



## Tobacco-control policy support among people from low socioeconomic positions in Massachusetts

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### ARTICLE INFO

#### Keywords:

Low socioeconomic groups  
Cigarette use  
Smoking  
Policy support  
Health communication

### ABSTRACT

People from low socioeconomic positions (SEP) are at a higher risk of smoking, face greater barriers to smoking cessation, and have lower access to health information. To improve tobacco-related health outcomes, policies requiring altering labeling on cigarette packs could be implemented. However, public support is needed to influence the policymaking process. We assessed factors associated with supporting tobacco-control communication policies. We analyzed data from Project CLEAR, a study conducted in Massachusetts. The analytic sample included participants who answered questions on their support for three policies: 1) graphic health warnings (GHWs), 2) Quitline number, and 3) smoking cessation information on cigarette packs (n = 357). Binomial logistic regression modeling was conducted by policy. Independent variables included demographic characteristics and smoking status. We found that younger vs. older individuals (aOR = 0.41, 95 %CI:0.23–0.72), males vs. females (aOR = 0.58, 95 %CI:0.35–0.96), and people who smoke vs. those who don't smoke (aOR = 0.41, 95 %CI:0.24–0.70) were less likely to support a law requiring GHWs. Participants with a low vs. higher level of education (aOR = 0.55, 95 %CI:0.32–0.95) were less likely to support a law requiring a Quitline number. Younger (18–39) vs. older individuals (aOR = 0.53, 95 %CI:0.29–0.94), males vs. females (aOR = 0.57, 95 %CI:0.34–0.96), and participants with a low vs. higher level of education (aOR = 0.56, 95 %CI:0.32–0.98) were less likely to support a law requiring cessation information on cigarette packs. Findings suggest that targeted theory-based public health and communication strategies should be developed to increase awareness and support towards policies that would help reduce cigarette smoking among people from low SEP to eliminate tobacco-related health inequities in the US.

### 1. Introduction

In the United States (US), cigarette smoking is a major public health concern. It is the leading cause of preventable disease and death (Cornelius et al., 2020; U.S. Department of Health and Human Services, 2014). Smoking causes cancer in the esophagus, trachea, and lungs, among others (Cancer., 2021). Despite the significant reduction in smoking during the last several decades in the US, about 34.1 million adults reported smoking cigarettes in 2019 (Cornelius et al., 2020). For that same year, the prevalence of cigarette use was higher among males (15.3%) than among females (12.7%). Also, among those between the ages of 45 to 64 (17%), and 25 to 44 (16.7%), the prevalence of cigarette use was higher compared to those between 18 and 24 (8.0%) and 65 years or older (8.2%) (Cornelius et al., 2020).

People from low socioeconomic positions (SEP), (i.e., those with lower educational attainment, unemployed, or with low income), are more likely to smoke compared to the rest of the population (Centers for Disease Control and Prevention, 2019). Low SEP groups also have a higher tobacco-related cancer incidence rate, prevalence, mortality, and morbidity (Cancer., 2021; Centers for Disease Control and Prevention, 2019). For example, the prevalence of cigarette use was higher among those with lower educational levels (e.g., adults with GED, a credential equivalent to a high school diploma, – 35.3% compared to those with graduate degrees – 4.0%) (Cornelius et al., 2020). Similarly, the lower the annual household income the higher the prevalence. For instance, the prevalence of cigarette use was higher among adults with an income of \$35,000 or less (21.4%) compared to those with an income of \$100,000 or more (7.1%) (Cornelius et al., 2020). Additionally, people

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<https://doi.org/10.1016/j.pmedr.2023.102336>

Received 12 September 2022; Received in revised form 14 June 2023; Accepted 18 July 2023

Available online 22 July 2023

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from low SEP face greater barriers to smoking cessation (U.S. Department of Health and Human Services, 2014), are heavily targeted by tobacco companies' advertisements (U.S. Department of Health and Human Services, 2014; Centers for Disease Control and Prevention, 2019), have less access to health information (Viswanath, 2006), and have lower cancer-related knowledge (Viswanath et al., 2006). Notably, research within the communication inequalities theoretical framework has shown that differential access to and use of health information could be contributing to these health inequities (Viswanath, 2006; Viswanath, 2011).

