

HSHM 448: American Medicine and the Cold War
Professor Naomi Rogers

By submitting this essay, I attest that it is my own work, completed in accordance with University regulations. –Kathleen Yu

Public Health in the Age of Nuclear Fallout: St. Louis and the Baby Tooth Survey, 1958-1963
by Kathleen Yu

On May 15, 1957, Nobel Laureate in Chemistry Linus Pauling delivered an impassioned speech to more than one thousand students and academics at Washington University in St. Louis. Calling for an end to nuclear weapons testing, Pauling singled out the dangers of a specific radioisotope, Strontium-90:

If you explode a bomb in the upper atmosphere, you can't control it. The fallout radiation, Strontium-90, and similar things, spread over the world...Everybody in the world now has Strontium-90 in his bones, radioactive material, and nobody had it 15 years ago...This is a new hazard to the human race, a new hazard to the health of people, and scientists need to talk about it.¹

In the year when Pauling spoke at Washington University, the government had conducted 32 atmospheric nuclear tests. Most of these had been carried out at the Nevada test site (NTS), located over 1600 miles west of St. Louis.² Pauling represented a growing chorus of physicians, scientists, and civilians who, by the late 1950s, raised concerns about the harmful effects of radioactive fallout. From the numerous radioisotopes generated by each explosion, strontium-90 was believed to be especially threatening to human health. After dispersing across the earth's

¹ Pauling, Linus. "Science in the Modern World." Speech delivered at Washington University in St. Louis (May 15, 1957).

² U.S. Department of Energy, Nevada Operations Office. *United States Nuclear Tests: July 1945 through September 1992*. (Oak Ridge, TN: Office of Scientific and Technical Information, December 2000). xi.

surface, the radioisotope would infiltrate the food and water cycles, accumulate in bones and teeth, and release cancer-causing particles throughout its victim's body.³

The first large-scale project to investigate the effects of radioactive fallout was launched through a collaboration among clinicians, scientists, and residents of St. Louis, Missouri, in the following year. Working with the dental schools at Washington University and St. Louis University, the St. Louis Citizen's Committee for Nuclear Information (CNI) collected thousands of baby teeth from children in the city and surrounding county. Dentists then analyzed the donated teeth for traces of strontium-90.⁴ Prior studies by the US Public Health Service had demonstrated contamination with this radioisotope in milk supplies around the nation.⁵ The Baby Tooth Survey sought to provide direct evidence for strontium-90's accumulation in human bodies. When preliminary findings were published in the November 24, 1961, issue of *Science*, the CNI had already collected over 61,000 milk teeth shed by children born before and during the years of continental nuclear testing.⁶

This paper will examine how St. Louis residents perceived of and responded to the health impacts of nuclear testing, from 1958 to 1963. Early anti-nuclear activists had focused on the weapon's potential to bring about immediate and large-scale casualties, pointing to the Hiroshima and Nagasaki bombings as examples. But as the Cold War progressed, opponents shifted their attention to the slowly lethal yet largely invisible fallout from testing nuclear explosives. I will argue that the Baby Tooth Survey signaled a tendency for the public to think

³ "Danger—Strontium 90." *Newsweek* (November 12, 1956): 88–89.

⁴ Reiss, Louis Z. "Strontium-90 Absorption by Deciduous Teeth." *Science* 134 (November 24, 1961): 1669.

⁵ Campbell, J. E., and Murphy, G. K. "Summary of results from the raw milk sampling program, June 1957–April 1963." *U.S. Public Health Service. Radiol. Health Data.* (October 1963): 511–519.

