Title
State Education Standards for Tobacco Prevention and Classroom Instruction

Journal
Health Behavior and Policy Review, 2(5)

ISSN
2326-4403

Authors
Carpenter, Christopher S
Bruckner, Tim A
Domina, Thurston
et al.

Publication Date
2015-09-01

DOI
10.14485/hbpr.2.5.3

Peer reviewed

HHS Public Access

Author manuscript

Health Behav Policy Rev. Author manuscript; available in PMC 2018 March 16.

Published in final edited form as:

Health Behav Policy Rev. 2015 September ; 2(5): 352–361. doi:10.14485/HBPR.2.5.3.

State Education Standards for Tobacco Prevention and Classroom Instruction

Christopher S. Carpenter, PhD,
Professor, Vanderbilt University Department of Economics, Nashville, TN

Tim A. Bruckner, PhD, MPH,
Associate Professor, University of California, Irvine, Departments of Public Health and Planning, Policy, and Design, Irvine, CA

Thurston Domina, PhD,
Associate Professor, University of North Caroliona-Chapel Hill, School of Education, Chapel Hill, NC

Julie Gerlinger, MA, and
Doctoral Student, University of California, Irvine, Department of Criminology, Law and Society, Irvine, CA

Sara Wakefield, PhD, MS
Assistant Professor, Rutgers University School of Criminal Justice, Rutgers, NJ

Abstract

Objectives—We examine whether state educational standards regarding tobacco correspond with teacher reports of classroom instruction.

Methods—We test this relation with data on tobacco use prevention standards, reports of middle and high school teachers from the 2008 and 2010 School Health Profiles study, and logistic regression models.

Results—State education standards are significantly related to increased likelihood of a lead health education teacher in that state reporting that the specific topic was taught in the school. These relationships are stronger for middle school teachers than for high school teachers.

Conclusions—Associations between state standards and teacher reports of actual instruction are consistent with education standards influencing the teaching of these health education topics.

Keywords

tobacco use prevention; state education standards; teachers

Correspondence Dr Carpenter; christopher.s.carpenter@vanderbilt.edu.

Human Subjects Approval Statement
No protocol approval was needed for this study; the research is exempt.

Conflict of Interest Disclosure Statement
All authors of this article declare they have no conflicts of interest.

Despite substantial reductions in youth smoking in the US, tobacco use among young adults remains an important public health concern. It is therefore critical to identify which of the current tobacco use prevention efforts show effectiveness. Although tobacco taxes, warning labels, and state spending on anti-tobacco programs receive substantial attention,[1–4] less is known about school-based anti-tobacco policies. This gap in knowledge is surprising given that youths spend approximately 14% of their waking hours in school.[5]

School-based policies regarding tobacco use (and substance use more generally) take a variety of forms, including restrictions on smoking in school buildings and on school property and penalties for violating school tobacco use policies. Research on these policies suggests they are negatively associated with youth tobacco use.[5,6] A separate literature using randomized-controlled trials (RCTs) examines a broad class of school-based educational interventions.[7–9] These RCTs indicate that interventions focusing on problem-solving, decision making, coping skills, and other social competencies are effective at reducing youth smoking initiation over the longer term. However, interventions that focus only on information regarding the harms of smoking or only on the role of social influences like peer pressure are not effective at reducing youth smoking.

In this paper we focus on a previously understudied aspect of school health policy: state education standards for tobacco use prevention. We specifically study the link between these standards and instruction. Strong evidence suggests that the implementation of instructional standards influences instruction in core subjects such as math, English, and science.[10–12] Standards may be particularly influential in prevention education if they lead schools to implement prevention programs and activities that are aligned with standards and that are evidence-based.[13,14] However, teachers retain professional autonomy over the interpretation and implementation of instructional standards. As a result, considerable variation exists in the extent to which teachers' instruction reflects standards.[10–12,15–17]

To our knowledge, no prior work examines state education standards for tobacco use prevention. In prior work, we collected and rigorously coded tobacco-related education standards for 45 states.[18] These instructional standards – like the other policies described above – are intended to reduce youth tobacco use by establishing a set of shared expectations in the highly decentralized context of American public education. In core academic areas such as mathematics and English, state and federal educational accountability policies enforce instructional standards by testing student mastery of standards and providing sanctions and rewards to schools based on student performance. Whereas there are no similar standardized tests or school-based sanctions related to tobacco use prevention education, the state standards require schools within the state to instruct students about tobacco prevention. Moreover, most state standards explicitly identify the topics that must be taught.

