



BABY TOOTH SURVEY

... a history of strontium-90 absorption

The Baby Tooth Survey, a study of strontium-90 absorption by children, is based on the analysis of a large-scale, continuing collection of deciduous (baby) teeth shed by children living in a particular geographical area.

The importance of an immediate collection of baby teeth lies in the fact that teeth now being shed by children represent an irreplaceable source of scientific information about the absorption of strontium-90 in the human body.

What is Strontium-90 ?

Every nuclear explosion produces large amounts of radioactive materials, one of the most hazardous being strontium-90. Since the beginning of the atomic era, yearly increases in the amount of strontium-90 in soil and food have been observed by the Atomic Energy Commission and the U.S. Public Health Service. The mushroom cloud formed in a nuclear explosion pushes the radioactive material high above the earth into the stratosphere. From there it is gradually brought down in rain and snow and contaminates the earth's surface.

How Strontium-90 Gets Into The Body

What happens when strontium-90 is deposited on earth stems from its chemical similarity to calcium. Wherever calcium goes, strontium-90 goes as well. Both substances are absorbed from the soil by plants, which in turn are eaten by animals who need calcium mainly for their bones and teeth. In cows the two elements appear in milk. In the human diet, about one-half of the strontium-90 comes from milk, the rest from

grains and vegetables. While the deposition of calcium in bones and teeth is wholly beneficial, the strontium-90 carried with the calcium may be a source of trouble.

The Effects of Strontium-90

Since strontium-90 never existed on earth before, scientists throughout the world are puzzling about its long-range effects on man. We know it is radioactive, and because it is deposited in bone, it may irradiate the sensitive blood forming tissues of the bone marrow and the living cells of the bone itself. In sufficiently large amounts, radiation may cause bone cancer and leukemia.

Scientists disagree as to the amount of strontium-90 that can cause a noticeable increase in the incidence of these diseases. Most studies in the past have dealt with relatively high degrees of radiation exposure. There is as yet no direct information about the consequences of exposing the entire population to low levels of radiation for a lifetime, which is the situation with fallout.

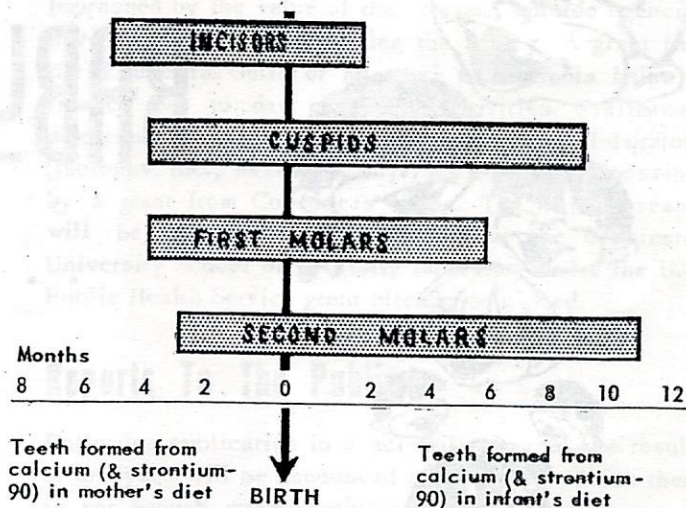
Why Baby Teeth Are Used

The first step in estimating the long-range effect of strontium-90 is to discover just exactly how much of it is being absorbed by the body through food, and then deposited in the bone. The Baby Tooth Survey is designed to provide information in this area.

Baby teeth form the basis for a study of strontium-90 absorption for two reasons: (1) In contrast to samples of human bone, they are plentiful and easily available for study on a large scale; (2) Baby teeth acquire calcium, and likewise, strontium-90, over a short period of time before and after birth. When the teeth are shed later, they contain an amount of strontium-90 that reflects the strontium-90 level of the mother's and the baby's diet during the year the child was born. By studying the teeth of children born each year since the early fallout period, the yearly rate of strontium-90 absorption will be obtained.

Teeth are needed from children between the ages of 5 and 13 - years in which baby teeth are ordinarily shed. The incisors are shed by younger children, and the molars by older ones. It is important to collect them all since different types of teeth reveal different facts.

