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ARTICLE

Communicating Evidence-Based Information on Cancer Prevention to State-Level Policy Makers

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Background Opportunities exist to disseminate evidence-based cancer control strategies to state-level policy makers in both the legislative and executive branches. We explored factors that influence the likelihood that state-level policy makers will find a policy brief understandable, credible, and useful.

Methods A systematic approach was used to develop four types of policy briefs on the topic of mammography screening to reduce breast cancer mortality: data-focused brief with state-level data, data-focused brief with local-level data, story-focused brief with state-level data, and story-focused brief with local-level data. Participants were recruited from three groups of state-level policy makers—legislative staff, legislators, and executive branch administrators—in six states that were randomly chosen after stratifying all 50 states by population size and dominant political party in state legislature. Participants from each of the three policy groups were randomly assigned to receive one of the four types of policy briefs and completed a questionnaire that included a series of Likert scale items. Primary outcomes—whether the brief was understandable, credible, likely to be used, and likely to be shared—were measured by a 5-point Likert scale according to the degree of agreement (1 = strongly disagree, 5 = strongly agree). Data were analyzed with analysis of variance and with classification trees. All statistical tests were two-sided.

Results Data on response to the policy briefs ($n = 291$) were collected from February through December 2009 (overall response rate = 35%). All three policy groups found the briefs to be understandable and credible, with mean ratings that ranged from 4.3 to 4.5. The likelihood of using the brief (the dependent variable) differed statistically significantly by study condition for staffers ($P = .041$) and for legislators ($P = .018$). Staffers found the story-focused brief containing state-level data most useful, whereas legislators found the data-focused brief containing state-level data most useful. Exploratory classification trees showed distinctive patterns for brief usefulness across the three policy groups.

Conclusion Our results suggest that taking a “one-size-fits-all” approach when delivering information to policy makers may be less effective than communicating information based on the type of policy maker.

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A large portion of the cancer burden is preventable (1–3), and increasing attention is being paid to the effectiveness and reach of policy interventions to reduce cancer mortality (4–10). Such interventions are designed to make healthy choices more available and unhealthy behaviors less available or illegal (4). Changes in the policy environment can directly affect behaviors (eg, taxes that increase the price of tobacco result in reduced cigarette consumption) or may indirectly alter social norms (eg, workplace policies that promote physical activity may shift the workplace culture). Importantly, policy interventions often produce longer lasting changes compared with many public health programs that target the individual. There is now an extensive array of effective policy interventions specifically for cancer prevention (4,11). These ap-

proaches address both primary prevention (ie, diet, physical activity, tobacco use, sun protection) and secondary prevention (ie, screening for breast, cervical, or colorectal cancers). However, these interventions are not fully used in practice settings (eg, a state health department) (12–14).

There are many opportunities to disseminate evidence-based cancer control strategies to state-level policy makers in both the legislative and executive branches (5,15,16). The focus at the state level relates, in part, to the constitutional doctrine of reserved powers, where the 50 states retain enormous authority to protect the public's health (17). However, state-level policy makers face a diverse set of issues and priorities (18), and the information they receive regarding policy decisions may be disconnected, random,

and chaotic (19,20). Furthermore, state-level policy officials are often overwhelmed with the volume of information they receive and have a strong preference for data that are concise, visually appealing, and relevant to current health policy debates (21–24). Thus, a key for an effective policy making process at the state level is clear and successful communication between public health practitioners and legislative policy makers (25,26). However, there is sparse information on how best to frame and communicate information to policy makers, making this an area of high priority for public health research (27,28). For example, a study of directors of applied research organizations in Canada found that 67% of organizations reported targeting policy makers with their research knowledge (29), of which only 49% tailored materials to specific policy makers.

Success in the policy making process may be driven in part by use of narrative forms of communication (ie, stories) (30,31) and the use of local data (32,33) to improve the delivery of information to policy. For this study, narrative communication was defined according to Kreuter et al. (34), as any representation of a sequence of connected events and characters that has an identifiable structure, is bounded in space and time, and contains implicit or explicit messages about the topic addressed. Narrative communication has long been recognized as an important form of political communication: Elected officials report that policy-oriented stories can surpass statistical data in usefulness, in part, because the latter can be seen as too complicated or boring (35,36). However, to date, the use of narratives to persuade policy makers has mainly been restricted to the use of anecdotes (35–39). The effectiveness of narratives in persuasion has been debated, with some studies (outside the policy arena) favoring narrative over data and others favoring the reverse (40,41). However, the experience of public health practitioners suggests that use of local data can be a vital component in achieving policy objectives in cancer screening, tobacco control, and promotion of physical activity (33,42,43).

Policy briefs are one of the main ways by which public health practitioners, advocates, and researchers communicate information on cancer prevention to policy makers (28,44). An effective policy brief should 1) make the evidence concise and understandable, 2) explain why the evidence is important, and 3) describe evidence-based policy options that would be suitable actions for policy makers to take (45,46). To date, there has been little research on the most effective way of constructing and delivering a policy brief to a range of policy makers. The aim of this exploratory study was to identify the factors that influence the likelihood that state-level policy makers will find a policy brief understandable, credible, and useful.

Methods

Participants

The Institutional Review Board at Washington University in St Louis approved all research activities in this project. This study was conducted among three groups of state-level policy makers. The first group consisted of legislative staff members. These individuals have considerable influence in forming the priorities of an elected official because they are responsible for gathering information, setting the agenda, and crafting specific legislative proposals

CONTEXT AND CAVEATS

Prior knowledge

Clear and successful communication of evidence-based cancer control strategies between public health practitioners and policy makers is essential for effective policy making. However, it is unclear how best to frame and communicate such information to policy makers at the state level.