In this paper, we ask a straightforward question: is the presence of a state standard in a specific tobacco use prevention topic area positively associated with the likelihood a school's lead health education teacher reports that particular topic being taught in the school? Quantifying the relation between education standards and lead teacher reports of actual classroom instruction is important for understanding the potential for state education

standards to reduce youth tobacco use. If state education standards for tobacco use prevention are unrelated to reported classroom instruction, it is unlikely that such policies – which receive a great deal of attention and public resources – will reduce youth smoking.

METHODS

We merge restricted-access teacher survey data from the School Health Profiles study (henceforth, Profiles) with state-level data measuring the content of tobacco educational standards to create our analysis dataset. Profiles is a survey carried out by the Division of Adolescent and School Health (DASH) at the Centers for Disease Control and Prevention (CDC) that asks the lead health education teacher within each sampled school whether specific topics regarding tobacco use prevention were taught in their schools. Profiles uses random, systematic, equal-probability sampling strategies, and the sampling frame in most jurisdictions includes all secondary public schools with one or more of grades 6 through 12. For the years we study (2008 and 2010), teachers from 33 states (including several large urban school districts) provided weighted data to the CDC, meaning that at least 70% of principals or lead health educators completed a survey (the rest of the states did not achieve sufficiently high response rates to be included in the weighted sample). Results are representative of those states and large urban school districts.

We restrict our analysis to the 2008 and 2010 waves of the Profiles survey for 2 reasons. First, we wanted to align the time frame with the date the education standards data were measured (ie, in 2011). Second, the Profiles questionnaire and participant set changed substantially between the 2006 and 2008 waves. We focus our attention on the activities of teachers in middle schools (grades 6-8) and high schools (grades 9-12) which comprise the large majority of teachers in the Profiles data.

Measures and Statistical Models

Because the Profiles questions are not themselves grade-specific, we cannot match the grade-specific education standards precisely in each state to each individual teacher report. Instead, we aggregate the standards across the grade spans for middle schools (grades 6-8) and high schools (grades 9-12) and define an indicator variable equal to one if the teacher works in a state where any of the grade levels taught in the school is covered by a specific topical standard on tobacco use prevention. We aggregate the data in this fashion because the relevant wording of the questions asks whether teachers taught about each topic for students in *any* of the grades in the school.

We control for whether the teacher is certified in the state; for ranges of teacher experience (1 year, 2 to 5 years, 6 to 9 years, 10 to 14 years, and 15 years or more); and for the major emphasis of the teacher's professional preparation (health and physical education combined, health education only, physical education only, and any other subject).

We estimate straightforward logistic regression models of the form:

1. INSTRUCTION OF A TOBACCO USE PREVENTION $\text{TOPIC}_{is} = \beta_1 X_{is} + \beta_2$ RELEVANT TOBACCO USE PREVENTION $\text{STANDARD}_s + e$.

In this specification, INSTRUCTION OF A TOBACCO USE PREVENTION TOPIC refers to each of the 6 specific topics asked about in the Profiles survey for teacher *i* in state *s*. X is a vector of teacher characteristics such as experience, state certification, and area of previous education specialty. RELEVANT TOBACCO USE PREVENTION STANDARD is the relevant vector of state-specific standards for tobacco use prevention described above and varies according to the specific topic being studied (Table 1).

We estimate separate models for middle school teachers and high school teachers. All analyses are performed in STATA Version 11 and use the Profiles-provided weights. We account for correlation in teacher reports at the state level by using STATA's SVY suite of commands that explicitly accounts for the complex sampling design of the Profiles survey.

