
Scientist-citizen advocacy in the atomic age: A case study of the Baby Tooth Survey, 1958-1963

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Abstract

Environmental advocacy campaigns facilitate community action through concrete, strategic activities. Using a diffusion of innovation theoretical framework, this paper examines a scientist- and citizen-based campaign that helped shape public discourse on the topic of nuclear test safety. It presents a historical case study of the Baby Tooth Survey, a research project started by the Greater St. Louis Citizen Committee for Nuclear Information that eventually collected and tested 325,000 baby teeth for strontium-90, a radioactive by-product of atomic testing, and that included a campaign to educate citizens about potential health risks associated with above-ground nuclear testing. The case study illustrates key elements of an effective environmental advocacy campaign: defining the problem and solution, involving key opinion leaders and relevant constituents, and implementing varied communication strategies to gain support. The paper concludes that the Committee for Nuclear Information used modern media advocacy techniques to communicate complex issues, but more importantly, included a call to action that inspired local citizens' participation.

Introduction

One day in 1961, a young Eric Reiss picked up the phone at his family's St. Louis home to hear: "This is John Kennedy, can I talk to your mom?" (Eric Reiss, personal communication, February 11, 2013.) The president wanted to chat with Dr Louise Reiss, the first director of the Baby Tooth Survey, about her research that had recently appeared in *Science* magazine. The study,

first proposed by the Greater St. Louis Citizens' Committee for Nuclear Information (CNI) in December 1958, eventually tested 325,000 baby teeth for strontium-90, a radioactive by-product of atomic testing. Research findings confirmed a significant build-up of strontium-90 and helped galvanise public support for a ban on above-ground nuclear testing in the U.S. in 1963 (Hevesi, 2011; Sorkin, 2011).

This historical case study uses diffusion of innovation as a theoretical framework to explore a scientist- and citizen-based environmental advocacy campaign in America's heartland that helped shape public discourse on the safety of nuclear testing. The Committee for Nuclear Information motivated thousands of area children to participate in its Baby Tooth Survey, informed residents of health concerns posed by above-ground nuclear testing, and served as a model for cities around the world. The paper shows that this early campaign effectively employed a variety of media advocacy strategies, including an important call to action not used by earlier science-based campaigns.

The Committee for Nuclear Information and its Baby Tooth Survey have received little scholarly attention. A Washington University occasional paper described the founders and projects of the CNI (Sullivan, 1982). In *Written Communication*, Bazerman (2001) analysed the rhetoric of the group's newsletter, *Information*, created in January 1959 and renamed *Nuclear Information* in March 1959. Also, relatively few scholars have studied how journalists reported above-ground atomic tests, according to historian Glen M. Feighery (2011), who analysed newspaper coverage of the Nevada tests from 1951-1953.

The study of this campaign is important for another reason. Understanding how a campaign used public relations strategies to inform public discourse about one of the 20th century's most important environmental health issues is particularly relevant today as scientists and advocacy groups seek to persuade citizens and government officials of the serious nature of climate change and other environmental threats. This paper considers the lessons such groups might learn from this pioneer effort.

Method

For this research, the author studied documents of the Committee for Nuclear Information (CNI) and papers of committee founders housed in archives at Washington University Libraries in St. Louis, Missouri, and the Special Collections Research Center at the University of Chicago. Among the primary documents studied were the CNI newsletter, flyers promoting upcoming events, and meeting agendas. The author conducted a semi-structured telephone interview with Eric Reiss, whose parents were founders of CNI, and analysed media coverage by the *St. Louis Post-Dispatch* from 1958-1960. For the latter, the author searched microfilm for news articles that named the Committee for Nuclear Information or Baby Tooth Survey and that covered the topics of nuclear testing, strontium-90, and milk contamination. Campaigns unfold alongside other voices and counter-campaigns, making the study of media coverage appropriate (Cox, 2010). Textual analysis of 188 articles during this period showed the Cold War context in which the CNI campaign began and the local coverage it received.

