ABSTRACT

Title of Document: THE STATE OF HEALTH JOURNALIST TRAINING AND EDUCATION: AN EXPLORATORY QUALITATIVE STUDY

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Health journalism critiques have often attributed shortcomings to inadequate training of health journalists, but few researchers have examined the educational opportunities available to health journalists. The purpose of this study was to explore how specialized education and training activities impart skills critical to performing health journalism. Eighteen semi-structured interviews were conducted with health journalists and health journalism educators. Interviewees identified skills critical to health journalism and described educational opportunities available to help specialists hone those skills. Educational opportunities vary in depth of coverage of science- and health-related subjects. Interviewees discussed the challenges of obtaining health journalism training and education weighed against benefits of such activities. Interviewee perceptions and experiences echo concepts from science journalism sociology literature, and align with theoretical media influence models. Findings indicate that opportunities exist to target public health messages through health journalists, and public health communicators may find partners for collaboration in health journalism educators.

THE STATE OF HEALTH JOURNALIST TRAINING AND EDUCATION:

AN EXPLORATORY QUALITATIVE STUDY

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Context

In 2007, I graduated from the Philip Merrill College of Journalism and began a career as a digital news editor. For the next five years, hundreds of health and medical stories crossed my desk, nurturing a growing interest in health issues that led me to pursue a master's degree in public health. Since enrolling, I've completed courses that diverge wildly from the writing and reporting classes that composed my undergraduate education, including epidemiology, biostatistics, program evaluation, research methods, and health behavior, among others. At some point in almost every course, a professor or classmate would scoff at some example of poorly-done health reporting by the mainstream media, inspiring me to contemplate how to improve the partnership between public health professionals and the news industry.

With my background in journalism, I know there is no beaten path to becoming a reporter on a specialized topic. Health and medical journalists come from varied backgrounds, and must learn about complex health concepts – the same concepts I've struggled to master as a graduate student – through on-the-job experience and self-guided study. My personal background and experiences have influenced my research interests and driven me to better understand how health journalists build their skills.

Statement of Research Problem

The terms "health journalism," "health news," and "health reporting" are used to encompass a broad range of reporting about health topics, including coverage of health policy, health care providers, public health, medical research and personal health issues

(Schwitzer, 2009). In the course of covering such a broad and complex beat, health journalists in the mass media perform a number of functions. They disseminate new health information and research, educate their audience about risks and benefits and advocate for patient interests and public health goals (Finer, Tomson and Bjorkman, 1997). Research has shown that people are more often exposed to health information through the mass media than other traditional sources of information, such as physicians or health facilities (Cho, 2006). Health journalism can potentially affect public health on multiple sociological levels (Dentzer, 2009). At the individual level, health news may influence behaviors and healthcare utilization. A 2009 Pew News Interest Index survey revealed that 41% of respondents cited what they have heard or read in the media as the most important factor in helping them form opinions about health care (Pew Research Center for People & the Press, 2009). At the governmental level, media coverage of health issues can influence policymakers' agendas and voter perceptions of health programs (Pettersen, 2012). Furthermore, one study has shown that health journalists perceive themselves to be health educators, to some extent, and recognize their power to influence public health. Results of a national survey showed that health journalists view educating people to make informed decisions and disseminating new, accurate information as the top priorities in their jobs. The majority also mentioned that their responsibilities include developing the health and scientific literacy of audiences and influencing public health behaviors (McCauley et al., 2012).

Shortcomings of health reportage

Despite the influence wielded by the news media, and journalists' views of themselves as educators, news critiques have revealed shortcomings in the reporting of

health issues. Though health information is abundant, some research has shown that information to be deceptive (Frost, Frank and Maibach, 1997), inaccurate (Gerlach, Marino and Hoffman-Goetz, 1997) or alarmist (Moynihan et al., 2000). One analysis of 500 news stories about medical treatments, tests, products and procedures found that journalists usually fail to adequately discuss intervention costs, the quality of the evidence, the existence of alternative options, and the absolute magnitude of potential benefits and harms. Only 35% of stories evaluated were rated satisfactory on the criterion of whether the reporter had discussed the study methodology and the quality of the evidence. Only 38% of stories were rated satisfactory for framing the intervention under discussion within the context of existing alternative options (Schwitzer, 2008). Some scientists claim press coverage of health stories can be "inaccurate, superficial, or sensationalized" (Pettersen, 2012, p. 5). Inaccurate, incomplete or misguided reporting on health issues can lead people to make poor choices that may put their health at risk or influence policymakers to support harmful laws (Vargas and De Pyssler, 1999; Pettersen, 2012).

Training health journalists

Health news analyses often attribute shortcomings to insufficient training in the area of health research and the scientific method. Hartz and Chappell (1997) wrote a seminal critique of science journalism and cited as a root issue "reporters who don't speak science" (p. 22). Their survey showed that 77% of the science reporters they surveyed did not quite understand the complexities of the scientific subjects they wrote about. Whereas journalists can become quite fluent in the language of government and politics, science is a specialized and more opaque culture. "Few [journalists] understand

the scientific method, the dictates of peer review, the reasons for the caveats and linguistic precision scientists employ when speaking of their work" (Hartz & Chappell, 1997, p. 36). Traditionally, few journalists are trained in the beats they cover, and in the case of health journalism, insufficient training could result in reporting that's confusing at best and dangerous at worst.

Voss (2002) found that 83% of the studied health journalists had received no specific training for covering health news, but many expressed that they desired such training. The author recommended collaboration between public health professionals and journalists with the goal of improving the quantity and quality of training opportunities, but stressed that further research is needed to examine how much and what kind of training would be most effective. Viswanath et al. (2008) expressed surprise that so few studies have examined the educational background of health and medical science reporters and editors in the United States and also recommended further research into journalist training. In order to make recommendations to improve health journalist training and education, public health professionals must first learn more about current educational practices. This study aims to advance research in the directions recommended by Voss and Viswanath et al. (2002, 2008) by gaining insight into the training practices and curricula for health journalists.

Research Goal and Specific Aims

In order to better understand the state of health journalist training and education, and to be able to make links between education and the critical skills health journalism demands, the goal of this study is to:

- QI: Explore how formal, specialized education and training activities and resources impart skills critical to performing health journalism.

Specific Aims:

Four specific aims were developed to contribute to the overarching research goal. These are:

- Identify what critical skills are relevant to health and medical reporting.
- Describe the form and content of health journalist education and training.
- Identify journalists' self-guided, on-the-job efforts to seek out training and improve understanding of health issues.
- Roughly gauge levels of interest and participation in specialized health journalism education and training.

Study Significance

During a literature review, the researcher did not encounter any published studies that aim to describe the content of health journalist education and training. Though Schwitzer (2008) interviewed more than 50 journalists in order to write his report on the State of Health Journalism, training opportunities comprised only a small portion of the overall

report, and he didn't touch on formal educational background at all. Viswanath et al. (2008) included questions about educational background in their study, but only broadly, ascertaining the number of journalists with journalism or communications degrees vs. the number with science degrees. Furthermore, the researcher found no published study that has sought to gather data from journalist educators and trainers; doing so will provide a more complete picture of educational offerings in addition to the resources that journalists most often take advantage of.

Many of the existing studies and reports concerned with health journalist training were published in the early 2000s, and in the intervening years the journalism industry has weathered great changes. Economic hardship has affected both staffing levels and monetary resources available for reporting and training. Freelancers, rather than staff writers, supply larger portions of reporting on specialized topics, and the changing digital landscape and the popularization of social media has altered how stories are reported and formatted (Keith, 2011). In the past decade, more universities have begun offering specialized or concurrent degrees in health and science reporting (Association of Health Care Journalists, 2014). Students of these programs will have an impact on the future of health journalism. Educators and educational and professional institutions create programs and training materials, and could serve as partners in public health communications. In light of these contextual factors, a more up-to-date study will result in a clearer picture of the state of health journalism education and training.

Definition of Study Terminology

Health journalist refers to an individual who produces health-related content for news media outlets. These may include writers or television or radio broadcasters. Journalists may be permanent staff of an outlet or freelancers who write on health topics for a number of outlets.

Health journalism educator refers to a person who develops or teaches curriculum covering special issues in specialized health reporting, either in formal educational settings, such as universities, or in more informal training settings, such as professional workshops.

Hierarchy of influences over media content is a theoretical framework that posits that the factors which influence the production of news operate separately and in conjunction with each other. The hierarchy includes individual, media routines, organizational, extramedia and ideological influences (Shoemaker and Reese, 1996).

Journalist education refers to the formal, systematic instruction of journalists. Most often, this formal education takes place in a college or university setting and includes undergraduate and graduate programs of study.

Journalist training refers to instruction of journalists outside formal school settings. This can include fellowships, seminars, conferences, online tool kits and written materials.

Chapter 2: Background

Review of Relevant Literature

Theoretical Models

Review of Relevant Literature

Introduction to literature review

In order to better understand health news reportage, it's important to look at the context surrounding the news product. This includes surveys of health journalist demographics, research into how they perceive themselves and their profession and critiques of their output. An additional consideration is the role of the news media in influencing their audiences' health decision-making process.

Health journalist characteristics

A mixed qualitative/quantitative study of 20 Norwegian health journalists found that none had degrees in biological or medical backgrounds, and they had restricted knowledge of statistics and "discourse" of science (Pettersen, 2012). Viswanath et al. (2008) also surveyed the broad educational backgrounds of health journalists, citing the importance of individual journalist characteristics as part of the hierarchy influences model as justification for their research. The authors found that 70% of respondents had bachelor's degrees; 8% were life sciences majors in college. In a series of in-depth interviews, Schwitzer (2009) found that the journalists he spoke to felt inadequately trained in their beat and would welcome more opportunities for training. One radio reporter said, "My biggest challenge is having enough background and training to cover health care. This is an incredibly complex and challenging beat. People are pitching stories left and right and if you don't have a way to analyze their claims, you could be doing your listeners a big disservice" (p. 11). Schwitzer (2009) also wrote of the findings of a nationwide survey of local television news health reporters published in 2004 that

suggested that many were eager for training, and, lacking it, fell prey to public relations spin.

Individual journalist characteristics, such as education, can affect how news stories are sourced and framed. Wallington, Blake, Taylor-Clark and Viswanath (2010) surveyed 468 health reporters and editors to determine how individual and organizational factors as defined under the hierarchy of influences theory affected health reports. Respondents with a bachelor's degree or less were significantly more likely than respondents with a master's degree or more to use government scientists and officials, and significantly less likely to use "other" scientists or researchers. Those with a bachelor's degree or less were also significantly less likely than those with a master's degree or higher to use scientific journal articles as a resource, and were significantly more likely to rely on press releases.

A journalist's role within an organization is also likely to affect output. In a series of interviews, Leask, Hooker and King (2010) found that specialist health and medical reporters, as opposed to those with general journalist training and professional experience, had a more sound technical knowledge, channels to appropriate sources, autonomy within their organizations, and ability to advocate for better quality coverage.

Health journalists' perceptions

Larsson et al. (2003) conducted focus groups and interviews with Swedish and British journalists to identify obstacles that hinder health journalists. The predominant obstacles mentioned by health reporters were lack of time, space and knowledge: Journalists have difficulties mastering the breadth of topics they must cover. The self-

reported lack of knowledge was particularly surprising to the authors because their sample of reporters had been working for many years and had long experience with medical reporting. When the journalists were asked how the knowledge obstacle might best be addressed, they emphasized the importance of their own improved education and interviewing skills.

A survey of Midwestern U.S. print health journalists found, interestingly, that less experienced reporters (an individual factor under the hierarchy of influences model) were more likely to have confidence in their skills and knowledge (Voss, 2002). Survey questions covered five skill areas: finding reliable sources, understanding key health issues, putting health news in context, producing balanced stories on deadlines, and interpreting statistical data. About 40% of the 165 reporters surveyed agreed that most health reporters lack adequate training to cover health. Nearly 83% reported having received no training for covering health news. Of those, about 73% said that training would be helpful. Nearly 84% reported having received no training in interpreting health statistics. Of those, nearly 68% said that training would be helpful.

Media critiques

Schwitzer's analysis of 500 news stories about medical treatments, tests, products and procedures uncovered several areas of weakness (2008). The analysis found that journalists usually fail to discuss costs, the quality of the evidence, the existence of alternative options, and the absolute magnitude of potential benefits and harms. Only 35% of stories evaluated were rated satisfactory on the criterion of whether the reporter had discussed the study methodology and the quality of the evidence. Only 38% of stories were rated satisfactory for putting the intervention under discussion into the

context of existing alternative options. Schwitzer's analysis research led to the founding of healthnewsreview.org, which graded the daily health reporting efforts of major print outlets until 2013, when funding ran out. The organization's grading criteria will provide a basis for interview questions about critical health reporting skills.

Some research makes news before it's been properly vetted. Schwartz, Woloshin and Baczek (2002) reviewed 147 research presentations at five major scientific meetings in 1998 that resulted in news coverage. More than one-quarter of the studies generated front-page news stories in at least one major newspaper, but more than one-third of those presentations involved small numbers of subjects or were based on animal or studies. Three years later, only half those research papers generating news coverage were published in a peer-reviewed journal.

In a retrospective case study of the mass media reporting of the Wakefield vaccine autism study, Boyce (2007) found issues with how health journalists seek out expert sources in their attempts to present a balanced story. "Journalists stated they did not use different methods to select expert-sources and non-expert sources…One tabloid health editor argued she chose expert-sources she 'could get hold of'" (p. 902). Boyce recommends that improvements in training can help health journalists better evaluate researcher expertise.

Audience influence

Some studies have attempted to quantify the impact of news media on public health, and research indicates that coverage correlates to varying degrees with perceptions and behaviors. A 2009 Pew News Interest Index survey revealed that 41% of

respondents cited what they have heard or read in the media as the most important factor in helping them form opinions about health care (Pew Research Center for People & the Press, 2009). A study of the association between media coverage and perceptions of infectious disease found that participants considered diseases that occur frequently in the media to be more serious, and have higher prevalence than those that infrequently occur in the media (Young, Norman & Humphreys, 2008). News coverage that supports tobacco control has been shown to set the agenda for further change at the community, state, and national levels (National Cancer Institute, 2008). Longitudinal studies examining the effect of news coverage on behavior change saw participants take action resulting from coverage, ranging from seeking information about and seeking health care or treatment (Caburnay et al., 2003; Wey, Lo & Lu, 2008). A 1997 National Health Council survey showed that more than half of Americans (58%) claim a medical or health news story led them to consider changing their behavior or to take a specific action, such as seeing their doctor, changing their eating patterns, modifying their exercise habits, or getting some kind of medical treatment. A January 2000 poll conducted for the American Dietetic Association found 48% of respondents who cited television as a leading source of nutrition information, while 47% said they get information from magazines and 18% from newspapers. Physicians were cited as a leading source by only 11% of respondents (Voss, 2003).

These studies demonstrate that health journalists and news media organizations can affect the public's attitudes, perceptions and behaviors relating to health topics. The issue of accurate, high quality health reporting, then, is justified as an area of focus for a behavioral and community health project. Journalists' perceptions of themselves as

audience educators may make them more accepting of interventions and collaborations with public health professionals. Though information from doctors and other medical professionals may be more highly influential on the health of individuals, the public is more frequently exposed to information about health topic through mass media. Furthermore, local coverage is more influential than national coverage, so in seeking to promote local community issues and interventions, media could be strong community health partner if they're properly trained and can reliably disseminate information (Pew Research Center for People & the Press, 2009).

Theoretical Models

Introduction to theoretical models

This study was based on Shoemaker and Reese's hierarchy of influences model (1996), a theoretical framework outlining the macro and micro factors that determine news content. Key to this framework is the idea that information flows through gatekeepers at various levels in the course of news production, and gatekeepers determine what subset of available information reaches the public. This model is highly relevant to mainstream media news products, and is one prominent framework through which the relevant literature explains phenomena in the field of health journalism. The hierarchy of influences model, within the context of health journalism sociology, guides this research.

Sociology of journalism

According to McNair's book (2008), the "sociology of journalism," broadly, is the study of how social determinants impact journalistic outputs. A number of factors

influence and constrain the form and content of news media. At the most proximal level, news is the product of an individual journalist. The journalist's background – including factors such as gender, race, upbringing and education – influences what the journalist considers to be news and how it's presented. Health journalist education can impact health news at this level because it will affect individual competence and skill. At a higher level, organizational factors influence news. "Organization" can refer to a distinct publication or broadcast program that employs a journalist, or it can refer to how the industry is organized around certain principles and practices. For example, it's an industry-level convention that in a print news story, a lede paragraph will convey the "5 W's" to quickly introduce a reader to the facts of a story. Further specifications can take place at the organizational level, such as a preference for a specific stylebook. Organizational factors impact journalist education in two main ways. In one direction, formal journalism education often includes the teaching of common industry practices to students. In the other direction, organizations demonstrate varying levels of support for journalists seeking ongoing, on-the-job training. Recommendations for improvements on health journalist training can therefore aim to impact this organizational level. At higher levels, media ownership and political pressures influence news output, but it's unlikely that changes in health journalist training can impact journalistic output at this level.

Issues in science journalism

More specific than the sociology of journalism are the theories surrounding how scientific information is popularized. One content analysis found that up to three-fourths of identified science news stories were medical or related to health (Gregory & Miller, 1998), so science communication research is relevant to this study. The linear and

diffusion models of science communication place the scientist in an "upstream" position as an initial source of information, which trickles down or out to the general public. "The members of the laity are understood purely as recipients of this information. Journalists and public relations personnel are viewed as intermediaries through which the scientific findings filter" (Gregory & Miller, 1998, p. 86). In such models, the aim is for the "downstream" parties to receive a message that is as faithful as possible to the one sent by the scientist originators.

This propensity to value accuracy above all else leads science journalists to form an alliance with scientists in order to get the most accurate facts. This, in turn, may result in journalism that is more deferential to its subjects than would be acceptable in other areas of news coverage in order preserve the relationship with important sources (Gregory & Miller, 1998). The values of science journalism may vary in other important ways from those of general journalism; for example, science and health articles have more of a tendency not to include a second voice in a story apart from the scientist or expert who is the main subject. This is especially problematic when scientists use the news media as an outlet to influence public policy issues. Though Russell (1986) states that though scientists have no duty to be neutral, journalists have an obligation to point out when a scientist becomes an activist or is influenced by financial considerations. Another issue is an over-reliance on especially visible and cooperative scientist and expert sources. "A danger exists both for these 'big name' researchers and for the journalists who quote them when the scientists begin to stray from commenting on their fields of expertise and become 'instant' experts on almost any scientific subject under the sun" (Russel, 1986, p. 87).

Beyond sourcing, there are other pitfalls to be aware of in the coverage of science and health news. A story must have meaning and relevance for a lay-audience, which is not the same as having meaning and relevance in the science community. Members of the media favor stories that emphasize the end-products of science, whereas scientific culture emphasizes process – "the fumbling trial and error, the logical way in which a scientist devises tests to choose between alternative hypotheses, the long chain of small advances gradually leading to new understanding" (Miller, 1986, p. 253) As a result, implications of a scientific finding may be overstated by journalists to meet a threshold of newsworthiness (Gregory & Miller, 1998).

Health media critiques have pointed out the elements commonly lacking in health news reports, which can help guide questions about what skills are most crucial for journalists to gain through education and training. Schwitzer's Health News Review grading criteria (2014) offer some guidance. His critics graded the success of health news based on the following list of criteria:

- Does the story adequately discuss the costs of the intervention?
- Does the story adequately quantify the benefits of the treatment/test/product/ procedure?
- Does the story adequately explain/quantify the harms of the intervention?
- Does the story seem to grasp the quality of the evidence?
- Does the story commit disease-mongering?
- Does the story use independent sources and identify conflicts of interest?
- Does the story compare the new approach with existing alternatives?
- Does the story establish the availability of the treatment/test/product/procedure?

- Does the story establish the true novelty of the approach?
- Does the story appear to rely solely or largely on a news release? (Schwitzer, 2014)

The main themes that carry through these criteria are the requirement to correctly quantify findings in a way that is contextually meaningful to a lay-audience, the ability to judge the quality of the study methods and data and the need for the journalist to have enough grounding in a research area to enable them to put the new "breakthrough" in perspective of the larger progress of scientific development in the field. These main themes are also made clear in Schwitzer's "Statement of Principles for Health Care Journalists" (2004). Key among these are: "Clearly identify and explain the meaning of results," "Understand the process of medical research in order to report accurately," and "Quantify the magnitude of the benefit or the risk in the story." These criteria and principles indicate that quantifying and contextualizing research are key skills for health journalists, which require a good understanding of statistics and the ability to critically evaluate scientific research. Hartz & Chappell (1997), Schwitzer (2004) and others stress that scientific culture can be opaque and that understanding of the scientific method is crucial to the successful interpretation of research. Previous research into health journalism sociology provides some guidance for areas to address during data collection.

Though this research, and much of the research focused on science journalism, assumes a degree of specialized knowledge, the majority of science and health news is not created by a specialist. "There are two types of journalists who cover science news: journalists and science journalists…There are certainly some distinct characteristics of the culture of science journalism….but mostly science journalism is just journalism"

(Gregory & Miller, 1998, p. 108). So in many ways, the practice of science journalism is susceptible to the same influences that impact general journalism. Deadlines often limit the amount of information that can be gathered to include in a science story, and they often contribute to lost subtlety. Intermediaries, like press officers, attempt to moderate the message and control access to scientists and officials. Ultimately, publication or broadcast of a story is subject to the judgment of editors, who, at general news outlets, are not likely to have specialized knowledge in the content area. Editors and publishers determine not only what stories look like, but how much space, time and resources to devote to health and medical coverage. There's also a newsroom problem-solving component to the decision making process, in which informational content choices are made to allow for convenience or expediency of newsgathering and reporting. For instance, health reporters receive pitches from public relation firms on a daily basis, and accepting releases is easier than reading research and finding expert sources to build a story from scratch (Gregory & Miller, 1998). Improved health journalist education and training may serve to empower the individual reporter as the gatekeeper if they feel better able to critically evaluate health information themselves, instead of relying on PR pitches. More empowered individual journalists may also be better able to argue for increased coverage of certain health topics or exercise greater autonomy within their beat.

