The news media play a vital role in disseminating health information, yet little is known about the social characteristics of health journalists or the impact they have on the newsmaking process. This study examines how the social group influences of US health journalists impact two important aspects of news production—‘media agenda-setting’ and ‘framing’. Using data from a national survey of health and medical science journalists, the authors conducted multivariable logistic regression analyses to study the links between the gender, age and race/ethnicity of respondents, and the ways in which they utilized news sources, other resources, news priorities and story angles. Female respondents were more likely than males to say that educating people to make informed decisions and disseminating new, accurate information are important priorities. Female and minority journalists were more likely than white males to use a variety of sources, and to say it is important to develop the health and scientific literacy of audiences and influence public health behaviors. The gender and race/ethnicity of journalists play an important role in the production of health news. Health educators can foster improved coverage by learning more about the life experiences of health journalists and developing better working relationships with them.
geographical scope of newsrooms and the professional practices that journalists follow [28]. In recent years, studies featuring in-depth interviews with health reporters have shown that they strive to write stories that are accurate and fair, despite considerable budget and deadline pressures. When reconciling these competing concerns, however, these journalists often rely on conventional story lines that privilege biomedical science over public health and offer solutions that focus on the individual’s responsibility to adopt healthier habits [29–33]. In terms of survey research, one study sponsored by the National Cancer Institute developed a general profile of US health and medical science journalists, including the occupational practices and determinants that influence their work [34]. It found that these journalists develop stories through a purposive process that considers the credibility of the story and its sources, the relevance of the topic to readers and viewers and the importance of disseminating new information. It also found that the process of health news reporting is influenced by the medium in which a journalist works and by whether the reporter works for a local or national news organization [34]. Other surveys have corroborated earlier findings about the lack of specialized training and beat-specific experience on the part of US health journalists and suggest that health reporters sometimes rely on colleagues and competitors when identifying and prioritizing topics worthy of coverage [35–41].

Another study based on the National Cancer Institute (NCI)’s national dataset [42] showed how the organizational and individual characteristics of US health journalists influence two important aspects of the newsmaking process—agenda-setting and framing. In its original conception, agenda-setting theory held that if a particular issue is covered more frequently or prominently by the news media, audiences are more likely to attribute importance to the issue [43, 44]. In this study, Wallington et al. used the construct of media agenda-setting [45] to better understand the factors that influence the selection and usage of journalistic sources (e.g. medical experts) and resources (e.g. medical websites). For example, they showed how educational attainment can impact the selection of sources and resources; journalists with a bachelor’s degree or less were more likely to rely on local health care providers and news releases, and less likely to consult scientific journal articles, than colleagues with graduate degrees. [42] While agenda-setting deals with the salience of issues in the news, framing is concerned with the manner in which the news is presented [44, 46, 47]. Wallington et al. used framing theory to study how reporters assign importance to certain elements in the news production process—news priorities and story angles—when ‘packaging’ topics for consumption by audiences. They found, for example, that journalists with a bachelor’s degree or less were almost twice as likely as those with graduate degrees to say that ‘educating the public to make informed decisions’ is an important priority. Reporters from small newsrooms were less likely than colleagues from large organizations to say they use an ‘economic impact’ angle and more likely to say they use a ‘human interest’ angle [42].