Opinion leaders and media advocacy

Since the 1940s, researchers have noted the importance of opinion leaders and their role in helping to inform others and shape their preferences. The two-step flow of communication posited that information flows first to people with more interest in and access to the media, the opinion leaders, who

then pass on information to a wider public (Katz & Lazarsfeld, 1955; Katz, 1957). Rogers (2003) described diffusion of innovation as a social process in which information, perceived subjectively, is communicated from one person to another. Researchers studying diffusion of innovation look at conditions that increase or decrease the likelihood that a new idea, product, or practice will be adopted. Media as well as interpersonal networks provide information and influence opinion and judgment (Katz, Levin, & Hamilton, 1963; Rogers, 2003).

Several studies have looked at the role such information brokers assume in climate change and other environmental campaigns. Nisbet and Kotcher (2009) argued that, until recently, public communication campaigns largely overlooked the power of opinion leaders to effect collective action on climate change. Dalrymple, Shaw, and Brossard (2013) studied the social and psychological factors that motivated a particular group of opinion leaders, bait vendors, to inform others about the spread of aquatic invasive species. As the author discusses in this paper, the CNI leaders in the 1950s and 1960s were prescient in their use of community opinion leaders to alter citizens' behaviour and shape attitudes about nuclear test safety.

This paper also argues that CNI's organisers pioneered tactics that public health advocates use today. Wallack noted that advocacy goes beyond traditional public education campaigns that relay health messages: "Media advocacy attempts to help individuals claim power by providing knowledge and skills to better enable them to participate in efforts to change the social and political factors that contribute to the health status of all. The health of the community, not necessarily the individual, is the primary focus" (1994, p. 433). Public health advocacy often brings together disparate groups to a common goal; important elements include the analysis of the problem and solution, coalition building, and strategic media use (Chapman, 2004; Woodruff, 1995). Various case studies show public health advocacy efforts involving tobacco and alcohol packaging and advertising (Jernigan & Wright,

1996); timber transport in Western Australia (Gomm, Lincoln, Pikora, & Giles-Corti, 2006); and prevention of childhood drownings (Chapman & Lupton, 1994).

Post-World War II science communication

The CNI campaign, which began in the late 1950s, followed a flurry of communication efforts by scientists after World War II (Lewenstein, 1992). Some of the scientists who had been part of the government's Manhattan Project to develop atomic bombs enjoyed an almost celebrity status, affording them opportunities to speak out for peace in front of civic groups and to radio audiences.

Historian Paul Boyer (1985) wrote in *By the bomb's early light* that some early scientists' organisations were surprisingly savvy about public relations. The National Committee for Atomic Information (NCAI), with the help of a publicist, managed to generate column inches of space in prestigious publications such as *The Nation*, *Popular Science*, and *New York Times Magazine*. The Atomic Scientists of Chicago created the *Bulletin of the Atomic Scientists* in December 1945, an influential newsletter that reached a circulation of 10,000 just one year later. By the end of the 1940s, educational journals, science popularisers, and radio programmes, including ones such as the June 1947 CBS documentary *The sunny side of the atom*, had jumped aboard the government's bandwagon promoting the peacetime uses of the atom (Boyer, 1985).

Slightly more even-handed was Fred Friendly's *The quick and the dead* radio series in 1950 that featured an eclectic ensemble: actors playing historical figures, atomic scientists, members of the Enola Gay crew, entertainer Bob Hope, and *New York Times* science reporter William Laurence.

Thus, on balance, Friendly's documentary was not an exercise in either pacifism or bellicosity. Its thesis was simply that Americans had to educate themselves about atomic energy because they stood at a crossroads where the possible paths

led toward either 'the quick' or 'the dead'. (Ehrlich, 2009, p. 9)

Of particular interest to this research is the Federation of American Scientists' creation of a 1946 advertising campaign with the War Advertising Council (the group later reverted to its pre-war name of the Advertising Council). The campaign promoted the establishment of an international authority to control the use of atomic energy and weapons, and its weekly radio messages reached more than six million people before the campaign's end. In *Journalism History*, Melillo (2013) maintained that the campaign failed in large part because it did not offer citizens the opportunity to act.