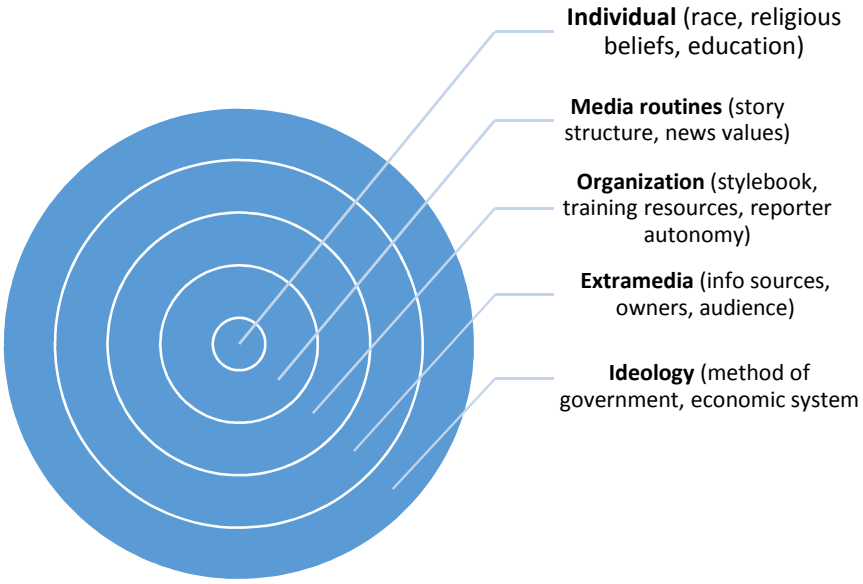
Hierarchy of influences model

Shoemaker and Reese (1996) expanded on the gatekeeper model with their hierarchy of influences model, which posits that gatekeeping occurs at various levels, and factors at each of five levels influence news production separately and in conjunction with one another (Shoemaker & Reese, 1996). The most basic level of analysis is the (1)

individual, and those corresponding micro-level factors which could influence news output, such as race, religion, education and attitudes about professional roles. In the model, the individual journalist's characteristics don't directly affect news output, but instead has a greater influence on professional attitudes, which may in turn influence content. This represents an avenue for training to influence media; health journalist education is where feelings about professional tenets can be formed. Education has more potential to influence content than journalist demographics.

The next level to influence mass media messages consists of (2) media routines, "those patterned, routinized, repeated practices and forms that media workers use to do their jobs" (p. 100). This represents the immediate environment in which individual health journalists do their jobs, and can be thought of as professional norms that span across organizations. The next level is (3) organizations (such as a specific publication), which can constrain news content through variations in internal structures, goals, technologies, and markets. The next level is (4) extramedia influences on content, which act on organizations. These include sources of information, audiences, government, the economic environment and technology. The final, all-encompassing level is (5) ideology. Ideology refers to the high-level, societal values that influence content by drawing on familiar cultural themes that resonate with audiences. For example, capitalist messages will prevail in United States media. Figure 1 depicts a visualization of this model:

Figure 1: Hierarchy of influences on media content



Shoemaker and Reese call for media interventions to span influence levels to have the most impact. Health journalist training and education has the potential to reach individuals, and also the routine and organization levels once professional associations and sources become involved in training (Shoemaker & Reese, 1996). One study performed since the advent of "new media" hypothesizes that individual level factors are becoming more important as organizational routines destabilize with the consolidation of newsrooms and the increased proportion of content that comes from journalists not employed by media organizations (freelancers) (Keith, 2011). Shoemaker and Reese's model is also appealing for studying media output in a public health context because it mirrors the Social Ecological Model of health behavior, which posits that for any single health behavior, there are multiple levels of influence, including the individual, the interpersonal, the organizational, the community, and the policy levels (McLeroy et al.,1988).

Chapter 3: Methods

Overview

Study Population

Sampling Procedure

Data Collection Procedures

Data Analysis

Overview

An important first step in improving health journalist training is performing a kind of environmental scan of the educational and training landscape. Environmental scanning is the acquisition and use of information about trends and relationships in a particular field, the knowledge of which would assist in identifying opportunities and planning future courses of action (Choo, 2001). The purpose of this thesis is to provide insight into the state of health journalist education and its relationship to news outputs. Specifically, this research sought to identify critical skills for successful health journalism and educational opportunities for journalists seeking to specialize or improve their skills in health and medical reportage. This was achieved by conducting a series of interviews with sources in the fields of health journalism and journalist education.

Qualitative research, especially interviews with experts in a field, can provide specific, rich insights not typically accessed via quantitative data gathering (Berg & Lune, 2004). The advantages of qualitative data-gathering methods are the depth and detail they lend to a topic. “Typically the choice to use an interviewing technique rather than a survey questionnaire is based on the selected procedure’s ability to provide maximum opportunity for complete and accurate communication of ideas between the researcher and the respondent” (Berg & Lune, 2004, p. 72). This is important for this thesis because it requires interviewees to discuss their personal educational experiences, articulate their thoughts about current practices and share their beliefs about critical skills and roles, which are difficult to capture through quantitative methods. Furthermore, the path to becoming a health journalist is far from standard (Keith, 2011); data gathering needs to be flexible enough to capture a wide spectrum of possible individual

experiences. However, in the interest of gathering an adequate quantity of data from busy professionals who may not be able to spare time for a lengthier interview, a short survey component was also included to gather information about health journalists' demographics (i.e. age, gender), educational background, descriptions of professional roles, length service in professional position, completion of health- and science-related curricula and efforts in seeking on-the-job training.

Study Population

Two classes of interviewees provided data for this study:

Journalists: Practicing journalists are able to describe how one makes the leap from general assignment reporter to specialized health topics reporter. However, even this seemingly self-explanatory label covers a range of professionals in a variety of media. For the purposes of this study, journalists invited to participate cover health and medical topics for written publications, broadcast outlets (television and radio) and digital media in the United States. Journalists were selected from a pool that included both staff and freelancers. Health reporting could comprise the entirety of a beat or only a portion. The varied experiences of these participants contribute to a rich picture of a profession that has no typical archetype. The goal was to obtain at least 5 participants from this interviewee class.

Journalism educators: This class of interviewee includes those who have taught or developed curricula for journalism courses in formal educational settings in the U.S., namely colleges and universities. Educators who teach health, medical or science

reporting were targeted to comprise this class of interviewee due to their specialized expertise and high levels of interaction with health journalists. Some of these educators work at the undergraduate level, but were more likely to be found in graduate programs. They are able to speak to the skills such programs seek to impart to their students, who may or may not go on to specialize in health reporting.

Also included in this class are those who have organized and implemented educational and training opportunities that don't terminate in a degree, such as a fellowship, professional conference or workshop. Such educators were found in professional journalist associations and foundations, or in health agencies that provide training for the media, for example. This class is able to provide insights on the types of training available for journalists seeking continuing education outside the confines of a formal degree program. The researcher aimed to obtain 13-15 interviewees from the health journalism educator class.

The total target sample for both interviewee classes was 18-20. This number was arrived at by considering the relatively small number of health, medical and science journalism educational programs that exist to draw participants from. Data saturation was a main concern. Qualitative samples need to be large enough to assure that most important concepts are explored, but a sample that is too large can produce repetitive and redundant data. Literature suggests that seeking participants with special expertise in a research topic area can reduce the number of participants needed to reach saturation, as can designing a study that uses more than one method of data collection (Mason, 2010). By focusing recruitment on journalists and educators specializing in health journalism, and using an online survey to supplement in-depth interviews, the 18-20 person target

sample for this research was determined to be adequate. Additionally, this sample size adheres to Bertaux's (1981) guidelines that 15 is the smallest number of participants able to provide data saturation in a qualitative study.

Sampling Procedure

In order to gain approval to perform research with human subjects, an application was submitted to the University of Maryland, College Park (UMCP) Institutional Review Board (IRB) on December 15, 2014. After providing revisions to study materials, final approval was granted by the IRB on December 22, 2014. Only after approval was obtained from the IRB did sampling and recruitment of participants begin (Appendix 1).

The researcher identified a convenience sample of journalists through a two-step process. First, the researcher used the 2014 BurrellsLuce list of top media outlets to identify the newspapers, broadcast outlets and digital media platforms with the largest market reach in the U.S. Then, contact information was obtained by searching these outlets' publicly available web sites for any reporters listed as a health or medical reporter. Names and contact information were collected in order of media outlet market size rank, as it was assumed larger outlets would be most likely to have a staff member devoted to health or medical coverage. Any journalist whose e-mail address or phone number could not be found was excluded, due to the logistical concerns of a physical address as the only means of contact.

A convenience sample of educators was assembled with the aid of a former professor of science, health and environmental journalism in the University of

Maryland's Phillip Merrill College of Journalism. This professor helped the researcher assemble a shortlist of colleges, universities, associations and agencies that she knew to have health, medical or science education programs. The researcher added to this list by using basic Internet search tools, and then used these institutions' publicly available Internet listings to identify directors, professors or leaders of those programs. Again, any potential interviewee who couldn't be reached via e-mail or phone was excluded from the workbook.

The process of identifying potential participants did not overlap with the recruitment process, and was completed by January 7, 2015. Once the list of potential interviewees was generated, each was contacted with an invitation to participate via e-mail. The email contained the details of the study, including the study topic, survey and interview process, confidentiality, and incentives, followed by a request to participate (Appendix 2). If the stakeholder agreed to participate, then a time and place was agreed upon to conduct a phone interview, during which a script was read to further clarify consent.

As interviewees were identified, their names and contact information were recorded in Microsoft Excel (Microsoft, 2013). Journalists and educators were assigned to separate workbooks. The names of interviewees were added, along with their contact information and associated media outlet or institution, in the appropriate workbook. For the sake of timeliness, a cap of 80 interviewees from the journalist class and 35 interviewees from the educator class was set. The lower cap for educators was arrived at under the reasoning that they would be more likely than the journalists to participate in scholarly research related to their field. The cap was met in the journalist workbook, but

not the educator workbook. The total number of stakeholders identified through this initial convenience sampling process was 102: 80 journalists and 22 educators.

The first round of invitations, sent January 8, 2015, yielded four responses from journalists agreeing to an interview and zero from educators. Journalists who had not responded to the first round were e-mailed again after one week. A second round of invitations to educators was delayed until February 2, 2015, under the supposition that they might be more likely to respond to their business e-mail closer to the traditional start of the Spring academic semester. Second-wave invitations resulted in zero additional journalist responses and 10 responses from educators either agreeing to an interview or suggesting a colleague who might be able to participate in their stead.

A contact log was kept as a separate worksheet in Microsoft Excel (Microsoft, 2013), which detailed attempted e-mails for each selectee, so that responses and next actions could be recorded and the follow-up timeframe could be followed. It included eight columns: the selectee's name, their media outlet or institution, their contact information, the date of initial contact, notes on the initial contact, date of the second contact, notes on the second contact, and a final column to indicate whether the selectee was enrolled or removed from the list. Each time a contact was attempted, the contact log was updated to reflect that activity.

Interviews were conducted on a rolling basis as selectees' replies were received. These interviews included questions meant to induce snowball recruitment. As interviewees suggested other contacts, they were added to the Excel workbooks and sent an invitation e-mail. Five additional interviewees were recruited in this process. The

target participant numbers were reached in this manner, so all potential interviewees received a maximum of two e-mail invitations with no additional follow-up.

Data Collection Procedures

Data collection began after the first round of participation e-mails was sent on January 8, 2015, and took place concurrently with further recruitment efforts.

Interviews

Data collection primarily included 20-30 minute semi-structured interviews. Once affirmative responses to the e-mail invitation were received, the researcher began scheduling phone interviews with participants. The date and time of the interviews were based on the preferences and availability of each interviewee, as well as on the availability and discretion of the researcher. At the beginning of each interview call, the researcher read an informed consent script, which was approved by the UMCP IRB (Appendix 3). This script laid out the purpose of the study and confidentiality measures, and emphasized that participation in the study was completely voluntary. After being given the opportunity to ask questions, all interviewees assented to be interviewed. At this point the researcher asked interviewees if they would agree to have their responses audio recorded, with the assurance that the recordings would not be used for broadcast. All interviewees consented. Interviewees were notified that their identify wouldn't be linked to their responses, and that any potentially identifying information included in their responses, such as places of employment, would be redacted from transcripts of their interview.

Once interviewees stated that they were willing to voluntarily participate in this research, data collection began. All interviews were one-on-one, semi-structured phone interviews. Data was collected from each participant using a qualitative interview protocol. There was a separate protocol for journalist and educator interviewees (Appendices 4 and 5). Journalists' protocols included 10 questions with an optional eleventh questions for those in supervisory roles. Only one of the five journalist interviewees answered the optional eleventh question. Otherwise, all journalist interviewees answered the same protocol. The educator protocol contained eight questions, and all 13 educator interviewees answered the same protocol. Both protocols were designed to take 20-30 minutes to complete. Throughout the course of the data collection process, interview times ranged from approximately 15 minutes to approximately 40 minutes, not counting the time spent on the consent process. Interviewees were informed that they were not required to answer any question they weren't comfortable with. The interview protocol was followed with as few diversions for clarification or elaboration as possible.

Interview protocol

The interview protocol was designed to address the specific aims of this study within context of the theoretical frameworks mentioned above. Table 1 illustrates how some portions of the protocol relate to study aims and theoretical frameworks:

Table 1: Interview protocol content areas

CONTENT AREA	EXAMPLE QUESTIONS
Role of health journalists: (personal level in hierarchy of media influence)	What role, if any, do you think health journalists play in affecting public health?
Identify critical skills (research aim)	What skills do you think are crucial for science and health reporting that might not be necessary for other types of reporting?
Identify self-guided training efforts (research aim)	What are some ways you've tried to improve your health reporting skills since being on this beat?

At the close of each interview, interviewees were asked if they had any questions or any additional comments, and were thanked again for their time and participation. The researcher then told the interviewee that as a thank-you gift they could receive a copy of the book *A Field Guide for Science Writers: The Official Guide of the National Association of Science Writers* ($18 value) if they chose to. Only one interviewee accepted this, and the researcher recorded their address for shipping. Dr. Garza provided funding for this incentive from a departmental research fund. The participant was asked to confirm receipt of their book with an e-mail to the researcher. The researcher also told each participant that they would be sent a report summarizing the findings of this research at its completion.

All interviews were audio recorded digitally using the Voice Memo application on the researcher's iPhone and transferred immediately to the researcher's private password-protected laptop. The audio files, and the resulting transcriptions, were labeled

with 2-3 letter codes to preserve confidentiality. Codes were made up of the first one or two letters of the participant's last name plus a "j" for journalist or "e" for educator to allow for file organization. Each interview was transcribed within 48 hours of the interview. All written transcriptions were saved electronically to researcher's private pass-word protected computer, using a corresponding identifier code. Data collection took approximately nine weeks from IRB approval to completion. All audio files and interview texts will be securely stored for a period of 5 years from study completion, at which point they will be destroyed.

Survey

Interview data was augmented by a brief online survey hosted by Qualtrics (Qualtrics, January 2015). Only journalist recruits were invited to take this survey. A link to the survey was included in journalists' invitation emails, so participants could navigate to it at their convenience if they decided to participate. The introduction screen to this survey included informed consent information approved by the UMCP IRB (Appendix 6). The information included the purpose of the study, confidentiality measures, and the contact information of the researchers should the participant have further questions. The information also emphasized that participation in the survey was completely voluntary. Continuation of the survey signified implied consent. The journalists' 10-question survey contained a section of demographic items, including gender, age range, highest level of education completed, degrees attained. Professional items included open-ended questions about the description of their professional role, number of years in professional role and percent of time spend on health reporting tasks. The last section focused on education and training experiences and included open-ended items inquiring about any health and

science-related courses completed during secondary education, and materials and resources used for on-the-job training (Appendix 7).

Data Analysis

Online survey analysis

The online Qualtrics (Qualtrics, January 2015) survey for journalists contained seven items designed to gather information about respondents' demographics, educational backgrounds and professional roles. The first three items were multiple choice questions about gender, age and highest level of education completed. The next four items called for a short, open-ended response naming any degrees earned, their current professional role, number of years in current position and percent of time at work spent reporting on health/medical topics. Responses from the Qualtrics survey were exported into a Microsoft Excel (Microsoft, 2013) workbook, and cleaned up so that response units were standardized (i.e., 3 months converted to .25 years). All data was included for analysis, as no outliers were identified based on interquartile range calculations. In the workbook, each column represented a variable (i.e. age, highest degree acquired), and participant responses were entered in the cells beneath their respective variables. Descriptive statistics were calculated based on survey data in order to determine the distribution of demographic and background variables among the respondents. A series of univariate analyses were conducted to construct a profile of participant demographics and professional variables (i.e., average number of years working as a health journalist).

The last three questions in the survey were open-ended items asking respondents to list any college-level health- and science-related courses they recall taking and any training resources they've used on-the-job in their professional roles as health journalists. Data from these lists was organized in Microsoft Excel (Microsoft, 2013). Each course or training resource mentioned by participants was entered into a column, and the adjacent column was used to tally the frequency by counting mentions of each item across all responses. Data gathered in the online survey supplements data collected during the qualitative interviews.

Deductive qualitative analysis

Although this was an exploratory study that does not set out to test hypotheses, its specific research aims and use of media and communication theory provided a starting point for data analysis. According to the literature, deductive qualitative data analysis is well-suited for investigations where research objectives are set in advance and response themes can be anticipated through a priori reasoning (Pope, Ziebland & Mays, 2000). Therefore it was appropriate in this research due to the incorporation of a theoretical framework and the design of the interview protocol to illicit responses in several specific content areas.

Qualitative data resulting from this research was assigned codes. Codes are "labels that assign symbolic meaning to the descriptive or inferential information compiled during a study. Codes are usually attached to data 'chunks' of varying size and can take the form of a straightforward, descriptive label, or a more evocative and complex one" (Miles, Huberman & Saldaña, 2014, pp. 71-72).

In a deductive approach to qualitative data, the researcher creates a list of initial codes based on well-known concepts explored in extant literature before collecting and performing a line review of the qualitative data (Miles, Huberman & Saldaña, 2014).This encourages new research to build on previous findings from the field. A provisional "start list" can come from research questions and theoretical frameworks, and the researcher can begin analyzing data while in the field and tweak the start list for best fit while working on field notes (Bradley, Curry & Devers, 2007).

Despite the creation of an a priori code structure, deductive analysis still allows for some flexibility to capture unanticipated concepts that emerge in interviewee responses. Miles, Huberman and Saldaña (2014) advise that codes will change and develop as the data gathering process develops. Revisions to the start list and additions of emerging codes should be both expected and welcomed, since it usually signifies interesting new findings not previously encountered in the literature.

Once the first wave of coding is complete, second wave coding identifies patterns in the data and allows for it to be arranged into a narrative or visual display from which conclusions can be drawn and related to the research aims of this thesis (Miles, Huberman & Saldaña, 2014). Thus, the data analysis process performed for this research was focused on accomplishing the four specific aims of the study, which are listed in Chapter 1, and expanded to encompass unforeseen themes that emerged in interviewees' responses.

Qualitative data analysis process

To aid in organization and coding of data, the researcher purchased a student license for QSR International's NVivo 10 software package (NVivo, Version 10, 2012). This qualitative data analysis software includes tools to create code taxonomies, manage the textual data of the interviews and organize and segment qualitative data. Data analysis began before data collection with the creation of a code start list based off of the media and science communication theories uncovered during the literature review and the interview protocols that were designed to elicit interviewee responses related to specific areas of interest. During this process, 25 nodes were created in the NVivo software and were labeled with meaningful names to categorize them as codes and subcodes. Subcodes are second-order tags nested as children of primary codes in the tag hierarchy to allow more extensive subcategorization of data (Miles, Huberman & Saldaña, 2014). At this point, codes were predominantly high-level descriptors of information the researcher anticipated receiving during interviews. For example, one node of the code hierarchy consisted of skills critical to the successful performance of health journalism. This utility of this code was anticipated from both the science communication sociology literature as well as the main research aims set out for this study.

The start list of 25 codes was printed out on a sheet of paper to assist with note-taking during interviews. When an interviewee began speaking about a topic covered by the start list, a note of the recording time and was made to assist with later organization and categorization in the analysis software. The use of a start list also allowed for an emerging awareness of relationships and patterns emerging between existing codes, which could be represented using rudimentary symbols during note taking. Inductive

analysis began during the data collection process. During interviews with key informers, the researcher took note of potentially important or relevant topics not present on the start list. The notes then contained a fairly concise snapshot of the data contained in each interview. While listening to interview audio recordings and transcribing, the researcher was able to become more familiar with the content of the data and adjust the start list accordingly to aid in analysis of later interviews. The researcher's code book is included here in Appendix 8.

Once transcription of each interview was complete, it was uploaded individually to a single project within the NVivo software, and labeled with a code corresponding to the file name of the interview audio recording. Thus, each interview could be viewed separately or as a pool of data. Once transcripts were imported into NVivo, data was tagged according to existing codes, and new nodes were created within the hierarchy to correspond with new codes derived from inductive analysis conducted during data collection.

Once the final interview had been conducted and transcribed, the researcher re-read them all to engage in second-cycle coding, a method of condensing groups of data into a smaller number of categories representing themes, patterns or relationships (Miles, Huberman & Saldaña, 2014). Illustrative models and matrices were created to visualize and summarize the relationships between codes.

Chapter 4: Results

Interviewee Backgrounds

Study Findings Related to Specific Research Aims

Other Themes

Interviewee Backgrounds

Journalist survey participant backgrounds demographics

Ten participants responded to the online Qualtrics survey for journalists. Four respondents were male, 6 were female. The median participant age group was 40-44 years. Table 2 summarizes the journalist survey participants' demographic profile.