Times when Calcium and Strontium-90 Are Deposited in the Crowns of Deciduous (Baby) Teeth



How Teeth Are Collected

Special forms have been printed which explain the survey, list the facts needed with each tooth, and give mailing instructions. Teeth are sent in, together with completed forms which provide the important background information needed to interpret the results of the strontium-90 studies made on the teeth. The following information is requested:

- Name and address of child
- Birth date
- Date on which tooth was shed
- Residence of mother during pregnancy
- Residence of child during the first year
- Duration of breast feeding
- Duration of formula feeding
- Kind of milk used in formula
- Other milk used during first year

Why These Questions Are Asked

Each question the parent answers is of utmost importance to the scientists who will process the teeth. The birth date tells when the strontium-90 was deposited. The date the tooth was lost shows how long the tooth was in the mouth. This may affect the strontium-90 content. The residence of the mother during pregnancy and of the child during the first year indicates the geographical area being monitored. The duration of breast feeding is important to know because breast milk is thought to have a different strontium-90 content from cow's milk. From the kind of milk used in the formula the scientist determines whether the milk came from other than the local area.

The Committee For Nuclear Information

The Baby Tooth Survey was initiated in December, 1958, as one of the activities of the Greater St. Louis Citizens' Committee for Nuclear Information (CNI). The Committee was organized in April, 1958, by a group of scientists and public-minded citizens who felt that the community should be given accurate information on the known effects of nuclear energy and radiation. Scientific facts are assembled and studied by the Committee and then made available to the public through regular bulletins and a speakers bureau.

The Idea

The initial impetus for the Baby Tooth Survey came from an article by Dr. Herman M. Kalckar, a Johns Hopkins University biochemist. In the article, which appeared in *Nature*, a British scientific publication (August 2, 1958), Dr. Kalckar proposed a worldwide survey of baby teeth for strontium-90 content and states "Such an International Milk Teeth Radiation Census would contribute important information concerning the amount and kind of radiation received by the most sensitive section of any population, namely, the children."

Because of the striking lack of scientific information on the human absorption of strontium-90, CNI responded to the challenge.

A Cooperative Program

To collect and catalogue the huge number of teeth needed to study the St. Louis area would be a difficult task for a professional research team. CNI, however, was in a position to enlist volunteer help and community-wide support for such a project, and could thus provide a research group with the teeth needed for study.

When the proposal was presented, an enthusiastic response came from the deans of both St. Louis and Washington University Schools of Dentistry. They joined with other scientists to form a Scientific Advisory Group

to guide the program. The Washington University School of Dentistry further aligned itself with the project by setting up a research team which immediately applied for a grant from the National Institute of Dental Research of the U.S. Public Health Service under which a laboratory could be established and maintained to carry out the strontium-90 studies. This grant for \$197,454 has been approved and the laboratory is now set up.

The Collection

Under a physician director, and a Baby Tooth Survey Committee composed of women volunteers, the collection program was organized. Tooth forms describing the survey and listing necessary background information were prepared. All libraries and schools and later drugstores have become distribution centers. A mass distribution of these tooth survey forms to school children early in the program served to introduce the tooth survey into virtually every household with children in Greater St. Louis, and generous support by newspapers and radio and television stations has maintained a growing interest. Children's television programs have been especially influential in recruiting the support of the youngsters. Active participation in the program has come from church and social organizations, school teachers and school nurses, Boy Scout, Girl Scout and "Y" groups and a host of individuals. The 1960 spring drive began with a proclamation of Tooth Survey Week by the Mayor of St. Louis and was so widely supported by the entire community that 10,000 teeth were collected in a single month.

An Active Dental Community

The role of the dental community in this program has been one of major importance. In addition to the active support of both schools of dentistry, invaluable aid has

Join "OPERATION TOOTH"
BABY TOOTH SURVEY
...send a tooth with a form

No. Sex M F Birth date:

Do not write in this space

Mother's residence during this pregnancy:

Child's residence during this year:

Months on breast: Kind of milk used in formula:

Months on formula: Other milk used first year:

DO NOT WRITE BELOW THIS LINE

Incisor 1st molar Canine Non-carious
Cuspid 2nd molar Restored Rootless

BABY TOOTH SURVEY

Strontium-90 is a radioactive material in fallout from hydrogen and atomic bomb explosions. It has been increasing in food and is retained in the developing bones and teeth of children.

Will you help us collect 50,000 baby teeth a year?

The teeth you send will be analyzed for strontium-90 so that we may be learned about the accumulation of this radioactive substance in the human body. Results will be published. Since teeth must be pooled to provide enough material for each analysis, we require one individual tooth can be used.

Please send baby teeth from children of all ages and as many teeth as possible from each child.

Send a tooth - get a button

Name of child

Address

City State

Telephone

The BABY TOOTH SURVEY is sponsored by the Greater St. Louis Citizens' Committee for Nuclear Information in cooperation with the Schools of Dentistry at St. Louis and Washington Universities. The survey is supported in part by a grant from the Leukemia Guild of Missouri and Illinois.