The scientists' mistaken assumption that people would behave rationally if given enough information prevented them from providing the critical support needed to move the campaign to the important action state. With no action message to tell members of the public what they could individually do to help establish international control, the radio announcements only produced fear, denial, and a sense of helplessness. People could not be persuaded by the campaign because they were never given the chance to act. (2013, p. 241)

Like the Advertising Council campaign and Friendly's documentary series, CNI's efforts underscored the importance of an informed public. CNI's goals, however, were established by a mix of citizens and scientists. An even more significant difference is that from the onset the CNI encouraged citizen action—through the collection of thousands of baby teeth—and thus individuals' active participation in research aimed at creating systemic change in the government's behaviour.

Case study: Historical context

From 1951 to 1962, the U.S. conducted 100 atmospheric tests of nuclear devices in Nevada, where prevailing winds blew radioactive substances eastward toward the farm belt, including St. Louis (Titus, 1986). The headline of a December 1958 picture story in the *St.*

Louis Post-Dispatch declared in large type: *Strontium-90 – its nature, its dangers* (Dempsey, p. 6), and the paper reported a month later that the city's milk supply contained some of the nation's highest levels of strontium-90 (Deakin, 1959).

As CNI began its campaign to collect baby teeth from area children, the city's morning newspaper kept atomic issues on residents' minds with a steady stream of local and national articles. The author's microfilm search of the newspaper's news and editorial pages from January 1, 1958 to December 31, 1960 found 188 articles containing information on strontium-90, atomic tests and test ban negotiations, and CNI activities, including the Baby Tooth Survey. Although most of the news stories did not carry a by-line, several covering Congressional panels and other news from the Capital were written by Richard Dudman (1960), James Deakin (1959), and Thomas W. Ottenad (1959), Washington correspondents for the St. Louis newspaper.

The safety of nuclear testing was clearly of concern to *Post-Dispatch* readers; 44 of the articles reviewed focused on strontium-90 levels in the St. Louis area and other health issues related to fallout. *Milk strontium content increasing* declared a June 10, 1958 headline (p. 3C). A year later the news was much the same, as the June 29, 1959 headline read: *Strontium-90 in St. Louis area milk soars to record for U.S.* (Ottenad, 1959, p. 1). Another news story reported the alarming view held by some scientists that radiation from tests could produce leukaemia in children: *New study provides direct evidence that test fallout can cause cancer in children* noted the headline on a May 24, 1958 story (p. 1). And a May 8, 1958 editorial cartoon showed a hand outstretched from a dark cloud, dripping strontium-90 from a medicine dropper into baby bottles (*Rx: A drop a day*, 1958).

Eric Reiss, whose mother Dr Louis Reiss directed the Baby Tooth Survey in its early years, recalled in a telephone interview how these fears were manifested in his family. He said his medical-scientist parents carefully

washed food and bought only powdered milk: "I didn't have fresh milk for years after the testing stopped. I can see the rows and rows of boxes of powdered milk in the pantry" (personal communication, February 11, 2013).

Cold War tensions were evident on the pages of the *Post-Dispatch*. More than 130 of the articles covered U.S. and Soviet atomic tests, test ban talks, and civil defence planning. Reports of secret U. S. testing did little to calm fears: *U.S. fires atom blasts 300 miles high in tests yielding important information* read a March 19, 1959 headline (p. 1).

The stories also show the conflicting information St. Louis-area residents faced. For instance, the May 24, 1958 *Post-Dispatch* story *Nuclear tests harmful, scientists of U.N. agree* quoted a United Nations report suggesting that even minute doses of ionising radiations might produce mutant genes (Freudenheim, p. 1). The next day's paper followed with the less alarming headline *Radioactivity in milk here not dangerous* and assurances by the U.S. Public Health Service that radioactivity in milk examined in the St. Louis milk shed was below "permissible" limits agreed upon by a national agency (*Radioactivity in milk*, 1958, p. 16A). A *New York Times* article reported that the surgeon general saw no immediate danger to milk from fall-out but expected contamination levels to continue to rise through 1975 (*Fall-out danger*, 1959, p. 5).

