ABUSE OF THE
SCIENTIFIC
LITERATURE
IN AN
ANTIFLUORIDATION
PAMPHLET

SECOND EDITION

COLLEEN A. WULF
KAREN F. HUGHES
KATHLEEN G. SMITH
MICHAEL W. EASLEY

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AMERICAN ORAL
HEALTH INSTITUTE
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Introduction

John Yiamouyiannis, Ph.D., calls himself "the world's leading authority on the biological effects of fluoride." He appears brilliant—and determined. Had he chosen a positive direction he might well have made a valuable contribution to science. But he has not. For more than 15 years he has been obsessed with the idea that water fluoridation is dangerous. From 1974 through 1980 he served as "science director" of a health food industry group which hired him to "break the back" of fluoridation in America. Subsequently he founded the Center for Health Action, described in its brochure as "a union of virtually every effective antifluoridation group in the country."

I have seen Dr. Yiamouyiannis in action. He is personable and appears sincere. Though public health officials regard him as a terrorist, to the uninformed he seems credible. His activities have frightened many communities into opposing fluoridation. If he doesn't appear in person, his presence—through his publications—will still be felt wherever fluoridation is being considered.

Fighting fluoridation is actually quite simple. Just claim that it causes cancer—or AIDS—or a hundred other diseases. Or suggest that it is a form of pollution, will raise taxes, is undemocratic, or hasn't been studied enough. Or use dozens of other ploys and hope that at least one will work. It isn't necessary to convince people that all antifluoridation arguments are valid. A single doubt may be persuasive.

Examination of these arguments one at a time is an endless task. It is more practical to ignore the "laundry list" and evaluate the credibility of those who make the claims.

Yiamouyiannis' "Lifesavers Guide to Fluoridation" provides an opportunity to do this. It packs a long list of arguments into a brief text—supposedly backed by 250 scientific references. However, thanks to painstaking investigation by the team of dental scientists who produced this book, it is clear that Yiamouyiannis uses deception by omission and that the references he cites do not support his claims. Skillful use of this information should blow him out of the water.

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Dr. Barrett, a practicing psychiatrist and a consumer advocate, edits Nutrition Forum Newsletter and has produced more than 20 books on health topics, including The Health Robbers—How to Protect Your Money and Your Life. In 1984 he received the FDA Commissioner's Special Citation Award for Public Service in fighting nutrition quackery.
LIFESAVERS GUIDE TO
FLUORIDATION
RISKS/BENEFITS EVALUATED IN THIS
1988 QUESTION AND ANSWER REPORT
BY JOHN YIAMOUYIANNIS, PH.D.

Dr. Yiamouyiannis received his B.S. in Biochemistry from the University of Chicago and his Ph.D. in Biochemistry from the University of Rhode Island. He is recognized as an international authority on the biological effects of fluoride and has served as Science Consultant on fluoridation in the United States and abroad.

What is fluoridation?
Fluoridation is the addition of fluoride to the public water systems, usually at the rate of about 1 part fluoride for every million parts of water (1 ppm).

What is fluoride?
Fluoride is a poison. According to the 1984 issue of Clinical Toxicology of Commercial Products, it is more poisonous than lead and just slightly less poisonous than arsenic. It has been used as a pesticide for the control of mice, rats, and other small pests. A spokesperson from Proctor and Gamble, the makers of Crest, acknowledged that a family-sized tube of fluoride toothpaste "theoretically, at least, contains enough fluoride to kill a small child." However, no one is going to die from drinking one glass of fluoridated water, just as no one will die from smoking one cigarette. It is the longer-term chronic effects of glass after glass of fluoridated water — as with cigarette after cigarette — that takes its toll in human health — and life.

Have these harmful effects been proven?
Yes. First, in a court case in Pennsylvania lasting 20 days and decided in 1978 in which top experts on both sides of the question were summoned from around the world, it was proven by a preponderance of the evidence that fluoridation is harmful. In his decision, the presiding judge, the Hon. John P. Flaherty, pointed out that he was "compellingly convinced" of the harmful effects of fluoridation. Second, in a court case in Illinois lasting 40 days and decided in 1982, the presiding judge, the Hon. Ronald A. Niemann, ruled that fluoridation "created a risk . . . of serious health hazards" and declared the Illinois mandatory fluoridation law unconstitutional. While appeals courts in these cases determined that the court does not have the jurisdiction to grant relief, their findings that fluoridation created a threat to the public health have never been overturned.
Have these findings been confirmed by others?

Yes. Both the Ministry of the Environment for the Province of Quebec and the Chief Toxicologist for the Virginia Department of Health issued detailed reports confirming these findings. Dr. Robert Carton, scientist at the United States Environmental Protection Agency and the 1986 president of the union representing scientists and professional workers at its Washington D.C. headquarters, opposes fluoridation and has accused upper level bureaucrats of trying to cover up the harmful effects of fluoride in the water.

What are some of these adverse effects?

Allergic-type reactions have been reported by top physicians, including Nobel Prize winner Dr. William Murphy. With regard to the amount of fluoride found in a quart of fluoridated water, the Physicians' Desk Reference points out: "In hypersensitive individuals, fluorides occasionally cause skin eruptions such as atopic dermatitis, eczema, or urticaria. Gastric distress, headache, and weakness have also been reported. These hypersensitive reactions usually disappear promptly after discontinuation of the fluoride."

Does fluoride weaken the immune system?

Yes. In 1981 and 1982, during a court case in Scotland, studies by both proponents and opponents of fluoridation confirmed that fluoride does weaken the immune system. In 1985, Japanese researchers confirmed that as little as 10% of the amount of fluoride used to fluoridate public water supplies is capable of weakening the immune system. In 1987, Russian investigators confirmed suppression of the immune systems among children drinking fluoride in their water. This fluoride-induced damage to the immune system can lead to chronic problems such as colds which never seem to go away, to cancer in individuals whose immune system is too weak to arrest the growth of "precancerous" cells, and to other immune deficiency diseases.

Does this mean that fluoride causes AIDS?

Not exactly. What it does mean however is that fluoride, or any other drug (such as cortisone) which suppresses the immune system, can be a contributing factor in the production of AIDS in people who would otherwise not have gotten it.

Are there any visible symptoms of people poisoned by fluoride?

Yes. About 20-30% of the people growing up in artificially fluoridated areas will experience a disturbance of tooth development so great that the resulting damage is visible to the naked eye. This disease is referred to as dental fluorosis. In mild cases, it appears as a chalky-white area on the tooth. In more advanced cases, especially in areas where the natural fluoride content of the water is high, teeth become yellow, brown, or black and the tips break off. Poorly nourished children consuming water with as little as 0.4 ppm fluoride have exhibited dental fluorosis.
If fluoride damages teeth, will fluoride also cause bone damage?

Yes. Fluoride damages teeth by interfering with the proper formation of proteins which form the structural framework of the tooth during the tooth formative stages. These proteins comprise 30% of the body’s protein and also provide the structural framework for skin, ligaments, muscles, and bone. Fluoridated water leads to the breakdown of these proteins, confirming not only the clinical reports of bone damage, but also the reports of prematurely wrinkled skin and arthritis, as well as the possibility of a greater frequency of torn ligaments and tendons in fluoridated areas.

Does fluoride cause genetic damage?

Yes. Researchers from Columbia University, Texas A & M University, the Japanese Dental University, the Russian Research Institute of Industrial Health and Occupational Diseases, and other research facilities from around the world have shown that as little as 1 ppm fluoride in the drinking water causes genetic damage. It is generally agreed that substances which cause genetic damage are likely to cause cancer.

Are there studies showing a link between fluoride and cancer?

Yes. In animal studies, water fluoridated at 1 part per million has been shown to increase tumor growth rate by 25% and, at levels recommended by the National Cancer Institute as appropriate for testing whether fluoridation causes cancer, fluoride has been shown to transform normal cells into cancer cells and to produce melanotic tumors. In human studies, fluoride has been shown to transform certain white blood cells into cells “suggestive of reticuloendothelial malignancy” and airborne fluoride has been linked to lung cancer.

If I live in a fluoridated area, are my chances of getting cancer greater?

Yes. Dr. Dean Burk, former Chief Chemist of the National Cancer Institute and Dr. John Yiamouyiannis showed that 10,000 or more fluoridation-linked cancer deaths occur yearly in the United States. In court cases in Pennsylvania and Illinois, experts from the Royal College of Physicians, Oxford University, the Royal Statistical Society and the University of Newcastle-upon-Tyne tried to refute these figures; however, in his decision, the Pennsylvania judge remarked: “point by point, every criticism . . . made of the B-Y [Burk-Yiamouyiannis] Study was met and explained.” In addressing this same question, the Illinois judge pointed out: “This record is barren of any credible and reputable studies [showing] . . . that fluoridation . . . is . . . safe.” While numerous studies have been cited to refute the Burk-Yiamouyiannis Study, most of these studies, after corrections for errors and omissions, show an increase in cancer death rate in the fluoridated areas. According to Dr. Brian Dimenti, Toxocologist for the Virginia Dept. of Health: “it appears that Burk and Yiamouyiannishave correctly approached the problem and that their findings stand successfully unrefuted.”
But how can such a small amount of fluoride have such harmful effects?

The amount of fluoride used to fluoridate public water systems leads to soft tissue fluoride levels\textsuperscript{115, 116} which damage biologically important chemicals, such as enzymes,\textsuperscript{117-119} leading to a wide range of chronic diseases. A recent study published in the \textit{Journal of the American Chemical Society}\textsuperscript{120} provided the chemical evidence to support this view. In reviewing this paper, the editors of \textit{New Scientist} concluded: "some of the charges that are laid at its [fluoride's] door — genetic damage, birth defects, cancer and allergy response — may arise from fluoride interference after all."\textsuperscript{121} More recent findings lend further support to this statement.\textsuperscript{122-125}

Doesn't fluoridation reduce tooth decay?

No. Although attempts have been made,\textsuperscript{126-129} the U.S. Center for Disease Control\textsuperscript{130} and the British Ministry of Health\textsuperscript{131} admit that no laboratory experiment has ever shown that 1 ppm fluoride in the drinking water is effective in reducing tooth decay. They also admit that there are no double-blind epidemiological studies on humans showing that fluoridation reduces tooth decay.

In a historic departure with the entrenched dental bureaucracies, the October, 1987 issue of the \textit{Journal of the Canadian Dental Association} published an article\textsuperscript{132} admitting that fluoridation isn't doing the job that dentists have been claiming it could do. According to the article: "Survey results in British Columbia with only 11\% of the population using fluoridated water show lower DMFT [tooth decay] rates than provinces with 40-70 per cent of the population drinking fluoridated water" and "school districts recently reporting the highest caries-free rates in the province were totally unfluoridated."

In 1985, Dr. John Colquhoun, former Chief Dental Officer of the Department of Health for Auckland, New Zealand and former President of the National Society to fluoridate New Zealand, investigated tooth decay statistics from 98\% of all the 12- to 13-year-old children in New Zealand (60,000 children); he found that there was no significant difference in tooth decay rates between fluoridated and nonfluoridated areas in New Zealand. Because of this and the damage he found fluoride was doing to teeth (dental fluorosis), he has begun campaigning against fluoridation.\textsuperscript{34, 133-134}

In 1972, Japanese investigators examined over 20,000 students and found there was a higher percentage of students with tooth decay in areas with a fluoride level of 0.40 ppm or more than in areas with 0.20-0.39 ppm fluoride.\textsuperscript{135}

On January 1, 1945, Grand Rapids, Michigan became the first city in the world to become fluoridated. A 10-year study was conducted to study tooth decay in Grand Rapids, using Muskegon, Michigan as the nonfluoridated city for comparison. When after 5 years, it was observed that the tooth decay rate of nonfluoridated Muskegon had decreased about as much as that of artificially fluoridated Grand Rapids\textsuperscript{136} — Muskegon was dropped from the study and the only report made was that the tooth decay rate in Grand Rapids decreased after fluoridation. Twenty years after the study was completed, it was found that life-long residents of fluoridated Grand Rapids had a tooth decay rate equal to that of the national average,\textsuperscript{137} again showing no decrease in tooth decay from fluoride.
Then fluoridation doesn't reduce dental costs?
No. From 1958 to 1970, increases in dental costs were virtually identical in the 10 most fluoridated states and the 10 least fluoridated states.\textsuperscript{136,139}

And the teeth of people drinking low-fluoride water aren't falling out?
No. In primitive societies whose drinking water contains negligible amounts of fluoride, such as the Otomi Indians in Mexico,\textsuperscript{140} the Bedouins in Israel,\textsuperscript{141} and the Ibo in Nigeria,\textsuperscript{142} 80-90\% of the people go throughout life without tooth decay. Looking at their diets, we find that their consumption of refined carbohydrates, such as white sugar, is extremely low. It is quite evident that proper diet — not fluoridation — is necessary for good dental health.\textsuperscript{143-146}

What people will be hurt most by water fluoridation?
People on poor diets and in poor health,\textsuperscript{147-151} older people,\textsuperscript{88,91} people with or having a predisposition toward kidney disease (especially people on kidney machines),\textsuperscript{152-168} diabetes (and hypoglycemia),\textsuperscript{169-173} and hypothyroidism.\textsuperscript{174-187}

What other sources of fluoride should I stay away from?
1. Fluoride treatments at the dentist's office use 5000 to 20,000 ppm fluoride, which is hazardous, even deadly (consider the January 20, 1979 New York Times headline: "$750,000 Given in Child's Death in Fluoride Case" about a 3-year-old killed by a fluoride treatment at the dentist's office).
2. Fluoride toothpastes use 1000-1500 ppm fluoride, levels which can cause gum damage, sickness -- or even death if a small child consumes a family-sized tube.
3. Fluoride mouthrinses sold in stores or administered in schools containing 500 ppm fluoride, will often cause sickness -- and can in rare cases cause death.
4. Fluoride tablets or drops usually prescribed for children or infants have as bad and sometimes worse effects than fluoridated water.
5. Fluoride tablets for the treatment of osteoporosis contain about 50 times the amount of fluoride as the children's tablets and are very hazardous.
6. Foods containing fluoridated water which has been added (and sometimes subsequently removed) during food processing (for example soft drinks, freeze dried coffee). Concern over the safety of fluoridated water has led infant formulas manufacturers to remove the fluoride from the water they use to make their formulas with.
7. The use of fluoridated water for the preparation of foods (such as rice, spaghetti, or coffee) in which the water used is consumed with the food.

The lack of effectiveness and the dangers of using fluoride from the above sources is well-documented.\textsuperscript{32,169,186-212}

Is there any danger from malfunctioning fluoridation equipment?
Yes. In 1979, 50,000 people were poisoned by a 50 ppm fluoride spill in Annapolis, Maryland.\textsuperscript{213-215} An undisclosed number of citizens died of heart failure due to the spill, over 5 times the normal number during the week following the spill alone. A number of other spills have also been reported.\textsuperscript{216-221}
if all this is true, why are we not seeing a reduction in tooth decay rates? many may find it hard to realize that the single most cost-effective method of reducing caries in children is fluoride. dentists and public health officials developed the habit of promoting water fluoridation as the most effective caries prevention measure. many may find it hard to realize that fluoride was promoted as the most effective caries prevention measure.

for information or to order reprints, ($ each, $10 for 4 copies, $150 for 1000 copies) send to: the safe water foundation, 4349 aggar road, dundalk, md 21222

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Foreword

Probably no medical or scientific advance has been the victim of as much irresponsible journalism and abuse of the scientific literature as has community water fluoridation. Armed with literally volumes of pseudo-scientific propaganda and inaccurate media portrayals, antifluoride zealots have inappropriately influenced city council decisions, state legislative initiatives, and citizens' referenda. Their spokespersons have repeated the many baseless claims at judicial proceedings and regulatory agencies' hearings. Unfortunately, much damage has been done to the public's psyche because of repeated inaccurate and perverted portrayals of community water fluoridation appearing in newspapers, magazines, "health food" pamphlets, and other lay publications, as well as in articles appearing in "textbooks" and "journals" published by the antifluoride press. Many citizens have been denied the benefits of an effective, economical, and safe public health measure because of the misguided, but effective, efforts of a small, vocal minority.

A number of specific technics have been used by antifluoridationists in their attempts to prevent fluoridation of public water supplies. For instance, by repeatedly alleging that fluoride causes cancer, kidney disease, heart disease, and other serious maladies, fluorophobics persuade some people that their claims are true, even though no scientifically valid evidence exists to corroborate their allegations. The public tends to believe such claims, assuming that their repeated appearance in print, most often in letters-to-the-editor columns, is evidence of their validity and that "authorities" would "never" allow unproven claims to be printed.

Antifluoridationists have also become masters of the use of half-truths and innuendo. Examples of their use of half-truths are provided by the following:

1.) "Fluoride is a poison, so don't let them put it in our water." Opponents of fluoridation fail to inform the public that toxicity is primarily related to the dose of a substance and not merely to the substance itself. Chlorine, vitamin D, table salt, and water are examples of substances harmful in the wrong amounts, but beneficial in the correct amounts.

2.) "Fluoride causes dental fluorosis or mottling." By itself, this statement fails to take into account either the level of fluoride in the water or the time of exposure as related to the dental age of the intended beneficiary.

3.) "The majority of AIDS victims come from fluoridated cities." AIDS has been associated for the most part with choice of lifestyle in certain populations. Most major metropolitan areas in the U.S., including San Francisco, New York, Chicago, and Miami, while fluoridated, contain significant percentages of those populations considered most at risk for AIDS.
Antifluoridationists also continue to utilize innuendo effectively as part of their marketing arsenal. They allege that while one glass of fluoridated water will not kill anyone it is the "glass after glass of fluoridated water, as with cigarette after cigarette, that takes its toll in human health and life." In addition to this guilt-by-association ploy, opponents of fluoridation assert that insufficient research has been carried out to prove safety and urge consumers and government officials to wait until all doubt about the safety of fluoridation has been "scientifically" resolved. Such an argument continues indefinitely because of the impossi-

bility of ever proving absolute safety.

Other technics successfully employed by antifluoridationists include neutralization of politicians, use of the "big lie" and the "laundry list," quoting of self-proclaimed "experts," allegations of conspiracy, and use of scare words. These technics have been comprehensively reviewed by several authors and will not be explored further.2,3

Among the most serious violations of the scientific ethic are those with which this monograph focuses and which can be categorized as abusive uses of the scientific literature. Opponents of fluoridation frequently quote statements that are out of date, taken out of context, or misrepresentations of legitimate scientific research. Numerous examples of this technic are apparent when one reviews closely the popular antifluoride pamphlet, "Life-savers [sic] Guide to Fluoridation".1 As will be illustrated repeatedly in the following pages, many references for the pamphlet's claims of hazard are from obscure or hard-to-locate journals. Those articles referred to as containing the most convincing antifluoride arguments are usually not from recognized peer-reviewed journals and often are authored by the same anti-

fluoridationists editing the controversial journals. Painstaking library research by Wulf and colleagues has shown that many of the references used actually support fluoridation, with works of respected fluoride researchers selectively quoted and misrepresented in order to appear to discourage the use of fluorides. The average consumer, unable to properly evaluate mis-

information and misrepresentations in the antifluoride literature, falls prey to what amounts to a marketing fraud. Nothing summarizes the situation better than the often-repeated quotation from "Consumer Reports":

The simple truth is that there's no "scientific controversy" over the safety of fluoridation. The practice is safe, economical, and beneficial. The survival of this fake controversy represents, in CU's


[Consumers' Union] opinion, one of the major triumphs of quackery over science in our generation.

No amount of rationalization on the part of antifluoride propagandists will alter the reality of their misuse of legitimate scientific research and their misrepresentations of scientific facts. No recantation of their fraudulent claims could ever repay the millions of American citizens for the pain, suffering, nutritional compromise, economic loss, and social estrangement resulting from the widespread existence of dental disease that could have been prevented if every community water system in the U.S. had been fluoridated during the nearly 40 years in which the process has been available. No amount of civil damages exacted from antifluoridationists could ever reimburse local, state, and federal governments for the millions of dollars spent to repeatedly defend such a well-accepted, scientifically valid public health measure as community water fluoridation in courts and public hearings.

It is hoped that the information provided in the following pages will enable public health officials, educators, public and private decision-makers, and private citizens to evaluate the legitimacy of antifluoridationists' technics and claims. Once the validity of the claims and the ethics of the technics are examined closely, it should become apparent that many American citizens have been victimized by antifluoride health quacks as defined by Consumers' Union. This extensive work by Wulf and colleagues should continue to provide a basis for the rejection of antifluoride arguments for years to come and could lead to the provision of fluoridated water to many Americans, a benefit already enjoyed by over 123 million of their fellow citizens.

Michael W. Easley
Columbus, Ohio

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Preface

When the "Lifesavers [sic] Guide to Fluoridation"¹ was first thrust into my hands by a concerned citizen, I promised to read the flyer and prepare some materials that would refute the antifluoridation claims found in it. As I read it and cross-checked a few of the references, I became angry at the way the scientific literature was abused. Calling fluoridation "the greatest medical fraud in history", the author of the pamphlet, John Yiamouyiannis, claimed that fluoridation did not reduce dental caries and that drinking fluoridated water would interfere with one's ability to have children as well as increase one's chances of getting cancer and a host of other ailments.

Utilizing a question and answer format, the author cited 250 references from a variety of journals, court cases, books, newsletters, symposia, and newspapers, as well as several personal communications. He made literally hundreds of charges in this eight-page pamphlet and used a pseudo-scientific approach that could, at first glance, fool the casual reader.

In early 1983, I attended a city council meeting in a small Ohio community where governing officials were contemplating passage of a local fluoridation ordinance. John Yiamouyiannis was present and spoke to the members of council about the alleged dangers of fluoridation. One astute councilman, who had received a copy of the "Lifesavers Guide" a week before the meeting, had consulted his chemistry journals and researched a few of Yiamouyiannis' references. He had found "nothing to do with water fluoridation" and chastised Yiamouyiannis publicly for his inappropriate use of the scientific literature.

It was at that time that I decided that it might be worth the time and effort to look up all of the references and determine just how much fact and how much fiction this pamphlet contained.

At the same time, colleagues who were also engaged in grass roots fluoridation activities were finding it increasingly important to have facts at their disposal to counter what we have perceived as a more technical and scientific attack on the safety and effectiveness of community water fluoridation. For example, if an opponent of fluoridation claimed that fluoride was harmful in some way, and based this claim on a special research project, it was important to know what fluoride compound was used in the study, what type of subjects were used (animal, human, or plant?), and most importantly, what concentration of fluoride was used in the research. We have tried to provide this kind of information for all of the laboratory and clinical studies cited in the "Lifesavers Guide".


Eds. note: Throughout this document we will simply refer to the pamphlet as the "Lifesavers Guide". Please note that we have chosen, for the sake of simplicity, to maintain Yiamouyiannis' lack of possessive punctuation in Lifesaver's rather than insert "[sic]" after every use of the word.
In some instances, certain authors or resources consulted by fluoridation opponents must be evaluated by the public health professional and the lay person before trustworthy conclusions can be drawn. Can the experiments be repeated by other researchers using accepted scientific methods, and more importantly, will the same results accrue? Can the author or the organization be relied upon for objectivity, technical accuracy, and reputability? Again, we have tried to provide this kind of information for the references used in the pamphlet.

For many of the references, particularly those found in foreign language journals, contributors found it appropriate to include the summary of the article or the abstract as it appeared in the journal. This proved particularly helpful when esoteric studies reporting highly technical results were cited, or when all but the summary of the study was published in another language. We did not correct grammar, punctuation, or abbreviations in these instances, although style and clarity (particularly for the translated studies) often left much to be desired.

The contributors succeeded in obtaining all but 19 of the 250 references cited in the 1982 pamphlet. Local, state, and national libraries were contacted, as were state officials who were in possession of some of the articles. Chemical Abstracts Services had a large number of the foreign articles, and when it was possible, we obtained translations of non-English studies. A very large percentage of the references were in outdated or obscure foreign journals that are not part of the collections of most libraries. Several "personal communications" cited in the "Lifesavers Guide" were not obtainable, nor were we successful in locating all of the transcripts or exhibits used in a Scotland court case. Appendix A lists the references we were unable to obtain. The Table of References lists the numbered documents according to the question used in the "Lifesavers Guide".

Since the project began, two documents have been published that have a direct bearing on how this refutation will be used. In July 1983, the Safe Water Foundation began to circulate the 1983 "Lifesavers Guide to Fluoridation". It contained many of the references found in the 1982 version, but the citation numbers are different as a result of some minor changes in the text. For this reason, this document lists both 1982 and 1983 "Lifesavers Guide" reference numbers with each abstract.

In July 1983, the author of the "Lifesavers Guide" published a book entitled Fluoride, the Aging Factor. Yiamouyiannis once again used many of the same references from his previous pamphlets. Therefore, this compilation of abstracts may be helpful in responding to claims made in Fluoride, The Aging Factor. Unfortunately for those of us who rely on the accepted and traditional scientific reference format, Yiamouyiannis did not use superscripts, footnotes, or numbered references in his book and only listed information sources in an appendix for each chapter. This makes it difficult to attribute a specific claim to its source in the literature. Appendix B lists the references from the "Lifesavers Guide" that coincide with references in Fluoride, The Aging Factor.

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In 1986, and again, in 1988, Yiamouyiannis published revised versions of the "Lifesavers Guide." Appendix C contains an index of the reference numbers used in all four versions of the "Lifesavers Guide." Special thanks to Tom Reeves of the Centers for Disease Control for helping to compile this index.

A "Summary" appears before the lengthy section on individual references. I hope this summary will be useful to boards of health, governing councils, educators, and citizens' groups who need a concise analysis of antifluoride propaganda. My collaborators on the project recognized the need to summarize our findings succinctly, since there is rarely enough time to address every reference cited by antifluoridationists and respond thoroughly to each scare tactic used.

The Centers for Disease Control very aptly describes the dilemma that we face in our efforts to responsibly educate the public about the benefits and safety of fluoridation:

It is unfortunate that irrelevant, unreplicated, or refuted research is purposefully presented to the detriment of the health of this nation's children. It is also unfortunate that misinterpretation of actions in foreign countries and out-of-context statements continue to circulate and create unnecessary fears. For every report which casts doubt on fluoridation, there are innumerable reports attesting to its safety and efficacy. It is not surprising that some differences of opinion among scientists and professionals in research and medicine may occur. What is surprising, however, is their almost universal agreement on the safety and effectiveness of fluoridation. Fluoridation is not a controversy in any scientific sense. There are few public health measures which have had the scientific endorsement and broad base of research which supports its use as does fluoridation.

Fluoridation has the support of the U.S. Public Health Service and, in the more than 30 years that the program has been in effect, there has been no valid evidence of harm to anyone from drinking optimally fluoridated water. There is no valid reason why the benefits of fluoridation should be denied to the citizens of any community3.

Special thanks go to my co-editors, each contributor, Petta Khouw for extraordinary library "sleuthing", Beverly Wargo, Janet Pierson, and Molly Frazier for patient proofreading, and dozens of other librarians and translators who kindly assisted the contributors. A special note of appreciation is due to Ann Malone, whose exceptional word processing skills and commitment to excellence helped bring this project to completion.

Colleen A. Wulf
Columbus, Ohio

Introduction

The task of summarizing this document is not an easy one, but we have made an attempt to categorize the types of citations used in the "Lifesavers Guide to Fluoridation" and discuss the various ways these references have been used and abused.

Types of References

Only about 48 percent of the articles cited by Yiamouyiannis come from reputable journals that, to the best of our knowledge, utilize a panel of referees to screen articles submitted for publication. Needless to say, some of the more obscure foreign journals may employ this screening technique, but we have separated out the non-English articles into a different category.

The author of the "Lifesavers Guide" did not limit himself to the use of refereed journals but relied on a large number of non-scientific, rather anecdotal articles to support his claims. The chart below categorizes the types of references used in the "Lifesavers Guide".

<table>
<thead>
<tr>
<th>Type</th>
<th>Number of References</th>
<th>Type</th>
<th>Number of References</th>
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<tr>
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<td>42</td>
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<td>Personal Communications</td>
<td>2</td>
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<tr>
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<td>7</td>
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<td>3</td>
</tr>
<tr>
<td>Self-Published Documents</td>
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<td></td>
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</tbody>
</table>

22 of the above references were authored by well-known antifluoridationists or found in antifluoride documents.

Further evaluation of the types of references used in the "Lifesavers Guide" indicates that many plant and animal models are used in some of the references cited. Below is a listing of the number of studies cited that were conducted on various plants or animals:

- Plants/vegetables: 9
- Fruit flies: 8
- Rats/mice: 40
- Rabbits: 9
- Guinea pigs: 4
- Sheep: 2
- Monkeys: 3
- Quail/turkeys: 2
- Cattle: 5
- Pigs: 2
- "Bufo bufo" tadpoles: 1
- Mongrel dogs: 1
In determining if references are used appropriately, the reader of the scientific literature should observe closely a number of factors:

1.) Was the research conducted in vivo* or in vitro**?

Eighty-four of the references used in the "Lifesavers Guide" were articles that reported the results of some type of laboratory study. Of these, 26 were in vitro studies and 58 were in vivo studies. Only seven of these studies reported laboratory results on human tissues (blood cells, dental enamel). In addition, 58 references described findings based on evaluation of large human populations or based on community trials. Eighteen of the articles cited were case histories or clinical evaluations of small groups of patients, workers, or clients—many of whom were exposed to unnaturally high levels of fluoride.

2.) What fluoride compound is being used and are the effects of that compound comparable to the effects of drinking optimally fluoridated water?

Many references used in the "Lifesavers Guide" report the effects of fluoride compounds that are not used in either water fluoridation or topically applied fluoride products. For example, in reference #63, a researcher examines the effects of 3 micrograms per cubic meter of hydrogen fluoride gas (HF) on tomato plants. The results cannot be extrapolated to human beings who consume 1 ppm fluoridated water! The results should not even be extrapolated to inhalation of fluoride by humans, since urban air usually contains less than 1 microgram per cubic meter. Thirteen references in the "Lifesavers Guide" report on the effects of airborne fluoride—one study cited by Yiamouyiannis is clearly used inappropriately since it reports on the biologic effects of fluoride-containing rocket propellant. Nearly half of the references (124) had no relevance to community water fluoridation.

3.) Are the fluoride levels used excessive or comparable to those found in either optimally fluoridated water or the body fluids of a person who consumes optimally fluoridated water?

Eleven references utilized fluoride in excessive doses (not including the fluorosis-related references). Optimally fluoridated water contains 1 mg fluoride (F) per liter (L). At 1 mg F/L an adult (60-72 Kg) ingests about 0.028 to 0.033 mg/Kg from 2 L of water. Several studies cited in the pamphlet report the use of 10-50 mg F/Kg of body weight! Often researchers expose the experimental animals to almost lethal doses of fluoride in order to measure exaggerated responses.

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*Webster's 9th New Collegiate Dictionary defines in vivo as "in the living body of a plant or animal."

**Webster's 9th New Collegiate Dictionary defines in vitro as "outside the living body and in an artificial environment."
The reader should also be careful not to confuse fluoride levels in body fluids with fluoride levels in drinking water. In other words, consuming 1 ppm fluoridated water results in fluoride levels in body fluids that are much lower—approximately 0.019 mg/100 ml. Therefore, if a researcher tests the effects of fluoride on blood or other tissues by exposing the cells to say, 1 ppm fluoride, this fluoride concentration is far in excess of the levels found in body fluids of normal human beings. Therefore, such results must be interpreted with caution.

Accuracy and Completeness

A total of 21 references (9%) were incorrectly cited by the author of the "Lifesavers Guide". In many cases, incorrect pages, years, or volume numbers are utilized, requiring painstaking title or author searches.

Almost every reference was incompletely cited. It is common practice to include authors and titles for journal articles, yet these were not available for easy verification. Legal citations were incomplete and Yiamouyiannis failed to utilize a standardized format for legal referencing. In addition, books that were cited rarely included a publisher's name and for many references, certain page numbers, volume numbers, and years of publication were selectively omitted.

An unorthodox method of placing superscripts is used throughout the "Lifesavers Guide". The author selectively references only portions of statements and then fails to reference the conclusion(s) he draws. For example, on page 3 of the "Lifesavers Guide" the following statement is used: "The amounts of fluoride used to fluoridate public water systems lead to soft tissue fluoride levels, 122,123 which damage biologically important chemicals, such as enzymes, 4,124,125 leading to a wide range of chronic diseases." This statement could lead the casual reader to erroneously conclude that because 1 ppm fluoride affects enzymes, it causes a variety of chronic diseases. This is untrue. Many agents (including penicillin) will negatively affect enzymes in vitro. However, to assume that these effects are found at appropriately low concentrations, or that an in vitro effect of 1 ppm translates directly to an effect in vivo is totally unsubstantiated.

It can be concluded that based on the types of references cited and the accuracy and completeness with which they are used, the author of the "Lifesavers Guide" repeatedly fails to demonstrate a fundamental knowledge of proper scientific documentation.
Responses to Major Claims

In his pamphlet, Yiamouyiannis makes a variety of allegations that the editors have condensed into categories that are discussed below.

Immune System

Nine references (117-25) are cited to support the claim that fluoride weakens the immune system. Four of them could not be located, but the five that were reviewed and abstracted report results of extremely esoteric, in vitro research that has no relevance to the consumption of optimally fluoridated water by humans. For example, three references examine the effects of high levels of fluoride on rabbit, mouse, and human white blood cells or polymorphonuclear leukocytes (PMN's), which play a role in the host-parasite relationship. In each article, the authors carefully qualify their conclusions to avoid impugning water fluoridation or they make no attempt to relate their findings to normal fluoride blood levels in humans. One author specifically states, "There is no evidence that the levels of fluoride found in the plasma of persons living in a fluoridated community could cause inhibition of any of the PMN functions tested."

Two of the articles report that very high fluoride levels cause an elevation in cyclic-AMP levels in certain rat tissues. Cyclic-AMP, a compound that is formed in most cells in the body, can inhibit phagocytosis and leukotaxis, which are basic cellular defense mechanisms. In an effort to correctly interpret these findings, the editors contacted one of the co-authors of this research, Dr. D.W. Allmann. Dr. Allmann indicated that extrapolating his data to the immune system of human beings is premature, since "we rig the system" in the laboratory. He further noted that some human hormones, glucagon, and epinephrine can also increase cyclic-AMP levels in body tissues.

Clearly, the scientific literature cited was inappropriately used by Yiamouyiannis and fails to support the claim that fluoride weakens the immune system.

Collagen

One of the "newest" claims made by fluorophobics is that fluoridated water leads to a breakdown of collagen, a structural component of skin, ligaments, muscles, and bone. Yiamouyiannis infers in his pamphlet that this breakdown of collagen can lead to wrinkled skin, arthritis, and torn ligaments which are likely to be more common in fluoridated areas. The articles he cites, however, do not support this claim.

Eight of the ten references used in the "Lifesavers Guide" have no relevance to optimal fluoridation, since most of them use excessive levels of water or airborne fluorides. One reference is a magazine article from a German weekly tabloid that presents no scientific basis for its claims, relying solely on interviews and testimonials. This magazine article is emphasized in the first chapter of Yiamouyiannis' book, The Aging Factor, as evidence that fluoride causes premature aging.
In an effort to determine just how Yiamouyiannis could make this seemingly ridiculous claim based on scientific research, the editors personally contacted two of the researchers who authored studies that are cited in Yiamouyiannis' publications. Dr. L.J. Ream and Dr. P.B. Pendergrass of Wright State University's School of Medicine were informed about the manner in which their studies were used in the "Lifesavers Guide". Both researchers insisted that their findings could not be extrapolated to human beings because the research was with laboratory rats at very high fluoride concentrations. Dr. Pendergrass noted that rat bone is very different from human bone: it does not have Haversian systems or the compact bone formation found in humans. Dr. Ream states, "We don't want to infer that 1 ppm fluoridated water is doing any harm." He expressed his concern that his research was misused for the purpose of impugning community fluoridation.

