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Media Coverage of EPA's Draft Dioxin Reassessment Report

Sharon M. Friedman, Megan A. Fitzpatrick
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Introduction

Controversial and scientifically uncertain environmental risks often present complex and confusing pictures as they evolve. Information accepted as fact, early in a risk controversy, often is questioned as scientific advances alter knowledge. Political and risk management aspects of controversies change as new approaches emerge. Frequently, however, mass media coverage does not detail the evolution of a risk issue over the years. Instead, gradually evolving changes appear as sudden shifts of scientific or governmental opinion often surprising and angering members of the public.

Such journalistic coverage works against the socially responsible media role to offer information that people can use for democratic decision making. In a participatory democracy, individual members are supposed to be active in determining their destiny, based on their consistent knowledge of available alternatives. Few people develop adequate information for decision making through face-to-face contact with informal information sources. Rather, they are most likely to become informed, directly or indirectly, from the mass media.¹ To aid individuals making such decisions, responsible media should provide "a truthful, comprehensive, and intelligent account of the day's events in a context which gives them meaning," according to the Commission for a Free and Responsible Press, also known as the Hutchins Commission.²

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¹ See Ralph D. Barney, *The Journalist and a Pluralistic Society: An Ethical Approach*, in *Responsible Journalism* 61-63 (Deni Elliot ed., 1986).

Yet, this responsibility seems to be an area where many news organizations have not lived up to their promise. "Part of the obligation to tell readers and listeners about things they should know about includes informing them about developing issues and social conflicts before these become explosive events. It also means keeping important issues before the public after explosive events would otherwise be forgotten."³

The Evolving Dioxin Issue

Dioxin illustrates an excellent example of an explosive, complex risk issue that has affected this nation during the last 30 years with the potential to continue into the future. Over the years, scientists and others have argued about the degree of toxicity of this family of chemicals (which are byproducts of industrial and other activities)⁴ and the amount of regulation they require. In the 1960-1980s, dioxin was considered by most scientists and the media as one of the "most acutely toxic compounds made by man."⁵ As a result, the Environmental Protection Agency (EPA) developed strict regulations on dioxin emissions to air, water, and land. In 1985, the EPA reassessed 2,3,7,8-TCDD, the most potent form of dioxin, and based on animal studies, classified it as "a probable human carcinogen."⁶ In 1988, it reassessed dioxin again, but this time a review by the EPA's Science Advisory Board (SAB) suggested that the agency develop "new methods for estimating human exposure to dioxin and relating exposure levels to health risks."⁷

² See Edmund B. Lambeth, *Committed Journalism: An Ethic for the Profession* (1986).

³ Deni Elliot, *Foundations for News Media Responsibility*, in *Responsible Journalism* 40 (Deni Elliot ed., 1986).

⁴ Dioxin is a general term that describes a family of many chemicals. The most potent is 2,3,7,8-tetrachlorodibenzo-p-dioxin or 2,3,7,8-TCDD. The EPA uses dioxin in its draft assessment report to refer not only to TCDD, but also to every other polychlorinated dibenzodioxin and polychlorinated dibenzofurans (EPA, 1994). *Dioxin* used here represents the whole family unless otherwise noted.

⁵ Wayne Biddle, *Toxic Chemicals Imperil Flooded Town in Missouri*, N.Y. Times, Dec. 16, 1982, at A17.

⁶ Linda-Jo Schierow, *Dioxin: Reassessing the Risk*, Congressional Research Service Report (visited June 3, 1997) <<http://c3.org/library/crsdioxin.html>>.

⁷ *Id.*

In 1991, re-interpretations of scientific data about dioxin's carcinogenic effects by some scientists and pressure by the paper and chlorine industries led to a third reassessment.⁸ In a draft report of this reassessment in September 1994, the EPA said that it had even greater confidence in its 1985 findings that dioxin is a proven animal carcinogen and a probable human carcinogen.⁹ It also noted a stronger body of scientific evidence to "suggest that at some dose, dioxin exposure can result in a number of non-cancer health effects in humans. These effects may include developmental and reproductive effects, immune suppression, and disruption of regulatory hormones."¹⁰

However, in 1995, when the SAB reviewed the draft reassessment report, it sent two chapters — on dose-response and on the risk characterization — back for major additional work, while accepting the others with some changes.¹¹ After more than 30 years of study by hundreds of scientists, the dangers of dioxin still exists as a matter of great contention and the dioxin controversy continues to evolve.