Table 2: Survey respondent

Variables	Journalists (*N* = 10)
Age group (yrs)	
18-24	1
25-29	1
30-34	1
35-39	1
40-44	2
45-49	0
50-54	2
55-59	1
60-64	1
Median age group	40-44
Gender	
Male	6
Female	4

Table 3 summarizes the journalist survey participants' educational and professional backgrounds. Three of the ten participants had obtained a bachelor's degree, one had completed some master's studies, and six had obtained a master's degree or higher. Three of the ten participants' bachelor's degrees were in journalism, two were in English, two were in history, two were in biology, and one was in communications. Of the six participants who earned master's degrees or higher, three were in journalism, one was a master's of public health, one was an MD, and one didn't specify an area of study. Nine participants identified their professional role. Of those nine, seven were staff reporters at daily newspapers. Of those, four called themselves health/medicine reporters, one identified as a science reporter, and one identified as a city desk reporter. Two participants of the ten were staff reporters for online publications, one at a digital news outlet and one at a trade publication. Time spent in current professional role ranged from 3 months to 26 years, with the average amount of time being 8.6 years. Nine participants

provided an estimate of what percent of their time at work is spent reporting on health and medical topics. One gave an estimate of 50%, another estimated 60%; the remaining five respondents estimated that 90% or mo re of their time at work is spent reporting on health and medical topics.

Table 3: Survey respondent educational and professional backgrounds

Variables	Journalists (*N* = 10)
Highest degree earned	
Bachelor's degree	3
Some masters studies	1
Master's degree or higher	6
Bachelor's degree area of study	
Journalism	3
English	2
History	2
Biology	2
Communications	1
Postgraduate degree area of study	
Journalism	
Public health	3
MD	1
Unspecified	1
	1
Professional role	
Staff reporter at daily newspaper	7
Health/medicine reporters	4
Science reporter	1
City desk reporter	1
Staff reporter for an online publication	2
Time in current professional role (yrs)	
Mean	8.6
Range	25.8
% of time at work spent covering health/medical topics	
50	1
60	1
90+	5

Interviewee backgrounds

The 18 interviewees who participated in this qualitative research represent a broad spectrum of journalism professionals. The target number of participants in each interviewee class was met; five journalists and 13 journalism educators were interviewed, for a total of 18 interviews.

However, boundaries between these classes of interviewees were extremely blurry. All but one educator either had practiced journalism at some point in their professional past, still considered themselves to be a journalist even if they weren't currently practicing, or are currently practicing

journalism in addition to performing their role as an educator. These participants were asked to speak as educators, but were encouraged to draw on the full range of their experience when responding to the interview questions. One journalist was also an adjunct professor of medical journalism and taught training seminars through a professional association, and was instructed to respond to interview questions as a journalist.

Table 4: Journalist informant backgrounds

Variables	Journalists (N = 5)
Gender	
Male	1
Female	4
Highest degree earned	
Bachelor's degree	2
Master's degree	2
MD	1
Years of professional experience	
<5	1
5-9	2
10+	2

Table 4 summarizes the journalist class of interviewees' educational and professional backgrounds. Journalist interviewees had a range of experience in the field. Out of five interviewees in this class, one had less than 5 years of professional experience, two had at least 5 years of professional experience, and two had at least 10 years of experience. These interviewees were highly educated. Two of the five journalist interviewees hold a bachelor's degree, two have master's degrees, and one has an M.D. Women were overrepresented in this class; four of the five journalist interviewees were women.

Table 5 summarizes the journalism educators' educational and professional backgrounds. Of the 13 educator interviewees, two had between 1-9 years of experience in educating journalists, eight had at least 10 years of experience, one had at least 20 years of experience, and one had more than 30 years of experience as an educator. As might be expected, the educator interviewees were highly educated themselves. Five of thirteen educator interviewees hold bachelor's degrees, six earned a master's degree, one had a Ph.D., and one had an M.D. The gender makeup of in this interviewee class was more evenly divided; 6 of the 13 educator participants are were women.

Table 5: Educator informant backgrounds

Variables	Educators (*N* = 13)
Gender	
Male	7
Female	6
Highest degree earned	
Bachelor's degree	5
Master's degree	6
PhD	1
MD	1
Years of experience as educator	
1-9	2
10-19	8
20-29	1
30+	1
Unspecified	1

Study Findings Related to Specific Research Aims

Specific aim #1: Critical skills in health journalism

The first specific aim of this research is to identify critical skills relevant to the practice of health and medical reporting. This was addressed by categorizing responses to the interview question, "What skills do you think are crucial for science and health reporting that might not be necessary for other types of reporting?" which was asked of both journalist and educator interviewees. Every interviewee responded to this interview prompt. Specific skills mentioned fell into ten main codes: critical analysis of health

information, information gathering, interviewing, sourcing, statistical analysis, understanding of scientific process, understanding of study design, interpretation, contextualization and specialized knowledge. In the reporting of results that follows, substantial blocks of data quoted directly from the sources will be italicized to differentiate them from quotes from the literature. The interviewees who provided the quotes will be identified by gender and interviewee class only to maintain their anonymity.

Critical analysis of health information

The skill mentioned most often by interviewees, in various phrasings, was the ability to critically analyze or evaluate scientific literature and data. This was a skill that was addressed heavily in the literature, and thus was included in the initial list of start codes. Throughout data collection, interviewees continued to bring up the skill in various contexts, which enriched the coding associated with the overall concept. The ability to critically analyze health and medical information was the skill mentioned most often; 10 sources contain 15 references to the importance of the skill in performing health journalism. One female educator defined the skill articulately:

> *"Covering health and medicine well requires a specialized set of skills that I think goes beyond science literacy. It is one thing to understand the basic outlines of a research study and accurately translate its reported findings into language the average consumer will understand. It is far more difficult to critically assess a given study (and researchers' declarations about its implications), reflect on the strengths and limitations of its design, and to understand how it fits, or doesn't, in the broader context of what is already knownon a given issue."*

Most often, those interviewees who mentioned critical analysis skills were specifically referring to the ability to evaluate scientific and medical literature and studies. Eight

references to critical analysis skills specifically mention scientific literature. One male educator elaborated on why the skill is important to health journalism.

> *"One [critical skill] absolutely is the ability to read and understand critically the original literature. Reading the papers, understanding the study well enough to ask questions about how it was done [helps] determine whether or not it's a story that merits broad coverage and who are the audiences that could potentially benefit from knowing about this."*

Other interviewees referred to the critical analysis of other forms of health and medical information, such as press releases, story pitches and claims made by interviewees. A female educator spoke about being critical of press releases:

> *"Students can't tell a health story because a hospital or university or a research institution issued a press release about a study that's been done on a new procedure, or a new treatment or identifying the cause of a condition…Just as the study itself is peer reviewed before it's going to appear in any major publication, we have our own vetting in covering anything like that."*

A female reporter spoke of the need to be critical of story pitches:

> *"Every day I'm pitched something or some product, 100s of emails, and they're all trying to sell you… I learned very quickly that every hospital has a shiny new toy and they want you to write about it, how wonderful it is. And so you have to really have skepticism."*

Some recurring language in references to critical analysis skills stood out in responses. Two educators and two journalists used "skepticism" or "B.S. detector" when speaking about critical thinking skills in health journalism, either equating skepticism with critical analysis or viewing it is as a value necessary for critical analysis. "Skepticism" in some form had four references, and two participants referenced the need to have a good "B.S. detector." A female educator spoke about skepticism specifically in

relation to medical literature. *"They (health journalists) basically need to know how to look at a medical study or a science study with some degree of skepticism."* A female reporter spoke more generally*: "I would say that as a health reporter, the skepticism you bring as a journalist, you have to amplify by 10."* By using this language, interviewees implied an ingrained unwillingness to take health information or source claims at face value.

Three codes emerged as skills that support or aid health journalists in the critical analysis of health and medical information: information gathering, statistical analysis and understanding of the scientific process. Subskills within these top-level codes include interviewing, sourcing and an understanding of study design.

Information gathering

A crucial health journalism skill most often referenced in relation to critical analysis of health information is the ability to gather information. Eight interviewees mentioned information gathering. "Information gathering" is an umbrella code that captures a variety of related skills. A female journalist boiled it down to "research and interviewing." A female educator equated it with reporting:

> *"For me what I want out of them (students) are strong reporting skills. I want people who believe that interview, observation and data research are a three-cornered stool and that they're all equally important."*

The repeated references to these skills as "reporting" skills implies that interviewees feel this is a foundational journalistic skill that becomes especially critical in specialized health journalism. These information gathering or reporting skills support critical analysis of health information because they allow health journalists to integrate information

additional to and independent of that provided in the literature, press release, etc. A male educator explained that, since health journalists cover a wide range of topics,

> *"you have to in a way educate yourself from zero every day, which means very quickly getting yourself up to speed by reading as much as you can around the web or in the journals, and then finding the experts and just asking them potentially dumb sounding questions until you get the story."*

Interviewing and sourcing

Interviewing and sourcing skills are subsets of information gathering. Three interviewees made three references to interviewing as a critical skill. When speaking about interviewing, language about asking "challenging" or "dumb" questions recurred (two references for each). Challenging questions allow journalists to dig beneath the surface assertions of health information. A female educator explains that "*being unafraid to talk to the actual scientists and researchers and physicians and keep asking them potentially dumb sounding questions*" helps journalists "*really understand what they did and what they think the significance is*."

Sourcing is related to interviewing. A female journalist described it as finding the people who will give journalists the information they need for a story. Three interviewees made four references to sourcing being a critical skill for health journalists. Participants identified two main factors in the need for proper sourcing. One is that health journalists can't be experts on every topic they write about, so "*what they need is to have access to sources and experts who know this stuff,*" according to a male journalist. The other reason for good sourcing is to add varied and independent perspectives to a story. A male educator cited the need to talk to people who can comment on a study's field or topic, but has no personal or professional stakes in publication or its outcomes

Statistical analysis

Five interviewees mentioned statistical analysis being an important skill that supports health journalists' ability to critically analyze health information, as well as the ability to contextualize it by comparing it to statistics reported in related research. A male educator explains, "*An ability to analyze data allows you to place numbers into perspective, find outliers and monitor changes over time*." Notably, each of the participants who identified statistical knowledge as a critical skill was an educator. No health journalists mentioned a need to analyze statistics. A male journalist noted the importance of being able to analyze data in studies, but said it's *"much better to find a good biostatistician who will help you with that than necessarily do it yourself*." Another journalist interviewee corroborated that statement, saying that rather than focusing a lot of time and energy on learning biostatistics, it's more important for journalists to know their weaknesses and know how to ask questions about that to mitigate those weaknesses and produce a high-quality story.

Understanding of scientific process

Four interviewees made five references to the understanding of the scientific process being necessary to the critical analysis of health information. A male educator elaborated,

> *"A sort of larger cultural understanding about the process and methodology of that realm of research is very important: an understanding of the way science and medicine work, how data is collected, how experiments are designed, how trials are designed, how work is published, and some of both the strengths and weaknesses of that."*

A male educator explains that, *"an understanding of evidence-based medicine is a big help because it allows you to question the thousands of press releases on medical studies*

that come out each year." Beyond aiding in critical analysis, another male educator mentioned that,

> *"knowing what it means to be a researcher and how the scientific process works can lead to much richer stories, especially in longer formats…[Health reporters] can ask those kinds of questions about the sociology behind a scientific experiment and really extract anecdotes and laboratory tales and other narrative elements that might not occur to general assignment reporters."*

Related to understanding the scientific process, three interviewees mentioned that understanding study design is necessary to health journalists' ability to critically analyze medical information. A male educator explained,

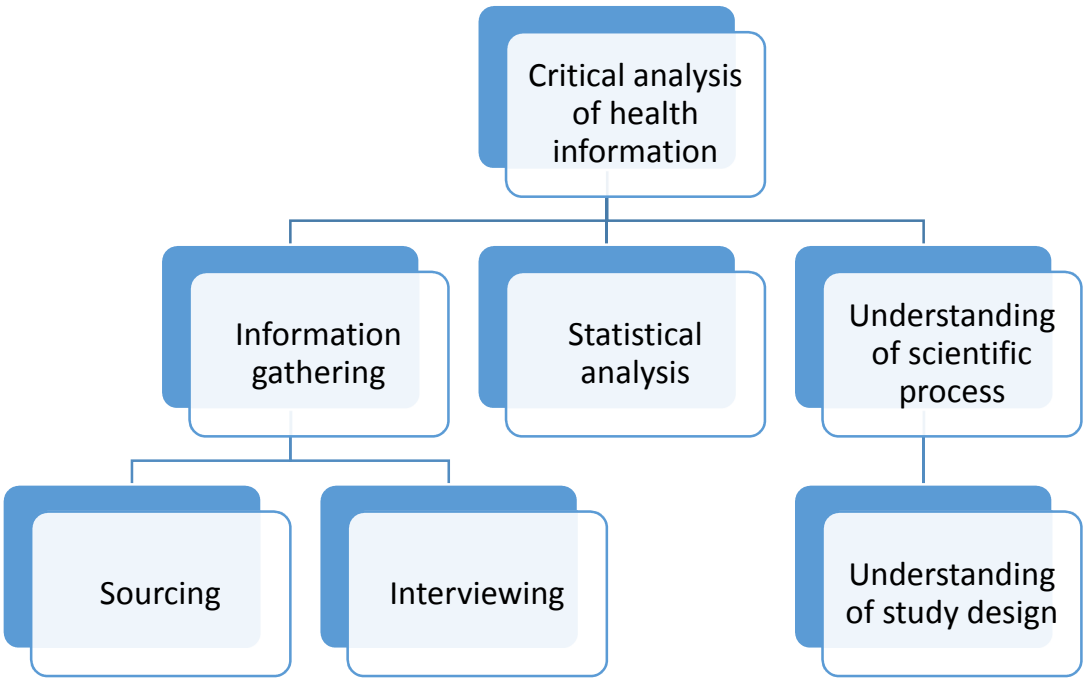
> *"It's really important to be able to read a science paper and form your own judgment about how good the study design was so that you can actually tell whether the results hold water. You have to have a really good B.S. detector and that depends on actually understanding some things about study design."*

Again, this language implies that journalists need to take a start from a place of criticism. Other educators specifically mention that in order to critically evaluate literature and story pitches, journalists should learn the relative merits of observational vs. randomized control trials, understand study "assumptions" and biases and be able to discern "what different study designs are able to tell you."

Figure 2 illustrates the relationship between skills that support critical analysis of health information. Interviewees specifically referred to information gathering, statistical analysis and understanding of scientific process as skills that help journalists critically analyze health information and place it in perspective relative to previous research. Some skills emerged as sub-skills of these parent skills. The ability to find appropriate, independent sources and ask them the right questions go hand-in-hand as a part of

information gathering during story reporting. An understanding of the scientific process includes understanding the relative merits of various study designs and principles.

Figure 2: Skills supporting the critical analysis of health information



Interpretation and contextualization

After critical analysis of health information, the skill that interviewees most often identified as being critical to health journalism was interpretation. Six sources referenced interpretation in interview responses. These responses indicate a sequence in a creative process: Once a health journalist has evaluated the merit of health institution's press release or the latest breakthrough study and decides it's worthy of media coverage, the journalist needs to be able to relate that information to their audience clearly and

effectively. A female journalist spoke of how her teachers and mentors impressed upon her that interpretation is the most critical skill for a health journalist to possess:

> *"Interpreting the numbers, interpreting the scientific concepts, interpreting health policy, interpreting disease states. Any knowledge that tends to be held by gatekeepers, be it scientists, doctors or legislators, any of that stuff, we learned how to interpret it for laypeople. We learned how to interpret it from the people who hold the information to the people that the information actually affects"*

One female educator described the interpretation of health information as making it "accessible" for laypeople: *"First of all is making the story accessible. That's what we say: build bridges, not barriers."* Beyond making health information easier to understand, participants noted that good interpretation skills make dry, technical concepts more appealing to read. When asked what skills are critical for health journalists, a male educator responded, "*Translating technical material into strong, compelling prose, that's a big deal. Knowing how to make test stuff really understandable and appealing."*

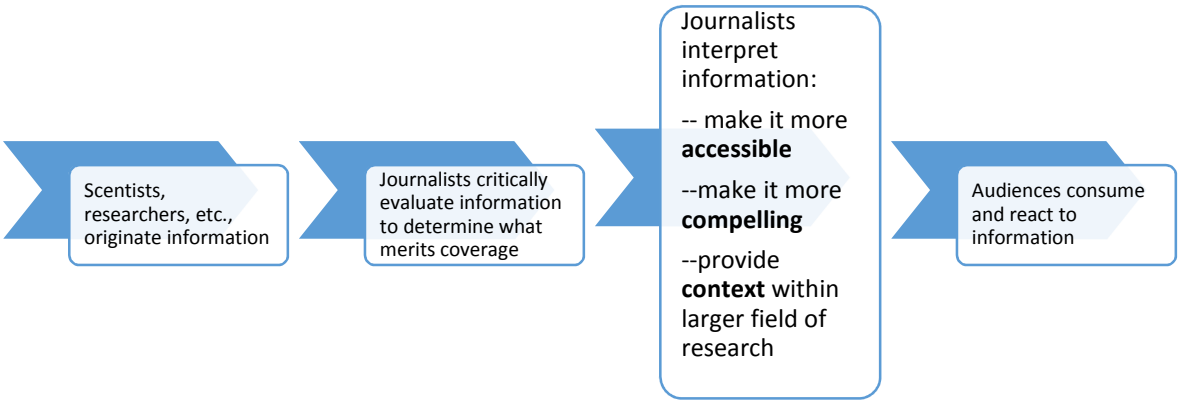
A related skill that commonly emerged in discussions about interpretation was contextualization. Three sources made references to the importance of contextualizing health information for layaudiences. For example, a male educator stressed the importance of not just

> *"identifying technical terms and what they mean, but looking at the impact of a new treatment or a medication, telling people very clearly, there's a new medication that works, what stage of development it's in, whether it's still being studied in a petri dish or it's in phase III clinical trials and what that means."*

A male educator explained that good contextualization signals to readers how they should react to news, "*so people know how to respond to it with a little bit more depth and clarity*." In the process of interpreting health news, journalists need to describe developments in relative terms to avoid overstating the importance of a "breakthrough."

Figure 3 depicts how interpretation comes into play in the reporting of health information, assuming that scientists, researchers and health professionals originate health information. Interviewee responses alluded to the order in which they apply critical skills in the course of reporting and creating news products. First, science, health and medical professionals create information, in the form of a new study, press release, etc. Journalists must then critically evaluate that information to determine whether it's worthy of reporting to their audience. In the course of reporting and producing worthy news, journalists make that information more accessible and compelling for laypeople, and contextualize the information to provide audiences with perspective regarding the significance of the information. After the information is interpreted via news media, audience members can choose to consume that information and react to it.

Figure 3: Flow and processing of information through health journalists



Specialized knowledge

Though not technically a skill, four interviewees mentioned that they believe it's important for health journalists to have some specialized knowledge in science- and health-related areas. Rather than bestowing any special advantage in producing news

output, this sort of specialized knowledge is desirable to give a journalist some basic fundamental understanding science and medical fields. A female educator described the need for this skill:

> *"Just as you have trained sports journalists covering sports, they know how to call the plays. The same is true in health journalism. The health and science reporters need to have some grounding in science to know how to call the plays there."*

With three specific references, biology was mentioned most often as the area where journalists need to have some grounding. A male educator stated that it's important for health journalists to "*know some basic epidemiology concepts so they understand the difference between correlation and causation or absolute vs. relative risk.*" Other specific knowledge areas explicitly mentioned include physiology, life sciences, pharmaceutical research, environmental health, public health and health policy. No consensus emerged as to which knowledge areas are most critical. No participants made reference to know much specialized knowledge in any area is "enough" to succeed in health journalism, nor did anyone elaborate on whether it's best to gain this knowledge in an academic setting or through independent learning and experience. Though the nuances of this "skill" area are ambiguous, interviewees seem to be emphasizing in these discussions that specialized knowledge is important in a coverage area that is often assigned to generalists. To continue the comparison above, a publication wouldn't call on its local government reporter to cover the Super Bowl, but the local government reporter might be assigned to report on the latest health development.

Other skills

Three other skill-related codes garnered three or fewer mentions in interview responses. Three sources made three reference to the importance of health journalists' understanding of healthcare industry economics. One male educator mentioned that such knowledge helps reporters "*examine hospital finances and insurance offerings.*" A female educator mentioned that healthcare industry knowledge helps reporters identify conflicts of interest and "*how money can pollute the system in various ways.*" Language like "pollute" and "conflict" again point to a belief that journalists should take a critical or distrusting stance when speaking with sources or gathering information. Two interviewees mentioned the importance of good writing and storytelling skills, which is related to the need to make the interpretation of scientific information appealing to laypeople.

Though not necessarily a hard skill, two interviewees mentioned that empathy is a critical value for health journalists to possess in their work. One male educator called it out as the most important skill, saying "*specialization is less critical, however, than caring about people*." A health reporter for a metropolitan daily reasoned that this characteristic is necessary due to the inherent human element of health-related stories.

> *"I think in health reporting a lot of the time you're talking to people who, unfortunately, they're dealing with something at the worst possible time in their life. You're kind of catching them right after they've had a crisis -- a stroke or various other illnesses. So I think just sort of understanding that and recognizing that and trying to put yourself in their shoes."*

Though these "other" skills are somewhat disparate and wide-ranging, enumerating them could provide insight into the skills and values that interviewees believe to be important to impart during health journalist training and education programs.

Table 6 shows where journalist and educator responses regarding critical health journalism skills overlap and diverge. Though there was quite a bit of overlap in the critical skills identified by both classes of interviewee, educators' list of critical skills was longer and included more technical and specialized areas. Many of the skills more closely associated with journalism, such as interviewing, sourcing and storytelling, were mentioned by both journalists and educators. Educators added more technical science- and health-related skills to the list, such as statistical analysis and understanding of study design.

Table 6: Critical skills by interviewee class

Critical skills identified by educators	Critical skills identified by journalists
• Critical analysis of health information • Information gathering • Interviewing • Sourcing • Statistical analysis • Understanding of scientific culture • Understanding of study design • Empathy • Understanding of healthcare industry economics • Interpretation • Contextualization • Specialized knowledge • Writing and storytelling	• Critical analysis of health information • Information gathering • Interviewing • Sourcing • Empathy • Interpretation • Writing and storytelling

Skill strengths and weaknesses

In addition to identifying the skills critical to performing health journalism, interviewees were also asked to identify skill areas they perceived to be particularly strong or weak in themselves (in the case of journalist interviewees) or their students (in the case of educator interviewees). Journalists answered the question mostly in the

context of how they felt their educations prepared them for their current professional roles as health reporters or editors. Information gathering skills, sometimes referred to as "reporting," was the strength most often mentioned by journalists. One female journalist said that the skills she calls on most often on the job are "*research, interviewing, information gathering, being out in the public, multitasking. These are all things I learned in journalism school that I've been able to apply in health reporting*." Another female journalist said that her education most effectively taught her how to "*find the people we need to interview, how to find the right information*." Beyond education, job experiences can help journalists prepare to specialize in health reporting. One male journalist mentioned that a previous job at a medical trade publication helped him learn the language of health and medicine and provided him with a better understanding of how the scientific peer review process works.

