A Comprehensive Analysis of Breast Cancer News Coverage in Leading Media Outlets Focusing on Environmental Risks and Prevention

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Abstract

Breast cancer has a high profile in the news media, which are a major source of information for cancer patients and the general public. To determine the nature of breast cancer news coverage available to audiences, particularly on the topics of environmental risks and prevention, this content analysis measured a broad array of dimensions in 231 stories appearing in nine leading newspapers, newsmagazines, and television networks in 2003 and 2004. One fourth of all stories reported on various risks such as hormone replacement therapy (HRT) use. Very few items specifically addressed risks related to controllable lifestyle practices such as prepubertal obesity or chemical contaminants in the environment. About one third of the stories included prevention content, primarily focusing narrowly on use of pharmaceutical products. Little information described risk reduction via other individual preventive behaviors (e.g., diet, exercise, and smoking), parental protective measures, or collective actions to combat contamination sites. The more traditional categories of prevalence, detection, and treatment were featured in one third, one quarter, and two fifths of the news items, respectively. There were twice as many stories featuring personal narratives as statistical figures, and two thirds of all the news items cited expert medical professionals, researchers, or organizations. Implications of these findings and directions for future research are addressed.

According to the American Cancer Society (ACS), breast cancer is the most widespread cancer in U.S. women, with more than 200,000 new cases expected in 2006. More than two million women are living with breast cancer, and more than 40,000 deaths are expected this year. The death rate has dropped steadily since 1990 (averaging a 2.3% decrease per year) due to improvements in early detection and treatment; the 5-year survival rate has risen to 88% (ACS, 2005). The sheer prevalence of disease and mortality, combined with concerns among a large audience of adult females, makes breast cancer compelling to the news media. It is currently a high profile news topic after a dramatic increase in coverage over the last third of the twentieth

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century (Corbett & Mori, 1999), and breast cancer has gained substantially more coverage than other major types of disease such as lung cancer (Kitzinger, 2000).

The leading predictors of breast cancer are the individual attributes and genetic traits of older age, inherited genetic mutations such as BRCA1 and BRCA2, family history of two or more first-degree relatives with breast cancer, and breast density; a secondary array of risks primarily pertain to "environmental" factors: exposure to contaminants at home, work, and local areas; HRT among older women; and obesity and consequent early menarche resulting from lifestyle behaviors such as poor diet and lack of exercise among young girls (Vogel & Bevers, 2003).

This investigation examines how the news media portray breast cancer, and it encompasses a wide array of message content with special attention to coverage of the risks of controllable environmental exposures and preventive behavior (Hiatt, 2005). The content analysis is part of a multifaceted federal program (Breast Cancer and the Environment Research Centers) featuring biological and epidemiological research at four sites. Biologists are studying the developmental steps of the mammary gland and use mouse models to test the effects of exposure to potential environmental stressors. A complementary investigation by epidemiologists examines determinants of the trend toward earlier onset of puberty in adolescent girls, particularly the identification of environmental exposures in the prepuberty years that may put girls at risk for future breast cancer. Communication specialists work with the scientists to interface with the public (particularly breast cancer activists and organizations), designing educational messages and monitoring media content that is reaching mass audiences.

This content analysis is designed to provide a comprehensive characterization of news coverage across newspaper, newsmagazine, and television channels, with particular attention to stimuli that potentially may educate and persuade the readers and viewers. While much research has been conducted on breast cancer newspaper and magazine stories, content analyses of televised news stories on breast cancer have been limited to case studies of debates over mammography (Steele, Mebane, Viswanath, & Solomon, 2005) and mammography for women in their forties and the use of Tamoxifen for primary prevention (Schwartz & Woloshin, 2002). The key content measures here focus on news about environmental risks and preventive actions, because it is critical to know the amount and nature of risk and prevention information available to the audience, and this has not been examined in the breast cancer literature within a broad array of other media messages. Brown, Zavestoski, McCormick, Mandelbaum, and Leubke (2001) did describe news and feature stories focusing specifically on environmental causes of breast cancer, as presented in newspapers and magazines from 1961 to 1999. During that era of heightened environmental consciousness, there was little coverage of potential causal contributions or government and corporate responsibility to protect the public. This predominantly historical study excludes television coverage, and the analysis of content features is confined to the subset of stories mentioning environmental causation rather than assessing all breast cancer stories. This project extends the findings of breast cancer news content analyses by including televised news along with newspaper and newsmagazine stories and by adding a comprehensive examination of risk and prevention stories within an assessment of all types of breast cancer stories. Thus, this research attempts to present a comprehensive picture of how news information on breast cancer prevalence, environmental risks, prevention, detection, and treatment are presented to media audiences in relation to one another.