⁶ Reiss, Louis Z. "Strontium-90 Absorption by Deciduous Teeth." 1669.

about health beyond individual bodies, encompassing a community level, national, and even international scope. First, I will examine the powerful rhetoric surrounding strontium-90's role as an environmental toxin. Next, I will describe how the Baby Tooth Survey embraced an ecological approach to health, where the locus of control resided outside the individual. In the age of nuclear fallout, Americans were increasingly aware that environmental threats could profoundly shape their health. The CNI drew upon these ideas by framing participation in the study as serving a greater good. Thus, despite offering no medical benefit to any particular participant, the Baby Tooth Survey succeeded in capturing the public's imagination and inspiring widespread support. Overall, the survey reflected an expanding vision of the far-reaching and communal responsibility for protecting the health of the public.

I. Growing concerns about Strontium-90: "a new hazard to the human race"

After Hiroshima and Nagasaki, the US continued to deploy nuclear bombs in an effort to improve its nuclear technologies and strengthen its defense against the Soviet Union. The first atmospheric nuclear test, code named "Trinity," had taken place over a remote desert region in New Mexico, on July 16, 1945. Following World War II, atmospheric and underwater bombings were primarily carried out in the Pacific Ocean.⁷ As the Cold War intensified and war broke out in Korea, government and military officials began to urge President Harry Truman for a continental testing site. Testing within the United States offered significant advantages in terms of accessibility, convenience, and security against foreign forces, but also gave rise to concerns about radiological hazards and public safety.⁸ In his testimony to the Atomic Energy

⁷ U.S. Department of Energy, Nevada Operations Office. *United States Nuclear Tests: July 1945 through September 1992*. 2.

⁸ Fehner, Terrence R. Gosling, F.G. *Origins of the Nevada Testing Site*. (US Department of Energy History Division, December 2000). 39.

Commission (AEC), Director of the AEC's Division of Military Application James McCormack admitted that no continental test site was a "completely satisfactory alternate" to the Pacific. However, one proposed region in Nevada, spanning 1,375 square miles of rugged mountain and desert terrain, was a "substantial improvement in predicted safety" over other candidates.⁹ Only 4,100 people lived within a 125-mile radius downwind of the Nevada test site (NTS), thus government officials argued that this location would minimize radiation exposure to humans. On December 18, 1951, Truman formally approved NTS as the primary location for conducting weapons testing.¹⁰

Despite NTS's relative isolation, the danger of radioactive fallout soon captured the nation's attention. Between 1951 and 1958, the US carried out 183 atmospheric nuclear tests at NTS.¹¹ Each explosion shot a "mushroom cloud" of radioactive dust into the atmosphere, which was visible from over a hundred miles away. Depending on wind patterns, the fallout cloud could drift across the entire planet. Americans saw this threat materialize on March 1, 1954, when the US detonated a 15-megaton hydrogen bomb at Bikini Atoll. The explosion generated an unprecedented volume of radioactive fallout. National and international coverage surrounding the incident reported the death of a Japanese fishing boat crewmember who had been near the test site. Islanders living over 100 miles from where the bomb was dropped suffered from skin burns, hair loss, and radioactive sickness.¹² A November 12, 1956 article in *Newsweek* highlighted the public's horror: "hydrogen bombs may have already propelled enough [of] the

⁹ Ibid. 48.

¹⁰ Ibid.

¹¹ U.S. Department of Energy, Nevada Operations Office. *United States Nuclear Tests: July 1945 through September 1992*. 2-10.

¹² Jessee, Emory J. *Radiation Ecologies: Bombs, Bodies, and Environment during the Atmospheric Nuclear Weapons Testing Period, 1942-65*. (PhD Diss. Montana State University, 2013). 233.

most pernicious aftermath of nuclear fission into the stratosphere to doom countless of the world's children to inescapable and incurable cancer."¹³ Americans became increasingly aware that nuclear testing on the other side of the world could endanger their health.