The skill area most commonly cited as a weak area was the ability to analyze scientific literature, referred to by three interviewees. Among this skill set, one female journalist clarified that she had particular difficulties evaluating the validity of outcome results. A female educator reported that students in her course "*often came in reporting that they had a hard time judging the merits of a given study beyond such factors as where it was published*." The same educator mentioned that students entered her training admitting to having particular difficulties with statistics and understanding how they could support or refute findings. A female journalist commented that when she came to the health beat, she was most unprepared for examining healthcare system financial documents, and this weakness left her less able to contextualize the meaning of health business news to her audience. Lastly, one female journalist expressed that she wished

she had come to her job with a better understanding of human biology and physiology because when she spoke with scientists and researchers, they would refer to disease mechanisms and biological functions in terms that made it more difficult to pose challenging and clarifying questions. These responses show that journalists and journalism students often come to the health beat with weaknesses in skill areas that interviewees identify as critical to the job.

Table 7 shows how mentions of interviewees' perceived strengths and weaknesses overlap with the critical skills identified by interviewees. Each item on the list was identified as a specific skill. Items are color coded to indicate which skills journalist interviewees mentioned as personal area of strength or weakness in their skills upon first entry into a specialist journalist role. Educator interviewees generally referred to skill areas where their students struggle or thrive. Generalists or beginner journalists recognize that they don't always have the adequate critical skills to perform health journalism to the highest standard; for example, interviewees weren't always comfortable critiquing health information. However, they also feel that their generalist educations and job experience equips them with some necessary critical skills, mostly those related to information gathering and reporting.

Table 7: Interviewees' strengths and weaknesses

List of critical skills identified by interviewees		
Critical analysis of health information Information gathering Interviewing Sourcing Statistical analysis	Understanding of scientific culture Understanding of study design Empathy Understanding of healthcare industry economics	Interpretation Contextualization Specialized knowledge Writing and storytelling

--Weak skill areas mentioned by interviewees
--Strong skill areas mentioned by interviewees
--Skill areas mentioned as both a strong and weak area by different interviewees

Specific aim #2: Form and content of health journalist education and training

The second main research aim goal research is to describe the form and content of health journalist education and training opportunities in order to better understand how critical skills are imparted to specialized health reporters. Health journalism educators were asked to describe their curriculum, and journalists were asked what health-related education they had, and what training resources they take advantage of on the job.

The backgrounds and positions of the educator participants themselves, summarized in Table 8, provide insight into this topic. If they perform their educator roles within these institutions, then these institutions are resources where journalists may look to pursue specialized training in health reporting. Eight educator interviewees were educators at the graduate level. One was an educator primarily in an undergraduate

program, and four specialized in educating and training journalism professionals outside formal degree programs.

Table 8: Educators' professional settings

Professional educational setting	# of educator participants
Undergraduate program	1
Graduate program	8
Professional fellowship	2
Professional association	1
Health agency	1

The settings where educator interviewees work suggest that health journalists can gain specialized health reporting education and training at the undergraduate, graduate and professional level. Because interviewees' professional roles were known before data gathering began, codes for undergraduate, graduate and professional level educational and training opportunities were included on the initial start list for analysis. Throughout analysis it was unnecessary to add more primary codes to capture these concepts, though secondary coding was expanded. For example, at the professional level, various opportunities exist to receive training through fellowships, professional associations and from health stakeholder institutions (i.e. government agencies) that provide training for members of the media. Interview responses elaborated on the form and content of education available at the undergraduate, graduate and professional levels.

Education at the undergraduate level

Three interviewees' responses specifically touched on undergraduate educational experiences and opportunities relevant to the role of health journalist. One male educator who had taught mainly in an undergraduate journalism program pointed out that "*Specialization can manifest itself in double majors, for example, journalism and a related major in health or medical sciences."* At the undergraduate level, most opportunities for specialized education takes the form of traditional classroom lectures and seminars. The highest degree earned by two of the interviewed health journalists was a bachelor's degree in journalism, and these journalist interviewees provided more details into the educational opportunities available to them during college. Courses mainly fell into two categories: courses focused on science- and health-related topics, and journalism courses on how to cover science- and health-related topics. A female journalist, who double majored in journalism and another liberal arts subject, mentioned that in her second major she encountered some health-related topics, such as HIV. She also referred to a specialized health reporting course offered through the journalism program, though it was an elective she chose not to take. Beyond traditional classroom learning, opportunities to specialize in health journalism at the undergraduate level can be found through internships. The health journalist previously mentioned had no intention of becoming a health journalist, but she was offered a health reporting internship while in undergrad that determined her career path. The other female health journalist who earned a bachelor journalism degree mentioned that she took undergraduate biology and chemistry courses, which she felt was relevant to her job.

Table 9 summarizes all interviewee references to undergraduate educational opportunities related to specialized health reporting. Opportunities exist to major or double major in a science program and take the relevant course criteria, or to major only in journalism. Students majoring in journalism may encounter science and health topics through required or elective science courses, health reporting classes or in classes that touch on other health-related topics. Beyond the classroom, students of any major can try to gain health journalism experience through internships.

Table 9: Undergraduate health reporting opportunities

Undergraduate health journalism education opportunities			# of sources	# of references
(Double) major in journalism and science/ health subject			1	1
Classes within journalism major			2	4
	Classes on health or medical topics		1	1
	Specialized health reporting electives		1	1
	Science classes		1	1
		Biology	1	1
		Chemistry	1	1
Experiential learning			1	1
	Health reporting internship		1	1

Journalist interviewees' graduate education experiences

The teaching format most often mentioned at the graduate level is a traditional classroom setting where content is taught by an instructor in a seminar, lecture or workshop format. Three of the health journalist interviewees earned masters' degrees or

higher, and their individual paths represent a range of specialization opportunities. Each described some classes or seminars that were included in their formal educations. Table 10 summarizes the types of courses encountered by journalist interviewees in their various types of masters programs.

One option at the graduate level is to earn a journalism master's degree and take classes within the program, usually electives, focusing on health reportage. One female journalist received a general journalism master's degree and described how health journalism was approached in her program:

> "*When I was at [university], they had a few specialization classes, so I took literally one class of health reporting in addition to things like business reporting. That was one semester, but that was about all [the specialized education] I had before this [health reporting job].*"

Another option for specialization at the graduate level is to seek out a program that's devoted to health, medical and science journalism. One female journalist interviewee took this route, choosing a health and medical journalism master's degree program. She described taking one course on journalism fundamentals and two focused on specialized health reporting methods and techniques. Additionally, according to this interviewee,

> "*there was a portion of the program where we took some graduate classes outside of the journalism school in the college of public health, or any other departments that were science or health-based. It was intended that we would get some extra knowledge from those classes that would help us understand those topics more, if ever we were writing about those.*"

Yet another graduate level experience was described by the third male journalist interviewee; he completed medical school and gained journalism experience by writing for the school newspaper and other publications upon graduation. Those choosing this

option seek a science, health or medical master's degree during their formal education and learn journalism skills through experiential learning and work experiences.

Table 10: Graduate level courses encountered by health journalist interviewees

Type of graduate program	Type of classes/seminars encountered
General journalism master's program	• Journalism fundamentals classes • Specialized health reporting class
Health journalism master's program	• Journalism fundamentals classes • Specialized health reporting classes (multiple) • Electives in health/science departments
Science/medical graduate program	• Pre-med/medical school courses

Journalist survey: College level courses

The online Qualtrics (Qualtrics, January 2015) survey for journalists included an open-ended question about what college-level health- and science related courses they recalled completing during their formal education. Their responses provide insight into what types of topics a journalist might encounter before entering a professional health reporting role, whether they planned on pursuing that career or not. The question did not differentiate between undergraduate and graduate level courses, so participants could have encountered these courses at either level.

Table 11: College-level science and health courses taken by journalists

Course	Frequency
Biology	6
(Organic) Chemistry	5
Psychology	3
Geology	3
Statistics	1
Biostatistics	1
Health Management	1
Social Science Research Techniques	1
Human Sexuality/Health Activism	1
Genetics	1
Health Reporting	1
Epidemiology	1
Anatomy and Physiology	1
Astronomy	1

Table 11 lists the courses identified in journalists' survey responses in descending frequency. These college-level courses may be an introductory point to the critical skills health journalists should possess, as identified by interviewees. The science-related subject journalists most often mentioned encountering during their college education was biology. This is also a an area of "specialized knowledge" interviewees mentioned as being critical when speaking of the skills required for performing health journalism. As previously mentioned, one journalist interviewee indicated she wished she'd had more knowledge of biology coming into her health reporting job. One survey respondent mentioned taking a course on research techniques, which relates to an understanding of study design, another critical skill identified by interviewees. Courses from survey respondents that correspond with critical skills also include statistics/biostatistics, epidemiology and health reporting.

Survey responses also shed light on the range of pre-career health education a journalist might get before entering their profession. Only one respondent said that they had encountered no health-related courses during their formal education. Another respondent had a master's degree in biology (with a minor in chemistry) and provided a

list of advanced biology courses, including parasitology, microbiology, invertebrate zoology and vertebrate zoology. One respondent had earned a master's of public health, so her education would have familiarized her with some of the concepts she would encounter in her health journalism career. This range of responses indicate that, upon entry into a health journalist position, a person may have had very little formal education in the area or very advanced education, depending on their background. Because there's no "typical" path to becoming a health journalist, prior skills or knowledge can't be generalized or predicted very well.

Graduate-level education described by educator interviewees

Because graduate level health journalism educators responded in the greatest numbers to requests for participation in this research, they provided most of the insights into the form and content health journalism education opportunities available at this level. Health journalism educator interviewees were able to elaborate on the form and content of their curriculum and what they viewed as the main goals of their graduate programs. All eight graduate-level educator touched on the types of courses offered through their programs. Similar to the experiences described by the journalist interviewee, these courses include classes on general journalism topics; science, health and medical journalism reporting; and science, health and medical courses outside the journalism school.

Three educator interviewees mentioned that their classes included content on journalism fundamentals. One health journalism educator explained the importance of teaching journalism fundamentals at the graduate level:

> *"When I first started I thought, 'Okay, I can recruit students with journalism backgrounds and with science backgrounds. I can I can put them into this two-course sequence of health and medical journalism and public health community journalism and they'll be great.' But you know, that wasn't true, because we get students who have no values as journalists -- who don't understand that the primary loyalty of journalism is to an audience, not to an advertiser or the person you happen to be interviewing at the moment, but actually to the people who use what you do. That's a very core value in journalism…Not only that, they don't have skills to understand the basic elements of a news story, what makes news, news, nor have they ever heard of AP style, which is still a convention in our business as digital as we have become."*

All eight graduate-level educator interviewees mentioned that their graduate programs include classes that teach students the specialized reporting and journalism skills needed to write about health, medical and science topics. These classes move beyond the basics of general assignment reporting to give students the skills they will need to navigate a science and health beat in particular. A female educator explained that, once students have the fundamentals of journalism down,

> *"We try to build reporting skills that are specific to health and science reporting, so as I mentioned, finding studies from lesser journals that might not have been covered, how to skim effectively so you don't get bogged down in a lot of extraneous information, how to find scientific sources and questions to ask in interviews, how to use medical databases."*

Interviewees mentioned other content areas for these specialized health reporting classes; they focus on teaching students how to make stories "accessible" to laypeople and analyze scientific studies, as well as concepts related to the culture of science and the peer-review publishing process. The classwork in these types of courses often involve students reporting and producing news pieces across various media, including podcasts, videos or written articles. This classwork is meant to allow students to practice their specialized skills in a closed environment. A male educator discussed the purpose of this type of classwork: *"For each of our courses we hire practitioners to come and teach in*

their areas of specialty and then they are editing to the standards of the places for which they write or edit. The students are immediately learning how to respond to that level of editorial scrutiny before something gets published." Another important aspect of these specialized reporting classes is instruction on how to cover health in a variety of media formats. These programs teach students that health storytelling, especially in a digital format, can expand to include written materials, graphic, video and audio components. For example, one program that emphasizes visual journalism includes a course on how to produce, edit videos for broadcast; another course focuses on documentary production. Overall, three sources mentioned teaching multimedia health reporting.

Another feature of graduate-level health journalism programs are courses that include instruction on health, science and medical subjects, intended to give students a basic educational grounding in these topics, as well as an idea of the breadth of the fields they'll be covering. One female educator mentioned that she chooses five different topic areas to talk about each semester, and in the current semester she chose to focus on psychology, neuroscience, the healthcare system, inequities in the healthcare system and obesity. A male educator introduces students to the variety of topics under the health and medical coverage umbrella by workshopping current health news stories that arise during the semester. Some programs encourage students to take science and health electives outside the journalism school to get more in-depth instruction in these topics. Two educator interviewees said that their students are urged to explore health- and science-related topics by taking "cognate" courses outside the journalism school in the university's science and medical departments. They indicated that these course

requirements are designed to allow students to pursue health-related topic interests and develop some deeper expertise in an area. A female educator elaborated:

> *"Cognate courses are courses outside of [the journalism college] that you can take for academic credit and where the professors know you're coming, so even if seating is tight they give permission to enroll even though you're not in their native department…It's really pretty flexible. I always tell [students], figure out what your passion is and what expertise you want to provide that other reporters won't have. You've got the chance to essentially tailor your electives so that you can do that."*

Another interviewee provided further examples, stating that her students had previously taken cognate courses in global health, nutrition, health policy and epidemiology, among others.

Beyond traditional classroom seminar and lecture formats, three educator sources mentioned that their graduate science/health journalism program features classroom newsrooms, where students develop and report "real life" health stories under the guidance of instructors that they seek to publish through professional media outlet partners or school-supported outlets. One female educator detailed the experience: "*Every student has a beat, they do a lot of writing in class with me prowling around looking over their shoulders. They can do interviewing or reporting during class time, but in this 15-week course they actually write or produce 15 stories."* In that instance, the educator partnered with locally-based media outlets to publish students' worthy work. Another female educator described a setting where students of various specialized reporting tracks staff distinct "bureaus" in a graduate newsroom where they can experiment in different media and practice what they've learned about how to report in their topic areas.

Table 12 summarizes some of the content covered by courses in the graduate health journalism programs that employ the health journalism educators interviewed in this research. At this level, students without journalism undergraduate educations or work experience take journalism fundamentals courses to learn skills like news judgement and writing stories in standard formats. Graduate students also take courses on special issues in health reporting; presumably these classes would focus on teaching some of those skills interviewees identified as critical and distinct to the specialization. In general journalism graduate programs, this type of course may be an elective; in devoted science and health journalism programs, they're requirements. Students may also take electives outside the journalism school to build a foundation in science and health subjects they're particularly interested in. Classroom newsrooms allow students to practice the skills they learn in the classroom under the guidance of instructors, but that classwork may also lead to publication.

Table 12: Graduate-level course content described by health journalism educators

Course format		Examples of course content
Seminars/lectures/ Workshops	Journalism fundamentals Classes	• News judgment • News story elements • AP style • Journalism legal issues • Ethics
	Specialized health reporting classes	• Analyzing scientific studies • Sourcing • Interviewing scientists • Using medical databases • Multimedia reporting • Topics in health and medicine • Culture of science • Making health/science information accessible
	Science/health/medical electives (“cognates”)	• Epidemiology • Nutrition • Global health • Health policy
Classroom newsrooms		

Experiential learning

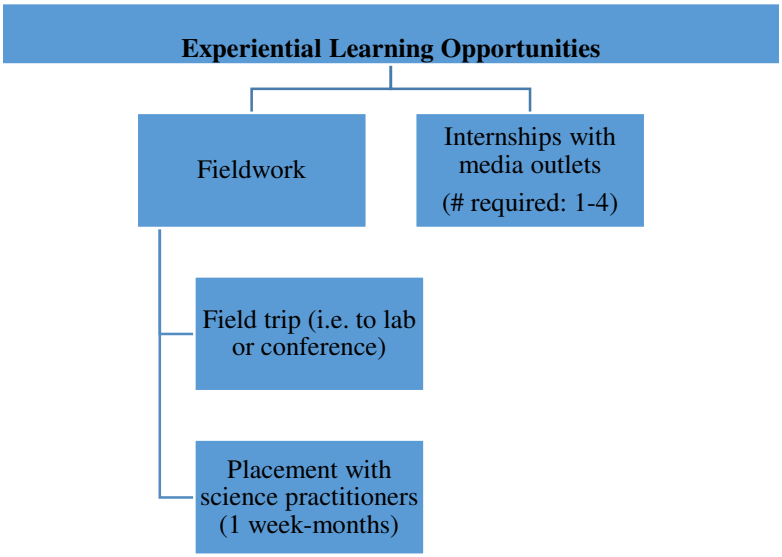
Another format for graduate health journalism education involves leaving the classroom to gain field experience. Three graduate level educators mentioned that their students take field trips in some courses that are meant to illustrate and expand on the concepts that they’ve learned in the classroom. One female educator interviewee spoke of traveling with her students to a conference of cardiologists and cardiothoracic surgeons, and students were assigned to write an article stemming from what they heard during the panels they attended. Another female educator described a similar exercise in which students visit a scientist in the lab. Students research an aspect of the scientists’ research

before the visit and develop interview questions. After the visit, students write the opening of a feature profile of the scientist and his or her work. One female educators' program provided students with more in-depth, immersive field experiences. *"[Students] also have a one-week practicum, which is a week of field research. They'll go to labs, hospital settings, research institutes, to spend a week looking at how science is done*" and return to class with story ideas. The same graduate program uses grants to fund some students to embed them with research teams internationally, which allows them to observe and participate in research and work on in-depth stories over a longer term. Because students can choose these field experiences, they can represent a huge range of science and health subjects, ranging from genetics to global warming, to use some examples from interviewee responses. These field experiences allow students to practice reporting on the various types of stories and events they'll cover in their careers under the guidance of professors and advisors.

The second form of experiential learning commonly encountered at the graduate level is the internship. Two graduate level educator interviewees said that their students are required to complete an internship before graduation. One program requires one summer internship. Another program requires four internships over the course of the program. Over three 10-week periods, students complete reporting internships in 3 of 4 placements: newspaper, radio, research institute or online media outlet. The culminating experience of that program is a 3-6 month internship at a national media outlet. Whereas classroom fieldwork gives students the ability to practice their skills under the guidance of a teacher, internships allow students to apply those skills in a professional setting. Educator interviewees explained that these internships not only improve students' skills,

they also give students workplace experience and help them build a portfolio that is attractive in the job market. Figure 4 depicts the types of experiential learning encountered in health journalism graduate programs as described by educator interviewees. The two most common types of graduate experiential learning are internships and fieldwork. Programs require a varying number of internships, and amount and depth of fieldwork can also vary depending on funding and student interests.

Figure 4: Graduate level experiential learning



Goals of graduate education

When speaking about the form and content of their programs' curricula, graduate-level educator interviewees also touched on the goals of their programs. Two primary codes emerged related to these goals: educators aimed to 1) teach students how to develop and work a health beat and 2) equip students to compete in the job market. Three graduate-level educator sources spoke of the importance of students' learning a "beat," which encompasses several concepts. According to this female educator, "*We teach*

students it's all about networking and sourcing and building on every story you do to find out what layer of that story to keep on your radar, to keep reading, to keep in touch with people, go to conferences. They need to think about how to be on that beat in your everyday life." By teaching students how to develop a beat, it gives them a way to specialize within a specialty and develop critical information-gathering skills. Another female education elaborated:

> *"Something we do is we try to get them (students) to cultivate a beat within health journalism or science journalism because it's so broad. We not only teach them the subject matter, here's what you need to know about health or science, but we try to get them to choose a beat and…get used to what it's like to dive into something they don't know anything about but they're interested in. They need to figure out who are the journals, who are the research groups, professional organizations, patient groups, the different potential sources in that beat."*

When speaking of the main purpose of their graduate programs, educators most often mentioned preparing students to successfully navigate the job market. Four of the eight graduate-level educator interviewees touched on this concept. One male educator said this mission defined their program: "*We are very much an on-the-job training program. I regard our program as a 1-year professional school in science reporting.*" Three interviewees mentioned that a critical element of this mission was enabling students to produce a diverse portfolio of work during the courses. Getting classwork published in professional outlets allows students to demonstrate their specialized knowledge to prospective employers. According to a male educator, "*It's largely portfolio driven. We emphasize for the students to compile a very diverse set of clips, both in terms of where the stories appear and what the students cover.*"

Table 13 summarizes the skills and student outputs that help students meet the goals of their graduate programs. When teaching students how to work a health beat, educators try to impart research, networking, sourcing and story idea generation and development skills. To equip students to enter a competitive job market, educators encourage or require students to develop a portfolio of diverse published work, created either as classwork or in the course of internships.

Table 13: Graduate program goals

	Program Goals	
	Understanding of health beat	Job market advantage
Student skills and outputs	• Research • Networking • Sourcing • Story development	• Portfolio of published work • Diverse clips

Education at the professional level

After formal education, opportunities to participate in health journalism education and training exist at the professional level, for those who are trying to enter the field or who find themselves in a health reporting position. Only two of the five health journalists interviewed said that they intended to specialize in health journalism when they pursued their formal education. Three interviewees brought up the point that most health coverage is produced by general assignment reporters, who rely on on-the-job experiences to learn

about specialized topics. According to one male educator, "*the truth is that most articles about health and medicine are written by general assignment reporters who don't actually have a beat covering medicine, it's just that story comes up, they get assigned the story and they have to go write about it, so that's true of almost all the news you see about science and health*." This means that for many journalists, specialized education in health and medical reporting begins and ends on the job, whenever a journalist can carve out the time and secure resources to seek out training and resources. This is consistent with the experiences of at least one female journalist interviewee, who stated, "*There was really nothing brought up in journalism school about what I cover, at least not that I remember, so mainly I have been self-educating*."