What remains to be examined is the influence of other individual-level factors on the ultimate shape and tone of health news content. One media scholar notes that the social characteristics of a journalist—including gender, race/ethnicity and age—will tend to ‘make him or her more interested in certain topics than others’ and that these interests may be ‘reflected in stories that the journalist pursues’ [22]. In other words, these social characteristics may matter because they serve as ‘proxies’ for social group designations; in turn, the experiences associated with belonging to a social group may influence journalists’ worldviews, priorities and practices. Two social group designations are of central interest to this study. Female reporters and editors, and journalists from racial/ethnic minority groups, share several characteristics that may translate into preferences for covering certain kinds of stories. In general, women and minorities learn more about the importance of family life during their early years, when compared with white males [48]; they also tend to place greater value on cooperative interpersonal relationships and have greater appreciation for the importance of personal
networks [48, 49]. In terms of broader social roles, women and minorities are most often defined in distinction to the normative position of white males. Members of both groups generally have lower socioeconomic status [50–53]; comparatively speaking, they must also cope with persistent negative stereotypes and greater burdens of stress across several life domains. Well-educated women and minorities have also found it tougher to advance their careers within certain industries and organizations [54]. For these and other reasons, women and minorities generally experience poorer health than white males [50, 55, 56]; as a result, journalists from these social groups approach their work with certain shared tendencies. Compared with male colleagues, female journalists tend to write more stories about educational and social issues (i.e. schools, public health and welfare, gender and minority affairs), use a wider variety of sources, use fewer stereotypes and write in a positive tone [22, 49]. One recent study showed that minority journalists were more than twice as likely as whites to identify stories about education and social issues as their ‘best work’. This study also suggests that younger journalists favor ‘soft news’ stories, compared with older colleagues. Future studies about age-related effects may help us to better understand the ways in which health journalism will change over time, as younger journalists move into editorial positions [22].

The literature of media sociology offers another framework—‘gatekeeper’ versus ‘advocate’ journalism—that may be useful in understanding the impact of social group influences on health reporting [57]. Gatekeeper journalists emphasize objectivity—the observation, processing and packaging of issues in a manner that reflects the essential facts, and the separation of those facts from opinions and commentary. In contrast, the advocate journalist is a critic and interpreter who strives to present all viewpoints, including those of marginalized social groups. Advocate journalists are sensitive to social injustices and often develop their stories with an eye toward addressing these injustices [57]. It may be that the sociodemographic characteristics of health journalists are important because they have some bearing on whether these journalists approach their work as advocates or gatekeepers. If women and minorities have faced similar struggles in order to attain social and political standing in the face of persistent discrimination, they may view journalism as a vehicle for mobilization and social change.

Research question

This study builds on the research literatures of media sociology and health communication to further extend our knowledge about health and medical science journalists. It explores the following research question: How do the de facto social group identities of health reporters in the United States (delineated by gender, race/ethnicity and age) influence their selection of news priorities, story angles, news sources and resources? By focusing on the ways in which these identities lead to the differential selection of sources, resources, priorities and angles, we hope to deepen our overall understanding about the ways in which health news makes its way from researchers to journalists and, through their work, to the general public. This task takes on added significance in an era where the sheer volume of health news is expanding rapidly, with increased emphasis on the need for health information that is customized to the specific needs of population subgroups. Armed with a better understanding of how journalists do their work, we may devise better ways to train health reporters and structure their organizational practices to ensure that their stories help to educate and inform.

Figure 1 demonstrates the relationships we envision between the social group classifications of health and medical science journalists and the stories they produce. In this study, we focus on three classifications—the gender, race/ethnicity and age of health journalists—and measure their influence on two important newsmaking processes. Specifically, we gauge their impact on the ways in which health journalists use sources and non-human resources in the process of assigning importance
to certain health stories (media agenda-setting) and on their use of various news priorities and narrative angles in the process of packaging their stories for public consumption (framing). Our model also presumes, but does not measure, certain other outcomes. The logical outcome of media agenda-setting is the shaping of journalistic ‘evaluations’, or the ways in which journalists come to privilege certain scientists, patient groups and bodies of research when developing their stories. The logical outcome of framing in our study is the development of ‘attributions’ on the part of journalists regarding the causes of, and remedies for, specific health problems and medical conditions. The attributions and evaluations that journalists make will impact the tone and frequency with which certain health topics appear in the news media [44, 47]. Finally, we suggest that journalists influence each others’ evaluations and attributions; that, in many cases, journalists develop certain ‘scripts’ for telling health news stories based on the opinions and journalistic output of their peers [41].