The analysis specifically examines news items describing the *prevalence* of breast cancer in society, which convey to the audience the overall level of risk of disease. Complementing these stories are those that concern *environmental risks*, notably contaminants, pharmaceuticals, and lifestyle practices (Andsager & Powers, 1999, 2001; Brown et al., 2001; Clarke, 1999; Lantz & Booth, 1998; Whiteman, Cui, Flaws, Langenberg, & Bush, 2001). Another set of relevant stories deals with *preventive* measures (Andsager & Powers, 1999), ranging from individual

prevention (e.g., avoiding personal exposure to pesticides) to parental protection (e.g., encouraging daughter to avoid contaminants) to collective action (e.g., supporting initiatives to restrict local chemical emissions). All three levels of prevention are central to the Breast Cancer and the Environment project. At the societal level, the project prioritizes precautionary interventions with young girls and community-level reduction of hazards via organized initiatives to alter environmental policies. This latter factor is associated with intense controversies in "breast cancer hotspot" locales such as Long Island and Marin County, where elevated disease rates are attributed to contaminants in the local environment.

News describing *detection* of breast cancer and reporting effectiveness of *treatment* (Andsager, Hunt, & Powers, 2000; Andsager & Powers, 1999; Corbett & Mori, 1999; Freimuth, Greenberg, DeWitt, & Romano, 1984; Gerlach, Marino, & Hoffman-Gertz, 1997; Henderson & Kitinger, 1999; Houn et al., 1995; Jones, 2004; Marino & Gerlach, 1999; Moyer, Greener, Beauvais, & Salovey, 1995) also are investigated because the audience's formation of beliefs about survivability may shape responses to prevention news; for example, optimistic treatment stories may contribute to complacency in preventive activities.

For all types of stories, the characteristics of the source (e.g., government vs. industry) and the nature of evidence (narrative vs. statistical) are assessed because of implications for credibility and comprehensibility of audience processing of the messages. For example, news media coverage partly is driven by statistics drawn from published reports of disease incidence or medical trial findings, but key peaks of coverage can be traced to personalized cases of breast cancer among prominent women (Corbett & Mori, 1999).

While the research noted above has addressed content presented on these issues separately or in partial combination, none of the studies reviewed have looked at how stories on prevalence, environmental risks, prevention, detection, and treatment of breast cancer are examined in relation to one another. To examine these types of content, we examine the three leading news media channels of newspapers, newsmagazines, and television newscasts. Therefore, this study assesses a more comprehensive array of media than previous investigations of breast cancer coverage with the focus on environmental risks and prevention to complement the stories on prevalence, detection, and treatment.

Media Sources of Breast Cancer Information

Survey studies indicate that the general public relies on media mass as a leading resource for health information (Martinson & Hindman, 2005; Reagan & Collins, 1987), and that media messages contribute to health knowledge (Salmon & Atkin, 2003). Studies examining health information sources show that the public uses differing channels, depending on background characteristics and health needs (Maibach & Parrott, 1995; Marshall, Smith, & McKeon, 1995; Rimal, Flora, & Schooler, 1999; Schooler, Chaffee, Flora, & Roser, 1998). In the most recent study comparing communication sources of health information, Dutta-Bergman (2004) discovered that "active" retrieval channels (newspapers, magazines, Internet) are the primary sources for health-oriented individuals, while "passive" consumption channels (television, radio) serve those who are less health conscious. He concluded that the broadcast media are best suited for prevention campaigns, particularly if the messages feature entertainment-education.

Focusing on sources of breast cancer impact, surveys of female college students and their mothers indicate that exposure to breast cancer stories in newsmagazines is related to breast self-exam and clinical screening (Jones, Denham, & Springston, 2006). Yanovitzky and Blitz (2000) showed that the quantity of mammogram screening coverage in newspapers contributes to mammography utilization.

The content analysis presented in this article measures news coverage in newspapers, newsmagazines, and television news. Television news is defined broadly to include not only the early-evening half-hour newscasts, but also early morning news/talk programming and television magazine shows. According to Atkin (2001), key strengths of television news include reach (proportion of community exposed to the message), intrusiveness (capability for overcoming selectivity and commanding attention), personalization (human relational nature of messenger–receiver interaction), decodability (mental effort and literacy required for processing stimulus), and credibility (believability of material conveyed).

As disseminated via newspapers and newsmagazines, news articles in the print media potentially are influential due to the factors of retrievability (ready access during visual scanning), depth (channel capacity for conveying detailed and complex content), agenda setting (potency of channel for raising salience priority of issues), and credibility.

Among content analytic investigations specifically examining breast cancer, an early analysis of newspaper coverage by Freimuth and colleagues (1984) revealed a lack of detailed information about cancer incidence rates and prevention; the authors asserted that these useful forms of content would provide perspective affecting emotional fear arousal and satisfy public needs. Andsager and Powers (2001) identified shortcomings in the comprehensiveness and utility of magazine articles about breast cancer. Another investigation showed that newspapers and newsmagazines emphasized genetic causation and highlighted individual responsibility for prevention while providing little news about environmental contamination (Brown et al., 2001). Lantz and Booth (1998) found that popular magazines in the 1980s and 1990s highlighted the increased incidence of breast cancer, portraying it as a mysterious epidemic possibly due to women's lifestyle changes; another study of magazine articles during this period indicated that risk factors and lifetime risk statistics were not well explained (Marino & Gerlach, 1998).