While it has been demonstrated that skeletal changes may be produced by toxic levels of fluoride, these changes occur only after long-continued exposure to extremely large amounts of fluoride, ranging from 20 to 80 mg. or more per day.

Furthermore, recent studies have demonstrated some dramatic results from the use of therapeutic levels of fluoride in the treatment of osteoporosis¹ and otospongiosis², bone-thinning diseases.

**Deregulation of Blood Sugar Levels**

Seven references (#46-51) are cited to support the claim that fluoride deregulates blood glucose. In fact, five of the references provide absolutely no data on blood glucose levels. One reference could not be located due to incomplete referencing, and one reference had no relevance to the consumption of optimally fluoridated water by humans.

Extensive studies concerning possible relationships between waterborne fluorides and diabetes have been reported. Data comparing vital statistics were compiled by the Department of Public Health of the State of Wisconsin.³,⁴ These data show a complete lack of correlation in rates of


death for diabetes between cities whose water contained fluoride in amounts ranging from 0.5 to 2.5 ppm. Moreover, in a 10-year study in Sheboygan, Wisconsin, the rates for diabetes actually dropped from 32.5 to 24.4 per 100,000 after fluoridation of that city. These statistical analyses are in agreement with separate studies made by the Department of Public Health of Illinois.5,6

**Genetic Damage**

Yiamouyiannis cites 14 references to support his claim that fluoride causes chromosomal (genetic) damage in various plants and animals. Six of the studies examine the effects of either sodium fluoride or hydrogen fluoride gas on plants (barley, onion root tips, maize seedlings, tomatoes). It is improper, however, to rely on research involving plants and hydrogen fluoride gas to imply a possible genetic hazard to humans. In October 1972, the U.S. Public Health Service (U.S.P.H.S.) criticized the research in plant genetics by Dr. Aly Mohamed, who Yiamouyiannis relies upon heavily to substantiate his alleged claims. The U.S.P.H.S. states: "The effects reported cannot reasonably be extrapolated to human genetics and the conclusions reached are not relevant to the consumption of optimally fluoridated water by humans, animals, or plants."

Seven other references used by Yiamouyiannis describe research on fruit flies. It is essential to realize that results cannot be extrapolated to effects on human health because of weight differences, fluoride concentration variations, species differences, and other mitigating circumstances specific to each study. In several cases, Yiamouyiannis errs in his use of the literature: for example, one study notes that fluoride inhibits the effects of mutation-causing chemicals. Interestingly, one of the articles cited discusses research on automobile emissions, making no mention of fluoride!

Elsewhere in the "Lifesavers Guide" Yiamouyiannis again uses studies on fruit flies to substantiate claims that fluoride induces tumor growth. Once again the use of a fruit fly animal model is inappropriate because the "melanotic tumors" induced in the flies are not the same as a cancerous tumor in a human or mammal. They are more akin to scar tissue, and, unlike a cancerous tumor, are not malignant or harmful.


Cancer

A study by Burk and Yiamouyiannis was initially circulated in 1975 claiming to have demonstrated a link between water fluoridation and cancer. Upon examining the data, reputable scientists found obvious shortcomings in the statistical methods used by Burk and Yiamouyiannis. Burk and Yiamouyiannis made minor changes in the data and published it again in 1977, claiming to have corrected any statistical shortcomings. Since 1977, no fewer than 17 published scientific reports refute their claims and verify that there is no association between fluoridation of community water supplies and cancer.

Yiamouyiannis employs an interesting technic in his pamphlet. In an apparent effort to lengthen as well as legitimize his bibliography, he uses a surprisingly large number of references that are actually favorable to fluoridation. The most obvious example is found on page 3 of the "Life-savers Guide" where Yiamouyiannis cites 18 references that refute his fluoride-cancer link. He goes on to claim that after corrections for errors and omissions these studies do not adequately refute his research, but he can base this statement only upon his own "corrections."

Fluoridation Litigation

Yiamouyiannis, as well as other fluorophobics, repeatedly claim that harmful effects of fluoridation have been proven in the courts. During approximately 35 years of litigation, the legality of fluoridation has withstood the challenge of repeated legal and constitutional objections. Fluoridation cases have been heard in over half of the states and this public health measure has been upheld by the highest court in over a dozen states. Moreover, the U.S. Supreme Court has denied review of fluoridation cases over 12 times because no substantial federal or constitutional questions were involved.

No court of last resort has ever rendered an opinion adverse to fluoridation on the grounds of safety, efficacy, or constitutionality. This may be a reason why Yiamouyiannis and other opponents of fluoridation have dramatically cut back litigation efforts in the last few years. In a particularly insightful decision, a judge in the Court of Common Pleas of South Carolina stated:

Dr. Yiamouyiannis' participation in this case was that of an advocate rather than an unbiased expert. In addition, Dr. Yiamouyiannis must be viewed as having a direct interest in this case since he has, in the past, emphasized his court appearances and victories in his solicitations for contributions.


Kidney Disease

Yiamouyiannis cites 17 studies to support his claim that kidney disease is likely to be aggravated by fluoride. Several references are misinterpreted or have no relevance to consumption of optimally fluoridated water. Six references recount the effects of higher-than-normal fluoride exposure. Two references could not be located and one reference is a magazine article that shows a serious lack of objective reporting. In five references the kidney disease preceded the effects of fluorides. The use of these references demonstrates a lack of fundamental knowledge about causation versus effect.

Hodge and Taves have determined that human kidneys are not damaged even after heavy and continued over-exposure to fluoride under industrial conditions. Data from Bartlett, Texas (8 ppm) showed no effect on kidney status. In addition, according to the National Research Council, based on a large body of data from animal studies it has been calculated that the minimal fluoride concentration (in water) necessary to induce kidney changes in a number of animal species is 100 ppm ingested daily over a long period of time.

Finally, it is important to note that since many of the references Yiamouyiannis uses were published, much progress has been made in the prevention of problems associated with long-term hemodialysis. At the recommendation of the National Institute of Arthritis and Metabolic Disease, it is now a common practice to purify water used for hemodialysis by reverse osmosis and/or deionization processes in order to clear it of calcium, magnesium, copper, fluoride, and other mineral content. Many normal constituents of water, even at quite small concentrations, can be harmful to dialysis patients, since their blood is exposed to 50-100 times the amount of fluid that a healthy person consumes.

Hypothyroidism

Fourteen references are cited to support the claim that fluoride aggravates hypothyroidism. Eleven of the articles were written prior to 1968, before many of the advanced biochemical studies were done on the effects of fluoride on thyroid activity. Two of the articles could not be located and five are written in foreign languages with either no or limited English summaries. One reference related to fluoride used as a rocket propellant and several other references dealt with excessive levels of fluorides or research on tadpoles, rats, and dairy cattle.


In 1971, the National Research Council of the National Academy of Sciences thoroughly reviewed research on the biological effects of fluoride.\textsuperscript{12} They concluded that there is no harmful effect of fluoride on thyroid function. In addition, the World Health Organization's monograph, Fluorides and Human Health,\textsuperscript{13} contains an extensive literature review and analysis of the effects of fluoride on thyroid activity. The conclusions reached were that, "...fluoride does not accumulate in the thyroid gland, that its presence does not decrease the uptake of iodine by the thyroid and that it has no effect on the synthesis of thyroxine."

The authors of this monograph also concluded that, "Consumption of drinking water containing fluoride, either naturally or artificially, does not impair the thyroid function, nor does it change the morphology and histological structure of the thyroid gland. Even the consumption throughout life of water containing 6 or 7 ppm fluoride does not affect the thyroid function."

Fluoride Overdoses Through the Food Chain

Yiamouyiannis cites 13 references to support the claim that fluoride overdoses by means of food consumption among children and adults are now a concern. On closer examination it's clear that Yiamouyiannis once again selectively interprets the scientific literature.

Two of the studies report questionable conclusions because of bias or poor methodology. Seven references are clearly misinterpreted by Yiamouyiannis, and one other has no relevance to consumption of optimally fluoridated water by humans. This latter reference describes a study conducted on rats who were fed varying amounts of high-fluoride water. There is absolutely no mention of fluoride levels in foods and the author makes no attempt to impugn community fluoridation. Three of the references cited could not be located—one of which was missing from both the National Library of Medicine and the National Institutes of Health Library.

National symposiums\textsuperscript{14}, special commissions\textsuperscript{15}, and more recent research\textsuperscript{16} have confirmed that dietary intake of fluorides has not significantly increased in recent years.


No Laboratory Studies

A common but erroneous claim often made by opponents of fluoridation is that: "No laboratory experiment has ever shown that 1 ppm fluoride in the drinking water is effective in reducing tooth decay." Yiamouyiannis makes this claim on page 4 of the "Lifesavers Guide" as well as on page 101 of The Aging Factor. Unfortunately, an individual with limited knowledge of research methodology could be concerned by this alleged lack of research.

Actually, the lack of laboratory studies on the effectiveness of 1 ppm fluoride in preventing caries in humans is due to the fact that low concentrations have no discernible effect on the teeth of small animals used in dental research. Because these animals have shorter life spans, more rapid tooth development and maturation, and faster metabolic and excretion rates than humans, higher concentrations of fluoride must be provided to them to produce caries preventive effects similar to those gained by children who regularly use water supplies with a fluoride concentration near one part per million.

There are many studies on record done in laboratories using the higher concentrations appropriate for the animal species which clearly demonstrate the decay preventive benefits of fluorides in drinking water.

It must be emphasized that laboratory experiments on the effects of varying levels of a therapeutic agent are often conducted because it is impossible or unethical to test the agent on humans in community trials. Early researchers on fluoridation, however, did not experience such difficulties. In the early 1930's it was determined that hundreds of "natural laboratories" already existed. In other words, there were entire communities where natural fluoride levels ranged from .1 ppm to 8 ppm, allowing researchers to conduct retrospective studies as well as initiate controlled community trials.

Furthermore, the simple fact remains that there has never been a single legitimate laboratory or epidemiological study that showed that drinking water with fluoride levels at 1 ppm caused cancer or any of the other multitude of diseases claimed to be caused by fluoridation.

Diet, Not Fluoridation, Will Improve Oral Health

Several references are cited in the pamphlet to support the claim that proper diet, not fluoridation, is necessary for good dental health. Yiamouyiannis notes that studies on Mexican Indians, Bedouins, Nigerians, Aborigines, and several other ethnic groups demonstrate that fluoride is ineffective. Several illogical or impractical suggestions are made:

1.) Lower caries experience among members of some primitive societies in fluoride-deficient areas proves that there is no need for the use of fluorides for caries prevention.
2.) High caries rates among members of societies in high fluoride areas prove that fluorides are ineffective.

3.) Steps to control the dietary consumption of refined carbohydrates will result in reduced decay and serve as an alternative to fluoridation.

Two of the seven references cited by Yiamouyiannis indicate that fluoride levels were not actually measured. Two other references actually credit fluoride for the noted reductions in caries.

The simple fact is that proponents of fluoridation have consistently stressed for over 40 years that proper diet AND fluoridation are essential for optimum dental health. Neither measure in and of itself will eradicate dental disease.

Caries Rates Are Declining in Nonfluoridated Areas

Researchers, dental practitioners, and public health workers in developed countries have noted in the last few years a secular decline in caries rates in both fluoridated and nonfluoridated areas. This trend is explained, in part, by the availability of both topical and systemic fluorides. The antifluoridationists inappropriately use this data in an attempt to support their view that fluoridation is ineffective or unnecessary and therefore should be discontinued.

Since lower caries rates are, to a great extent, the result of widespread use of fluoride products and fluoridated water, it would be illogical to discontinue their use.

It should also be noted that in many developing countries, where access to refined carbohydrates have increased and availability of topical and systemic fluorides is minimal, caries rates have increased at alarming rates.

Fluoride "Spills"

Among the most ridiculous charges made by antifluoridationists are those that imply that by accident or design, a community's water system could be flooded with enough fluoride to kill the entire population.

Yiamouyiannis cites nine articles to support his claim that fluoride spills due to malfunctioning equipment pose a danger to people drinking fluoridated water. Yiamouyiannis goes so far as to state that spills have occurred in other places and are probably occurring in every fluoridated area but are not being reported. This is not true.

According to the Centers for Disease Control in Atlanta, Georgia, only 17 overfeeds have been documented in 35 years of fluoridation involving over 7,000 water systems: 12 caused by equipment malfunction and five by human error. Two should not have been reported, since they did not exceed the federal Environmental Protection Agency standard of two times the optimum. In three of the incidents, the fluoride level never exceeded natural fluoride levels found in this country.
As regrettable as these few incidents are, the rareness of the occurrence and the mild transitory nature of the resulting illnesses from drinking the water continue to substantiate that fluoridation enjoys a wide margin of safety. In this country, the fluoridation apparatus, chemicals, and mode of operation are so arranged that it would be very difficult to administer a dangerous dose to a whole community. When a fluoridation system is properly designed, the type of pump used for operating near its maximum capacity would add fluoride solution at the rate of only 2 ppm. Moreover, the fluoride content of the water is checked routinely so that any deviation from the desired level would be found quickly and corrected accordingly.

**Is Fluoride an Essential Nutrient?**

The question of the essentiality of fluoride is really one of semantics. Most researchers consider fluoride essential for proper development of bones and teeth. Whether it is essential for reproduction, growth, and other body functions has been difficult to determine because of the difficulties in developing a totally fluoride-free diet.

Yiamouyiannis capitalizes on this dilemma by selectively interpreting a number of scientific articles as indicating that fluoride is not an essential nutrient. On reviewing the full texts of the reports cited in the "Lifesavers Guide" it is obvious that three of his nine citations actually confirm that fluoride is essential. Two of the references make no specific claims either way and methodological errors were obvious in another source listed.

**Concluding Statements**

While we do not claim to have responded to every allegation made in the "Lifesavers Guide" we've tried to address the major scientific issues raised in the document as well as evaluate the types of references used by Yiamouyiannis. It doesn't take a scientist to see that there is no legitimate basis for the author's warnings based on experimental or historical experience. It is essential to consider that almost 116 million people in the U.S. have access to fluoridated water. Over nine million of these people have used drinking water for generations with natural fluoride levels that range from 1.5 to 8.0 ppm. No definite evidence has been forthcoming that continued consumption of such water is in any way harmful to health.

Clearly, Yiamouyiannis relies on a lower standard of proof for his claims than anyone should rely on in an issue of this importance. The author makes very superficial observations and leaps to some conclusions which are unwarranted even by the data he presents. Bias pervades his evaluation of the data and as other authors have noted, opponents of
fluoridation take scientific findings out of context or erroneously interpret them to instill fear and confusion among the general population. 17, 18, 19

Since the early part of this century, literally thousands of scientific studies have examined the safety and effectiveness of fluoride. The "Life-savers Guide to Fluoridation" is simply an attempt to create the illusion of a scientific controversy, that, in reality, does not exist.


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<td>What about baby formulas, are they fluoridated too?</td>
<td>no references</td>
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<td>Are you saying that fluoridation increases tooth decay rate?</td>
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<td>242-246</td>
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<td>Don't doctors use fluoride in the treatment of osteoporosis?</td>
<td>247-250</td>
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xxxiv
Question
If all this is true, why are the American Dental Association and the U.S. Public Health Service pushing fluoridation more than ever?

Reference Number
no references
REFERENCE #1
(##1 in 1983)

National Academy of Sciences, National Research Council, Committee on
Biologic Effects of Atmospheric Pollutants. Fluorides: biologic effects of
atmospheric pollutants. Wash. D.C. The Academy, 1971. xii+295p. (This
document is also cited in "Lifesavers Guide" reference #124 and #223.)

REASON CITED

The article was cited to support the claim that U.S. industries "throw
over 100,000 tons of fluoride into our atmosphere yearly." The "Lifesavers
Guide" contains information on pp. 8-9, which is refuted by the following
abstract of the original article.

ANALYSIS

Industrial Sources of Fluorides in the Environment

Fluoride dusts and gases are emitted into the atmosphere by many types
of industrial operations. Some of the chief industrial processes that
release fluoride dusts and gases to the atmosphere are described in this
article.

Most of phosphate rock mined in the U.S. is converted into phosphate
fertilizers, phosphoric acid, and elemental phosphorus. During grinding and
drying of the phosphate rock, which consists chiefly of fluorapatite and
contains 3-4% fluorine, considerable amounts of dust are produced. Recovery
and control devices are used to limit the dust emissions into the atmos­
phere. The efficiency of the various control systems varies from about 95-
99.9%.

TABLE 2-1 Estimated Total Fluoride Emissions from Major
Industrial Sources in the United States in 1968a

<table>
<thead>
<tr>
<th>Source</th>
<th>Atmospheric Emissions, tons/year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manufacture of normal superphosphate fertilizer</td>
<td>9,700</td>
</tr>
<tr>
<td>Manufacture of wet-process phosphoric acid</td>
<td>3,000</td>
</tr>
<tr>
<td>Manufacture of triple superphosphate fertilizer</td>
<td>300</td>
</tr>
<tr>
<td>Manufacture of diammonium phosphate fertilizer</td>
<td>100</td>
</tr>
<tr>
<td>Manufacture of elemental phosphorus</td>
<td>5,500</td>
</tr>
<tr>
<td>Manufacture of phosphate animal feed</td>
<td>100</td>
</tr>
<tr>
<td>Manufacture of aluminum</td>
<td>16,000</td>
</tr>
<tr>
<td>Manufacture of steel (open-hearth furnace)</td>
<td>16,800</td>
</tr>
<tr>
<td>Manufacture of steel (basic-oxygen furnace)</td>
<td>8,400</td>
</tr>
<tr>
<td>Manufacture of steel (electric furnace)</td>
<td>14,900</td>
</tr>
<tr>
<td>Welding operations</td>
<td>2,700</td>
</tr>
<tr>
<td>Nonferrous-metal foundries</td>
<td>4,000</td>
</tr>
</tbody>
</table>
Manufacture of brick and tile products 18,500
Manufacture of glass and frit 2,700
Combustion of coal 16,000
Total 118,700

aData from U.S. Department of Health, Education and Welfare.

**REFERENCE #2**
(#2 in 1983)


**REASON CITED**

The article was cited in support of the claim that "We have no idea how much fluoride is being dumped into our waters but estimates range up to 500,000 tons or more." (p. 1 of "Lifesavers Guide")

**ANALYSIS**

The author of the "Lifesavers Guide" apparently arrived at the tonnage figure by guesstimate, since the sections on aqueous discharge and water-borne fluoride provide no such tonnage figure. The report discusses volumes of waste water, fluoride content of certain types of waste water, and discharges by the aluminum industry (est. 69,445 tons).

At the request of the Canadian Dental Association, a review of this report was undertaken by H. J. Hann, D.D.S., M.P.H. Among other comments, his Critique** shows that proof is not convincing that total fluoride ingested from all sources is higher than that currently estimated by most researchers. He states that the authors appear to have concentrated upon the length of their bibliography rather than on the caliber of the studies referenced. Dr. Hann indicates that studies are cited with little critical analysis with the result that deficient or questionable investigations are used as evidence.

*This document is also cited in "Lifesavers Guide" reference #167.


**REFERENCE #3**
(#3 in 1983)

This index is cited to support the claim that fluoride is poisonous. The section on sodium fluoride is reproduced below:

**Sodium Fluoride.**

*Use:* As insecticide, particularly for roaches and ants; in other pesticide formulations; constituent of vitreous enamel and glass mixes; as a steel degassing agent; in electroplating; in fluxes; in heat-treating salt compositions; in the fluoridation of drinking water; for disinfecting fermentation apparatus in breweries and distilleries; preserving wood, pastes and mucilage; manufacture of coated paper; frosting glass; in dental laboratories.

*Med Use:* For prophylaxis of dental caries. Formerly in hyperthyroidism, rheumatoid arthritis, epilepsy. *Dose:* For caries prophylaxis, 0.7 to 1 ppm of drinking water; topically 2% soln applied directly to teeth. *Human Toxicity:* Severe symptoms from ingestion of 0.25 to 0.45 g. Death from 4 g. *Sublethal:* nausea and vomiting, abdominal distress, diarrhea, stupor, weakness. *Lethal:* muscular weakness, tremors, convulsions, collapse, dyspnea, respiratory and cardiac failure, death. *Chronic:* mottling of tooth enamel, osteosclerosis.

*Vet Use:* Poultry lice; roundworms of swine. *Dose:* Swine, 1% in dry feed.

**ANALYSIS**

It is commonly understood that toxicity is a matter of dose of a given compound. Almost every substance can be toxic if ingested in the wrong concentration. For example, Vitamins A and D, table salt, and even water are toxic when ingested in larger than recommended quantities.

**REFERENCE #4**

(4 in 1983)


**REASON CITED**

This book is cited in support of the following claims:

1.) Drinking fluoridated water has long-term negative effects on human health ("Lifesavers Guide" question #3)

2.) Fluoride causes allergic-type reactions ("Lifesavers Guide" question #6)
3.) The incidence of birth defects is higher in fluoridated areas ("Lifesavers Guide" question #8)

4.) The amounts of fluoride used to fluoridate public water systems lead to soft tissue fluoride levels which damage biologically important chemicals, such as enzymes ("Lifesavers Guide" question #13).

ANALYSIS

George Waldbott, M.D., author of this book, personally led the anti-fluoridation forces throughout the United States for over twenty years. His advocacy on behalf of groups opposing this proven public health measure tends to cast considerable doubt on his ability to objectively evaluate and report on the health aspects of fluoridation.

Dr. Waldbott, who died in July 1982, had no formal training as a physiologist, biochemist or epidemiologist. His book has enjoyed modest popularity among antifluoridationists despite its flawed logic, faulty assumptions, and weak references.

Waldbott has attempted to link fluoride with a variety of vague symptoms and ailments, amassing a list of fluoride "victims", sometimes by diagnosing their alleged ailments through the mail. Because of his unorthodox testing procedures and inadequate experimental design, his medical opinions have been routinely questioned by specialists in the United States and abroad.

REFERENCE #5
(#5 in 1983)


REASON CITED

Cited to support the claim that harmful effects of fluoridation have been proven.

ANALYSIS

A Pennsylvania Court of Common Pleas judge, John P. Flaherty, made a ruling against the practice of fluoridation in a 1978 lawsuit. His objectivity in the aforementioned case, however, remains highly questionable. In taking jurisdiction in this case, he ignored the provisions of the Administrative Agency Law as well as the Rules of Appellate Procedure. He subsequently wrote misleading correspondence which has been heavily utilized in antifluoridationist activities and also made a keynote presentation at the Health Expo convention, a meeting sponsored by the National Health Action Committee in June 1981.

It is interesting to note that although the "Lifesavers Guide" was revised three months after Flaherty's decision was unanimously reversed by the appellate court, this reference remained unchanged. In addition, the
Supreme Court of Pennsylvania denied the subsequent appeal of this case on March 3, 1983, which further erodes the relevance of this citation. Moreover, Judge Flaherty's order was not carried out and the West View Water Authority never once ceased fluoridation of the water supply.

REFERENCE #6
(#6 in 1983)


REASON CITED

Cited to support the claim that harmful effects of fluoridation have been proven.

ANALYSIS

Judge Niemann declared Illinois' fluoridation statute unconstitutional, alleging that it violated the right "to provide and maintain a healthful environment..." (Article XI, Section 1, 2 of the Constitution of the State of Illinois, 1970). The plaintiffs' (antifluoridationists) arguments that there was "a risk of serious health hazards" and "the failure of the state to adequately explain the scope of risks to the public" led to his decision enjoining the Alton Water Company from introducing fluoride into the drinking water. Because Niemann is one of the few judges to rule in favor of the opponents of fluoridation, his decision is cited often.

The defendants (State of Illinois) were successful in obtaining a Stay Order from the Illinois Supreme Court, which required fluoridation to continue in Alton as well as every other Illinois public water supply.

In October 1984, the Illinois Supreme Court—in a unanimous decision—overturned Judge Niemann's ruling, thus upholding the statutory requirement to fluoridate all public water systems in Illinois.

REFERENCE #7
(#7 in 1983)


REASON CITED

Cited to support the claim that harmful effects of fluoridation have been proven.

ANALYSIS

This reference is a rehash of reference #6. "Health Action" is the bulletin of a group formerly called the National Health Action Committee, an antifluoride membership organization whose executive director was John Yiamouyiannis.
Judge Niemann declared Illinois' fluoridation statute unconstitutional, but the proponents of fluoridation were successful in obtaining a Stay Order from the Illinois Supreme Court, enabling Alton and all other Illinois communities to remain fluoridated.

In October 1984, the Illinois Supreme Court—in a unanimous decision—overturned Judge Niemann's ruling, thus upholding the statutory requirement to fluoridate.

No court of last resort has ever ruled against fluoridation. The constitutionality of fluoridation has been upheld in literally hundreds of courts throughout the United States.

REFERENCE #8
(#8 in 1983)


REASON CITED

The article was cited to support the claim that the Ministry of the Environment for the Province of Quebec confirms the findings of U.S. courts that fluoride has harmful effects.

ANALYSIS

The full text of this Canadian report was not available, but it was possible to obtain the 20-page abstract of the Quebec study entitled "The Departmental Committee Report on the Quality of the Environment and the Fluoridation of Drinking Waters."

This abstract was reviewed in September 1979 by several distinguished scientists:

John C. Greene, D.M.D., Deputy Surgeon General, U.S. Public Health Service;

Marvin A. Schneiderman, Ph.D., Associate Director for Science Policy, National Cancer Institute;

W. D. Armstrong, Ph.D., M.D., Regents' Professor, Department of Biochemistry, University of Minnesota Medical School;

Gordon H. Schrotenboer, Ph.D., Secretary, Council on Dental Therapeutics, American Dental Association;

William B. Bock, D.D.S., Chief, Dental Disease Prevention Activity, Centers for Disease Control;

George R. Martin, Ph.D., Chief, Laboratory of Developmental Biology and Anomalies, National Institute of Dental Research.
Every reviewer found serious flaws in this report. Their comments can be summarized as follows:

1.) The document does not contain "new" information. Its references have been reviewed and used as a basis for erroneous conclusions for many years.

2.) The literature sources cited demonstrate the negative bias of the authors and, according to one reviewer, the bibliography was grossly incomplete.

3.) The conclusions drawn by the authors of the Quebec study are a compendium of unwarranted inferences.

4.) Some statements reflect a naivete of chemistry or a lack of knowledge between the difference of organic versus inorganic chemistry.

5.) The document has no acceptance by and is contrary to the published conclusion of Dr. David Crombie, Minister of National Health and Welfare of the Dominion of Canada. Dr. Crombie stated in September 1979, "I have no hesitation therefore in advocating the widest practicable implementation of this public health measure by the authorities responsible for community water supplies in Canada".

6.) The document has no serious acceptance by the Canadian Provinces where fluoridation has been and continues to be implemented for about half of the population where fluoridation is feasible.

REFERENCE #9
(#9 in 1983)


REASON CITED

The Dementi article was cited to support the claim that harmful effects of fluoride have been proven in Illinois and Pennsylvania courts and that Burk and Yiamouyiannis have correctly proven a cancer-fluoridation link.

ANALYSIS

This unpublished report by a toxicologist who was formerly employed by the Virginia State Health Department presents nothing new and represents his personal viewpoint. Admitting that he is neither a statistician nor an epidemiologist, he presents his opinion that the Burk/Yiamouyiannis findings stand unsuccessfully refuted. (See Lifesaver's Guide reference #92.)

Joseph M. Doherty, D.D.S., M.P.H., Director, Division of Dental Health, Virginia State Health Department, states, "The questions raised by this paper have all been adequately answered in the literature."
The forward to this paper is included below:

Dr. Dementi reviewed available literature on the health effects of fluoride at the request of others in the Department of Health who were faced with a decision on the advisability of defluoridizing water supplies naturally containing fluoride levels in excess of 1.8 ppm. As indicated in the text, the opinions are those of the writer. It represents a working paper which might contribute to a recommended policy.

By statute, the State Health Department carries out the policies, rules, and regulations of the State Board of Health. As such, the Department takes no stand, one way or the other, on endorsement of the paper.

The Virginia State Health Department is actively encouraging the initiation of fluoridation in communities not presently receiving its dental benefits.

REFERENCE #10


REASON CITED

The "Lifesavers Guide" claims that "with regard to the amount of fluoride found in a pint of water" the Physicians' Desk Reference (PDR) points out:

Dental fluorosis (mottling) may result from exceeding the recommended dose. In hypersensitive individuals, fluorides occasionally cause skin eruptions such as ectopic dermatitis, eczema or urticaria. Gastric distress, headache, and weakness have also been reported. These hypersensitive reactions usually disappear promptly after discontinuation of the fluoride.

ANALYSIS

The PDR lists over 25 different preparations of fluoride and fluoride with vitamins for children that are available in America. With only one product, Cari-tab® Softab®, is there any reference to the above mentioned problems with fluoride use, with none of the other preparations listing hypersensitivity reactions. This one compound is a multivitamin preparation containing fluoride, not pure fluoride. In no instance was any reference made to the amount of fluoride in a pint of drinking water; all references are to fluorides being prescribed for systemic use in place of fluoridated drinking water.
REFERENCE #11
(#11 in 1983)


REASON CITED

The article was cited in support of the claim that poorly nourished children consuming water with as little as 0.4 ppm fluoride have exhibited dental fluorosis.

ANALYSIS

Drinking water sources in the rural areas of Uttar Pradesh, India, are most often open, shallow wells. Since the suspended impurities are likely to be ingested, investigators analyzed 100 well water samples for fluoride, phosphate, magnesium, calcium, chloride, and hardness for several seasons.

Analysis revealed significant seasonal variation for all the constituents examined in both the clear and sedimented water samples.

There is absolutely no mention of dental fluorosis or malnourished children in this article. This citation not only fails to support the claim made in the Lifesavers Guide but it also demonstrates the inaccurate and inappropriate method of referencing prevalent in the antifluoride publication.

REFERENCE #12
(#12 in 1983)


REASON CITED

The article was cited in support of the claim that poorly nourished children consuming water with as little as 0.4 ppm fluoride have exhibited dental fluorosis.

ANALYSIS

This study evaluated the prevalence of fluorosis in Lucknow, India, and studied factors responsible for the high degree of fluorosis among children in the area. Eighteen percent of the 16,565 children examined had dental fluorosis, and 24 percent of the children ingesting water with 0.4–0.8 ppm fluoride had fluorosis. It must be noted, however, that only a portion of those children in rural areas had a fluorosis index > 0.6, necessary to indicate a public health problem.
To determine factors responsible, researchers took complete dietary histories on 444 children during three distinct seasons of the year. Drinking water was the principal source of fluoride intake and there were no undue concentrations of fluoride found in the foods examined. Total fluoride intakes were approximately twice those expected. While the authors note that some studies have indicated a link between nutritional status and fluorosis, the present study indicates that total consumption of fluoride is a more significant determinant of dental fluorosis than are nutritional factors.

It should be noted that consumption of water is much higher in India than in the United States. Ongoing research to determine total fluoride intake, as well as the present practice of climatically adjusting the fluoride concentration of community drinking water based on mean maximum temperatures are clear indications that aesthetically unacceptable fluorosis is not a problem in fluoride-adjusted water systems in the United States.

REFERENCE #13


REASON CITED

The article was cited as providing evidence to support the view that various persons exhibited allergic reactions after the use of toothpastes and vitamin preparations containing fluoride.

ANALYSIS

The entire population consumes fluoride. It is the thirteenth most abundant element in the earth's crust and is in all water supplies, food, and air. Numerous studies in areas with high natural fluoride levels involved thousands of people with clinical evidence of excessive exposure and no allergenic effects. The amount of fluoride in vitamin drops or fluoridated toothpastes has not been shown sufficient to cause any evidence of allergenic response.

Fluoride, like other simple ionic substances (e.g., calcium or magnesium) cannot alone act as an antigen because it is not recognized by the body as a foreign agent in the immunological sense. Simple chemicals with molecular weights approximately 1000 or less are not capable of acting as antigens. Fluoride's atomic weight is 19.

REFERENCE #14

This report describes eight cases of what the author/clinician calls "chronic fluoride poisoning." Dr. Waldbott claims this condition is the result of exposure to fluorides in water, air, and fluoride supplements. Symptoms described include headaches, abdominal pains, backache, diarrhea, lethargy, and other nondescript complaints.

Analysis

The American Academy of Allergy reviewed such findings of reported allergenic reaction and concluded that no evidence of immunologically mediated reactions had been presented. There is insufficient clinical and laboratory evidence to determine the existence of fluoride allergy or intolerance. Subsequently the Executive Committee of the American Academy of Allergy unanimously adopted this statement in 1971:

There is no evidence of allergy or intolerance to fluoride as used in the fluoridation of community water supplies.

This statement was reaffirmed by the Executive Committee of the American Academy of Allergy in 1980.

Dr. George Waldbott, author of this book, personally led the antifluoridation forces throughout the United States for over twenty years. His advocacy in behalf of groups opposing this proven public health measure tends to cast considerable doubt on his ability to objectively evaluate and report on the health aspects of fluoridation.

Reference #15
(#15 in 1983)


Reason Cited

The article was cited to support the claim that allergic-type reactions due to fluoride are well documented.

Analysis

This article is a brief letter to the editor written by a dermatologist who recounts his personal observations—it's hardly what one could appropriately term "well documented" research.

The physician describes "about" 65 patients who experienced acne-like eruptions on the chin and corners of the mouth. At his request they switched from fluoride dentifrices to non-fluoride dentifrices. Approximately 50 percent of the patients were cleared of the eruptions.
The remaining 50 percent of the patients who experienced no improvement then switched to baking soda and Scope. Nearly all were considerably improved. Several who resumed using a fluoride dentifrice had a recurrence of the skin problem.

It is not possible or appropriate to draw definitive conclusions from this anecdotal information. It's necessary to control for many confounding factors that could be associated with the dermatological problem (e.g. binding and flavoring agents in the dentifrices). The author notes that for many patients the side of the face that had greater acne involvement was the side on which the patient slept, giving credence to the hypothesis that nocturnal salivary drainage could be the cause of the dermal problem.

The American Academy of Allergy has adopted the following statement:

"There is no evidence of allergy or intolerance to fluorides as used in the fluoridation of community water supplies."

REFERENCE #16
(#16 in 1983)


REASON CITED

The article was cited to support the claim that allergic-type reactions due to fluoride are well documented.

ANALYSIS

This report has absolutely no relevance to water fluoridation. The researchers applied 1% NaF to abraded rat skin for 24 hours to get a pathological effect. With less than 1% NaF (which is 4500 ppm fluoride) researchers caused no pathological effects.
References 17 through 25 are cited to support the claim that fluoride weakens the immune system.

These references are discussed individually on the following pages, but some explanatory information is presented here.

- Three articles (#17, 19, 22) had no relevance to the consumption of optimally fluoridated water by humans.
- In one article (#21) the authors stated that their findings in no way implicated the consumption of optimally fluoridated water by humans.
- A co-author of research cited in two references (#17, 18) was contacted personally by the editors and emphasized that his research has been carried out in an artificial system. He indicated that extrapolating the data to the immune systems of humans is inappropriate.
- One article (#17) was incorrectly cited.
- Four articles (#20, 23, 24, 25) could not be located: one is in an issue of the periodic newsletter of an antifluoride organization headed by John Yiamouyiannis; two are transcripts from a foreign court case where the judge completely exonerated fluoridation as a safe and effective public health measure.

All of the articles that were located reported extremely esoteric research and none of them were relevant to the consumption of optimally fluoridated water. J. Steven McDougal, M.D., Chief, Immunology Branch, Center for Infectious Diseases, Centers for Disease Control, has stated, "No one doubts that fluoride is a metabolic poison when used pharmacologically (primarily acting on oxidative metabolism enzymes), but to assume these effects are found at 1 ppm or that an in vitro effect of 1 ppm translates directly to an effect in vivo is totally unsubstantiated by the data he [J. Yiamouyiannis, author of the "Lifesavers Guide to Fluoridation" and The Aging Factor] presents."

Reason Cited

The article was cited to support the claim that fluoride weakens the immune system.