Scientists studying nuclear fallout focused on the hazards of a specific radioisotope, strontium-90. "From the standpoint of its possible effect on humans," declared a 1956 public report from the National Academy of Science, "the important ingredient of delayed fallout is Strontium-90."¹⁴ The report listed several reasons why strontium-90 was so dangerous: first, it was one of the most abundant fission products, second its half-life of 28 years was long enough for the chemical to remain active for many years, but short enough to serve as a "strong radiator"; third, its chemical similarity to calcium meant that it was easily absorbed by bones and teeth; fourth, research on experimental animals had shown that the radioisotope caused bone cancers; and finally, after a nuclear explosion, strontium-90 was carried into the stratosphere, whereupon it "spreads over the entire earth and is deposited gradually, over a period of years."¹⁵

This report emphasized an ecological approach to this threat:

It is a long way from [the nuclear test site] Eniwetok to Chicago or Bombay. A power station in Oslo or Moscow is a far remove from Johannesburg. Yet all these places are in the same ocean of air; all are surrounded by the interconnecting oceans of water. English grass has been sprinkled with strontium 90 from Nevada. And English cows have eaten it... Between the potential sources of man-made radiation and the people of the world is a vast, complex connecting network."¹⁶

Other research reinforced strontium-90's threat to public health. In 1953, geologists at Columbia University provided experimental verification that strontium-90 was present in animal bones,

¹³ "Danger—Strontium 90." *Newsweek* (November 12, 1956): 88–89.

¹⁴ *The Biological Effects of Atomic Radiation and Excerpts From Pathologic Effects of Atomic Radiation, Studies by the National Academy of Sciences, National Research Council.* (Washington: National Academy of Sciences – National Research Council, 1956). 24.

¹⁵ *Ibid.* 21.

¹⁶ *Ibid.* 22.

milk products, and soil. They also articulated a path by which strontium-90 infiltrated human bodies: the radioisotope was “transported to the soil... plants take up this radioactive strontium [and] human beings ingest strontium-90 from vegetables and milk products.”¹⁷ Additional analysis of human bone samples led to their conclusion that strontium-90 was “found in all human beings, regardless of age or geographic location.”¹⁸ Overall, these studies rejected the false security afforded by geographic distance by showing that strontium-90 was an ever-present environmental threat.

II. Civilians mobilize: The St. Louis Committee for Nuclear Information

St. Louis, Missouri, was an epicenter for public discourse surrounding the issue of nuclear fallout. In November 1956, 130 physicians and scientists at Washington University sent a request to the Joint Committee on Atomic Energy for a public investigation of the government’s nuclear testing program.¹⁹ The next Spring, several Washington University scientists invited anti-nuclear activist and 1954 Nobel Laureate in Chemistry, Linus Pauling, to campus. Pauling addressed an enthusiastic audience of faculty and students about the dangers of radioactive fallout and the need to end nuclear testing.²⁰ Soon after, Pauling drafted a petition calling for an international nuclear testing moratorium. When Pauling presented this petition to the UN Secretary General in January 1958, he had enlisted the support of 11,021 scientists from

¹⁷ Kulp, J.L. Eckelman, Walter R. Schulert, Arthur L. “Strontium-90 in Man.” *Science*. 125(3241) (February 8, 1957): 219.

¹⁸ *Ibid.*

¹⁹ Smith, Allen. “Democracy and the Politics of Information: The St. Louis Committee for Nuclear Information.” *Gateway Heritage: The Quarterly Journal of the Missouri Historical Society* 17(1) (Summer 1996): 4.

²⁰ *Ibid.*

43 countries. Many of the early signers were faculty members at Washington University and St. Louis University.²¹

St. Louis residents also rallied against nuclear testing. In 1956, 28 prominent local women drew up a letter voicing their concerns about radioactive contamination in the city's food supplies. Most of these activists were married to physicians, scientists, and leading Democrats in St. Louis.²² Over the next year and a half, the "Eves Against Atoms" group met with Congressional representatives, sponsored petitions, and wrote to government agencies over the fallout question. While championing an anti-nuclear stance which resembled that of Pauling and Washington University scientists, this grassroots organization concentrated specifically on the impact of nuclear testing on diet and the public's health.²³