In 2009, the Family Smoking Prevention and Tobacco Control Act (FSPTCA) directed the Food and Drug Administration (FDA), among other things, to create graphic health warning labels (GHWs) depicting the effects of smoking. Moreover, Lindblom, Berman (Lindblom et al., 2017) argue that, as part of the FSPTCA's amendment to the Federal Cigarette Labeling and Advertising Act of 1966, inserts are under the "FDA's authority to disclose information to consumers about tobacco products and tobacco smoke constituents." (p. 4). Strategies such as GHWs or inserts including cessation information could reduce tobacco-related health outcomes and communication inequalities. These could provide information when individuals are about to engage in unhealthy behavior since all people purchasing a package of cigarettes would be exposed to them (Cantrell et al., 2013; Thrasher et al., 2015). For example, one of the benefits of having GHWs as a policy and population-based strategy is its effectiveness over text-only warnings across all socioeconomic and racial/ethnic populations of people who smoke (Cantrell et al., 2013).

The use and implementation of tobacco-control policy interventions, such as raising tobacco taxes and limiting tobacco-related marketing, have been interrupted by the work of tobacco companies (Matheny, 2019; Ulucanlar et al., 2016). Moreover, some of their actions to influence policy have been considered fraudulent. For example, evidence showed that tobacco companies misinformed the public and policymakers on the health risks related to smoking; thus, were ordered by the courts to disseminate corrective statements (Matheny, 2019; Guardino et al., 2007). These corrective statements provide accurate information about the negative health effects of smoking and secondhand smoke, and nicotine addiction, among other topics (The United States Department of Justice, 2017; The United States Department of Justice, 2022). Tobacco companies have also used legal strategies, such as filing lawsuits against the FDA claiming violation of their commercial speech, to halt the rollout of GHWs in the US (U.S. Food & Drug Administration, 2021; Gregory, 2023).

Research has noted the substantial role of public opinion in the policymaking process (Burstein, 2003; Diepeveen et al., 2013). Moreover, as a part of the political landscape, public opinion is important for evidence-informed health policymaking (Purtle, 2019). Studying public opinion towards population-based tobacco prevention interventions and the factors that may influence it, is important for identifying attitudes, knowledge, and behaviors that may be amenable to change through public health and communication interventions (Glanz et al., 2015). Furthermore, identifying demographic characteristics that could be associated with public opinion, such as age, gender, and education level, can provide insights into the perceptions of different populations (Diepeveen et al., 2013) and inform the sociopolitical landscape. This understanding can potentially inform the policy creation and implementation processes (Diepeveen et al., 2013), that can help reduce the harmful effects of smoking.

In the US, little is known about the factors associated with policy support towards having GHWs (Hall et al., 2018; Kamyab et al., 2015; Kaufman et al., 2022), Quitline numbers, and cessation information on cigarette packages. Moreover, due to the insufficient and inadequate (i. e., data absenteeism and chauvinism) data collected from low SEP groups despite the dawn of 'big data' (Lee and Viswanath, 2020), research with low SEP groups is needed to understand their opinions and needs. Researchers have noted the possibility of increasing health

inequities if the use of big data does not consider groups or populations that have been historically marginalized and, thus carry higher negative outcomes of diseases (Lee and Viswanath, 2020; Veinot et al., 2018). Therefore, the objective of this study was to assess factors associated with policy support for requiring: 1) GHWs, 2) Quitline information, and 3) cessation information on cigarette packages among a Massachusetts (MA) sample of people from low SEP groups.