Analysis

This report discusses the role of the host relative to the incidence and prevention of dental caries. The author cites various studies that indicate that NaF, used in higher concentrations than is used in fluoridating water for public use, inhibits phagocytosis and leukotaxis, which are basic defense mechanisms. He cites Allmann and Benac's work (see reference #18 of "Lifesavers Guide") on NaF-induced elevations of cyclic-AMP levels in liver, heart, and submaxillary glands, noting that cyclic-AMP inhibits phagocytosis and leukotaxis.

Allmann, via personal communication, has indicated that his research is carried out in an artificial system and that extrapolating his data to the immune systems of human beings is premature.

This reference was incorrectly cited by the author of the Lifesavers Guide (volume, issue, and year do not coincide). Hexagon is a periodical published for the medical profession by F. Hoffman-LaRoche & Co.

REFERENCE #18
(#18 in 1983)


Reason Cited

The article was cited in support of the claim that fluoride weakens the immune system.

Analysis

This abstract briefly describes research on 24 male rats: six receiving distilled water; six receiving NaF at 1 ppm fluoride in water; six receiving Na2PO3F at 1 ppm fluoride in water; and six receiving Na2SiF6 at 1 ppm fluoride in water. All 3 fluoride groups had cyclic-AMP (cAMP) levels in tissue and urine.
Because of the technical nature of the research, the principal author, Dr. D. W. Allmann, was telephoned and asked to explain how cAMP levels related to the immune system. Dr. Allmann indicated that his research contains no evidence to prove or disprove the claim found in the "Lifesavers Guide". In fact, he stated that he and his colleagues have done no research on the immune system and fluoride.

He took great pains to explain that cAMP is a compound that is formed in most cells in the body. Some human hormones, glucagon, and epinephrine can also increase cAMP levels in body tissues.

Dr. Allmann also stated that his research does not relate to fluorides as used in the drinking water, indicating that "we rig the system" in the laboratory and it is not comparable to the individual drinking fluoridated water in the community situation.

REFERENCE #19
(Not cited in 1983)

REASON CITED
This study was cited as evidence that fluoride weakens the immune system.

ANALYSIS
Researchers treated rabbit and human polymorphonuclear leukocytes (PMN's) with fluoride in the presence and absence of calcium. Treatment of rabbit PMN's with fluoride in the absence of calcium did not result in significant enzyme release (a measure of the degree of cytolysis). In the presence of calcium the results of the interaction strongly depend on the experimental procedure. Fluoride levels which brought about enzyme release started at 2.5 mM fluoride, a level much higher than that expected in human blood.

Whereas pretreatment with fluoride resulted in extensive exocytosis after pretreatment with calcium in rabbit PMN's, no exocytosis occurred with the same treatment in human PMN's.

The authors acknowledge considerable differences between the structure and/or composition of rabbit peritoneal PMN's and human peripheral PMN's.

This extremely esoteric research has no relevance to consumption of optimally fluoridated water.
REFERENCE #20
(1983)


REASON CITED

This study is cited to support the claim that fluoride weakens the immune system.

ANALYSIS

The article could not be located through interlibrary loan, Chemical Abstracts Service, or other sources.

REFERENCE #21
(1983)


REASON CITED

This study is cited to support the claim that fluoride weakens the immune system. Because of the importance of polymorphonuclear leukocytes (PMNs) in the host-parasite relationship, the researchers studied the effect of varying concentrations of fluoride on several PMN functions in vitro. The authors state on p. 1937:

"The concentration of fluoride required to inhibit the PMN functions measured in the human blood samples of this study was considerably greater than that found in the plasma of persons living in water fluoridated communities, (2 - 5 x 10^{-3} \text{mM})...Thus, it is unlikely that water fluoridation has any effect on the ability of PMNs to resist bacterial invasion, since a fluoride ion concentration greater than 1,000 times that found in the plasma of persons living in a fluoridated area was required to suppress PMN function by 50%.

In conclusion the reference article states, "There is no evidence that the level of fluoride found in the plasma of persons living in a fluoridated community could cause inhibition of any of the PMN functions tested."

REFERENCE #22
(1983)


REASON CITED

This article is cited to support the claim that fluoride weakens the immune system.
ANALYSIS

Three groups of mice were provided with drinking water that contained 11 ppm NaF (Group I); 22 ppm NaF (Group II); and no NaF (Group III - controls) for eight months. The effect of fluoride on circulating leukocytes was investigated by means of blood cell counts and smears.

Leukocytes from control mice revealed no alteration in number, structure, or nucleic acid distribution. The white cells increased about 23 percent in Group I and 35 percent in Group II. The number of circulating neutrophils increased relative to the level of fluoride. Other cell changes occurred, leading the investigators to state that the data suggest that the fluoride administered to the mice may induce leukocytic degeneration that stimulates a responsive bone marrow.

The levels used in this study are much higher than those used in community water fluoridation. In addition, the researchers draw no conclusions about the effects of optimally fluoridated water on the immune system of man.

REFERENCE #23
(#24 in 1983)


REASON CITED

This study is cited to support the claim that fluoride weakens the immune system.

ANALYSIS

This reference is a periodic newsletter of the National Health Action Committee, an antifluoride organization. It could not be acquired at any libraries or agencies that were contacted.

REFERENCE #24
(#25 in 1983)


REASON CITED

The transcript is cited to support the claim that studies by both proponents and opponents of fluoridation confirm that fluoride weakens the immune system. The transcripts could not be acquired.

ANALYSIS

The ruling of the judge in this court case completely vindicated fluoridation as a public health measure that is both effective and safe.
REFERENCE #25
(#26 in 1983)

Transcript of testimony of Dr. Peter Wilkinson and exhibits 137, 635, 636, 637 in McColl vs. Strathclyde Regional Council, Scottish High Court in Edinburgh, 1982, p. 17723-18150, 19328-19492.

REASON CITED

The transcript is cited to support the claim that studies by both proponents and opponents of fluoridation confirm that fluoride weakens the immune system. These transcripts could not be located.

ANALYSIS

The ruling of the judge in this court case completely vindicated fluoridation as a public health measure that is both effective and safe.
References 26 through 35 are cited to support the claim that fluoridated water leads to the breakdown of collagen, a protein that is the structural component for skin, ligaments, muscles, and bone. The "Lifesavers Guide" goes on to infer that wrinkled skin, arthritis, and torn ligaments are likely to be more common in fluoridated areas.

These references are discussed individually on the following pages, but some explanatory information is presented here.

- Eight of the references (#27, 28, 29, 30, 31, 32, 34, 35) have no relevance to the consumption of optimally fluoridated water. Excessive levels of fluoride are used in most of the studies (#27, 28, 30, 31, 32, 34) and one article is used inappropriately, since it reports on the effects of inhalation of hydroxyfluoride gas.

- One reference (#35) is a magazine article from a German tabloid that presents no scientific basis for its claims.

- Two references (#29, 33) are co-authored by the same researchers who specifically qualify their results by stating that while fluoride may affect collagen metabolism in their experiments on female rats, "the mechanism of fluoride action on living organisms is still unclear."

- Two references (#28, 32) are authored or co-authored by Dr. L.J. Ream of Wright State University's School of Medicine. The editors contacted Dr. Ream and his colleague, Dr. P.B. Pendergrass, to inform them about the manner in which their study was used in the "Lifesavers Guide." Both researchers insisted that their findings could not be extrapolated to human beings because the research was with laboratory rats at very high fluoride concentrations. Dr. Pendergrass, co-author of reference #32, noted that rat bone is very different from human bone: it does not have Haversian systems or the compact bone formation found in humans (six of the collagen references report results of studies on laboratory rats). Dr. Ream states, "We don't want to infer that 1 ppm fluoridated water is doing any harm." He expressed his concern that his research was misused for the purpose of impugning community water fluoridation.

- While it has been demonstrated that skeletal changes may be produced by toxic levels of fluoride, these changes occur only after long-continued exposure to extremely large amounts of fluoride, ranging from 20 to 80 mg. or more per day. Studies by Steinberg* and Leone** indicate that there is no relationship between fluoridation and

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various arthritic conditions or musculoskeletal diseases. Furthermore, recent studies have demonstrated some dramatic results from the use of therapeutic levels of fluoride in the treatment of osteoporosis+ and otospongiosis,++ two bone-thinning diseases.

It is neither accurate nor appropriate to conclude from the studies cited in the "Lifesavers Guide" that optimally fluoridated water in any way causes wrinkled skin, arthritis, or a greater frequency of torn ligaments.


REASON CITED
This article was cited to support the claim that fluoridated water leads to the breakdown of collagen, a structural component of skin, ligaments, muscles, and bone.

ANALYSIS
This Japanese article contained the following English abstract.

"The effect of fluoride on bone metabolism was studied in rats. Since urinary hydroxyproline (OHPro) is a good indicator of bone resorption level, OHPro in urine was studied mainly in rats exposed to chronic doses and/or acute doses of fluoride. As a supplementary indicator, additional analyses were also done: calcium, Pi and fluoride in urine; alkaline phosphatase activity, calcium and fluoride in serum and analyses of those mineral contents and/or soft X-ray analysis of the femurs. High doses of fluoride (100 and 200 ppm F-) produced lowered urinary levels of free and total OHPro. This finding indicates that bone resorption and collagen synthesis are depressed. In the medium dose groups (10 and 50 ppm fluoride), high urinary levels of free and total OHPro were seen only on the 15th experimental day, indicating a temporal acceleration of bone resorption. An interesting finding was seen in a lower dose group (1 ppm fluoride), i.e., a rising tendency in the urinary level of free OHPro. It is possible that the bone metabolism can be activated by optimum fluoride. On the other hand, abrupt and temporal bone resorption at the site of high metabolic activity may occur. No significant changes in serum alkaline phosphatase activity, serum calcium, urinary Pi and urinary calcium were observed."

The author of this report makes no attempt to delineate hazards associated with changes in collagen metabolism, nor does he discuss fluoridation of community water systems. Therefore, this study must be interpreted with caution.


REASON CITED
The study is cited to support the claim that fluoridated water leads to a breakdown of the protein collagen, a structural component of skin, ligaments, muscles, and bone.
Rabbits weighing 600-800g received sodium fluoride (NaF) (10 mg/kg body weight/day) intragastrically for up to 12 months. The chemical composition of cancellous and cortical bone was evaluated.

The authors indicate that the dose used in this study is used widely in the experimental induction of severe fluorosis. The results indicate that excess fluoride ingestion "adversely affects the hydroxyproline content in both cortical and cancellous bones which suggests reduced collagen biosynthesis."

This study has no relevance to community water fluoridation since the average 70 kg man would have to consume approximately 700 mg of sodium fluoride each day (700 liters of water or 1 liter of water fluoridated at a level of 700 ppm) to have a dosage comparable to that which was administered in this study.

Reference #28
(#29 in 1983)


Reason Cited

The study was cited to support the claim that fluoridated water leads to a breakdown of collagen, a structural component of skin, ligaments, muscles and bone.

Analysis

The femurs from rats given 120 ppm fluoride in their drinking water for four weeks were examined with histological, histochemical, and radiographic methods. Blood removed from the rats prior to sacrifice was analyzed for calcium, phosphorus, and alkaline phosphatase. Results of this study indicated that the ingestion of fluoride produced wide osteoid seams on the periosteal surface of the femoral diaphysis within four weeks. The increase in osteoid appeared to be due to an increase in the number of osteoid-producing cells (osteoblasts) along with a subsequent delay in the mineralization of this tissue. The metabolic activity of osteoblasts did not appear to be affected since the intracellular production of acid and alkaline phosphatase was not inhibited. However, due to the high concentration of fluoride ingested, abnormal collagen deposition and a change in bone mineral may have combined to cause a delay in osteoid mineralization. Concurrent with these changes in bone, the serum levels of calcium, phosphorus, and alkaline phosphatase remained within normal ranges.
The author notes that worldwide, it has been found that the ingestion of water-borne fluoride in small amounts (0.7 to 1.5 ppm) reduces dental caries in children. The objective of the present study was to determine the initial effects of short-term, high level fluoride ingestion on blood and on the patterns of bone formation and resorption in the femur of the rat. It has no relation to consumption of optimally fluoridated water.

REFERENCE #29
(30 in 1983)


REASON CITED

The study was cited to support the claim that fluoridated water leads to the breakdown of collagen, a structural component of skin, ligaments, muscles, and bone.

ANALYSIS

Female rats were exposed to hydroxyfluoride (2.7 mg/m³ or 5.0 mg/m³) gas seven weeks before pregnancy, during pregnancy and lactation as well as subsequently with the offspring up to one, two, four and six months after birth. The offspring were taken for investigation.

It was found that serum hydroxyproline and hydroxylysine were elevated in growing rats exposed to hydroxyfluoride. The elevation was higher in animals treated with 5.0 mg/m³ than in rats treated with 2.7 mg/m³. One- and two-month old rats were shown to be more sensitive to hydroxyfluoride. Similar changes were observed in urinary excretion of these compounds. Changes in collagen content were found in skin and lungs. A marked decrease in total collagen content and changes in collagen fractions were shown.

Authors attest to the fact that fluoride is "an element necessary for normal metabolism" and "has been found to be highly effective" in the prevention of caries. They state the need to examine the possibility of cumulative toxic effects in view of fluoride emissions into air, intoxication of environment, and "artificial application of the element in caries prophylaxis." The authors conclude:

"Results confirm previous suggestions that fluoride compounds evidently affect collagen metabolism, and indicate that young animals are more sensitive to these compounds. However, the mechanism of fluoride action on living organisms is still unclear."

Note that water was not the vehicle in which fluoride was administered.
REFERENCE #30
(1983)


REASON CITED

The study was cited to support the claim that fluoridated water leads to the breakdown of collagen, a structural component of skin, ligaments, muscles, and bone.

ANALYSIS

Rabbits of similar age and body weight received sodium fluoride (NaF) (50 mg/kg body weight/day) intragastrically for up to 136 days. The acid-soluble collagen of bone, tendon, trachea, and skin was extracted and purified. Aldehyde associated with the collagen was determined spectrophotometrically. Bone collagen, which had maximum aldehyde content in normal conditions, showed maximum reduction after sodium fluoride ingestion, as compared to other tissues. The mode of action of fluoride appears variable from tissue to tissue. The collagen fibers produced during fluoride toxicity would be defective due to inadequate cross links. Thus, sodium fluoride interferes with the maturation and normal metabolism of tissue collagen.

The authors state: "Fluoride is useful in preventing dental caries and in the treatment of osteoporosis." The study was conducted strictly to examine the nature of defects occurring during fluoride intoxication. This is not applicable to community water fluoridation at a concentration of 1 ppm.

REFERENCE #31
(1983)


REASON CITED

This study is cited to support the claim that fluoridated water leads to the breakdown of collagen, a structural component of skin, ligaments, muscles, and bone.

ANALYSIS

Actually, the study describes the effects of "excessive" (author's term) amounts of fluoride ingestion on rabbit skin collagen. Researchers intragastrically administered to an undisclosed number of rabbits 10 mg/kg body weight of sodium fluoride PER DAY for up to 180 days. An undisclosed number of control rabbits were maintained under the same laboratory conditions except for the fluoride administration.
The authors conclude that fluoride, ingested in excessive amounts, increases the solubility and degradation of collagen and reduces collagen biosynthesis in the skin of laboratory rabbits.

This study has no relevance to community water fluoridation since the average 70 kg man would have to consume approximately 700 mg of sodium fluoride each day (700 liters of water or 1 liter of water fluoridated at a level of 700 ppm) to have a dosage comparable to that which was administered in this study.

REFERENCE #32
(#33 in 1983)


REASON CITED

This study is cited to support the claim that fluoridated water leads to the breakdown of collagen, a structural component of skin, ligaments, muscles, and bone.

ANALYSIS

In this study, researchers observed the morphological alterations in the femoral diaphyses of male rats given 150 ppm fluoride in drinking water for 10 weeks. Scanning electron microscopy indicated that rats fed 150 ppm fluoride in drinking water showed increases in matrix and bone formation at the periosteum with a concomitant decrease in resorptive activity at the endosteum; i.e., at very high concentrations of fluoride the researchers noted abnormal bone formation and abnormal bone resorption.

However, when the researchers were contacted personally and informed about the manner in which their study was cited in the "Lifesavers Guide", both of them insisted that their findings could not be extrapolated to human beings because the research was conducted with laboratory rats exposed to high fluoride concentrations. Dr. P. B. Pendergrass, co-author of the study, noted that rat bone is very different from human bone: it does not have Haversian systems or the compact bone formation found in humans. The principle investigator, Dr. L. J. Ream, states, "We don't want to infer that 1 ppm fluoridated water is doing any harm." He expressed his concern that his research was misused for the purpose of impugning community fluoridation.

REFERENCE #33
(#34 in 1983)

REASON CITED

The study is cited to support the claim that fluoridated water leads to the breakdown of collagen, a structural component of skin, ligaments, muscles, and bone.

ANALYSIS

Adult rats were given water with sodium fluoride (10 mg/1 or 10 ppm) for seven weeks before pregnancy, during pregnancy and after the delivery. The born rats were treated in the same manner and were investigated one, two, four and six months after birth.

It was found that exposure to sodium fluoride stimulated an increase of hydroxyproline and hydroxylysine concentrations in serum and the urinary excretion of these catabolites. A decrease of soluble collagen was shown in skin and lungs of exposed animals as compared with controls. The decrease of collagen in tissues was not age-dependent.

The researchers indicate that while their investigation confirms that excessive fluoride affects collagen metabolism, the mechanism of its action is still unknown. The authors of this report make no attempt to delineate hazards associated with changes in collagen metabolism, nor do they discuss fluoridation of community water systems.

REFERENCE #34
(#35 in 1983)


REASON CITED

This article is cited to support the claim that fluoridated water leads to the breakdown of the protein collagen.

ANALYSIS

This extremely technical report evaluates enamel matrix changes when mature rats are given 50 ppm fluoride. The authors report that the amount of enamel matrix protein synthesized was depressed and the composition of the protein was altered.

Applying multivariate analysis to determine the effect of this extremely high dose of fluoride on selected sets of groupings of amino acids, the authors noted that fluoride affected certain single and groups of amino acids and not others. "The biological importance of these changes in the matrix will remain incompletely defined until the role of the matrix itself is clearly elucidated."

The authors make no attempt to extrapolate their findings to human consumption of optimally fluoridated water.

REASON CITED

The article was cited to support the claim that wrinkled skin is a result of fluoridated water.

ANALYSIS

This article was published in the German magazine, Stern, which is reported to be a weekly news magazine that tends to print sensationalism. (This same magazine printed portions of Adolph Hitler's "long lost diary" a few years ago, which soon was exposed as a forgery.)

A translation of the article indicates a human interest story about the plight of people in the Turkish village of Kizilcaoren, who suffer from a "mysterious illness." The author of the article implies that various conditions--brown teeth, muscle weakness, wrinkles, miscarriages, stiff joints, impotence, and depression--found among the inhabitants of this village, are due to the consumption of the local water, which has a natural fluoride content of 5.4 mg/l.

This news article presents no scientific basis for its claims, relying solely on interviews and testimonials. The author uses no scientific references.


REASON CITED

The study was cited as providing chemical evidence to support the view that fluoride increases radicals in the blood (inferring that this causes adverse effects--not specifying how or why).

ANALYSIS

This in vitro study conducted on PMNs (polymorphonuclear leukocytes) of rabbits considered varying preincubation fluoride concentrations (0-30 mM or 0-.57 ppm fluoride) with varying pH levels (5.8, 7.2, 7.8) and PMN O_2 production when extracellular Mg^{2+} and Ca^{2+} are introduced into the medium. Although a relationship is reported, the author (Elferink) does not make any statements as to potential harmful effects for rabbits or humans.
REFERENCE #37
(Not cited in 1983)


REASON CITED

The article was cited as providing clinical evidence to support the view that fluoride increases radicals in the blood (inferring that this produces adverse effects--although not specifying what nor how).

ANALYSIS

This article refers to the use of human cell samples, in vitro, to identify chemo-attractants that stimulate activity of the superoxide generating system (such activity enhances the responsiveness of neutrophils at infection sites). Fluoride (at 20 mM) is identified as a chemo attractant; yet, it is not identified as causing adverse effects. The author ends his discussion with the following statement: "...the role of chemotactic enhancement of oxidative metabolism in host defense remains to be established." The article abstract is reproduced below:

Author's Abstract: Human neutrophils exposed to chemotactic concentrations of zymosan-activated serum (ZAS) and a formulated chemotactic peptide (FMLP, 10^{-7}-10^{-9}M) were markedly enhanced in their ability to generate superoxide (O_2^{-}) upon stimulation with either sodium fluoride or phorbol myristate acetate (PMA). For both fluoride and PMA, enhancement was characterized by a decrease in the lag from stimulation to initiation of superoxide release and by an increase in the rate of superoxide generation -- representing faster activation and increase activity of the O_2^{-} generating enzyme, respectively. Chemotactic concentrations of casein, normal serum, and casein-treated serum enhanced the activity, but not the rate of activation, of the fluoride-stimulated superoxide generating system. This effect on activity was not so impressive as that obtained with FMLP or ZAS. The mechanisms by which FMLP enhanced responsiveness to fluoride and PMA were found to be different. Optimal enhancement for fluoride-stimulated responses required extracellular Ca^{++}. Extracellular glucose, but no extracellular Ca^{++}, was required for enhancement of FMLP of PMA-stimulated responses. A similar glucose requirement could not be demonstrated for chemotactic peptide enhancement of the superoxide-generating system stimulated by fluoride. Fluoride and PMA apparently activate the neutrophil O_2^{-} generating enzyme by pathways that are not identical. However, responsiveness of the enzyme to both agents is susceptible to modulation by cellular responses to chemotactic peptides.
REFERENCE #38
(Not cited in 1983)


REASON CITED

The article was cited as providing chemical evidence to support the view that fluoride increases radicals in the blood (infers this produces adverse effects).

ANALYSIS

This article makes no mention of an increase of radicals in the blood. Instead, the authors investigate the effects of high doses of fluoride (in the amount of 50 mg/kg body wt./day for periods of 22-83) days on osseous and non-osseous tissue. Although severe harmful changes were demonstrated on these tissues at such high levels, this study has no relevance to the consumption of optimally fluoridated water. The level of fluoride used would translate to 550 mg/day for a 22 lb. child.

REFERENCE #39
(Not cited in 1983)


REASON CITED

The article was cited as providing evidence to support the view that fluoride increases radicals in the blood. The author of the "Lifesavers Guide" infers that this produces adverse affects, but fails to specify to what extent or how.

ANALYSIS

This article appears to be in Greek or Yiddish; yet, the final summary is in English (see below). The article is related to chronic intoxication (levels not noted in summary), which would not occur at 1 ppm as in fluoridated water.

Article Summary: In rats at different diets it had been studied the influence of chronic fluorine intoxication on lipid peroxidation and the state of antioxidant system.

It was shown that chronic fluorine intoxication inhibited the anti-oxidant activity and caused an increase in the rate of peroxidation and the level of lipoperoxides in organs and tissues (liver, brain, serum). Additional complex supplementation of the latter with
methionine and vitamin E restored original antioxidant activity and reduced the content of lipoperoxides in tissues almost to the normal level and, therefore, was recommended as protecting factors in fluorosis.

REFERENCE #40
(Not cited in 1983)


REASON CITED

The article was cited as providing chemical evidence to support the view that fluoride increases radicals in the blood. The author of the "Life-savers Guide" infers that this produces adverse affects, but fails to specify to what extent or how.

ANALYSIS

The experiment was conducted in vitro in a medium using concentrations of 2, 10, and 20 mM NaF (.038, .19, and .38 ppm sodium fluoride) substituted for NaCl (sodium chloride) which would normally be found in vivo. The use of these concentrations did stimulate respiratory bursts by the neutrophils; but the authors went on to say this activity was reversible. The authors do not suggest that this stimulation would result in adverse effects to the cells. Thus, this article does not substantiate the claim that levels of fluoride consumed from fluoridation would result in adverse effects.

Article Summary: Fluoride ion (F-) is an effective activator of the respiratory burst in neutrophils, as indicated by its ability to induce O2- production by these cells. Other halide ions did not activate the burst; Cl- in particular appeared to antagonize the effect of F- on O2- production. F--stimulated O2- production showed a requirement for Ca++, but was independent of other exogenous cations. Neither phagocytosis nor degranulation was necessary for respiratory burst activation by F--.

The effect of F- on the respiratory burst was reversible. Washing the cells after treatment with F-, while they were still producing large amounts of O2-, returned them to the resting state. They could then be stimulated again to produce O2- in amounts equivalent to those originally produced. Our experiments indicated that restimulation did not represent the activation of a population of cells that had not been activated during the initial exposure to F-, nor did it represent serial activation of different subpopulations of the O2--forming enzyme molecules present in a given cell. Rather, our data suggest that the entire population of O2--forming enzyme molecules was activated in a reversible fashion by F-. 

30
The article was cited as providing chemical evidence that fluoride results in increased lipids and nitrogen in the blood. The author of the "Lifesavers Guide" infers that this produces adverse affects, but fails to specify to what extent or how. Published in Spanish, the English summary is included below.

**ANALYSIS**

Article Summary: We studied the influence of fluorine on farm animals with special reference to the Japanese quail, whose six annual generations enable the possible changes to be followed through. In several of these generations, biological, hematologic and anatomopathological parameters were established. Simultaneously, another group of investigators proceeded to analyse such parameters as mortality, convertibility, fertility, incubation capacity, etc. The study comprised 4 groups of 20 birds each (10 males and 10 females), one of the groups serving as control without fluorine overload. The other three groups received 1-15 and 30 ppm of fluorine, respectively, in excess of the natural content in the diet.

The study revealed normal values as yet undisclosed for the quail. Changes have been revealed in relation to the ingestion of fluorine, in some of the parameters covered by the investigation: lipids, triglycerides, cholesterol, phospholipids, proteins, calcium, phosphorus, uric acid, hemoglobin, GOT, GPT, LDH, and phosphatases.

The influence of fluorine was more evident in lipids and their fractions where an increase is noted with exception of cholesterol. Our hematologic and cytochemical studies have already been published.

The groups of quail were kept under daily observation and note was taken of such signs as vivacity, behavior, plumage, mortality, convertibility, fertility, incubation capacity, weight, food consumption and amount of feces. The birds receiving fluorine showed greater consumption of food and more weight gain. No significant changes took place in the remaining parameters. (emphasis added)
REASON CITED

The article was cited to support the claim that fluoride deregulates blood glucose levels (noted as an adverse effect).

ANALYSIS

Interlibrary loan service could not acquire this reference due to poor documentation.

REFERENCE #43
(Not cited in 1983)


REASON CITED

The study was cited as providing evidence to support the view that fluoride reduces vitamin C blood levels.

ANALYSIS

The research was carried out in vivo on guinea pigs to determine the effect of 25 mg - 30 mg F/day/kg of body weight on vitamin C action. Although hypovitaminosis C was acquired, the dosage of fluoride given to the guinea pigs is equivalent to 225 to 300 mg/day in a 22 lb. child!

Because the animals were exposed to excessive amounts of fluoride, it has no relevance to the consumption of optimally fluoridated water by humans.

REFERENCE #44
(Not cited in 1983)


REASON CITED

The article was cited as providing evidence to support the view that fluoride reduces vitamin C blood levels.

ANALYSIS

The author reviewed a chronic fluoride toxicity incident in guinea pigs given food pellets which accidentally contained 60-440 ppm fluoride and were consumed daily. This extremely high level was acquired due to use of crude phosphates with high fluoride content in feed pellets resulting in incorporation of fluorides into the pellets. The authors are reporting on chronic fluoride toxicity due to ingestion of extremely high levels of fluoride.
They indicated that "dentine and odontoblastic layer (of teeth) showed changes characteristic of subacute hypovitaminosis C." Yet, the authors make no statement that fluoride consumption by humans at 1 mg per day either through fluoridation or daily supplements would cause reduced vitamin C blood levels.

REFERENCE #45
(Not cited in 1983)


REASON CITED

The article was cited as evidence that fluoride causes reduced blood vitamin C levels.

ANALYSIS

A translation of this Russian article was obtained through the National Institutes of Health. The researchers examined 2007 children of preschool age who lived in localities of endemic fluorosis. (The author does not present data on natural fluoride levels in water systems, or total fluoride intake, so there is no way for the reader to adequately estimate fluoride consumption in these subjects.) Of the total number, 457 exhibited fluorosis: 21 children exhibited what the author classifies as very weak degree lesions; 95 children exhibited weak degree lesions; 59 children had strong degree lesions; and 50 children had very strong degree lesions.

The author makes no claims to the effect that fluoride reduces blood vitamin C levels, but rather administered 800 mg of vitamin C daily to an undisclosed number of children to determine effects on blood serum levels of phosphorus and calcium. The author recommends supplemental administration of vitamin C to achieve "normalization of existing biochemical shifts in the blood serum level" of preschool children who exhibit fluorosis.

This article has no relevance to community water fluoridation at optimal levels.
NOTE ON REFERENCES 46 – 51

References #46 through #51 are cited to support the claim that fluoride deregulates blood glucose.

It was not possible to locate reference #47 (Revista 24:79, 1967), because the journal title is incomplete.

In none of these references, except #50, did any of the researchers present any data whatsoever on blood glucose values. This is yet another example of improper scientific documentation noted in much of this document.

These references are discussed individually on the following pages.
REFERENCE #46
(#139 in 1983)


REASON CITED

This article was cited to support the claim that fluoride deregulates blood glucose.

ANALYSIS

Investigators tested mice by giving alloxan diabetes to one group in comparison with the control group. Animals in four groups were provided with either distilled water or water containing 1, 5 or 20 ppm fluoride ion added as sodium fluoride. The diabetic animals receiving 1 ppm fluoride, though showing slightly less decay than the diabetic rats receiving no fluoride supplement, still closely paralleled that group. The diabetic rats receiving 1 ppm fluoride showed a three-fold increase in bone fluoride concentration over the diabetic rats at 0 ppm fluoride. Fluoride was ineffective in preventing decay in the control animals at levels of 5 ppm.

This experiment does not substantiate the claim that various levels of fluoride deregulate blood glucose. No blood glucose data were reported. The researchers make several statements in their discussion (p. 873) to discourage anyone from misinterpreting their data. The data on these abnormal, diabetic rats cannot be extrapolated to consumption of optimally fluoridated water by humans.

REFERENCE #47
(#140 in 1983)


"Revista" means journal. Without a full title of the journal this reference cannot be located.

REFERENCE #48
(#141 in 1983)


REASON CITED

This article was cited to support the claim that fluoride deregulates blood glucose. This paper was published in 1982 not 1981 as noted in the "Lifesavers Guide".

35
ANALYSIS

Male rats were fed a fluoride deficient diet (<0.5 ppm) and either distilled water or fluoridated water (1 ppm). Urinary and tissue cAMP levels* were measured and found to be significantly higher (after the third week) in the rats fed fluoridated water. Liver glycolytic metabolites were determined after six weeks and the results suggested a decrease in pyruvate kinase activity.

The authors indicate that, "The exact mechanism by which sodium fluoride alters glucose metabolism still remains to be elucidated." The scientists did not measure blood glucose levels.

This citation not only fails to support the claim made in the "Life-savers Guide", but it also demonstrates the inappropriate method of scientific referencing noted in much of this document.

*See reference #18 for further discussion of Allmann's work on cAMP levels.

REFERENCE #49
(#142 in 1983)


REASON CITED

This article was cited to support the claim that fluoride deregulates blood glucose.

ANALYSIS

This extremely technical biochemical study has no relationship to community water fluoridation at 1 ppm. The study was conducted to determine whether excessive levels of sodium monofluorophosphate (MFP) or sodium fluoride (NaF) would alter in vitro activity of phosphorylase a and phosphofructokinase a phosphatase in rat hepatocytes. Since the authors do not even measure blood glucose, this reference is inappropriately used.

REFERENCE #50
(Not cited in 1983)


REASON CITED

This article was cited to support the claim that fluoride deregulates blood glucose.
ANALYSIS

This research examines various surgical procedures (splanchnicotomy of ganglionic blockade) on the central nervous system of the rat that diminish the effects of hyperglycemia induced by injections of toxic amounts of sodium fluoride. Rats were given either 10 mg/kg fluoride intraparenterally or 4 mg/kg fluoride intravenously. This is equivalent to 280 mg in a 70 kg human!

The authors state that the primary mechanism(s) of the fluoride effect remains unknown. Metabolic poisons such as azide, iodacetate, CN-, and malonate, will also cause hyperglycemia when given acutely.

This reference has no relation to water fluoridation. The authors draw no conclusions and make no inferences concerning consumption of fluoridated water and blood glucose levels.

REFERENCE #51
(Not cited in 1983)


REASON CITED

This article was cited to support the claim that fluoride deregulates blood glucose.

ANALYSIS

This reference has absolutely nothing to do with either blood or glucose. Diabetes insipidus was studied by the researcher, not diabetes mellitus. D. insipidus has nothing to do with glucose (the word "diabetes" simply means an excessive urinary volume and that is what was measured by the researcher). Incidentally, the patients consumed 10-15 liters of water/day (average water consumption is 1 liter/day), so it was not surprising that they exhibited some dental fluorosis.

REFERENCE #52
(Not cited in 1983)


REASON CITED

This study was cited to support the claim that fluoride deregulates blood enzyme levels. Published in Russian, this English abstract was included:
Article Summary: A study was made of the fluorine-ion content in the vegetables and grain grown on experimental plots of land fertilized for 4-6 years with fluorine-containing fertilizers: active slurry potassium tetrafluoroborate and sodium fluorosilicate. It was found that the fluorine-ion content in individual samples of the vegetables and grain was increased 2-32-fold as compared to that in the control samples. As for the diet, the total content of fluorine-ion was increased 6.1-12.3-fold. Experiments were made on rabbits and rats whose diets contained the vegetables and grain from the experimental plots of land. The animals of the experimental groups manifested a lowering of the prothrombin index by the end of the 6th month of the experimental studies. There was a statistically significant fall in the cholinesterase activity and an increase in the activity of glutaminopyruvic aminotransferase (by 45-42 units). The activity of total alkaline phosphatase progressively increased at the expense of the elevated activity of liver and intestinal isozymes.

The effect reported cannot reasonably be extrapolated to humans and the conclusions reached are not relevant to the consumption of optimally fluoridated water by humans.

REFERENCE #53
(Not cited in 1983)


REASON CITED

This article was cited as evidence that fluoride deregulates blood enzyme levels.

REFERENCE #54
(#37 in 1983)

REASON CITED

This journal article was cited to support the claim that drinking fluoridated water will interfere with one's ability to have children. The study, as the title clearly indicates, deals with excessive fluoride intake in cows.

ANALYSIS

Observations were made over four breeding seasons to determine the effect of 5, 8, and 12 ppm fluoridated drinking water on the breeding efficiency of 50 South African range-fed heifers. Breeding performance was normal for all groups the first year, but in following years delayed oestrus and lower conception and calving rates affected the groups in varying degrees.

The authors concluded:

1.) The adverse influence of excessive fluorine on reproduction was manifested before the animals revealed any evidence of impairment of health, such as loss of condition and inappetence;

2.) The addition of defluorinated superphosphate to the drinking water did not diminish the harmful effect of fluorine on reproduction, but on the contrary, appeared to aggravate it.

And most importantly:

3.) For normal reproduction, the fluorine content of the drinking water should be under 5 ppm.

The effects reported cannot reasonably be extrapolated to humans and the conclusions reached are not relevant to the consumption of optimally fluoridated water.

REFERENCE #55
(#39 in 1983)


REASON CITED

The article was cited to support the claim that the incidence of birth defects has been reported to be higher in fluoridated areas.
ANALYSIS

This Japanese study had no English abstract. Only the title was translated, but it appears that the research was conducted on human embryonal tissues in vitro. Whether this has any relevance to consumption of optimally fluoridated water is impossible to ascertain unless fluoride levels used in this study could be determined.

REFERENCE 156
(140 in 1983)


REASON CITED

The article was cited to support the claim that the incidence of birth defects is higher in fluoridated areas.