Researchers have assessed the quality of coverage, including scientific accuracy and bias. In an analysis of more than 100 magazine and newspaper articles citing scientific research on breast cancer and mammography, Moyer and colleagues (1995) found that less than half of the references provided enough information to locate the original source, and that inaccuracies were discovered in two thirds of these cases. Whiteman and colleagues (2001) reported that the news media gave disproportionate coverage to scientific articles showing a positive link between HRT and breast cancer relative to null effects research. A study analyzing print media coverage of the association between alcohol consumption and breast cancer indicates that reporters relied on only a small fraction of the published scientific studies examining this potential lifestyle risk factor (Houn et al., 1995).

An analysis by Kline and Mattson (2000) dealing with breast self-examination pamphlets isolated message features related to four theoretically relevant variables: severity, susceptibility, response efficacy, and self-efficacy. They discovered that the pamphlets contained a preponderance of threat rather than efficacy content, which would be counterproductive in influencing audiences. A study of accuracy of detection information in Australian print media showed that the messages were unlikely to promote screening (Jones, 2004). The current study was designed to extend the literature on the content of breast cancer messages by assessing a broad range of content across multiple channels.

The selection of variables measured in this content analysis was guided by several considerations. First, an extremely broad range of measures was created in order to determine whether the news media are covering the important health topic of breast cancer in a comprehensive manner. There are five basic substantive domains: prevalence; environmental risks; prevention, made up of individual prevention, parental protection, and collective

prevention; detection; and treatment. Each domain has six to 10 specific dimensions measured (e.g., parental protection includes preventing daughter's exposure to household contaminants, encourage daughter to exercise, discouraging daughter's consumption of unhealthy food). Certain dimensions are included because of the central importance of the particular health issue; for example, content referring to early mammography screening is crucial because this has been demonstrated to be the largest single contributor to the reduced death rate from breast cancer (Berry et al., 2005), and scientists have generated evidence showing breast cancer risks associated with women's use of HRT.

The other determinant of variables is the theoretical relevance of the content in impacting the audience, notably females and particularly the segment of mothers raising young daughters. Drawing upon key concepts from Protection Motivation Theory and the Health Belief Model (Floyd, Prentice-Dunn, & Rogers, 2000; Janz & Becker, 1984; Rosenstock, 1990), the measures assessed content factors that might influence women's perceived vulnerability and severity, perceived barriers and benefits in reducing risk, and self-efficacy and treatment efficacy (Lalor & Hailey, 1989–1990).

Method

Sample of News Stories

The content that is analyzed in this study is essentially the universe of breast cancer news stories appearing in the nation's three newsmagazines (*Time, Newsweek, US News and World Report*), the three basic television news networks (NBC, ABC, CBS), and three of the leading newspapers (*New York Times, Los Angeles Times*, and *USA Today*). The time period covered in this investigation began with the initiation of the grant project in June 2003 and continued through the end of the calendar year 2004. Full-text versions of stories were examined, and every message that fit the selection criteria was included.

News items were not included in the sample if the story did not specifically deal with breast cancer. A story was excluded if it mentioned multiple types of cancer without specifically discussing breast cancer (such as mentioning it in a list with the other diseases). Letters to the editor and obituaries were not included. Stories simply mentioning that an individual had breast cancer also were excluded if the main topic of the article focused on another issue. In contrast, articles that dealt with other topics such as HRT, pharmaceuticals, or chemical contaminants that devoted part of the actual article to the topic of breast cancer were included.

For the three television networks, the search was performed using the Lexis-Nexis system, which allows specific news sources to be selected. For each network, a search was performed through the source "News Transcripts" using the key words "breast cancer." The key word search was performed in "Headline, Lead Paragraph, Terms." Transcript items were not coded if they were repeated segments (i.e., the same story verbatim at different times within the same program).

The search for the *New York Times, USA Today*, and the three newsmagazines also was performed using the Lexis-Nexis system under "Today's News," with each magazine and newspaper as a selected source. The search was done using the key words "breast cancer" within "Headline, Lead Paragraph, Terms." A separate search was conducted for each of the sources. For the *Los Angeles Times*, the search accessed the newspaper's archives found at www.latimes.com. Using the archives' advanced search, articles were found under the topic "breast cancer." In all cases, the articles were searched within the date range from June 2003 to December 2004.

Through this message selection process, a total of $N = 231$ news items were retrieved for analysis: $N = 123$ television news stories, $N = 84$ newspaper stories, and $N = 22$ newsmagazine stories. The individual story was the unit of analysis.