## 2. Materials and methods

### 2.1. Data source

This study uses data from Project CLEAR (Cigarette Labels: Effectiveness and Resonance), a field experimental study that tested the effects of GHWs on multiple tobacco-control outcomes with a particular focus on lower SEP groups. Data were collected between August 2013 to April 2014 from three MA communities. A targeted recruitment strategy was used to enroll 1,200 participants from low SEP (i.e., people living below the federal poverty line, those unemployed, and people with low educational attainment) and from vulnerable groups (e.g., Hispanics), between the ages of 18 to 70 years old (Ramanadhan et al., 2017; McCloud et al., 2017). Community partners from MA collaborated during the recruitment process which included the distribution of flyers in their community locations and word of mouth (Ramanadhan et al., 2017; Hayashi et al., 2018). Participants answered a survey available in English and Spanish and were provided a \$50 gift card for their time. Survey development used a mixed-methods approach which included a review of the literature, focus groups, interviews with key informants, and cognitive interviewing (Ramanadhan et al., 2017; Hayashi et al., 2018). The study was approved by the Harvard T.H. Chan School of Public Health Institutional Review Board.

### 2.2. Sample

The questionnaire included several modules that were randomly administered to the participants. Data for the current manuscript comes from participants who received the module with policy questions (n = 371). Missing cases for all outcome variables and any of the independent variables were deleted (n = 7). Participants who identified as transgender or other gender (n = 7) were excluded from the dataset due to small sample size. The final analytic sample consisted of 357 participants.

### 2.3. Measures

#### 2.3.1. Outcome variables

The three policy outcome variables of interest were: Would you oppose or support a law that 1) requires graphic warnings on cigarette packs? 2) requires cigarettes to have a telephone quit-line number printed on the pack? and 3) requires cigarette packages to include information on how to stop smoking? The options for answers included a 5-point scale ranging from strongly oppose (1) to strongly support (5). Given our interest in examining support to the policy, we combined the responses to either non-support (*strongly oppose*, *oppose*, and *neither support nor oppose*), and support (*support* and *strongly support*).

#### 2.3.2. Independent variables

The independent variables included demographic characteristics, political affiliation, whether the participant lived with a person who smokes, and smoking status (Table 1). Demographic characteristics included age coded as younger (18–39 years) and older adults (40–70 years), gender (male or female), ethnicity (Hispanic or Non-Hispanic), and race (Black, White, Other). The level of education was coded as 'high school/GED or less' or 'some college or more' which comprised those with an associate degree and a bachelor's degree or higher. We also included if the participant reported being employed (Yes/No). The

**Table 1**

Descriptive statistics for characteristics of participants from low SEP and vulnerable groups living in MA (data collected from 2013 to 2014).

Independent variables	Categories	n = 357	%
Age	18–39 years	236	66.1
	40 + years	121	33.9
Gender	Male	177	49.6
	Female	180	50.4
Ethnicity	Hispanic	149	41.7
	Non-Hispanic	208	58.3
Race	Black	118	33.1
	Other*	100	28.0
	White	139	38.9
	HS/GED or less	200	56.0
Education	Some college or more	157	44.0
	No	138	38.7
Employment	Yes	219	61.3
	Republican	30	8.4
Political Affiliation	Other*	119	33.3
	Democrat	208	58.3
Living with a person who smokes	Yes	131	36.7
	No	226	63.3
Smoking status	People who smoke	167	46.8
	People who don't smoke	190	53.2

Notes: \*The 'Other' race category includes those who identified as 'American Indian or Alaska Native', 'Asian', 'Native Hawaiian or Other Pacific Islander', and those who chose 'I don't identify with any of the categories'. The 'Other' political affiliation category includes those who reported being 'independent' or 'other'.

political affiliation categories were coded as 'Republican', 'Democrat', or 'Other' (which included those who marked 'Independent' or some other affiliation). To include potential health risks related to secondhand smoking, we used an item that asked if the participant lived with a person who smokes (Yes/No). The 'people who smoke' group included those who described themselves as regular or occasional smokers.