In April 1958, scientists and laypeople came together to establish the Greater St. Louis Citizen's Committee for Nuclear Information (CNI). One journalist for the *Nation* reported that the Committee's members represented a "cross-section of the medical and scientific elite of the city, along with lawyers, ministers and other civic leaders."²⁴ The group's founders were motivated by their opposition to the arms race, yet they officially declared a nonpartisan position to establish credibility with the public. Calling itself "the pioneer citizens' group in the field of nuclear education," the CNI's mission statement clarified that their goal was to "[present] the known facts for people to use in deciding where *they* stand on the moral and political questions of the nuclear age."²⁵ Historian Michael Egan noted that CNI leaders were suspicious that

²¹ Egan, Michael. *Barry Commoner and the Science of Survival: The Remaking of American Environmentalism*. (Cambridge: The MIT Press, 2009), 55.

²² Smith, Allen. "Democracy and the Politics of Information: The St. Louis Committee for Nuclear Information," 5.

²³ *Ibid*, 6.

²⁴ Wyant, WK Jr. "50,000 Baby Teeth." *The Nation* (June 13, 1959): 535.

²⁵ *Ibid*.

government information about nuclear testing was based on sociopolitical, rather than scientific, factors.²⁶ Thus, the committee concentrated on disseminating “objective” facts to the public.²⁷ The group organized a speaker’s bureau, composed of physicians and scientists (“capable of dealing with technical aspects of the fallout controversy”), who gave lectures to various “church, parent, fraternal, and business groups”; seminars and public meetings for scientists and laypeople to discuss the consequences of radiation and fallout; and a monthly publication, *Nuclear Information*, whose objective was to “report new scientific facts in lay language.”²⁸ Committee members also appeared on local radio and television programs. These efforts met widespread support from city residents. One year after the group’s founding, it already boasted more than 500 members and reached over 2,500 subscribers through its monthly bulletin.²⁹ By reaching out to the St. Louis community, the CNI became the respected authority for explaining complex nuclear issues to the public.

At the heart of the CNI’s agenda from 1958 to 1963 was investigating the link between radioactive fallout and the milk supply. The 1956 National Academy of Science report had concluded that milk was the primary source of strontium-90 in the human diet.³⁰ Building on these findings, the US Public Health Service initiated a longitudinal study to measure the levels of radioisotopes in milk. Every month, researchers tested samples from nine milksheds around the country. Their findings confirmed what many Americans had suspected: from 1957 to 1959,

²⁶ Egan, Michael. *Barry Commoner and the Science of Survival: The Remaking of American Environmentalism*, 64.

²⁷ Smith, Allen. “Democracy and the Politics of Information: The St. Louis Committee for Nuclear Information,” 6.

²⁸ Wyant, WK Jr. “50,000 Baby Teeth,” 535.

²⁹ *Ibid.*

³⁰ *The Biological Effects of Atomic Radiation and Excerpts From Pathologic Effects of Atomic Radiation, Studies by the National Academy of Sciences, National Research Council.* (Washington: National Academy of Sciences – National Research Council, 1956), 24.

there had been a sharp increase in strontium-90 and cesium-137 concentrations. This trend coincided with more frequent nuclear weapons testing at NTS, and was observed across geographically distant areas of the nation. Furthermore, out of the nine metropolitan cities monitored, St. Louis consistently had the highest concentrations of fission products in its milk supply. The US Public Health Service assured the public that radioactivity levels were “well below the permissible levels agreed upon by the National Committee on Radiation Protection and Measurement.”³¹ But for St. Louis residents already primed to the dangers of nuclear testing, the study reinforced their fears that radioactive fallout was becoming part of their daily lives.