ANALYSIS

The study is written entirely in French, but a summary provided by a translator states:

A statistical study of the geographic distribution of Mongolism in cities in Wisconsin, Illinois, North Dakota and South Dakota, shows similarities between the prevalence of this ailment and the rate of fluoride in the drinking water.

The hypothesis of the role of fluoride in the etio-pathogeny of Mongolism is proposed.

Relative to references 56 and 57, Rapaport's studies, which allege a fluoride-mongolism link, have been discredited because of serious flaws in protocol:

- Used child's place of birth rather than mother's place of residence during gestation.

- Failed to use age specific rates and yet asserted younger mothers were adversely affected.

- Cited incidence of mongoloid births at less than 1/3 the national average in both fluoridated and non-fluoridated cities. The author has been criticized for his calculation of the total number of mongoloid births.

Rapaport's claims have been refuted by:

- Berry, 1958, 1962--used accurate calculations of total number of mongoloid births and adjusted for age at parturition--studies showed no increase.
- Milligan, 1975--study showed the expected incidence of mongolism at fluoride levels as high as 2.0 ppm.

- Erikson, 1976, 1979--compared data on 636,765 live births in 17 non-fluoridated cities and 27 fluoridated cities. Down Syndrome rate was comparable; no indication of maternal age-specific association.

REFERENCE #57
(#41 in 1983)


REASON CITED

The article was cited to support the claim that the incidence of birth defects is higher in fluoridated areas.

ANALYSIS

The study is written entirely in French, but a summary provided by a translator states:

"A new statistical study of the distribution of mongolism in cities in Illinois, from January 1, 1950, to December 31, 1965, shows an increase in the occurrence of this ailment, associated with concentration of fluoride in the drinking water.

This study is a follow-up to the preceding investigation made of the prevalence of mongoloid cases, born before 1950, in the same state.

Such studies could not be conducted in other countries without ascertaining the amount of fluoride in the diet, which varies from one country to another. The role of advanced age of the mother in the etio-pathogeny of mongolism reflects a slow and progressive accumulation of fluoride in the maternal organism."

See reference #56 for a discussion of the flaws in Rapaport's studies and research that refutes his claims.

REFERENCE #58
(#42 in 1983)


REASON CITED

The article was cited to support the claim that the incidence of birth defects is higher in fluoridated areas.
ANALYSIS

This is a retrospective case-control study of 558 women residents in England and Wales who bore anencephalic (without a brain) children and 2232 control women. The former group was significantly more likely to drink three or more cups of tea per day, but only if they resided in high or medium incidence areas. A possible connection with soft water was postulated, but a need for cautious interpretation of results was stressed.

Fluoride is mentioned twice (in passing) in the article: first, as being more "toxic" in areas where water is soft and secondly, insofar as tea infusions contain up to 9 ppm fluoride.

There was absolutely no mention of fluoride as a cause of the defect or of fluoride levels in water and tea consumed by study/control groups. At the admission of the author, questions raised in this study cannot be answered without further research.

This study not only fails to support the claim made in the "Lifesavers Guide", but it also demonstrates the inappropriate method of scientific referencing noted in much of this document.

REFERENCE #59
(#43 in 1983)


REASON CITED

The article was cited as providing evidence to support the view that fluoride leads to birth defects.

ANALYSIS

The study was carried out on 20 experimental and 20 control mice to determine the fetotoxicity or teratogenic properties of fluoride. Although the experimental group had significantly more fetus reabsorptions, runt fetuses, and fetus bone deformities, the dosage of fluoride given to the mice was equivalent to 30 mg/day for 10 consecutive days in early pregnancy. Equating that level with a recommended 1 mg/day for human consumption is unjustified and has no relevance to consumption of optimally fluoridated water.

This article was incorrectly cited in the "Lifesavers Guide".

The article was cited to support the claim that laboratory studies show that fluoride leads to birth defects.

The objective of the study was to report changes in teeth of newborn Webster mice whose mothers received the following amounts of sodium fluoride (NaF) or calcium fluoride (CaF$_2$) during all or part of the gestation period.

<table>
<thead>
<tr>
<th>N=270</th>
<th>Fluoride Cmpd.</th>
</tr>
</thead>
<tbody>
<tr>
<td>80</td>
<td>NaF (20 ppm) in drinking water</td>
</tr>
<tr>
<td>50</td>
<td>CaF$_2$ (20 ppm) in drinking water</td>
</tr>
<tr>
<td>60</td>
<td>CaF$_2$ (1000 ppm) intraperitoneal injection (0.1 cc daily)</td>
</tr>
<tr>
<td>55</td>
<td>CaF$_2$ (1000 ppm) intraperitoneal injection (0.1 cc daily)</td>
</tr>
<tr>
<td>25</td>
<td>Control</td>
</tr>
</tbody>
</table>

The researchers concluded that fluorides in excessive concentrations seemed capable of passing through the placental membrane and affected calcification of the jaws (retarded), enamel matrix maturation (retarded), and cartilaginous-like formations (encouraged). CaF$_2$ seemed to be more toxic to the fetuses than NaF, and pulpal blood vessels in the teeth of newborn animals appeared to be hyperemic.

Fluoride dosage to the pregnant mice in this study is far in excess of proportionate human intake by consumption of optimally fluoridated water.
References #61 through #66 are cited to support the claim that fluoride causes chromosomal (genetic) damage in various plants. The studies examine the effects of either sodium fluoride or hydrogen fluoride gas. In October 1972, the Public Health Service commented on this type of research:

"The results of recently completed research in plant genetics by Dr. Aly Mohamed, University of Missouri, have been used to oppose fluoridation through improper interpretations that imply a possible genetic hazard to humans in the use of optimally fluoridated water. Knowledgeable scientists with the Environmental Protection Agency, sponsor and reviewer of the project, have stated that the implication is not supported by the research, which involved only plants and hydrogen fluoride gas. The effects reported cannot reasonably be extrapolated to human genetics and the conclusions reached are not relevant to the consumption of optimally fluoridated water by humans, animals, or plants."

These references are discussed individually on the following pages.
REFERENCE #61
(#45 in 1983)


REASON CITED

This article was cited to support the claim that fluoride causes chromosomal (genetic) damage in various plants.

ANALYSIS

Barley seedlings were treated with either sodium fluoride alone (at concentrations of 1%, 4% and 6%) or in combination with dimethyl sulfoxide. Growth was not inhibited but analyses demonstrated that these treatments produced chromosome abnormalities. The results indicated that dimethyl sulfoxide used in combination with sodium fluoride enhanced the uptake and increased the mutagenic effect. No chlorophyll mutations were observed in first or second generation seedlings.

According to the U.S. Public Health Service, the reported effects cannot reasonably be extrapolated to human genetics and the conclusions reached are not relevant to the consumption of optimally fluoridated water.

REFERENCE #62
(#46 in 1983)


REASON CITED

This article was cited to support the claim that fluoride causes chromosomal (genetic) damage in various plants.

ANALYSIS

The cytological effect of an aqueous sodium fluoride solution of 1 x 10^{-2} M was studied on onion root tip chromosomes. Root tip smears showed that this chemical agent was able to induce chromosomal abnormalities.

According to the U.S. Public Health Service, the reported effects cannot reasonably be extrapolated to human genetics and the conclusions reached are not relevant to the consumption of optimally fluoridated water.

REASON CITED

This article was cited to support the claim that fluoride causes chromosomal (genetic) damage in plants.

ANALYSIS

Tomato plants were fumigated for various time intervals in growth chambers with hydrogen fluoride at a concentration of about three micrograms per cubic meter. Young leaf and flower bud smear preparations revealed chromosomal aberrations. A higher percentage of chromosomal aberrations was associated with longer treatment periods. The authors indicate that the results suggest that hydrogen fluoride may be a mutagenic agent.

According to the U.S. Public Health Service, the reported effects cannot reasonably be extrapolated to human genetics and the conclusions reached are not relevant to the consumption of optimally fluoridated water.


REASON CITED

This article was cited to support the claim that fluoride causes chromosomal (genetic) damage in plants.

ANALYSIS

In this study, the seeds from tomato plants were fumigated with hydrogen fluoride gas for various time intervals at a concentration of about 3 mg/m^3. After planting, a number of plants in each culture were found to have developed abnormally. The conclusion presented by the author is that these results suggest that hydrogen fluoride is a mutagenic agent probably blocking directly or indirectly the replication of the DNA.

According to the U.S. Public Health Service, however, the reported effects cannot reasonably be extrapolated to human genetics and the conclusions reached are not relevant to the consumption of optimally fluoridated water.

REASON CITED

This article was cited to support the claim that fluoride causes chromosomal (genetic) damage in plants.

ANALYSIS

Maize seedlings were fumigated in growth chambers with hydrogen fluoride for various time intervals. Microsporocyte smears from the treated plants revealed chromosomal aberrations. The author concludes that the findings indicate that hydrogen fluoride is a mutagenic agent.

According to the U.S. Public Health Service, the reported effects cannot reasonably be extrapolated to human genetics and the conclusions reached are not relevant to the consumption of optimally fluoridated water.


REASON CITED

This article was cited to support the claim that fluoride causes chromosomal (genetic) damage in plants.

ANALYSIS

Maize seedlings were fumigated with hydrogen fluoride gas continuously for four, six, eight and ten days. Microspore mitosis of the treated plants indicated the presence of fragments and bridges suggesting the occurrence of the phenomenon of breakage-fusion-bridge cycle of McClintock. The author states that these findings indicate that hydrogen fluoride, in addition to being a mutagenic agent, is also able to reduce crossing over in certain chromosome segments.

According to the U.S. Public Health Service, however, the reported effects cannot reasonably be extrapolated to human genetics and the conclusions reached are not relevant to the consumption of optimally fluoridated water.
NOTE ON REFERENCES 67 – 74

References #67 through #74 are cited to support the claim that fluoride causes chromosomal (genetic) damage in fruit flies. Reference #70 presents research on automobile emissions in industrial centers and has no bearing on the use and effects of fluoride compounds whatsoever.

The effects reported in references 67-74 cannot reasonably be extrapolated to human genetics and the conclusions reached are not relevant to the consumption of optimally fluoridated water by humans.

These references are discussed individually on the following pages.

**Reason Cited**

This article was cited to support the claim that fluoride causes chromosomal (genetic) damage in fruit flies.

**Analysis**

The authors investigated the effect of two inhibitors of glycolysis, sodium fluoride (NaF) and iodoacetamide on the production of recessive lethal mutations by X-rays in the sperm of mature fruit flies. Pre-treatment with injections of NaF ($10^{-3}$M) led to a marked increase in the radiation-induced mutation frequencies in fully mature spermatozoa, with the effect being more variable after pre-treatment with iodoacetamide.

The authors specifically state that in this study the dose of sodium fluoride is not mutagenic by itself, but interacts with the mechanism of mutation induction by X-irradiation. The fruit flies were exposed to 2000 R x-irradiation at 100 KV, 4mA with 1 mm Al filtration, at an exposure rate of 46R/sec. Exposure to this level of X-irradiation would result in certain death for any mammal.


**Reason Cited**

This article was cited to support the claim that fluoride causes chromosomal (genetic) damage in fruit flies.

Two strains of fruit flies were treated with sub-lethal levels of gaseous hydrogen fluoride (HF) for six weeks. Adult fruit flies raised from the treated egg samples were evaluated for fecundity and fertility.

**Analysis**

Treatment with HF caused a marked reduction in hatchability and fecundity in the more sensitive strain. Male fertility was depressed but female fertility remained stable over the test period. The authors conclude that the reduction of these parameters in the offspring of populations subjected to low levels of atmospheric HF for prolonged periods suggests that treatment with excessive levels of HF causes genetic damage.
The effects reported cannot reasonably be extrapolated to human genetics and the conclusions reached are not relevant to the consumption of optimally fluoridated water by man.

REFERENCE #69
(#52 in 1983)


REASON CITED

Drosophila melanogaster (fruit flies) were used to test the mutagenicity of sodium and stannous fluorides.

ANALYSIS

A direct correlation between the treatment concentration and the frequency of sex-linked recessive lethals was observed. The authors conclude that their data demonstrate that under these test conditions sodium and stannous fluoride are mutagenic to fruit flies.

The effects reported cannot reasonably be extrapolated to human genetics and the conclusions reached are not relevant to the consumption of optimally fluoridated water by humans.

REFERENCE #70
(#53 in 1983)


REASON CITED

Page 26 of this article was cited as one of the eight references in support of the claim that fluoride causes chromosomal damage in fruit flies. As can be seen by the title, this article is not related to this subject nor does it discuss any aspect of fluorides or fluoridation.

REFERENCE #71
(#54 in 1983)

REASON CITED

This article was cited to support the claim that fluoride causes chromosomal (genetic) damage in fruit flies.

ANALYSIS

Male Drosophila melanogaster were fumigated with hydrogen fluoride in a concentration too low to cause any death to the flies, and then crossed individually to virgin tester females. The data obtained from generation two showed chromosome damage, increasing in frequency as the hydrogen fluoride exposure was increased.

The effects reported cannot reasonably be extrapolated to human genetics and the conclusions reached are not relevant to the consumption of optimally fluoridated water.

REFERENCE #72
(55 in 1983)


REASON CITED

This research evaluates potential air contaminants for mutagenic effects in fruit flies.

ANALYSIS

Flies were placed in fumigation chambers, at various concentrations of hydrogen fluoride (HF) gas, for a 24 hour period. The males were then mated to females in a sequence of three 3-day broods. The standard sex-linked recessive lethal test was made on the F1 females.

<table>
<thead>
<tr>
<th>Treatment Level</th>
<th>Pooled Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 HF Control</td>
<td>2/5231 = .00032 # lethal/ # chromosomes tested</td>
</tr>
<tr>
<td>1.3 ppm HF</td>
<td>3/5633 = .00053</td>
</tr>
<tr>
<td>2.9 ppm HF</td>
<td>11/5181 = .00212</td>
</tr>
<tr>
<td>4.3 ppm HF</td>
<td>16/5514 = .0029</td>
</tr>
</tbody>
</table>

The authors conclude that there are no significant differences in mutations between broods exposed to varying levels of HF.

The author of the "Lifesavers Guide" has erroneously interpreted these data and has inappropriately used the study to support the claim that fluoride causes genetic damage in fruit flies. The effects reported cannot reasonably be extrapolated to human genetics and the conclusions reached are not relevant to the consumption of optimally fluoridated water.

Fruit flies were used to test the mutagenicity of sodium fluoride (NaF) and stannous fluoride (SnF). Lethal dose (LD50) determinations, i.e. the concentration at which 50% of the flies survived, were made for varying concentrations of each compound.

The LD50 for sodium fluoride was 4.8% NaF. However, the low solubility of SnF prevented high lethal levels so a usable LD50 was not obtained for SnF. A direct correlation between the treatment concentration and the frequency of the sex-linked recessive lethals was observed. The authors take care to point out that in this investigation, "the concentrations which produced significant mutagenicity are extreme."

The effects reported cannot reasonably be extrapolated to human genetics and the conclusions reached are not relevant to the consumption of optimally fluoridated water.


The article was cited to support the claim that fluoride causes chromosomal (genetic) damage in fruit flies.

In this study, the author tries to determine what reactions occur when reproductive cells of fruit flies are exposed to a combination of sodium fluoride and strong mutagens such as Trenimon, PDT, and A137.

The interesting finding in this study is that fluoride levels inhibit the effects of the mutation-causing chemicals. Therefore, this reference does not support the claim made in the "Lifesavers Guide".

In their discussion, the authors note that fluoride might serve as a tool to distinguish between different types of mutations. The results are also instructive insofar as pointing out that a chemosterilant in combination with a strong mutagen can be demonstrated to be a powerful antimutagen.
The fluoride levels used in this study (2.4–24mM) did cause a decrease in the fertility and fecundity of the cells, but these levels are much higher than cellular levels expected in a person who consumed optimally fluoridated water.

**REFERENCE #75**

(58 in 1983)


**REASON CITED**

The article was cited to support the claim that fluoride causes genetic damage in rats.

**ANALYSIS**

This Russian study had the following English abstract:

"The authors studied toxicity of weakly soluble salts of hydrofluoric acid cryolite in case of their chronic introduction by inhalation into the body of albino rats at concentrations of 3.1 and 0.5 mg/m³ for a period of 6 hours a day. The finding was that cryolite at a concentration of 3.0 and 1 mg/m³ produced a general toxic and a specific effect on the body. Fluorides at a concentration of 0.5 mg/m³ were ineffective and this level may be recommended as the maximum permissible concentration of weakly soluble fluoride salts in the air of industrial premises."

From this information, it appears that the researchers were not studying genetic damage but rather the toxicity of concentrated hydrofluoric gas in rats. These findings have no relevance to the consumption of optimally fluoridated water by humans.

**REFERENCE #76**

(59 in 1983)


**REASON CITED**

The article was cited to support the claim that fluoride causes chromosomal damage in humans.
ANALYSIS

This Russian study contained an English abstract. Excerpts from the abstract indicated that three fluoride compounds were studied: hydrogen fluoride gas, cryolite, and sodium fluoride. Mixtures of these substances were tested on chromosomes of animal cells.

Chromosome aberrations were noted in bone marrow of albino rats after five months treatment with cryolite at a 3.0 mg/m³ concentration. No increase in the frequency of cells with translocations was observed in testes of mice subjected for two months to inhalation with hydrogen fluoride at 0.1 mg./m³ cryolite at 0.5 mg/m³, or a mixture of 0.05 mg/m³ HF and 0.25 mg/m³ cryolite.

Most relevant was the finding that a two hour treatment of human lymphocytes in vitro with NaF at concentrations of 1.0 x 10⁻³ and 3 x 10⁻³M (much higher than normal human plasma levels) did not induce any chromosomal aberrations. The use of this citation is a clear example of inaccurate scientific referencing.

REFERENCE #77
(#60 in 1983)


REASON CITED

This study was cited to support the claim that fluoride causes genetic damage in rats.

ANALYSIS

This Russian article was accompanied by the following English abstract:

Aberration dynamics was studied in anaphase cells of rat femoral bone marrow cells using the usual procedure. Sodium fluoride had marked mutagenic properties in a single-moment inoculation in an acute experiment. The identification of the mutagenic properties of sodium fluoride indicates that the maximum permissible concentration should be revised and genetic indices taken into account. A decrease in the mutagenic effect of sodium fluoride by preventive exogenous administration of alphatocopherol (vitamin E) points to the promising future use of the latter in decreasing the level of genetic pressure in a population exposed to the mutagen at work.

A translation of the entire article brought to light the following data:
22 control animals were used.

44 experimental animals were used.

Toxic levels of sodium fluoride were administered perorally in order to elicit acute reactions.

The research was undertaken to determine possible hazards associated with industrial exposure.

No mention is made of community water fluoridation at optimal levels.

REFERENCE #78
(161 in 1983)


REASON CITED

This study was cited in support of the claim that fluoride causes genetic damage in rats.

ANALYSIS

A translation of this Russian study indicates that the goal of the researchers was to examine in a subacute experiment on white rats the cytogenetic activity of sodium fluoride and the possible antimutagenic effect of vitamins E, A, and C.

One-tenth of the lethal dose of sodium fluoride (0.32 mg F/100 g body weight) was administered perorally to four groups of experimental rats for one to three months. Each group of rats received various combinations of sunflower oil, vitamins E, A, or C.

Daily peroral administration of vitamins both in complex, as well as vitamin E alone, led to a significant decline in the level of aberrations induced by sodium fluoride.

As was noted in reference #77, this research has no relevance to community water fluoridation. Toxic levels of sodium fluoride were administered to determine possible hazards associated with industrial exposure.

REFERENCE #79
(162 in 1983)


This article could not be located through interlibrary loan, Chemical Abstracts Service, the National Library of Medicine, or the National Institutes of Health Library.
REFERENCE #80
(#63 in 1983)


REASON CITED

The article was cited to support the claim that laboratory experiments indicate that fluoride causes chromosomal (genetic) damage in mice, sheep, and cows.

ANALYSIS

Dr. Jagiello has furnished the following statement in refutation of attempts to apply the referenced research to fluoridation:

"Concerning our publication, 'Sodium Fluoride as a Potential Mutagen in Mammalian Eggs,' published in Archives of Environmental Health, may I direct particular attention to:

1.) the variation of response between species and especially the lack of human data;

2.) the statement that it is unlikely that oocytes with clumping or atresia could be ovulated or fertilized;

3.) only minor effects were seen in the in vivo mouse experiments; and

4.) the long discussion concerning the translation of these very restricted, specific experiments with lower forms to anything we know about fluoride environments.

At the present time with the little we know about fluoride levels, it is not possible to extrapolate from these experiments to a mutagenic effect of fluoride on human oocytes. It would clearly be scientifically unsound to do so."

Shroeder, who testified in a Senate Hearing on the Safe Drinking Water Act in 1973, found no toxic effect from 10 ppm fluoride in life term exposure in mice.

Martin (1977) conducted a series of chromosome studies on mice and found that fluoride does not alter chromosome structure and is not mutagenic.

Joint studies were undertaken by the Laboratory of Developmental Biology and Anomalies, the National Institute of Dental Research, the Department of Biochemistry at the University of Minnesota, and the Laboratory of Cellular and Comparative Physiology at the National Institute on Aging. None of these studies produced evidence that fluoride damages chromosomes, even at levels 100 times that in fluoridated water supplies.
REFERENCE #81
(Not cited in 1983)


REASON CITED

Pages 42-60 are specifically cited in support of the claim that 1 ppm fluoride in drinking water produces chromosomal damage in mice. These pages describe a study done by Aly H. Hohamed and Mary E. Chandler entitled "Cytological Effects of Sodium Fluoride on Mice," in which the researchers claim that sodium fluoride is mutagenic at low concentrations. The study was presented as a paper at the September 1976 American Chemical Society meeting (see reference #82), but not published until July 1982, when it appeared in the journal "Fluoride".

ANALYSIS

The study protocol is riddled with errors:

- Mice used in the study (experimental and control) had been bred and raised on fluoridated water as were their ancestors for generations—Jackson Laboratories, Bar Harbor, Maine, fluoridated in 1964.

- The abnormalities they reported as a result of fluoride ingestion included ball metaphases and bridges. Ball metaphases are not generally accepted as a cytogenetic defect. Production of bridges may be an artifact due to the method they used to prepare the chromosome spreads.

- The level of abnormalities in their control animals was about 18 times that usually reported for normal mice.

- Aberrations are not repeated on multiple slides.

- Each slide was identified as to the treatment, indicating that double blind procedures were not used to avoid possible bias.

- The studies were carried out by Ms. Chandler as part of her Masters thesis. She was not trained previously in such work.

George R. Martin, Ph.D., Chief of the Laboratory of Development Biology and Anomalies, National Institute of Dental Research, has carried out a variety of related studies and has found no evidence that fluoride damages chromosomes or causes mutations.

The article was cited to support the claim that as little as 1 ppm fluoride in the drinking water can produce chromosomal damage in mice.

This magazine article gives a report of the paper presented by Aly H. Mohamed at the September 1976 meeting of the American Chemical Society. Mohamed claimed his research linked low and high levels of sodium fluoride (1, 5, 50, 100, and 200 ppm) with chromosome abnormalities in the bone marrow and testes of mice.

The faulty conclusions and errors of protocol in this research are discussed under reference #81.


This study was cited to support the claim that fluoride causes chromosomal damage in humans.

Article Summary: Human leucocytes cultured in vitro were exposed to the action of lead and fluorine ions at the concentrations of $10^{-3}$M and $10^{-5}$M for lead ions and $3.15\times10^{-3}$M, $3.15\times10^{-4}$M, $3.15\times10^{-5}$M for fluorine ions. Both of these factors caused structural and quantitative aberrations in the chromosome set, which seems to indicate their mutagenic character.

It is noteworthy that the smallest of the applied concentrations of fluorine ions ($3.15\times10^{-5}$M) is equal to the concentration of these ions in the running water of Szczecin, [Poland] given for the prevention of caries [0.6 mg/l]. However, in the light of the obtained results some apprehensions regarding the aptness of this treatment have arisen.

Elsewhere in this article the authors indicate, "it is accepted that fluorine ions at increased concentration favourably effect tooth tissues, periodontium and mucous membranes of the mouth cavity, and the susceptibility to caries is considerably lower in persons who were given fluorine."

REASON CITED

The article was cited to support the claim that 1 ppm fluoride inhibits the enzymes responsible for maintaining the genetic integrity of the cell.

ANALYSIS

This Austrian article contained an English abstract.

Article Summary: The influence of NaF on the biosynthesis of nucleic acids and proteins was studied in vivo with Swiss mice. Using a fluoride concentration of 0.4 mg/g no effect on DNA-repair appeared within 12 weeks, while DNA-, RNA- and protein-synthesis were suppressed after 10 weeks. Fluoride in a concentration of 3.5 mg/g gives a nearly complete inhibition of DNA-repair after 10 weeks, while DNA-, RNA- and protein-synthesis were suppressed to various degrees from week 2 until week 12. The phosphorylation of DNA- an RNA-precursors indicated results comparable to both synthesis, but investigating the particular kinase-steps of the phosphorylation, no specific effect on one of them can be localized significantly.

The clinical significance of such changes is unknown. Until a clear relationship between illness and exposure is demonstrated a strong influence on health status cannot be inferred.


REASON CITED

The article was cited to support the claim that 1 ppm fluoride in the drinking water produces chromosomal damage in mice.

ANALYSIS

This German study contains no English abstract. The study was submitted in appendix B of the appellants' brief (June 3, 1983) in the South Carolina fluoridation suit. Charleston Committee for Safe Water v. Commissioners of Public Works, No. 82 CP 10-1666 (S.C. 1982). The opponents of fluoridation...
stated in the brief that this research shows that $5 \times 10^{-5}$ M (1 ppm) sodium fluoride inhibits the DNA repair enzymes by 50%. Other concentrations used in this study are $1 \times 10^{-5}$ M and $1 \times 10^{-4}$ M.

An oral translation of this document provided the following information:

- The journal is entitled Climatic Medicine and serves as a publication for those who "specialize" in the treatment of people who frequent health spas.
- The authors indicate that fluoride is useful for caries prophylaxis and osteoporosis.
- The concluding paragraph mentions air contaminants, but fluoride is not mentioned relative to genetic damage or cancer risk.

**REFERENCE #86**

(869 in 1983)


**REASON CITED**

This study was cited to support the claim that 1 ppm fluoride inhibits the enzymes responsible for maintaining the genetic integrity of the cell.

**ANALYSIS**

As the title of this study suggests, the information provided in this report is indeed esoteric! The stimulations of RNA (ribonucleic acid) release from isolated nuclei by ATP and related compounds has been investigated in several laboratories and the effect has been interpreted in at least four different ways. The aim of this study was to investigate the reasons for these discrepancies.

The author confirms that changes in the incubation media have more of an effect (in the majority of cases) on the release of RNA from cell nuclei than the particular compound being studied. In other words, if nuclei are treated in an incubation medium in which they remain stable, fluoride will not affect significantly the release of RNA. The concentrations of fluoride used are:

- $0.1 \text{mM} = .0019 \text{ or } .002 \text{ mg} / \text{l (ppm)}$
- $0.2 \text{mM} = .0038 \text{ or } .004 \text{ mg} / \text{l (ppm)}$
- $0.5 \text{mM} = .0095 \text{ or } .01 \text{ mg} / \text{l (ppm)}$

The author makes no attempt to relate the findings to the consumption of optimally fluoridated water.
REFERENCE #87
(#70 in 1983)


REASON CITED

The article was cited to support the claim that 1 ppm fluoride inhibits the enzymes responsible for maintaining the genetic integrity of the cell.

ANALYSIS

The purpose of the study was to test the effect of fluoride on the cellular polyamine levels in order to see if there was any correlation to the inhibitory effect of fluoride on protein and DNA synthesis.

Article Summary: Sodium fluoride exhibited a dose dependent inhibitory effect on protein and DNA synthesis at concentrations from 1.3mM in growing LS [mouse fibroblasts] cells. The activity of ornithine decarboxylase (ODC) was slightly stimulated by 0.5 mM-NaF, but inhibited at 1.3 mM and above. The reduced enzyme activity seemed to be due to a reduced denovo formation of the enzyme caused by an inhibition of the protein synthesis. In spite of a reduction in ODC-activity, fluoride had no effect on the cellular polyamine content during the experimental period (10 hours).

The results presented here must be interpreted with caution. The authors make no attempt to relate the findings of this in vitro experiment to the consumption of optimally fluoridated water.

REFERENCE #88
(#71 in 1983)


REASON CITED

The article was cited to support the claim that 1 ppm fluoride inhibits the enzymes responsible for maintaining the genetic integrity of the cell.

ANALYSIS

The purpose of this study was to determine the sensitivity of the protein synthesis in LS (mouse fibroblast) cells for fluoride, in order to correlate this with the growth inhibitory effect and with possible effect on the synthesis of DNA. Hence, the influence of fluoride in various concentrations on the incorporation of 14C-leucine and 3H-thymidine was investigated.
Article Summary: Fluoride concentrations at and above 0.9 mM [1.3, 2.0, and 6mM] caused a progressive concentration-related inhibition in the incorporation of both 14C-leucine and 3H-thymidine in LS [mouse fibroblasts] cells incubated in medium with serum. The incorporation of leucine was more affected than that of thymidine. Lowering the pH enhanced the effect of fluoride on both. Removing serum from the incubation medium changed the effect of fluoride, particularly at low pH (7.0). Incorporation of leucine was then stimulated by low fluoride concentrations (0.5 and 0.9 mM), and the effect on thymidine incorporation was eradicated up to 1.3mM-NaF. No differences were found in the pool and the specific activity of 14C-leucine in the fluoride exposed cells compared to control cells without fluoride (incubated at pH 7.4 in medium without serum). The cellular pool of 3H-thymidine decreased markedly during the incubation period, somewhat less in the fluoride exposed cells than in the control.

The results presented here must be interpreted with caution. The author makes no attempt to interpret the findings of this in vitro experiment relative to consumption of optimally fluoridated water.

REFERENCE #89
(#72 in 1983)


REASON CITED

The article was cited to support the claim that fluoride induces biochemical abnormalities leading to interference of genetic integrity.

ANALYSIS

The aim of the study was to determine the relative amounts of acid soluble nucleotides and the base compositions of RNA in control and fluoride-treated corn seedling roots. Levels of sodium fluoride used were 5 x 10^-4 M, 1 x 10^-3 M, and 2 x10^-3 M. At these levels, fluoride suppressed root growth, modified the relative amount of acid soluble nucleotides, and induced changes of RNA structure.

The authors make no attempt to relate the findings to consumption of optimally fluoridated water. It is not possible nor prudent to extrapolate study results directly from corn seedling roots to humans.

REFERENCE #90
(#73 in 1983)

The article was cited to support the claim that fluoride induces biochemical abnormalities leading to interference of genetic integrity.

This Russian article was accompanied by the following English abstract:

It has been demonstrated with the use of 3H-uridine uptake as an indicator of the RNA synthesis rate that there are qualitative differences in the kinetics of the synthetic processes in different mouse organs during the development of experimental fluorosis.

The experimental fluorosis was induced by injecting 12mg/g body weight daily over a period of 1-4 weeks into male mice weighing 18-20 grams. This constitutes excessive fluoride exposure and bears no relationship to community water fluoridation at a concentration of 1 ppm.


Pages 3, 61, 75, and 310 are specifically cited in support of the claim that Dean Burk and John Yiamouyiannis have shown that 10,000 or more fluoridation-linked cancer deaths occur yearly in the U.S.

Page 3: Contains a graphic representation of cancer death rates from 1940 to 1970. This graph was compiled by Dean Burk and John Yiamouyiannis and appears on p.106 of their 1977 study, "Fluoridation and Cancer Age Dependence of Cancer Mortality Related to Artificial Fluoridation". This is reference #92 from the "Lifesavers Guide" and is discussed thoroughly under that number.

Page 61: Contains John Yiamouyiannis' prepared statement before the House Subcommittee and is strictly a re-hash of the 1977 study. (Page 62 contains the same graph that appears on p. 3 of these proceedings).

Page 75: Contains Dean Burk's prepared statement before the House Subcommittee which refers to the 1977 study he co-authored.
Page 310: Contains John Yiamouyiannis' rebuttal of statements made by Arthur C. Upton and Robert N. Hoover of the National Cancer Institute (NCI) made before the Subcommittee. John Yiamouyiannis purports that there are errors and omissions in the NCI data that contend there is no link between community water fluoridation and cancer.

It must be pointed out that since 1975, no fewer than 17 studies have refuted the Burk/Yiamouyiannis study.

REFERENCE #92
(#75 in 1983)


REASON CITED

The article was cited to support the claim that 10,000 or more fluoridation-linked cancer deaths occur yearly in the United States. The Burk-Yiamouyiannis study was initially circulated in 1975 claiming to have demonstrated a link between water fluoridation and cancer. Upon examining the data, reputable scientists found obvious shortcomings in the statistical methods used by Burk and Yiamouyiannis. Burk and Yiamouyiannis made minor changes in the data and published it in 1977, claiming to have corrected any statistical shortcomings. Since 1977, no fewer than 17 published scientific reports refute their claims and verify that there is no association between fluoridation of community water supplies and cancer. The most glaring inadequacies of the initial paper and the published study are as follows:

Yiamouyiannis, 1975 Paper - claimed direct cancer link to community water fluoridation.

- Used crude death rates--no adjustment for population difference of known cancer factors:
  - Age--older people have higher cancer incidence than younger people.
  - Race--blacks have higher cancer incidence than whites.
  - Sex--males have higher cancer incidence than females.

- Used 10 largest fluoridated cities and selected 10 nonfluoridated cities:
  - Excluded then nonfluoridated Boston, New Orleans, and Cincinnati.
  - Author decided they were aberrant cities but did not apply same criteria to fluoridated cites.
  - Compared highly industrialized cities of Northeast with cities from South and West.
Failed to consider cancer data prior to fluoridation:

- Fluoridated cities had higher cancer death rates in 1950.
- Comparison 20 years later—fluoridated cities still had the higher incidence, but the rate of increase between fluoridated and non-fluoridated cities was the same.

Despite major errors in protocol and data, the author claimed excess cancer deaths in absolute numbers of 22,500–25,000–36,500, a discrepancy rate of 60%.

Burk/Yiamouyiannis Study, 1977:

- Corrected some protocol errors: for example they revised selection of cities for comparison and adjusted for age in four broad categories.
- Rudimentary adjustment for age reduced their claim of excess cancer deaths to 10,000.
- Continued to ignore the long established scientific methods of epidemiology:
  - Age categories were too broad which concealed vital differences.
  - Rationalization, but no meaningful adjustment, for sex and race.
  - Used inter-census estimates rather than 3-year average around census year.
  - No simultaneous adjustment for age, race, and sex—used direct rather than indirect methods—direct method requires detailed data, much of which did not exist.

REFERENCE #93
(#76 in 1983)

Exhibits 16–30 in McColl vs. Strathclyde Regional Council, Scottish High Court in Edinburgh, 1980.

REASON CITED

These exhibits are cited to support the claim that most of the studies refuting the alleged fluoride-cancer link, once corrected for errors and omissions, show increased cancer death rates in fluoridated water.

ANALYSIS

The author of the "Lifesavers Guide" indicates that these were submitted to the chief medical officer of Britain, Dr. G. K. Matthew, along with the return letter from Dr. Matthew.

These documents could not be acquired.
These studies have been cited by the author of the "Lifesavers Guide" as studies that refute the Burk/Yiamouyiannis study. Indeed, all of them do!

The Burk/Yiamouyiannis study was initially circulated in 1975* claiming to have demonstrated a link between water fluoridation and cancer. Upon examining the data, reputable scientists found obvious shortcomings in the statistical methods used by Burk and Yiamouyiannis. Burk and Yiamouyiannis made minor changes in the data and published it again in 1977,** claiming to have corrected any statistical shortcomings. Since 1977, no fewer than 17 published scientific reports refute their claims and verify that there is no association between fluoridation of community water supplies and cancer.