Measures

Breast Cancer Prevalence—To measure the manner that stories conveyed the statistical and verbal representations of the quantity of breast cancer cases in the United States, seven dimensions were coded (yes/no). The first three focus on statistics: odds of incurring breast cancer in lifetime (e.g., "one out of nine," "10%"), total number of deaths per year, and total number of current breast cancer cases (e.g., new diagnoses, survivors currently living with breast cancer). There are four aspects of verbal descriptions of prevalence: rate of breast cancer characterized as widespread, without quoting specific statistical figures; rate characterized as limited, with a small but unspecified number of cases; trend characterized as increasing in recent years; and trend characterized as decreasing in recent years. In addition, coders indicated whether the prevalence was portrayed as relatively greater compared with other diseases (whether statistical or verbal).

Environmental Risks—Due to the project focus on environment and breast cancer, news item references to nine nongenetic risk factors were coded (yes/no): use of hormones/estrogen/ progesterone/HRT, use of other pharmaceuticals, exposure to chemical contaminants, exposure to pesticides, exposure to second-hand smoke, personal tobacco use, lack of exercise, eating certain foods identified as unhealthy, and obesity.

Individual Prevention—The news items were examined for references to self-protective actions to reduce risky practices or to prevent exposure to risky contaminants. Coding focused on presence of eight prevention behaviors: avoiding environmental contaminants, participating in exercise, avoiding obesity, avoiding unhealthy foods, eating beneficial foods, avoiding tobacco use, avoiding secondhand exposure to smoke, and taking pharmaceuticals such as aspirin.

Parental Protection—Beyond self-protection measures, parents can perform interventions to reduce their daughter's breast cancer risk. Experts recommend a variety of actions to address a parallel set of environmental and lifestyle risk factors applicable to growing girls. Coders recorded whether each story made reference to parents performing the following behaviors: prevent daughter's exposure to environmental contaminants (e.g., household pesticides, chemicals), prevent daughter's exposure to second-hand smoke, prevent daughter's tobacco use, encourage daughter to exercise, encourage consumption of beneficial foods, discourage consumption of unhealthy foods, and discourage daughter's condition of obesity.

Collective Prevention—At the societal level of action, collective behaviors designed to reduce breast cancer risk were assessed. The key variable was supporting policy initiatives, so coders recorded whether there were references to efforts to enact and implement environmental reforms such as pollution controls or elimination of contaminants.

Detection—The key method of detecting breast cancer is the mammogram; there are varying guidelines regarding appropriate age and risk level. Three categories of mammogram recommendations are coded (yes/no): screening beginning at age 40, screening beginning at age 50, and mammograms for high-risk cases (e.g., family history). References to the effectiveness of mammograms also were recorded. In addition, coders recorded stories referring to effectiveness of "other" screening techniques, such as breast self-exams and clinical exams.

Cancer Treatment—The messages were coded (yes/no) to record references to the three basic types of treatment: chemotherapy and targeted drugs, surgical procedures, and radiation. In addition, the effectiveness of treatment was examined in terms of content characterizing survivor rates as improving/encouraging/high and as declining/discouraging/low.

Source Citations—When information in a news item was attributed to a source, the identification of individuals or organizations was classified (yes/no) into the following nine categories: government NIH agencies; government other (e.g., CDC, EPA, FDA, state/local); medical and research centers; individually named experts (e.g., scientists, researchers, doctors); individually named patients, survivors, or advocates; medical journals (e.g., *JAMA, Lancet*); foundations and societies (e.g., Komen, American Cancer Society); websites (breast cancer or general health information); and corporations (e.g., chemical, pharmaceutical). In many cases, multiple sources were cited in breast cancer news items.

Structural and Narrative Attributes—Coders also recorded story length and location (e.g., front page, health section) and determined whether the narrative featured controversy and whether there was an emphasis on personal cases rather than on societal statistics.

Coder Training and Reliability

Two graduate student coders were trained to use the detailed codebook listing the 74 measures used in the study, with separate training sessions for the print vs. broadcast stories. Reliability estimates were computed by analyzing coding on a random sample of $N = 46$ stories (20% of the total). The unitizing reliability was 80%. The coding reliability averaged across the 74 measures is 85% agreement. All measures yielded a percent of agreement above the 75% level. Coding disagreements were resolved by discussion, and the resolution was noted so that it was used in future coding.

Results

References to Breast Cancer Prevalence

The risk of breast cancer is reflected in stories that describe the number of cases and the proportion of women who incur the disease, along with fatality rates and trends. At least one of these prevalence indicators is mentioned in 30% of all news items; 20% of the stories cite statistical figures (odds or numbers of cases/deaths). The most frequent reference is to the total number of women who are diagnosed each year or who currently are living with breast cancer; this statistic appears in 13% of all stories, and the total number of deaths is cited in 6% of all stories. In addition, 6% of the news items refer to the lifetime odds of women experiencing the disease, and 6% state that breast cancer is more prevalent relative to other diseases; moreover, 5% state that breast cancer is widely prevalent or increasingly prevalent without citing specific figures. By contrast, only 2% of all news items provide a clear indication that the prevalence is limited or diminishing over time. In 8% of all prevalence stories, information is presented about treatment (5%) or prevention (3%).