Adding to residents' confusion, as with many environmental concerns today, was that top scientists disagreed. In February 1958, well-known scientists Linus Pauling and Edward Teller debated on television about the perils of nuclear tests and whether the U.S. should continue them. The KQED broadcast out of San Francisco was distributed nationwide (*Scientists Pauling and Teller debate*, 1958). A May 6, 1959 *Post-Dispatch* article reported conflicting testimonies about the dangers of strontium-90 that two nationally renowned scientists presented before a Senate committee (*Strontium-90 in bones*, 1959). And a May 1960 *Post-Dispatch* story noted two panels of leading scientists differed sharply as to what should be done about radiation hazards (Dudman, 1960).

Defining the problem, solution, and target

Woodruff (1995) noted that strategic analysis, “the touchstone of every advocacy effort” (p. 806), involves identifying the problem, solution, and target. Wallack and Dorfman (1996) defined the target in media advocacy campaigns as the people or groups who have the ability to make the change requested.

The information that St. Louis-area citizens were receiving from media reports and government sources about the safety of their milk supply was not only confusing; it was frightening. The public health problem was clear: an unknown amount of nuclear fallout was entering the area’s food system, and government health officials disagreed on what represented safe levels for human uptake. Therefore, a group of citizens, including scientists associated with two St. Louis universities, decided to collect local data that would help answer questions about contamination from radioactive fallout.

They latched onto a novel solution: study baby teeth of St. Louis-area children for strontium-90 content. The idea to research baby teeth originated from Johns Hopkins University biochemist Herman M. Kalckar, who proposed an international census of children’s milk teeth in an article in *Nature* (1958). But such a study had never been undertaken. Fast-growing baby teeth were ideal to analyse for they readily absorb substances from the food eaten by children and their mothers. And they were easier to study than bones, which also absorb radioactive elements, for the simple reason that baby teeth come out (*Persistent fallout*, 1958).

But there was a small problem: Young children were in the habit of tucking their baby teeth under the pillow for the tooth fairy’s visit and the hoped-for appearance of a quarter in the morning. CNI members, although not communication professionals, saw the need for an aggressive campaign that would educate the community about the tooth survey’s goals and encourage children to participate. They made plans to promote the Baby Tooth Survey with a variety of

communication tactics including press releases, newsletters, word of mouth, and hundreds of visits to churches and clubs. Chapman (2004) argues that strategic advocacy efforts should include a non-technical symbol and “pithy, memorable” sound bite to frame the issue. For CNI, a cartoonish tooth offered a recognisable picture. Children who donated teeth received membership cards for Operation Tooth Club, along with buttons that proclaimed: ‘I Gave My Tooth to Science’ (*Thank you*, n.d.; *Baby Tooth Survey...a history*, n.d., p. 4).

The target audience for the tooth collection effort included young children and their parents. The latter would be critical in convincing the youngsters to forgo the traditional tooth fairy’s visit. One CNI flyer called the mothers and fathers the “unsung heroines (and heroes) of the study” (*Baby Tooth Survey News*, 1964, p. 1) for their work attaching children’s teeth to the forms and mailing them in. CNI also needed to attract volunteers. As Louise Reiss told a *Newsweek* reporter, a scientific group would have a difficult time tackling this tooth collection effort itself: “It’s a big, backbreaking job—this is probably the largest research study that has ever depended to such a degree on public participation” (*Fallout*, 1960, p. 70).

Engaging opinion leaders

Opinion leaders in an environmental campaign can help bolster the general public’s cognitive understanding of the issue by interpreting scientific or policy information; they may also spearhead efforts to change individuals’ personal behaviours (Nisbet & Kotcher, 2009). Researchers also note that opinion leaders may be more exposed to the mass media than those they influence and that they reflect every level of society (Katz, 1957).

CNI’s founding members included well-respected scientists and physicians from St. Louis and Washington universities, business and civic leaders, teachers, and homemakers. Hardly anti-nuclear test zealots, they were, however, citizens comfortable speaking up for social causes. For instance, among the scientists named to a steering committee March 23, 1958

were Barry Commoner, then a Washington University plant physiology professor gaining national attention for his leadership in the American Association for the Advancement of Science, and John M. Fowler, an assistant physics professor at Washington University who would publish the book *Fallout: A study of superbombs, strontium-90, and survival* in 1960 (Sullivan, 1982.)