Study design

Three groups of state-level policy makers (legislative staff, legislators, and executive branch administrators) rated four types of policy briefs on the topic of mammography screening to reduce breast cancer mortality (data-focused brief with state-level data, data-focused brief with local-level data, story-focused brief with state-level data, and story-focused brief with local-level data) on whether the brief was understandable, credible, likely to be used, and likely to be shared.

Contribution

All three groups of policy makers found the briefs to be understandable and credible. Legislative staff found the story-focused brief containing state-level data most useful, whereas legislators found the data-focused brief containing state-level data most useful.

Implications

When delivering information to policy makers, a “one-size-fits-all” approach may be less effective than communicating information based on the type of policy maker.

Limitations

Because the policy brief used in this study covered only one topic in cancer prevention, it is unclear if these findings are generalizable to other topics. The importance of timing in the delivery of the brief to policy makers was not examined nor was the use of authentic local stories. The questionnaire response rate was low.

From the Editors

(47). For this study, the sample of legislative staff included only committee staff, not leadership or personal staff, because committee staff generally work on their designated policy issues for an entire legislative session, whereas personal and leadership staff tend to spend less time with specific bills (47). The second group of policy makers consisted of state legislators. State legislatures are the lawmaking bodies of the 50 states in the United States; they perform many of the same duties on the state level that the US Congress performs on the federal level. The third group of policy makers consisted of executive branch administrators (hereafter called executives), who work in a variety of public health settings (eg, division directors, program heads) and are frequently called on by the legislative branch of government to prioritize, implement, and evaluate cancer control programs. Executives often make important decisions about which health policies to enact and enforce, and how resources are to be allocated.

Participants were selected from six states (Mississippi, Missouri, New Jersey, Oregon, Pennsylvania, and South Carolina), which were chosen from each of six strata created by sorting all 50 states by population size (smaller or larger than median population size

for all US states) and the dominant political party in the state legislature (both houses Democratic, both houses Republican, or mixed) to provide the greatest geographic diversity. All of the state legislators (n = 288) and legislative staffers (n = 360) were enumerated to provide a complete sampling frame using current member lists provided by the National Conference of State Legislatures (48). All executives (n = 192) were identified from the current membership lists of the National Association of Chronic Disease Directors (NACDD) (49) or were individuals who worked in state health departments or cancer coalitions but were not members of NACDD.

Study Design and Random Assignment

Participants from each of the three policy groups were randomly assigned to one of four study groups—data-focused brief with state-level data (hereafter called data/state), data-focused brief with local-level data (data/local), story-focused brief with state-level data (story/state), and story-focused brief with local-level (story/local)—defined according to the elements included in the policy briefs.

Development of Policy Briefs

Core Components of Each Brief. We chose mammography screening to reduce breast cancer mortality as the topic of the policy brief that we developed for this study because of the importance of the issue (50,51) and the effectiveness of this intervention (11). Each brief was printed in full color on both sides of an 8.5 × 14-in sheet of paper, which was folded to become a 4-page 7 × 8.5-in booklet. The inside third and fourth pages of each brief were identical across the four types of briefs (ie, data/state, data/local, story/state, and story/local). The front cover varied according to whether the policy brief was data-driven or story-driven. For data-driven briefs, the front cover contained two statements that included data percentages related to mammography screening. For story-driven briefs, the front cover contained two personal stories related to mammography. All briefs included relevant statistics about uninsured women, women who were not up to date on their mammograms (by insurance status), breast cancer mortality compared with other common causes of death, the benefits of mammography as a tool for the early detection of breast cancer, and the societal costs that can be saved through early detection of breast cancer. Finally, all briefs provided evidence-based policy recommendations (11) and references and contact information for policy makers to learn more about the policy brief topics.

Sources of State and Local Data. All data presented in the policy briefs were genuine and state specific. We used three primary sources to develop state and local data for the policy brief. First, we used 2005 US Census data (52) to estimate the frequency of women at high risk for death from breast cancer and state-specific poverty guidelines for Medicare and Medicaid to determine the percentage of women aged 40–65 years who did not have health insurance and, among the uninsured, the percentage of women who did not meet the criteria for any government-sponsored screening programs. Second, to determine the percentage of women with no health insurance who were not up to date on their mammograms compared with the percentage of insured women who were not up to date, we used data for 2006 from the Centers

for Disease Control and Prevention, Behavioral Risk Factor Surveillance System (BRFSS) (53). Third, we also used BRFSS data to estimate the percentage of women older than 40 years who were not up to date on mammograms in each state (53). Finally, we used data from the National Center for Health Statistics (54) to calculate the number of deaths (from breast cancer and other causes) for 2005 among women aged 35 years or older. Information was gathered on the number of women who had died of breast cancer [*International Classification of Diseases Tenth Revision* codes C00–D48 (55)] at both the state and local (ie, county) level. Next, we tabulated the number of women who had died of car crashes, drug use, suicide, murder, and HIV/AIDS at both the state and local levels (“other” causes). If the total number of deaths due to breast cancer was less than 50 for a particular county, the data for every surrounding county were summed.

Content of Stories. On the basis of principles discussed by Kreuter et al. (34), staff at the Health Communication Research Laboratory at Washington University drafted 10 stories that presented a variety of protagonists, situations, and perspectives. The stories focused on several main characters, including a breast cancer survivor, a woman getting screened for breast cancer, the daughter of a breast cancer survivor, and a sister and the father of a woman with breast cancer. Different versions of each story were developed to emphasize either the benefits of screening or the consequences of not being screened. For example, stories from the father’s point of view emphasized his daughter’s survival because of early detection or her death from late-stage breast cancer. Each story was written to maximize each of the following five elements: plot hook, emotional intensity, realism, universal appeal, and relevance to an audience of policy makers.