**2.4. Statistical analysis**

Descriptive statistics were conducted to calculate frequencies and percentages of the outcome and independent variables. Binomial logistic regression models were independently fitted for each of the outcome variables. Independent variables (i.e., age, gender, ethnicity, race, education, employment, political affiliation, living with a person who smokes, and smoking status) were mutually adjusted. The odds ratios, adjusted odds ratios, and 95% confidence intervals were then calculated. The data were assessed for the assumptions of regression. All analyses were conducted using SPSS v.24.

**3. Results**

**3.1. Sample characteristics**

Most of the participants were in the 18 to 39 years age group (66.1%). Half of the study sample were women (50.4%), and Hispanics made up 41.7% of the sample. Only 44% had some college education or higher, and most participants reported being employed (61.3%). Most did not live with a person who smokes (63.3%), and 53.2% were people who don't smoke. Among those participants who reported their income (79.3%, n = 283), 39.5% had an income under \$19,999, 20.4% had an income between \$20,000 and \$39,999, and only 19.3% reported an income higher than \$40,000. See Table 1 for all sample characteristics.

**3.2. Policy support**

Most of the participants (67.8%) answered that they would support a law that required GHWs on cigarette packages. Similarly, 73.1% answered that they would support a law that required having a Quitline

number on cigarette packages, and 73.9% answered that they would support a law that required cigarette packages to include information on how to stop smoking.

**3.3. Factors associated with supporting GHWs on cigarette packages**

Younger (18–39 years) vs. older individuals (aOR = 0.41, 95% CI:0.23–0.72), males vs. females (aOR = 0.58, 95% CI: 0.35–0.96), and people who smoke vs. people who don't smoke (aOR = 0.41, 95% CI: 0.24–0.70) were less likely to support a law requiring GHWs on cigarette packages (Table 2).

**3.4. Factors associated with supporting a Quitline number on cigarette packages**

Participants with a low level of education vs. higher educational attainment (aOR = 0.55, 95% CI: 0.32–0.95) were less likely to support a

**Table 2**

Logistic regression models for support to having 1) graphic health warning labels (GHWs), 2) Quitline number, and 3) cessation information on cigarette packages.

Independent variables	Categories	1) GHWs	2) Quitline number	3) Cessation Info.
		aOR (95% CI)	aOR (95% CI)	aOR (95% CI)
Age	18–39	<b>0.41</b> (0.23–0.72)	0.64 (0.37–1.11)	<b>0.53</b> (0.29–0.94)
	40 + (Ref)	–	–	–
Gender	Male	<b>0.58</b> (0.35–0.96)	0.77 (0.46–1.26)	<b>0.57</b> (0.34–0.96)
	Female (Ref)	–	–	–
Ethnicity	Hispanic	1.45 (0.74–2.87)	1.08 (0.54–2.24)	0.86 (0.44–1.71)
	Non-Hispanic (Ref)	–	–	–
Race	Black	1.78 (0.98–3.26)	0.81 (0.44–1.48)	0.81 (0.45–1.51)
	Other	0.75 (0.35–1.59)	0.64 (0.30–1.37)	0.96 (0.44–2.10)
	White (Ref)	–	–	–
Education	HS/GED or less	0.85 (0.50–1.46)	<b>0.55</b> (0.32–0.95)	<b>0.56</b> (0.32–0.98)
	Associate degree, some college or more (Ref)	–	–	–
Employment	No	1.34 (0.78–2.92)	0.94 (0.56–1.58)	1.49 (0.85–2.60)
	Yes (Ref)	–	–	–
Political Affiliation	Republican	1.25 (0.52–3.04)	0.75 (0.31–1.78)	0.77 (0.32–1.89)
	Other	0.96 (0.56–1.67)	1.01 (0.57–1.77)	0.85 (0.48–1.49)
	Democrat (Ref)	–	–	–
Living with a person who smokes	No	1.16 (0.69–1.98)	0.86 (0.50–1.48)	1.08 (0.63–1.87)
	Yes (Ref)	–	–	–
Smoking status	People who smoke	<b>0.41</b> (0.24–0.70)	0.73 (0.43–1.24)	0.68 (0.39–1.61)
	People who don't smoke (Ref)	–	–	–

Note: Bolded numbers = statistically significant, Ref = Reference group.

law requiring a Quitline number on cigarette packages (Table 2).

