not fluoridation. Sugar and low/nutrient carbohydrates are the caries-producing foods. ]When public policy supports fluoridation of water supplies, it is the most vulnerable in our society who benefit the most.

The liberal individualist arguments against the involuntary medication of populations may initially seem compelling. However, Canadian society has established a core set of values which allow for the infringement of individual rights in certain instances. For example,

- mandatory vaccinations,
- fortification of foods with essential nutrients,
- testing for certain genetic diseases at birth

are accepted public health measures despite the fact that these measures can be seen as an infringement on individual rights.

[fluoride has not been proven to be “beneficial” – fluoride is not an “essential nutrient” therefore this is a red herring argument]

Although we are a society dominated by individual rights, Canadians accept that some public policies must put the common good above the desires of some individuals. Fluoridation of the water supply fits into this philosophical framework.

Conclusion

For Canadians, improving oral health by reducing dental caries is a good. Economic benefit to both society and to individuals is a good. The protection of vulnerable populations is a valued good. It is on the basis of this good that we would argue that CDA should continue to support water fluoridation.

Before closing, we would challenge CDA members to consider an important yet frequently ignored question: “In debates about fluoridation, are you hearing the voices of the vulnerable?” When political arguments erupt between policy-makers, interest groups and oral health professionals, are the groups who are most vulnerable even part of the discussions? For good reason, there is a great deal of concern being expressed by contemporary health care ethicists about health policies being made without consideration of the interests and desires of members of society who do not have a voice. When decisions are being made about public health policy, members of society who may be disadvantaged by a lack of education, resources and access to proper health care must be part of the discussions. It is not clear that they are when it comes to the issue of water fluoridation. CDA members should ensure that they seek out these voices before taking a final position on this issue.
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