Next, we organized a transdisciplinary group (n = 15) that included experts from our study team and affiliated researchers in health policy, communication, visual design, journalism, epidemiology, and behavioral science. Each study team member reviewed and rated each story according to the five elements listed above as weak/needs further development, adequate representation, or strong/well-developed, and ranked their top five favorites. The stories that ranked the highest were discussed in depth by the study team, which collectively made suggestions for modifying the stories into three vignettes representing the following perspectives: a female employee of a family-owned business who found a breast lump but did not have health insurance and did not qualify for the government-sponsored breast cancer screening program; the physician who treated this woman for late-stage breast cancer once she finally sought treatment; and the woman’s employer, who discussed the dilemma of trying to run a small business when an employee is on an extended leave of absence while undergoing lengthy treatment for late-stage cancer. Sample briefs are provided in Supplementary Material 1 (available online).

Measures Development

Sources of Items. We designed a core questionnaire to examine responses of policy makers to the policy briefs. Whenever possible, questionnaire items were based on previous research (56–60). Primary outcomes—whether the brief was understandable, credible, likely to be used, and likely to be shared—were measured by a

5-point Likert scale according to the degree of agreement (1 = strongly disagree, 2 = mostly disagree, 3 = undecided, 4 = mostly agree, 5 = strongly agree) with a prompt (ie, “The information in this report was . . .”) eliciting cognitive (eg, understandable, credible) and affective (eg, affected me emotionally) responses to the policy brief. Similarly, we assessed the likelihood of a policy maker using or sharing the brief with a colleague by use of a 5-point Likert scale (1 = not at all likely, 5 = very likely).

A series of factors that may have mediated or moderated the effects being analyzed (61–64) were also collected in the questionnaire, including how health ranks in importance in relation to other policy issues (eg, crime, education) and the influence of various factors (eg, scientific evidence, local leaders, advocacy groups) on health priorities (65,66). A 7-point Likert scale was used to measure political ideology on social and fiscal issues (66). The questionnaire asked whether the respondent had a close friend or family member with breast cancer or a daughter because these factors were found to influence legislators’ responses to policy issues and women’s responses to breast cancer stories in previous studies (67,68). Data were collected on whether a family member or friend lacked health insurance based on an item in the National Survey of the Uninsured (69). The questionnaire included standard demographic questions on age, sex, and level of education. A variable was also included about whether a legislator represented an urban or rural district (70). The questionnaire was designed to be completed in approximately 10 minutes. The core questions were the same for all policy maker groups, but the final questionnaires were slightly different for each decision maker group (eg, staffers were asked about their job responsibilities, executives were asked for their job title). The staffer questionnaire contained 23 items, the legislator questionnaire, 16 items, and the executive questionnaire, 19 items (Supplementary Material 2, available online).

Testing of the Questionnaire. By using established methods of cognitive response feedback (71–74), we tested the staffer questionnaire among a group of staff members ($n = 8$) at the National Conference of State Legislatures (Denver, CO) who were currently working with state legislatures or had previously served as a state legislator or legislative staffer. Participants in this cognitive testing phase were instructed to first review the policy brief and then the questionnaire. A study author (K. A. Stamatakis) reviewed each questionnaire item with participants using paraphrase tasks (eg, What do you think the question is asking?), information retrieval (eg, What do you need to recall from memory to answer the question?), and decision processing (eg, How did you choose your answer?). Results from the cognitive response testing were used to refine the wording of a number of questions and response categories. In addition, based on feedback from participants, a small number of role-specific questions were added to the questionnaire. For example, in the staffer group, there were questions on one’s role as a staffer and from whom she or he takes direction. Among the executive group, a set of job categories was specified (eg, administrator, division, or bureau head).

Data Collection

Data were collected from February 2, 2009, to December 31, 2009. The data collection process began with a telephone call to the offices

of legislators to introduce the project to the legislators, let them know that mailed materials were coming, and encourage their support. The policy brief and questionnaire were mailed to each office, and follow-up telephone calls were made to encourage participation. We e-mailed the policy brief as a PDF file and also sent a survey link to those who preferred to complete the questionnaire online. In two states (Mississippi and South Carolina), local constituents who had a background in health policy made personal telephone calls to and in-person visits with legislators to encourage questionnaire completion. In two other states (New Jersey and Oregon), personal visits with legislators were completed by a study author (C. G. Wintrobe). By 8 months into data collection, to address the small number of legislators who had agreed to participate, we increased the legislator sample by 50% and sent one of the four types of briefs (data/state, data/local, story/state, and story/local) to randomly selected legislators ($n = 16$ per each of the same six states) to augment the legislator sample size.

Statistical Analysis

The two experimental conditions (data vs story and state data vs local data) were combined into a four-level variable: data/state, data/local, story/state, and story/local. Frequencies of demographic variables were used to describe the sample overall and by the four-level intervention grouping variable. Given the large number of rating items assessed, we conducted exploratory factor analysis with the use of the Varimax rotation function (SPSS for Windows, Rel. 17.0.1. 2008; SPSS, Inc, Chicago, IL) to identify a smaller number of groupings of items. Two factors were identified. The first factor addressed whether the brief was understandable and was composed of three measures that assessed whether the information in the brief was clear, presented in an attractive way, and held the respondent’s attention. The second factor addressed whether the brief was credible and was composed of two measures that assessed whether the information in the brief was believable and accurate. One-way analysis of variance was performed to investigate the association of the four-level variable (ie, data/state, data/local, story/state, and story/local) with two additional outcome variables: the likelihood of using the information in the brief and likelihood of sharing the policy brief with a colleague. Levene statistics were used to test the assumption of homoscedasticity (75), and the Kolmogorov–Smirnov test (76) was used to test normality of the residuals. While homogeneity of variances was shown, the residuals deviated statistically significantly from normality. Therefore, Kruskal–Wallis tests were used to assess the statistical significance of the associations (77).