For further information call or write:
COMMITTEE FOR NUCLEAR INFORMATION
4504 Delmar Boulevard, St. Louis 30, Missouri Phone, Parkway 7-2646

INSTRUCTIONS FOR SENDING TEETH

Fill in both sides of the top section of this card.

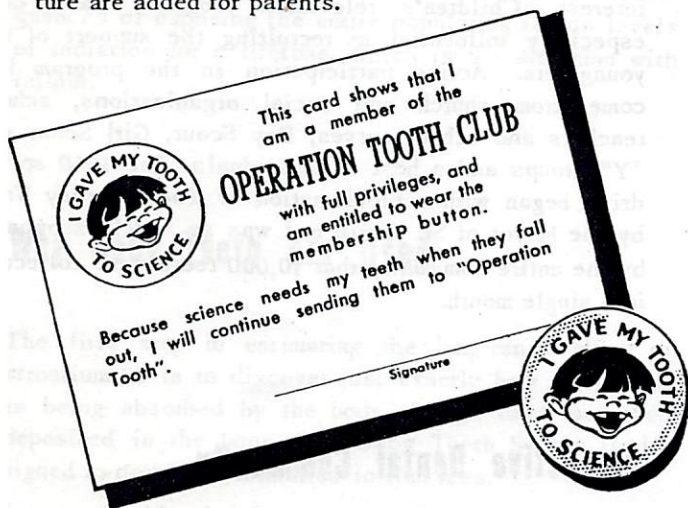
Fold card as perforation, put in an envelope and send to -

'OPERATION TOOTH'
BOX 222
ST. LOUIS 5, MISSOURI

come from the St. Louis Dental Society, which has provided many facilities for enlisting the cooperation of local dentists. The enormous task of cataloging the teeth is carried out almost entirely by members of its Women's Auxiliary. The state and the local dental journals, whose editors are members of the Scientific Advisory Group, have supported the project from the start by publishing announcements and progress reports. The City Dental Clinics of the St. Louis Department of Health and Hospitals add large numbers of extracted deciduous teeth to the collection daily.

"Operation Tooth Club"

After teeth are received a multitude of tasks must be performed by volunteers from CNI and other community groups. First the youngsters get their reward. In return for a tooth, each child is sent a card of membership in the "Operation Tooth Club", a button which reads "I Gave My Tooth to Science" and another tooth survey form. From time to time newsletters and other pertinent literature are added for parents.



Cataloging and Classification

The teeth must then be catalogued, classified, and filed in readiness for the research team. Each tooth is placed in a separate numbered envelope and a corresponding file card bearing background information is prepared. This card is the detached top section of the tooth form, or when several teeth arrive with a single form, an additional file card copied from the original. When information is missing, parents are called to supply the needed facts. This cataloging is usually done by volunteers at home often with groups of friends. Once the cataloging is completed teeth and file cards go to a dentist (volunteer) who examines each tooth and records its type and condition. Teeth and cards are then returned to the office where volunteers file teeth by number and record cards by date of birth and type of tooth.

Financial Support

Impressed by the value of the program, outside agencies have aided CNI in supporting the Survey. A grant from the Leukemia Guild of Missouri and Illinois helps to finance day to day collection activities. Preliminary strontium-90 analyses at a commercial laboratory (Isotopes, Inc., Westwood, N.J.) are being made possible by a grant from Consumers Union. The major research will be carried out in St. Louis at the Washington University School of Dentistry laboratory under the U.S. Public Health Service grant already mentioned.

Reports To The Public

Following publication in a scientific journal the results of analyses will be announced to the public. Since there is not enough strontium-90 in a single tooth to run an assay, many teeth must be pooled for each analysis. Therefore, no reports on individual teeth can be made.

An Expanding Program

Interest in the Baby Tooth Survey has spread widely. Other communities are exploring the possibility of establishing programs coordinated with that of St. Louis. In several cities tooth collections have already been started. Such surveys will monitor local strontium-90 absorption and provide data upon which geographical comparison of strontium-90 uptake can be based.

WANTED: Baby Teeth

Join in a project to help determine what fallout means to you and your children.

If you are a parent you can help by sending your child's teeth to the Baby Tooth Survey.

Others can participate by offering their services as volunteers and by giving financial support.

The nuclear age has posed many challenges. The Baby Tooth Survey is a program that allows the public at large and the scientific community to join forces in promoting a better basic understanding of the problems of this new era.

Baby Tooth Survey of the Greater St. Louis Citizens' Committee for Nuclear Information - Louise Reiss, M.D., Director
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