The backgrounds of four of the educator interviewees from this research represent a set of training opportunities available to provide education and training resources to professional journalists. These training opportunities include fellowships, training through professional associations and training through health or other stakeholder agencies.

Fellowships

Two interviewees are involved with health reporting fellowships for career journalists; one male educator described the mission of his program: "*Part of what the program hopes to do, has always hoped to do over the long run, is to provide tools and training for general assignment reporters who aren't necessarily career science writers.*" Another male educator interviewee is involved with a professional journalist association that offers health coverage training. One female educator is a coordinator at a health

agency that provides training for members of the media. These interviewees touched on the form and content of their educational offerings in their interview responses.

The formats of fellowships for professional journalists vary, but they usually involve journalists leaving the newsroom for a period of time to get in-depth training in a certain coverage area or technique. One educator described his program as ten days of intensive seminars and field work, followed by a year of mentoring and sporadic follow-up seminar and workshop sessions once the fellows return to the newsroom. Topic areas covered in the past include public health, mental health and healthcare costs, and session speakers have included medical researchers, health system administrators and policy experts. Explaining the mission of the program, the male educator laid out four key goals:

> *"The point of our program is to a) introduce our journalists to smart colleagues covering similar issues from across America; b) introduce them to smart experts thinking new ideas on handling these issues; c) get the journalists out to see and ask and learn in a way they can't on deadline; d) expose them to a deeper understanding of issues they cover and curiosity about those they don't but could."*

The other fellowship experience detailed by interviewees provides fellows with a stipend so they are able to take leave from their jobs to devote more time and energy to in-depth specialized health reporting training. During this time it's expected that fellows develop and pursue long-term reporting projects. This fellowship partners with universities so fellows can enroll in medical and science courses and "*pretend that [they're] a college student again*," according to the male educator involved with the fellowship. Another component includes work sessions with scientists and researchers. According to the male educator, these sessions

> *"are basically little master classes. It's the 10-12 science journalism fellows around a table interacting directly with these top researchers, hearing about the latest developments in their fields and then asking questions, so it's like 75 little press conferences where you get personal time with these folks."*

This fellowship also offers 2-3 seminars per year on science topics to journalists outside the program; an annual event focuses on "medical statistics and medical evidence." The male educator involved with this fellowship said that the main goal is to get journalists current with the "cutting edge" of the field:

> *"In the design of all of them we're trying to respond both to science, and what's the cutting edge science we want the fellows to know about, and also what are the skills they need to be effective in their newsrooms or to be effective as freelancers …We continually revise the types of workshops and the types of technologies we're training people on to keep up with changes in the profession and we're also trying to always pick science subjects for the workshops and the seminars that will represent cutting edge stuff going on."*

Professional association training

Professional journalist associations offer training and create resources specific to health reporting topics that member and non-member journalists can take advantage of while on the job. One participant in this research is involved with the training efforts of a journalist association that provides training in a range of formats: conferences, workshops, seminars, fellowships and online training and tool kits. As for content, the male educator says that the inspiration for resource topics "*come[s] from both monitoring what is happening around the world each day and from members asking for help in strengthening their skills in specific reporting areas*." This comment indicates that content is designed to reflect health issues currently in the news and react to the needs of journalists themselves. Aside from this educator, one journalist interviewee mentioned that he teaches a workshop at an association conference on how to read medical studies.

More details about the training and resources available through professional associations emerged when speaking with journalists about the resources they use the most, and can be found in the results section titled "Specific aim #3: Use of on-the-job training and resources."

Training from health stakeholder agencies

One female educator interviewee is involved with a health/medical training course for members of the media offered by a health agency. This educator described the initial course as a multi-day series of "*largely didactic*" talks on "*a variety of topics at the intersection of medicine and journalism*" -- mostly current, topical health issues. Over time, the course evolved into a more interactive workshop experience. According to this female educator, programmers determined that the course "*needed more foundational material on concepts like randomization and understanding risk, and more interactive, hands-on sessions to let participants practice what they were learning, wrestle with new concepts, and engage with the faculty on particularly challenging concepts.*" However, this interviewee said that due to cut funding, this training program will no longer be offered. This indicates that this type of professional training opportunity may be unreliably available. Their continued existence within a particular organization depends on funding, positive evaluations and the whims of programmers.

Table 14 summarizes the form and content of professional health journalist training opportunities as described by journalist educator interviewees in this research. Fellowships require the most time away from the newsroom, and often consist of seminars, field trips and long-term projects. Training offerings from professional associations require a range of time and financial commitments. Journalists can spend

several days attending panels at a conference, or take an online course without leaving their desk. Interviewee responses indicate that offerings via health communication stakeholders, such as governmental health agencies, can be mercurial. A program funded one year may not be funded the next. As for training content at the professional level, interviewee responses indicate that it varies widely by design. It is intended to be responsive to journalist needs and current science and health events and developments.

Table 14: Format and content of professional level training and education

Training available to professional journalists			
	Type of professional training		
	Fellowship	**Professional association resources**	**Health agency training resources**
Format of training	• Field trips (i.e. ride-along with EMTs) • College courses • Seminars/workshops with science/health practitioners • Seminars/workshops with journalism practitioners • Mentoring • Long-term reporting projects	• Conferences • Seminars/workshops with science/health practitioners • Seminars/workshops with journalism practitioners • Fellowships • Online training modules • Online tool kits	• Seminars/workshops with science/health practitioners
Content areas	• Public health • Mental health • Healthcare system • Digital media • Medical studies and statistics • Scientific developments • Current health topics	• Medical studies • Healthcare system • Current health topics	• Study design • Epidemiology concepts (i.e. risk) • Current health topics

Specific aim #3: Use of on-the-job training and resources

The third specific aim of this research is to identify journalists' self-guided, on-the-job efforts to seek out training and improve understanding of health reporting issues. Distinct from identifying the types of education and training available to health journalists, these coded themes can provide insight into the types of health-reporting resources journalists may be most likely to turn to. Interviewee responses indicate that on-the-job learning is the main way that journalists build specialized health reporting knowledge and skills. According to one male journalist, "*Most of the learning you do is going to have to be on the job and especially nowadays when nobody's going to send you to training. You've got to seek it out yourself.*" Data from interviews suggest that, on the job, journalists often rely on other people (i.e. colleagues and experts), professional associations and online resources when they need to quickly obtain some specialized health-related training or knowledge.

Interviewee responses indicate that journalists most often turn to other people to help them navigate health reporting issues. All five journalist interviewees mentioned using expert sources, such as scientists, researchers and doctors, either to gain insight into their beat or to aid understanding about challenging topics. One male journalist tries to turn every interview into a learning experience:

> *"Even when you're on the phone with someone on deadline, take another minute or two and say, 'Hey, tell me what's going on in your field, what's interesting? What's controversial, what are people talking about? Can I call you sometime and just tell me something that's interesting. I'd love to hear once a month from you about a paper you found noteworthy.' That's how you get good stuff."*

In addition to helping develop story ideas, expert sources can help journalists understand complex technical concepts. The same interviewee as above also recommended keeping a

"*biostatistician in your back pocket…. That can be a metaphor for lot of different kinds of experts, but when you get stuck or you need to understand what's wrong with a study, and there's something wrong with every single study out there, you can have someone to send it to.*" A female journalist also mentioned that she turns to experts when she feels like she's on shaky ground in understanding the topic she's writing about: "*I just made friends with a woman who has a master's in public health, so she and I have started emailing back and forth. I'm trying to find an epidemiologist to befriend, to just have these as background sources.*" Two journalists mentioned that they approach former professors with questions about health-related topics. Though not necessarily expert sources, two journalists referenced relying on communication and media specialists at health and research institutes to help them navigate the public health and healthcare systems and provide access to information sources. From interviewee responses, it seems that people are their most valuable resources because experts can give information tailored to situational needs, whereas other resources may be static or offer more general information.

Four journalist interviewees made references to seeking training or resources through professional journalist associations. The two mentioned by name were the Association of Health Care Journalists (AHCJ, three sources) and the National Association of Black Journalists (NABJ, one source). Two journalists mentioned that they attended AHCJ conferences that taught attendees how to read scientific studies. Another mentioned seeking out AHCJ seminars on topical health issues in the news, such as ebola and measles. According to a female journalist, these association events are valuable resources because they're "*specifically tailored, [and this information] is not*

what other health professionals need to know, this is not what the lay public need to know, this is what journalists need to get right." Additionally, these conferences and events planned by professional associations can allow journalists to network with colleagues and potential sources. Two journalists mention using AHJC events to gain access to expert sources who were leaders in their fields giving talks about their topic of study.

The third source of specialized information journalists rely on while on the job are internet resources. Most internet resources are widely and freely available to journalists. Four journalist sources called out in their responses the web resources they felt were trustworthy. These resources include NIH materials (three sources), CDC materials (three sources), the National Library of Medicine's MedLine Plus, other "government funded sites," the Mayo Clinic site, and "health blogs" (one reference each). One reporter made specific reference to using Gary Schwitzer's HealthNewsReview.org criteria for evaluating health news stories, which is mentioned in this research's literature review. Two reporters mentioned signing up for listservs from health research institutes and governmental health agencies, such as state public health departments. One reporter mentioned searching archives of health coverage in bigger national publications, like the New York Times and the Washington Post, to see how they're covering topics that arise in that journalist's beat. Though interviewees mentioned a wide range of online resources in their responses, a common theme was that the journalist interviewees started from a place of criticism in determining which online sources are trustworthy and dependable. Another feature of these resources is that journalists can choose resources most relevant

to their beat and localities, seeking out information from specific research institutions or state and local health agencies.

Journalist survey: On-the-job resources

The online Qualtrics (Qualtrics, January 2015) survey for journalists included an open-ended question asking respondents to list some health/medical training resources they've used while on the job. Once again, responses fell into three main categories: fellowships, professional association resources and online and printed resources. Three survey respondents (n=10) referenced seven fellowships:

- Nate Haseltine Memorial Fellowship, Council for the Advancement of Science Writing
- AHCJ Midwest Health Journalism Program Fellowship: "for the study of policy, financial and clinical issues in health care"
- Association of Health Care Journalists Reporting Fellowship on Health Care Performance: "year-long fellowship sponsored by the Commonwealth Fund to write a series of stories"
- CDC Reporting fellowship
- Annenberg reporting fellowship
- Kaiser Family Foundation fellowship
- Knight Fellowship sessions

Two survey respondents referenced four AHCJ resources including seminars, the AHCJ website (www.healthjournalism.org), the "guide to reporting medical studies," and general "AHCJ information." One respondent made a general reference to attending professional conferences, and another mentioned using unspecified online courses and workshops. One respondent reported relying on the FDA and CDC websites, as well as health blogs. Two respondents mentioned relying on books, with one specifically calling out *News and Number*s*: A Writer's Guide to Statistics.* Two respondents said they refer to journal articles or scientific studies, and another listed "Mayo Clinic experts" as a

resource." One respondent left the question blank and another responded "none." Table 15 summarizes the above information and includes the types of resources interviewees and survey participants use while on the job, along with specific examples of each type and some of the uses journalists have for the resources.

Table 15: On-the-job resources used by journalists

Type of Resource	Specific Examples	Uses
People	• Colleagues • Expert sources (for background and comment) • Former professors/teachers • Agency/institution communications offices	• Story development • Specialized knowledge • Access to experts
Professional Associations	• Association of Health Care Journalists • National Association of Black Journalists	• Training conferences, lectures, workshops (i.e. on reading medical studies, topical health subjects) • Networking with colleagues and experts
Online Resources/ Web sites	• CDC • NIH • MedLine Plus • Mayo Clinic • HealthNewsReview.org • Listservs (i.e., research institutes, health agencies) • Health blogs • News publications (i.e., New York Times, Washington Post)	• Topical information/ reference • Examples of coverage • Story development
Printed Materials	• *News and Numbers: A Writer's Guide to Statistics* • Journal articles	• Reference • Research
Fellowships	• Nate Haseltine Memorial Fellowship, Council for the Advancement of Science Writing • AHCJ Midwest Health Journalism Program Fellowship • AHCJ Reporting Fellowship on Health Care Performance • CDC reporting fellowship • Annenberg reporting fellowship • Kaiser Family Foundation fellowship • Knight Fellowship sessions	• Training seminars • Mentoring • Opportunity to work on long-term projects

Newsroom attitudes towards training

When discussing on-the-job training and resources, interviewees' responses touched on how training is viewed among their newsrooms and editors. Though no sources mentioned that newsroom policies actively discourage on-the-job training, interview responses tend to indicate that newspaper staff journalists in particular face challenges in pursuing training opportunities. Some evidence for this theme is supported by the results about freelancers making up larger proportions of training program attendance than staffers, the details of which can be found in this chapter's following section entitled "Specific aim #4: Roughly gauge participation in specialized education and training." Beyond that, four interviewees specifically referenced newsroom factors that make it difficult for journalists to pursue specialized training. Though one reporter at a metropolitan daily says that training is "absolutely" encouraged in her news room, job expectations make it difficult. She says, *"I've been getting a lot busier in terms of what's sometimes now asked of reporters, in terms of now in addition to writing a story, they also want you to take pictures; they want you to do video... So to get a story done it means there's more preparation involved.… I just don't find the time*." Another female journalist expressed feeling similar pressures from editors in some workplace settings:

> *"I don't know if this is everywhere, but certainly at my major metro newspaper, the opportunities to go to training, it's really hard. AHCJ and all the other associations are always like, 'come to this, come to that,' and even if it's paid for, my editors will be hesitant about it…. They just want you to be doing journalism."*

This interviewee elaborated that support for training can vary from editor to editor; some prioritize training more highly than others. One male educator says this isn't a new trend. "*Newsrooms have never been good about encouraging staff members to be gone for a few days. That has only gotten worse as staff numbers decrease."* On the bright side, he

believes quality, effective training begets more training. "*Once a reporter does attend training and makes both immediate use of the training resources and story ideas and longer-term project use of the training, editors and other managers become believers and are more likely to encourage the use of training opportunities."* Due to time constraints, these newsroom staffers may be more likely to pursue on-the-job resources that require less of a time commitment, relying more on online resources and expert sources than fellowships and out-of-town seminars.

Specific aim #4: Roughly gauge participation in specialized education and training

The last research aim of this study is to roughly gauge levels of interest and characteristics of participation in specialized health journalism education and training. Educator interviewees provided insight into this area when speaking about trends in enrollment in their educational and training programs. The initial start list of codes anticipated that interviewees would touch on student backgrounds and class sizes, and student demographics emerged as another primary code during data-gathering.

Student backgrounds

Five interviewees said that their classes or are made up of a mix of scientists and journalists. According to a female educator, "*Every year I have a couple who come from a hardcore science background…I usually get some who come with a social science background, like sociology or psychology or linguistics. Then I have some who come from journalism backgrounds. It's usually a mix, which I find good because they bring different strengths.*" One graduate program represented in these interviews only accepts students with a scientific background. Students of that program usually come to the

program after several years of work experience; "*it's always about 3/4 from the life sciences and 1/4 from the physical sciences and engineering,*" explains a male educator. When asked for his perceptions about who was getting specialized health reporting training a male journalist said, "*I think there are a lot more people who train either as scientists or even as doctors, still mostly scientists rather than doctors, who then decide to go into journalism and they have really interesting backgrounds because of that*." Once again, these responses indicate that those seeking to specialize in health journalism come from a wide range of professional and educational backgrounds.

Five educator interviewees indicate that their programs' participants have only media and journalism experience. Among those programs for journalists, the consensus was that participants come from a range of media. A male educator elaborated, "*They always span a variety of media including newspaper and traditional print media, magazines, but also radio and film making and online journalism.*" This indicates that health journalism specialists can be found in each medium. Among these journalists seeking health journalist education and training, three interviewees said they noticed a rising trend in the number of freelancer attendees. Whereas the previous results section indicated that newsroom staffers have difficulties carving out the time to attend training opportunities due to expanding job duties, these responses suggest that freelancers may have more freedom to seek training, and indeed may use specialized training to carve a coverage niche for themselves in order to be more competitive in the freelance market. One male educator estimated that his among his program participants, about half are freelancers:

> *"They're roughly half freelance and half staff people. That's one of the trends we see is over the years it's been a change in the makeup of the fellowship in that in the 80s most of the people joining the fellowship were employed by large news organizations. They were mostly folks working at the science sections of big city newspapers, maybe occasionally people from network TV. Over the years obviously as the media have changed there are fewer and fewer outlets that have weekly science sections or even a designated full time science or health reporter, and more and more of the people who do this are doing it on a freelance basis for a variety of publications."*

A female journalist estimated that at a conference she attended, the proportion of freelancers was much greater, comparing staff health journalists to an endangered species: "*When I was at [the conference] it was a ton of freelancers. I felt like me and this one other daily journalist were like pandas in the crowd, like you wouldn't really get to see very many of us.*"

Size of classes and applicant pools

Five graduate-level educators made references to class sizes within their programs. Among those programs, none were said to have more than 20 students per class or program cohort. One factor mentioned in relation to class size was the relative newness of the program at the university. A female educator said, "*We started out really small because no one knew we existed… We're constantly trying to make people more aware that this option, that we're out there in the marketplace.*" Another factor had to do with how much funding was available to subsidize enrollment. A male educator mentioned that the number of students attracted to the program was related to the number of fellowships available in a given year.

Interviewees involved with programs aimed at working journalists all indicated high interest in their resources. The educator associated with a professional association

did not give specific numbers, but mentions that attendance at conferences and workshops, as well as the utilization of web resources, are in a growth trend. Two educators mentioned that the number of applicants for specialized training regularly exceeds the number of available slots by a large margin, and one noted that interest in the program continues to grow. A male educator said, "*I assumed, when the program started 14 years ago, that we'd run out of applicants. Instead, we've been going up every year in numbers and quality*." Two sources hypothesized that higher-than-expected interest in training stems from economic difficulties in the journalism industry. A male educator explained the phenomenon:

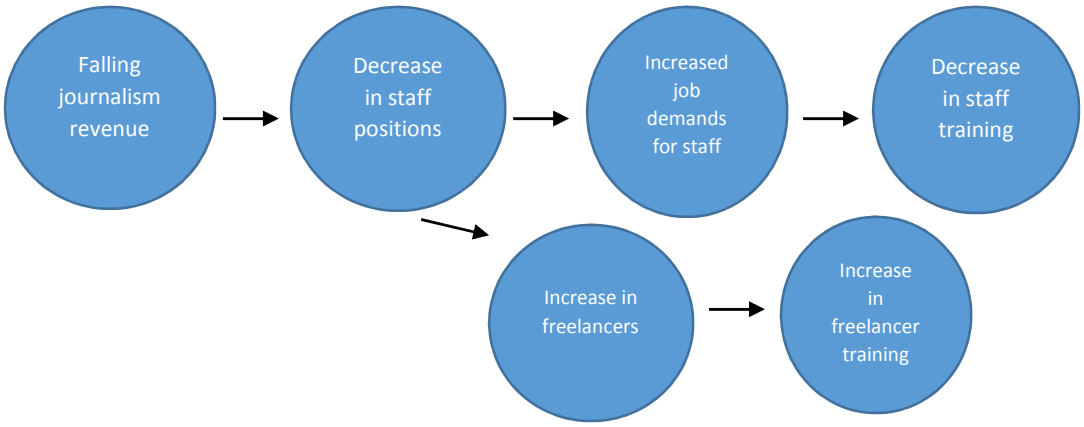
> *"I think as the media business has started to disintegrate economically without any sort of amazing new business model on the horizon just yet. I think that it's kind of a sink or swim environment and more and more journalists are having to fend for themselves and think in an executive way about their whole careers…I think basically this fellowship and other similar fellowships wind up being an experience that it's a line on your resume, but even more importantly it's an opportunity to take a deep breath, evaluate where your career is going, figure out what you really enjoy and what you want to do with the next 10 or 20 years of your career. Network, meet people, get ideas about new stories and new focus areas, maybe switch jobs, maybe launch a new specialty.…That's the kind of switch you can engineer while you're here."*

Growing interest in training and numbers of freelancers seeking specialized health reporting education is one way the industry's economic struggles affect trends in training enrollment.

Figure 5 illustrates how current journalism industry economics might be affecting participation in specialized health journalism training and education. Falling revenue for media outlets leads to a decrease in the number of staff positions available, especially for specialist positions. This leads more journalists to work on a freelance basis, and they pursue training in higher numbers because they have more freedom in their schedules and

they use specialist training to create a niche for themselves. The decrease in staff positions leads staff members to take on more job demands, which leaves them less time to pursue training. Staff media members make up a smaller portion of professional training enrollment.

Figure 5: Industry economic effects on training participation



Student demographics

Interviewees' mentions of student demographics mainly referred to participants' age and gender. Three interviewees mention trends in the age makeup of health journalism education and training programs. Two graduate-level educators indicate that their students are usually mid- to late-twenties, which would logically seem to be the case for a professional graduate program. A male educator associated with a professional journalist association noted and "upswing in younger reporters and in journalism students who have a particular interest in health and science."

The other most-mentioned demographic factor was gender (3 interviewees). While one male educator said that his program makeup was 50/50 male to female, two others noted a higher number of women participants. Both of those educators put the ratio

at 3 to 1 female-to-male. A male educator noted that health journalism "*tends to be a discipline that attracts a lot of women, often people who've had exposure to science at some level, maybe an undergraduate degree in some cases.*" Another male educator made a reference to women in science backgrounds seeking medical journalism as a secondary career option. He said that, in interviews with prospective students, women provided reasons for seeking a specialized degree in science reporting:

> *"One of them certainly is that women who were part of the academic trajectory for a while pursuing a master's degree or PhD have decided that it's simply not consistent with the type of life that they want to have, in particular on the family side. So we have a lot of students come here because of the flexibility of having a career that is still fundamentally based in science and still talking to researchers all the time and loving that kind of exploratory part of the profession, but also not wedded to the relentless time scale and demands of getting tenure and applying for grants and all the other time demands that go along with remaining in academia or going to industry."*

Although two references to gender imbalance in specialized training don't strongly support a theme, these comments may be revealing when paired with the fact that 4 of the 5 health journalist key interviewees in this research are women. Additionally, female journalist commented that the role of health reporter is perceived as "*the lady job in the newsroom.*" Gender may play a role in who decides (or is assigned) to specialize in health journalism, which in turn affects the gender makeup of education and training participation.