**Methods**

**Data collection**

Data for this study come from the 2005 Survey of Health and Medical Science Reporters and Editors, funded by the NCI [34]. The study population were editors and reporters working for a diverse assortment of print and broadcast news organizations. Using Bacon’s MediaSource, we identified 1482 news organizations representing local and national media outlets of varying size. The final sample (see Table I) included 468 reporters and editors from 463 news organizations, with a response rate of 31.2% (see Discussion for consideration of response bias). In this study, the news organization is the unit of analysis and the units of observation are reporters and editors. Our analyses showed that non-respondent organizations are similar to respondent organizations in terms of media type and size, with only slight variation for local television. Our sampling and weighting schemes minimized...
any bias due to non-response by weighting the final respondent database back to the original population based on their strata and using their probabilities of selection and non-response [34].

**Measures**

**Dependent variables**

To explore health reporting processes related to agenda-setting, respondents were asked how often they rely on information from the following ‘sources’: (i) government scientist or official; (ii) industry scientist or spokesperson; (iii) other scientist or researcher; (iv) health care provider and (v) patient or advocacy organization representative.

They were also asked how often they rely on the following ‘resources’: (i) government websites; (ii) other websites; (iii) news releases and (iv) scientific journal articles. To explore processes related to framing, respondents were asked how important each of the following ‘priorities’ are when developing a health news story: (i) disseminating new, accurate information; (ii) educating the public so people can make more informed decisions; (iii) providing entertainment; (iv) developing public health and scientific literacy and (e) influencing the public’s health behavior. They were also asked how often they choose the following ‘angles’: (i) public impact; (ii) economic impact; (iii) controversial new information, (iv) human interest and (v) need to change personal behavior.

Outcome variables were measured on a scale of 1 to 5, with 5 being ‘very often’ and 1 being ‘not at all’. Given the exploratory nature of our study, and the number of variables in the regression equation, we found it most interesting to learn whether our independent variables predicted the use of various sources, resources, priorities and angles ‘often’ or ‘not often’. Thus, all scales were dichotomized for use in logistic regression; the values 4 and 5 represent ‘often’ and the values 1, 2 and 3 represent ‘not often’.

**Independent variables**

Three individual-level predictor variables are of central interest: the gender, race/ethnicity and age of health journalists. In terms of race/ethnicity, almost 97% of respondents self-identified as non-Hispanic and almost 93% as white. For simplicity sake, the race/ethnicity of respondents was coded as either ‘white’ or ‘non-white’, with the latter category including Hispanic respondents of various ethnic origins. Given our research strategy, our chief interest was to see whether being an ‘older’ or ‘younger’ journalist had any appreciable impact on the dependent variables. Thus, the age of our respondents was coded dichotomously, with categories for journalists ‘younger than 40’ and ‘40 or older’. Our decision to use the age of 40 as a break point conforms with common precedent in journalism studies, as the mean and median ages of US journalists surveyed in relevant studies ranges between 40 and 44 [22, 23, 34, 42].
Covariates

In this exploratory study, we seek to understand the impact of certain key predictor variables while controlling for several other organizational- and individual-level variables that are known to influence the newsmaking process. One control variable deserves special mention. The educational level of journalists is conceptually distinct from our primary variables of interest since it is not an innate quality, but one that is closely related to a journalist’s life experience and family socioeconomic status. Nonetheless, an earlier study of health journalists found that education helped to predict the sources, resources, priorities and angles that reporters use [42]. Thus, the impact of education is noted in regression tables, while its conceptual place as a covariate is maintained. Other control variables included individual characteristics, such as the number of years a respondent has worked as a journalist, and two measures of occupational autonomy: the freedom to select stories that are important and the freedom to emphasize certain aspects of a story. Three additional organizational-level variables were included: the number of full-time news and editorial staff members employed by the respondent’s organization, whether the organization is owned by a publicly traded corporation and whether the organization is part of a larger group or chain. Covariates were chosen because previous studies using these data showed statistically significant associations between many of these variables and the health news production process, though they are not a focus of the current analyses [42]. For a visual representation of our measures and their role in the production of health and medical science news, see Fig. 1.