Because we did not know which attributes of the respondents would affect their likelihood to use and share the briefs, we created classification trees (78) for the likelihood of use by using the partition analysis function (rpart) in R (version 2.11.0, R Foundation for Statistical Computing, Vienna, Austria) (79). This exploratory multivariable technique allows a researcher to efficiently discover groups of respondents who are higher or lower on an outcome metric based on multiple and potentially interacting predictor variables (79). The sample was repeatedly split into different “branches,” with the goal of maximizing the statistical deviance between each branch. Independent sample t tests were used to assess the statistical significance of each branching. All tests of statistical significance were two-sided; a P value less than .05 was considered statistically significant.

Results

The overall response rate was 35% with a response rate of 35% among staffers (360 questionnaires sent, 125 completed), 26% among legislators (288 sent, 75 completed), and 47% among executives (192 sent, 91 completed). Table 1 summarizes the characteristics of the respondents. The staffers were the youngest of the three policy maker groups (mean age = 47 years) and the legislators were the oldest (mean age = 58 years). The majority of the staffers (58%) and the executives (67%) were female, whereas 76% of legislator participants were male. In all three policy maker groups, more than 70% of respondents reported that their health was very good or excellent. The majority of participants across all three policy maker groups were college graduates, and the highest educational attainment was among the executives (86% held postgraduate degrees). The legislators tended to be more fiscally conservative than the other two policy maker groups, and the executives were the most socially liberal among the three groups of respondents. There were no study-condition differences by age, sex, self-reported health status, education level, or fiscal or social position.

Results for key outcome variables were calculated for the whole group and for each of three groups of policy makers (Table 2). All three groups found the briefs to be understandable and credible, with mean ratings for these variables that ranged from 4.3 to 4.5 on 5-point scale. The likelihood of using the brief (the dependent variable) differed statistically significantly by study condition for staffers ($P = .041$) and for legislators ($P = .018$). Staffers were most likely to use the story/state brief (mean rating = 3.4; 95% confidence interval [CI] = 3.0 to 3.9) and least likely to use the data/state brief (mean rating = 2.5; 95% CI = 2.0 to 3.0). By contrast, legislators were most likely to use the data/state brief (mean rating = 4.1; 95% CI = 3.6 to 4.6) and least likely to use the story/state brief (mean rating = 3.1; 95% CI = 2.6 to 3.6). Regarding the likelihood of sharing the brief, the only differences by type of brief were observed for staffers ($P = .008$). Staffers were most likely to share the story/state brief (mean rating = 3.8; 95% CI = 3.3 to 4.2) and least likely to share the data/state brief (mean rating = 2.7; 95% CI = 2.3 to 3.2).

Although the executives and the legislators were most likely to share the data/state brief and least likely to share the story/state brief, the differences in the likelihood of sharing by type of brief for these policy maker groups were not statistically significant. The majority of staffers (74%), legislators (76%), and executives (67%) reported that the policy briefs contained an appropriate amount of information (data not shown). More staffers (20%) and executives (20%) than legislators (15%) wanted additional information in the brief.

We constructed classification trees for the likelihood of using the brief. The trees included only factors that could be manipulated in constructing policy briefs (eg, data- vs story-focused, state vs local data) or data about the target audience that are publicly available and could be used to enhance the relevance of a brief to a specific legislator (eg, sex, political party affiliation). Each node (rectangle) in the classification tree maximizes the statistical deviance for use of the brief. For the entire sample of policy makers ($n = 291$), the first branching occurred between the combined group of staffers and executives and the legislators, with legislators being

more likely to use the brief than staffers and executives (mean rating: 3.7 vs 3.2, respectively; $P = .001$) (Figure 1). For legislators only, the next branching for likelihood of using the brief occurred for data- vs story-focused (mean rating: 4.0 vs 3.5, respectively; $P = .044$). Among legislators who favored the story-focused brief, there was a preference for briefs containing local data over those containing state data (mean rating: 3.8 vs 3.1, respectively; $P = .035$). Among legislators who favored the data-focused brief, Democrats reported a greater likelihood of using the brief than Republicans (mean rating: 4.4 vs 3.5, respectively; $P = .012$). On the left-hand side of the tree (ie, among staffers and executives), the likelihood of use was higher among women than among men (mean rating: 3.4 vs 3.0, respectively; $P = .047$). Among female staffers and executives, those without a graduate education were more likely to use the brief than those with a graduate education (mean rating: 3.8 vs 3.2, respectively; $P = .018$). Among female staffers and executives with a graduate education, there was a preference for briefs containing local data over those containing state data (mean rating: 3.5 vs 2.9, respectively; $P = .024$).

In a classification tree on the likelihood of using the policy brief that included staffers only, the first branching occurred on whether individuals had a graduate education, with those lacking a graduate education reporting a higher likelihood of use than those with a graduate education (mean rating: 3.5 vs 2.8, respectively; $P = .004$) (Figure 2). Among staffers without graduate education, the likelihood of use was higher among women than among men (mean rating: 3.8 vs 3.0, respectively; $P = .022$). At the next branching among women, those who were more socially liberal were more likely to report a higher likelihood of use than those who were socially moderate or conservative (mean rating: 4.4 vs 3.5, respectively; $P = .025$). In a classification tree that included executives only, none of the branchings was statistically significant (Figure 3). Only at the fourth branching, where women were more likely than men to find the brief useful, was the difference in ratings close to statistical significance (mean rating: 4.2 vs 3.4; $P = .052$). Across the three policy groups, the highest rating for the likelihood of using the brief was for legislators (mean rating = 3.7; 95% CI = 3.6 to 3.8), followed by executives (mean rating = 3.4; 95% CI = 3.3 to 3.5) and staffers (mean rating = 3.1; 95% CI = 3.0 to 3.2) (Figures 1–3).