Representing the region's union workers was Virginia Brodine, an official with the International Ladies Garment Workers Union. Particularly noteworthy was the participation of Edna Fischel Gellhorn, described as "perhaps the most important woman in St. Louis in 1958" (Sullivan, 1982, p. 21). Gellhorn, the mother of World War II correspondent Martha Gellhorn, was a prominent civic leader and long-time activist in a variety of social causes such as women's voting rights and food and sanitation concerns. Eric Reiss, in a telephone interview with the author, described Gellhorn's important role in CNI's early years: "She opened doors for geeky academics who probably wouldn't have gotten very far on their own" (personal communication, February 11, 2013).

Before long, the founding committee received the support of the local public health service and officials at city hall for its tooth survey (*Baby Tooth Survey to measure*, 1960). The group named Louise Reiss, a physician who worked at the St. Louis Public Health Department, as the initial Baby Tooth Survey director, a post she held through 1961. Her husband, Eric Reiss, an internist affiliated with Washington University, was also a founding member. He reported the tooth survey's scientific findings at Senate subcommittee hearings in 1963 (Hevesi, 2011; Simons, 1963). The Reiss family's Waterman Avenue home in St. Louis quickly became Operation Tooth headquarters. Their son Eric, who in 1959 was five years old, recalled that it was not unusual for some 20 or 30 women to be at the house sorting teeth at card tables (personal communication, February 11, 2013). An organisational chart shows that women volunteers under his

mother's direction were responsible for Baby Tooth Survey publicity, form distribution, thank you mail, and cataloguing and classifying teeth (Organizational Plan, n.d.).

Purposeful goals

The CNI's activities reflect the four common features of most public relations campaigns described in Rogers and Storey's (1987) classic study: they were purposeful, aimed at a large audience, had a defined time limit, and employed a specific set of communication activities. Cox (2010) wrote that environmental advocacy campaigns differ from other public health campaigns in two major ways. He noted they typically are instigated by non-institutional sources and seek systemic change in government policies, for instance, rather than change in individual behaviours.

From the start, the Committee decided it would provide the public fact-based information. Commoner (1960) wrote in a paper he presented to an American Association for the Advancement of Science (AAAS) committee that the CNI's role in educating the local community with facts, not rhetoric, was a lofty one:

But it is enough for the moment to know that science and citizenship working together can provide means for making the social judgements that will guide the course of the Nuclear Age – and in doing so conserve the hard-won traditions of democracy and the humane goals of science. (pp. 20-21)

Fowler (1962) noted the time was ripe for scientist and layman to come together:

The public needed our explanation of the available facts because they were faced with decisions they could not make intelligently without these facts. Their problems ranged all the way from whether to cut milk out of the baby's diet to the need for moral and political decisions bearing on nuclear testing and nuclear war. (p. 4)

The group set an ambitious goal: collect 50,000 teeth a year for 10 years. A quick start

was critical as teeth being shed in 1959 had been formed before significant atomic fallout and thus would offer key baseline data. But the pool was good; estimates suggested St. Louis-area children shed a half million teeth each year.

Strategies

Public meetings

The right spokesperson can enhance a campaign's credibility and aid in building a coalition. "Spokespeople put a human face on the issue and whoever is behind it" (Jernigan & Wright, 1996, p. 318). Woodruff (1995) argued that community organising is a critical element of public health advocacy as it helps to mobilise public support. CNI created a speakers bureau that successfully reached adults in the target audience. The initial list of speakers included 17 men and three women, who all held medical or doctoral degrees. Between October 1958 and December 1960 alone, CNI speakers appeared before 160 groups, including civic, YMCA and YWCA, school, church, and women's organisations, and reached an estimated audience of 15,000 people (Commoner, 1960). They held public lecture series and scientific seminars to keep citizens and scientists up to date on the latest nuclear data. In 1963, five years after CNI's creation, its speakers remained in demand, addressing 5,000 people in 58 groups (Sullivan, 1982).

Individuals could join CNI as supporting members for \$10. Members were invited to annual meetings to hear guests such as noted anthropologist Margaret Mead and childcare expert Benjamin Spock, who discussed the potential impact of nuclear fallout on children's health (Dr Margaret Mead to speak tonight, 1960; *Dear parents*, n.d.).