To explore robustness we also investigate sensitivity to including controls for geography (either through 4 Census region dummies or 9 Census division dummies) and examine the presence and strength of any observed relationships between standards and instructional topics that are not directly matched. For example, we explore models that relate tobacco use standards in one domain to tobacco use instruction topics in an entirely separate domain (eg, asking whether standards on nicotine's addictive effects relate to teaching about gathering information and resources for tobacco use cessation).

RESULTS

Table 2 presents descriptive statistics of lead health education teachers at both the high school and middle school levels in the Profiles data.

High school lead health education teachers are significantly more likely to have 15 or more years of experience teaching compared with middle school lead health education teachers (40.7% vs 32.3%). High school lead health education teachers are also significantly more likely to be certified to teach in the state compared with middle school lead health education teachers (88.6% vs. 77%). High school lead health education teachers are significantly more likely to have prior degrees in health and physical education (57.6% vs. 48.8%), whereas middle school lead health education teachers are more likely to have prior degrees in physical education only (13.9% vs. 9.7%). The large majority – at least 68.4% – of both high school and middle school lead health education teachers report that the topics were taught in a required class within their school (middle panel, Table 2). The most common instructional topic for both high schools and middle schools is identifying the short-term and long-term health consequences of tobacco use (92.1% and 84.5%, respectively), whereas the least common instructional topic for both high schools and middle schools is finding valid information and services relating to tobacco-use prevention and cessation (79.8% and 68.4%, respectively). For all instructional topics, a significantly larger proportion of high school lead health education teachers report the topic is taught in their school compared to their middle school counterparts.

We find wide variation in the prevalence of the various state education standards (bottom panel, Table 2). For example, among high school teachers, although 32.9% are covered by a standard that discusses the long-term health consequences of tobacco use, just 9.2% are

covered by a standard that discusses the short-term health consequences of tobacco use. Moreover, we find large differences between high schools and middle schools: the proportion of high school teachers covered by each state standard is significantly different than the proportion of middle school teachers covered by the same standard. Standards pertaining to middle school teachers are more likely to discuss short-term health and addictive consequences of tobacco, as well as strategies for saying 'no' and decision-making skills, compared to the standards covering high school teachers. By contrast, the standards covering high school teachers are more likely to address long-term health consequences as well as legal and social consequences of tobacco use. This pattern may reflect a deliberate policy approach to tailor educational messages based on the appropriate developmental stage. To our knowledge, this result provides the first available look at education standards for tobacco use prevention across US states as well as the first description of how state education standards for tobacco use prevention are reflected in a large representative dataset of teachers.

Table 3 presents logistic regression model results relating the presence of state standards for short-term and long-term health consequences of tobacco use with the likelihood a teacher reports she taught about tobacco's short- and long-term health consequences.

The presence of a state standard on the long-term health consequences of tobacco use is significantly related to an increased likelihood that a high school lead health education teacher reports that the short-term and long-term health consequences are taught in a required health class in the school (adjusted odds ratio [OR]=2.01; 95% confidence interval [CI]=1.40, 2.90). In contrast, the presence of a standard for the short-term health consequences of tobacco use is not significantly related to the likelihood that a high school lead health education teacher reports that the short-term and long-term health consequences are taught in a required health class in the school (OR=0.74, 95% CI=0.43, 1.28).

Regarding covariates, we find that high school lead health education teachers who are certified to teach in the state are significantly more likely to report that the short-term and long-term health consequences of tobacco use are taught in a required health class in the school compared to teachers who are not certified to teach in the state (OR=3.11, 95% CI=2.27, 4.26). Regarding experience, we find no statistically significant relationship between teaching experience and teaching about short-term and long-term health consequences for high school lead health education teachers.