### 3.5. Factors associated with supporting cessation information on cigarette packages

Younger (18–39 years) vs. older individuals (aOR = 0.53, 95% CI: 0.29–0.94), males vs. females (aOR = 0.57, 95% CI: 0.34–0.96), and participants with a low vs. high educational attainment (aOR = 0.56, 95% CI: 0.32–0.98) were less likely to support a law requiring cessation information on cigarette packages (Table 2).

## 4. Discussion

This study assessed factors associated with supporting tobacco-control communication policies in a sample of people from low SEP groups in MA. Most participants supported laws that require tobacco companies to alter cigarette packages to include GHWs, a Quitline number, and cessation information. Findings from previous research on public support for having GHWs on cigarette packages in the US have been mixed. For instance, a study using a US representative sample found relatively low levels of support towards having GHWs on cigarette packages and advertisements (45%) compared to other point-of-sale policies such as restricting minors' access (80%), but higher support compared to a ban on menthol cigarettes (36%) or having plain packaging (23%) (Rose et al., 2015). Another study looking at trends of support from 2007 to 2012 noted that most Americans supported the use of GHWs (64.6% in 2007 and 75.8% in 2012) (Kamyab et al., 2015). Similar to our results (67.8%), Kaufman and colleagues (2022) found that 69.9% of US adults supported requiring GHWs on cigarette packages (Kaufman et al., 2022). Attitudes towards other attributes of the GHWs have also been studied. Using a nationally representative sample of adults, Kowitz and colleagues (2017) found 72% of support towards requiring having GHWs to be as large as 75% of the cigarette pack (Kowitz et al., 2017). Notably, few studies have focused on looking at support among lower SEP groups who are disproportionately more likely to smoke and suffer from tobacco-related morbidity and mortality, and have less power and resources to influence public policy (Cullerton et al., 2018).

In our sample, younger people (18 to 39 years), individuals with low educational attainment, and men were less likely to support these policies despite being among the groups that are more likely to smoke (Cornelius et al., 2020). This may be in part due to the targeted marketing communications strategies used by tobacco companies to influence low SEP groups to buy their products (Centers for Disease Control and Prevention, 2019) and the limited access to health information experienced by these groups (Viswanath, 2006; Viswanath, 2011). In contrast to the tobacco companies' marketing strategies, using corrective statements have shown to influence public support towards requiring GHWs (Matheny, 2019). In a study that used a representative sample of the US adult population and randomly exposed some participants to the court-ordered corrective statements; researchers found that the exposed group was more likely to support requiring large GHWs on cigarette packages than the unexposed group (Matheny, 2019).

Our finding that people who smoke are less likely to support having GHWs on cigarette packages is similar to the overall trend in previous studies with nationally representative samples, where people who smoke showed low support to GHWs in cigarette packages and advertisements (Rose et al., 2015). Moreover, data from 2011 to 2012 showed that among people who smoke, support towards requiring GHWs was 39.6%, which is a significant decrease from 62.4% during the 2010 to 2011 period (Kamyab et al., 2015). Although it was noted that this decrease could have been due to changes in the question's wording, the authors suggested that the media coverage related to the selected GHWs and the legal challenges experienced during those years could have caused this significant decline in support (Kamyab et al., 2015).

Research from Australia, a country that historically has favored

tobacco-control policies (Freeman, 2023), found that most of the people from disadvantage groups who smoke perceived GHWs on cigarette packs as an ineffective policy. Some participants described the ineffectiveness due to people who smoke been desensitized to GHWs and skeptical of their legitimacy (Parnell et al., 2019). The few that perceived GHWs as effective noted that the policy can persuade smokers to quit and deter others from starting (Parnell et al., 2019). A study from the United Kingdom with young adults who smoke found that 55% supported having inserts with cessation information on all cigarette packs (Moodie et al., 2018). In the US, more research is needed to fully understand public support and its role potentially facilitating or hindering policy adoption and implementation, not only about laws requiring GHWs but also on having a Quitline number and cessation information on cigarette packages. Understanding this relationship is key to adopt and implement evidence-informed policies, and develop the necessary interventions to increase knowledge, and change attitudes, beliefs and behaviors.