Children were thought to be especially at risk for adverse health effects from contaminated milk; their smaller bodies made them more radiosensitive than adults. They also had a greater need for calcium and usually consumed significant quantities of milk.³² At the request of the St. Louis Dairy Council, the CNI issued a public statement in January 1958 responding to the Milk Monitoring Survey. The group urged parents not to eliminate milk from their child’s diet, because “nothing can be gained by reducing milk intake.”³³ Nevertheless, through public talks and articles in *Nuclear Information*, the CNI made sure that this issue remained on the public’s conscience. During this time, *Nuclear Information*’s front page featured articles ranging from “Milk and the Strontium-90 Problem” to “Strontium-90 and Common Foods” and “Mothers ask – What should we feed our kids?”³⁴ To the American public,

³¹ Campbell, J. E., and Murphy, G. K. “Summary of results from the raw milk sampling program, June 1957–April 1963.” *U.S. Public Health Service. Radiol. Health Data.* (October 1963): 511–519.

³² Kalckar, Herman M. “An International Milk Teeth Radiation Census.” *Nature.* 182 (August 2, 1958): 283.

³³ Wyant, WK Jr. “50,000 Baby Teeth,” 536.

³⁴ Egan, Michael. *Barry Commoner and the Science of Survival: The Remaking of American Environmentalism*, 69-70.

radioactive fallout became a personal issue, yet one largely outside of their own control. Their health was subject to decisions made in Washington and bombings conducted hundreds of miles away.

The CNI aimed to provide the public with answers. The first step was to measure how much fallout material was entering the human body. By 1957, only “erratic data [existed], based on the autopsy of bone samples derived mainly from adults.”³⁵ Not only was the supply of bones limited, but many of the adult bones had already been fully developed by the time the government began nuclear testing.³⁶ An alternative approach came from National Institutes of Health biochemist Herman M. Kalckar, in the August 2, 1958 issue of *Nature*. Kalckar proposed “An International Milk Teeth Radiation Census.” He called on “public health agencies of every nation [to] organize a large-scale collection of milk teeth (with dates of appearance and shedding, and the child’s age in each instance) and conduct measurements of radioactivity on this material.” According to Kalckar, baby teeth were ideal research material, because they tended to absorb substances from food eaten by the mother or child. The measurements would reflect the amount of radiation absorbed by a child just prior to birth (“when the calcified structure of the deciduous teeth is deposited”), which was around 7 years before the tooth was shed. Kalckar’s proposal emphasized the humanitarian implications of nuclear fallout. He claimed that his “suggestion arises from the belief that any family, regardless of whether or not its country has ambitions in the development of atomic weapons, would be sympathetic to and support an international study involving atomic radiation and ultimately concerned with the health of its own children.” Furthermore, Kalckar urged for collective responsibility when it

³⁵ Kalckar, Herman M. “An International Milk Teeth Radiation Census,” 283.

³⁶ *Ibid.*

came to ensuring the public's health. Naming the United Nations as "the best agency to handle such a project," Kalckar added that it would be "particularly impressive if the Western world... took the initiative by offering to make its equipment and technical advice available to any country interested in participation." He argued that this international study would serve a "concrete demonstration of respect and reverence for life, regardless of creed, colour, or political system." By emphasizing the moral obligation to protect "the most sensitive section of any population, namely, the children," Kalckar advocated an inclusive approach to research that transcended geopolitical hostilities that had been intensified during the Cold War.³⁷

On December 21, 1958, the CNI became the first group to put Kalckar's plan into action. The St. Louis Baby Tooth Survey aimed to "collect 50,000 baby teeth a year to provide an important record of the absorption of radioactive strontium-90."³⁸ The associated press release stressed the study's far-reaching and deeply personal elements:

The importance of an immediate collection of deciduous, or 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. Beginning about ten years ago, strontium-90 from nuclear test fallout began to reach the earth and to contaminate human food.³⁹

Funded through grants from the US Public Health Service, American Cancer Society, and Leukemia Guild of Missouri and Illinois, the study had also obtained endorsements from the deans of Washington University and St. Louis University's schools of dentistry. Dr. John Bird, assistant dean of Washington University's School of Dentistry, volunteered to head a group of local dentists to examine and classify the teeth. Directing the overall study was Dr. Louise Reiss,

³⁷ Ibid, 283-4.