Other Themes

Though the interview protocol was designed to elicit responses relevant to the four main research aims of this thesis, adjacent topics arose that were not necessarily

directly related to those specific aims. Nonetheless, interviewees' adjacent discussions shed light onto various other aspects of the topic, so are valuable to this research. The following section of this results chapter covers those themes that are related to the topic of health journalism education and training, but do not specifically speak to a particular research aim. The main themes that emerged touched on job prospects for health journalism specialists, perceived roles of health journalists in affecting public health and advice for would-be specialists.

Job prospects for journalism specialists

In discussing the goals and aims of specialized health journalism training and education programs, interviewees often turned to the job prospects for those who completed those programs. Though no educator sources were able to provide an estimate of the number of graduates who found employment upon completion of the program, eight educator interviewees perceived that former participants were succeeding in their job searches. A male educator said, "*The nice thing about teaching at [a university health journalism program] for so long is that there aren't too many news outlets that cover science, that I can't look at the masthead and go 'oh yeah, there's one of my former students.' So those folks are really taking the world by storm, and deservedly so.*" Five educators listed some outlets where students found employment after completing their education or training:

- National Public Radio
- Atlantic.com
- Voice of America
- Scientific American Online
- AHCJ blog
- MedPage today
- Huffington Post
- ABC News
- WNYC New York
- American Dental Association
- Buzzfeed
- Centers for Disease Control and Prevention

Notably, few of these listed employers are "traditional" print outlets of the type that employ the journalist interviewees that participated in this research – mostly newspaper staffers. This indicates that the number of health journalism positions may be most plentiful at online publications. Furthermore, not all specialists go on to work in the media; some enter into agency or association communications positions.

Other interviewees were more ambivalent about whether specialization leads students to have more success in a job search. Such specialization may be most helpful at entry level. A male journalist interviewee is an editor who hires for his publication, and he said that he would be more likely to hire interns out of specialized programs above generalists with similar levels of work experience because "*they can hit the ground running a little bit better… It tells me they're really dedicated to a subject and they're willing to seek it out.*" However, that editor went on to say that he has hired people who have never reported on health but have demonstrated strong enterprise journalism skills in previous positions. Another female educator for a graduate-level health reporting program said,

> *"I don't know if it gives them an edge. It really depends because some places are looking for specialized people, and some places are looking for generalists. I think we're probably seeing the same patterns that a lot of other schools or programs are seeing, which is some people do really well right away. More people are, I think, freelancing and sort of creating niches for themselves as freelancers because it's much harder to find full-time staff positions."*

Related to job prospects, several comments emerged as factors that affect demand for health reporting specialists in the journalism industry. One educator believed students specializing in health reporting will find success because of a perceived audience demand for health news. A male educator interviewee believes consumer demand for health news stems from the universality of the topic. "*The one beat newsrooms know they can't cut is health. Every reader has a health problem of their own, or their kids', or their parents', etc.*" Another male educator interviewee noted that the ever-changing nature of health and medical science creates job security for specialists. "*If you develop or cultivate a reputation in the area, there's a lot of demand. One of the things about science and technology is it's obviously reinventing itself all the time. The story never grows old, it's constantly refreshing itself, constantly needs reporting and interpretation.*"

On the other end of the demand spectrum, five sources stated that decreased revenue for media outlets has resulted in fewer positions devoted to specialized topic areas. According to a male educator, "*Unfortunately, the decline in the print industry -- newspapers, magazines and books -- has resulted in cutbacks in specialized reporting and editing within the health and medical fields, although broadcast TV and radio still shows some good reporting by specialists.*" This interviewee indicated that he thought students would have more success gaining a general journalism education and then

slowly specializing through gaining job experience. A journalist went so far as to not recommend specialization for those looking for jobs at newspapers:

> *"I've never worked at any newspaper where you were only responsible for your beat. You may cover health, but chances are on a fast day when everybody's busy, you're going to get roped into something else, so be prepared for that.… Know that as much as you want to focus on health, you're probably going to have to other things. If you're only thinking you want to do health, and you're not interested in anything else, you might not be in the right type of business, at least in newspapers, because that's just now how they work these days."*

Another factor affecting job prospects for health reporting specialist is technological advancement in digital media. An educator explained that any specialized education and training programs need to approach health-specific reporting issues while paying "*special attention to the opportunities and challenges of digital media, the Internet and multiple platforms, social networks.*" A medical reporting fellowship employs a "digital media training coordinator" to help program participants fill this industry-wide need for tech-savvy specialists; participants "*go back to their jobs with a much better understanding of the technologies that go into modern storytelling*." For those who learn technical and multimedia skills in their education, entry into a post-education job can be easier. "*There's still the traditional print platform, but there's been a lot of expansion into online, blogging and all that stuff. The students seem to move pretty comfortably into that world from the program.*" Table 16 summarizes the above information, laying out side-by-side the factors interviewees identified as affecting demand for health journalism specialists. Though technological advancements, audience demand and the ever-changing nature of health fields drive up demand for health reporter specialists, cutbacks in the industry have led to fewer available staff positions and a need for staffers who can cover more than one beat.

Table 16: Factors affecting demand for health journalism specialists

Factors positively affecting demand	Factors negatively affecting demand
• Audiences' interest in health news • Ever-changing nature of health/medical fields • Need for digital-savvy specialists	• Print media cutbacks: smaller news hole, fewer staff positions • Need for generalists to cover more beats

Benefits associated with specialized education and training

During interviews, some interviewees talked about the advantages they believed specialized training and education bestowed on participants. Five codes emerged that provide insight into the specific types of job market advantages interviewees believe are gained through pursuing specialized education or training: credibility, geographic setting, network access, professional publication and program reputation.

Two journalists mentioned that their education provided them with specialized knowledge that made them seem more credible to scientists, which helped them get information for stories. One female journalist detailed her experience:

> *"I've had sources who will say, 'I don't talk to journalists, because I talked to this one journalist in 1971 and she messed up, and she didn't understand what a genetic mutation was, and it made me look stupid, so I don't talk to journalists anymore.' I've been able to convince them to talk to me because I say, 'I only cover medicine and I've written x number of articles about genetics and I have a degree in medical journalism and it's my specialty.'…It's definitely helped me put sources more at ease. If they're talking to somebody who speaks their language, you're not going to garble the science and make them sound bad."*

Two educators mentioned that the geographical setting of their programs held advantages for their students, but for different reasons. A male educator stated that his program's close proximity to New York City is critical to students' being able to gain experience and exposure due to the sheer number of health media outlets based there. A female educator believed that being in a more rural setting exposes her students to different types of health issues, and that experience in covering a wide range of health topics is attractive to employers. She said, "*Being in a place that's not part of the Boston-Washington corridor has given our students some advantages. We're in a state that exemplifies everything that is wrong with American healthcare…We've got it all going on here; we've got racism and poverty, rural-urban differences.*"

Three educators said that their programs place students in a network of graduates and employers that better enables them to find employment. A female educator explained the process: "*Students are hired, editors have great things to say about them, and they [former students] in turn become the editors looking for a new generation of reporters*." Two educators felt that the fact that they require students to develop a portfolio of published work opens doors for them professionally. A female educator said, "*People see that everybody who graduates has had work in professional publications, which I think has really been crucial in helping them find work out in the world.*" One educator said the strength of his program's reputation results in employers contacting the school when they have health-specific position openings, which allows students and alumni to gain an edge in finding post-graduation positions. Though no consensus was reached on whether specialized education itself improves journalists' job prospects, interviewees' responses

indicated that other intangible benefits accompany education, such as alumni networks and media outlet access.

Role of journalists in affecting public health

Thirteen interviewees spoke in some detail about what role they believed health journalists play in affecting public health. This theme ties into the overall research goals because the literature asserts that attitudes about professional roles affect journalistic output, and individuals' beliefs about their professional roles can be molded during their education. Comments about health journalists' roles mainly fell into three codes: information gatekeeper, consumer decision influencer and watchdog.

Gatekeeper

Gatekeeper was the health journalist role interviewees mentioned most often, with 16 references from 12 sources. This role involves being a conduit for information flowing from scientists and researchers to the general public. A male educator explained, "*Even though scientists are mostly used to communicating through scientific journals, the public basically learns about issues of public health, development and so on through the news media.*" A female educator concurred, stating that, because the vast majority of the public isn't reading the scientific literature and policy papers on health-related topics, "*public health can't do its work without the media to amplify its message.*" Echoing the sentiments touched upon in earlier discussions about critical skills for health journalists, seven sources specified that journalists' roles go beyond parroting the views of researchers or literature findings and includes interpreting and contextualizing scientific and medical information for audiences. A male educator elaborated, "*There are all sorts*

of conflicting sources of information out there, and the most valuable kind of health and medical journalism is a meta-approach that looks at many different assessments and tries to present to informed readers, 'here's the consensus.'" This response recognizes that there is also some element of agenda setting in the gatekeeper role – that is, determining what information gets "play" in the media. Health journalists help determine which stories are covered and how they're covered. Beyond interpretive skills, journalists use their critical analysis skills to make that determination.

Health decision influencers

The second most-mentioned role that health journalists play in affecting public health, with four mentions from four interviewees, was their position to help audiences to make decisions about their health and health care. One female educator phrased this in terms of creating news that is "useful" in helping audiences make good decisions for themselves and their families. A male educator referred to it as empowering the public to be able to participate more fully in the healthcare system. Three references mentioned that successfully fulfilling this role requires more than surface reporting. Interviewees indicated that making sound decisions requires "reliable information" that's "free from spin" from "from journalists who have really looked into an issue in depth."

In addition affecting consumer decisions, one educator source mentioned that health journalists have an important role in affecting public health policy through a number of mechanisms. First, just as media is an important source of information for the public, politicians and government officials also learn about health and medicine developments through the news. Second, this interviewee felt that how a news story is

portrayed in the media can affect public opinion, which in turn applies pressure to elected officials.

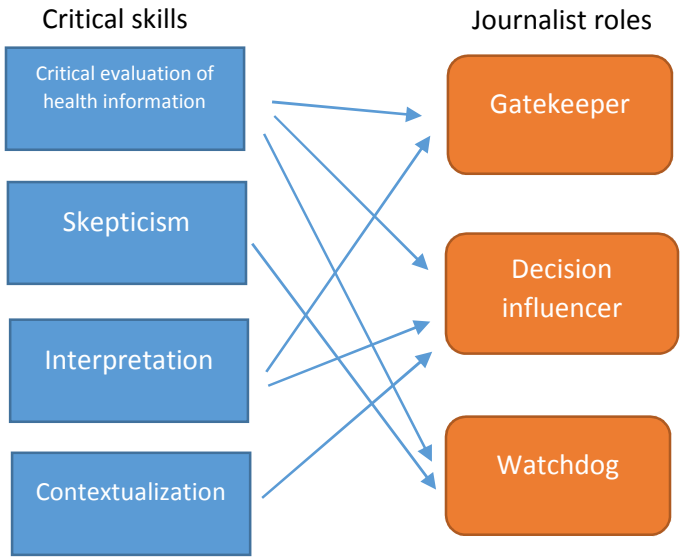
Watchdog

The watchdog role was the third most-mentioned health journalist role among interviewee responses, with three references from two interviewees. This role appeared to be related to interviewees' comments about the importance of skepticism in producing health journalism. The watchdog role was viewed as necessary among interviewees because of the complexities of the healthcare system in America. One educator interviewee described the need for watchdogs because the healthcare system is "*so messed up.*" For some sources, the funding issues related to health and medical industry and research created a need for journalist watchdogs. When speaking about the watchdog role as it relates to health financing, interviewees used cynical language about money "*polluting*" the system and creating conflicts of interest. Additionally, many health-related issues are entangled with political issues, which journalists traditionally view as requiring fourth-estate scrutiny.

Figure 6 depicts which previously identified critical health journalism skills are most closely related to perceived roles of health journalists in affecting public health. In order to perform the gatekeeper role, journalists need to be able to critically evaluate health information to determine what information is most important to pass on to the audience, and interpret that technical information for laypeople. In their role as health decision influencers, journalists once again need to be able to critically evaluate and interpret health information, but contextualization is especially important to this role so that audiences can understand information about a given development or treatment as one

item on a menu of choices and weigh risks and benefits accordingly. To perform a watchdog role, journalists need to critically evaluate health information and, beyond that, be skeptical of that information and its sources so that audiences are aware of any researcher agendas and conflicts of interest that could affect their reactions to the information.

Figure 6: Critical skills' relationship to journalist roles



Examples of media influence

In discussing the perceived roles of journalists in affecting public health, eight interviewees provided specific examples of instances where news coverage has affected public health behavior. Because a measles outbreak was prominent in the news at the time of data collection, six interviewees spoke about how news coverage of vaccination studies and "anti-vaxxers" influenced vaccination rates. In the eyes of two interviewees, journalists' ingrained routine of producing "objective" articles led to anti-vaccine research and viewpoints getting more play in the news than the evidence warranted. One

male educator opined that more recent reporting from health journalists better highlights the efficacy of vaccines and the importance of vaccination rates for herd immunity than previous years' reporting. He said, "*If you had a bunch of general assignment reporters covering the story, you might still be having the he-said, she-said stories that were more prevalent 10 years ago, that I think in many ways gave rise to this anti-vaccine movement, or at least helped fuel it.*" Another male educator mentioned the anti-vaccination movement in relation to the roles of health journalists, saying that science and medical journalists have a special responsibility to correct misinformation perpetuated through the media. Two sources pointed to the public's reaction to the ebola outbreak as being the result of media coverage; both attributed the public's outsized alarm partially to journalists' poor communication and contextualization of risk. These examples directly relate to the specialized health reporting skills of sourcing and contextualization as previously discussed in this research.

In a more general sense, two interviewees cited the "breaking news cycle" as a media convention that has affected how audiences react to health coverage. Both related breaking health news to "study of the week" reporting that produces shorter stories containing little nuance. According to a male education, "*The public is frustrated by what they perceive as a ping-ponging back and forth of recommendations, particularly when it comes to health and diet, or medical testing and the efficacy and wisdom of doing certain types of medical tests at certain times in one's life.*" Interviewees indicated that this type of reporting contributes to audiences' confusion and mistrust of health coverage in general. Thought it's impossible to say whether more education in these areas would

improve overall health coverage, these examples provide insight into how educators relate the practice of these skills to news products and audiences' reaction to them.

Advice for specialization

Given that the interviewees for this research are regarded as experts in the field of health journalism and health journalism education, they were asked what advice they would give to those looking to enter the profession or those who have found themselves newly in that role. Three sources responded that the most important thing for a health journalist is to adopt mindset that learning should continue at every stage of their career, because "*they are in a complex, ever changing field that requires lifelong learning and continuing education*," according to one male educator. Along these lines, another educator advised that journalists need to "learn how to learn." The interviewee related this advice back to two critical skills comprising information gathering: research and sourcing. Relatedly, two educators stressed the importance of reading widely. Regular reading of technical journals will allow students and new journalists to stay on top of developments in the field, and following "good writers," in specialized and general interest publications, teach journalists to recognize good writing and good stories.

Two educators made the more concrete recommendation to pursue advanced or specialized formal education. One noted that normally he would advise generalists to "just do it" and start writing; however, pursuing healthcare journalism requires caution because "*it's so easy to get it wrong and it's so dangerous to get it wrong*." Advanced education both gives a grounding in science and medical concepts and helps "kick start" a career in specialized reporting. Another educator brought up the idea that pursuing post-graduate education allows would-be specialists to perform their own research and give

them a better understanding of the scientific process that will enhance their journalism. However, this advice comes with the stipulation that aspiring health journalists should pursue specialized education after gaining a few years of work experience to help them develop a “richer perspective” than someone who seeks to specialize directly out of undergrad.

Two interviewees gave advice focused on writing experience. One male journalist tailored his advice depending on the student’s background. For those coming from a general journalism background, he advised finding work at a trade publication to dig deeper into health topics and gain the attention of medical journalists. For those with science backgrounds looking to break into journalism, he recommends blogging to show demonstrate "*how you can write, how you can report, how you can think.*” For another educator, the purpose of jumping into writing as much as possible goes beyond gaining practice to gaining exposure. This interviewee recommended distributing work over social media to garner responses and feedback. Though the advice varied widely, most of it relates to gaining a grounding in health and medical topics, practicing reporting and writing and gaining exposure.

Chapter 5: Discussion

Discussion

Study Limitations

Study Strengths

Conclusions

Discussion

Interviews with eighteen interviewees from the fields of health journalism and health journalist education, combined with short online surveys completed by journalists, resulted in a wealth of qualitative data that was then used to 1) identify what critical skills are relevant to health and medical reporting, 2) describe the form and content of health journalist education and training, 3) identify journalists' self-guided, on-the-job efforts to seek out training and improve understanding of health issues and training, and 4) roughly gauge levels of interest and participation in specialized health journalism education. Combined, the 13 health journalist educator interviewees possess more than 130 years of experience in educating journalists, in addition to their own experiences practicing journalism. These interviewees were able to speak at length about the demands of health journalism and the advantages and challenges of seeking specialized health reporting training. The five journalist interviewees, along with the online survey respondents, represent a range of personal and professional backgrounds that enabled them provide insight on the myriad ways to become a working health journalist, a profession that has no typical model or standard path to walk. This discussion summarizes the relationship of study findings to the theoretical principles that served as a framework for this research, as well as the relationship to the previous literature that was used to guide it.

Study findings and specific aims

Specific aim #1: Critical skills

Many of the critical skills in health journalism identified by interviewees are consistent with those discussed in related literature (Gregory & Miller, 1998; Russel,

1986; Miller, 1986; Schwitzer, 2004; Schwitzer, 2014). Specifically, interviewees discussed critical analysis of health information (Schwitzer 2014), understanding of scientific culture and process (Schwitzer, 2014; Gregory & Miller, 1998), sourcing (Schwitzer, 2014; Russel, 1986), interpretation (Schwitzer, 2014; Russel, 1986) and contextualization (Schwitzer, 2014; Miller, 1986). Though the literature does not specifically state that these are the skills necessary to produce successful health journalism, it contains critiques of health news and criteria for judging health journalism, which can be extrapolated to serve as a list of the skills necessary to produce high-quality health news content.

The ability to critically analyze health information emerged as a primary critical skill. One of Schwitzer's criteria (2014) asks, "Does the story seem to grasp the quality of the evidence?" This reference to judging the quality of the evidence seems to relate directly to interviewees who assert that the ability to critically evaluate health information is the most important skill for health journalists to possess. Many interviewees spoke of the need to be skeptical of information presented to them, rather than taking journal publication or a researcher's claim at face value. Furthermore, interviewees broke down this parent skill into component skills, including information gathering, statistical analysis and understanding of the scientific process. Schwitzer (2014) also calls for journalists to be "able to understand the process of medical research in order to report accurately," but the interviewees explicitly linked critical analysis and scientific understanding in a way that Schwitzer's criteria do not, implying that the latter is necessary to the former. Wallington, Blake, Taylor-Clark and Viswanath (2010) found that health journalists with a bachelor's degree or less were significantly more likely to

rely on press releases in reporting. Though no participants in this research had less than a bachelor's degree, interviewees across all brackets of educational achievement mentioned the importance of critical evaluation of health information. Recognition of the importance of this skill doesn't seem to be tied to educational achievement, but this study cannot speak to whether those with higher education are better able to perform this kind of critical analysis.

Interviewees referenced interpretation skills, which related to Schwitzer's (2014) directive that journalists should "Clearly identify and explain the meaning of results." Within the concept of interpretation, interviewees said that health journalists need to be able to contextualize new information within the context of existing evidence, which also arises in the literature. Interviewee comments in defining and discussing contextualization correlate with several of Schwitzer's (2014) criteria:

- Does the story adequately quantify the benefits of the treatment/test/product/ procedure?
- Does the story adequately explain/quantify the harms of the intervention?
- Does the story compare the new approach with existing alternatives?
- Does the story establish the true novelty of the approach?

Miller (1986) and Gregory and Miller (1998) warn of the pitfalls of overstating an outcome without providing audiences with a bigger picture of the field. Interviewees providing data for this thesis seemed to be acquainted with these pitfalls and, furthermore, related the skill of contextualization to the influence health journalists have on audiences. Interviewees explained that health journalists need to be able to correctly interpret and contextualize health information, because overstating the benefits or

outcomes of a “breakthrough” can lead audience members to get their hopes up or make inappropriate decisions about their health care or lifestyles.

Interviewee responses and previous literature also overlap in discussing proper story sourcing as a critical skill (Russel, 1986; Gregory & Miller, 1998). Russel’s (1986) criticism of health news calls out the importance of seeking out independent voices when reporting. Several interviewees of this study echoed the need to find independent views for a story, and educators asserted that the importance of independent sourcing is impressed upon their students. Furthermore, interviewees in this research associated sourcing skills with the ability to critically evaluate health information; speaking only with sources who have a stake in a study or finding leads health journalists to misunderstand the study or its importance. Gregory and Miller (1998) discuss the tendency of health journalists to be deferential to scientific sources in order to maintain a beneficial alliance with them. Interviewees in this research did not explicitly discuss deference to scientist sources, though one interviewee did use the term “making friends” in reference to her reliance on expert sources for background information. However, abounding mentions of skepticism and “B.S. detectors” throughout the interviews indicate that misplaced deference in sources is not a pressing concern for many interviewees.

Interviewees in this research brought up several skills not found in the literature review, including empathy, good writing and storytelling skills and an understanding of health care industry economics. Interviewees’ discussions of empathy referred mostly to the treatment of laypeople who may be affected by a disease, rather than scientists and researchers whose claims journalists should be evaluating critically. Interviewees related

good writing and storytelling skills to interpretation skills, so perhaps the importance of being a good, clear, concise writer is implied in the literature. However, interviewees highlighted the importance of compelling writing in attracting audiences to dry, technical information, which the literature did not specifically discuss (which literature need to include citations). Schwitzer's health news review criteria (2014) does refer to the importance of journalists recognizing and identifying conflicts of interest in health stories, but interviewees specifically named an understanding of health economics as a skill necessary to carry out this duty. Identification of critical skills, especially from educator interviewees, should give insight into the types of skills that should be included in specialized health journalism training and education.