Discussion

In this study, we explored the factors that influence the likelihood that state-level policy makers would find a policy brief understandable, credible, and useful by comparing narrative-based policy briefs with those containing primarily statistical information. The findings suggest that the likelihood of using these briefs was highest among legislators, followed by executives and staffers. The likelihood of use was generally greater among women, those who identify themselves as socially liberal, respondents older than 52 years, and those without a graduate education. The branching of classification trees showed that each of the three policy maker groups responded differently to the policy brief.

To our knowledge, this is the first report of an empirical test of the usefulness of various versions of a policy brief in communicating cancer prevention information to three groups of state-level

Table 1. Characteristics of participants in the study of cancer communication in policy makers, six US states, 2009*

Characteristic	Total sample (n = 291)	Policy maker group			Study group			Pt
		Staffers (n = 125)	Legislators (n = 75)	Executives (n = 91)	Data/state (n = 79)	Data/local (n = 66)	Story/state (n = 78)	Story/local (n = 68)
Age, No. (%), y								
1–44	78 (28)	47 (40)	11 (15)	20 (23)	14 (18)	19 (30)	24 (32)	21 (33)
45–54	85 (30)	37 (32)	17 (23)	31 (35)	29 (37)	19 (30)	20 (27)	17 (27)
≥55	117 (42)	33 (28)	47 (63)	37 (42)	36 (46)	26 (40)	30 (41)	25 (40)
Mean (SD)	51.0 (12.2)	46.6 (12.4)	57.6 (11.2)	51.2 (10.2)	53.9 (10.4)	51.0 (13.4)	49.5 (11.6)	49.0 (13.2)
Median (range)	52 (23–82)	47 (23–82)	58 (31–81)	52 (26–73)	54 (29–80)	51 (26–82)	51 (24–75)	52 (23–75)
Sex, No. (%)								
Female	149 (52)	71 (58)	18 (24)	60 (67)	40 (51)	34 (52)	39 (51)	36 (54)
Male	138 (48)	52 (42)	57 (76)	29 (33)	39 (49)	31 (48)	38 (49)	30 (46)
Health status, No. (%)								
Excellent	71 (25)	23 (19)	20 (27)	28 (32)	19 (24)	13 (20)	23 (30)	16 (24)
Very good	136 (48)	65 (53)	36 (48)	35 (39)	41 (52)	36 (55)	29 (38)	30 (46)
Good	69 (24)	32 (26)	15 (20)	22 (25)	16 (20)	14 (22)	20 (26)	19 (28)
Fair	10 (4)	2 (2)	4 (5)	4 (5)	3 (4)	2 (3)	4 (5)	1 (2)
Education completed, No. (%)								
Trade or high school	9 (3)	4 (3)	5 (7)	0	1 (1)	2 (3)	4 (5)	2 (3)
Some college	24 (8)	12 (10)	12 (16)	0	6 (8)	4 (6)	8 (10)	6 (9)
College graduate	70 (25)	39 (32)	19 (25)	12 (14)	24 (30)	13 (20)	20 (26)	13 (19)
Graduate degree	183 (64)	67 (55)	39 (52)	77 (86)	48 (61)	46 (71)	45 (58)	44 (65)
Fiscal position, No. (%)								
Liberal	68 (24)	27 (23)	9 (12)	32 (37)	17 (22)	22 (35)	18 (24)	11 (17)
Moderate	86 (31)	35 (29)	23 (32)	28 (32)	24 (32)	17 (27)	23 (30)	22 (34)
Conservative	126 (45)	58 (48)	41 (56)	27 (31)	35 (46)	24 (38)	35 (46)	32 (49)
Social position, No. (%)								
Liberal	136 (49)	53 (44)	26 (36)	57 (66)	38 (50)	33 (52)	37 (49)	28 (43)
Moderate	65 (23)	31 (26)	18 (25)	16 (18)	16 (21)	12 (19)	17 (22)	20 (31)
Conservative	79 (28)	36 (30)	29 (40)	14 (16)	22 (29)	18 (29)	22 (29)	17 (26)

* Totals for some categories do not equal the total sample size because of missing data. data/local = data-focused brief with local-level data; data/state = data-focused brief with state-level data; story/local = story-focused brief with local-level data; story/state = story-focused brief with state-level data.

† Two-sided χ^2 test.

Table 2. Differences in understandability, credibility, likelihood of use, and likelihood of sharing by type of policy brief and type of policy maker, six US states, 2009*