³⁸ Wyant, WK Jr. "50,000 Baby Teeth," 535.

³⁹ Ibid, 357.

a founding member of the CNI and physician with the City of St. Louis Health Department.⁴⁰ Having secured support from the scientific establishment, the CNI now turned to the survey's target audience: children and parents from the St. Louis community.

III. The St. Louis Baby Tooth Survey: a citizen-science project

CNI members embarked on a broad-based public awareness campaign to inspire St. Louis residents to participate. The sample material consisted of baby teeth donated by children and a tooth survey form filled out by parents. The package was mailed to the CNI office, where volunteers from the Women's Auxiliary of the St. Louis Dental Society catalogued the samples and contacted parents for any missing information. Next, a pediatric dentist examined each tooth and recorded the presence of any caries, root canals, or amalgam fillings. A subset was forwarded to a laboratory at Washington University, where scientists could quantify the exact strontium-90 content. Based on census data, the CNI estimated that around half a million baby teeth were shed by children from the St. Louis area each year. While organizers were uncertain how large the samples of teeth would have to be to yield meaningful data, they set an ambitious goal of collecting 50,000 teeth a year. They were also aware that they needed to begin immediately: Kalckar's proposal had commented that the teeth currently being shed (in 1958) had formed just before significant fallout had occurred (in 1951). The early samples would provide essential baseline information for their study. A successful collection program relied on all members of the community, from volunteers who coordinated logistics, to physicians and scientists who analyzed the data, to young children who contributed their milk teeth.⁴¹

⁴⁰ Ibid.

⁴¹ Reiss, "Strontium-90 Absorption by Deciduous Teeth." 1669.

The survey's director, Dr. Louise Reiss, first enlisted the support of "all the schools in the area – city and county, public, parochial and private." St. Louis-area superintendents assured her that the questionnaires would be delivered in their respective elementary schools.⁴² Other CNI members spoke at churches, libraries, PTA meetings, and dental clinics throughout the city.⁴³ To reach an even wider audience, the CNI spread their message through local media. Members addressed the St. Louis public during "public service time," given by radio and television stations.⁴⁴ In the third issue of *Nuclear Information*, published on December 24, 1958, the group explained the study's objectives and urged readers to volunteer for the cause.⁴⁵ Other news agencies raised awareness by publishing articles and press releases from the CNI. City papers such as the *St. Louis Dispatch* reminded readers that "50,000 baby teeth [were] wanted yearly for strontium-90 tests."⁴⁶ Finally, the CNI ramped up its ongoing public education programs; from October 1958 to December 1960, CNI speakers addressed a total of 15,000 individuals from the surrounding area. The presentations and discussions explained the latest scientific and medical research on nuclear fallout.⁴⁷

Beyond promoting the Baby Tooth Survey's scientific value, the CNI emphasized that St. Louis residents were contributing to a larger cause. Each child who donated their tooth received a package containing: an "I Gave my Tooth to Science" button pin, a membership card to the

⁴² Logan, Yvonne. "The Story of the Baby Tooth Survey." *Scientist and Citizen* 6(9-10) (1964): 38.

⁴³ Egan, Michael. *Barry Commoner and the Science of Survival: The Remaking of American Environmentalism*, 69-70.

⁴⁴ Logan, Yvonne. "The Story of the Baby Tooth Survey," 39.

⁴⁵ *Nuclear Information*, (December 24, 1958).

⁴⁶ "50,000 baby teeth wanted yearly for strontium-90 tests." *St. Louis Post-Dispatch* (December 21, 1958), A3.

⁴⁷ Egan, Michael. *Barry Commoner and the Science of Survival: The Remaking of American Environmentalism*, 63.