Data analysis

We used multivariable logistic regression to model the fitted odds that survey respondents’ social group characteristics, delineated by gender, race/ethnicity and age, independently and differentially predict the sources, resources, priorities and angles they use when developing health news stories. Medical scholars routinely use this technique to examine binary health outcomes (disease/no disease) and social scientists use it to model binary decision outcomes (yes/no) [58, 59]. Thus, multivariable logistic regression is an ideal methodology for this study. Complete case analyses were utilized for each dependent variable. All independent variables were included in each model to control simultaneously for the contribution of other organizational and individual characteristics of respondents. Weights were added to reflect differential probabilities of selection per stratum (e.g. national outlets were sampled with certainty, while local television and radio were sampled using a simple random sampling method). The model chi-square statistic for each regression run was significant at the 95% confidence level.

Results

Influence of gender, age and race/ethnicity on health news sources and resources

Individual characteristics of US health and medical science reporters, including gender and race/ethnicity, were independent predictors of the likelihood that respondents would use news sources from several sectors (see Table II). Female respondents were nearly three times more likely than male respondents to use health care providers (odds ratio [OR] = 2.90; 95% confidence interval [CI] = 2.11, 4.00) and also more likely to use patient or advocacy organization representatives (OR = 0.47; 95% CI = 0.26, 0.85) and industry scientists or spokespersons (OR = 0.56; 95% CI = 0.34, 0.91).

Individual characteristics such as gender, age and race/ethnicity were also associated with the use of other journalistic resources (see Table II). Female respondents were significantly less likely than journalists of color to use ‘other’ scientists or researchers (OR = 0.44; 95% CI = 0.27, 0.74), patient or advocacy organization representatives (OR = 0.47; 95% CI = 0.26, 0.85) and industry scientists or spokespersons (OR = 0.56; 95% CI = 0.34, 0.91).

Medical scholars routinely use this technique to examine binary
### Table II: Reliance on health news sources and resources, by journalist gender, age and race/ethnicity

<table>
<thead>
<tr>
<th>Predictor variable</th>
<th>Government scientist or official (n = 420)</th>
<th>Industry scientist or spokesperson (n = 420)</th>
<th>Other scientist or researcher (n = 419)</th>
<th>Health care provider (n = 420)</th>
<th>Patient or advocacy organization representative (n = 420)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender (ref. male)</td>
<td>Female</td>
<td>1.25 (0.97, 1.61)</td>
<td>0.83 (0.63, 1.09)</td>
<td>0.97 (0.71, 1.35)</td>
<td>1.50*** (1.16, 1.97)</td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>1.00 (1.00, 1.00)</td>
<td>1.00 (1.00, 1.00)</td>
<td>1.00 (1.00, 1.00)</td>
<td>1.00 (1.00, 1.00)</td>
</tr>
<tr>
<td>Age (ref. younger than 40)</td>
<td>40 or older</td>
<td>0.99 (0.74, 1.33)</td>
<td>1.02 (0.74, 1.40)</td>
<td>0.95 (0.71, 1.28)</td>
<td>0.98 (0.71, 1.34)</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>1.00 (1.00, 1.00)</td>
<td>1.00 (1.00, 1.00)</td>
<td>1.00 (1.00, 1.00)</td>
<td>1.00 (1.00, 1.00)</td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>1.00 (1.00, 1.00)</td>
<td>1.00 (1.00, 1.00)</td>
<td>1.00 (1.00, 1.00)</td>
<td>1.00 (1.00, 1.00)</td>
</tr>
<tr>
<td>Race/Ethnicity (ref. non-white)</td>
<td>White</td>
<td>0.63 (0.40, 1.02)</td>
<td>0.56* (0.34, 0.91)</td>
<td>0.44** (0.27, 0.74)</td>
<td>0.47* (0.26, 0.85)</td>
</tr>
<tr>
<td></td>
<td>Black</td>
<td>1.63*** (1.07, 2.48)</td>
<td>1.29 (0.77, 2.12)</td>
<td>1.29 (0.77, 2.12)</td>
<td>1.29 (0.77, 2.12)</td>
</tr>
<tr>
<td></td>
<td>Hispanic</td>
<td>0.68 (0.40, 0.94)</td>
<td>0.68 (0.40, 0.94)</td>
<td>0.68 (0.40, 0.94)</td>
<td>0.68 (0.40, 0.94)</td>
</tr>
<tr>
<td></td>
<td>Asian</td>
<td>1.13*** (1.01, 1.26)</td>
<td>1.13*** (1.01, 1.26)</td>
<td>1.13*** (1.01, 1.26)</td>
<td>1.13*** (1.01, 1.26)</td>
</tr>
<tr>
<td></td>
<td>Masters or more</td>
<td>0.64** (0.48, 0.86)</td>
<td>0.64** (0.48, 0.86)</td>
<td>0.64** (0.48, 0.86)</td>
<td>0.64** (0.48, 0.86)</td>
</tr>
</tbody>
</table>