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The article was cited as one of the studies refuting the Burk/Yiamouyiannis study which attempts to link fluorides and cancer.

These cancer epidemiologists take a close look at the methodology used by Burk and Yiamouyiannis and conclude that in the Burk/Yiamouyiannis study:

"...men and women and whites and non-whites were classed together in broad age groups (0-24, 25-44, etc.) and this analysis did not take account of the changes in the sex and ethnic structure of the populations under comparison or adequate account of changes in their age structure. Although these shortcomings were repeatedly pointed out, the claims of Yiamouyiannis and Burk have continued to be published in many parts of the world and extreme statements made about the merits of the direct over the indirect methods of standardization—even when the former is used, as in this case, in a crude and inappropriate manner."

The researchers properly applied the direct method of standardization and concluded that cancer mortality rates are not associated with community water fluoridation.


The article is cited as one of the studies refuting the Burk/Yiamouyiannis study which attempts to link fluoridation and cancer.

Article Summary: Earlier attempts by Burk and Yiamouyiannis to show a relationship between community water fluoridation and cancer mortality failed to properly adjust for factors such as age, race, and sex. Their subsequent efforts to remedy these faults in methodology added but slight improvement to the validity of the report. The conclusions of Burk and Yiamouyiannis still were not supported by these later reports. However, the renewed charges did suggest the need for an updated investigation of U.S. mortality rates in relation to community water fluoridation.
The findings presented in this study further substantiate the safety of fluoridated community water supplies. Mortality rates—for blacks and whites only—in 24 cities with fluoridated and 22 cities with nonfluoridated water supplies in the United States, were compared for the years 1969-1971. Adjustments for age, sex, and race reduced differences for some causes and removed them for others. Further correction, using analyses of covariance for city characteristics that influence mortality, gave adjusted death rates for all causes of 1,123.9 and 1,137.1, and for malignant neoplasms 195.3 and 196.9, in the cities with fluoridated and nonfluoridated water respectively. No evidence of a harmful effect of fluoridation was found.

REFERENCE


REASON CITED

The article is cited as one of the studies refuting the Burk/Yiamouyiannis study which attempts to link fluoridation and cancer.

ANALYSIS

This research evaluated cancer mortality rates in New Zealand from 1961 to 1976. By 1975, approximately 54 percent of the New Zealand population was served with fluoridated water.

The authors state:

We concluded from the study of 1961 and 1976 New Zealand cancer mortality data that there was no support for the assertion that fluoridation of public water supplies resulted in any increase in cancer mortality. On the contrary, there was some evidence that the rate of increase in cancer mortality over the 15-year period 1961-1976 had been greater in unfluoridated areas than that occurring in areas with fluoridated water supplies.

Claims that fluoridation of the municipal water supply causes cancer in humans have not been substantiated by independent objective studies in the United States of America, Canada, or New Zealand. After thorough re-examination of the earlier publications from other countries, and our own study of data available for the New Zealand population, we consider the 1976 statement of the Royal College of Physicians more than ever justified: 'There is no evidence that fluoride increases the incidence or mortality of cancer in any organ.'

REFERENCE

The article is cited as one of the studies refuting the Burk/Yiamouyiannis study which attempts to link fluoridation and cancer.

ANALYSIS

Article Summary: A recent report by the National Health Federation, a private agency, related cancer mortality patterns in the United States to fluoridation of water supplies, triggering much public health concern and some political response. To clarify the issues raised, we studied cancer mortality and incidence statistics for U.S. counties, 1950-69. No trends could be ascribed to the consumption of water that is artificially or naturally fluoridated.

REFERENCE #98
(#82 in 1983)


REASON CITED

The article is cited as one of the studies refuting the Burk/Yiamouyiannis study which attempts to link fluoridation and cancer.

ANALYSIS

The numerous brief reports found on pages 186-190 as cited in the "Life-savers Guide" have absolutely no relevance to fluorides and fluoridation. Clearly this is an incorrect citation, since Volume 69 of Public Health Reports was published in 1954, over 20 years before Yiamouyiannis and Burk circulated their report.

REFERENCE #99
(#83 in 1983)


REASON CITED

The article was cited as one of the studies refuting the Burk/Yiamouyiannis study which attempts to link fluorides and cancer.

ANALYSIS

This study represents the first analysis of cancer incidence in relation to the levels of natural or introduced fluoride in water. In areas of England with a high natural fluoride level in the water the incidence of cancer of the thyroid, kidney, stomach, esophagus, colon, rectum, bladder,
bone, and breast was compared with that in areas with low water fluoride levels. No differences were detected. Similarly, no differences were found in cancer incidence between fluoridated and control districts in England, Wales, the U.S.A., Holland, and New Zealand.

The author of the "Lifesavers Guide" indicates in the reference bibliography that reference #99 is also reprinted in British Dent. J. 138:121-124, 1975. This information is incorrect.

REFERENCE #100
(#84 in 1983)


REASON CITED

The article is cited as one of the studies refuting the Burk/Yiamouyiannis study which attempts to link fluoridation and cancer.

ANALYSIS

Article Summary: Authoritative statements that fluoridation of public water supplies is not associated with any increase in cancer have been challenged on the basis of data which, it is claimed, show that cancer mortality in the United States rose more sharply in cities with fluoridated water than in those without. However, during the period of study (1950-70) the population structures of these cities changed substantially. When account is taken of age, sex, and ethnic group the ratio between observed cancer mortality and expected cancer mortality fell slightly in the cities with fluoridated water and did not change in the non-fluoridated cities.

REFERENCE #101
(#85 in 1983)


REASON CITED

The article is cited as one of the studies refuting the Burk/Yiamouyiannis study which attempts to link fluoridation and cancer.

ANALYSIS

This reference describes dental and non-dental physiologic effects among participants in the Grand Rapids, Michigan fluoridation project. In this article, which was presented at the Annual Meeting of the Michigan State Medical Society on September 25, 1953, Knutson refers to data from the Public Health Service (1949-50 Census Reports) related to death from nephritis, cancer, and heart disease in 28 fluoridated and 60 nonfluoridated communities. No significant differences in death rates due to these causes...
were found. In addition, a comparison of mortality rates from cancer in the U.S., Grand Rapids, and the control city, Muskegon, Michigan, from 1943-1950 shows no significant increase in fluoridated Grand Rapids.

REFERENCE #102
(#86 in 1983)


REASON CITED

The article is cited as one of the studies refuting the Burk/Yiamouyiannis study which attempts to link fluoridation and cancer.

ANALYSIS

The analysis done by these researchers shows that the two groups of 10 cities used in the Burk/Yiamouyiannis study differed in their age-sex-race structure in 1950. The cities which were to be fluoridated started with many fewer elderly white females, somewhat fewer elderly white males, and more non-whites at ages below 50.

When these differences are taken into consideration, the two groups both had higher-than-expected cancer mortality in standardized comparison with national rates; this conforms with world-wide experience that cancer is generally more common in towns than in rural areas. But the two groups were not similar in 1950, despite similar crude death rates: the cities which were to be fluoridated had at that time an excess of cancer deaths which was 10.3 per 100,000 population greater than that of the control cities.

By 1970, the two sets of cities differed much more in their demographic structure than they had in 1950. The fluoridated cities now had many more non-whites of all ages in their populations, and many fewer whites under the age of 55. These demographic changes made the fluoridated cities much more likely to have deaths from cancer.

When these demographic changes were taken into account, the excess cancer rate increased by one percent over the 20 years in the fluoridated cities, but it also increased by four percent in the unfluoridated control cities, giving a difference of three percent to the advantage of the fluoridated cities.

The authors of this article state:

"We have established that the association claimed by Burk and Yiamouyiannis between fluoridation and cancer has not been substantiated. We concur with the statement by the Royal College of Physicians, in Fluoride, Teeth and Health, that there was no evidence that fluoride increases cancer mortality."

REASON CITED

The article is cited as one of the studies refuting the Burk/Yiamouyiannis study which attempts to link fluoridation and cancer.

ANALYSIS

The standardized cancer mortality ratios for selected localities in New South Wales with fluoridated and non-fluoridated water supplies were examined. The cancer mortality ratios for both fluoridated and non-fluoridated localities (one fluoridated, one non-fluoridated) had standardized mortality ratios significantly lower than the New South Wales State average. No relationship was found between cancer deaths and whether water supplies had been fluoridated or not.


REASON CITED

The article is cited as one of the studies refuting the Burk/Yiamouyiannis study which attempts to link fluoridation and cancer.

ANALYSIS

Researchers examined mortality trends from 1950 to 1970 in 473 U.S. cities with populations of 24,000 or more in 1950, according to fluoridation status of their water supplies. Findings showed no relationship between fluoridation and observed changes in general mortality over the 20 year period. Also, no relationship was found between fluoridation and heart or cancer death rate trends.

REASON CITED

The article is cited as one of the studies refuting the Burk/Yiamouyiannis study which attempts to link fluoridation and cancer.

ANALYSIS

This paper points out that when studies are conducted examining potential carcinogens, there should be proper scrutiny of the data analysis. It specifically points out the pitfalls of the data analysis by the National Health Federation (NHF), i.e. the 1975 Burk/Yiamouyiannis report.

"The [NHF] paper discussed provides clear examples of the most commonly committed errors in the analysis of mortality data on human populations. Though the paper claimed to have rallied impressive evidence linking cancer and fluoridation, it, in fact, failed to provide any evidence capable of withstanding careful scrutiny. Our critique does not and is not meant to provide an argument that fluoridation is safe or that it is not carcinogenic. However, because in the future we can expect the appearance of many studies claiming to have found a link between an environmental agent and disease, we have endeavored to present an often neglected part of the scientific standard against which any such investigation should be judged."

The authors go on to point out:

"There are other considerations to be made in evaluating research papers. For example, authors frequently cite a large number of references as supportive of their findings. These references may have been poorly screened and may have limited relevance. The National Health Federation paper concludes that fluoride and cancer are linked in humans, even though many of the references are studies performed on invertebrates and plants involving massive doses of fluoride." (emphasis added)

REFERENCE #106
(#90 in 1983)


REASON CITED

The article is cited as one of the studies refuting the Burk/Yiamouyiannis study which attempts to link fluoridation and cancer.

ANALYSIS

In this chapter, Taves summarizes several studies that refute the Burk/Yiamouyiannis cancer study, specifically:
1.) The National Cancer Institute (NCI) report that demonstrated that Burk and Yiamouyiannis had not taken into account the changes in demographic factors and age distributions that affect cancer rates;

2.) Taves' studies with Standard Mortality Ratios that show there is no statistically significant difference in time trends in overall cancer mortality rates for fluoridated and non-fluoridated cities;

3.) Hoover, et. al, studies at NCI:
   a.) Demonstration that of 34 specific cancer sites, none gave an indication of an increase in cancer following fluoridation for all U.S. counties, two-thirds of which were fluoridated;
   b.) study comparing Standard Mortality Ratios in naturally fluoridated and non-fluoridated counties in Texas showing no consistent trends with increasing fluoride content;

4.) Doll's criticism of Burk and Yiamouyiannis' use of 20-year age groups without sex and race adjustment and the need for the use of indirect method of analysis.

REFERENCE #107
(#91 in 1983)


REASON CITED

Pages 381-389 were specifically cited as an article refuting the Burk/Yiamouyiannis study which attempts to link fluorides and cancer.

ANALYSIS

In this report, the Safe Drinking Water Committee reviews the Burk/Yiamouyiannis study as well as several other studies which examine fluoridation status and cancer mortality rates. The Committee notes statistical errors in the Burk/Yiamouyiannis research and concludes:

"...the available evidence does not suggest that fluoridation has increased the overall cancer mortality rates."

REFERENCE #108
(#92 in 1983)

The article is cited as one of the studies refuting the Burk/Yiamouyiannis study which attempts to link fluoridation and cancer.

At the request of the Safe Drinking Water Committee of the National Academy of Sciences, Taves has reviewed the Burk/Yiamouyiannis cancer data using standardized mortality rates. He extended the analysis of the 10 cities with fluoridated water to 20 cities, and those without fluoridated water to 15. In a very detailed report of these analyses Taves concludes that the assertion of Yiamouyiannis and Burk that fluoridation has caused an increase in cancer rates does not hold up. He maintains that the rates in fluoridated cities are higher only for a particular set of fluoridated cities, and the higher rates in those cities were present prior to fluoridation. He concludes that the available evidence does not suggest that fluoridation has increased or decreased cancer mortality rates.


The authors conclude that correlations between mortality rates and fluoride content of the water tended to be weak and negative, and when socioenvironmental factors and water hardness were allowed for by calculating partial correlation coefficients, no significant associations emerged. The authors conclude:

"At no point in this study has anything approaching a statistically significant adverse effect of fluoride in water supplies been found. All indications are that if naturally occurring fluoride has any effect on mortality, it is likely to be beneficial."

REFERENCE #110
(#94 in 1983)


REASON CITED

The article is cited as one of the studies refuting the Burk/Yiamouyiannis study which attempts to link fluoridation and cancer.

ANALYSIS

This report describes a retrospective study of cancer mortality in 100 Canadian cities during the period of 1954-1973. The purpose of the investigation reported here is to examine data for cancer mortality in Canada in relation to the known history of fluoridation in this country.

No appreciable differences in death rates from all types of cancer or any specific tumour site were indicated between fluoridated and non-fluoridated municipalities over this period, nor were any significant differences apparent between death rates from all types of cancer when compared within the same group of municipalities prior to and after fluoridation.

The authors conclude that no correlation exists between cancer and fluoridation. They specifically note that there are many shortcomings in the statistical methods used by Burk and Yiamouyiannis.

REFERENCE #111
(#95 in 1983)


REASON CITED

Pages 394-399 are cited to support the claim that numerous studies have refuted the Burk/Yiamouyiannis study which attempts to link fluoridation and cancer.

ANALYSIS

These pages contain a memorandum from Donald Austin, Chief of the California Tumor Registry, to Charles Gardipee, Chief, Family Health Services Section, California Department of Health. Dr. Austin reports his analysis testing the hypothesis that fluoride in drinking water is related to cancer in humans. In his conclusion he indicated that on the basis of consistency of the association, strength of the association, specificity, time relationship, and coherence, "no conclusion of a causal role for cancer is justified."
REFERENCE #112
(#96 in 1983)


REASON CITED

This document is cited to support the claim that most of the studies refuting the alleged fluoride-cancer link, once corrected for errors and omissions, show increased cancer death rates in fluoridated areas.

ANALYSIS

This document was written by the author of the "Lifesavers Guide" in defense of his findings of a link between fluoridation and cancer (see reference #92). Yiamouyiannis reviews 11 studies that challenge the results that he and Burk obtained regarding fluoridation and cancer. He lists objections he has to study design, sampling technic, and statistical analysis used by these researchers.

The document also includes letters sent between some of these researchers (Kinlen and Hoover, Oldham and Newell, Hoover and Newell) regarding their findings and some calculation errors that were made. Yiamouyiannis tries to imply in this document that there was collusion and cover-up among these researchers. Their letters, however, were clarifying a minor omission of cancer deaths in an American city which had no effect on the conclusion that a fluoride-cancer link does not exist.

This is a classic example of a technic commonly used by the author of the "Lifesavers Guide" to substantiate his own claims by referencing his own work. The accepted scientific practice, however, is to use independent research findings to support one's hypothesis.

REFERENCE #113
(#97 in 1983)


REASON CITED

The affidavit was cited to support the claim that most of the studies refuting the alleged fluoride-cancer link, once corrected for errors and omissions, show increased cancer death rates in fluoridated areas.

ANALYSIS

This document was written by the author of the "Lifesavers Guide" and submitted to the Minnesota Fluoridation Study Commission, which was authorized by the governor of that state in 1978 to consider the health effects of fluoridation.
The affidavit primarily contains Yiamouyiannis' response to several points made by witnesses at the hearings before the Commission. Yiamouyiannis presents data (many of the references in his affidavit are the same references in the "Lifesavers Guide") that he claims links fluoridation with cancer and mutagenesis.

The three-person Commission initially retained Ralph Katz, D.M.D., M.P.H., Ph.D., Associate Professor in the Division of Health Ecology of the School of Dentistry at the University of Minnesota, as consultant to assist in the examination of the various studies submitted to them. Following the public hearings of the Commission in October, 1978, questions were raised by antifluoridationists concerning possible bias of Dr. Katz. In order to avail any potential claim of prejudice, the Commission agreed to retain as a second consultant, John Yiamouyiannis.

The Commission's final report concluded:

"With regard to potential adverse health effects of fluoridation, the Commission finds that the claims that fluoride is allergenic, mutagenic, or carcinogenic are not supported by the preponderance of available scientific data."

Use of this reference in the "Lifesavers Guide" is another example of a technic commonly used by the author to substantiate his own claims by referencing his own work. The accepted scientific practice, however, is to use independent research findings to support one's hypothesis.

REFERENCE #114
(#97 in 1983)


REASON CITED

The case was cited to support the claim that most of the studies (references 94-111) refuting the alleged fluoride-cancer link, once corrected for errors and omissions, show increased cancer death rates in fluoridated areas.

ANALYSIS

This 51-page document is nothing more than interpretations of scientific testimony and arguments compiled by attorneys who were paid to represent antifluoridationists in this specific lawsuit. Interestingly, all 14 court cases that have been heard since Yiamouyiannis' initial claim of a cancer-fluoridation link have been won by proponents of fluoridation.

The salient fact remains that every scientific body that has either reviewed the work of Burk and Yiamouyiannis or conducted independent studies has refuted their findings on the basis of the errors in protocol and study design, the failure to adhere to basic principles of epidemiology, and/or the lack of corroboration of other investigators.
REFERENCE #115
(#99 in 1983)


REASON CITED

The memorandum was cited to support the claim that most of the studies refuting the alleged fluoride-cancer link, once corrected for errors and omissions, show increased cancer death rates in fluoridated areas.

ANALYSIS

This legal document discusses the age-race-sex adjustments of cancer death rates in the Burk/Yiamouyiannis (B/Y) study from the plaintiffs' (antifuloridationists') testimony in the fluoridation case in Illinois. The B/Y 1975 paper originally claimed that 25,000 or more excess cancer deaths occurred annually in fluoridated cities. In 1977, Burk and Yiamouyiannis made adjustments for age-race-sex and changed the claim to an excess of 10,000 cancer deaths per year occurred.

This document was written by the opponents of fluoridation as their summary of evidence presented in the fluoridation case in Illinois. It fails to mention that those studies reanalyzing the Burk/Yiamouyiannis study utilizing standard procedures found the differences in cancer rates to be due to the age and racial make-up of the populations and not to fluoridation.

Use of this reference in the "Lifesavers Guide" is another example of a technic commonly used by its author to substantiate his claims by referencing his own work. The accepted scientific practice, however, is to use independent research findings to support one's hypothesis.

REFERENCE #116
(#104 in 1983)


REASON CITED

The article was cited to support the claim that fluoride increases tumor incidence and growth rate in animal studies.

ANALYSIS

Two strains of Drosophila melanogaster were grown in nutrients with different concentrations of sodium fluoride. The strain of fruit flies
which normally has a relatively strong disposition for forming melanotic tumors (tu strain) showed a significantly higher rate of induced melanotic tumors than the second strain (wild-type Oregon - R), which normally has a relatively weak genetic predisposition in this respect.

The effects reported cannot reasonably be extrapolated to human genetics and the conclusions reached are not relevant to the consumption of optimally fluoridated water. Consumers Union very effectively addressed the inappropriate use of this study in a 1978 report on fluoridation:

Another study currently getting star billing in antifluoridation tracts is an experiment conducted with fruit flies in 1963. This time, legitimate findings are being substantially distorted. In that study, two strains of fruit flies exposed to 20 to 50 ppm of fluoride in their food experienced an increased incidence of melanotic tumors. Opponents of fluoridation interpret that to mean that fluoride can cause cancer. That's not so, according to scientists working at the National Cancer Institute. While humans may be physiological cousins to the mouse and other mammals, their kinship to the fruit fly is somewhat more distant.

Specifically, a melanotic tumor in a fruit fly is not the same as a cancerous tumor in a human or mammal. It is more akin to scar tissue, and, unlike a cancerous tumor, it's not malignant or harmful. It can be induced by a wide range of substances, including some vitamins and even lysine and tryptophan, two amino acids essential for human growth and health. Fruit flies can also get malignant tumors, but there's no evidence that fluoride has ever caused any. Indeed, fluoride has never proved to be carcinogenic in tests on a variety of animals, including rats, mice, guinea pigs, rabbits, hamsters, dogs, and sheep.


REFERENCE #117
(100 in 1983)


REASON CITED

The article was cited to support the claim that fluoride increases tumor incidence.

ANALYSIS

The authors indicate in this report that in 54 tests involving 991 mice bearing transplanted tumors and in 58 tests including 1817 tumor-bearing eggs, data were obtained which indicated a statistically significant acceleration of tumor tissue growth in association with relatively low levels of sodium fluoride (1-55 mg/l).
It should be noted that the researchers claimed no increase in cancer, but rather an earlier onset of cancer. The results obtained by Taylor and Taylor have never been replicated.

Consumers Union very effectively addressed the inappropriate use of this study in a 1978 report on fluoridation:

Possibly the most absurd evidence marshalled against fluoridation is material purporting to show that fluoride induces cancer in animals. One series of studies frequently quoted by anti-fluoridationists was conducted by researchers in Texas in the 1950's. The first study involved a strain of mice that ordinarily gets cancer. Supposedly, the mice given fluoridated water developed tumors slightly earlier than similar mice on fluoride-free water. There were a few minor hitches in the experiment, however. All the mice were also fed a dog chow that, unknown to the investigator, contained 42 ppm of fluoride—or 10 to 100 times the amount any of the mice got in their water, thus making any comparison between the two groups invalid. A further botching occurred when the investigator miscalculated the amounts of fluoride in the water. Two scientists from the National Institutes of Health reviewed the study in 1951 and dismissed it. Other experiments by the same investigator and a co-worker have long been discredited by subsequent research. Nevertheless, opponents of fluoridation still cite the Texas experiments as significant evidence that fluoride is carcinogenic.

REFERENCE #118
(#106 in 1983)


REFERENCE #119
(Not cited in 1983)

This article was cited to support the claim that gastric cancer has been associated with fluoride intake in humans.
ANALYSIS

This is another example of inappropriate referencing, because this article, which discusses factors affecting the changing trends for selected cancers in Japan, never mentions fluoride or its association with stomach cancer.

Interestingly, the title of the article indicates a decrease in stomach cancer mortality.

REFERENCE #120
(#107 in 1983)


REASON CITED

The article is cited to support the claim that airborne fluoride has been linked to lung cancer.

ANALYSIS

The discharge of 2 large aluminum plants in the Soviet Union is evaluated. The authors briefly mention dust emissions from the plants and list hydrogen fluoride (HF) among the agents emitted, but that is the only reference to fluoride in the entire report. The emphasis of the study is clearly on benzpyrene and its carcinogenic action. The researchers summarize:

"It was found that over 10 kg of 3, 4 benzpyrene was discharged per day in the atmospheric air. The distribution in snow and dust in the environment was analyzed. Chronic morbidity of the respiratory tract was studied as a disease predisposing to cancer in three test groups and a positive correlation with air pollution was established, as was done for actual cancer incidence."

The authors made no attempt to suggest that airborne fluorides increase the incidence of lung cancer.

REFERENCE #121
(#108 in 1983)


REASON CITED

The article was cited to support the claim that airborne fluoride has been linked to cancer.
ANALYSIS

Article Summary: This paper represents an extension of a previous study concerned with the incidence of cancer in the steel city of Ontario [Canada]. A review of the mortality rates for cancer for the years 1966 to 1970 in Hamilton reveals a considerably higher death rate from cancer in Hamilton than in the less industrialized city of Ottawa. The highest rate (65 per 100,000) occurred in the proximity of the steel mills, compared with the death rates (23 and 12 per 100,000) farther distant. Admission records at two large Hamilton Hospitals showed a close correlation between respiratory disease and the daily pollution index. The role of fluoride, as a major pollutant derived from manufacture of steel, is discussed.

In the author's discussion on fluorides, he states that the pollution index level is based on varying amounts of sulphur dioxide and suspended particulates in the atmosphere. He further suggests that the pollution index level serves also as a rough guide to other pollutants such as fluorides, hydrocarbons, carbon monoxide and dioxide, oxides of nitrogen, ozone, etc. The author alludes to the fact that fluoride is the major contaminant responsible for respiratory illness in the industrialized portion of the city. However, he ignores the possible human health hazards associated with the other pollutants. In fact, the author contradicts his statement that fluoride was found to be a major contaminant by concluding that "It cannot be considered proven that the effects of gaseous and particulate fluorides, when inhaled alone or together with other toxic or irritating fumes and minute particulates are responsible for the high rate of cancer of the respiratory system among steel workers and other persons (mostly male), living in or near such a polluted industrial area."

It should also be noted that this study has no relevance to the consumption of optimally fluoridated water. The author makes no mention of the fluoridation status in either Hamilton or Ottawa.

REFERENCE #122
(#109 in 1983)


REASON CITED

This book was published in 1975 not 1974 as noted in the "Lifesavers Guide". This article is cited as providing evidence that the amount of fluoride used to fluoridate public water systems leads to soft tissue fluoride levels which damage biologically important chemicals.

ANALYSIS

This book is a compilation of tables and values of various elements in the body including fluoride. Total body content (2.6 g), model values for fluoride intake and loss, and fluoride content in various tissues, organs,
and body fluids are listed in several tables. The reference makes no diagnostic claims of harm related to fluoride intake and makes no statements as to dangers or benefits associated with various body fluoride levels. It is the author of the "Lifesavers Guide" who is concluding that certain levels are harmful.

Ed. note: An unorthodox method of placing superscripts has been used in the "Lifesavers Guide" relative to this topic. Please note how the author selectively references only portions of statements and then fails to reference the conclusion he draws. ("Lifesavers Guide", page 3)

REFERENCE #123
(#110 in 1983)


REASON CITED

Page 100 is specifically cited in support of the claim that the "amounts of fluoride used to fluoridate public water systems lead to soft tissue fluoride levels which damage biologically important chemicals, such as enzymes, leading to a wide range of chronic diseases". ("Lifesavers Guide", page 3)

ANALYSIS

This page contains tables that list the fluoride content of rat tissues (plasma, liver, muscle, tendon) and the concentration of fluoride in human soft tissues (heart, lung, liver, kidney, spleen, aorta). The entire chapter contains no mention of fluoride levels that either cause damage to biological chemicals, or affect incidence of chronic disease. Furthermore, the authors note that normal soft tissue fluoride levels remain fairly constant when exposure level or length of exposure is increased. Complicated regulatory mechanisms operate within the body to maintain soft tissue fluoride levels within rather narrow limits.

Ed. note: An unorthodox method of placing superscripts has been used in the "Lifesavers Guide" relative to this topic. Please note how the author selectively references only portions of statements and then fails to reference the conclusion he draws. ("Lifesavers Guide", page 3)

See reference #125 for further discussion of this cited book.

REFERENCE #124
(#111 in 1983)

REASON CITED

This reference is cited in support of the claim that the "amounts of fluoride used to fluoridate public water systems lead to soft tissue fluoride levels which damage biologically important chemicals, such as enzymes, leading to a wide range of chronic diseases."

ANALYSIS

The author of the "Lifesavers Guide" cites pages 71 and 73. On page 71 is a table listing eight enzymes highly sensitive to fluoride in pH ranges of 5-8 in vitro. Of the eight listed, three of the enzymes were exposed to molar concentrations of fluoride 10 times greater than the molar concentration of 1 ppm (5.25 x 10^{-5} M). One of the enzymes was exposed to fluoride at over eight times the molar concentration. The other four enzymes showed only 50-61% inhibition when exposed to molar concentrations of fluoride which were lower than the molar concentration of 1 ppm. Page 70 of the reference states: "The question of which enzymes are most sensitive to fluoride is complicated by the fact that sensitivity is influenced by many other factors."

On page 73 is a table listing examples of physiologic processes and enzymes that are influenced slightly to moderately by fluoride concentrations below 2 ppm in vitro. The author of the research from which the table is drawn (Venkateswarlu) points out that in some cases where a metabolic pathway is blocked by fluoride, an alternate pathway may appear to be or may actually be more heavily used. Thus fluoride both activates and inhibits certain physiologic processes.

Note that Venkateswarlu is co-author of a report in Fluorides and Human Health, World Health Organization (ref. #125 in "Lifesavers Guide") which states that "No evidence has yet been provided that fluoride ingested at 1 ppm in the drinking water affects intermediary metabolism of food stuffs, vitamin utilization, or either hormonal or enzymatic activity."

This document is also cited in "Lifesavers Guide" references #1 and #223.

Ed. note: An unorthodox method or placing superscripts has been used in the "Lifesavers Guide" relative to this topic. Please note how the author selectively references only portions of statements and then fails to reference the conclusion he draws. ("Lifesavers Guide, page 3)

REFERENCE #125
(#112 in 1983)


85
REASON CITED

Page 183 is specifically cited in support of the claim that the "amounts of fluoride used to fluoridate public water systems lead to soft tissue fluoride levels which damage biologically important chemicals, such as enzymes, leading to a wide range of chronic diseases."

ANALYSIS

This page contains a table that shows the physiological processes and enzymes that are activated or inhibited slightly or moderately by levels of fluoride below 2 ppm (10^-4 M per liter).

The authors are careful to note that:

"We are still a long way from understanding precisely the biochemical mechanisms underlying the role of F, if any, in biological systems, particularly at the low levels F is present in body fluids and soft tissues." (p. 182)

And later, in the same article:

"No evidence has yet been provided that fluoride ingested at 1 ppm in the drinking water affects intermediary metabolism of foodstuffs, vitamin utilization or either hormonal or enzymatic activity." (p. 214)

Ed. note: An unorthodox method of placing superscripts has been used in the "Lifesavers Guide" relative to this topic. Please note how the author selectively references only portions of statements and then fails to reference the conclusion he draws. ("Lifesavers Guide", page 3)

See reference #123 for further discussion of this cited book.

REFERENCE #126
(#173 in 1983)


REASON CITED

The article was cited as providing chemical evidence to support the view that the amount of fluoride used in fluoridation leads to harmful effects.

ANALYSIS

The authors do not claim that fluoride causes any dread disease. The research was conducted in vitro, in a pure uncontaminated system, with a fluoride concentration of 32,700 ppm. These results have no biological relevance.
The author concludes:

"The profound biological effects that are being linked to the simple fluoride ion such as genetic damage, birth defects, allergy responses, and cancer are difficult to explain as arising from the chemistry of this ion, which in aqueous solution is stable and not active in bond-forming or bond-breaking reactions, being a very weak nucleophile. We believe that we have found, in its strong hydrogen bonding potential toward the NH group of amides and related biomolecules, an explanation of how this reputedly inert ion could disrupt key sites in biological systems. By the same token it may also explain why fluoride is an essential element in low concentrations, use being made of the N–H–F hydrogen bond as an intermediate step in reactions involving amides." (emphasis added)

REFERENCE #127
(#114 in 1983)


REASON CITED

This editorial is cited to support the claim that an article published in the Journal of the American Chemical Society by Emsley and others (see reference #126) provides evidence that optimal fluoridation levels (.9-1.2 ppm) damage enzyme production leading to a wide range of chronic diseases. After reviewing the article by Emsley, et al, Yanchinski erroneously concludes that "some of the charges that are laid at its (fluoride's) door - genetic damage birth defects, cancer and allergy response - may arise from fluoride interference after all".

ANALYSIS

Emsley, et al, (reference number 126) does not make such expansive statements of cause and effect. The authors do not claim that fluoride causes any dread disease. The research was conducted in vitro, in a pure uncontaminated system, with a fluoride concentration of 32,700 ppm. These results have no biological relevance.

REFERENCE #128
(#115 in 1983)


REASON CITED

The article was cited as providing further support that fluoride at optimum fluoridation levels damages enzyme production leading to a wide range of chronic diseases.
ANALYSIS

This article reviews a method for determining the potential strength of hydrogen bonds between the uracil amide and fluoride utilizing programmed models and computed solvation calculations. The authors base some calculations on their findings from a 1981 article (see reference 126) wherein the fluoride concentration used for the study was 32,700 ppm. The authors feel that the strength of fluoride-hydrogen bonds could play a disruptive role toward RNA and DNA. Yet, they preface that statement with "If our calculations and hypotheses are correct, then....". In addition, they end the article by stating that "strong hydrogen bonding may provide the fluoride ion with a mechanism and the necessary energy to cause fundamental biochemical changes, given the right environment. Whether, in fact, it does operate in this way in living cells remains to be seen." (emphasis added)

REFERENCE #129
(#117 in 1983)


REASON CITED

The article was cited to support the claim that people on poor diets and in poor health are most susceptible to fluoride poisoning.

ANALYSIS

Authors studied 928 individuals in two Italian communities, Campagnano di Roma (3.5 ppm fluoride in water and fairly healthy people) and Quarto (1.3 ppm fluoride in water and much malnutrition). Comparisons indicate malnutrition, particularly calcium deficiency, tends to increase severity of mottling. This study has nothing to do with fluoride poisoning.

REFERENCE #130
(#118 in 1983)


REASON CITED

The study was cited to support the claim that people on poor diets and in poor health are most susceptible to fluoride poisoning.

ANALYSIS

After seventeen years of fluoridation in Grand Rapids, Michigan, researchers looked at enamel opacities in 822 seventh, eighth, and ninth grade students who were born and raised, at least the first seven years of life, in Grand Rapids. If the opacities were fluorotic, Dean's criteria was utilized for classification. Results of community fluorosis indices for
white and Negro groups were 0.15 and 0.31 respectively. This is well within the range zero to 0.40 considered unimportant from an esthetic view. This research supports findings that at 1.0 ppm fluoride, there is a two-fold margin of safety against mottling. This article does not deal with underprivileged or under-nourished individuals nor does it discuss fluoride poisoning.

REFERENCE #131
(#119 in 1983)


REASON CITED

The article was cited to support the claim that people on poor diets and in poor health are most susceptible to fluoride poisoning.

ANALYSIS

The authors of this paper postulate that "certain vitamins may be implicated in and concerned with the development of fluorine toxicosis." The role of vitamins A, D, and C in tooth and bone development is discussed. The authors indicate that the adequacy of the diet plays a significant role in relation to the physiologic tolerance of fluorine ingested by animals and man. The development of fluorosis is enhanced by poor diet, high fat intake, limited plane of nutrition, and deficiency diseases. Certain nutrients, especially ascorbic acid, mitigate the severity of the disease.

The authors' conclusions are based primarily on reviews of studies that use extremely high doses of fluoride: e.g. 10-30 mg fluoride per kg of body weight or "growth-inhibiting" doses of fluoride.

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*This reference is incorrectly cited in the "Lifesavers Guide". It is Chapter 4 of a book, not Volume 16 as the "Lifesavers Guide" indicates.

REFERENCE #132
(#120 in 1983)


REASON CITED

The article is cited to support the claim that people on poor diets and in poor health are most susceptible to fluoride poisoning.
Although this article from a foreign journal did not contain an English abstract, an oral translation indicates that the researcher studied 2700 preschool children. Fifty of these children exhibited a high degree of fluorosis and 400 were affected less severely. The investigator notes biochemical changes in the blood of the children with fluorosis: reserve alkalinity, alkaline phosphatase, calcium, and phosphorous were affected. The author recommends that children in endemic fluorosis areas get vitamin and calcium supplements.

To find a high degree of fluorosis in preschoolers is extremely unusual. No information on water fluoride concentrations or water intake levels is given, thus it is difficult to assess the applicability of this study to consumption of optimally fluoridated water.

**REFERENCE #133**

(11121 in 1983)


**REASON CITED**

This article is cited in support of the claim that people on poor diets and in poor health are most susceptible to fluoride poisoning.