Media Influence on Risk Issues

Many reports and studies demonstrate the impact of the mass media on communication about risks. Stallings has called the media one of the most significant factors involved in the social construction of risk.¹² In its report on *Improving Risk Communication*, the National Research Council said: "The mass media are widely perceived as playing a powerful role in constructing laypeople's understanding of and attitudes about risk."¹³

⁸ See Jeff Bailey, *How Two Industries Created a Fresh Spin on the Dioxin Debate*, Wall St. J., Feb. 20, 1992, at A1.

⁹ See Environmental Protection Agency (EPA), *Estimating Exposure to Dioxin-like Compounds*, Volume 1: Executive Summary, Review Draft (June 1994); Environmental Protection Agency (EPA), *Health Assessment Document for 2, 3, 7, 8-Tetrachlorodibenzo-p-Dioxin (TCDD) and Related Compounds*, Volume III, Review Draft (Aug. 1994).

¹⁰ *Id.*

¹¹ Environmental Protection Agency (EPA), *Reevaluating Dioxin: Science Advisory Board's Review of EPA's Reassessment of Dioxin and Dioxin-like Compounds* EPA-SAB-EC-95-021 (Sept. 1995).

¹² See Robert A. Stallings, *Media Discourse and the Social Construction of Risk*, *Social Problems* (Feb. 1990).

¹³ National Research Council, *Improving Risk Communication*, at 138 (1989).

Various researchers have identified different media influences on risk perception including, among others, that people increase their estimates of being harmed by risks by reading about them¹⁴ and that media coverage amplifies risks in the public's mind.¹⁵

Despite these influences, many communication researchers do not think that the media cover risk issues very effectively. Insights from various studies of media coverage of risk indicate, among others, that the media treat risk as an event-centered news item; that risk articles lack in-depth analysis; and that the media do not put the issue of risk into a larger context or perspective.¹⁶

Dioxin Media Coverage

A larger study to examine how the media followed the evolution of the dioxin issue over the years reviewed scholarly research on, and actual coverage of dioxin from the 1960s through the 1990s. A part of this study focused on a major dioxin occurrence in 1994-95 — media coverage of the EPA's draft dioxin reassessment report and its review by the SAB, the prime subject of this article. Early coverage will be briefly described here and can be found in more detail elsewhere.¹⁷

Early media coverage of dioxin often was extensive, focusing on such issues as Agent Orange, an explosion at a factory in Seveso, Italy, and the evacuation of Times Beach, Missouri. Palen reported that *The New York Times* alone printed more than 700 articles on dioxin or related issues between 1964 and 1988.¹⁸ According to Nelkin, early media articles about dioxin and other toxic chemicals helped give birth

¹⁴ See Eric J. Johnson & Amos Tversky, *Affect, Generalization and the Perception of Risk*, 45 *J. of Personality and Soc. Psych.* 20 (1983); Sharon Dunwoody & Kurt Neuwirth, *Coming to Terms with the Impact of Communication on Scientific and Technological Risk Judgments*, in *Risky Business: Communicating Issues of Science, Risk, and Public Policy* 11 (Lee Wilkins & Philip Paterson eds., 1991).

¹⁵ See Paul Slovic, et al., *Psychological Aspects of Risk Perception*, in *Accident at Three Mile Island: The Human Dimensions* (David Sills et al. eds., 1982); see also Roger E. Kasperson et al., *The Social Amplification of Risk: A Conceptual Framework*, 8 *Risk Anal.* 177 (1988); Allan Mazur, *Technical Risk in the Mass Media*, 5 *Risk* 189 (1994).