Type of policy maker	Type of policy brief	Mean rating (95% CI)			
		Understandable	Credible	Likely to use	Likely to share
All participants (n = 291)	Total	4.3 (4.3 to 4.4)	4.4 (4.4 to 4.5)	3.3 (3.2 to 3.5)	3.5 (3.3 to 3.6)
	Data/state	4.4 (4.2 to 4.5)	4.4 (4.3 to 4.6)	3.3 (3.0 to 3.6)	3.5 (3.2 to 3.8)
	Data/local	4.3 (4.1 to 4.5)	4.4 (4.2 to 4.6)	3.3 (3.0 to 3.6)	3.6 (3.2 to 3.9)
	Story/state	4.4 (4.2 to 4.5)	4.5 (4.4 to 4.6)	3.4 (3.1 to 3.6)	3.4 (3.1 to 3.8)
	Story/local	4.3 (4.1 to 4.5)	4.4 (4.3 to 4.6)	3.4 (3.1 to 3.7)	3.4 (3.1 to 3.7)
	P	.924	.800	.990	.930
Staffers (n = 125)	Total	4.4 (4.2 to 4.5)	4.4 (4.3 to 4.5)	3.1 (2.8 to 3.3)	3.3 (3.1 to 3.6)
	Data/state	4.3 (4.1 to 4.5)	4.2 (4.0 to 4.5)	2.5 (2.0 to 3.0)	2.7 (2.3 to 3.2)
	Data/local	4.3 (4.0 to 4.6)	4.4 (4.0 to 4.7)	3.2 (2.7 to 3.7)	3.6 (3.0 to 4.2)
	Story/state	4.5 (4.3 to 4.7)	4.5 (4.3 to 4.6)	3.4 (3.0 to 3.9)	3.8 (3.3 to 4.2)
	Story/local	4.3 (4.0 to 4.6)	4.4 (4.2 to 4.6)	3.1 (2.7 to 3.6)	3.1 (2.6 to 3.6)
	P	.552	.460	.041	.008
Legislators (n = 75)	Total	4.4 (4.2 to 4.6)	4.5 (4.3 to 4.6)	3.7 (3.5 to 3.9)	3.5 (3.2 to 3.8)
	Data/state	4.5 (4.2 to 4.8)	4.4 (4.1 to 4.8)	4.1 (3.6 to 4.6)	3.8 (3.2 to 4.4)
	Data/local	4.3 (3.9 to 4.8)	4.3 (4.0 to 4.7)	3.6 (3.1 to 4.0)	3.5 (3.0 to 4.1)
	Story/state	4.4 (4.0 to 4.7)	4.4 (4.1 to 4.7)	3.1 (2.6 to 3.6)	3.1 (2.5 to 3.7)
	Story/local	4.4 (3.9 to 4.9)	4.7 (4.4 to 4.9)	3.8 (3.3 to 4.3)	3.4 (2.8 to 4.0)
	P	.954	.564	.018	.306
Executives (n = 91)	Total	4.3 (4.1 to 4.4)	4.5 (4.4 to 4.6)	3.4 (3.1 to 3.7)	3.7 (3.4 to 3.9)
	Data/state	4.4 (4.1 to 4.7)	4.6 (4.5 to 4.8)	3.5 (3.0 to 4.0)	4.0 (3.6 to 4.5)
	Data/local	4.3 (4.0 to 4.6)	4.4 (4.1 to 4.7)	3.3 (2.7 to 3.8)	3.5 (2.9 to 4.1)
	Story/state	4.1 (3.7 to 4.5)	4.6 (4.4 to 4.8)	3.4 (2.9 to 3.9)	3.2 (2.5 to 3.8)
	Story/local	4.2 (3.8 to 4.7)	4.3 (3.9 to 4.7)	3.3 (2.7 to 4.0)	3.9 (3.3 to 4.4)
	P	.675	.177	.924	.111

* Ratings are based on a 5-point scale: 1 = strongly disagree, 2 = mostly disagree, 3 = undecided, 4 = mostly agree, 5 = strongly agree. Analysis of variance was used to test statistical significance; all *P* values are two-sided. CI = confidence interval; data/local = data-focused brief with local-level data; data/state = data-focused brief with state-level data; story/local = story-focused brief with local-level data; story/state = story-focused brief with state-level data.

policy makers. This study sought to understand the gap between the generation of evidence and its use in policy settings (80). In part, this gap relates to a misalignment between the type of evidence generated by researchers and the needs of policy makers. For example, researchers often present data in long complex summaries (81), yet policy makers consistently express their desire for short summaries of key issues (21,26) as may be presented in succinct policy briefs.

A number of studies, reviews, and meta-analyses have compared the impact of narrative vs statistical evidence on persuasion. Findings to date have been equivocal, in large part because of the varying definitions of narrative used in these studies. For example, Baesler and Burgoon (41) examined 19 studies that compared statistical and narrative approaches and found that 13 studies reported narrative evidence as being more persuasive, two studies reported statistical evidence to be more persuasive, and four studies