**ANALYSIS**

This study, written in Russian, included an English abstract:

**Article Summary:** By conducting experiments on guinea pigs, receiving by mouth sodium fluoride over a period of 2 months (0.3 mg of fluorine per kg body weight) studies were made of the protective action produced by the following nutrients: vitamin "C" (5 mg); vitamin complex comprised of B1 (0.05 mg), B2 (0.05 mg) and PP (0.25 mg); vitamin "D" (10 U) and calcium (30 mg); and complex of the above stated nutrients. Being added to the routine ration of the animals the above substances were capable of completely or partially eliminating manifestations of chronic intoxication and of increasing the amount of fluorne excreted from the body.

From among the vitamins tested it was ascorbic acid that showed a particularly accentuated protective effect. In observation made under conditions prevailing in the fluorine-manufacturing industry on the operators engaged therein it was found that an addition of ascorbic acid in an amount of 100-120 mg to the daily ration tends to appreciably (1.4-2 fold) increase the excretion of fluorine from the body.

By enriching the daily food allowance with a complex of C, B1, B2, PP and D vitamins and with calcium no considerable advantages of this complex over the administration of vitamin "C" alone could be gleaned under conditions of the actual experiment.
This study has no relevance to consumption of optimally fluoridated water, since the comparable dose of sodium fluoride for a 70 kg man would be 21 mg of fluoride (210 liters of water at 1 ppm fluoride or one liter of water at 21 ppm fluoride).

*The editors are unable to determine what the authors are referring to when they discuss "vitamin PP".*
References 134 to 150 are cited to support the claim that kidney disease is likely to be aggravated by fluoride. In addition, references 145-148 are cited to support the claim that in fluoridated areas, people on kidney machines are developing osteomalacia and "are being poisoned by fluoride in the water."

The references are discussed individually on the following pages, but some explanatory information is presented here.

* Seven references (#135, 136, 138, 139, 140, 141, 149) were misinterpreted or had no relevance to consumption of optimally fluoridated water (e.g. reference #138 examines effects of high concentrations of hydrogen fluoride gas on laboratory animals).
* Six references (#134, 137, 138, 140, 142, 149) recount the effects of higher-than-normal fluoride exposure.
* In five references (#139, 143, 145, 146, 147) the kidney disease preceded the effects of fluorides. The use of these references demonstrates a fundamental ignorance of causation versus effect.
* Two references (#144, 150) could not be located.
* One reference (#148) is a magazine article that shows a serious lack of objective reporting.

Hodge and Taves have determined that human kidneys are not damaged even after heavy and continued over-exposure to fluoride under industrial conditions.* Data from Bartlett, Texas (8 ppm) showed no effect on kidney status.** In addition, according to the National Research Council, based on a large body of data from animal studies it has been calculated that the minimal fluoride concentration (in water) necessary to induce kidney changes in a number of animal species is 100 ppm ingested daily over a long period of time.***

Finally, it is important to note that since many of these references were published, much progress has been made in the prevention of problems associated with long-term hemodialysis. At the recommendation of the


National Institute of Arthritis and Metabolic Disease, it is now a common practice to purify water used for hemodialysis by reverse osmosis and/or deionization processes in order to clear it of calcium, magnesium, copper, fluoride, and other mineral content. Many normal constituents of water, even at quite small concentrations, can be harmful to dialysis patients, since their blood is exposed to 50-100 times the amount of fluid that a healthy person consumes.

REFERENCE #134
(Not cited in 1983)


REASON CITED

This article was cited to support the claim that kidney disease is likely to be aggravated by fluoride.

ANALYSIS

Article Summary: Morphological and cytochemical studies on the squirrel monkey have been made after maintaining the subjects on pure distilled water and fluoridated distilled water for 18 months with the objective of determining the effect of fluoride on the activity of some hydrolytic and oxidative enzymes in the kidney, liver and nervous system. Daily water intake by individual animals was measured over the final 10 months of the animal's exposure to 0, 1 and 5 ppm fluoride. Water consumption was considerably higher in the animals on higher fluoride intake. Whereas the nervous system remained totally unaffected by this experimental procedure, the liver showed a slightly enhanced activity of Krebs citric acid cycle enzymes. The kidneys, however, showed significant cytochemical changes, especially in the animals on 5 ppm fluoride intake in their drinking water. In these animals, the glomeruli showed an increase in the activity of acid phosphatase and the enzymes belonging to the citric acid cycle and the pentose shunt, whereas lactate dehydrogenase, a representative of the anaerobic glycolytic pathway, remained unchanged or only slightly changed. These observations suggest that fluoride in concentrations as low as 5 ppm interferes to some extent with the intracellular metabolism of the excretory system.

A review of the research in this area shows that such a conclusion has not been reached by others.

REFERENCE #135 A
(Not cited in 1983)

REASON CITED

This article is cited to support the claim that fluorides aggravate kidney disease.

ANALYSIS

Article Summary: There is abundant evidence of increase in human ionic plasma fluoride (IPF) concentrations with age if the drinking water is optimally fluoridated (approximately 1 ppm fluoride). The reasons for this phenomenon might be the accumulation of fluoride into human bone and/or diminishing renal function in old age.

In the present series of hospitalized patients living in a fluoridated community (1.0-1.2 ppm fluoride in the drinking water) there was a statistically highly significant correlation between IPF concentrations and age (p < 0.001). Furthermore, an equally strong correlation was found between the IPF concentration and serum creatinine level of the patients. A closer analysis of the latter correlation, however, revealed an artifact, which notably weakened the correlation on its removal. Finally it became evident that the main reason for the increase in IPF concentration with age is probably bone fluoride. The changes in renal function remaining within normal limits with age may have only a slight modifying effect on this increase. It must be stressed that only patients with normal serum creatinine concentrations were included in this study.

Clearly, this study does not support the claim made in the "Lifesavers Guide".

* * *

REFERENCE 135 B
(Not cited in 1983)


REASON CITED

This article is cited to support the claim that fluorides aggravate kidney disease.

ANALYSIS

The principle aim of this study was to try to find evidence of an increase in ionic serum fluoride (ISF) and ionic plasma fluoride (IPF) concentration with age in a low fluoride area. The author also tried to quantitate the effect of age and renal function on the results obtained. The results are not surprising nor are they indicative of harm. Ionic serum and plasma fluoride concentrations are higher (but not harmfully so) in
people who consume higher levels of fluoride in water or food. Also, plasma 
and serum fluoride concentrations increase with age, probably as a result of 
fluoride intake, since human bone tissue accumulates fluoride throughout 
life. Neither of these findings are earth shattering.

The author indicates that "renal function is a much less significant 
factor than soluble fluoride intake and probably less significant than the 
accumulation of fluoride into bones when considering the increase in [ionic 
plasma and serum fluoride levels] with age." The author makes no statements 
regarding fluoride as a cause of renal harm.

This article does not support the claim made in the "Lifesavers Guide".

REFERENCE #136
(#124 in 1983)

Spencer, H., Kramer, L., Norris, C., and Wiatrowski, E. Effect of 
calcium on fluoride metabolism of patients with chronic renal failure. 

REASON CITED

The article is cited as evidence that kidney disease is aggravated by 
fluoride.

ANALYSIS

Researchers conducted this study to determine whether the response to a 
high calcium intake, in terms of fluoride metabolism, is similar or differs 
in patients with chronic renal failure. Metabolic balances of fluoride were 
determined for three patients with chronic renal failure who were not under­
going hemodialysis. Three age-matched patients with normal kidney function 
served as control.

Increasing the calcium intake to levels ranging from 800 to 2000 mg/day 
did not affect fluoride metabolism of the patients with renal failure. 
While the authors note that fluoride balance studies have shown that urinary 
fluoride is considerably lower and fluoride retention is increased in 
patients with chronic renal failure, they do not make any statements con­
cerning harms associated with this altered metabolism. The net absorption 
of fluoride for the three experimental subjects was very slightly lower to 
that of the controls.

REFERENCE #137
(#125 in 1983)

Kessabi, M. Braun, T.P. Benard, P. Burgat-Sacaze, V. and Rico, A.G. 
Acute kidney toxicity of sodium fluoride in the rat. Tox. Lett. 5(2):169- 
174, 1980.
REASON CITED

The article is cited to support the claim that kidney disease is likely to be aggravated by fluoride.

ANALYSIS

Six groups of male Sprague-Dawley rats (N=30) were given intraperitoneal injections of sodium fluoride in varying concentrations: 0.0 ppm (control); 0.05; 0.10; 0.25; 0.50; and 1.00 micromole F/kg. Urine samples were taken every 24 hours for four days previous and four days after injections. All animals were sacrificed and kidney tissues were examined.

Kidney tubule lesions were observed in rats exposed to levels of 0.25 mmol and above. Lesions increased in severity with higher doses. No lesions were found at lower doses of 0.05 and 0.10 micromole F/kg, but diuresis and phosphaturia increased.

The authors conclude that the "results may have implications in acute human fluoride poisoning." (emphasis added) This research, however, is not relevant to community water fluoridation at 1 ppm, since average plasma fluoride levels do not reach the levels at which these researchers noted lesions.

REFERENCE #138
(#126 in 1983)


REASON CITED

The article is cited to support the claim that fluoride aggravates kidney disease.

ANALYSIS

This study is written entirely in French, but a summary provided by a translator states:

Inhaled hydrogen fluoride gas (HF) is carried rapidly and massively through the organism. This is seen through a greatly increased excretion of fluoride in the urine.

Keeping animals in an atmosphere containing 150 micrograms of fluoride/m3 for 18 months results in a disruption of renal function.

Injury to the tubes appears at the sixth month of intoxication and results in a urinary excretion of gamma-glutamyl transferase which is confirmed later at 12 months and 18 months by an increase in the excretion of creatinine and urea.
This rapid urinary elimination of fluoride has been affirmed by several authors, but the rate of excretion depends on previous amounts of saturation of fluoride of the organism.

Obviously, this research is not relevant to community water fluoridation, since test animals were exposed to high doses of hydrogen fluoride gas.

REFERENCE #139
(#127 in 1983)


REASON CITED

The article is cited to support the claim that fluoride aggravates kidney disease.

ANALYSIS

A one-paragraph summary in English describes this Belgian article: "An isolated case of chronic fluorine intoxication with ankylosis of the vertebral column is presented. (emphasis added) This patient got also a renal insufficiency with an histologic picture of chronic interstitial nephritis. These lesions resembling those described in experimental fluorine intoxication in the animal, and other causes of renal insufficiency being absent, we believe to have demonstrated the nephrotoxicity of fluorine for the first time in man."

It was not possible to obtain a full translation of this article or to determine what fluoride concentration was used. Symptoms referred to in this summary do not occur through consumption of optimally fluoridated water.

REFERENCE #140
(#128 in 1983)


REASON CITED

The article is cited to support the claim that fluoride aggravates kidney disease.

ANALYSIS

The skeletal changes of an individual from the Punjab area of India were studied. The fluoride content of the water in the Punjab area is up to 14 parts per million. The authors do not claim fluoride aggravates kidney
disease. In fact, the authors state that through a necropsy, the internal organs were found to be normal. Renal disease was specifically excluded because renal disease can cause skeletal changes similar to fluorosis.

REFERENCE #141
(#129 in 1983)


REASON CITED

The article is cited to support the claim that fluoride aggravates kidney disease.

ANALYSIS

This Italian journal article contains no English summary. An oral translation brought the following facts to light:

* Histological examinations of liver and kidney tissues were made on 27 Golden hamsters who had received .5048 mg NaF daily for 15-60 days through a tube placed in the esophagus.

* Alterations were noted in tissues examined (vasodilation was a common alteration).

* The authors indicate that exposure to fluoride could cause intoxication in animals and humans according to the dose, method of administration, and duration of exposure.

The claim made by these researchers is not new. The final statement utilizes the future tense "could" and in truth virtually anything "could" happen. Research and experience, however, have rejected any likelihood of such events.

REFERENCE #142
(#130 in 1983)


REASON CITED

This article is cited to support the claim that fluorides aggravate kidney disease.

ANALYSIS

This article reviews the effects of fluoride on the kidneys of animals and humans under a variety of circumstances.
Article Summary: A review of the available literature on the effects of fluoride on kidneys indicates that fluoride is removed from the kidneys by glomerular filtration. Approximately 1/3 of ingested fluoride appears in the urine within 24 hours.

In experimental animals massive doses of fluoride induce tubular necrosis, especially in the convoluted portions of the tubules, and inflammation of glomeruli. These changes are associated with the clinical findings of impaired kidney function such as polyuria, polydipsia, increase nonprotein nitrogen, etc.

In humans, in acute fluoride intoxication, the kidneys are affected adversely. Although data on the long-term effect of repeated small doses of fluoride are sparse, in areas of endemic fluorosis functional disturbances have been reported. Whereas epidemiological statistics in the U.S.A. have not revealed any effect of fluoridated water (1 ppm) on the kidneys, in persons with kidney disease increased retention of fluoride in the blood has been recorded. Prolonged anesthesia with methoxyflurane can lead to renal failure and death. (emphasis added)

Obviously, the adverse effects referred to in these articles result only when excessive exposure to fluoride compounds occurs.

REFERENCE #143
(#131 in 1983)


REASON CITED

The article is cited to support the claim that kidney disease is likely to be aggravated by fluoride.

ANALYSIS

Case studies are presented of two patients who suffered from renal insufficiency and systemic fluorosis. The authors attempt to determine whether chronic excessive fluoride intake caused renal damage (either directly or indirectly) or whether systemic fluorosis was due to impaired renal function. The patients were an 18 year old boy whose home well water contained 2.6 ppm fluoride, and a 17-year old girl whose home well water contained 1.7 ppm fluoride.

The authors conclude that the kidney disease preceded the fluorosis: the renal insufficiency resulted in excessive water intake and reduced excretion of fluoride, thus producing systemic fluorosis. They note that chronic ingestion of water containing these fluoride levels is unable to cause renal damage. They also state that in people with normal renal function, the frequency of systemic fluorosis is negligible unless the fluoride content of the water exceeds 4 ppm.
REFERENCE #144
(132 in 1983)


This personal communication could not be located.

REFERENCE #145
(133 in 1983)


REASON CITED

This study is cited to support the claim that in fluoridated areas people on kidney machines are developing osteomalacia (a bone disease) and are being poisoned by fluoride in the water.

ANALYSIS

Article Summary: Serum and bone fluoride concentrations of ten patients maintained on long-term hemodialysis with fluoridated water (1 ppm, i.e., 50 uM) were correlated with duration of treatment and the occurrence of clinical, radiological, and histological manifestations of bone disease. Two patients had symptomatic renal osteodystrophy when accepted on the program, whereas six others developed the disease within a year of fluoridated dialysis. However, in all patients, the disease progressed despite recommended therapy (including high doses of vitamin D). The mean pre-dialysis serum fluoride level was 16 + 4 uM which rose to 28 + 3 post-dialysis. The bone fluoride content ranged from 800 to 22,500 ppm on a dry fat-free basis. Toxic effects have been reported at these levels and could complicate underlying renal osteodystrophy. Further studies are required to delineate the role of fluoride in this condition.

Since 1971, much progress has been made in the prevention of problems associated with long-term hemodialysis. It is now a common practice to purify water used for hemodialysis by reverse osmosis and/or deionization processes in order to clear it of chloramines, nitrates, and other mineral content. Many normal constituents of water, even at quite small concentrations, can be harmful to dialysis patients, since their blood is exposed to 50-100 times the amount of fluid that a healthy person consumes.

REFERENCE #146
(134 in 1983)

The article is cited to support the claim that in fluoridated areas people on kidney machines are developing osteomalacia (a bone disease) and are being poisoned by fluoride in the water.

This study evaluated the prevalence of bone disease in patients on a hemodialysis program. It was stated that not all dialysis units using fluoridated water have noted an increased prevalence of osteomalacia. It was suggested, therefore, that some other factor in untreated water could be responsible.

Seven of the 41 patients studied were using fluoridated dialysate. An increase of osteoid occurred in four of the seven. Patients using non-fluoridated water remained within normal limits of osteoid. Some bone disease in the form of osteitis fibrosa was noted but was usually reversible with treatment.

The authors conclude that patients on long-term hemodialysis using fluoridated water for periods of years will encounter an unacceptable frequency and degree of osteomalacia. They further suggest that it seems prudent to use non-fluoridated dialysate baths in long-term hemodialysis. Deionization and/or reverse osmosis is now commonly practiced to purify the dialysate of all common chemicals.

Ed. note: The reference as cited in the "Lifesavers Guide" (U.S. Nat'l. Inf. Serv. PB Rep., 1973, No. 225081/9GA, 61pp.) could not be located. However, the authors submitted a shorter version of the article to the Journal of the Canadian Medical Association. It is this version which is abstracted here.

REFERENCE #147
(#135 in 1983)


The article is cited to support the claim that people on kidney machines are developing osteomalacia and are being poisoned by fluoride in the water.

This is a report of the absorption of fluoride by a 41-year old female patient with chronic renal insufficiency who underwent dialysis repeatedly with fluoridated water in the dialysate bath. The authors noted a higher than normal fluoride bone content and a severe degree of osteomalacia, but attributed the condition to renal osteodystrophy. Given this condition, it
was virtually impossible to determine if bone deterioration resulted, in part, from excessive exposure to fluoride. The authors noted the possibility that extra fluoride was beneficial for the patient's bone.

It is a well-known medical fact that water used for hemodialysis should be purified by reverse osmosis and/or deionization processes in order to clear it of chloramines, nitrates, and other mineral content. Many normal constituents of water, even at quite small concentrations, can be harmful to dialysis patients, since their blood is exposed to 50-100 times the amount of fluid that a normal person consumes.

This reference is inappropriately and inaccurately cited and has no relevance to consumption of optimally fluoridated water.

**REFERENCE #148**
(#136 in 1983)


**REASON CITED**

The article is cited to support the claim that in fluoridated areas, people on kidney machines are developing osteomalacia (a bone disease) and are being poisoned by fluoride in the water.

**ANALYSIS**

In this magazine article the implications for people with kidney ailments who drink fluoridated water are explored. The author also outlines the series of events that led to recommendations that deionized water be used in long-term hemodialysis.

Hinting of cover-ups and hesitation to publish research findings, the author of this article describes the early research that indicated the increased retention of fluoride in bone tissues that occurs when fluoridated water is used in hemodialysis. He fails to mention that drinking water commonly contains dozens of other substances that can be of even greater danger to the dialysis patient, since the blood of dialysis patients is exposed to 50-100 times the amount of water a healthy person consumes.

Deionization and/or reverse osmosis is now commonly practiced to purify the dialysate of all common chemicals.

**REFERENCE #149**
(#137 in 1983)

REASON CITED

This reference is a compendium of concise accounts of original research results published by the International Research Communications System. The article is cited to support the claim that fluoride aggravates kidney disease.

ANALYSIS

The researcher studied the effects of fluoride administration on some enzymes in rat liver and kidney. Tissues were exposed to 0, 10, and 25 ppm fluoride. No significant differences were found in the activities of six different enzymes at 0 and 10 ppm, but enzyme activity was significantly altered for all the enzymes at the level of 25 ppm. The author concludes that "the results suggest that the effects of ingestion of water fluoridated at 25 ppm on enzyme activities are large and might be associated with some pathological changes."

This research has no relevance to consumption of optimally fluoridated water by humans.

REFERENCE #150
(#138 in 1983)


REASON CITED

The article is cited to support the claim that fluoride aggravates kidney disease.

ANALYSIS

This Chinese study had no English abstract. In reviewing the references it appears that the study was performed on rats.
References 151 through 164 are cited to support the claim that fluoride aggravates hypothyroidism.

These references are discussed individually on the following pages, but some explanatory information is presented here.

Eleven of the 14 articles were written prior to 1968, before much of the advanced biochemical studies were done on the effects of fluoride on thyroid activity. Two of the articles could not be located through normal library channels, and five were written in foreign languages with very limited or no English summaries. One reference was related to fluoride used as a rocket propellant, several other references dealt with excessive levels of fluoride, and other research was done on tadpoles, rats, and dairy cattle.

In 1971, the Committee on Biologic Effects of Atmospheric Pollutants of the National Academy of Sciences thoroughly reviewed research on the biological effects of fluoride.* They concluded that there is no harmful effect of fluoride on thyroid function.

In addition, the World Health Organization's monograph, Fluorides and Human Health**, contains an extensive literature review and analysis of the effects of fluoride on thyroid activity. The conclusions reached were:

"Advances in biochemistry, in particular tracer studies, have led to a complete revision of the theory of iodine-fluorine antagonism. We now know that fluorine does not accumulate in the thyroid gland, that its presence does not decrease the uptake of iodine by the thyroid and that it has no effect on the synthesis of thyroxine.

The information derived from the large-scale demographic surveys in the U.S.A., Great Britain and elsewhere indirectly confirms the facts we have mentioned above. Consumption of drinking water containing fluoride, either naturally or artificially, does not impair the thyroid function, nor does it change the morphology and histological structure of the thyroid gland. Even the consumption throughout life of water containing 6 or 7 ppm fluoride does not affect the thyroid function."

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*Reference #124 in the "Lifesavers Guide". (pp. 198-213)

**Reference #123 in the "Lifesavers Guide". (p. 261)
In the experiments described, 80 rats weighing 50g each were divided into 4 groups: Group A received daily over various durations, 0.1 ml of a 0.1% aqueous NaF solution providing a dose of 2 mg/kg (corresponding to 10 times that which is generally ingested in areas with dental fluorosis); Group B received 0.1 ml 0.01% NaF solution or 0.2 mg/kg (comparable to that found in areas of dental fluorosis); while Group C received 0.1 ml of 0.001% NaF solution, or 0.02 mg/kg (the equivalent of .12 mg/day for a 60 kg man, considered optimal for dental caries prophylaxis). Group D was designated as the control. Histologic sections of the thyroid were prepared immediately after sacrifice by exsanguination.

There was only one histologic section presented and described for Group C (which received the dose most like 1 ppm in water). That section showed fewer affects than those for Groups A and B, but did show signs of slightly increased thyroid function.

The increased thyroid function encountered in these animals was explained by the hypothesis of an altered functional equilibrium between the pituitary and the thyroid when fluoride dose is minimal and the organism itself is in some way accustomed to the ingestion of fluoride. On the basis of these experiments the authors indicate that administration of fluoride salts even in doses held to be optimal extending over a period of several months causes damage to the thyroid gland which is histologically demonstrable. They also feel that in addition to the amount of fluoride administered daily, the duration of treatment should be considered as well. Since the optimal dose of 1 mg does not include the possibility of accumulation, nor the condition of the individual organism, they suggest that this question be examined further.
REASON CITED

This article is cited to support the claim that fluoride aggravates hypothyroidism.

ANALYSIS

This article is a field study to determine the relationship of fluoride in urine to thyroid hormones and other blood criteria. The study was conducted on cattle with chronic fluorosis resulting from excessive consumption of fluoride-containing mineral supplements. Cattle were given various amounts of fluoride supplements ranging from 6,000 ppm fluoride to 7.5 ppm ad libitum. Levels of fluoride consumed were not known. However, the study showed that increased amounts of fluoride in the urine were associated with decreased production of thyroid hormones.

Obviously, this research is not relevant to consumption of optimally fluoridated water by humans, since the animals involved received excessive amounts of fluoride.

REFERENCE #153
(#147 in 1983)


REASON CITED

This article is cited to support the claim that fluoride aggravates hypothyroidism.

ANALYSIS

This report deals with the biologic effects of the fluorine-containing rocket propellant, trifluoroamine oxide (AMOX).

The toxic effects of AMOX after acute inhalation and intraperitoneal injection are described. This report did not deal with the ingestion of fluoride in drinking water and was dealing with concentrations of 87-240 ppm AMOX via inhalation and 51.6 and 32.1 mg/kg AMOX injected into the peritoneum. Results showed that in mice and rats that survived, fluoride levels in thyroid were initially high but returned to normal in four-six weeks.

Obviously, this research is not relevant to consumption of optimally fluoridated water by humans.
REFERENCE #154
(#148 in 1983)


The publication "Fluoride" (International Society for Fluoride Research) is not indexed by the Library of Medicine and does not appear in Index Medicus; thus, it is not readily available for review.

In the past, the majority of the editorial staff of "Fluoride" has been comprised of well-known opponents of fluoridation. Thus, the objectivity of this publication could be questioned.

It was not possible to locate this volume through interlibrary loan channels.

REFERENCE #155
(#149 in 1983)


REASON CITED

This article is cited to support the claim that fluoride aggravates hypothyroidism.

ANALYSIS

This survey was conducted in three areas of India which exhibited endemic fluorosis to determine the incidence of thyroid enlargement. Except for temporary thyroid enlargement encountered with pubertal (ages 14-17) subjects, there was no relationship found between the incidence of endemic goiter and fluoride in the water. The temporary enlargement was not pathological and disappeared after age 17.

The survey has nothing to do with optimally fluoridated water. Rather, the authors indicate that thyroid enlargement has to do with lack of iodine in the water where fluoride is present in excessive amounts.

REFERENCE #156
(#150 in 1983)


REASON CITED

This article is cited to support the claim that fluoride aggravates hypothyroidism.
This Italian journal article contains the following English summary:

"The AA studied the histological behaviour of the thyroid in 'Bufo bufo' tadpoles in metamorphosis, to which increasing NaF doses had been administered at different stages. The results are being discussed and some hypotheses on their interpretation are being put forth."

It is not possible to determine from this abstract whether this research was appropriately used.

REFERENCE #157
(#151 in 1983)


REASON CITED

This article is cited to support the claim that fluoride aggravates hypothyroidism.

ANALYSIS

This Italian journal article contains the following English summary:

"Investigations have been done, in different groups of rats, on the action induced by toxic and non-toxic doses of NaF on enzymatic endothyroidal activity and on the basal metabolism of single animals. After reporting the results obtained by the experiments, the influence of fluorine on cellular oxidations in general and on thyroid activity in particular has been discussed. On the basis of the data obtained it seems possible to conclude that fluorine acts competitively on the synthesis of iodated amino acids and can inhibit, peripherally, the biocatalytic activity of thyroid hormones."

It is not possible to determine if this reference has any relevance to consumption of optimally fluoridated water.

REFERENCE #158
(#152 in 1983)


This article could not be located through interlibrary loan, Chemical Abstracts Service, the National Library of Medicine, or the National Institutes of Health Library.
REFERENCE #159
(#153 in 1983)


REASON CITED

This document is cited in support of the claim that hypothyroidism is aggravated by fluoride.

ANALYSIS

This chapter, part of a rather lengthy German book, contains no English abstract or summary. The chapter appears to deal with various nutrients, including a one-page discourse on fluoride.

An oral translation indicates that on p. 254-255 there is a review of the literature regarding the effects of fluoride and concern is expressed about possible effects on thyroid function and iodine antagonism.

The summary at the end of this section indicates that the foregoing information is not conclusive and more research is needed.

REFERENCE #160
(#154 in 1983)


REASON CITED

This document is cited to support the claim that fluoride aggravates hypothyroidism.

ANALYSIS


REFERENCE #161
(#155 in 1983)

This article is cited to support the claim that fluoride aggravates hypothyroidism.

ANALYSIS

This German journal article contains only a brief English summary:

"Fluorine and iodine are antagonists not only chemically but also biochemically. Iodine increases, fluorine decreases metabolism. Therefore superabundance of iodine as seen in iodine thyrotoxia can be favourably influenced by fluorine. In fact, I obtained good results without any detrimental side effects from a percutaneous fluorine-treatment in the form of hydrofluoric baths. Gains in weight up to 20 kg., normalisation of the basal metabolic rate and of the increased iodine level in the blood was achieved only if the iodine level in the blood was increased temporarily. Oral administration of fluorine, however, especially for a prolonged period of time, e.g. by prolonged administration of fluorine-tablets or by fluoridation of the drinking-water, in order to prevent dental caries appears to be dangerous both to metabolism and skeletal system."

As indicated on the introductory page for references 151 through 164, research conducted since this document was published in 1963 indicates that no impairment of thyroid function occurs when optimally fluoridated water is consumed.

REFERENCE #162
(#156 in 1983)


This article is cited to support the claim that fluoride aggravates hypothyroidism.

ANALYSIS

Article Summary: By means of immunobiological and biochemical reactions the authors investigated the influence of dental periapical foci on the organism, as well as on the course of the rheumatic process. The data derived demonstrate that not all dental periapical foci exert an active influence on the organism. The most active periapical foci of the granulating form (both in rheumatism affected and nonaffected patients), this demonstrating an increased ASL-0 titers and a reduction of SH-groups. The removal of the mentioned foci exerts a favorable effect on the organism (diminution of ASL-0 titers, increase of SH-groups in the blood and a favorable course of rheumatism).
From the English summary of this Slavic journal article it is obvious that the research did not investigate the use of fluorides nor any aspect of community water fluoridation. Clearly, this study has no relevance to the claims made in the "Lifesavers Guide".

**REFERENCE #163**

(157 in 1983)


**REASON CITED**

This article is cited to support the claim that fluoride aggravates hypothyroidism.

**ANALYSIS**

The purpose of this study was to find out whether or not there is a relationship between the quality of drinking water and the endemicity of goiter in Taiwan. A drinking water survey was conducted in 1971 to assess levels of chlorides, iodine, fluorides, magnesium, calcium, alkalinity, total residues, manganese, and iron. The 216 water samples, covering 30 townships taken from the hyper-endemic area, the meso-endemic area, the hypo-endemic area, and the non-endemic area were analyzed.

The authors note that total fluorine content in the water was found to have the tendency to increase with the endemicity of goiter. However, the water taken from the meso-endemic area was found to have the highest content of fluorine. Water fluoride levels ranged from trace levels to 0.73 ppm in the samples analyzed.

The authors present a review of the literature on fluorides and goiter, pointing out conflicting reports on the effects of fluoride on the thyroid gland. They draw no conclusions, however, relative to the effects of fluoride on the thyroid gland.

**REFERENCE #164**

(158 in 1983)


**REASON CITED**

The article is cited in support of the claim that fluoride aggravates hypothyroidism.
ANALYSIS

This article reviews various studies conducted by the author and others (primarily in South Africa) on the effects of higher than optimal levels of fluoride in drinking water on bone, teeth, and thyroid tissues. The author states that drinking water with as little as 1-2 ppm fluoride "may, in certain circumstances, cause serious disturbances of general health and especially of thyroid function and the process of calcium-phosphorus metabolism."

These conclusions appear to have been drawn from a brief and selective review of the literature--two references used by Steyn are editorials and several of his references are studies that examine effects of natural fluoride in water at levels much higher than U.S. EPA standards.

Steyn does not describe his research methodology nor provide significant quantitative data from his studies. Rather, he describes vague symptoms (pains in legs and back) experienced by selected individuals and families in Transvaal, S. Africa, who consume bore-hole water containing 10.0 ppm fluoride.

In the 20 years since this article was published, advances in bio-chemistry have resulted in revised theories about the effects of fluoride on thyroid function. The prevailing scientific view is that the consumption of optimally fluoridated drinking water does not impair thyroid function nor does it change the morphology and histological structure of the thyroid gland.
NOTE OF REFERENCES 165 - 177

References 165 through 177 are cited to support the claim that fluoride overdoses by means of food consumption among children and adults are now a concern.

These references are discussed individually on the following pages, but some explanatory information is presented here.

- Two articles (#166, 167) report questionable conclusions because of bias or poor methodology.
- Three references (#169, 170, 172) could not be located.
- One reference (#168) has no relevance to humans consuming optimally fluoridated water.
- Seven references (#165, 171, 173, 174, 175, 176, 177) are misinterpreted by the author of the "Lifesavers Guide".

National symposiums*, special commissions**, and more recent research*** have confirmed that dietary intake of fluorides has not increased significantly in recent years.

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REFERENCE #165
(#159 in 1983)

Fluoride Symposium, 143rd Annual American Association for the Advance­ment of Science (AAAS) Meeting (February 25, 1977).

REASON CITED

The document is cited to support the claim that fluoride overdoses by means of food consumption among children and adults are now a concern.

ANALYSIS

The book Continuing Evaluation of the Use of Fluorides is based on the symposium held at the meeting referenced in the "Lifesavers Guide". In the 315 pages there is only one chapter that deals with total fluoride intake. The discussion in Chapter 6 refutes rather than supports the assertion made in the "Lifesavers Guide". The author of the chapter states on page 156 under "Concluding Remarks":

"It has been shown that evidence of an increase in fluoride intake is based on faulty analyses. Data obtained with reliable methods show no indication of an increase in food, bone or urine concentrations as compared to 20 or more years ago. The amount of increase in total intake (based on urine values) that might have occurred and yet have escaped detection with the available data is less than 10%.

This is yet another example of how the author of the "Lifesavers Guide" misrepresents data favorable to the use of fluorides in an effort to support his claims.


REFERENCE #166
(#160 in 1983)


REASON CITED

This article is cited to support the claim that fluoride overdoses by means of food consumption among children and adults are now a concern.

ANALYSIS

Total fluoride ingestion and urine excretion by children in Marin County (California) were studied in 1973 before municipal water fluoridation. The sample size in this study is extremely small: only 17 sample diets were
evaluated and only 17 children had fluoride urine analyses performed. This author suggests the possibility that Marin County children consume adequate dietary fluoride without the addition of supplemental water fluoridation.

The author recognizes the limitations inherent in his small sample size and recommends future large scale studies on this subject. Since 1975 researchers have conducted large scale analyses on dietary fluoride intake. The American Dental Association and the American Academy of Pediatrics continue to encourage either water fluoridation or fluoride supplementation because the normal diets of children do not contain adequate levels of fluoride for proper development of teeth and bones.

It should be noted that the author of this article has been an outspoken opponent of fluoridation for many years. He is presently serving as the vice-president of a national antifluoridation organization.

REFERENCE #167
(#161 in 1983)


REASON CITED

The referenced section 5.1.1, "Fluoride Intake in Humans," is a literature review by Rose and Marier in which they discuss the possibility of fluoride overdoses through the food chain.

ANALYSIS

This document has been severely criticized by reviewers for several reasons:

1.) It is incomplete and skewed toward studies at the high end of the continuum.

2.) It is not balanced. Findings that did not support their position were editorialized, whereas supporting conclusions were not; i.e., no comment on their own 1966 study which either contained conversion errors (ppm to mgs) or assumed a daily consumption of 1 kg of canned food; or the early studies of Spencer that employed the colorimetric method which requires an omitted drying step and is not nearly as sensitive as the fluoride electrode.

3.) Rose and Marier appear to be unconcerned with numerous qualifying remarks by the quoted authors—i.e., "probably, are thought to be", "need more accurate detailed information", and "this result requires confirmation, but if it is correct..."

National symposiums and special commissions have confirmed that study data obtained with reliable methods show no indication of increased fluoride levels in food, bone, or urine concentration over the past 20 years or more.
REFERENCE #168
(#162 in 1983)


REASON CITED

This article is cited to support the claim that fluoride overdoses by means of food consumption among children and adults are now a concern. It is also cited to support the claim that heart damage and other complications might occur in babies who consume fluoridated liquids.

ANALYSIS

This reference contains the proceedings of an international conference organized, in part, by George Waldbott, M.D. (see pp. 344-345 of Waldbott's book, Lifesaver's Guide reference #4, for a description of the meeting). The pages referenced contain a paper by one of the two speakers invited to discuss the effects of fluoride on the heart.

The study is completely speculative concerning humans. The author fed albino rats food containing 5-375 ppm fluoride, with daily fluoride dosage calculated to range from .49 mg/kg body weight to 31.03 mg/kg body weight. A 50 kg human would have to drink 2 liters of 13 ppm fluoridated water daily to begin to ingest a dosage equivalent to the low fluoride group in this study. The author notes degeneration of heart tissue correspondingly proportionate to the length of administration and dosage of sodium fluoride.

U.S. cardiovascular disease mortality rates have decreased dramatically in the last 15 years. Furthermore, the American Heart Association formally endorses the practice of community water fluoridation.

REFERENCE #169
(#163 in 1983)

Burkov, T. and Burkova, T. Early morphological and some enzymochemical changes in the liver and oral mucosa under the effect of fluoride-containing waters. (Nauchno-Izsiedovateleskogo Instituta Stomatologii) 13:1-9, 1969.