The middle school sample reveals different patterns. The presence of a state standard for the short-term health consequences of tobacco use is significantly related to increased likelihood that a middle school lead health education teacher reports that the short-term and long-term health consequences are taught in a required health class in the school (OR=4.80, 95% CI=3.18, 7.25). In contrast, the state standard for long-term health consequences of tobacco use is not significantly related to this same outcome. Unlike the pattern for high school teachers, middle school lead health education teachers exhibit strong associations between experience and their reports of providing tobacco-related instruction. Even middle school lead health education teachers with just 1-5 years of experience, for example, are significantly more likely than their counterparts with less than one year of experience to

report that the short-term and long-term health consequences of tobacco use are taught in a required health class in the school (OR=1.86, 95% CI=1.37, 2.53). This difference is slightly larger and also statistically significant for 6-9, 10-14, and 15 or more years of experience. As with high school teachers, middle school lead health education teachers who are certified to teach in the state are significantly more likely to report that the topic was taught (OR=1.44, 95% CI=1.13, 1.83) compared to those without certification.

We report results for the 5 other tobacco use instruction outcomes (paired with their attendant state standard) in Table 4. The number of state standards in each model ranges from one (for the topic about nicotine's addictive nature) to 3 (for the topic about the social, legal, and economic consequences of tobacco use). All models include controls for the lead teacher characteristics (not shown). For brevity, we do not report odds ratios for the control variables; these exhibited similar patterns to those reported in Table 3 and are available upon request.

Table 4 shows that many state standards are positively associated with an increased likelihood of teaching the particular instructional topic related to the standard. For example, we estimate that the presence of a state standard on the social consequences of tobacco use is associated with a significantly greater likelihood that the lead health education teacher in both middle and high schools reports that teachers in the school teach about the social, legal, and economic consequences of tobacco use in a required health education class (for high school teachers, OR=1.39, 95% CI=1.08, 1.78; for middle school teachers, OR=2.52, 95% CI=1.88, 3.40). We find a similar relationship for standards about the legal consequences of tobacco use among high school teachers (OR=1.79, 95% CI=.98, 3.29), but the relationship is not significant for middle school teachers.

Notably, we find consistently larger and more statistically significant relationships between the state standards and instructional outcomes for the middle school sample compared to the high school sample. For all tobacco use prevention topics except finding valid information and services for tobacco use prevention we find that at least one of the state standards is significantly related to increased likelihood of teaching the particular topic among middle school lead health education teachers, and the odds ratios are consistently much larger in magnitude for the middle school sample compared to the high school sample.

We also examined models that related a tobacco-specific instructional topic with a tobacco-specific standard in a different domain. We generally found evidence consistent with a strong role for standards in determining instruction. Associations between standards and instruction were generally stronger for the exact matches presented in Table 4 than for the non-exact matches described here (available upon request). We also examined models that controlled only for one state standard instead of multiple state standards. This model would be more appropriate if, for example, the states that have standards that discuss the long-term consequences of tobacco use are also more likely to have standards that discuss the short-term consequences of tobacco use. These analyses produced results that were generally similar to those reported in Table 4. In some cases, however, we found significant positive associations between state standards and instruction of relevant topics when controlling for

individual standards that are not found when controlling for multiple standards (available upon request).

DISCUSSION

This paper provides the first evidence that state education standards for tobacco use prevention in middle and high schools are positively associated with instruction. We find that these relationships are stronger for middle schools than for high schools. These results are robust to a variety of tests. These associations suggest that state-level educational context may importantly complement other policy approaches to preventing tobacco use among adolescents. Our findings on standards relating to social competence factors (eg, decision-making skills) in Table 4 are particularly important given evidence from well-designed RCTs that school-based interventions focusing only on information or social influence skills are ineffective at reducing youth smoking initiation.[7–9] The fact that the strength of the discovered relationship between standards and instruction in social competence domains was smaller than the associated relationships for information and social influence domains suggests that the goal of reducing youth smoking could be improved by strengthening social competence standards. In particular, it seems likely that health teachers may benefit from additional professional development and curricular assistance regarding social competence instruction.