As shown in Table 1, stories mentioning any form of prevalence appear most frequently in newspapers (35%), followed closely by newsmagazines (29%) and television (27%). Prevalence is the most evenly distributed type of news coverage across the three basic channels.

Comparing the key sources, prevalence stories heavily cite experts (78%), and three other sources have similar levels of citation: foundations (39%) and journals (38%) are relatively heavily cited in prevalence stories than other types of stories, while personal cases (38%) are not disproportionately represented. Stories about prevalence often do not rely on information from government (17%) or corporations (10%).

Coverage of Environmental Risk Factors

In 16% of the news items, the use of one or more pharmaceutical products is characterized as posing a risk; HRT-related stories (12%) are most often the subject of this coverage. Among lifestyle-related factors, there are infrequent references to obesity (3%), unhealthy diet (2%), and inactivity (1%). Only 4% of all stories mention the risks of exposure to contaminants, such as chemicals, pesticides, and tobacco smoke.

References to Breast Cancer Prevention

Individual Preventative Actions to Reduce Risk—The news media generally pay little attention to the roles of fundamental lifestyle practices and environmental exposures in preventing breast cancer. The main prevention information in the 2003–2004 period focuses narrowly on use of pharmaceutical products (26%), notably that aspirin is related to lower incidence of breast cancer.

By contrast, there is only limited coverage of factors related to diet, exercise, and smoking. Just 4% of stories mention that women can reduce risk by avoiding obesity, 4% by changing eating patterns, and 3% by exercising; there is no information about either personal tobacco use or exposure to second-hand smoke.

Remarkably, just 1% of all stories in this sample make any reference to avoiding environmental contaminants. Despite intense controversies in certain geographical locales and general concerns about chemical products, the national news media have not highlighted this set of issues. Summing together all the prevention measures except for pharmaceuticals, we find that a total of $N = 23$ stories deal with lifestyle or environmental actions to prevent breast cancer; this constitutes 10% of all news stories.

For purposes of comparison analyses, any story with at least one prevention element is labeled as prevention (this includes taking pharmaceuticals, as well as the negligible coverage of actions that might be taken by parents to protect daughters, described in the next section). In the total sample of 231 news items, $N = 82$ stories deal with prevention, which is 35% of the total.

It is important to note that there is a modest overlap between prevention vs. treatment elements in news items; in 27% of prevention stories, the subject of treatment also is mentioned. As shown in Table 1, prevention news is much more likely to appear in the print media (50% of magazine stories and 42% of newspaper stories), than on television (28% of stories). There are twice as many prevention stories as treatment stories in magazines, and prevention stories appear somewhat more often in newspapers. By contrast, treatment stories outnumber prevention stories by a three-to-two margin on television.

Prevention stories are more likely to cite expert sources; 81% make reference to medical authorities, compared with 62% in nonprevention stories. Journals are cited twice as often in stories featuring prevention content; 44% refer to medical periodicals, compared with 22% in other types of stories. There is a slightly higher rate of government citations in prevention stories, by a 22%-to-16% margin. The pattern is reversed for stories citing personal sources; 26% of prevention stories refer to individual patients, advocates, or celebrities, which is much lower than the 48% citation rate for this type of source in other stories. There are no differences between prevention vs. nonprevention citation patterns for foundation and corporation sources.

Parental Actions to Protect Daughters—A major focus of the breast cancer and the environment project is the protective role of parents in reducing their daughters' risk factors related to diet, exercise, and exposure to contaminants. The news media present almost no information to educate parents about how to address environmental risks during the early years.

Just 1% of stories tell parents to encourage their daughters to exercise, and 1% tell them to discourage obesity. There are no stories about preventing exposure to environmental contaminants or second-hand smoke, nor preventing tobacco use by the daughter. Moreover, no stories deal with parental encouragement of healthy dietary practices, including avoiding certain foods and eating beneficial foods.

Collective Actions for Reducing Breast Cancer Risks—Reduction of risks via changes in environmental policies collectively organized initiatives. The coders determined that 3% of all news items fell in the category of "Supporting policy initiatives (e.g., pollution controls)." This is a rather low proportion, reflecting the lack of coverage of advocacy seeking to reform governmental or industrial policies. With this small number of news items, there is an insufficient basis for performing further analyses.

Detection of Breast Cancer

Detection-related news content appears in 23% of all stories. A subset of 17% of all news items specifically refer to mammograms, dealing with effectiveness and age thresholds (12% describe the general effectiveness of mammograms; 5% recommend mammograms at age 40, 1% at age 50, and 2% for high risk cases).