Media events

Public health advocates who understand the media's need for stories hold events, enlist government officials' support, and create various other newsworthy activities to draw attention (Jernigan & Wright, 1996). Employing a typical public relations event, the CNI feted seven-year-old Alexis Christine

Paspalas in May 1961 when she mailed in the 50,000th baby tooth. She was treated to dinner and a visit to a local children's television programme (Sullivan, 1982). Other public relations promotions included semi-annual Tooth Roundups, mayoral proclamations of Tooth Survey Weeks, visits by the city's reigning beauty queen to children's hospitals, and a large tooth—with a child tucked inside—that distributed forms in department stores (Logan, 1964).

Flyers and newsletters

The committee produced varied written materials to attract members and explain its goal: "to promote public knowledge and understanding of nuclear problems: nuclear testing, nuclear war, and the peaceful uses of nuclear energy" (*Baby Tooth Survey, A 10-year study 1959*, p. 2). For \$5, individuals received a subscription to the committee's mimeographed newsletter *Information*, renamed *Nuclear Information* after three issues. It was initially published nine times a year for the "citizen who wants to know" (*Dear parents*, n.d.).

Nuclear Information was an important public relations tool for CNI. It galvanised support for the baby teeth collection project and served as a resource for speakers. Importantly, it gained the group credibility among various stakeholders, from local citizens to journalists. *St. Louis Post-Dispatch* news articles frequently referenced newsletter stories (*Strontium-90 peak*, 1960). According to Bazerman (2001), *Nuclear Information's* rhetoric signalled the coming Information Age. The newsletter offered an alternative definition of information that had immediate political and policy consequences and, even more significant, would be utilised by subsequent activist movements in the twentieth century:

One local, but defining, moment for this anticentralizing view of information occurred as part of the anti-nuclear testing movement in the late 1950s, when information became a powerful rhetorical tool to unite citizen interests and pose those citizen interests against the interests of more centralized governmental and military

institutions... In this case, the definition of what counted as information, who produced it, and who had access to it was crucial in contesting who had the right to make informed policy changes. (Bazerman, 2001, p. 264)

Initially four pages in length, each *Nuclear Information* newsletter focused on one theme. The first two issues, published October 24 and November 24, 1958, provided basic science details about fallout and issues surrounding strontium-90. The third issue on December 24, 1958, introduced the Baby Tooth Survey and enlisted readers' participation in gathering the data. Noting that CNI was the first group in the world to start such a large-scale collection of baby teeth, the writer inspired citizens' pride. Working hand-in-hand with local scientists, area citizens could help fight this threat to their community.

Interestingly, highly emotional language was absent. Still, the facts presented were likely to evoke parents' guilt and fears about the safety of their children's milk and other foods (Bazerman, 2001). For example, three issues offered these compelling front-page stories: *Mothers ask—what should we feed our kids?* (1959), *Radiation and birth defects* (1960), and *The detection of nuclear tests* (1960). The anonymous authors, whose initials of F.M. and BC JNO appeared at the end of articles, translated complex findings from scientific journals and Congressional hearings into layperson language. Parenthetical expressions explained scientific terms, such as the following description of congenital malformation: "(The term means a defect existing at the time of birth.)" (*Radiation and birth defects*, 1960). Bold sub-headings such as *Why so many cleft palates?* addressed questions about radioactivity's relationship to birth defects that worried readers (*Radiation and birth defects*, 1960).

Analysis of the first 10 volumes of the newsletter showed it typically reported authoritative, impartial facts but stopped short of making conclusions or suggesting political

positions. And while the information in stories derived from scientist sources, the newsletters' plain design and use of typewriter fonts indicated this was an effort by local, ordinary citizens (Bazerman, 2001).

By the March-April 1963 issue, the newsletter's length had increased to 12 pages (*Strontium-90 fallout*, 1963). With the October 1964 issue, it was renamed *Scientist and Citizen*, and in 1968, it became the journal *Environment*; the latter reflected CNI's new name as the Committee for Environmental Information and its broader focus on issues besides nuclear fallout.