We document intriguingly different patterns between middle schools and high schools – both with respect to the prevalence of the various standards and with respect to the strength of the relationships between the standards and instruction. High school teachers typically have more professional autonomy than middle school teachers. Furthermore, high school teachers are subject to high-stakes standards-based evaluation under No Child Left Behind and other accountability policies in fewer grades than middle school teachers. For example, NCLB requires testing in grades 3-8 and 11 and specifies sanctions based on poor performance. Thus, middle school teachers face accountability in all grades whereas high school teachers face such pressure in only one.[19] If high school teachers view standards as being out-of-step with students' developmental needs or otherwise inappropriate, their instruction may align less closely to standards.[10] In line with this argument, middle schools are 3 times more likely to have a state education standard about the addictive effects of nicotine. Moreover, the relation between such a standard and reported instruction was much larger for the middle school sample. These 2 patterns could reflect an understanding among those who write the high school standards and among high school teachers, respectively, that such strategies are unlikely to be effective for high school students perhaps because it is unlikely to be 'news' to a 9th-grader that smoking is addictive.

Another interesting difference across grade levels is that in predicting instruction on the short-term and long-term health consequences of smoking, we only find a statistically significant association for the standard about long-term health consequences for the high school sample, and we only find a significant association for the standard about short-term health consequences for the middle school sample. This finding is noteworthy given that the high school sample has much higher prevalence of the standard regarding long-term consequences compared to the middle school sample (30% vs 20%), whereas the opposite is

true for the standard regarding short-term consequences (10% vs 20%). This difference could reflect teachers' understandings of developmental differences between high school and middle school students. Specifically, teachers may believe that a focus on the long-term consequences is more appropriate and effective than a focus on the short-term consequences for high school students, and vice versa for middle school students.

Limitations

Use of observational cross-sectional data precludes causal claims between the state standards and reports of teacher instruction. Omitted variables may also correlate with both standards we identify and teacher reports of whether specific topics are covered. Second, we observe relatively few demographic characteristics of the lead health education teachers and the schools. Regarding schools, we do not observe whether they are urban or rural or other aspects of socioeconomic status. This omission means that we cannot stratify our results along these potentially interesting margins. Third, the Profiles data only surveys the lead health education teacher, and there is no way to validate the quality of this person's report. This measurement error should be less severe in smaller schools where there is likely only one health education teacher. This circumstance may partly explain why we find stronger relationships between standards and instruction reports in middle schools (which tend to be smaller) compared to high schools. Fourth, we do not observe the mechanisms that explain the observed relationship between standards and instruction. Although we lack data on school-level or district-level adoption of evidence-based prevention curricula, standards may shape these curricular decisions and these decisions, in turn, may influence instruction.[11] Future work using qualitative interviews of teacher awareness of the content of state standards, content analysis of health education textbooks, and/or district purchasing decisions of various educational materials would provide a nice complement to the evidence presented here.

There are other important dimensions of the state standards that could relate to instruction that we do not measure or observe. For example, some states specify the number of minutes of instruction that must be delivered and/or the frequency of instruction that must be provided. Our Profiles data lack information on both of these measures of the intensity of tobacco prevention instruction. Another limitation is that the timing of the measurement of the state standards with the availability of the Profiles data is not aligned in the same year. However, we matched the datasets as closely as possible in time given data availability. We also know of no sources of data that would allow us to track changes over time in state standards for tobacco use prevention, which precludes a longitudinal analysis.

Conclusions

Our study uses large, recent, and representative samples of teacher reports of classroom instruction on tobacco use prevention topics to provide to our knowledge the first evidence on how state education standards in this area relate to classroom instruction. We also document for the first time the prevalence of state tobacco use prevention education standards and find important variation across topics covered in standards as well as between standards for middle and high school instruction. We found that several state education standards for tobacco use prevention were significantly related to increased likelihood of a

specific topic being taught in the school. These relationships were generally stronger for middle school lead health education teachers than for high school lead health education teachers. Future work should identify the extent to which strong state education standards regarding tobacco use, as well as teacher instruction, relate to adolescent tobacco use.