“Operation Tooth Club,” a thank you note, and a new tooth form.⁴⁸ The button pin lent a heroic aspect to tooth donation by praising children for their sacrifice to the greater good. Children could wear this emblem with pride to show their classmates and friends that they had contributed to “science.” The membership card fostered a sort of collegiality and exclusivity among donors; but those who were uninitiated could easily join their friends in the “Operation Tooth Club” by mailing their tooth to the CNI. Finally, the new tooth form was a subtle reminder for children to continue donating their teeth (and likely a source of stress for children whose teeth were not ready to fall out!) To mobilize the city’s residents, the mayor of St. Louis, Raymond Tucker, proclaimed Tooth Survey Weeks and semi-annual tooth round-ups.⁴⁹ In May 1961, when the CNI received the study’s 50,000th tooth, volunteers honored the donor (7-year-old Alexis Paspalas) with a dinner and a segment on the local children’s television station.⁵⁰ Overall, the CNI inspired a unified vision around the Baby Tooth Survey. By emphasizing the bigger picture, the CNI overcame challenges inherent to such a large-scale study. Each individual tooth did not offer meaningful data, and there were no inherent benefits to each participant from donating. However, the CNI created smaller rewards to remind participants of their role in advancing scientific and social progress; as one *Newsweek* journalist explained, “any child with a wobbly baby tooth is a person of consequence in St. Louis, MO.”⁵¹

By November 24, 1961, when Reiss published the Baby Tooth Survey’s preliminary results in *Science*, the CNI had received over 61,000 baby teeth from children in the St. Louis area. Over 10 percent of the donations had come from children living outside the study area

⁴⁸ Logan, Yvonne. “The Story of the Baby Tooth Survey,” 38-9.

⁴⁹ *Ibid*, 39.

⁵⁰ Gerl, Ellen. “Scientist-citizen advocacy in the atomic age: A case study of the Baby Tooth Survey, 1958-1963.” *Prism* 11(1) (2014): 7.

⁵¹ “Fallout: The Facts Are Brighter,” *Newsweek*, (April 18, 1960), 68.

(“which included Greater St. Louis and environs within 100 miles”), demonstrating the large-scale enthusiasm generated by the study. The initial analysis of 1,335 teeth revealed that strontium-90 levels had increased sharply with nuclear testing: “the upward trend with time may be correlated with increasing dietary concentrations of strontium-90.” Children born in 1954 had four times as much strontium-90 in their deciduous teeth as those born in 1951. The survey provided scientific validation that strontium-90 from milk was infiltrating and accumulating within children’s bodies.⁵²

While these results added fuel to the anti-nuclear campaign, Reiss chose to focus instead on the Baby Tooth Survey’s precedent for future public health studies. She recommended other researchers to consider the “special contributions which can be made... by the early analysis of deciduous teeth”: “A large population can be sampled to provide a continuous record of strontium-90 absorption in man which will span the entire fallout period anywhere in the world.”⁵³ Because radioactive fallout was a threat to the entire world, any research group could undertake this study and contribute valuable information to the international community. Reiss advised collection programs to focus on incisors; these were the “most useful” type of tooth for collection, because “[they] appear to have the greatest psychological appeal for young children.”⁵⁴ Reiss’ comment reminded readers of the personal element to scientific research; while large-scale public health research might not offer therapeutic benefits to individuals already exposed to fallout material, these studies could nonetheless win over the hearts of the public and contribute to scientific and social progress.

⁵² Reiss, Louis Z. “Strontium-90 Absorption by Deciduous Teeth.” *Science* 134 (November 24, 1961): 1669-73.

⁵³ *Ibid.*, 1673.