An emotional appeal

Elements of ethical persuasive and advocacy communication include truthfulness and authenticity, among others (Edgett, 2002; Messina, 2007). Messina wrote that standards of ethical persuasion "must deliver to audiences the ability to make voluntary, informed, rational and reflective judgements" (2007, p. 38). In a departure from *Nuclear Information's* usual straightforward, news-style articles, the September 1959 issue contained the fictionalised account of the aftermath of a nuclear attack: *Nuclear war in St. Louis: One year later* (Moog, p. 1). Graphic, emotional, and inherently compelling, the story enjoyed wide readership. CNI distributed more than 50,000 copies of the issue, far surpassing the newsletter's usual circulation of 3,000 (Commoner, 1960). The article was reprinted in the *Saturday Review* (1959) and other national publications. Author Florence Moog, a professor of zoology at Washington University, used data from congressional hearings to create the narrative of fictional survivors:

But even for the 200,000 who survived without apparent injury life was very difficult. Here in our refugee center in South Dakota, almost everyone is suffering to some extent from malnutrition and exposures to weather. All sorts of infectious diseases are rampant. Antibiotics are still very difficult to obtain. Last spring the camp here was decimated by pneumonia.

Blindness is terribly common. (Moog, 1959, p. 18)

This fictional account never claimed to be true. However, by employing this emotional narrative, CNI was directing its audience's opinion to a preconceived conclusion about the perils of the nuclear age. Shock tactics and strong emotional appeals have been used since the early days of public health campaigns; proponents note such appeals can enhance public response while ethicists question if they meet standards of truthfulness and sincerity (Guttman & Salmon, 2004).

Press releases and media relations

Gaining media attention for environmental or public health issues requires that advocates offer stories which journalists find timely, controversial, or relevant to the public; that is, reflecting the criteria for newsworthiness (Wallack & Dorfman, 1996; Woodruff, 1995). Feeling a sense of civic responsibility to their communities, journalists are more likely to see an issue as relevant and newsworthy if that initiative enjoys wide local support (Wallack, 1994). CNI organisers prepared press releases that prompted coverage in the city's morning newspaper, the *St. Louis Post-Dispatch*, on news items such as teeth collecting activities, noteworthy speakers, and research results. For example, the *Post-Dispatch* story *50,000 baby teeth wanted yearly for strontium-90 tests* (1958) originated with CNI.

An important part of CNI's media relations' strategy was to have its experts serve as sources in news stories about nuclear fallout in local and national media. As Chapman and Lupton pointed out, the media serve to mediate between specialised research forums for information and the public, and they shape public perceptions of risk, particularly when individuals don't have first-hand experience with the issue (Chapman & Lupton, 1994). For instance, local scientists associated with CNI offered their expertise in the article *Scientists urge milk be kept in diet in spite of strontium-90* (1959). CNI not only provided a call to action for local residents. It

also served to reconcile what they were being told by national and international officials. It let residents know what their local opinion leaders—scientists and civic leaders alike—thought about the subject.

Not all of CNI's newspaper coverage was favourable. Although analysis of the *St. Louis Globe Democrat*, St. Louis's evening newspaper, was outside the scope of this paper, Sullivan wrote that the conservative *Globe Democrat* often criticised CNI activities and the company it kept, such as outspoken scientist-activist Linus Pauling. The *Globe Democrat* coverage was especially negative after CNI was implicated in 1960 as having communist leanings in a Senate Subcommittee document entitled *Communists [sic] infiltration of the nuclear test ban movement* (Sullivan, 1982, pp. 52-53).

CNI activities received national notice as well. Wyant (1959) wrote in *The Nation* that CNI, then heading into its second year, “waged such a valiant fight on the information front that strontium-90 is now a household word in St. Louis” (p. 535). Chronicling the group's achievements at length, Wyant added that other communities were now following CNI's lead: “What official bodies will not do for them, citizens are seeking to do for themselves” (p. 535).

Newsweek reported the St. Louis mayor's proclamation of Tooth Survey Week with an upbeat tone: “Any child with a wobbly baby tooth is a person of consequence in St. Louis, Mo., this week—in the world's first region-wide analysis of baby teeth for radioactive strontium-90 content (*Fallout*, 1960, p. 70). The article went on to note that while children are rewarded with buttons, adults find reward in “helping scientists gauge how dangerous strontium-90 may be”(p. 70).