IMPLICATIONS FOR HEALTH BEHAVIOR OR POLICY

This study has important implications for health policy, in particular school health policy. Our results suggest that strengthening education standards for tobacco prevention could increase instruction of specific tobacco prevention topics in middle and high schools. This strengthening could be accomplished in a number of different ways. One is simply to require the states that do not currently have such standards to adopt them. Another would be to amend the language of some states' current standards to move from instructional 'recommendations' to instructional 'requirements'. State education standards for tobacco prevention also could be strengthened by expanding the number of topics that require instruction, expanding the number of grade levels that must receive instruction, and/or expanding the number of minutes of instruction that must be provided. States and school districts also could devote additional funding and resources to tobacco prevention instruction (eg, improved textbooks or other educational supports). Finally, states could provide additional training and curricular resources to help instructors implement standards in the classroom with more fidelity.

Acknowledgments

The authors thank Tutrang Nguyen and Jin Kyoung Hwang for assistance with coding several content areas of the state educational standards data. The authors thank Nancy Brener and Tim McManus for help with obtaining the Profiles data with state identifiers. Doug Clements and Susanna Loeb provided useful comments. CC, TB, TD, JG, and SW jointly conceived the study. CC conducted the analysis and interpreted the analysis. TB, TD, JG, and SW interpreted findings. CC wrote the original manuscript. TB, TD, JG, and SW revised the manuscript. This work was supported by a grant from the Eunice Kennedy Shriver National Institute of Child Health & Human Development of the National Institutes of Health P01HD065704. The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health.

References

1. Tworek C, Yamaguchi R, Kloska DD, et al. State-level tobacco control policies and youth smoking cessation measures. Health Policy. 2010; 97:136–144. [PubMed: 20483500]
2. Carpenter CS, Cook PJ. Cigarette taxes and youth smoking: new evidence from national, state, and local Youth Risk Behavior Surveys. J Health Econ. 2008; 27:287–299. [PubMed: 18242745]
3. White V, Webster B, Wakefield M. Do graphic health warning labels have an impact on adolescents' smoking-related beliefs and behaviours? Addiction. 2008; 103:1562–1571. [PubMed: 18783508]
4. Vardavas CI, Connolly G, Karamanolis K, et al. Adolescents perceived effectiveness of the proposed European graphic tobacco warning labels. Eur J Public Health. 2009; 19:212–217. [PubMed: 19218335]
5. Downey DB, Gibbs BG. How schools really matter. Contexts. 2010; 9:50–54.
6. Lovato CY, Pullman AW, Halpin P, et al. The influence of school policies on smoking prevalence among students in grades 5-9, Canada, 2004-2005. Prev Chronic Dis. 2010; 7:A129. [PubMed: 20950536]
7. Thomas RE, McLellan J, Perera R. School-based programmes for preventing smoking (review). Cochrane Database Syst Rev. 2013; 4

8. Botvin GJ, Griffin KW, Diaz T, et al. Smoking initiation and escalation in early adolescent girls: one-year followup of a school-based prevention intervention for minority youth. J Am Med Womens Assoc. 1999; 54:132–143.
9. Brown KS, Cameron R, Madill C, et al. Outcome evaluation of a high school smoking reduction intervention based on extracurricular activities. Prev Med. 2002; 35(5):506–510. [PubMed: 12431899]
10. Diamond JB. Where the rubber meets the road: rethinking the connection between high-stakes testing policy and classroom instruction. Sociol Educ. 2007; 80:285–313.
11. Polikoff MS. The association of state policy attributes with teachers' instructional alignment. Educ Eval Policy Anal. 2012; 34:278–294.
12. Hamilton, LS., Berends, M. Instructional practices related to standards and assessments. Santa Monica, CA: Rand; p. 2006Available at: http://www.rand.org/pubs/working_papers/WR374.html. Accessed June 1, 2015
13. Moore L, Roberts C, Tudor-Smith C. School smoking policies and smoking prevalence among adolescents: multilevel analysis of cross-sectional data from Wales. Tob Control. 2001; 10:117–123. [PubMed: 11387531]
14. Ringwalt C, Vincus AA, Hanley S, et al. The prevalence of evidence-based drug use prevention curricula in US middle schools in 2005. Prev Sci. 2009; 10(1):33–40. [PubMed: 19002583]
15. Ringwalt C, Hanley S, Ennett ST, et al. The effects of No Child Left Behind on the prevalence of evidence-based drug prevention curricula in the nation's middle schools. J Sch Health. 2011; 81(5):265–272. [PubMed: 21517866]
16. Spillane, JP. Standards deviation: how schools misunderstand education policy. Cambridge, MA: Harvard University Press; 2004.
17. Meyer, JW., Rowan, B., Meyer, MW. The structure of educational organizations. In: Ballantine, JH., Spade, JZ., editors. Schools and Society: A Sociological Approach to Education. Thousand Oaks, CA: SAGE Publications; 1978.
18. Bruckner TA, Domina T, Hwang JK, et al. State-level education standards for substance use prevention programs in schools: a systematic content analysis. J Adolesc Health. 2014; 54:467–473. [PubMed: 24016749]
19. Hess, FM., Petrilli, MJ. No Child Left Behind Primer. New York, NY: Peter Lang International Academic Publishers; 2006.