Multilevel, comprehensive, and population-level interventions are recommended to reduce tobacco use in the US. Moreover, targeted approaches are needed to reach groups with disproportionately higher use of tobacco products and negative health outcomes, such as men and individuals with lower educational attainment (Cornelius et al., 2020; U. S. Department of Health and Human Services, 2014; Centers for Disease Control and Prevention, 2014). Adopting and implementing policies that require GHWs, a Quitline number, and cessation information on cigarette packages could be part of the interventions considered to tackle cigarette use in the US. Theory-informed public health communication strategies should be developed to increase awareness and support towards these policies to influence the policymakers and consequently, the policymaking process. For example, media campaigns by tobacco control advocates have been recommended to increase public support for new tobacco policies (Kowitz et al., 2017). These interventions need to be strategic in the message, mode, and channels used because uninformed interventions could contribute to continuing communication inequalities by limiting information access to individuals from low SEP (Viswanath, 2006). Moreover, including in these efforts members of groups that have been historically and systematically marginalized, as well as local organizations that work with low SEP groups (Ramanadhan, 2018), could serve as means of empowering them to be active and knowledgeable participants in the policymaking and implementation processes of tobacco-control policies.

Some study limitations should be noted. First, our study relied on a sample of individuals from the state of MA, which may limit the generalizability of our findings to other states. Future research should investigate factors associated with policy support considering individuals from low SEP in other states. Second, smoking status was self-reported. Third, because data were collected in 2013–14, public opinion towards these policies could have changed. However, this study uses data from people of low SEP, groups whose data tend to be limited and inadequate in health organizations datasets (i.e., data absenteeism) (Lee and Viswanath, 2020; Viswanath et al., 2013). Despite these limitations, this study can help inform policymakers and public health officials about who they may target in communicating the advantages of supporting these types of population-based interventions and highlights the need to study people from low SEP.

## 5. Conclusion

Identifying factors associated with attitudes towards tobacco-control communication policies in people from low SEP is important as they are most affected by the negative health outcomes of smoking. Targeted public health and communication strategies should be developed to increase awareness and support towards policies that would help reduce cigarette smoking among people from low SEP to eliminate tobacco-related health inequities in the US.

## CRedit authorship contribution statement

**Coralía Vázquez-Otero:** Conceptualization, Methodology, Writing – original draft, Writing – review & editing. **Mesfin A. Bekalu:** Conceptualization, Methodology, Writing – original draft, Writing – review & editing. **Dhriti Dhawan:** Methodology, Writing – original draft, Writing – review & editing. **Kasisomayajula Viswanath:** Conceptualization, Resources, Methodology, Writing – original draft, Writing – review & editing.

## Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

## Data availability

Data are available upon reasonable request.

## Acknowledgments

The authors gratefully acknowledge Carmenza Bruff, Rachel McCloud, and Sara Minsky, who were instrumental to the successful execution of the study. We are also grateful to our community partners, without whom the study could not have been executed, including Vilma Martinez-Dominguez and the City of Lawrence Mayor's Health Task Force, David Aronstein, and the Boston Alliance for Community Health, and Clara Savage and Common Pathways in Worcester.

## Funding

This work was supported by the National Cancer Institute (PI: KV, 3P50CA148596-03S1). Support for CVO was provided by the Cancer Prevention Fellowship from the National Cancer Institute and Harvard T.H. Chan School of Public Health – National Institutes of Health grant number 2T32CA057711-27. Its contents are solely the responsibility of the authors and do not necessarily represent the official views of the National Institutes of Health.

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