In a *New York Times* article, the reporter wrote it was difficult for the average citizen to get accurate, understandable information about radiation hazards and applauded the efforts of the CNI and a New York scientists' group: “Currently in at least two American cities, groups of scientists are attempting to translate the basic facts and theories of nuclear physics, radiobiology and the related sciences into terms

the average thinking citizen can understand” (Rusk, 1960, p. 77).

Some of the most significant media coverage in the timeframe considered in this paper followed CNI’s August 21, 1963 report to the Joint Congressional Committee on Atomic Energy that challenged the safety of the nuclear testing for local populations (Simons, 1963). *Washington Post* reporter Howard Simons quoted directly from the report, which indicated that past nuclear tests exposed children in local populations from Nevada to New York to fallout “so intense as to represent a medically unacceptable hazard to children who may drink fresh locally produced milk” (Simons, 1963, p. A18).

Conclusion

Less than two years from its December 1958 start, committee volunteers had distributed one million tooth survey forms. St. Louis residents had responded eagerly to CNI’s call for action. They convinced their children to trade a tooth fairy visit for science, volunteered their own time, and contributed money as supporting members. As the programme’s notoriety continued to grow, letters from children addressed simply ‘Tooth Fairy, St. Louis’ found their way to the CNI office (Logan, 1964, p. 39). By the end of 1959, CNI members had collected 14,500 teeth; by the end of 1960, 27,000; and in the first six months of 1961, 19,500 (*Thank you*, n.d.).

As the teeth came in, CNI scientists were studying their composition for the absorption of nuclear by-products. The November 1961 issue of *Nuclear Information* reported early results of the Baby Tooth Survey, based on 67,500 teeth collected to date; the data were published the same month in *Science* (Reiss, 1961). The results indicated increased strontium-90 in the children’s teeth occurred in the years following nuclear tests. The *Science* article also concluded that deciduous teeth analysis was a feasible means of gathering information about strontium-90 deposition in bone (Reiss, 1961).

The *Science* article received wide attention in the press and among scientific journals. Political leaders took note as well. In 1963, Dr Eric Reiss reported the tooth surveys results at Senate subcommittee hearings (Simons, 1963; Hevesi, 2011). President John F. Kennedy ratified the Limited Test Ban Treaty on Oct. 7, 1963 (*Treaty banning nuclear weapon tests*, n.d.).

Another measure of the campaign’s level of success is the extent to which it was replicated. CNI’s Baby Tooth Survey served as a model for other cities, including Montreal, New Orleans, and Tokyo, which established similar tooth collection and public education projects. In College, Alaska, organisers of the Alaskan Baby Tooth Survey were preparing to help Eskimo and Indian mothers to fill out forms, according to the *CNI Newsletter (BTS Grows*, 1965, p. 3; *Alaskan BTS*, 1965, p. 3).

This case study shows how the effective use of opinion leaders and modern media advocacy tactics helped a pioneer scientist- and citizen-led campaign achieve its goals. CNI and Baby Tooth Survey opinion leaders communicated with children, parents, and the general public through various channels. They also served as sources for journalists’ stories. The campaign illustrates the importance of community organising, smart use of the news media, and selection of appropriate spokespeople. Without today’s Internet and social media platforms to reach an audience, CNI galvanised support using volunteers and interpersonal networks. Perhaps the most important lesson for today’s environmental advocates, however, is the value of including a call to action that allows citizens to be active participants in change.

Epilogue

A recent addition to this story is intriguing: After finding a stash of 85,000 teeth not used in the original Baby Tooth Survey in a St. Louis-area munitions bunker, Washington University officials in 2001 donated them to the New York-based Radiation and Public Health Project. Each tooth was accompanied by a card identifying its donor. The group’s executive director tracked down 1,000 of the early donors

to research their current health status. The research findings suggested a link between atomic fallout and the incidence of cancer in those donors, now more than 40 years later. According to an article in the *St. Louis Post-Dispatch*, the study authors found the level of strontium-90 was 122 percent higher in teeth of 50-year-old men who had cancer than those without (Cambria, 2010; Simon, 2001).

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