¹⁶ See Sharon M. Friedman et al., *Alar and Apples: Newspapers, Risk and Media Responsibility*, 5 *Public Understanding of Science* 1 (1996).

¹⁷ See Sharon M. Friedman et al., *The Never-ending Story of Dioxin*, in *Communicating Uncertainty: Media Coverage of New and Controversial Science* at 113 (Sharon M. Friedman et al. eds., 1999).

¹⁸ See John A. Palen, *Dioxin in the News*, Presented at the American Association for the Advancement of Science Annual Meeting, Boston, MA, Feb. 14, 1993.

to public "chemophobia," with dioxin serving as a symbol for other toxic chemicals.¹⁹ The early stories so strongly described dioxin's dangers that the House of Delegates of the American Medical Association called them "hysterical malreporting," a charge they quickly rescinded.²⁰

In the early 1990s, some of the media coverage started to reflect scientific doubts about dioxin's toxicity. In particular, reporting by environmental reporter Keith Schneider during 1991-1994 in *The New York Times* suggested that the EPA had overreacted about dioxin and that it probably was not as dangerous, particularly as a carcinogen, as scientists thought.²¹ While some journalists, government officials, and industries supported Schneider's views, other journalists on less influential newspapers reported that dioxin was as deadly as ever, particularly because of suspected non-cancerous effects on the immune, reproductive, and developmental systems.²²

Media Coverage of the Draft Dioxin Reassessment Report

The EPA released its more than 2,000-page draft dioxin reassessment report on September 13, 1994. However, even before its release in May 1994, *The New York Times'* Schneider played a controversial and influential role, scooping the media with a leaked summary of the risk characterization chapter.²³ His article was controversial because it emphasized concerns over dioxin's non-cancerous effects and downplayed the chemical's cancer-causing ability. It was influential because it was widely reprinted or quoted by other media outlets and most emphasized Schneider's point of view that cancer was not the main problem with dioxin.

A few journalists wrote different interpretations of the leaked chapter including those at *The Wall Street Journal*, whose article

¹⁹ See Dorothy Nelkin, *Selling Science: How the Press Covers Science and Technology* (rev. ed. 1995).

²⁰ Cass Peterson, *Imprudent Language: AMA Backpedals on Dioxin*, Wash. Post, July 1, 1983, at A1.

²¹ See, e.g., Keith Schneider, *U.S. Backing Away from Saying Dioxin is a Deadly Peril*, N.Y. Times, Aug. 15, 1991, at A1.

²² See, e.g., David Shaw, *Controversial Stories Go Against the Grain*, L.A. Times, Sept. 11, 1994, at A31.

²³ See Keith Schneider, *EPA Moves to Reduce Health Risks from Dioxin*, N.Y. Times, Sept. 14, 1994, at A15.

stated the EPA report “will find ‘there is no evidence that dioxin is any less harmful than previously thought’” and that the draft report “will reaffirm that dioxin poses a cancer risk to humans.”²⁴

The second major coverage period started several days before the report’s actual release by the EPA when the Associated Press (AP), *The Washington Post*, and the National Public Radio (NPR) ran stories about what was in the report, while other newspapers reported what experts expected to be in there. The majority of stories, however, appeared on September 13th when the report was released and for several days afterward.

During this round of coverage, *The New York Times* took a less controversial approach, but still maintained its contrarian attitude. Schneider called dioxin’s potential risk to human health “worrisome but significantly less than that posed by smoking.”²⁵ He reported that the EPA called dioxin a probable human carcinogen, but put that fact low in the story. This time, his story had little influence on the rest of the media — most reporters put the EPA’s view that dioxin was a probable carcinogen high in the story. Only four other reporters used the smoking comparison, which was in the EPA draft report, but they put it quite low in their stories.