In interviewee responses, information gathering, with its subskills of independent sourcing and good interviewing skills, emerged as perhaps the most important skill in performing health journalism. Both journalist and educator interviewees named these skills, citing their necessity in determining the truth or basis of health information. However, these skills are necessary in reporting of all types, no matter the subject matter. A government reporter has just as much responsibility perform their due diligence through research and proper sourcing as a health reporter. The most important skill distinct to the health reporting specialty is an understanding of scientific culture and process, with its subskill of understanding study design. These skills help in both agenda setting and interpretation of health information for layaudiences. A journalist with a good understanding of scientific process is better able to read a study or press release and understand the significance of a finding or development. This journalist is also better at contextualizing information in a way that helps audiences of health care consumers

understand the information and integrate it into their decision-making. Without these skills, journalists may fall back on reporting on the "study of the week," acting like a loudspeaker for the researcher rather than adding value to the information.

It's also worth emphasizing that these findings define successful health journalism and critical skills from the journalist point of view. Audience members and public health professionals may have completely different criteria for judging the quality of a health story or the trustworthiness of a health journalist. Though it's outside the scope of this research to speculate on those differences, future research seeking insight from these stakeholders could provide a valuable comparison that could better inform specialist education and training efforts.

Specific Aim #2: Describe the form and content of health journalist education and training

Most of the relevant literature to date (Voss, 2002; Viswanath et al., 2008; Schwitzer, 2008; Schwitzer, 2009; Pettersen, 2012) has focused on studying the educational backgrounds of journalists covering health rather than detailing the form and content of that curriculum and opportunities for training. Furthermore, no study found in the review gathered data from health journalism educators, just working journalists. Viswanath et al. (2008) broadly surveyed the broad educational backgrounds of health journalists and found that 70% of respondents had bachelor's degrees and 8% were life sciences majors in college. 100% of the journalists participating in this thesis research have at least a bachelor's degree. Two of the survey respondents (20%) and one of the interviewees (20%) majored in life sciences in college. Though the samples in the Viswanath et al. survey and this research are very different, interviewee responses

indicate that health reporters are currently likely to have at least a bachelor's degree, though field of study is varied. Furthermore, in this research, interviewees and survey participants were asked to identify any college-level health- or science- related courses that they'd completed. Responses indicate that most health journalists had at least some experience with these topics in their formal education, even if they hadn't received a degree in that field. Therefore, measures capturing health journalists' educational background solely through degree-related variables may not paint a complete picture of journalists' experiences with science- and health-related subjects.Voss' survey of health journalists in the Midwest (2002) revealed that 83% reported having received no training for covering health news, though the article did not detail the kind of training received by those who had received some training. By contrast, 100% of the health journalist interviewees indicated that they received at least some training in covering health news, whether it came from university education, internships or professional association events. This difference between the literature findings and the experiences of interviewees in this research may, in part, be attributable to Voss' research. Upon finding that health journalists lacked training and were eager for it, Voss co-founded the Association of Health Care Journalists, and training activities began in 2000. Many of the interviewees in this research said that the AHCJ was a valuable resource for them. Therefore, this research indicates that, though health journalism professionals are still eager for training, more resources have been established in recent years to meet their needs.

No literature encountered in review included qualitative data from health journalism educators. Educator interviewees in this research were able to describe the types of education and training available to journalists, rather than merely identifying the

educational backgrounds of current health journalists by degree and field of study as seen in Pettersen (2012), Viswanath et al. (2008), and Wallington, Blake, Taylor-Clark and Viswanath (2010). Educator interviewees in this research outlined the opportunities to specialize that exist at the undergraduate, graduate and professional levels, though their responses indicate that depth and breadth of curricula varies greatly at each level. It is unsurprising that graduate-level curricula are more in-depth than those found in undergraduate journalism programs that specialize in generalist education, and professional-level training that needs to be concise for the convenience for working professionals. Graduate programs provide additional opportunities for experiential learning, as well as access to alumni networks and media partners that can benefit jobseekers.

Despite these advantages, responses from journalists in this research suggest that few seek to specialize in health journalism through graduate-level education, presumably due to the cost and the time commitment required for completion. The ideal health journalist would have a deep background in science and medical topics. Programs that aim to produce health journalists would do best to accept students who already have undergraduate or graduate degrees in medicine or science. However, few students will be willing to undertake the challenge of obtaining multiple advanced degrees to work in an unstable journalism field known for low salaries. The best compromise may be programs that teach journalism skills through experiential methods (i.e. classroom newsrooms, fieldwork, internships), but that require the majority of class instruction to take place in science or health departments so students get a maximum of exposure to scientific and health principles from the appropriate instructors.

Interviewees in this research suggest that journalists are most likely to require and pursue specialized training at the professional level, and fellowships provide the most wide-ranging, in-depth curricula at this level. Journalist interviewees and participants from this study most often reported relying on professional journalist associations when they were seeking training at the professional level. For this reason, professional associations could be valuable partner stakeholders for those public health professionals wishing to create programs and resources aimed at improving the skills or knowledge of health journalists. The content of professional training tends to be concise and topical, but can vary according to the resources and participation levels of local chapters.

Interviewee responses indicate that intensive topic-specific education leads to better health journalism; unfortunately, the public is less likely to benefit. Those journalists who shoulder the cost and time commitment of advanced education seek to benefit from their investment by obtaining employment in higher paying positions. According to interviewee responses, the most highly educated health journalists tend to go on to produce content for specialist publications, such as trade papers or research institute communication departments. These positions may be more likely to value specialists and the stories they produce, so they're are willing to pay more to employ them. However, the news outlets that reach the general public are more likely to employ generalists who write the one-off health related story. The only way to offset this phenomenon would be to make editors and managers of generalist news outlets see a value in high-quality health journalism. Editors either need to see a monetary value (i.e. health stories get a larger share of page views or social media shares) or a journalistic value (i.e. appeal to an outlet's mission to perform "public service" journalism).

Freelancers may walk the line between specialization and economic return on education investment. They are more likely to seek out education and training, and they produce journalism for a variety of outlets, meaning that both specialist and layaudiences can benefit from their skills.

Specific aim #3: Identify journalists' self-guided, on-the-job efforts to seek out training and improve understanding of health issues

Again little research (Schwitzer, 2008; Voss, 2002) has approached the topic of health journalists' professional-level training, and no literature has provided details regarding the form and content of training resources. Consistent with the Voss and Schwitzer articles (2002, 2008), interviewees mention being eager to participate in professional development training, but job duties and time restraints make it difficult. Given previous literature's findings regarding increased job pressure on staff journalists (Keith, 2011), it's unsurprising that many respondents mention using online courses and resources to let them hone their skills without taking time away from their jobs. This provides insight into potential formats and platforms for public health professionals seeking to create programs or materials aimed at health journalists. The content and topics interviewees most often mentioned in discussions about training included critical reading of medical studies and specific illnesses related to current events, such as measles and ebola. This is focus on topical health issues is promising for public health professionals hoping to draw attention to rising public health problems. Interviewees most often mentioned relying on the Association of Health Care Journalists (AHCJ) when seeking specialized training through a professional organization. It's unsurprising that the AHCJ focuses on specialized training in health topics, and that the specialist interviewees

included in this study are AHCJ members, but this association might not have the widest reach within the industry. Given interviewees' comments that generalists are likely to produce a large portion of health journalism, generalists may not be aware of the AHCJ, or may not consider themselves to be health care journalists, leading them to avoid or ignore training offered through a specialist organization. Therefore, health journalism might see more benefit if general journalist associations (i.e. the Society of Professional Journalists) offered more training opportunities focused on health news issues.

Specific aim #4: Roughly gauge levels of interest and participation in health journalism education and training

Schwitzer conducted a series of interviews with health journalists (2009) to ascertain the state of the profession, and journalists he spoke to said they would welcome more opportunities for training, though no quantification was given in relation to this finding. This research sought comments on trends in health journalism education program enrollment, from both journalists and educators, to try to gauge interest and participation levels more accurately. Though specialized programs at universities tend to graduate small classes, interviewees estimate that numbers have been steady through the years. Educators who are primarily involved with training journalism professionals noted growth trends in enrollment and participation. They also mentioned that interest, as represented by applicant pool size, often outstrips availability. That the demand for specialist training is high or growing may justify the efforts of public health professionals who seek to target programs towards journalists. The key to success for such programs seems to lie in making training accessible and convenient for busy professionals.

Study findings and theoretical frameworks

Hierarchy of influences model

The results of this research suggest that specialized health journalist training and education are both integrated into Shoemaker & Reese's hierarchy of influences on media content (1996), and affected by influences at various levels of the model.

Individual level

Education is a classic individual-level factor that can influence news output, and interviewee responses indicate that those journalists with specialized education or training may cover health news differently than generalists. Interviewees discussed some of these differences: specialist education helps journalists ask sources more nuanced questions, equips them to better critique health information and lends them credibility that opens doors to a wider variety of stories. Furthermore, education affects journalists' attitudes towards their professional roles. Many interviewees mentioned believing that journalists help audiences make crucial decisions about their own health. If health journalism educators pass those attitudes on to their students, those students will feel a heavier responsibility to cover health accurately and soberly, affecting the quality and content of their news output.

On the other hand, individual level factors also determine how and when generalists or aspiring journalists seek out specialized training and education. Interviews with journalists touched on the idea of intention: only two interviewees entered into their education with the notion that they wanted to become health journalists, and they went to medical school or completed a devoted health and medical journalism graduate program. The three journalist interviewees started their journalism careers without any particular

desire to cover health; they relied more heavily on on-the-job training. Discussions with educators about trends in enrollment revealed that gender may also be associated with specialized education. Women with backgrounds in science may seek specialized journalism education to be able to "have it all". They can surround themselves with scientific discovery and cutting-edge research without becoming involved with the more grueling demands associated with working in academia or science industry.

Media routines level

The media routines that comprise the second level of Shoemaker and Reese's hierarchy of influence model (1996) were also touched upon in this research. Stakeholders mentioned that students of specialized health reporting programs are taught to eschew two specific traditional journalism practices that can create problems when they appear in health coverage. First, interviewees said that their students are taught to think beyond the breaking news cycle mindset that results in "study of the week" stories. Health journalists who become comfortable flouting this routine produce health stories based on a broader evidence base that provides contexts to help layaudiences understand the true value of a research/development breakthrough. The second media routine that health journalist educators advocate breaking is the convention to provide "equal time" to opposing voices in a story in an attempt to remain objective. Giving coverage to marginal voices in the health field creates a public "pseudo-debate" where none should exist, as in the case of vaccine safety.

This research suggests that specialized education may lead to some degree of inversion among the first two levels of the hierarchy model. Those who get specialized training beyond a generalist journalism education may be able to influence media

routines in the area in which their trained. Those without training follow the industry standard; in the example of public health, this could mean giving equal space to competing views on new findings. Journalists and educators who have specialized in the area know the common pitfalls of this approach. Specialist educators and editors teach students and protégés to work against this common routine. In this example, that could mean obtaining independent comments rather than comments on different sides of an issue. These new routines set a standard and themselves become a routine within the specialization. This is especially true as freelancers increasingly populate the field of health journalism. These individuals are more likely to get specialized training and have some freedom from organizational level influence since they produce journalism for numerous varied outlets. As work the body of work from these journalists grow and combine with the influence of specialist educators, specific health media routines are shaped and begin to branch off from traditional generalist routines.

Organizational level

The third level of the influence hierarchy model includes organizational structures and policies. Many themes related to the organizational level emerged in this study's findings, the first of which is newsroom attitudes towards on-the-job training. Though interview responses indicated that newsroom policies and supervising editors don't discourage specialist training, in practice, journalists found that escalating job demands made it difficult to take the time to pursue it. However, prioritization of training may vary by individual editor and manager preferences. This study also bore out Keith's (2011) findings that the ranks of freelancer journalists operating outside traditional media organizations are growing, weakening the effects of organizational factors. Indeed,

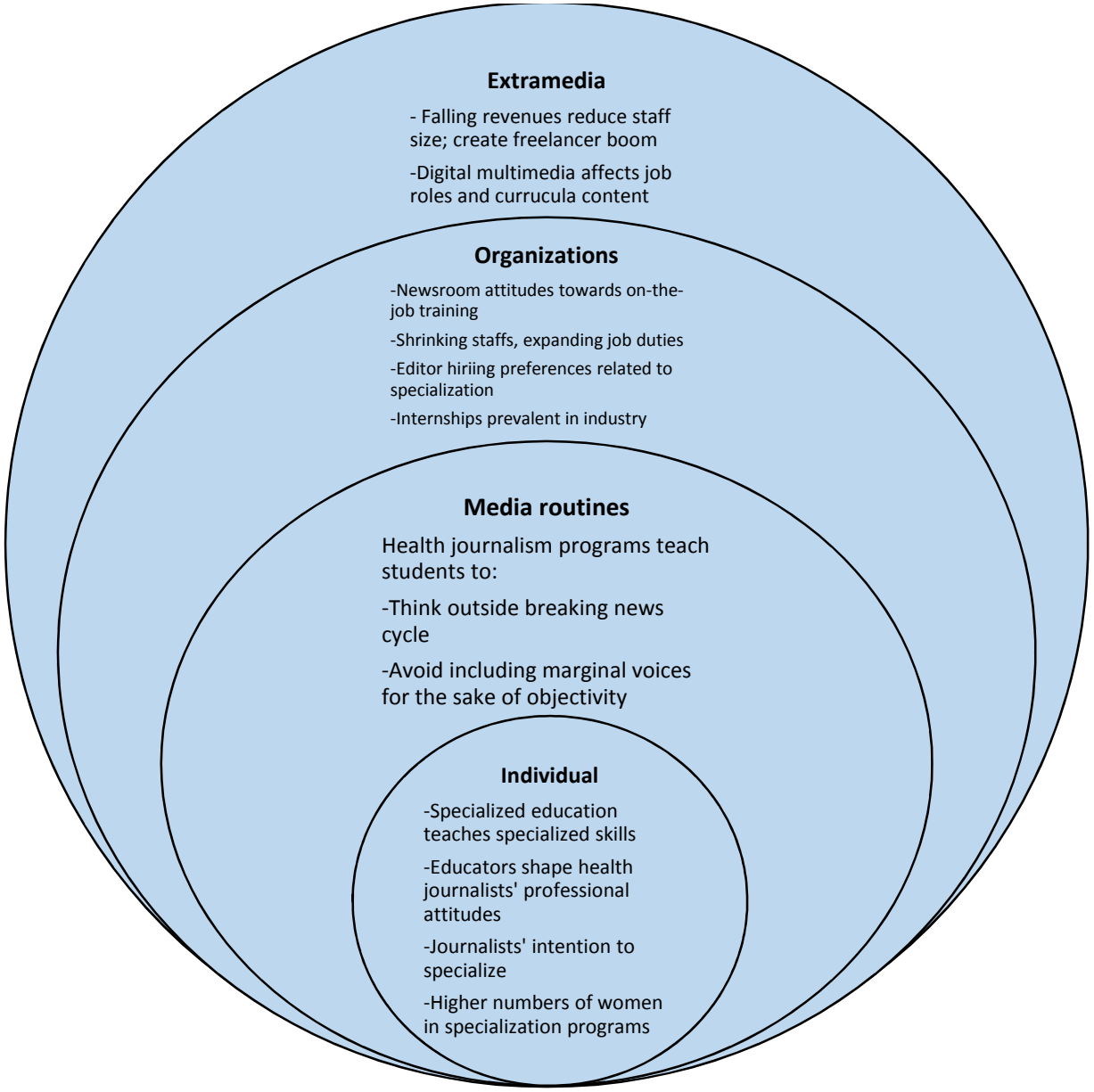
interviewee responses indicated that freelancers participate in specialized training at higher rates than newsroom staff members. Another prominent theme related to organizational structure is the downsizing of newsrooms, and especially reductions in positions for specialists. Smaller staffs mean that journalists cover more and varied beats, which shrinks the demand for specialists and also has the effect of leaving less time for training. Also related to organizational factors is the weight editors give to specialized education when making hiring decisions. Findings in this area are mixed. Some interviewees and specialists felt that graduates of health reporting programs would be better able to "hit the ground running" in entry level positions, but most of the time, work experience matters more in hiring. For very niche or technical publications, editors know that graduates of specialist programs will be able to produce a different standard of content. Key interviewees mention that these types of publications have been known to advertise to fill positions through these programs. Also at the organizational level, and somewhat of a tradition in the field of journalism, is the willingness of an organization to bring on interns. Findings from these interviews indicate that internships are still a significant feature of journalism education, even for health reporting programs at the graduate level. Internships provide a key pathway into the specialized health reporting profession, even for general journalism students.

Extramedia level

The fourth level of Shoemaker and Reese's hierarchy of influences on media model holds extramedia factors that act upon organizations. Most relevant to this research, this level includes the economic environment and technology. Falling revenue in the journalism industry, especially in print media, has led to cuts in newsroom staff,

which has created a freelancer boom. Unlike newspaper journalists who find themselves stretching to cover evermore beats, interviewees commented that they were seeing many graduates of health and science journalism programs become freelancers who cover health topics almost exclusively, but for many publications. When discussing trends in training enrollment, interviewees noted that classes and seminars seem to be filling up with freelancers. This could be because, free of the constraints of escalating job demands of the traditional newsroom, freelancers have more time to pursue training. Alternatively, freelancers may feel more pressure to differentiate themselves from the pack by specializing. The fourth level of the hierarchy model also includes technological influences, which interviewees perceived as having a large impact on industry practices and on journalism education. Interviewees referenced that their jobs have changed because they are producing multimedia content, such as videos and podcasts, for the digital arm of their publications. In many cases, interviewees noted that specialist students are having luck finding work in online-only outlets. Educators have recognized the demand for these skills and have begun including digital and multimedia components to their curricula. As anticipated, the fifth Shoemaker and Reese hierarchy, which includes ideological factors, is beyond the scope of this research. Figure 7 depicts the themes that emerged in this research as they fall into Shoemaker and Reese's hierarchy of media influence model.

Figure 7: Study findings in hierarchy of media influence model



Sociology of science journalism

Though the sociology of science journalism is broader than any one model or theory, the field still provides a framework relevant to this research because it identifies issues specific to health journalism, as a subset of science journalism, that go beyond the sociological factors that affect general news products. One special topic in health journalism is the flow of information from scientist gatekeepers to the laity, with the idea that "downstream" parties need to receive a message that is as faithful as possible to the one sent by the scientist originators (Gregory & Miller, 1998). Though interviewees very much agreed that accuracy is crucial to good health coverage, their responses indicate that they may take issue with the idea of "faithfulness."

Educators and journalists alike took the stance that members of the media should not parrot scientific messages, but approach them skeptically and evaluate them critically. This view is somewhat related to some interviewees' belief that they have a responsibility to educate their audience, rather than just informing them of a new health development. This view is somewhat problematic because the role of "educator" includes some characteristics that directly conflict with some journalism practices. For example, an educator reiterates information in different ways to ensure a student comprehends a concept; a journalist isn't able to do that. A journalist writing about a new cholesterol drug would probably not detail the effects of high cholesterol on the body, as a health educator would be expected to. Though interviewees and health journalists may view themselves as educators, their definition of "educator" is a self-generated construct, and should not be confused with the literal definition of an educator. It's especially important that audience members don't confuse the roles – information from a journalist requires

different considerations than information from an educator when it comes to making a health decision.

Science journalism researchers also note that the drive for correctness leads health journalists to form an alliance with scientists in order to get the most accurate facts, which may result in journalism that is more deferential to its subjects than would be acceptable in other areas of news coverage (Gregory & Miller, 1998). Though interviewees did indicate a propensity to seek out "friendships" with scientists and researchers to help them get stories right, the overwhelming volume of comments about skepticism and critical thinking leaves the impression that journalists and educators harbor a greater loyalty to audiences than sources. One female educator described adding a journalism fundamentals course to her health journalism graduate program to make sure that all her students understood "*that the primary loyalty of journalism is to an audience, not to an advertiser or the person you happen to be interviewing at the moment, but actually to the people who use what you do*." Somewhat relatedly, past story critiques by science journalism researchers revealed that health articles tend not to include a second voice in a story apart from the scientist or expert who is the subject (Russel, 1986; Schwitzer, 2014). From this study's findings, it would appear that journalists and educators have recognized this problem and taken steps to correct it. Multiple interviewees brought up the theme of independent voices, saying that students were never allowed to turn in stories with only one voice, or stressing the importance of seeking comments on research from experts without conflicts of interest.

Another issue particular to health journalism is the inclination towards stories that emphasize the end-products of science, even though scientific discovery is better

portrayed as a long chain of small advances (Miller, 1986). Interviewees touched on this topic most directly when speaking about the role health journalists play in affecting public health. Interviewees were considerate of the fact that health and medical stories provide information to audiences who are sometimes struggling with "mortal health issues" and are devastated when claims about developments turn out to be overenthusiastic. Interviewees spoke of the importance of contextualizing such information to help audiences react to it appropriately. It should be stressed that this study is not a critique of health news products, so it's impossible to say whether occurrences of these most common health journalism missteps are actually on the decline. However, this study's findings indicate that professionals in the field are very much aware of these issues and are mindful of them in their work.

Study Limitations

The interviewees invited to participate in this study represent a diverse range of relevant expertise in the field of health journalism. However, as noted previously, the distinction between the two informant classes – journalists and educators – is mostly nominal. All but one educator started their careers as practicing journalists and still refer to themselves as journalists. However, those in the educator class have teaching expertise mostly absent in the journalist class, making the distinction more useful. Also, journalist interviewees participating in this research are unrepresentative of the profession's population as a whole. Interviewee comments indicate that most health news coverage is produced by general assignment reporters; recruitment for this study targeted professionals who identified as reporters specializing in health. Therefore, findings can't

be generalized across the profession, and apparent participation in specialized training and education is likely especially overstated. Furthermore, all journalists interviewees work in print journalism; a wider representation of media would be more ideal.

Another limitation is the definition of health journalist in this research. There may be significant differences between journalists who have a health beat and those who undertook their education with the intention of becoming health journalists. Those "accidental health journalists" may be less likely to see the value of intensive education and training, and may be less likely to pursue professional-level training if they aren't committed to the role. Future research would do better to operationalize these roles separately. Similarly, "educator" in this study refers to a person who teaches journalists about topics in health journalism. They may have no particular qualifications as teachers, or as science and health educators. The methods and goals of a trained educator may differ from those who are labeled as educators situationally. Future studies could better operationalize these roles.