It is notable that almost as many stories refer to screening techniques other than mammograms, specifically self-exams (15%). These nonmammogram references occur in slightly more than half of the mammogram news items, indicating a tendency to describe multiple detection methods in the same story.

For purposes of analyzing relationships with other variables, all coding categories are combined into an overall dichotomous detection variable, indicating that the story has one or more references to detecting breast cancer. As shown in Table 1, stories mentioning detection appear most frequently on television (29%), followed by newspapers (19%) and newsmagazines (8%). In 48% of the detection stories, the topic of treatment also is mentioned; the topic of prevention is mentioned in 40 % of detection news items.

Regarding sources, detection stories most often cite experts (74%) and personal cases (48%), followed by breast cancer foundations (33%) and medical journals (24%). For each of these four types of sources, the rate of citation is slightly greater in detection stories than in stories that do not refer to methods for detecting breast cancer. The government (13%) is not a major source of information about detection, and corporations (7%) are cited infrequently.

Treatment of Breast Cancer

A total of 38% of all news items refer to treatment of breast cancer. The rate is highest for television (43%), followed by newspapers (34%) and newsmagazines (25%). Regarding type of treatment, 26% of stories deal with surgery, 24% with chemotherapy, and 16% with radiation. The survivor rates are characterized as improving or encouraging in 4% of the news items, while no stories present a discouraging perspective.

Examining treatment news coverage more closely, we see that there is a fairly high degree of overlap among surgery, chemotherapy, and radiation references. Half of the treatment stories (constituting 20% of all stories) mention more than one type; indeed, 10% of all stories refer to all three types of treatment. News items referring to any of the three types of treatment are labeled as "treatment" for purposes of comparison with other variables in the study.

Treatment stories are quite likely to cite personal sources; 64% make reference to individual patients, advocates, or celebrities, compared with 25% in nontreatment stories. Surprisingly, medical journals are cited much less often in stories featuring treatment content; 19% refer to

these research periodicals, compared with a 36% citation rate in other types of stories. There is also a much lower rate of government citations in treatment stories, by a 10% vs. 23% margin. There are no differences between treatment vs. nontreatment citation patterns for expert, foundation, and corporation sources.

Basic Characteristics of News Stories

The coders also recorded various structural and narrative characteristics that cut across the specific domains of breast cancer messages. Most news items are fairly lengthy, as 83% are longer than 100 words; stories are lengthier in newspapers (88%) than in magazines (83%) and television news (80%). Newspaper items were coded according to location: 8% appear on the front page, and an additional 33% appear elsewhere in the first section of the newspaper; 16% of stories are in the health section, and 13% are in the women/lifestyle section. Stories were also classified as making reference to controversy or inconsistency of evidence; 14% featured this type of debate, with newspapers (18%) leading television (12%) and magazines (8%). In addition, stories were examined to determine if there was substantial emphasis on specific personal cases rather than on women in general; 19% were judged to feature this personalized aspect of coverage, particularly television news (24%) rather than newspapers (16%) or magazines (4%).

Sources Cited in Breast Cancer Stories

The vast majority of breast cancer stories provide citations to specific individuals (typically experts or women experiencing the disease) or to pertinent organizations (medical centers, government agencies, foundations, or pharmaceutical companies).

Individual scientists, researchers, or doctors are cited by name in 63% of the items; 35% of the news items personally identify non medical individuals such as patients and advocates, and 11% of the stories cite the name of a celebrity.

Regarding organizations, 52% of the stories make reference to centers of research or medical practice, and 26% cite breast cancer foundations or societies, and 15% mention corporations. Among government agencies, 10% cite an NIH unit (usually NCI) and 10% cite CDC, EPA, or nonfederal agencies that deal with general health or environment. Among mediated communication sources, 29% of all news items refer to medical journals, and 4% make reference to medical/health websites.

This array of sources can be grouped into six basic types. The two categories of government agencies (NIH institutes and all other federal and state agencies) are slightly overlapping (3% of stories refer to both categories); 18% of all stories make reference to at least one of these *government* sources. The two categories representing medical expertise (individual professionals and medical/research centers) are highly overlapping because three fourths of the individual experts are identified as associated with an institution, and more than 9 out of 10 institutional references are accompanied by a named individual. Altogether, 68% of stories cite one or more of these *expert* sources. Combining the slightly overlapping categories nonmedical individuals (patients, survivors, advocates, and celebrities), 40% of stories refer to at least one of these *personal* cases. *Foundation* sources (public health and breast cancer organizations, primarily foundations) are categorized separately from the commercially oriented *corporation* source; the distinctive *journal* category is the final type of source.