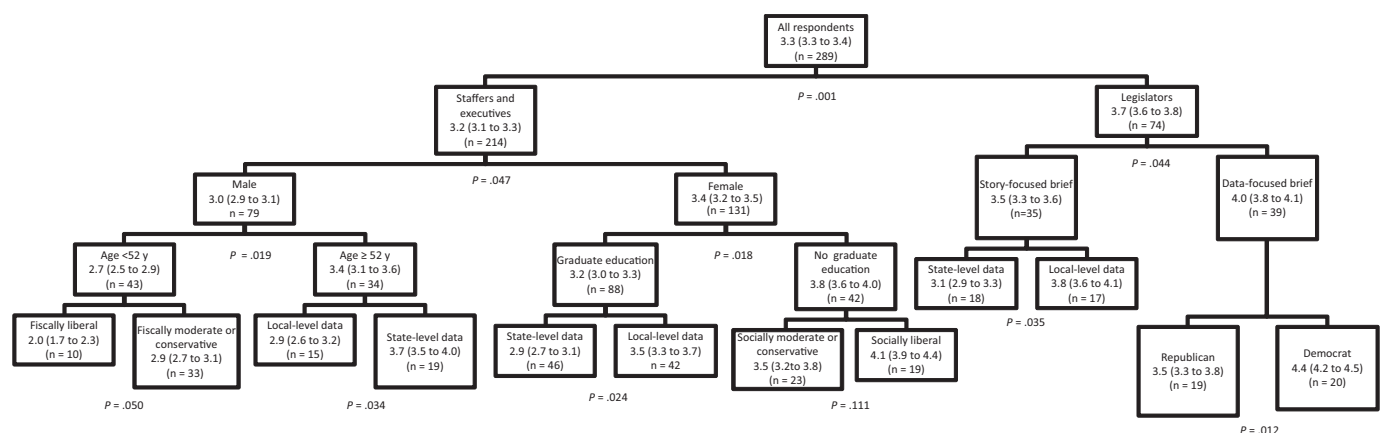


Figure 1. Classification tree for the likelihood of using the policy brief, all policy makers combined, six US states, 2009. The **first number** in each rectangle is the mean rating (with the 95% confidence interval in parentheses) for likely to use according to a 5-point Likert scale (1 = strongly disagree, 2 = mostly disagree, 3 = undecided, 4 = mostly agree, 5 = strongly agree). In some cases, the values for n reflect missing data for the dependent variable or for the branching variable. *P* values (two-sided) are from independent sample *t* tests.

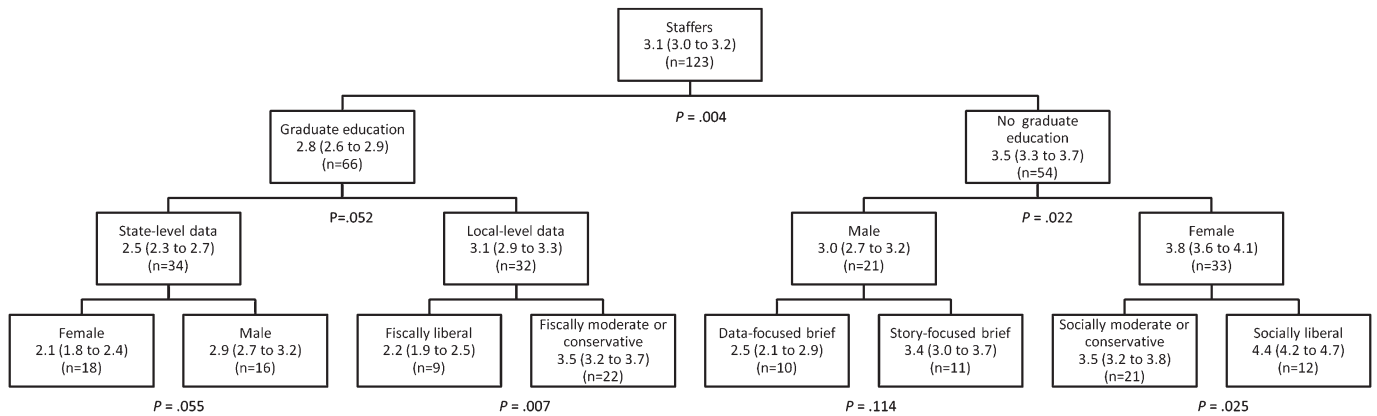


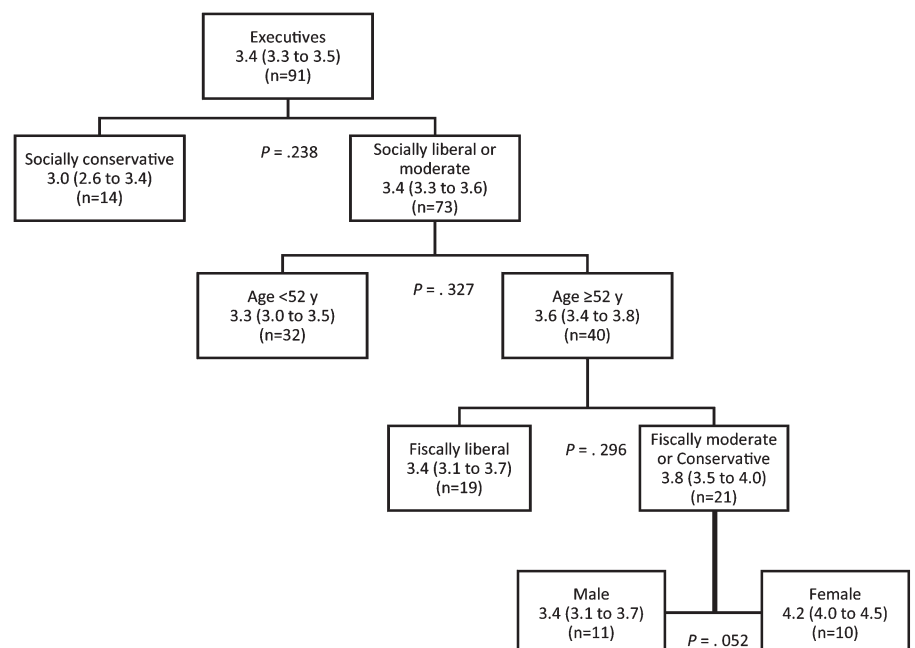
Figure 2. Classification tree for the likelihood of using the policy brief, staffers only, six US states, 2009. The **first number** in each **rectangle** is the mean rating (with the 95% confidence interval in parentheses) for likely to use according to a 5-point Likert scale (1 = strongly disagree, 2 = mostly disagree, 3 = undecided, 4 = mostly agree, 5 = strongly agree). In some cases, the values for n reflect missing data for the dependent variable or for the branching variable. *P* values (two-sided) are from independent sample *t* tests.

reported no difference in persuasiveness between statistical and narrative evidence. Allen and Preiss (40) conducted a meta-analysis of 16 studies and concluded that statistical information is more persuasive than narrative evidence. However, they did not consider audience type as a stratifying variable in their analyses.