Newspaper Coverage

To systematically examine some of the coverage, this study included a content analysis of 36 newspaper articles and 4 editorials or columns. They represent a census of relevant U.S. articles found in the Major Papers category of the Lexis-Nexis database about the EPA draft report.²⁶ In addition, coverage of the report was reviewed, but not systemically analyzed in magazine and wire service articles, and broadcast scripts included in Lexis-Nexis. The content analysis showed that much of the newspaper coverage of the draft report had

²⁴ Timothy Noah & Timothy Aepfel, *Politics & Policy: EPA Reaffirms Health Hazards Posed by Dioxin*, Wall St. J., May 11, 1994, at A16.

²⁵ Keith Schneider, *EPA Moves to Reduce Health Risks from Dioxin*, N.Y. Times, Sept. 14, 1994, at A15.

²⁶ With the terms “dioxin and reassessment report or study or review and date=September 1994,” 123 newspaper articles were found in the Major Papers category of Lexis-Nexis. After a review to remove irrelevant or foreign articles, 66 were printed for further study. Of these, 9 letters to the editor and 17 articles or editorials were eliminated because they were not on the topic, leaving 40 articles and editorials or columns for analysis.

predictable elements, given its newsworthiness and the results of studies of past media coverage of risk issues. Other elements, however, were surprising and showed improved coverage developments.

The predictable elements were that most of the articles were written by staff reporters (62%); were of medium length (67%); and were in the A section of the newspaper (67%). While more than three-quarters of the articles mentioned general findings about the levels of risk posed to humans from cancer and other health effects, they lacked detailed coverage. For example, only 45% of the articles included more than two paragraphs explaining the potentially cancerous effects of dioxin, while only 35% did so for the effects of dioxin on the immune, endocrine and reproductive systems.

Table 1
Newspaper Coverage of Eight Scientific Uncertainty Issues
in EPA's Draft Dioxin Reassessment Report

<i>Issue Mentioned</i>	<i>Percent of Articles (n=40)</i>
Sources of dioxin in the atmosphere	87.5
Amount of dioxin in food sources	85.0
Levels of risk posed to humans from non-cancerous effects	80.0
Levels of risk posed to humans from cancerous effects	77.5
Atmospheric transportation and deposition modes	60.0
Research done in animal studies	47.5
Types of risk models used	5.0
Use of Toxic Equivalency Quotients (TEQs)	0.0

Coverage levels about issues involving scientific uncertainty were both predictable and surprising; that technical concerns would not be as widely reported as the more general issues was predictable, but the large percentage of stories that mentioned the more general elements was surprising. The content analysis specifically looked for mention of eight uncertainty issues, and as can be seen in Table 1, the general topics mentioned frequently included sources of dioxin in the atmosphere; the amount of dioxin in food sources; general levels of risk from cancer and non-cancer effects; and atmospheric transportation and deposition of dioxin. Less than half the articles included information about animal studies — mostly criticism of their use — despite the EPA's research being highly dependent on them. Only 5% mentioned risk assessment

models used in the report and none included information about the use of Toxic Equivalent Quotients, a controversial multi-chemical approach that the EPA considered a "key assumption" in the report.²⁷

What was also surprising about the newspaper coverage, given past media reporting of dioxin and other controversial risk issues, was: the careful treatment of dioxin in the food chain; the discussion of the tentative nature of the report; the amount of general coverage given to factors that were controversial, and the balance shown among information sources.

Most articles appeared to treat dioxin's dangers carefully. For example, only 15% said either in the headline or body that dioxin was riskier than previously thought. In particular, although 85% of the articles included the news that dioxin was in the food chain, with some naming beef, fish, chicken, and mother's milk as possible sources, they also included other statements to help balance this information. Forty percent included statements from the EPA officials that the benefits of a balanced diet outweighed dioxin's risks, and 23% said that there was no need for panic. Clearly, here was another opportunity for an Alar-type public scare, particularly with concerns over dioxin being in mother's milk, but no article sensationalized the food aspect.

About 87% mentioned the tentative or draft nature of the EPA draft reassessment report, a departure from the May 1994 coverage on the leaked chapter. Almost 75% of the articles included concerns, questions, or criticisms related to controversial issues in the report. The majority wrote about data gaps in the report and the agency's need for further information, which the EPA officials themselves had pointed out in both a news release and at a news briefing. Other articles discussed disagreements about interpretations of the scientific data in the report from both the environmental and industrial sides.