Citation patterns of six major source types differ substantially by news channel, as shown in Table 1. *Government* agencies are mentioned in almost half of magazine stories and one third of newspaper stories, but almost never on television. Similarly, the two print media are far more likely than television to make reference to a medical *journal*. By contrast, almost half of

television stories refer to *personal* cases, compared with one quarter of newspaper articles and one eighth of magazine articles. *Experts* from medicine are somewhat more often cited in the print media than in the medium of television. Both the *foundation* and *corporation* sources are much more likely to be cited in newspapers.

Discussion

This content analysis was designed to provide a wide-ranging characterization of news coverage, with particular attention to stimuli that potentially may educate and persuade readers and viewers about breast cancer. The focus on news about environmental risks and preventive actions is critical because the amount and nature of risk and prevention information available to the audience has not been examined in relation to other types of stories and via television news in the breast cancer literature. An analysis and implications of the findings are discussed here.

Although a substantial number of news stories fall into the category of environmental risks, almost two thirds of these items involve the use of pharmaceuticals such as HRT regimens. Risks related to lifestyle practices and environmental contaminants are not frequently presented in news stories. This dearth of coverage is likely to limit audience learning about the neglected lifestyle and environmental risks. To increase journalistic coverage, breast cancer specialists and researchers will need to make greater efforts to publicize the evidence related to these risks. Moreover, health campaign designers will need to create messages in order to present to the public information on risks related to lifestyle practices and environmental contaminants.

News coverage of preventive actions during this time period focuses mainly on what women can do at the individual level rather than portraying actions at the family or societal level. Three quarters of all prevention stories focus narrowly on use of pharmaceutical products, notably aspirin. The ample news covering pharmaceuticals can enhance learning in that domain. In contrast, the news media present almost no information to educate parents about how to protect their daughters from environmental risks or to stimulate activists to undertake initiatives to deal with the threat of contaminants locally or nationally; this greatly limits the potential for audience learning and motivation to perform these types of actions.

The pattern of prevention news giving greater emphasis to individual responsibility undermines the potential for societal-level reforms (Wallach, Dorfman, Themba, & Jernigan, 1993). In the case of breast cancer and the environment, journalistic priorities may reflect the tendency for contaminant-focused activists to attract coverage only in the few news markets where concerns have been expressed, while national news gatekeepers may perceive that audience interest is confined to these locales. There are emerging nationwide initiatives with the potential to climb up the national news agenda, including campaigns to combat use of agricultural pesticides and presence of chemicals in cosmetics and household products. Widespread media overage of these initiatives might stimulate collective action. Similarly, journalists underplay key individual and parental prevention topics because the basic modes of preventing breast cancer rely on familiar prescriptions of healthy lifestyles that have limited news value. Although diet and obesity do receive heavy coverage, stories featuring the prevention angle seldom identify breast cancer as a reason to eat healthily and exercise.

Aside from aspirin news, prevention-oriented content is overshadowed by a heavy flow of stories about effective new treatments based on medical research. There is a considerable quantity of treatment news heralding promising chemotherapy regimens, and some items feature high language intensity, including (references to "breakthrough" or "cure"). A fundamental issue arising from the emphasis on optimistic treatment news is the potentially counterproductive impact on the audience, which can be addressed in studies of women's

responses to stories highlighting the effectiveness of new forms of treatment. For example, do women who are frequently exposed to treatment news perceive that that the breast cancer survival rate is high or rising, and consequently infer that they now have a lower risk of death? Does the belief of lower fatality risk lead women to develop a reduced level of concern and a diminished focus on prevention behavior?

Beyond substantive news content, the contextual findings indicate that there are twice as many stories spotlighting personal narratives compared with stories reporting statistical figures. Forty percent of the stories portray a breast cancer survivor, patient, or advocate; these individual cases are mostly ordinary women, supplemented by occasional examples of prominent women from public life or the entertainment world. Statistics are quoted in 20% of the stories, and almost half of these news items also present narrative case examples. These disparate forms of framing may have important implications for audience responses. Henderson and Kitzinger (1999) have reported qualitative findings indicating that the "human interest" angle engages attention and shapes understanding of stories describing genetic risk of breast cancer. Women also may respond differentially to latent themes involving personal fears and causal attributions that are characteristic of narrative stories (Clarke, 1999).

These news content analysis findings also yield applied implications for practitioners. The information can be useful for breast cancer specialists and activists seeking to evaluate the performance of the news media and monitor the array of information available to the general public and cancer patients. Data showing which topics are heavily and lightly covered can be used by communication professionals who are designing educational and persuasive messages to complement the journalistic stories that already are reaching readers and viewers. Notably, breast cancer communicators need to address the limited coverage of contaminant risks and preventive actions, particularly during the prepuberty years.

Limitations and Future Research Directions

In interpreting these patterns of results, there are several limitations of this investigation that should be taken into account. First, the time frame is restricted to 2003 and 2004, thus missing longer range trends and fluctuations of certain aspects of breast cancer news. The study examines only three basic channels reflecting the traditional mass communication news system; almost half of the items appear in newspapers and magazines, which restricts examination of messages that are likely to reach low-literacy and low-income audience segments. The public is increasingly using other communication channels, and learning from entertainment, advertising, and informational messages as well as from conventional journalistic coverage.