⁵⁴ *Ibid.*

IV. Conclusion: Changing the narrative around the health of the public

The Baby Tooth Survey inspired unprecedented levels of public engagement over the question of nuclear fallout. The survey not only informed St. Louis residents about the dangers of strontium-90 in their diet, but also captivated their imaginations by pointing to the far-reaching implications of scientific progress – which transcended local and national boundaries. Children could proudly declare that they had “donated [their] tooth to science,” while adults knew that they too had helped to advance the field. Overall, the Baby Tooth Survey reflected changing ideas around the public’s health. During the Cold War, Americans became increasingly concerned about nuclear fallout, a largely invisible and inescapable threat; decisions about weapons testing, made by unknown individuals around the globe, could directly impact their daily lives. But just as the locus of control expanded beyond the individual, Americans started to view health beyond their own bodies. The Baby Tooth Survey used population-level evidence to confirm that strontium-90 was contaminating children’s bones. Each individual tooth was insignificant, yet the thousands of teeth that poured in to the CNI’s headquarters had political and scientific ramifications. The survey’s results, and the conversations they generated about the health of the public, were instrumental to the signing of the 1963 Limited Nuclear Test Ban Treaty to end above-ground nuclear weapons testing.⁵⁵

⁵⁵ Smith, Allen. “Democracy and the Politics of Information: The St. Louis Committee for Nuclear Information,” 3.

Bibliography

Primary Sources

The Biological Effects of Atomic Radiation and Excerpts From Pathologic Effects of Atomic Radiation, Studies by the National Academy of Sciences, National Research Council. Washington: National Academy of Sciences – National Research Council, 1956.

“Danger—Strontium 90.” *Newsweek* (November 12, 1956): 88–89.

Kulp, J. L., Eckelmann, W. R., and Schulert, A. R. “Strontium-90 in man.” *Science*. 125(3241) (February 8, 1957):219–226.

Pauling, Linus. “Science in the Modern World.” Speech delivered at Washington University in St. Louis (May 15, 1957).

Kalckar, Herman M. “An International Milk Teeth Radiation Census.” *Nature*. 182 (August 2, 1958): 283-4.

“50,000 baby teeth wanted yearly for strontium-90 tests.” *St. Louis Post-Dispatch* (December 21, 1958), A3.

Wyant, WK Jr. “50,000 Baby Teeth.” *The Nation* (June 13, 1959): 535-37

Comar, Cyril L. “Radioactivity in Foods.” Report commissioned by the AMA Council on Foods and Nutrition. *JAMA*. 171(9) (October 31, 1959): 1221-3.

"Fallout: The Facts Are Brighter," *Newsweek*, (April 18, 1960), 68.

Reiss, Louis Z. “Strontium-90 Absorption by Deciduous Teeth.” *Science* 134 (November 24, 1961): 1669-73.

Campbell, J. E., and Murphy, G. K. “Summary of results from the raw milk sampling program, June 1957–April 1963.” *U.S. Public Health Service. Radiol. Health Data*. (October 1963): 511–519.

Logan, Yvonne. “The Story of the Baby Tooth Survey.” *Scientist and Citizen* 6(9-10) (1964): 38-9.

Nuclear Information (monthly bulletin by the Citizen’s Committee for Nuclear Information) [1958-63].

Secondary Sources

Egan, Michael. *Barry Commoner and the Science of Survival: The Remaking of American Environmentalism*. Cambridge: The MIT Press, 2009.

Fehner, Terrence R. Gosling, F.G. *Origins of the Nevada Testing Site*. US Department of Energy History Division, December 2000.

Gerl, Ellen. "Scientist-citizen advocacy in the atomic age: A case study of the Baby Tooth Survey, 1958-1963." *Prism* 11(1) (2014):1-14.

Jessee, Emory J. *Radiation Ecologies: Bombs, Bodies, and Environment during the Atmospheric Nuclear Weapons Testing Period, 1942-65*. PhD Diss. Montana State University, 2013.

Smith, Allen. "Democracy and the Politics of Information: The St. Louis Committee for Nuclear Information." *Gateway Heritage: The Quarterly Journal of the Missouri Historical Society* 17(1) (Summer 1996): 2-13.

U.S. Department of Energy, Nevada Operations Office. *United States Nuclear Tests: July 1945 through September 1992*. Oak Ridge, TN: Office of Scientific and Technical Information, December 2000.