Seventy percent of the articles showed a good balance among information sources, a clear improvement over past environmental and scientific coverage, where government officials were far more heavily quoted than other sources and statements made by environmental sources often outnumbered those made by industry representatives.²⁸

²⁷ Environmental Protection Agency (EPA), *EPA Calls for New Dioxin Data to Complete Reassessment Process*, News Release R-219 (Sept. 13, 1994).

²⁸ See Friedman, *supra* note 16.

Most dioxin reassessment articles included statements from all three groups — EPA officials, and environmental and industrial spokespersons. Such action could be the result of aggressive reporting, but could also be the result of an intense campaign by interested parties to convey information to the media and put their own spin on the draft report's findings. Immediately before the draft report's release, many U.S. industry associations and businesses "besieged reporters with news releases downplaying the damaging effects of dioxin."²⁹ On the environmental side, there were dozens of news briefings held around the country by environmental groups and coalitions.

Coverage in Other Print Media

Coverage in other media including wire services and general magazines followed the lead of the newspapers in emphasizing the major points, but not discussing technical risk issues. Most of the wire services including the AP, United Press International (UPI), Reuters, Gannett News Service, Greenwire, and Business Wire, ran stories on the release of the draft report. As with any wire service story, these were all short, although the initial AP story was longer and more detailed than the others. It indicated that dioxin was thought to be more dangerous now because non-cancerous effects had been found.³⁰ However, it said little about scientific uncertainty or the tentative nature of the report. In contrast, both the UPI and Gannett articles pointed out that there was some scientific uncertainty, and the report needed to be reviewed.³¹

In the general magazine category, *Time* carried two articles and *Newsweek* carried one article that included information on the draft report. Both *Time* articles discussed the report in the context of another related subject. One article, almost 2,000 words long, focused on various chemicals' possible effects on the human reproductive system.³² Its shorter companion article dealt with risk issues.³³ The

²⁹ Scott Bronstein, *EPA Agrees: Dioxin Likely Causes Cancer, Birth Defects*, Atlanta J. & Const., Sept. 13, 1994, at A5.

³⁰ See Associated Press, *Dioxin Dangers May be Worse than Suspected*, Chicago Tribune, Sept. 12, 1994, at 4.

³¹ See Larry Schuster, *Health Notes: Dioxin Report Adds Non-cancer Risk*, United Press International, Sept. 14, 1994; Ken Miller, *EPA Repeats Dioxin Concerns; Enviro Demand Chlorine Ban*, Gannett News Service, Sept. 13, 1994.

³² See Michael Lemonick, *Not So Fertile Ground. Some Scientists Fear that Pollutants are Damaging Human Reproductive Systems*, Time, Sept. 19, 1994, at

articles emphasized the controversial nature of various findings, both pro and con, and neither article pointed out that the EPA report was a draft. The *Newsweek* article focused more directly on the EPA draft report and the history of the dioxin debate. It noted the 120-day public comment period and said the EPA's report, for better or worse, restored dioxin's status "as the pre-eminent symbol of the age of toxics."³⁴

No other general magazine articles on the draft report were found in the Lexis-Nexis database during May, September, or October 1994. In contrast, 24 articles appeared during September and October in scientific, environmental, technical, or trade magazines or journals.

Coverage in the Broadcast Media

Television and radio covered the release of the draft report in a much less careful manner than the print media, according to scripts found in Lexis-Nexis. Most of this coverage consisted of brief one or two line items on local television or radio. These short statements usually used strong language without caveats to describe the EPA findings and did not include that the report was a draft. There were no discussions of scientific uncertainty. Mostly, they either pointed out that food contained trace elements of dioxin or they discussed the cancer aspects. Only a few discussed the non-cancerous aspects of the findings. A typical example was: "A new federal EPA report out tomorrow raises concerns that humans may be hurt by dioxin at very low levels."³⁵

National television network coverage was sparse. NBC gave two sentences to the story read by Tom Brokaw, relating that "even trace amounts of dioxin in the food chain could be harmful to humans."³⁶ The MacNeil/Lehrer Hour also only gave the draft report brief play with a focus on cancer.³⁷ A longer story appeared on CNN and was very strongly worded about health risks caused by dioxin.³⁸ There was

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³³ See Madeline J. Nash, *Keeping Cool about Risk*, *Time*, Sept. 19, 1994, at 70.