There is a lack of published research on how the effectiveness of narrative vs data-based communication might vary by audience type (eg, type of policy makers). For example, although there are data from Canada showing that executive branch and agency leaders rely heavily on scientific evidence (82), few studies (81,83,84) have examined how best to communicate with elected officials (legislators) to enhance their use of evidence-based interventions. Case reports and commentaries by policy makers (35,38,81) suggest the importance of narrative communication yet experimental data to support this notion have been lacking. Even fewer data exist on the most effective ways to present information to staffers (47).

Data from this study suggest that taking a one-size-fits-all approach when delivering information on cancer prevention to policy makers may be less effective than tailoring communication of information based on the type of policy maker and other characteristics. As noted earlier, our findings suggest that the likelihood of using (any of) the briefs was generally greater among women, those who identify themselves as socially liberal, respondents older than 52 years, and those without graduate education. Given that the topic of the policy brief was mammography and the recommended policy action was support for screening programs, three of these variables make sense: women and those older than 50 years are in the risk or target group for developing breast cancer and undergoing mammography, and those who are socially liberal may be more likely to support governmental screening programs for disadvantaged populations. The classification tree patterns for the three groups of policy makers were quite dissimilar. The first branching among staffers occurred for those with and without

Figure 3. Classification tree for the likelihood of using the policy brief, executives only, six US states, 2009. The **first number** in each **rectangle** is the mean rating (with the 95% confidence interval in parentheses) for likely to use according to a 5-point Likert scale (1 = strongly disagree, 2 = mostly disagree, 3 = undecided, 4 = mostly agree, 5 = strongly agree). In some cases, the values for n reflect missing data for the dependent variable or for the branching variable. *P* values (two-sided) are from independent sample *t* tests.



graduate education, where staffers with a graduate education indicated a lower likelihood of using any brief, especially when the brief had a state focus, and particularly so among women (the farthest left node). It is possible that staffers were generally more familiar with the issue of breast cancer screening and that broad population-level information may have added little to their existing knowledge. For legislators, the first branching favored data over stories, which is contrary to evidence suggesting the importance of stories in policy debates (35,36). However, legislators reported the highest overall likelihood of using the brief (mean rating = 3.7) compared with the other two groups (executives mean rating = 3.5; staffers mean rating = 3.1). This finding suggests that well-constructed data-focused policy briefs are an important method for communicating information on evidence-based policy to prevent cancer to elected state officials.

Four limitations of this study should be noted. First, the policy brief used in this study covered only one topic in cancer prevention (breast cancer screening), and thus, it is unclear if these findings are generalizable to other topics. Second, we did not examine whether timing in the delivery of the brief to policy makers was important. For example, reports that a prominent woman has been diagnosed with breast cancer can increase interest in this topic, as was observed when the breast cancer diagnoses among First Ladies Betty Ford and Nancy Reagan raised awareness of the importance of breast cancer screening (85). Timing could also be influenced by an issue a particular legislator is working on when she or he receives a brief. Third, although the test of narrative communication was designed to illustrate real-world challenges, the use of authentic local stories (eg, the experience of a woman in a legislator's district) might have shown other greater effects. Finally, the questionnaire response rate was lower than is typical of other population-based surveys (86), but similar to that in other policy-related studies, where response rates are as low as 10% (21,87). This low response rate may be due in part to our inability to use incentives for participation by the target group because of state ethics laws. However, the similar rates of nonresponse across study conditions and sociodemographic variables suggest that any bias in selection was distributed equally across conditions.

Although this study was exploratory, we have considered the results in the context of the literature on dissemination and implementation research (12,80,88). We suggest five topics that deserve future consideration by practitioners, policy makers, and researchers. First, work is warranted on how best to address the communication needs of different policy groups. For example, results of this study and those of Sorian and Baugh (21) suggest that practitioners and advocates should consider using short policy briefs with a linkage to a longer summary for those audiences (eg, staffers) who want to go more deeply into an issue. An online interactive tool that allows a policy maker audience to build policy briefs that are tailored to their needs may be useful. Second, there is a need to measure the long-term effects of communicating with various types of policy information. This study provided a snapshot of the potential usefulness of a policy brief at one time point. Given the dynamic nature of policy change (19,89), designs and measures that determine the success of information dissemination over a longer time period (eg, multiple briefs presented to policy makers during a legislative session) are needed. Because policy

makers are often concerned about costs (38), policy materials should contain cost information (eg, cost of intervention development, training). Third, there is a need to understand how to communicate effectively, regardless of the topic. This study examined a single cancer prevention topic (breast cancer screening). Future research is needed on a wider range of topics (eg, tobacco, diet, physical activity). Fourth, the communication needs of local policy makers may differ from those of state-level legislators. This study focused on state-level policy makers. However, many important policy initiatives for cancer prevention occur at the local level [eg, changes to the built environment (90), clean indoor air laws (91), calorie labeling (92)]. Therefore, future research needs to examine how to more effectively communicate with and persuade local policy makers. Analytic tools that can provide timely data for local policy briefs (eg, Cancer Control PLANET, the County Health Rankings) are increasingly available. Fifth, quantitative findings can be illuminated with qualitative approaches. This study used quantitative methods. However, there are advantages in conducting qualitative research (eg, individual or group interviews) on these issues to better understand the meaning behind certain numerical relationships. Ongoing regular interaction between researchers and policy makers may be needed for effective knowledge transfer (29), and many of these exchanges are more likely to be qualitative than quantitative.

There is now a substantial body of literature showing that policy interventions are effective in preventing cancer (4,5,11). However, public health researchers and practitioners lack the knowledge and resources to enable successful implementation of effective cancer prevention interventions. This lack is due, in part, to ineffective methods for communicating the latest information on evidence-based interventions to various policy makers. This exploratory study provides leads on how to communicate more effectively with a range of policy makers.

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