Sampling bias is likely an issue in this study because participants were drawn from a convenience sample. The journalist participant sample was drawn from a media list that orders media outlet by market size. This was done purposefully because outlets in larger markets are more likely to produce health coverage, but this also means that health journalists in smaller markets are underrepresented. In an effort to garner a maximum recruitment response, journalist interviewees were invited to complete a short online survey, and then, if they could devote more time, to contact the researcher to schedule a more in-depth interview. However, for the sake of anonymity, it's unclear how many and

which surveys were completed by interviewees. Therefore, some of the data will be redundant.

There is also a chance of interviewer bias resulting from slight variations in the way the researcher conducted interviews. In order to reduce bias, the researcher followed the same interview protocol for each participant within an interviewee class, but human error may still have introduced bias. Additionally, coding was performed by only one researcher, which is less ideal than having multiple coders validate interpretations of the data.

Study Strengths

As stated above, this study is unique in describing the form and content of specialized health journalist education and training opportunities. This focus on specialization paints a more complete picture of the educational experiences of health journalism specialists rather than measuring it in more generic terms of degree acquired and associated fields of study. Furthermore, this study is the first of its kind to seek qualitative data from health journalism educators. This provides insight into the various types of specialized education and training opportunities available for journalists, rather than just profiling the resources journalists commonly take advantage of.

This focus on educational and training opportunities provides public health professionals with potential partners (universities, professional associations, etc.) for collaboration that could potentially mutually benefit members of both professions. For instance, a health department official reading this research could be inspired reach out to

a regional chapter of a professional journalists' association to propose a talk about a local health problem that is not gaining enough coverage. This may prove to be more effective than sending a PR blast because it targets specialists. Knowing which resources journalists rely on can help those in public health communication focus their efforts.

Health journalism educators are a potential public health communication stakeholder heretofore not addressed in public health literature. Members of the media are commonly recognized as partners in spreading public health messages. However, by focusing on educators, public health professionals can think beyond a particular message and affect journalists while they're forming their skills.

Another strength of this study is the educational and professional background of the researcher, which combines journalism and public health experiences. Familiarity with conventions and language of both disciplines aids in nuanced understanding and interpretation of data.

Implications

This thesis forms a basis for future research in the areas of health journalism and specialized journalism education. The findings of this study indicate that educators of specialist health journalism training and education programs are aware of the subject-specific issues commonly cited in sociology of science journalism literature and health news critiques, and that many have developed curricula aimed at reducing substandard health journalism products. Because specialized educators teach to these common pitfalls that generalist educators may not, a logical next step would be a critique comparing the

news outputs of specially trained health journalists against those of generalists to determine whether specialized education is indeed improving the specialized health reporting skills of its students. If future research showed that trained health journalists do produce better quality health news, editors and hiring managers may be more inclined to hire journalists with more specialized training to fill health reporting positions on staff or trained freelancers to provide health-related content. This research also backs up more recent findings about the growing ranks of freelancers, particularly those who specialize in science- and health-related topics. Previous research primarily sought to recruit media outlet staff, but future research should be more inclusive of freelancers to obtain more complete, nuanced findings related to the practice of health journalism. Additionally, by identifying the skills critical for the practice of health journalism, this research could have practical implications for professionals. If journalists new to health reporting were able to see a list of relevant skills, and perhaps even take an online evaluation of their performance in various skill areas, they could better pinpoint their own strengths and weaknesses and seek out training most relevant to them.

Furthermore, this research could have implications for public health professionals. If public health communicators were looking to target messages for health journalists, educational and training programs may be appropriate venues to reach them. Say, for example, a state health department has assessed an increase in food insecure children. Public health communicators could reach out to a professional journalism association to propose a collaborative seminar covering the issue and adjacent topics. On a larger scale, public health officials should have a stake in improving health news outputs because they can influence audience member's health behaviors. Because this research identifies

critical skills, as well as the training formats and channels journalists are more likely to seek out, this study could form the foundation of an educational program targeted towards helping journalists report health news more accurately and completely.

Conclusion

This thesis was qualitative study that explored the ways in which health journalism education and training imparts the skills critical to the performance of health journalism. Data from this study was used to explore critical skills, describe curriculum and training resources and gauge interest and participation in specialized education. It included a sample of interviewees whose professional expertise is relevant to the topics broached in this study.

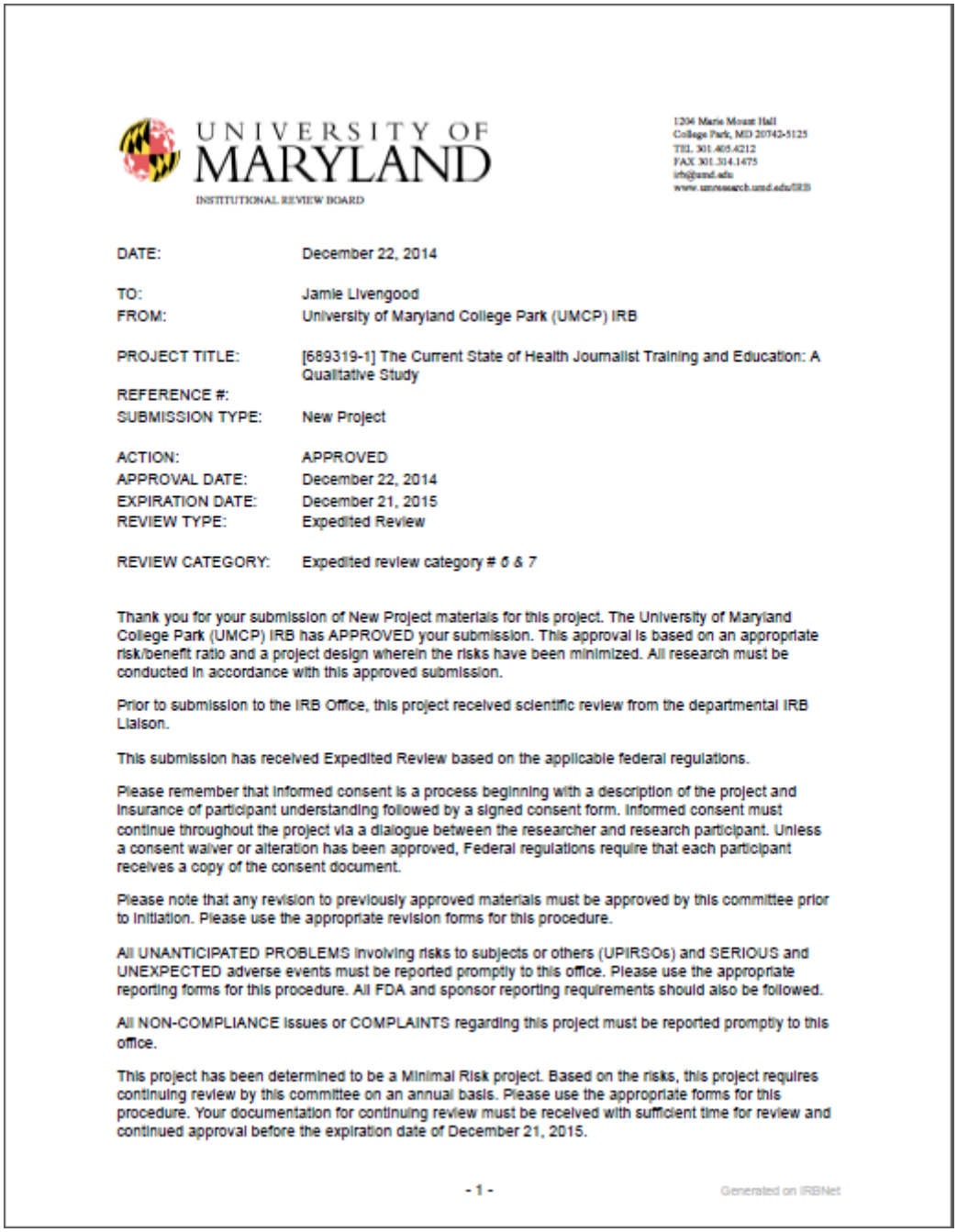
Based on the findings of this study, there are a variety of opportunities available to those journalists wishing to specialize in health reporting, and the curricula of those programs, by and large, emphasize skills considered to be critical and distinct to the practice of health journalism. That there is interest growing interest in these resources, especially among practicing journalists, should encourage public health professionals seeking to develop interventions aimed at affecting public health messages covered in health journalism.

This study establishes a basis on which more research can be conducted. Interviewee comments indicated that specialized health journalist educators design their curricula to teach students how to avoid many of the common pitfalls of health journalism. An interesting future study could compare health news products by

educational background of the creator, to gauge whether health journalism educators are successful in producing journalists who are better able to perform their professional duties. Public health practitioners might make more immediate use of this research. Opportunities for collaboration with journalism educators exist to better target public health messages for media coverage and to develop partnerships for designing and distributing programs and materials aimed at helping health journalists improve their skills.

This study is a result of the application of competencies acquired through the Masters of Public Health- Behavioral and Community Health program at the University of Maryland, College Park School of Public Health. These competencies include both public health core and community health education cognate competencies (Appendix 9).

Appendix 1: IRB Approval Letter



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DATE:	December 22, 2014
TO:	Jamie Livengood
FROM:	University of Maryland College Park (UMCP) IRB
PROJECT TITLE:	[689319-1] The Current State of Health Journalist Training and Education: A Qualitative Study
REFERENCE #:	
SUBMISSION TYPE:	New Project
ACTION:	APPROVED
APPROVAL DATE:	December 22, 2014
EXPIRATION DATE:	December 21, 2015
REVIEW TYPE:	Expedited Review
REVIEW CATEGORY:	Expedited review category # 6 & 7

Thank you for your submission of New Project materials for this project. The University of Maryland College Park (UMCP) IRB has APPROVED your submission. This approval is based on an appropriate risk/benefit ratio and a project design wherein the risks have been minimized. All research must be conducted in accordance with this approved submission.

Prior to submission to the IRB Office, this project received scientific review from the departmental IRB Liaison.

This submission has received Expedited Review based on the applicable federal regulations.

Please remember that informed consent is a process beginning with a description of the project and insurance of participant understanding followed by a signed consent form. Informed consent must continue throughout the project via a dialogue between the researcher and research participant. Unless a consent waiver or alteration has been approved, Federal regulations require that each participant receives a copy of the consent document.

Please note that any revision to previously approved materials must be approved by this committee prior to initiation. Please use the appropriate revision forms for this procedure.

All UNANTICIPATED PROBLEMS involving risks to subjects or others (UPIRSOs) and SERIOUS and UNEXPECTED adverse events must be reported promptly to this office. Please use the appropriate reporting forms for this procedure. All FDA and sponsor reporting requirements should also be followed.

All NON-COMPLIANCE issues or COMPLAINTS regarding this project must be reported promptly to this office.

This project has been determined to be a Minimal Risk project. Based on the risks, this project requires continuing review by this committee on an annual basis. Please use the appropriate forms for this procedure. Your documentation for continuing review must be received with sufficient time for review and continued approval before the expiration date of December 21, 2015.

Appendix 2: Invitation to Participate

Hello,

My name is Jamie Livengood, and I'm a graduate of the University of Maryland's Philip Merrill College of Journalism. I'm currently a master's candidate in the University of Maryland School of Public Health, and for my master's thesis, I am researching the education and training of journalists who cover health and medical news. The aim of the research to describe the critical skills the role demands, and to identify possible points of collaboration with public health professionals.

You've been identified as a [health journalist/health journalism educator] knowledgeable in this topic area. Therefore, I'd like to invite you to participate in this study.

The first part of this study is a 10-minute online survey, which can be found at https://umdsurvey.umd.edu/SE/?SID=SV_1Y4bS57lFxuTepT. Your responses will be anonymous and confidential.

You may choose to participate in only the survey, but I would greatly appreciate if you would consider taking part in the second part of this study, which consists of an in-person or phone interview to discuss your training experiences and educational background. This interview won't take more than 20-30 minutes, and will be recorded. Your name will not be used in the study. I know your time is valuable, but I hope you'll participate in this research that aims to improve understanding of your field. If you agree to be interviewed, please respond to this e-mail to schedule it.

As a thank you for your time and participation, those who agree to be interviewed will receive a copy of *A Field Guide for Science Writers: The Official Guide of the National Association of Science Writers*, by Deborah Blum and Mary Knudson.

If you are unable to participate but know of a colleague who might be interested, please feel free to forward this invitation.

Thank you for your time.

Sincerely,

Jamie Livengood (Student Investigator)

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E-mail: Jamie.livengood@gmail.com
jlivengo@umd.edu

Appendix 3: Informed Consent Script for Phone Interview Protocol

This research is being conducted by me, Jamie Livengood, under the guidance of my advisor, Dr. Mary Garza, as a master's thesis at the University of Maryland, College Park. We are inviting you to participate in this research project because you are a key informant able to give insight into the field of health journalism or journalist education. The purpose of this research project is to describe the form and content of education and training for health journalists. The answers to your questions may help inform future research and collaboration in between public health and journalism professionals.

This interview should take no longer than 30 minutes. You do not have to answer any questions you do not feel comfortable answering. No identifying information will be linked to your responses. If you have any questions, you may ask me or contact my advisor. If you would like a copy of this information for your records, I will email it to the address I have on record for you. By continuing with this survey, you attest that you are at least 18 years old and have read and understand the terms of this study and voluntarily agree to participate. Do you agree to continue and have your responses audio recorded?

Appendix 4: Interview Protocol for Journalists

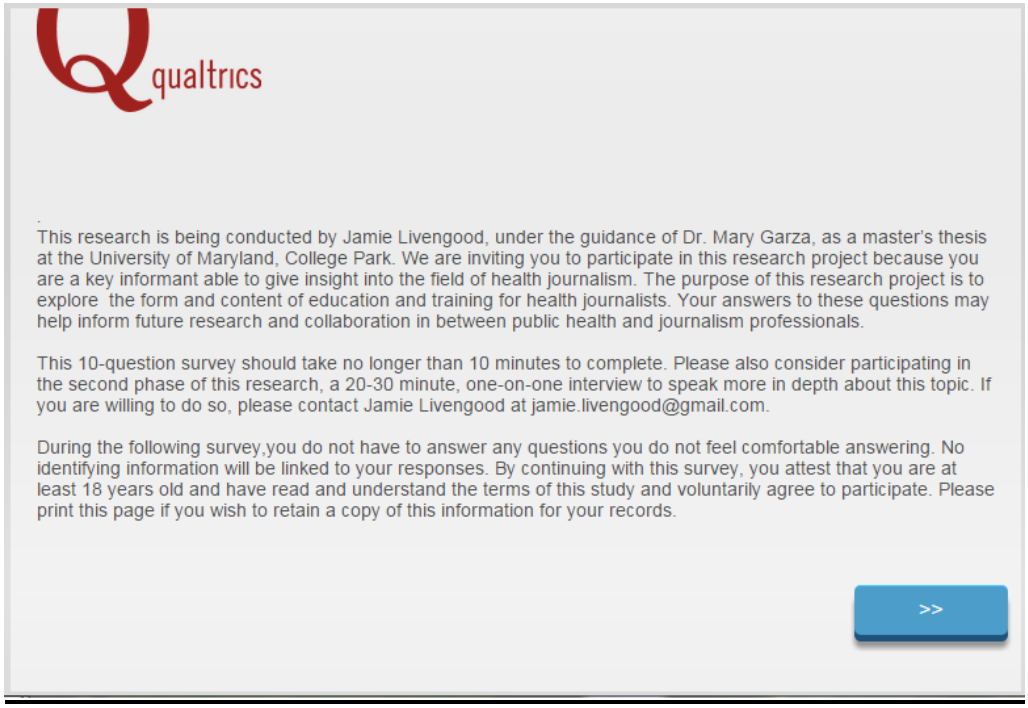
1. Did you set out to be a health journalist?
2. What was your path to your current position?
3. How much value do you place on training for health reporting?
4. Have you received any informal or experiential education in health topics?
5. What relevant skills did you think your previous experience endowed you with?
6. What skills do you think are crucial for science and health reporting that might not be necessary for other types of reporting?
    a. In what areas did you feel less prepared?
7. At your current position looking back, would you have taken additional training?
8. What kind of education and training would you suggest to your younger self, or those looking to enter the field of health journalism?
9. What are some ways you've tried to improve your health reporting skills since being on this beat?
10. How do you learn from colleagues and experts in health topics?
11. [For those in supervisory roles] Does specialized health training or background impact your hiring of a journalist?

Appendix 5: Interview Protocol for Educators

1. How do you describe your professional role, and what was your path to your current position?
2. What are the skills you feel are critical to the practice of health/medical journalism that may not be as necessary for journalists on other beats?
3. Can you briefly describe the process of developing content/training events? For example, might a new blog post come as a response to members' requests for help covering certain issues, or is that more of an internal decision?
4. How does cross-discipline collaboration come into play in developing AHCJ resources and events? How are experts chosen and sought for a panel discussion, for instance?
5. Can you make any comment about trends in participation in AHCJ training events or use of association resources? Are there any resources that are particularly popular? Do you get more of a particular type of student?
6. In a time when newsroom budgets are decreasing and individual journalists are stretching beyond traditional beats, do you feel health journalists are encouraged to take advantage of training and professional development resources like those offered by the AHCJ? What might you say to persuade a skeptical editor that continued training provides "return on investment?"
7. What role, if any, do you believe health journalists play in affecting public health?
8. If you were speaking to a newly assigned health journalist, or a young student looking to enter health journalism, what advice would you have for them?

Appendix 6: Informed Consent for Online Journalist Surveys

Journalists' survey opening screen:



Appendix 7: Journalists' Online Survey

1. Sex: M F
2. Age (in years):

   18-24 25-29 30-34 35-39 40-44 45-49 50-54 55-59 60-64 65+
3. Highest education completed:

   High School Some college Bachelor's degree Some graduate studies

   Masters +
4. Please name any degrees you have earned (i.e. BA in journalism):
5. Describe your professional role (i.e. staff reporter at daily newspaper, no need to name any specific publication or media outlet).
6. How long have you performed that professional role?
7. What percent of your time at work is spent reporting on health and medical news?
8. Please list any college-level health-related courses you completed:
9. Please list any college-level science courses you completed:
10. Please list any health/medical reporting training resources you've used while on the job (i.e. a book, online tool kit, workshop, etc.):

Appendix 8: Code Book

Rows with light blue background indicate codes present on initial code start list:

Primary Code	Secondary Code	Tertiary code	Number of referencing sources	Frequency of references
Advice for specialization			18	18
Beat coverage			2	3
Benefits of education			6	10
	Credibility		2	2
	Geography		2	2
	Network access		3	3
	Publication		2	2
	Reputation of program		1	1
Critical skills			18	75
	Critical analysis of health information		10	15
		Skepticism	4	4
	Contextualization		3	3
	Empathy		2	2
	Information gathering		8	10
	Interpretation		6	6
	Interviewing		3	3
	Sourcing		3	4
	Specialized knowledge		4	5
	Statistical analysis		5	5
	Understanding of health economics		3	3
	Understanding of scientific process		4	5
	Understanding of study design		3	3
	Writing and storytelling		2	3
Examples of journalist influence on public health			4	6
Freelancers in training			4	6
Generalists writing health news			4	5
Graduate-level health			13	62

journalism education				
	Journalism master's degree		1	1
	Science/health/medical journalism degree		1	1
	Science/medical degree		1	1
	Classes		1	26
		Class content	13	36
		Classroom newsroom	2	3
		Health reporting	10	12
		Journalism fundamentals	1	1
		Science/health electives	2	2
	Experiential learning		3	4
		Fieldwork	1	1
		Internships	2	3
Goals of graduate-level education			6	8
	Health beat		3	4
	Job market		4	4
Job prospects for specialists			9	9
	Factors affecting specialist demand		7	8
Journalist intention to specialize			5	5
Journalist roles			13	32
	Decision influencer		4	4
	Gatekeeper		12	16
	Watchdog		2	3
Newsroom attitudes towards training			5	5
Professional-level health journalism education			3	42
	Fellowships		2	9
		Format	2	4

		Content	2	5
	Professional assoc.		1	9
		Format	1	4
		Content	1	5
	Health stakeholder agencies		1	3
		Format	1	1
		Content	1	2
On-the-job resources			5	23
	Expert sources		5	7
	Online/web sites		4	12
	Professional assoc.		4	4
Strong skill areas			3	4
Trends in enrollment			13	24
	Class/applicant pool size		8	8
	Student backgrounds		11	11
	Student demographics		5	5
Undergraduate-level health journalism education			5	11
	Classes within journalism major		2	4
		Classes on health/medical topics	1	1
		Health reporting class	1	1
		Science classes	1	2
	Double major		1	1
	Experiential learning		1	1
		Internship	1	1
Weak skill areas			5	8

Appendix 9: MPH Program Competencies Addressed

My master's thesis integrated the following competencies for the Master of Public Health, Behavioral and Community Health degree:

- Identify critical stakeholders for the planning, implementation and evaluation of public health programs, policies and interventions.
- Conduct evaluation and research related to behavioral and community health.
- Communicate and advocate for public health.
- Identify basic theories, concepts and models from a range of social and behavioral disciplines that are used in public health research and practice.
- Describe the role of social and community factors in both the onset and solution of public health problems.
- Specify multiple targets and levels of intervention for social and behavioral science programs and/or policies.

Appendix 10: Timeline for Research

Task	Dec-14	Jan-15	Feb-15	Mar-15	Apr-15	May-15	Jun-15	July-15	Aug-15
Thesis proposal defense (12/2)									
Revisions to proposal									
Submit IRB application									
IRB proposal – is it approved?									
Select sample, make contact with key informants, schede interviews									
Data gathering - key informant interviews take place									
Transcription, analysis									
Schedule defense – poll, book room									
Write thesis chapters 4 & 5									
Draft editing and revisions									
At least 5 working days before defense: give hard copy of manuscript to committee AND abstract and defense date must be posted publicly on depts. graduate bulletin board and listserv (~July 1)									
Defend thesis – July 16									
Make any changes as needed, submit paperwork for graduation to UMD by 8/5									
Graduation									
Send summary of findings to key informants									

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