Table 1

Matching Instructional Topics to State Education Standards

Profiles Topic	Relevant State Standards
Identifying the short-term and long-term health consequences of tobacco use	Standard that discusses the short-term health consequences of tobacco use Standard that discusses the long-term health consequences of tobacco use
Identifying the legal, social, economic, and cosmetic consequences of tobacco use	Standard that discusses the legal consequences of tobacco use Standard that discusses the social (including cosmetic) consequences of tobacco use Standard that discusses the economic consequences of tobacco use
Understanding addictive nature of nicotine	Standard that discusses the addictive nature of nicotine
Using interpersonal communication skills to avoid tobacco use (eg, refusal skills, assertiveness)	Standard that discusses strategies for saying no Standard that discusses strategies for cessation
Using goal-setting and decision-making skills related to not using tobacco	Standard that discusses decision making skills for prevention Standard that discusses strategies for cessation
Finding valid information and services related to tobacco-use prevention and cessation	Standard that discusses gathering information for prevention Standard that discusses knowing resources for prevention

Table 2

Descriptive Statistics, Profiles 2008 and 2010

	High School Teachers	Middle School Teachers
Teacher Characteristics	**Mean (SE)**	**Mean (SE)**
Experience: 1 year or less	.054 (.004)	.079 (.005) *
Experience: 2 to 5 years	.202 (.007)	.256 (.008) *
Experience: 6 to 9 years	.165 (.006)	.165 (.006)
Experience: 10 to 14 years	.154 (.006)	.150 (.006)
Experience: 15 or more years	.407 (.008)	.323 (.008) *
Certified to teach in the state	.886 (.005)	.770 (.007) *
Prior degree: health and physical education	.576 (.008)	.488 (.008) *
Prior degree: health education only	.074 (.004)	.070 (.004)
Prior degree: physical education only	.097 (.004)	.139 (.006) *
Prior degree: other	.167 (.006)	.228 (.007) *
Instruction of Tobacco Use Prevention Topics: proportion who say this topic is taught in a required class in the school:		
Identify short-term and long-term health consequences of tobacco use	.921 (.004)	.845 (.006) *
Identify legal, social, economic, and cosmetic consequences of tobacco use	.876 (.005)	.791 (.007) *
Understanding addictive nature of nicotine	.909 (.005)	.827 (.007) *
Using interpersonal communication skills to avoid tobacco use	.863 (.006)	.805 (.007) *
Using goal-setting and decision-making skills for not using tobacco	.837 (.006)	.783 (.007) *
Finding valid information and services related to tobacco-use prevention and cessation	.798 (.007)	.684 (.008) *
State Education Standards: proportion of teachers in a state with a state standard in the following areas:		
Discusses the short-term health consequences of tobacco use	.092 (.004)	.187 (.006) *
Discusses the long-term health consequences of tobacco use	.329 (.008)	.184 (.006) *
Discusses the social consequences (including cosmetic) of tobacco use	.297 (.008)	.203 (.006) *
Discusses the legal consequences of tobacco use	.116 (.007)	.022 (.002) *
Discusses the economic consequences of tobacco use	.034 (.003)	.079 (.004) *
Discusses nicotine's addictive effects	.054 (.003)	.222 (.008) *
Discusses strategies for saying 'no' to tobacco use	.014 (.002)	.138 (.005) *
Discusses strategies for tobacco use prevention and cessation	.246 (.008)	.215 (.007) *
Discusses decision-making skills for prevention	.071 (.003)	.153 (.005) *
Discusses knowing helpful resources regarding quitting smoking	.008 (.001)	.046 (.003) *
Discusses gathering valid information about smoking cessation	.022 (.002)	.124 (.005) *
N	4408	4168