This article could not be located through interlibrary loan, Chemical Abstracts Service, the National Library of Medicine, or the National Institutes of Health Library.
REFERENCE #170
(#164 in 1983)


This article could not be located through interlibrary loan, Chemical Abstracts Service, the National Library of Medicine, or the National Institutes of Health Library.

REFERENCE #171
(#165 in 1983)


REASON CITED

Although cited to support the claim that fluoride overdoses by means of food consumption are now a concern, this article presents a weak and biased case against fluoride use. The bulk of the article has no relevance to consumption of optimally fluoridated water, since it reviews symptoms of skeletal and dental fluorosis that may occur only when people consume water with naturally high levels.

ANALYSIS

The author reveals a fundamental ignorance of fluoride's effect on dental enamel and draws several illogical conclusions about systemic and topical actions of fluorides. Since this article was published, research has continued to substantiate the safety of fluorides.

REFERENCE #172
(#166 in 1983)


This article could not be obtained. Volume 61 was missing at both the National Library of Medicine and the National Institutes of Health Library.

REFERENCE #173
(#167 in 1983)


The authors assessed the fluoride contents of various commercially-processed baby food products. Contrary to the "Lifesavers Guide" allegation that this article expresses concern about fluoride overdoses, the authors' only concern is that some infant diets may contain inadequate dietary fluoride. Indeed, they refer to fluoride as an essential nutrient which may require supplementation for some infants' diets.
REFERENCE #174
(#168 in 1983)


REASON CITED

This article is cited in support of the claim that fluoride overdoses by means of food consumption among children and adults are now a concern.

ANALYSIS

The purpose of this investigation was to compare the occurrence and degree of enamel fluorosis in school children whose diets as infants have been dominated by either breast milk (B) or water-diluted dry-milk formulas (F). A total of 352 children in Uppsala, Sweden (.12 ppm F in the drinking water) were evaluated.

Average values of enamel fluorosis indices and numbers of mottled first permanent molars and permanent upper central incisors were calculated. No significant difference existed between the selected B and F groups. There was an insignificant trend towards increased enamel mottling in those F children who received water-diluted dry-milk formulas exclusively for at least nine months of their first year of life. To quote the authors:

"No health hazard thus seems to be involved."

*A second article on the same topic by the same authors is discussed under #175.

REFERENCE #175
(#169 in 1983)


REASON CITED

This article is cited to support the claim that fluoride overdoses by means of food consumption among children and adults are now a concern.

ANALYSIS

The authors attempt to determine if breast-fed children experience a lower fluorosis index than water-diluted formula-fed children. The study was conducted in two Swedish communities where natural levels of fluoride are 1.2 ppm and 5.5 ppm.
There was no statistically significant difference between the fluorosis index or DMFT (decayed, missing and filled teeth) rate of the breast-fed or formula-fed children in either area. In fact, the authors note that it is extremely improbable that even the increased fluoride levels from some dry milk formulas diluted with water containing about 1 ppm fluoride would involve any health hazards. They state:

"This is supported by health investigations of populations of school children in countries where dry-milk feeding has long been common; such investigations have not revealed any differences in skeletal development or other relevant parameters between communities with high and low water fluoride content."

This study does not support the statement that there are fluoride overdoses in the food chain.

*Another article on the same topic by the same authors is discussed under #174.

REFERENCE #176
(#170 in 1983)


REASON CITED

The article is cited as evidence of potential overdoses of fluoride through the food chain. This article is in Polish, although a summary is in English.

ANALYSIS

Article Summary: The fluorine level in brews of various types of marketed tea, coffee, and its substitutes, and certain herb teas was determined. The brews were prepared according to the prescriptions suggested by the producers on the labels.

Fluorine was determined in the brews by the potentiometric method using an ionoselective electrode.

The level of soluble fluorine ranged in tea blends from 52 to 210 mg/kg, in coffee blends and its substitutes from 28 to 72 mg/kg, and in herb teas from 16 to 60 mg/kg.

These investigations suggest that the daily requirements for fluorine are as a rule covered by the daily intake of tea and coffee. The intake of tea and coffee brews containing high amounts of fluorine can in certain cases lead to a threat to health.
In the summary as well as a table in the body of the article, teas and coffees are considered relative to mg F/kg of the substance to be brewed. Yet, once brewed, a 200 ml (7 oz.) cup only contained between .2 - .8 mg fluoride. Still, some very strong coffees/teas (name brands not commonly seen) could contain .6 - 1.4 mg fluoride per cup. If the strongest brew contained only 1.4 mg of fluoride per cup, then a lethal dose from any of these would require an adult to consume over 1,000 cups at one sitting! The author may have drawn inferences from the dry weight concentrations of fluoride in these beverages. This reference underscores the safety of fluorides because in our long history of tea and coffee consumption a "threat to health" from fluoride in these beverages has not materialized. There is no legitimate basis for the author's warning based on experimental or historical experience.

REFERENCE #177
(#171 in 1983)


REASON CITED

The article is cited as evidence of potential overdoses of fluoride through the food chain.

ANALYSIS

The author (Leverett) notes that intentional and unintentional use of systemic and topical fluorides are contributing to a decline in dental caries prevalence. He also notes that there appears to be an increase in very mild to mild fluorosis among children, since the original studies done by H.T. Dean. However, Leverett clarifies this statement by emphasizing the occurrence is so mild that "...this level of mottling from fluorosis is, for the most part, not discernible by the layman."

The author never infers that the intake of intentional and unintentional systemic and topical fluorides has the potential to pose a threat to health. He merely uses the information gathered for the article to make projections on recommended studies to monitor fluoride intake, to reassess optimal fluoride intake, and to assess directions needed relative to dental health research.
REFERENCE #178
(#172 in 1983)


REASON CITED

The article is cited as evidence that the American Dental Association admits that 1/2 mg fluoride supplements dispensed to children results in fluorosis.

ANALYSIS

Nowhere in the editorial does the author state that 1/2 mg fluoride supplements dispensed to children result in fluorosis. Actually, the focus of the editorial was the process of reaching a consensus among governmental groups, the American Dental Association (ADA), and the American Academy of Pediatrics (AAP) on appropriate dosage schedules for fluoride supplementation.

In 1979 the ADA's Council on Dental Therapeutics and the AAP's Committee on Nutrition published a revised dosage schedule that takes into account dietary fluoride intake among infants in fluoridated and nonfluoridated communities. The author of the editorial states that "on the basis of available data the Council's regimen is safe and effective, and that supplementation should begin at birth at a level of 25 mg/day."

This editorial is also cited as the source of a statement by Dr. Dennis H. Leverett that caries is declining in fluoridated and nonfluoridated areas. Nowhere in this editorial is there a reference to statements made by Dr. Leverett about declining caries rates.

This is a clear example of inappropriate and inaccurate referencing noted in much of this document.

REFERENCE #179
(#173 in 1983)


REASON CITED

This article is cited as evidence that: "...some have warned since 1949 that children under 6 should not consume water containing more than 0.7 ppm fluoride." This is the only source cited to support the statement.

ANALYSIS

In this article, the author recommends maximum fluoride levels of .7 ppm as a precautionary measure. This recommendation is based on a survey this physician initiated in a local New Mexico school district to assess dental fluorosis among children. The author identified what he considered to be from mild to moderate fluorosis among 28 children (N=90) drinking community
water containing natural levels of 0.9-1.0 ppm fluoride. Also, the author analyzed water samples from 14 children on well water (five with fluoride; nine without) and found that what he was identifying as fluorosis was noted in high percentages of children not consuming fluoridated water, as well as those who did (over 55% in each).

The author indicates a concern about optimum fluoride levels based on potential water consumption relative to locality climate. Since this article was published, several excellent studies have been conducted relative to determining optimum fluoride concentrations for the prevention of dental caries. Since the mid-1950's we have utilized data from D.R. Galagan, J.R. Vermillion, and others to establish safe fluoride levels based on environmental temperature and water consumption among children. In fact, the optimum fluoride level established for most of New Mexico is 0.8 ppm because of climate and water intake!

REFERENCE #180
(#174 in 1983)


REASON CITED

The author of the "Lifesavers Guide" claims he pointed out as early as 1974 (by means of this article) that heart damage as well as other complications might occur in babies drinking formulas with fluoride.

ANALYSIS

This four-paragraph article was indeed written by the author of the "Lifesavers Guide" and appeared in the bulletin of an antifluoridation organization. It contains no citations to the scientific literature. The author recommends that mothers of newborns use the infant formula SOYALAC, because it is made in an unfluoridated community. He also suggests dry formulas be mixed with low-fluoride spring water.

The author does not discuss heart damage or any other complications associated with fluoride ingestion, but concludes the article with a plea for contributions to a fund for antifluoridation efforts.
A common but erroneous claim often made by opponents of fluoridation is that: "No laboratory experiment has ever shown that 1 ppm fluoride in the drinking water is effective in reducing tooth decay." (p. 4 "Lifesavers Guide", 1982).

There are no laboratory studies on the effectiveness of fluoride at one part per million in preventing caries because that concentration has no discernible effect on the teeth of small animals used in dental research. Because these animals have shorter life spans, more rapid tooth development and maturation, and faster metabolic and excretion rates than humans, higher concentrations of fluoride (often 5 to 10 ppm) must be provided to them to produce caries preventive effects similar to those gained by children who regularly use water supplies with a fluoride concentration near 1 ppm. There are many studies on record done in laboratories using the higher concentrations appropriate for the animal species used that have clearly demonstrated the decay preventive benefits of fluorides in drinking water.

Furthermore, careful epidemiological research, including hundreds of clinical studies and field trials, has fully substantiated the safety and effectiveness of consumption of optimally fluoridated water by humans.

References #181 through #186 must be interpreted with this information in mind.

The article is cited to support the claim that fluoridation does not reduce tooth decay. The author of the "Lifesavers Guide" notes that this study was an "attempt" at a laboratory experiment demonstrating the effectiveness of 1 ppm fluoride in reducing decay. Actually, the primary purpose of the study was to examine the effect of alloxan diabetes on fluoride retention in rats.

Article summary: Three experiments were conducted to assess the influence of the alloxan diabetic state in rats on the ingestion and retention of water-borne fluorides and to re-evaluate whether the diabetic state increased the rate of dental decay in these animals.

The fluoride ingestion from the water supply in the diabetic animals was three to five times that of their control counterparts, by reason of the increased water consumption caused by the dehydration due to diuresis in uncontrolled diabetes. However, the fluoride retention in the femurs of these diabetics was only two to three times that of their control littermates, suggesting that the excretion of fluorides in diabetic animals had been enhanced.

The rate of dental decay in the diabetic animals, whether receiving fluoride supplements or not, was found to be statistically significantly increased in comparison with their control littermates, except at levels of 20 ppm fluoride.

Fluoride was not so effective in reducing caries in the diabetic animals at equivalent levels in the water as in intact animals, even though increases in the absolute ingestion of fluoride were involved.

Any increased fluoride intake due to diabetes in humans would be of short duration. Once proper diabetic control measures are taken, the increased intake would be within normal tolerance.

REASON CITED

The article is cited to support the claim that fluoridation does not reduce tooth decay. The author of the "Lifesavers Guide" notes that this study was an "attempt" at a laboratory experiment demonstrating the effectiveness of 1 ppm fluoride in reducing decay.

ANALYSIS

The primary purpose of this study was to determine pH levels of tooth surfaces, saliva, and carious lesions in vervet monkeys. Four groups of fourteen monkeys were fed various diets. Groups I and II were fed the same cariogenic diet, but group II had 10 ppm fluoride in the drinking water. Groups III and IV were fed the same natural diet high in detergent foods, but group IV had 10 ppm fluoride in the drinking water. After two years results were:

<table>
<thead>
<tr>
<th>Group</th>
<th>Cavity Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>21 cavities in 8 monkeys</td>
</tr>
<tr>
<td>II</td>
<td>18 cavities in 8 monkeys</td>
</tr>
<tr>
<td>III</td>
<td>1 cavity in 9 monkeys</td>
</tr>
<tr>
<td>IV</td>
<td>1 cavity in 5 monkeys</td>
</tr>
</tbody>
</table>

The authors make no conclusions about the association between fluoride consumption and caries incidence. The purpose of their research was to determine how the caries process in this species of monkeys was related to pH of the saliva and the tooth surface.

REFERENCE #183
(177 in 1983)


REASON CITED

The article is cited to support the claim that fluoridation does not reduce tooth decay. The author of the "Lifesavers Guide" notes that this study was an "attempt" at a laboratory experiment demonstrating the effectiveness of 1 ppm fluoride in reducing decay.

ANALYSIS

This article evaluates the advantages and disadvantages of using monkeys for caries research. The author, Dr. Bowen, discusses caging and handling of monkeys; the dentition, salivary composition, and bacteriology of the saliva of monkeys; and caries incidence in wild and captive monkeys. The article reviews much of the caries research on monkeys prior to 1968. The only mention of fluoride in this article is a reference to the study done by Ockerse and deJager, which is reference #182 in the "Lifesavers Guide".

This is another example of inappropriate referencing. The accepted practice in scientific writing is to use only the original research to support a claim, rather than a secondary source that refers to the original study.
REFERENCE #184
(#178 in 1983)

Hardwick, J.L. and Bunting, D.M. Effects of fluoridation of drinking water or of a cariogenic diet on caries experience of rats. Journal of Dental Research 50 (Supplement to No. 5):1212 (1971).

REASON CITED

The article is cited to support the claim that fluoridation does not reduce tooth decay. The author of the "Lifesavers Guide" notes that this study was an "attempt" at a laboratory experiment demonstrating the effectiveness of 1 ppm fluoride in reducing decay.

ANALYSIS

The research demonstrates that significant reductions in the numbers of dentinal carious lesions occurred with supplementation of 5 ppm sodium fluoride. Advanced dentinal lesions were reduced with 3 ppm fluoride. As would be expected, changes in the number of lesions were not significant with 1 or 2 ppm fluoride supplementation because that concentration has no discernible effect on the teeth of small animals used in dental research. (See note on references 181-186.)

It is clear that the author of the "Lifesavers Guide" has purposely ignored the classic human epidemiological studies proving the effectiveness of fluoridation and has cited more obscure, less conclusive studies.

REFERENCE #185
(#179 in 1983)


REASON CITED

The document is cited to support the claim that the U.S. Centers for Disease Control (CDC) admit that no laboratory experiment has ever shown that 1 ppm fluoride in the drinking water is effective in reducing tooth decay.

ANALYSIS

Contrary to the allegations attributed to CDC in the "Lifesavers Guide", the testimony presented in this document adequately explains why a higher than optimal concentration of fluoride is needed for rats vs. humans. Rat enamel maturation only takes 6 to 8 weeks, whereas the process in humans is not completed for 8 to 10 years—thus, a shorter amount of time requires a higher concentration to achieve similar results.
Later, in response to the same question, the author of the "Lifesavers Guide" alleges that no epidemiological studies on humans would meet the minimum requirements of scientific objectivity, i.e. blind or double-blind study design. The blind study argument regarding safety was addressed subsequently in the testimony, but a later question pertaining to efficacy was not pursued. This change in the line of questioning does not negate the numerous studies on caries reduction by the use of fluoride that are intrinsically free of any subjective bias, i.e., blind clinical examination of dental x-rays, blind clinical examinations for caries without prior knowledge of fluoride concentrations of drinking water, and the use of definitive objective criteria such as missing permanent first molars.

REFERENCE #186
(#180 in 1983)

Personal communication from J. Rogers, Chief Dental Officer, British Ministry of Health to John Yiamouyiannis, December 11, 1980.

This personal communication could not be obtained.

REFERENCE #187
(#181 in 1983)


REASON CITED

The article is cited to support the statement that "blind design is also necessary for the proper selection of a non-fluoridated area since the tooth decay rates among U.S. children living in some non-fluoridated areas are more than twice as high as those living in other non-fluoridated areas."

ANALYSIS

The purpose of this study was to evaluate the relationship between caries prevalence and the concentrations of a number of trace elements present in public water supplies in 19 communities in the eastern United States. The authors indicate a statistically significant correlation between caries prevalence and the concentrations of copper (Cu) and lead (Pb) in the water supplies (the higher Cu and Pb levels directly associated with increased caries prevalence).

This study contains no discussion of the need for blind design in caries research. In the introduction, the authors point out that caries prevalence fluctuated widely among 12-14 year olds who were life-long residents of the 19 low-fluoride towns in the study. There were, for example, 57% fewer carious teeth in Manning, South Carolina (0.1 ppm fluoride), with 3.9 DMFT per child than in Franklin, New Hampshire (0.1 ppm fluoride), with 9.0 DMFT per child.
The authors take care to note in the introductory paragraph that:

"Many studies in different countries have established that the addition of an optimal amount of fluoride to drinking waters substantially reduces the prevalence of dental caries."

They also note that the status of fluoridation as a public health measure is "unquestionable".

REFERENCE #188
(#182 in 1983)


REASON CITED

The article is cited in support of the claim that fluoride does not reduce tooth decay. The author of the "Lifesavers Guide" refers to this early work as showing that children consuming water with relatively small amounts of fluoride had less tooth decay than children consuming 1.5 ppm fluoridated water. This is a total misrepresentation of the study.

ANALYSIS

Actually, Dean reports that examinations of 236 nine year old children (in six U.S. cities) with verified continuity of exposure to water with varying fluoride levels showed that there was a higher percentage of caries-free children in those communities where domestic water supplies contain higher concentrations of fluoride in comparison with communities using waters of lower fluoride concentrations. This limited immunity to dental caries seemed operative with respect to the deciduous teeth as well as the permanent teeth.

Yiamouyiannis uses this study to support his claim only because one table in the study indicates a higher percentage of caries-free children (relative to permanent teeth only) in Pueblo, Colorado (0.6 ppm fluoridated water) and Junction City, Kansas (0.7 ppm) than in East Moline, Illinois (1.5 ppm). After reviewing the data in total, Dean legitimately concluded that fluoride reduces the incidence of dental caries, and the author of the "Lifesavers Guide" does a disservice to this reputable scientific researcher by selectively interpreting the data.

REFERENCE #189
(#183 in 1983)

The article is cited to support the claim that U.S. Public Health Service studies showed no difference in tooth decay rates between high and low fluoride areas in Texas.

A 10 year (1943-1953) study of two groups of people residing in Bartlett (8.0 ppm fluoride) and Cameron (0.4 ppm fluoride), Texas, was conducted to determine if prolonged use of excessive fluorides in a water supply was associated with physiological changes in body tissues. The oral aspects of this study were presented in this report.

One hundred and fifty-six participants, 76 in Bartlett and 80 in Cameron, were examined in 1943 and in 1953 for dental caries experience, gingivitis, dental fluorosis, and other types of oral conditions.

As expected, dental fluorosis was significantly higher in Bartlett than in Cameron. There was no significant difference in the amount of gingivitis, alveolar bone resorption, calculus, dental caries experience and other oral pathologies between the residents. The authors note that similar DMF (decayed, missing, and filled) rates in Cameron and Bartlett are explained by: 1) comparatively few continuous residents in the Bartlett study group; 2) a larger segment of the tooth mortality rate attributed to periodontal disease and causes other than caries in the Bartlett group; and 3) only about half as much access to dental care among the Bartlett residents.

Once again, the author of the "Lifesavers Guide" has selectively interpreted this data, ignoring the statement by the researchers that:

"If the teeth lost through periodontal disease and causes other than caries were excluded from the 1953 DMF rate, the caries experience of the subjects in Bartlett would be 33% lower than was that of the subjects in Cameron."


The article is cited to support the claim that fluoridation does not reduce tooth decay. The author of the "Lifesavers Guide" refers to this work in his statement that there is no difference in tooth decay rates between high and low fluoride areas in Arizona.
ANALYSIS

This is yet another example of incorrect and inappropriate scientific referencing. The research by Galagan, a U.S. Public Health Service regional dental consultant, was designed to determine the extent of dental fluorosis in 726 children in six Arizona communities served by water with varying concentrations of fluoride. Examinations were conducted to determine fluorosis classifications only. Absolutely no data were obtained to determine caries rates among the subjects in the six communities. Therefore, this study has no bearing on the statement made in the "Lifesavers Guide."

REFERENCE #191
(1/85 in 1983)


REASON CITED

This article is cited to support the claim that decay preventive effects originally attributed to fluoride "have since been ascribed to other waterborne minerals." (p. 5 of "Lifesavers Guide")

ANALYSIS

This article is primarily a review and discussion of clinical surveys and laboratory findings suggesting that certain elements, either alone or in conjunction with one another or with fluoride, could work to retard caries. The authors from the Eastman Dental Center in Rochester, New York, compared the spectrographic analyses of water from six Illinois cities with the DMFT (decayed, missing and filled teeth) figures and fluoride levels from a 1948 U.S. Public Health Service report. From this comparison they noted that the DMFT figures in these six cities were as closely related to levels of strontium and boron as they were to fluoride levels. From this comparison the authors suggest that decay preventive effects may be associated with the presence of strontium and boron in the water. Obviously, a major limitation in this comparison is the small (6) number of cities examined.

The authors do not suggest that fluoride is no longer associated with caries reduction, as the "Lifesavers Guide" attempts to imply.

REFERENCE #192
(1/86 in 1983)

REASON CITED

The author of the "Lifesavers Guide" implies that this study is improperly used to support fluoridation (this study indicates a marked reduction in dental caries experience among young children in Grand Rapids, Michigan, versus Muskegon, Michigan, after four years of fluoridation in the former city).

ANALYSIS

The "Lifesavers Guide" claims that Muskegon, Michigan, was dropped as a control city in this study because after five years it was observed that caries rates were comparable in both cities. This is not true. Caries rates in permanent teeth of 12-16 year olds in both cities were not dramatically different after four years of fluoridation because, as the authors point out, sufficient time had not elapsed to evaluate the older children. But among the 5 year olds who were examined 4 years after fluoridation began, Grand Rapids children had a 72.7% reduction in DMFT (decayed, missing and filled teeth) while Muskegon children experienced a 133.3% increase in DMFT in the same age group.

Muskegon fluoridated its water system in 1950 and for that reason had to be dropped as a control in the experiment.

REFERENCE 193
(187 in 1983)


REASON CITED

This article was cited as evidence that lifelong residents of fluoridated Grand Rapids had a caries rate equal to that of the national average, "...showing no decrease in tooth decay from fluoride." The author of the "Lifesavers Guide" uses this reference inaccurately and inappropriately.

ANALYSIS

In 1965, the National Center for Health Statistics (NCHS) conducted a health examination survey to estimate caries prevalence in U.S. children. Examinations were performed on 7119 six- to 11-year olds in 40 sampling units in the U.S. The mean counts of DMF (decayed, missing, and filled) teeth of the subjects in the NCHS survey were only slightly lower than mean DMF teeth in six- to 11-year olds in fluoridated Grand Rapids, Michigan, and other fluoridated communities. Corresponding DMF values from non-fluoride areas, however, were appreciably higher.

The author indicates that the reason for the underestimation of caries prevalence in the U.S. and the subsequent similarity in DMF values between Grand Rapids and the NHCS survey is that the NCHS figures are better estimates of caries prevalence in fluoride areas since half of the NCHS sampling units were in fluoridated communities.
The author of the "Lifesavers Guide" has conveniently ignored the con­clusion of this article which indicates that average caries rates in the U.S. would be higher than the rates in fluoridated communities like Grand Rapids.

REFERENCE #194
(#188 in 1983)


REASON CITED

This article is cited to support the claim that fluoridation neither reduces tooth decay nor reduces dental costs.

ANALYSIS

This is an article in the newsletter of the Safe Water Foundation which is headed by the author of the "Lifesavers Guide". The newsletter article contains a report of John Yiamouyiannis' testimony before a Scottish court in 1981. Yiamouyiannis describes a study conducted by the British Department of Health between 1955/56 and 1967, which shows equivocal results on the effects of fluoridated water on tooth decay. It appears as though Yiamouyiannis himself tabulated data from the study, but there is no way to be sure, since he fails to cite the author(s), title, and place of publication of the original research.

The Honorable Lord Jauncey made the following remarks in his verdict in the Scotland case:

"Dr. Yiamouyiannis, who played so prominent a part in this case, is undoubtedly a propagandist as well as a scientist...I was driven to the conclusion that he not infrequently allowed his hostility to fluoridation to obscure his scientific judgment."

REFERENCE #195
(#189 in 1983)


REASON CITED

This article is cited to support the claim that fluoridation does not reduce tooth decay.

ANALYSIS

This article describes results of a study made of 22,000 school children in rural regions off the coast of Denmark. The areas studied were on an island that had no organized public school dental service.
Only a small negative correlation between fluoride content of drinking water and caries incidence was shown. It is suggested that this is because most children who attended schools in towns with a water supply of optimal fluoride content were drinking water at home from private wells with deficient fluoride content.

**REFERENCE #196**  
(190 in 1983)


**REASON CITED**

This article was cited as evidence that in Ottawa, Kansas tooth decay rates increased by over 100 percent following fluoridation.

**ANALYSIS**

The researcher reports that after three years of a ten year study, DMFT (decayed, missing, and filled teeth) rates among five and six year olds in Ottawa, Kansas increased, despite controlled fluoridation. In 1946, approximately 100 children were examined and found to have an average DMFT of .25. In 1949, examinations of the same number of children (not the same children) of that age disclosed average DMFT rates of .67. The researcher offers no explanation and indicates that the ten year study would proceed as planned.

Some possible explanations for these results are: 1) teeth must be checked over at least a ten year period to show the full effects of controlled fluoridation on caries reduction; 2) the 5 and 6 year olds examined in 1949 probably had very few erupted permanent teeth, all of which would have been calcified during 1943-46—before fluoridation began in Ottawa, Kansas; 3) if the subjects were not lifelong residents of Ottawa, Kansas, fluoride levels where subjects previously resided would be a factor.

The results of this study are not in agreement with subsequent reports of decay rates in Ottawa, Kansas. In 1952, researchers reported that after four and one half years of fluoridation, children in Ottawa experienced up to 41 percent less decay than children in non-fluoridated Lawrence, Kansas, the control city.* Another study, published in 1965, compared decay rates in three fluoridated Kansas communities (Ottawa was one of them) with three non-fluoridated cities. Once again, clinical examinations of over 630 children showed that dental caries experience in 9-12 year olds was reduced by 50 percent in the optimally fluoridated communities.**


REFERENCE #197
(#191 in 1983)


REASON CITED

This article is cited to support the claim that Japanese investigators found a higher percentage of students with tooth decay in areas with fluoride levels of 0.5 ppm or more than in areas with 0.2 - 0.4 ppm fluoride.

ANALYSIS

This 52-page article contains a brief abstract in rather stilted English that provides only minimal information. Apparently the author conducted research in 491 Japanese cities, towns, and counties, obtaining 1,657 tap and well water samples involving 1,533 people.

Of the areas examined, 69.5% of the people were using water with a fluoride level below 0.099 ppm. The abstract then goes on to state that 150,000 people which amounted to 0.2% of the population involved in this research (?) were using water with a fluoride content greater than that specified by regulation, but the abstract does not indicate what this level is!

The author apparently determined "caries prevalence ratios" for individuals or groups served by these water sources, but the technic or methods used are not described in the abstract. The relationship between water fluoride levels and caries was determined as follows:

1.) If the fluoride level is 0.30 - 0.39 ppm, the caries prevalence ratio is 45.5%.

2.) If the fluoride level is below 0.20 ppm, the prevalence ratio increases rapidly.

3.) When fluoride levels are over 0.40 ppm, the prevalence ratio increases rapidly.

REFERENCE #198
(#192 in 1983)


REASON CITED

This article is cited to support the claim that Japanese investigators found a higher percentage of students with tooth decay in areas with fluoride levels of 0.5 ppm or more than in areas with 0.2-0.4 ppm fluoride.
ANALYSIS

A very stilted English abstract accompanied this article. The authors apparently were referring to higher caries prevalence in the areas where high fluoride (as much as 8.6 ppm) water is consumed. In areas where natural fluoride content of drinking water is excessive, severe mottling can occur. Pitting of the enamel in such cases can result in an elevated decay rate. At optimum levels, however, severe fluorosis and related problems of enamel...

REFERENCE #199
(#193 in 1983)


REASON CITED

This article was cited to support the claim that community water fluoridation is not effective. On page 5 of the "Lifesavers Guide", Dr. Sutton is quoted as saying: "The sound basis on which the efficacy of a public health measure must be assessed is not provided."

ANALYSIS

The quality of Philip R. N. Sutton's report and the conclusions he reached were criticized by James M. Dunning, D.D.S., M.P.H., Professor, Harvard School of Dental Medicine, in "Nutrition Reviews" (Vol. 18, No. 6, June 1960):

Dr. Sutton, a Senior Research Fellow at the University of Melbourne Dental School and apparently without field experience in the epidemiological study of fluoridation, has devoted himself to a critical analysis of the printed reports of the long-term pilot studies of water fluoridation made in Grand Rapids, Michigan; Evanston, Illinois; Brantford, Ontario; and Newburgh, New York. The result is pure destructive criticism. A few errors and omissions are pointed out which might have been avoided. There are two or three valuable suggestions for future pilot studies of a similar nature. The bulk of Sutton's material, however, comprises criticism of a minor or irrelevant nature with no attempt to appraise the large positive accomplishments and extraordinarily comparable results of the four fluoridation projects...

Sutton was technically within his rights in confining his volume to destructive criticism, but the tragedy is that his work will be read by a public often unable to appreciate its defects or learn in detail the other side of the case. Worst of all the book will be used by unprincipled agitators to arouse fear in citizens' groups where fluoridation is up for community decision.
Assessment of the pertinent literature on this subject indicates that over 100 evaluatory surveys, conducted for periods of 10-22 years, have demonstrated beyond doubt the effectiveness of community water fluoridation.* No public health measure has been subjected to more scientific scrutiny. Virtually all reputable health organizations in the world endorse the effectiveness of fluoridation. Therefore, the reader is advised to carefully weigh the opinion of a single anti-fluoridationist 25 years ago against the voluminous scientific evidence to the contrary.

*U.S. Public Health Service, Centers for Disease Control, Dental Disease Prevention Activity, Evaluatory surveys of long-term fluoridation show improved dental health. No. FL-109, Atlanta, CDC, March 1979. i+8p.

REFERENCE #200
(#194 in 1983)


REASON CITED

This article was cited to support the claim that community water fluoridation is not effective. On page 5 of the "Lifesavers Guide", Dr. Sutton is quoted as saying: "The sound basis on which the efficacy of a public health measure must be assessed is not provided."

ANALYSIS

The above quote was taken by Sutton from his 1959 publication on errors and omissions in experimental trials, discussed in "Lifesavers Guide" reference #199. Sutton refers to the above quote twice (p. 78 and p. 92) in this 1979 report, which is a personal submission to the Committee of Inquiry into the Fluoridation of Victorian Water Supplies. Self-published in 1980, the document relies heavily on newspaper accounts, innuendo, and statements taken out of context.

The comments regarding "Lifesavers Guide" reference #199 hold for this reference as well.

REFERENCE #201
(#195 in 1983)


REASON CITED

This reference is cited in the "Lifesavers Guide" to support the claim that the United States is one of the most fluoridated countries in the world and yet has one of the world's highest tooth decay rates.
ANALYSIS

The article presents no such comparisons. Rather, it reports on the prevalence of dental disease in this country and the need for a greater emphasis on prevention, nutrition and dental care. Despite the "Lifesavers Guide" claim, fluoride is not even mentioned.

A recently published, national caries prevalence survey* has reported a remarkable decline in caries in U.S. children. Scientists from the National Institute of Dental Research note that "there has been no apparent decrease in decay-causing bacteria or in the consumption of sugar; however, teeth have become more resistant to caries." These researchers credit the decline in tooth decay to the more widespread use of fluorides, and specifically the increased number of community water fluoridation programs.

The World Health Organization has recently noted an alarming increase in caries prevalence in many developing countries. They indicate that epidemiological investigations suggest that the most important factors that encourage the rapid appearance of caries are "the composition of food (increased consumption of sugar) and lack of fluoride in the drinking water."**

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References 202 through 208 are cited to support the claim that proper diet and not fluoridation is necessary for good dental health.

These references are discussed individually on the following pages, but some explanatory information is presented here.

Opponents of fluoridation often use the illogical ploy that little or no caries experience among members of some primitive societies in low fluoride areas proves that there is no need for the use of fluorides for caries prevention. Another illogical argument is that high caries rates among members of societies in high fluoride areas prove that fluorides are ineffective. And finally, opponents of fluoridation make the suggestion that steps to control the dietary consumption of refined carbohydrates will result in reduced decay and serve as an alternative to fluoridation.

Proponents of fluoridation have consistently stressed for over 40 years that proper diet AND fluoridation are essential for optimum dental health. Neither measure in and of itself will eradicate dental disease.
REFERENCE #202  
(#196 in 1983)  


REASON CITED  

This article is cited to support the claim that in primitive societies "80-90% of the people go throughout life without tooth decay—not because the fluoride level in their drinking water is low [sic], but because their consumption of refined carbohydrates, such as white sugar, is extremely low."

ANALYSIS  

This article describes the relatively caries-free status of the Otomi Indian tribe in Mexico and discusses the possible contributing factors. The authors point out that the dental health status of the Otomi's cannot be ascribed to oral hygiene, a balanced diet, to genetic or climatic influences, or to fluorides in the water, but solely to their food habits. The conclusion reached by the authors is not based on the absence of refined carbohydrates but rather the high range of stress loads applied to the teeth from infancy, by means of cracking bones and nuts.

This reference has relevance only to those individuals who choose to move to Mexico, join the Otomi tribe, and apply great stress loads to their dentition.

REFERENCE #203  
(#197 in 1983)  


REASON CITED  

This article was cited to support the statement that the Bedouins in Israel go through life without tooth decay not because of fluoride level in the drinking water but because their consumption of refined carbohydrates is low.

ANALYSIS  

This article reports the results of a survey conducted in 1963 of Bedouins in Israel which demonstrated a low DMF (decayed, missing, and filled) rate. The authors attribute the low rate to low consumption of refined carbohydrates, due to strict adherence to Islamic diet, and consumption of highly detergent foods which cause attrition, thus reducing pits and fissures available for plaque accumulation and caries formation in the molars. The author of the article points out that although fluoride is high in the wells of Negev (where the survey took place), the fluoride content of the water sources from which the Bedouins derived their water was not measured.
REFERENCE #204
(198 in 1983)


REASON CITED

This article is cited to support the claim that low caries rates in Nigerians are attributable to low refined carbohydrate intake, not fluoridated water.

ANALYSIS

This article reports the results of a survey conducted in 1964 of urban and rural Nigerians. The survey showed that nearly 97% of Nigerians of lower socio-economic status were caries-free. Of the wealthier Nigerians who consumed higher amounts of refined carbohydrates, only 67.5% were caries-free, demonstrating that when diet is altered, caries experience increases. Although 5.1% of children exhibited enamel fluorosis, the fluoride concentration in the water was less than 1 ppm. The authors suggest that fluoride was not instrumental in the lower caries rate.

It would be interesting to study the current caries rates of Nigerians, because as countries become more highly developed, refined carbohydrate consumption and caries rates increase.

REFERENCE #205
(199 in 1983)


REASON CITED

This article is cited to support the claim that proper diet—and not fluoridation—is necessary for good dental health.

ANALYSIS

The author does not substantiate the claim that it is proper diet—not fluoridation—that is necessary for good dental health. Rather, the author reports that, despite a more cariogenic diet than in the past, young aborigines are experiencing a slight improvement in their dental caries rate. Fluoride is suggested as a possible factor.

Proponents of fluoridation have consistently stressed for over 35 years that proper diet AND fluoridation are necessary for good dental health.

REASON CITED

This study is cited to support the claim that proper diet—and not fluoridation—is necessary for good dental health.

ANALYSIS

The author examined the dietary habits and caries experience of several Arabian, Italian, and Egyptian communities. Despite their high fluoride intake, the inhabitants exhibited extensive dental caries, attributable to refined carbohydrate consumption, nutritional acids, and, possibly, the presence of Escherichia coli in the oral flora. Optimum fluoridation cannot be considered ineffectual, however, since these populations consumed excessive concentrations. At such levels, as high as 14 ppm, fluoride can indeed demonstrate reduced efficacy.