Data from 468 US reporters and editors who worked on the health and medical science beats. All models control for gender, age, race, ethnicity, education, years worked as a journalist, autonomy in story selection and autonomy in story emphasis. Organizational-level control variables include organization size, public/private ownership and chain/group ownership. Significance level: *P < 0.05; **P < 0.01; ***P < 0.001.
White respondents were nearly twice as likely as non-white journalists to use government websites (OR = 1.93; 95% CI = 1.19, 3.13), and journalists 40 or older were less likely than younger colleagues to use ‘other’ websites (OR = 0.65; 95% CI = 0.46, 0.91) and government websites (OR = 0.66; 95% CI = 0.48, 0.89).

Influence of gender, age and race/ethnicity on health news priorities and story angles

Gender was a significant predictor of differential priority setting (see Table III). Female respondents were nearly two-and-a-half times more likely than males to say that educating people to make informed decisions is an important priority in their reporting (OR = 2.41; 95% CI = 1.54, 3.79). They were also more likely to say that disseminating new, accurate information (OR = 1.87; 95% CI = 1.21, 2.90), influencing the public’s health behavior (OR = 1.69; 95% CI = 1.32, 2.17) and developing the health and scientific literacy of the public (OR = 1.61; 95% CI = 1.25, 2.08) were important. In terms of age, respondents 40 and older were more likely to say that developing the health and scientific literacy of the public was important (OR = 1.57; 95% CI = 1.16, 2.13). White respondents were less likely to find this same priority important (OR = 0.29; 95% CI = 0.16, 0.53) and less likely to say it is important to influence the public’s health behavior (OR = 0.45; 95% CI = 0.26, 0.79).

Discussion

This study focused on the impact of the de facto social group characterizations of US health and medical science journalists—regarding gender, age and race/ethnicity—on the newsmaking process; specifically, on the differential selection of sources, resources, priorities and angles. These data suggest that gender plays an important role in the selection and production of health stories, supporting earlier findings that female journalists use a wider variety of sources (and resources) than male colleagues. The results from this study also expand on earlier findings that female journalists writing in all genres have greater affinity for social issues, including matters of public health. This can be seen in terms of the news priorities that female respondents listed: educating audiences, disseminating new and accurate information, influencing health behaviors and developing the public’s health literacy. One possible explanation includes gender-based differences in early socialization and life experience. The collective experience of women on the health beat, in terms of overcoming discrimination and other barriers, may lead them to adopt the social change-oriented worldview of the advocate journalist instead of the more passive stance of gatekeeper journalism—which, for some scholars, typifies masculine forms of socialization and social functioning [49, 60].

Regarding the overall impact of a respondent’s race/ethnicity, data from this study offer limited support for the notion that journalists of color may align with the advocate journalist role. In terms of agenda-setting and framing, previous research [22] led us to believe that minority journalists would share most or all of the characteristics demonstrated by female journalists. It is likely that the small number of minority journalists in the sample do not provide sufficient power to observe significant differences. Future studies with larger, more diverse samples—including, perhaps, an over-sampling of
### Table III. Health reporting priorities and story angles, by journalist gender, age and race/ethnicity

ORs and 95% CIs from multiple logistic regression analysis to predict:

<table>
<thead>
<tr>
<th>Predictor variable</th>
<th>Disseminating new, accurate information ( (n = 420) )</th>
<th>Educating, so people can make informed decisions ( (n = 421) )</th>
<th>Providing entertainment ( (n = 420) )</th>
<th>Developing the health and scientific literacy of the public ( (n = 420) )</th>
<th>Influencing the public's health behavior ( (n = 420) )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender (ref. male)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>1.87*** (1.21, 2.90)</td>
<td>2.41*** (1.54, 3.79)</td>
<td>0.95 (0.65, 1.38)</td>
<td>1.61*** (1.25, 2.08)</td>
<td>1.69*** (1.32, 2.17)</td>
</tr>
<tr>
<td>Age (ref. younger than 40)</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>40 or older</td>
<td>0.68 (0.38, 1.24)</td>
<td>0.69 (0.37, 1.26)</td>
<td>0.69 (0.45, 1.07)</td>
<td>1.57** (1.16, 2.13)</td>
<td>0.93 (0.69, 1.26)</td>
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<tr>
<td>Race/ethnicity (ref. non-white)</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>Undefined(^b)</td>
<td>Undefined(^b)</td>
<td>1.40 (0.67, 2.93)</td>
<td>0.29*** (0.16, 0.53)</td>
<td>0.45** (0.26, 0.79)</td>
</tr>
<tr>
<td>Education (ref. Bachelors or less)</td>
<td></td>
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<td></td>
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<tr>
<td>Masters or more</td>
<td>0.90 (0.53, 1.52)</td>
<td>0.59* (0.37, 0.93)</td>
<td>1.12 (0.73, 1.72)</td>
<td>1.20 (0.89, 1.61)</td>
<td>0.87 (0.66, 1.16)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Predictor variable</th>
<th>Public impact ( (n = 419) )</th>
<th>Economic impact ( (n = 421) )</th>
<th>Controversial new information ( (n = 420) )</th>
<th>Human interest ( (n = 420) )</th>
<th>Need to change personal behavior ( (n = 420) )</th>
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</thead>
<tbody>
<tr>
<td>Gender (ref. male)</td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>1.01 (0.71, 1.43)</td>
<td>0.75* (0.58, 0.98)</td>
<td>2.07*** (1.61, 2.67)</td>
<td>1.82*** (1.29, 2.57)</td>
<td>2.49*** (1.93, 3.22)</td>
</tr>
<tr>
<td>Age (ref. younger than 40)</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>40 or older</td>
<td>0.60* (0.38, 0.93)</td>
<td>0.62** (0.45, 0.84)</td>
<td>1.01 (0.75, 1.35)</td>
<td>1.07 (0.69, 1.65)</td>
<td>1.24 (0.92, 1.67)</td>
</tr>
<tr>
<td>Race/ethnicity (ref. non-white)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>1.02 (0.51, 2.05)</td>
<td>0.23*** (0.14, 0.38)</td>
<td>1.08 (0.67, 1.74)</td>
<td>0.58 (0.26, 1.30)</td>
<td>1.20 (0.74, 1.96)</td>
</tr>
<tr>
<td>Education (ref. Bachelors or less)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Masters or more</td>
<td>0.81 (0.55, 1.19)</td>
<td>1.47* (1.10, 1.98)</td>
<td>1.77*** (1.33, 2.35)</td>
<td>0.34*** (0.24, 0.48)</td>
<td>0.83 (0.62, 1.11)</td>
</tr>
</tbody>
</table>

\(^a\)Data from 468 US reporters and editors who worked on the health and medical science beats. \(^b\)Odds ratios for these cells are undefined because some of the underlying chi-square tables have expected frequencies of less than 5. All models control for gender, age, race/ethnicity, education, years worked as a journalist, autonomy in story selection and autonomy in story emphasis. Organizational-level control variables include organization size, public/private ownership and chain/group ownership. Significance level: *\(P < 0.05\); **\(P < 0.01\); ***\(P < 0.001\).
large, urban communities—may shed more light on the role that race/ethnicity plays in health news production. This should be an important research priority for public health practitioners because of the significant health disparities that minority populations experience and because of the financial struggles of some racial/ethnic media outlets in recent years [61–64]. Finally, the impact of our respondents’ age on the production of health news seems to be weak. Of note, health journalists 40 and older are less likely to rely on websites when developing stories—an artifact, perhaps, of the greater familiarity that many young people have with computers and other information technologies. Future studies should focus more specifically on the types of stories that journalists prefer to cover depending on their age, or perhaps as part of their distinctive generational worldviews.