³⁴ Sharon Begley, *Don't Drink the Dioxin*, *Newsweek*, Sept. 19, 1994, at 57.

³⁵ *The 11 p.m. News* (WNBC-TV, New York, television broadcast Sept. 12, 1994).

³⁶ *The Nightly News* (NBC television broadcast Sept. 12, 1994).

³⁷ Margaret Warner & Jim Lehrer (The MacNeil/Lehrer News Hour Transcript #5053, PBS, Sept. 13, 1994).

no mention that this was a draft report, that it needed review, or that there was any scientific uncertainty. A more mildly worded and shorter story appeared later in September on "Earth Matters" on CNN.

The best broadcast coverage appeared on NPR, which broadcast two stories.³⁹ Both had balanced sources, used tentative language, explained the limits of the draft report, and noted it would require further review. The stories, which included comments from the EPA, and industrial and environmental representatives, explained many of the controversial points about the EPA's findings, including arguments over use of certain risk assessment models and animal studies.

1995 Media Coverage of the SAB Review

The release of the draft report was followed by a period for public comment and review of the draft by the EPA's Scientific Advisory Board (SAB). Media coverage of the public meetings held in different locations around the country was not extensive. Nor was coverage of the SAB scientific review; in fact, it was almost non-existent in the general media in 1995,⁴⁰ despite three major events that the media could have used for coverage opportunities: a two-day open meeting in May, release of the SAB report in September, and a Congressional hearing in December.

There were a few news reports, op-ed articles, and at least one editorial about the May open meeting, most of which emphasized comments that were critical of the draft report and challenged the science employed in it. UPI, Greenwire, and PR Newswire carried stories, but few newspapers appeared to have used them. In contrast, the SAB activities were carefully detailed in numerous articles in technical and trade publications, read by scientific and industrial dioxin stakeholders.

³⁸ Brian Barger, *EPA Study Warns of Dangers of Dioxins for Humans* (CNN News Transcript #875-6, Sept. 12, 1994).

³⁹ Richard Harris, *EPA Takes Second Look at Dioxin* (Morning Edition, NPR radio broadcast, Sept. 12, 1994); Richard Harris, *Dioxin Remains a Danger in the Environment* (All Things Considered, NPR radio broadcast, Sept. 12, 1994).

⁴⁰ These findings are based on searches in Lexis-Nexis using the Major Papers, Papers, Wires, Magazines and Scripts categories with the terms used previously, plus much broader search terms. Other databases were also searched. Finally, The New York Times, The Washington Post, The Wall Street Journal, Time and Newsweek were reviewed during May, September and December 1995 in microfiche and actual copies to make sure articles were not being missed by the database searches.

Given that most of the articles written about the release of the reassessment report in September 1994 included information that it would be scientifically reviewed, so that at least reporters were aware of this fact, it is surprising that not even the major newspapers that usually follow dioxin closely wrote about the SAB review, even though they covered many other dioxin events and reports during 1995.

One EPA official who worked with the SAB thought the lack of media coverage was because the SAB issues were "too complex and tentative."⁴¹ Another suggested that perhaps editors did not give reporters the opportunity to follow up on the draft report. He noted that this was "symptomatic of the media's decreasing interest in environmental journalism."⁴²

Conclusions

There are big stakes involved in the reassessment of dioxin. Stricter regulations called for by many environmental groups could cost industries millions of dollars. From a public policy viewpoint, the dioxin reassessment partly consists of a larger debate in Congress and elsewhere about how the EPA carries out risk assessment, and develops environmental regulations. What the media told the public and government leaders about the dioxin reassessment functions as an important part of that larger debate.