REFERENCE #207
(#201 in 1983)


REASON CITED

This study is cited to support the claim that proper diet—and not fluoridation—is necessary for good dental health.

ANALYSIS

There is no mention of the subject of diet in this article. Instead, the authors describe in vitro comparisons of extracted carious and non-carious teeth and the fluoride content of each. There is only speculation as to the fluoride histories of the individuals from whom these teeth were obtained. No conclusions were drawn concerning the preventive effects of either proper diet or fluoride.

This is another example of inappropriate scientific referencing, noted in much of this document.

REFERENCE #208
(#202 in 1983)

REASON CITED

This article is cited to support the claim that proper diet—and not fluoridation—is necessary for good dental health.

ANALYSIS

Once again, the author of the "Lifesavers Guide" has misrepresented these data. One-hundred thirty-six caries resistant (no history of tooth decay) naval recruits, aged 17-23 years, were surveyed regarding previous exposure to fluoridated water. A total of 112 or 82.4% of these men had some exposure to fluorides in drinking water, both natural and/or controlled, prior to entry in the service. Only 24 or 17.6% had no known exposure.

An interesting finding was that 76 recruits or 55.9% developed one or more carious lesions during their first year of military experience. No significant correlation was established between caries experience of the subjects during that year and previous fluoride exposure. The author indicates that what appears to happen is that "the individual who lives in a high fluoride and generally low caries environment, becomes susceptible when he leaves his protective environment." The author also points out that the microbiosis of the mouth changes among those who develop carious lesions.

The author refers to the fact that dietary changes may play a part in caries incidence, but explains that the number of subjects is too small for statistical evaluation. He notes that among caries resistant recruits there are some who frequently eat sweets and yet remain caries free.

Other researchers have looked at the caries experience of caries-free naval recruits. H.J. Keene and colleagues performed a 12 year survey on over 657,893 recruits at the Great Lakes Naval Training Center and noted that "the prevalence of caries-free men...was found to correlate...with the availability of natural fluoride in the public water supplies of 44 states."

References 209-213 are cited to support the claim that studies have reported a 50% decrease in tooth decay rates in non-fluoridated areas.

Indeed, researchers and practitioners in developed countries are observing a secular decline in caries rates in both fluoridated and non-fluoridated areas. This trend is explained, in part, by the availability of both topical and systemic fluorides.

Since lower caries rates are a result of the widespread use of fluoride products and fluoridated water, it would be illogical to discontinue their use.

It should also be noted that in many developing countries, where access to refined carbohydrates have increased and availability of topical and systemic fluorides is minimal, caries rates have increased at alarming rates.

REASON CITED

This study is cited to support the claim that U.S. studies have reported a 50% decrease in tooth decay rates in nonfluoridated areas.

ANALYSIS

An epidemiological survey was conducted of randomly selected school children from Boston (N=1936) and the surrounding suburban communities (N=2493). A comparison of the preliminary findings to those of nearly 30 years ago suggests a decline in caries prevalence of 40-50%. The authors indicate that the decline cannot be attributed to water fluoridation and seems too large to be explained trivially, e.g. because of differences in diagnostic standards. This phenomenon is discussed in the light of survey data obtained through mailed questionnaires and U.S. Department of Agriculture data relative to the consumption of cariogenic sweeteners over the last 30 years.


REASON CITED

This article was cited to support the claim that studies from the United States have reported up to a 50% decrease in tooth decay rate in non-fluoridated areas.

ANALYSIS

This article supports the statement that there has been a 50% decrease in dental decay from 20 years ago in two Massachusetts towns. It also points out that the decrease coincides with the increase in the use of fluoride products (including supplements and dentifrices).

REASON CITED

This article is cited to support the claim that studies conducted in Australia have reported a 50% decrease in tooth decay rates in non-fluoridated areas.

ANALYSIS

This article describes the results of a survey that showed a 50% reduction in dental decay experienced by children in selected cities in Australia compared to their counterparts in 1954. The authors point out that fluoride supplements played a major role in the reduction observed.

REFERENCE #212
(#)206 in 1983


REASON CITED

The article is cited to support the claim that there has been a 50% decrease in tooth decay rate in non-fluoridated areas in New Zealand.

ANALYSIS

This article shows a decrease in dental caries of a representative population of five year olds in New Zealand as compared to their counterparts 27 years ago. The author attributes this decrease to increase in fluoridation of water supplies throughout New Zealand and the use of fluoride supplements in non-fluoridated areas.

REFERENCE #213
(#)207 in 1983


This report could not be obtained through interlibrary loan.
These nine articles have been cited by the author of the "Lifesavers Guide" as evidence of the danger of fluoride "spills" due to malfunctioning fluoridation equipment. The author of the "Lifesavers Guide" goes on to state that "spills have occurred in other places and are probably occurring in every fluoridated area but are not being reported." This is not true.

According to the Centers for Disease Control in Atlanta, Georgia, only 17 overfeeds have been documented in 35 years of fluoridation involving over 7,000 water systems: 12 caused by equipment malfunction and five by human error. Two should not have been reported, since they did not exceed the federal Environmental Protection Agency standard of two times the optimum. In three of the incidents, the fluoride level never exceeded natural fluoride levels found in this country.

As regrettable as these few incidents are, the rareness of the occurrence and the mild transitory nature of the resulting illnesses from drinking the water continue to substantiate that fluoridation enjoys a wide margin of safety.

REASON CITED

This article is cited to support the claim that 50,000 people were poisoned and an estimated 10,000 people exhibited acute symptoms of fluoride poisoning in Annapolis, Maryland.

ANALYSIS

The reference describes a fluoridation accident in Annapolis, Maryland, resulting from operator negligence and inadequate water system design. Despite antifluoridationists' claims of severe and widespread illness following the incidence, an official investigation found no indication of any such outbreak. The allegation that 10,000 persons experienced acute illness is grossly exaggerated, since surveys of prison dispensary visits, mortality rates, and intensive and cardiac care admissions indicate no marked increases during the period of the accident.

Thirteen individuals working near the treatment plant reported experiencing mild illness shortly after the overfeed, as compared to three reports of illness during the week before. None sought medical attention; all recovered quickly. A thorough review of hospital records revealed no increase in acute-care admissions, nor did local school absenteeism rise.

Interestingly, the water system only serves 40,000 persons, so it is hard to believe the author of the "Lifesavers Guide" when he states that casualties reached 50,000!


REASON CITED

The article is cited in support of the claim that 50,000 people were poisoned and an estimated 10,000 people exhibited acute symptoms of fluoride poisoning in Annapolis, Maryland.

ANALYSIS

This report does not substantiate the claim. The fluoridation accident was carefully investigated, determining multiple causes for the episode. The report indicates that there was one associated death and seven ill dialysis patients as a result of the accident. The engineering design of
the water treatment plant, allowing soluble chemical wastes to be recycled with raw water, as well as failure of the dialysis unit to remove fluoride and other negative ions from the dialysis water, were major contributing factors to the incident.

Interestingly, the water system only serves 40,000 persons, so it is hard to believe the author of the "Lifesavers Guide" when he states that 50,000 persons were poisoned.

The field investigation report states:

"Through a series of surveys, it seemed evident that any illness caused by the drinking of overfluoridated water was not severe enough for the residents (of Annapolis) to visit the local emergency room or a large pediatric clinic. Children were not absent from school to any marked degree..."

Surveys of prison dispensary visits, mortality rates, and intensive and cardiac care unit admissions indicate no marked increases during the period of the accident.

Modifications were made in the fluoridation system to prevent a recurrence.

REFERENCE #216
(#210 in 1983)


REASON CITED
This article is cited in support of the claim that 50,000 people were poisoned and an estimated 10,000 people exhibited acute symptoms of fluoride poisoning in Annapolis, Maryland.

ANALYSIS
This article presents a leading antifluoridationist's description of the Annapolis, Maryland, fluoridation accident. His study of illnesses following the incident contains serious design flaws and unsubstantiated conclusions. In the past, this author has conceded that he diagnosed illnesses without seeing the patients, attributed symptoms to fluoridation even in non-fluoridated areas, and flatly rejected independent evaluations of his study cases. In this report, he used telephone interviews and questionnaires to gather information some time after the incident. Despite the lack of clinical examinations, hospital records, laboratory tests and even direct contact with the individuals, Waldbott claims that the array of reported symptoms were the direct result of fluoride ingestion. His findings are inconsistent with actual hospital and school medical records which failed to show any increase in illness.
REFERENCE #217
(#211 in 1983)


The report describes the mechanical failures of a rural grammar school fluoridator which resulted in an overfeed. Students and teachers experienced nausea and vomiting when they drank the 125 ppm fluoride concentration. Complete recovery occurred within 60 minutes. There were no other symptoms, nor was anyone hospitalized. This is consistent with the observation that the fluoride ion is rapidly absorbed from the gastrointestinal tract and excreted in the urine. To avoid a recurrence, improved monitoring of the equipment was recommended.

REFERENCE #218
(#212 in 1983)


REASON CITED

This inadequately-referenced document is cited relative to a fluoride "spill" in Rome, Pennsylvania.

ANALYSIS

John R. Clark, D.D.S., Chief Public Health Dentist, Pennsylvania Department of Health, was contacted concerning this reference. He could not locate any pertinent correspondence of June 6, 1972, from the Department of Environmental Resources.

Information provided concerning this incident indicates that in June, 1972, approximately 150 of 600 children attending a school picnic at the Northeast Bradford Elementary School in Rome, PA, experienced vomiting with no incidence of fever and no subsequent illness. Chemical analysis of the water showed 67 ppm fluoride; Koolaid tested showed 4.5 mg/1 copper. The fluoride source was traced to the school well. The operator of the school water supply had independently chosen to run the fluoride feeder after he had shut off the water supply.

REFERENCE #219
(#213 in 1983)


The article reports a fluoridation overfeed in Marin County, California. The "Lifesavers Guide" states that attempts were made to cover up the incident; however, the article fails to support this claim. The maximum fluoride concentration reached during the incident was 4.1 ppm, a level consumed regularly in many naturally fluoridated communities and fluoridated...
school water systems. Since the concentration remained below 5 ppm, formal health department notification was not required. Nevertheless, the author of the "Lifesavers Guide" interprets the lack of notification as an attempt to "cover up" the incident.

REFERENCE #220
(#214 in 1983)


The malfunction of an elementary school fluoridator relay switch resulted in an overfeed of as much as 375 ppm fluoride in a New Mexico elementary school. Approximately 16% of the staff and students experienced gastrointestinal upset. The symptoms were reported as "extremely mild" and of short duration. The authors emphasize the rarity of such incidents and their inconsequential effects. They further underscore the profound benefit from fluoridation as the cornerstone of modern dental health.

REFERENCE #221
(#215 in 1983)


REASON CITED

This article is cited as evidence of a fluoride spill due to malfunctioning fluoridation equipment resulting in acute fluoride poisoning.

ANALYSIS

The article reports an overfeed incident at the Jonesboro school, where a number of persons experienced nausea, vomiting, and abdominal cramps. All persons received hospital monitoring tests and "were later released with no further ill effects." This information is confirmed in a report by the Maine Office of Dental Health and the U.S. Centers for Disease Control with the following clarifications. This report reveals that some teachers consumed the high level of fluoride in coffee brewed with school water, while most school children refrained from consuming the water due to a bitter taste. The teachers experienced nausea but all persons were given ipecac which leads to nausea and vomiting; therefore, the actual nausea and vomiting due to fluoride consumption is unknown. No further illness was noted once the effects of ipecac dissipated.

The problem at the school was due to a malfunctioning antisiphonage device used for the fluoridation system. This device was redesigned by the company and such devices were replaced in all fluoridated schools. Also, on-site monitoring at fluoridated schools has been restructured so that sampling is done each morning before the school day begins.

The authors report on the mechanical failure of a fluoridator feed pump which resulted in the transient illness of four individuals in Harbor Springs, Michigan. Although as much as 2400 ppm fluoride reached nearby residences, no other persons became ill. A community-wide telephone survey and a review of hospital admissions and emergency room records failed to identify any other fluoride-related illness. The four affected individuals recovered without incident. Modifications were made on the fluoridation equipment to prevent a recurrence.
NOTE ON REFERENCES 223 - 231

References 223 through 231 are reports of studies, symposia, and literature reviews regarding the essentiality of fluoride.

The question is really one of semantics. As the following pages indicate, most researchers consider fluoride essential for proper development of bones and teeth. Whether it is essential for reproduction, growth, and other body functions has been difficult to determine because of the difficulties in developing a totally fluoride-free diet.

What becomes clear in reviewing these references is that the author of the "Lifesavers Guide" has very selectively interpreted the literature.
REFERENCE #223
(#)217 in 1983)


REASON CITED

This article is cited in support of the claim that fluoride is not an essential nutrient.

ANALYSIS

The authors state in chapter 5, "Is Fluorine an Essential Element?", that unequivocal evidence that fluorides perform any vital function in animals has not been produced yet. They note: "There is no doubt that an increase in the fluoride intake of the population in most parts of the world does result in a decrease in incidence of dental caries in that population." The authors indicate, however, that that benefit in itself is not a sufficient indication of essentiality.

The authors also outline the difficulties in developing diets that are sufficiently low in fluoride to determine essentiality. They state that it cannot be definitely concluded from rat experiments that fluoride is non-essential since different results might be obtained if it were possible to produce diets still lower in fluoride. But they note that it is "nevertheless apparent that, if fluoride is a dietary essential for the species studied (rats), its requirement must be extraordinarily low." 

*This document is also cited in "Lifesavers Guide" references #1 and #24.

REFERENCE #224
(#218 in 1983)


REASON CITED

The article is cited as evidence for the claim that fluoride is not an essential nutrient.

ANALYSIS

The researchers prepared a substantially fluorine-free diet and observed the growth, reproduction, caries rate, and general well-being of 110 rats through four generations. There was no indication of differences between fluoride deficient rats and control rats which were given the same diet plus 2 ppm fluoridated water. The authors indicated:
"Thus it is justifiable to conclude that under some conditions fluorine may not have any value in nutrition or even in the maintenance of dental health. Concerning dental caries, it should be noted that the experimental diet was sugar free and it was not conducive to impaction of food in the fissures of the teeth." (emphasis added)

The experimental diet was not only non-cariogenic, but it was also unrealistic to expect human beings to consume such a diet. No wonder the experimental rats were caries-free!

The authors note in the summary of the research report that the value of fluorine in the body is in the promotion of resistance to dental caries.

REFERENCE #225
(#219 in 1983)


REASON CITED

This article was cited in support of the claim that fluoride is not an essential nutrient, since as many as four generations of rats on fluoride-free diets show "no difference in general health, dental health, or weight gain."

ANALYSIS

The researchers make no specific claims concerning fluoride essentiality and do not indicate whether body weights, general health, and dental health are significantly different among the three groups of rats.

Article Summary: Soybean and grain sorghum grown hydroponically under minimal fluoride conditions, using recrystallized nutrient salts, were used to prepare a rat diet, containing <0.005 ppm F. Weanling Sprague-Dawley rats were fed: I - minimal fluoride diet, II - minimal fluoride plus 2 ppm F as NaF and III - field-grown soybean-sorghum diet (2.67 ppm F). Whole carcass fluoride analyses on the pups at the start of the study yielded an average value of 0.72 ppm.

At the end of the ten-week treatment period, the average body weights were: I - 267.8, II - 251.4 and III - 277.7 gm and the tibia and fibula bones contained an average fluoride level in ppm of: I - 2.92, II - 34.68 and III - 12.54.

Serum enzyme studies showed a significant (21.7%) increase in isocitric dehydrogenase activity of rats fed diet I, while no differences in alkaline or acid phosphatases, lactic dehydrogenase, or glutamic-oxalacetic and glutamic-pyruvic transaminases were observed.

Reason Cited

This document is cited in support of the claim that fluoride is not an essential nutrient since "rats on diets with virtually no fluoride (0.005-0.007 ppm fluoride) have lived through as many as four generations with no difference in general health, dental health, or weight gain."

Analysis

The authors of this study examined three groups of five female mice each: one group had a low-fluoride diet of hydroponically grown grain; the second group had the same diet plus 6 ppm fluoride; and the third group was a control group fed field-grown ingredients. There were no significant differences observed between the low-fluoride and 6 ppm fluoride-treated mice through four to six generations, except for femur fluoride levels, which were significantly higher in the 6 ppm fluoride-treated mice.

Interestingly, this same study could be used as evidence of the safety of fluoride, since the researchers compared the groups on the following parameters and found no significant differences:

1. Third week body weights (6 generations)
2. Feed intake per mouse per day (6 generations)
3. Femur citric acid levels (4 generations)
4. Small intestinal lipase (4 generations)
5. Number of mice born in each litter (4 generations)
6. Number of mice weaned (4 generations)

In the discussion section which follows the paper (p. 708) it is indicated that the rats were fed a low-fluoride diet (not a fluoride-free diet) containing 0.2 ppm fluoride; this is more than the 0.005-0.007 ppm fluoride level referred to in the "Lifesavers Guide".

REFERENCE #227
(#221 in 1983)

REASON CITED

The author of the "Lifesavers Guide" claims that this study (as well as reference #228), which shows that fluoride is an essential nutrient, has been refuted. In reviewing references #229-231, this cannot be concluded.

ANALYSIS

The authors found that fluorine is required for growth in rats. The growth promoting effect of 2.5 ppm fluoride, supplied as potassium fluoride (KF-2H₂O) was consistent in 10 successive isolator experiments.

Rats receiving fluoride were generally better developed, as shown by their dimensions and from skeletal x-rays. Significant improvements of tooth pigmentation were produced by fluoride supplement, as measured on a standardized color scale on the 26th day of the experiments. The data shows that fluorine is required for growth of rats on highly purified amino acid diets containing very low levels of the element.

The metabolism of fluorine in mammals presents several features which support the concept that it is essential. The authors reviewed the literature and list the normal fluorine content in the following mammalian tissues:

- Blood plasma - 0.1 - 0.2 ppm
- Teeth and bone - 100-600 ppm
- Embryo and newborn: vertebrae and ribs - 50-150 ppm
- Milk - 0.1-0.2 ppm of wet weight
- Liver, heart, kidney and brain - 2-5 ppm of dry weight.

The authors state that their data show fluorine is essential for overall growth and development. The element may fulfill a specific metabolic function in tissues. Adenyl cyclase, the primary mediator of hormone effects in tissues, is activated by fluoride.

This article included an addendum that contained the following statement:

"...other investigators have found a marked impairment in fertility of female mice maintained on a low-fluorine diet...The condition was prevented by 50 ppm of fluorine in the drinking water."

REFERENCE #228
(#222 in 1983)

REASON CITED

The author of the "Lifesavers Guide" claims that this article, which shows that fluoride is an essential nutrient, has been refuted. The author of the "Lifesavers Guide" incorrectly cited this article. Volume 103 is from 1973, not 1976 as indicated in the bibliography.

ANALYSIS

The reference cited has absolutely nothing to do with fluoride.

REFERENCE #229
(#223 in 1983)


REASON CITED

This document is cited to support the claim that studies showing that fluoride is an essential element have been refuted.

ANALYSIS

The author of the "Lifesavers Guide" actually references only pages 436-437 of this document, which consist of the discussion following presentation of the paper noted above by Messer, et al.

Researchers Messer, Armstrong, and Singer discuss the many criteria which must be met to classify an element as essential. "Very few essential trace elements have been shown to satisfy all of these criteria," they state, "and fluoride is no exception." Yet they conclude:

"A deficiency state has been demonstrated in animals with a restricted fluoride intake, characterized by retarded growth rates, infertility, and anemia. These signs of deficiency are relatively nonspecific (with the possible exception of the anemia), and a specific biochemical lesion accompanying these signs has not been identified. The demonstration of a deficiency state, and its prevention and cure by fluoride alone, justify the tentative inclusion of fluoride in the list of essential trace elements."

The author of the "Lifesavers Guide" conveniently ignores this research and has chosen to cite as his "proof" the two-page discussion of this paper among participants at the symposium, one of whom states: "Because of this, I think that it is premature to call fluoride essential at this time."
W. Suttie, University of Wisconsin, p. 436). However, in the same discussion another participant states, "I don't think any of the other agents which we have tested will substitute for fluoride. Therefore, from that point of view, I think the criterion of essentiality is fulfilled." (Klaus Schwarz, Long Beach, p. 437).

REFERENCE #230
(#224 in 1983)


REASON CITED

The article is cited to support the claim that studies showing that fluoride is an essential element have been refuted.

ANALYSIS

Selected excerpts from this study:

"A beneficial function of fluorine has been known since the late 1930's when it was discovered that the fluoride ion can play a significant role in the prevention of human dental caries."

"Epidemiological studies have shown that there is substantially less osteoporosis in some high-fluoride areas than in low-fluoride areas. Apparently, fluorine is not only beneficial for the maintenance of teeth, but also for the maintenance of a normal skeleton in the adult."

"If an essential element were defined as one which has a beneficial effect on health and well-being, under the usual conditions in which individuals live, then in light of the above evidence, fluorine would be considered an essential element in human nutrition."

"Clearly more research will be necessary before it can be stated that fluorine is essential for growth. At present, a requirement for fluorine cannot be estimated. However, 1 to 2 mg/g of diet appears beneficial."

"An important source of fluorine is drinking water. On the basis of the above experimental studies in animals and studies in man with osteoporosis, it seems possible that fluoridation of city water supplies is beneficial in ways other than in the prevention of caries."

"To date, (fluorine) has not been shown essential for man. However, from animal data, it seems probable that (it) has an essential function in human nutrition and metabolism."
In 1969, the National Research Council determined fluoride to be "an essential dietary ingredient." This position was reaffirmed in 1980 based on numerous studies which show that fluoride is essential for the proper development of bones and teeth.

REFERENCE #231
(#225 in 1985)


REASON CITED

The article is cited to support the claim that studies showing that fluoride is an essential nutrient have been refuted.

ANALYSIS

Selected excerpt from this study:

"The results of the present study suggest that the apparent essentiality of fluoride previously observed was due to a pharmacological effect of fluoride in improving iron utilization in a diet marginally sufficient in iron. The data does not support the previous claims of an essential role of fluoride in reproduction.

The results of this study have failed to confirm an earlier report that fluoride in the material diet is essential for reproduction in the mouse."

REFERENCE #232
(#226 in 1983)


REASON CITED

This article is cited to support the claim that fluoride at 3 ppm and at other levels has been found to depress growth in farm animals.

ANALYSIS

This Russian study contains no English abstract. The title alone leads one to conclude that the results have little relevance to consumption of optimally fluoridated water by humans.

Reason Cited

This article is cited to support the claim that fluoride at 3 ppm and at other levels has been found to depress growth in farm animals.

Analysis

The study was undertaken to determine the effect of normal and elevated fluoride levels (30, 150, 450 ppm) in conjunction with two calcium levels on growth and reproductive performance of swine.

Fluoride at levels of 150 ppm did not significantly affect the growth rate of the pigs, but 150 ppm fluoride with low calcium level may be close to the maximum safe amount for the animals. The researchers found this level of fluoride (as sodium fluoride) exceeds the safe limit for pigs for maximum growth. Fluorides less soluble than sodium fluoride would be expected to be tolerated at somewhat higher levels.

The data concerning reproduction are inconclusive. Sows receiving as much as 450 ppm fluoride consumed enough feed for an apparently normal four-week lactation.

These results have no relevance to consumption of optimally fluoridated water by humans.


Reason Cited

This article is cited to support the claim that fluoride at 3 ppm and at other levels has been found to depress growth in farm animals.

Analysis

This article contains no English abstract. Only the title was translated.

REASON CITED

This article is cited to support the claim that fluoride at 3 ppm and at other levels has been found to depress growth in farm animals.

ANALYSIS

This Turkish study contained no English abstract. Only the title was translated.

Examination of a table in the text of the document indicates that levels of fluoride ranging from 5.0 to 12.5 ppm were utilized. Clearly, the title indicates that the subject of this study has nothing to do with the consumption of optimally fluoridated water by humans.


REASON CITED

This article is cited to support the claim that fluoride at 3 ppm and at other levels has been found to depress growth in humans.

ANALYSIS

An oral translation provided the following information:

* 134 persons were examined who displayed symptoms of poisoning from natural intake of fluoride: 98% exhibited dental fluorosis and a significant proportion exhibited symptoms of skeletal fluorosis.

* The water was not determined to be the major source of fluoride, since fluoride intake from rice, wheat, vegetables, soybeans, and tea averaged 11.7 ppm daily.

* Urine fluoride levels averaged 6.4 ppm.

* Dry climatic conditions affected fluid intake.

* In one community, water contained fluoride levels of 7.6 ppm.
The author(s) concludes that food as well as water sources must be taken into account. The translator provided no information on whether the study addressed the issue of growth rate.

REFERENCE #237
(#231 in 1983)


REASON CITED

The article is cited as providing evidence that fluoride at 1 ppm may cause gum damage.

ANALYSIS

The author concludes that fluoride in the drinking water, up to the level of 2 ppm, has no effect or clinical significance on the prevalence of gingivitis or gingival recession in adults.

Once again, the scientific literature is inappropriately used in the "Lifesavers Guide".

All major fluoride dentifrices contain approximately 1000 ppm fluoride. Since 85 percent of toothpaste purchased in the U.S. is of the fluoridated variety, any gingival damage attributed to its use would have been identified by now.

REFERENCE #238
(#232 in 1983)


REASON CITED

This article is cited to support the claim that 1 ppm fluoride may be causing gum damage.

ANALYSIS

This reference is written in Chinese. An oral translation indicates that the study was conducted on an undisclosed number of workers exposed to fluoride levels of 25-162 ppm (no indication of whether fluoride was airborne, water-borne, or via other means). Subjects exhibited bleeding gums and symptoms of periodontal disease. Controls (?) exposed to 5.7 to 53 ppm fluoride levels exhibited normal tissue.
This is another example of faulty referencing. This study has no relevance to community water fluoridation at optimal levels.

All major fluoride dentifrices contain approximately 1000 ppm fluoride. Since 85 percent of toothpaste purchased in the U.S. is of the fluoridated variety, any gingival damage attributed to its use would have been identified by now.

REFERENCE #239
(#233 in 1983)


REASON CITED

The article is cited to support the claim that fluoride at 1 ppm may cause gum damage.

ANALYSIS

The effect of 0.1 - 80 mM/L sodium fluoride (.002 ppm - 1.6 ppm) on the tone of helical strips from bovine facial arteries, the membrane potential and resistance of frog muscle fibers, and epithelial cells of the rat gingiva in situ was investigated. Above a threshold of 1 mM/L (0.1m M/L fluoride in organic fluoride solutions) a contraction of the arteries and a depolarization of the muscle fibers was observed. By 25-50 mM/L sodium fluoride (.5 - 1 ppm) the preparations were irreversibly damaged.

It is doubtful that this extremely esoteric research has any relevance to the consumption of optimally fluoridated water by humans. It should also be noted that the fluoride levels that caused tissue damage are much higher than the cellular levels reached in an individual who consumes optimally fluoridated water.

All major fluoride dentifrices contain approximately 1000 ppm fluoride. Since 85 percent of toothpaste purchased in the U.S. is of the fluoridated variety, any gingival damage attributed to its use would have been identified by now.

REFERENCE #240
(#234 in 1983)


REASON CITED

The article is cited to support the claim that topical fluoride is "practically ineffective in reducing tooth decay."
ANALYSIS

In this study, two methods of topically applying stannous fluoride (SnF) were clinically evaluated in a non-fluoridated area. The study subjects were 1,157 children eight to 11 years of age, who annually received either a SnF pumice prophylaxis, a four-minute 8% SnF application, or both. (control group excluded)

The findings, after two years, failed to demonstrate a decay preventive effect of the SnF pumice prophylaxis paste, the SnF solution, or both agents combined. The research was conducted nearly 20 years ago and since that time studies show that due to the transitory effect of topically-applied fluorides, annual applications are ineffective. More frequent applications of various fluoride preparations have demonstrated a profound inhibitory effect on dental caries.

REFERENCE #241
(1235 in 1983)


REASON CITED

The article is cited to support the claim that "topical fluoride is practically ineffective in reducing tooth decay."

ANALYSIS

The authors attempt to determine which of four topical fluorides is the most effective and practical as an anticariogenic agent. The four compounds used were sodium fluoride, stannous fluoride, acidulated phosphate fluoride solution, and acidulated phosphate fluoride gel. There was no significant difference between control and other groups.

The authors indicate that additional laboratory and clinical research will be necessary to establish the superiority of any given fluoride preparation and scheduling of topical application.

Since this study was published we have learned that more frequent applications are necessary for a sustained caries-inhibitory effect.

REFERENCE #242
(#236 in 1983)


REASON CITED

The article is cited as providing evidence that fluoride in the concentration found in toothpaste (1000 ppm) causes gum damage.
ANALYSIS

A study was conducted to examine the inflammatory changes of both healthy and chronically inflamed gingivae after applications of sodium fluoride solutions, (.2% - 2.0%). The test animals were mongrel dogs. The observations indicated that inflammatory changes, revealed by measurements of exudate in both healthy and chronically inflamed gingivae are transitory and are compensated for by the anti-inflammatory mechanisms within the tissues. The authors state that because the resistance of the human periodontal tissue to injury is similar to that of the oral tissue of the dog there is reason to assume that long-term weekly or daily treatment with sodium fluoride solutions, even at high concentrations, does not cause permanent or significant damage to the gingivae.

Once again, the scientific literature is used inappropriately in the "Lifesavers Guide".

All major fluoride dentifrices contain approximately 1000 ppm fluoride. Since 85 percent of the toothpaste purchased in the U.S. is of the fluoridated variety, any gingival damage attributed to its use would have been identified by now.

REFERENCE #243
(Not cited in 1983)


REASON CITED

The article is cited as providing evidence that fluoride in the concentration found in toothpaste (1000 ppm) causes gum damage.

ANALYSIS

The number of leukocytes in the gingivae exudate of human subjects was studied for a three-month period. The number of leukocytes increased significantly in subjects brushing with a fluoride dentifrice compared with those using a fluoride-free dentifrice. The authors state that whether the rise in the number of leukocytes is due to the presence of fluoride in the toothpaste cannot be deduced from this study. In fact, the mean number of leukocytes in the gingivae fluid of the participants at the start of the experiment was similar to that at the completion of the experiment.

Once again, the scientific literature is inappropriately used in the "Lifesavers Guide".

All major fluoride dentifrices contain approximately 1000 ppm fluoride. Since 85 percent of the toothpaste purchased in the U.S. is of the fluoridated variety, any gingival damage attributed to its use would have been identified by now.
REFERENCE #244
(#237 in 1983)


REASON CITED

The article is cited as providing evidence that fluoride in the concentrations found in toothpaste (1000 ppm) causes gum damage.

ANALYSIS

Scratches were made to the depth of the upper dermis on the abdomens of rabbits. Concentrations of .05% to 0.5% stannous fluoride were applied to test sites as were concentrations of .25% - 2% stannous chloride. After 18 hours, the abdominal scratches exposed to the higher concentrations of both stannous compounds showed pustule formation. These lesions did not occur at the lower concentrations. When these substances were patch tested over non-traumatized tissue, no tissue damage occurred. The authors of this 1968 article concluded that further clinical observations on the effects of fluoride on oral inflammation are indicated since dentifrices are not in prolonged contact with oral tissues.

Recent studies suggest that high concentrations of fluoride may actually reduce the severity of periodontal disease. All major fluoride dentifrices contain approximately 1000 ppm fluoride. Since 85 percent of the toothpaste purchased in the U.S. is of the fluoridated variety, any gingival damage attributed to its use would have been identified by now.

REFERENCE #245
(#238 in 1983)


REASON CITED

The article is cited to support the statement that fluoride is ineffective in reducing tooth decay.

ANALYSIS

This study was an attempt to control for socio-economic factors, diet, and toothbrushing, in determining if fluoride supplements had an effect in lowering DFS (decayed or filled surfaces) scores. The authors in the discussion state, "It may not be concluded from this investigation that fluoride tablets or fluoride toothpaste are ineffective." In fact, the study showed that those children using fluoride supplements had lower DFS scores than those who had not used them.
Once again, the scientific literature is misinterpreted and inappropriately used in the "Lifesavers Guide".

REFERENCE #246
(#239 in 1983)


REASON CITED

The article is cited to support the statement that "It is important to note that children four-six years of age consume 25-33% of the toothpaste put on their toothbrush." (p. 6 of the "Lifesavers Guide")

ANALYSIS

In this article Ericsson and Forsman discuss the results of an attempt to measure the retained fluoride of children two to six years of age who rinse with 0.2% neutral fluoride solution, 0.5% neutral fluoride solution and 1% fluoridated toothpaste.

Contrary to the statement in the "Lifesavers Guide", the test did not show 25-33% retention of toothpaste; rather, there was a 25-33% retention of the fluoride contained in the toothpaste amounting to about 0.13 mg of fluoride. This level of fluoride intake is well within safe limits for young children.

REFERENCE #247
(#240 in 1983)


REASON CITED

The author of the "Lifesavers Guide" claims that because of fluoride toxicity, the American Medical Association discourages the use of fluoride in the treatment of osteoporosis. This claim is absolutely false.

ANALYSIS

The reference is a letter to the editor of the Journal of the American Medical Association. The author does not reject fluoride therapy; rather, he suggests that further investigation needs to be done before sodium fluoride is used routinely in the treatment of osteoporosis. Indeed, the author emphasizes the positive findings of recent fluoride therapy clinical trials.

This is an example of the inappropriate referencing seen in much of the "Lifesavers Guide".
REFERENCE #248
(#241 in 1983)


REASON CITED

The author of the "Lifesavers Guide" claims that because of fluoride toxicity, the American Medical Association discourages the use of fluoride in the treatment of osteoporosis. This claim is absolutely false.

ANALYSIS

The reference is another letter to the editor of the Journal of the American Medical Association. The authors do not reject fluoride therapy; rather, they suggest that further investigation needs to be done before sodium fluoride is used routinely in the treatment of osteoporosis. Indeed, the authors emphasize the positive findings of recent fluoride therapy clinical trials.

This is an example of the inappropriate referencing seen in much of the "Lifesavers Guide".

REFERENCE #249
(#242 in 1983)


REASON CITED

This article is cited to support the claim that fluoride as used in the treatment of osteoporosis does more harm than good.

ANALYSIS

These studies involved research on mice with heparin-induced osteoporosis. Estrogen and fluoride were administered in separate trials, rather than in the combination therapy that is showing promising results in human trials. Further, the fluoride was administered in a 75 ppm concentration, far in excess of naturally fluoridated water and the levels to which fluoride is adjusted.

REFERENCE #250
(#143 in 1983)

This document is cited in support of the claim that as little as 1 ppm fluoride in drinking water decreases bone strength and elasticity. It would be inaccurate to draw such a conclusion from this research.

The study was conducted on rabbits and sheep to investigate the effect of fluoride on tensile strength and modulus of elasticity of compact bone. Torsional strength and cortex diameter were also examined. Growing animals were given distilled water (controls) or water containing 1, 10, 100 and 500 ppm fluoride. Tensile strength and modulus of elasticity of compact bone decreased with increasing fluoride intake, but the authors do not indicate significant differences in bone characteristics of controls versus the 1, 10, and 100 ppm groups. (No optimum values are given in order to compare values of bone strength.)

The torsional strength of rabbit metatarsals, however, increases significantly for the 10 ppm group, but this fact is not noted by the author of the "Lifesavers Guide".

Interestingly, the researchers take care to state:

"The results of these studies indicate that treatment using doses of fluoride sufficient to produce x-ray changes in a relatively short period of time might be expected to have detrimental effect on the quality of bone." (emphasis added)

This research is not applicable to water fluoridation, since high doses of fluoride consumed over long periods of time are needed to produce x-ray changes in bone.
## APPENDIX A

References That Could Not Be Located

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APPENDIX B

Index of Authors/Titles Common to Both "Lifesavers Guide" and The Aging Factor

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