How can we put these findings to good use? One recent study of women in journalism offers a clue. In their study of newsroom leadership changes, Beam and DiCicco (2010) note that the arrival of a new female manager may have no discernible impact on the organization’s news agenda—but may lead to changes in the overall tone and feel of stories published thereafter. In other words, female editors and reporters could serve as important agents in the framing of health news stories [65]. This observation is of no small consequence, since the frames that journalists use in their news stories provide evidence about the attributions they make regarding the causes and solutions of various health problems [44, 47]. For example, interview-based studies suggest that journalists who avoid ‘social determinants’ frames may believe that a person’s health status depends more closely on the degree of motivation the person has to maintain appropriate health habits [30, 31]. Health educators interested in changing public opinion on this issue would naturally look for ways to influence the frames that reporters develop when covering these stories—in the hope that new understandings on the part of journalists will influence the attributions that audiences make about causes and cures.

Any practical strategy aimed at influencing health news coverage must begin with the realization that reporters who work the health beat often lack the specialized knowledge and journalistic resources needed to do their jobs well. All too often, tight budgets and deadline pressures rule out the possibility of taking reporters away from their jobs for a dose of concentrated training. But other avenues are available for facilitating the learning process, including efforts to help community-based health organizations forge cooperative partnerships with local reporters. Increasingly, health care, public health and human service organizations have the opportunity to exert meaningful influence on the interpretation of local events. Health educators can further stimulate this process by helping community groups to gain a better understanding of the individual and organizational factors that impact the lives of health journalists. Other methods may be found for helping reporters to convey information that is accurate, context-specific and compelling for local citizens. Finding these methods should be an important goal of future research.

Limitations
A limitation of this study is the low survey response rate of 31.2%. These rates may increase significantly when individuals are paid cash incentives [66]. NCI made no such offers, since the ethical norms of US journalism preclude reporters and editors from accepting such payments. However, close post hoc analyses showed no differences in the type of media organization that responding and non-responding journalists worked for, and response bias does not seem to be a significant issue.

Conclusion
Advances in health and medical science, and in communication technologies, mean that more information on health is being generated than ever before. But this new age of information is not without problems. For one thing, consumers of health information often have trouble knowing which sources to trust and which recommendations to follow. These challenges are magnified for the most disadvantaged populations, including those...
with lower socioeconomic positions and most racial/ethnic minorities. Members of these groups carry a disproportionate burden of poor health and are also subject to significant differences in their ability to access, use and process health information [67, 68]. Health and medical science journalists are well positioned to address these issues, and health educators should do everything they reasonably can to make their jobs easier. When journalists do not know where to turn for information on challenging topics, health educators might refer them to appropriate, easy-to-use resources like the online toolkits developed by the Journal of the National Cancer Institute and the Association of Healthcare Journalists [69, 70]. More generally, public health practitioners must learn to treat journalists not as adversaries, but as partners and colleagues in the effort to inform people about matters of mutual concern [31].

The promise of a health communication revolution that spreads through a wide range of information delivery platforms hinges on our ability to provide information that is targeted to selected audiences and customized to their particular needs, health status and personal backgrounds [6]. If health journalism is to fulfill this promise, we need to know more about the life experiences and worldviews of the people who practice it. Armed with this information, we can make intelligent investments in the sort of training and support that may lead to a smoother transfer of knowledge from health and medical experts to the general public—with an emphasis on improved communications with vulnerable population groups. If female and minority journalists hold greater potential for developing this kind of news coverage, public health and preventive medicine specialists should collaborate more closely with them in providing it.

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**References**

2. Leak J, Hooker C, King C. Media coverage of health issues and how to work more effectively with journalists: a qualitative study. *BMC Public Health* 2010; **10**: 535.
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