The research did not provide an assessment of the complexity of news coverage relative to audience levels of news media literacy and numeracy (Friedman & Hoffman-Goetz, 2006), particularly capacity to understand and interpret health risk information regarding controllable lifestyle factors and exposures to contamination. Future research is needed to thoroughly examine these issues involving audience capacity to absorb complex or written health information on various breast cancer topics appearing in different channels. One content analysis of more than 1,000 newspaper articles about environmental pollution over three decades shows that the news coverage is overwhelmingly directed to the highly educated segment of the public rather than to the broad audience (Kenix, 2005). Covello and Peters (2002) assert that many women misperceive breast cancer health risks based on media information sources, and that this contributes to a lack of taking appropriate prevention measures. Analysis of contextual risk information may be useful, because women's breast cancer risk perceptions are constructed relative to other women in society. A research team informed a sample of women about their personal 10-year and lifetime risk estimate either in isolation or in comparison with others in their age category at lowest risk (Lipkus, Biradavolu,

Fenn, Keller, & Rimer, 2001). Individual estimates in isolation led to accurate perceived risk, while providing comparative prevalence information distorted personal risk perceptions.

To expand upon the current focus on conventional news, the breast cancer content analytic agenda should include additional forms of media messages. On television, depiction of characters with breast cancer is an occasional storyline in daytime serials and primetime dramas, and breast cancer is a topic discussed by experts, celebrities, and survivors on talk shows. While newsmagazines carry major breaking news stories, women's magazines give more extensive feature coverage of breast cancer (Gerlach et al., 1997); it is important to note that these magazines are highly trusted for health information (Kitzinger, 2000).

News and educational material also is posted on websites of the leading breast cancer organizations (particularly Komen), universities and medical centers, as well as NCI and ACS; indeed, audiences increasingly access breast cancer news on websites of newspapers, newsmagazines, and broadcast news units. The Internet may play a different role than traditional media, because individuals motivated to search cancer websites are more likely to be patients and family members seeking treatment information from website material and links presenting more readily retrievable and detailed content (Matelski, 2001; Meric et al., 2002). Websites are especially promising sources of specialized news pertinent to narrow subgroups of high-risk women such as Ashkenazi Jews, which is often under-covered by traditional mass media (Donelle, Hoffman-Goetz, & Clarke, 2004). Those who are not specifically motivated to search Internet sites should continue to rely on the conventional media for their primary breast cancer information.

Finally, behavioral research projects might pursue two of the issues raised in the discussion of this content analysis. One priority is to examine how media coverage of treatment vs. prevention shapes audience responses, particularly the consequences for carrying out preventive measures. With respect to environmental risks, will long-range optimism undermine parents' motivation to perform protective behaviors with their young daughters, even though they realize that there are risk factors that they can impact?

Another future research priority is to determine which frames are most influential as cues triggering action or as evidence demonstrating risk levels. In the broad domain of breast cancer, what is the relative impact of statistical data vs. case examples in stimulating screening via self-exams and mammography? Which has the larger impact in motivating preventive behaviors? Does either type of message presentation have an effect on selection of treatment therapies? The personal cases tend to be presented primarily on television; experimental research can examine the optimum combination between narrative cases versus statistics in interaction with television vs. print versus online channel of information delivery.

In conclusion, this comprehensive content analysis offers a revealing overview of key dimensions of breast cancer news coverage, particularly the degree to which the media portray environmental risks and prevention behavior. Although the data are limited to a 2-year span in traditional news outlets, the findings yield useful applications for practitioners and suggest interesting issues regarding the potential audience responses to be studied in the future.

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Table 1

Cross tabulations between news channel and story content features

		News channel			
	Overall N = 231 (%)	Newspapers N = 84 (%)	Magazines N = 22 (%)	Television N = 123 (%)	
Domain					
Prevalence	30	35	29	27	X^2 = 1.4 (p = .49)
Environmental risks	25	29	46	19	X^2 = 8.7 (p = .01)
Prevention	35	42	50	28	X^2 = 6.3 (p = .04)
Detection	23	19	8	29	X^2 = 6.3 (p = .04)
Treatment	38	35	25	43	X^2 = 3.5 (p = .17)
Source					
Government agency	18	31	46	4	X^2 = 38.0 (p < .01)
Medical expert	68	77	75	61	X^2 = 6.7 (p = .03)
Personal case	40	25	12	46	X^2 = 19.5 (p < .01)
Foundation	26	38	8	20	X^2 = 12.5 (p < .01)
Corporation	15	26	17	7	X^2 = 13.8 (p < .01)
Medical journal	29	52	41	11	X^2 = 42.3 (p < .01)