Note.

Weighted means (standard error)

*indicates means are significantly different at $p < .05$

Table 3

Standards and Instruction: Short-term and Long-term Health Consequences of Tobacco Use

	High School Teachers OR (95% CI)	Middle School Teachers OR (95% CI)
Taught about Short-term and Long-term Health Consequences of Tobacco Use		
Standard: short-term consequences	.74 (.43, 1.28)	4.80 (3.18, 7.25)***
Standard: long-term consequences	2.01 (1.40, 2.90)***	1.00 (.72, 1.40)
Teaching Experience		
Less than 1 year	1.00	1.00
1 to 5 years	1.09 (.70, 1.72)	1.86 (1.37, 2.53)***
6 to 9 years	1.19 (.74, 1.92)	2.17 (1.54, 3.06)***
10 to 14 years	1.09 (.66, 1.80)	2.01 (1.41, 2.87)***
15 or more years	1.37 (.87, 2.14)	2.17 (1.57, 2.98)***
Prior Training		
Health and physical education	2.78 (2.08, 3.72)***	2.09 (1.61, 2.70)***
Health education only	3.21 (1.98, 5.72)***	1.79 (1.15, 2.80)**
Physical education only	1.66 (1.14, 2.43)***	.72 (.55, .94)**
Other	1.00	1.00
Certified to Teach in the State	3.11 (2.27, 4.26)***	1.44 (1.13, 1.83)***
N	4408	4168

* p < .10;

** p < .05;

*** p < .01

Note.

OR = adjusted odds ratio; CI = confidence interval

Table 4

Multiple Logistic Regression of Instruction of Specific Topics (Each panel is a separate model)

	High School Teachers OR (95% CI)	Middle School Teachers OR (95% CI)
Taught about Social, Legal, and Economic Consequences of Tobacco Use		
Standard: social consequences	1.39 (1.08, 1.78)***	2.52 (1.88, 3.40)***
Standard: legal consequences	1.79 (.98, 3.29)*	1.08 (.56, 2.08)
Standard: economic consequences	.97 (.56, 1.66)	.86 (.56, 1.31)
Taught about Understanding Addictive Nature of Nicotine		
Standard: nicotine's addictive nature	1.34 (.82, 2.18)	2.87 (2.07, 3.99)***
Taught about Using Interpersonal Communication Skills to Avoid Tobacco Use		
Standard: strategies for saying 'no'	.88 (.48, 1.59)	1.95 (1.44, 2.63)***
Standard: strategies for cessation	1.75 (1.34, 2.30)***	2.77 (2.01, 3.82)***
Taught about Using Goal-setting and Decision-making Skills to Avoid Tobacco Use		
Standard: strategies for cessation	1.46 (1.14, 1.89)***	2.50 (1.88, 3.32)***
Standard: decision-making skills	1.44 (1.04, 1.98)**	1.50 (1.18, 1.90)***
Taught about Finding Valid Information and Services for Tobacco Use Prevention		
Standard: knowing helpful resources	1.13 (.50, 2.55)	1.02 (.73, 1.44)
Standard: gathering valid information	.60 (.35, 1.02)*	1.20 (.95, 1.52)

* p < .10;

** p < .05;

*** p < .01

Note.

OR = adjusted odds ratio; CI = confidence interval

All models include the teacher characteristics as control variables described in the text: whether certified in the state, teacher experience, and area of prior teacher education (eg, physical education).