In their coverage of the draft reassessment report, the print media told concerned readers about the latest findings on dioxin's role as a probable cancer agent in humans and alerted them to some non-cancerous potential health risks. The journalists behaved responsibly, particularly about the news that dioxin is in the food chain, and made efforts to balance this news with reassurances from the EPA. Many of the newspapers also pointed out that the findings were controversial, data were still needed and the draft report still needed review. Their coverage of the report itself was generally even and reliable. Unfortunately, the broadcast media did not do as well. For the most part, they provided brief statements that sensationalized the threats to

⁴¹ Telephone Interview with Samuel Rondberg, Designated Federal Official to EPA's Scientific Advisory Board (Jan. 22, 1996).

⁴² Telephone Interview with Luke Hester, EPA Press Officer (Jan. 22, 1996).

human health without giving explanations of or caveats about the findings.

A major problem with the overall coverage of the report was that the media continued their episodic presentation of dioxin information. They treated its release as just another single event on which to report. With a few exceptions, they did not provide context to help readers and viewers follow the evolution or trends of this long-term controversy. Even the short leap in providing context from the draft report's release in 1994 to its review in 1995 was not taken.

Such behavior works against the role of responsible journalism in a democracy. By withholding context for stories, the media continue to contribute to public fears of dioxin and chemicals in general. In addition, the current media trend for shorter and lighter stories does not bode well for public decision making. If concerned citizens depend on only what they read or hear from the media to inform their understanding of complex, long-term risks such as dioxin, it will continue to become more and more difficult for them to make informed decisions about these risks.

There were some bright spots in the draft report coverage. In addition to several newspapers and the NPR, the EPA and a number of interested parties can claim some credit for them. In particular, the EPA had a complicated message to communicate, but through its written news releases, handouts and its news conference, it helped avoid public panic and clarified important but highly technical points for journalists. The agency also did not depend solely on the media to inform the public about dioxin risks. It had been holding public comment meetings on the reassessment since 1991, which allowed it to tell interested people about some of dioxin's scientific evolution and provide the context missing in most media reports. The EPA also has a dioxin website at www.epa.gov/nceal/dioxin.htm.

The aggressive behavior of industrial and environmental information sources regarding journalists, may have indirectly helped improve the quality of coverage of the draft dioxin report. While spin control does not normally seem to be considered a plus for media coverage, in this instance, the amount of information provided might have helped journalists understand, and describe the different viewpoints regarding complex and controversial scientific issues.

Government agencies and other organizations, interested in risk communication, need to make even greater efforts to help journalists cover the evolving elements of complex risk issues so that concerned citizens are not faced with remembering and interpreting snippets of information from singular events reported by the media over a long time period. Providing timelines and explanations about changes in scientific direction or interpretations of new data (as well as other background information) would help reporters better understand, and communicate about the long-term aspects of the issue. As part of their efforts, risk communicators should plan to educate the public directly about the history and evolving nature of various controversial risks in more depth in various ways, such as utilizing the World Wide Web.

From a research perspective, those who study mass media coverage of environmental, science, and health issues, as well as researchers who look at the media's impact on risk communication need to develop a broader brush and move away from studying single events or a series of them within a short time frame. They need to investigate how and why coverage changes over time and whether, for example, these changes are more influenced by scientific, political or economic factors. Many long-term environmental problems plague this nation besides dioxin (including climate change, air and water pollution, and pesticide health effects). Risk communication and media scholars need to look at the forest, not just the trees, in evaluating media coverage of these issues. They must track trends and find ways to help both journalists and information sources to provide a cogent, understandable picture of a long-term issue to citizens.

Of course, the dioxin reassessment story continues and reporters will have another chance to inform the public when the final EPA report is eventually finished. Perhaps this time, if journalists and information sources prove to be very savvy, more context about the long-term, evolving aspects of the issue will get into media accounts, helping provide a better base for public decision making about dioxin.