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## Trends in Asthma-Related School Health Policies and Practices in the US States

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### Abstract

**BACKGROUND:** Asthma is one of the leading causes of school absenteeism. Schools can play an important role in coordinating asthma care. The purpose of this study was to assess the implementation of asthma-related school health policies and practices across states and how they have changed over time.

**METHODS:** Data were analyzed from 36 states that conducted School Health Profiles surveys during 2008 to 2018. Trends in 6 topics were analyzed by logistic regression and JointPoint trend test.

**RESULTS:** Trends in efforts to identify and track students with asthma and improve students' and parents' knowledge about asthma were stable or increased. Interest among lead health education teachers in receiving professional development on asthma trended downward in 35 of 36 states.

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Conflict of Interest

The authors declare they have no conflicts of interest.

**CONCLUSIONS:** Stable to upward trends suggest that a majority of schools have maintained or improved their efforts to identify and track students with asthma and increase the knowledge of students and parents about asthma. However, further improvement is needed in referral of students with asthma to health care professionals and encouraging asthma-related professional development of lead health education teachers.

### Keywords

asthma education; school trend; asthma tracking

## INTRODUCTION

In the United States, asthma is a common chronic health condition that affects 1 in 12 children nationwide.<sup>1</sup> In 2019, asthma affected 8.6% (4.6 million) of school-age children (aged 5–17 years).<sup>2</sup> Asthma is one of the leading causes of school absenteeism.<sup>3</sup> Students with asthma missed 2.3 school days per year more than students without asthma,<sup>4</sup> for a total of 13.8 million missed school days per year.<sup>5,6</sup> Current guidelines for the diagnosis and management of asthma encourage expanding educational opportunities to reach patients through a variety of settings, such as pharmacies, community centers, patients' homes, and schools to manage asthma.<sup>7</sup>

Schools can play an important role in promoting the health and safety of children and adolescents. From ages 5 to 17 years, children spend about 6 to 7 hours per day at school for nearly half the year (about 180 days per year). Schools provide physical education, counseling and psychological services, nutrition and food programs, health education, and health services. School health policies and practices that establish guidelines to create a safe learning environment are key in promoting and maintaining the health and well-being of students and ensuring disease management of students with chronic health conditions such as asthma.<sup>8</sup>

The American Lung Association's Asthma-Friendly Schools Initiative (AFSI) is a comprehensive approach to asthma management in schools.<sup>9</sup> AFSI is aligned with Centers for Disease Control and Prevention (CDC) strategies for addressing asthma within a coordinated school health program.<sup>10</sup> AFSI Toolkit strategies (eg, maximize school health services, build asthma education, provide a healthy school environment, and manage physical education and activity) advance asthma management in schools and enable students to successfully manage their asthma. The strategies adopted by asthma-friendly schools were found to be very effective in improving health and quality of life of students with asthma. For instance, Clark et al. showed that providing education for elementary school children, plus educational components for principals, custodians, and other school staff members, resulted in fewer asthma episodes, improved asthma management, and decreased school absences.<sup>11</sup> Asthma management plans including individualized asthma action plans are fundamental tools in coordinating asthma care within schools. A recent systematic review focusing on asthma in schools found that comprehensive asthma education empowers schools to provide safe school environments for children with asthma.<sup>12</sup>

Several studies<sup>11–16</sup> show the effectiveness of asthma-friendly schools in promoting safe and healthy schools that improve the health and well-being of students and students' academic performance. However, limited information is available to describe the extent to which asthma-related school health policies and practices are implemented, and if implementation patterns have changed over time. To address this knowledge gap, we assessed 6 asthma-related school health policies and practices in secondary schools across states by analyzing data from the 2008 to 2018 School Health Profiles,<sup>8</sup> a state-based surveillance system developed by CDC.

## METHODS

Profiles is a surveillance system developed by CDC<sup>17,18</sup> to assess school health policies and practices in states, large urban school districts, and US territories. Profiles surveys are conducted every 2 years by education and health agencies among middle and high-school principals and lead health education teachers (LHETs). In 2018, across 43 states, the sample sizes of principals surveyed ranged from 72 to 558 and response rates ranged from 71% to 95%. The sample sizes of the LHET surveys across the states in 2018 ranged from 72 to 581 and response rates ranged from 70% to 94%.<sup>17</sup>

### Participants

Profiles data for this article were limited to those obtained from state surveys conducted in 2008, 2010, 2012, 2014, 2016, and 2018. During these survey years, the participating states surveyed either all secondary schools within their jurisdiction or a selected systematic, equal-probability samples of secondary schools. For profiles, secondary schools are defined as public schools with any of grades 6 through 12, including middle schools, junior high schools, and high schools. Respondents are principals and LHETs in the selected schools. The LHET is the person at the school that the principal designates to be most knowledgeable about health education.<sup>10,17,18</sup>

### Instruments

Profiles uses separate questionnaires for the principal and the LHET. We analyzed 2 questions from the principal survey and 4 questions from the LHET survey for this study. The 2 questions included asthma as a response category from the principal surveys, which were asked in 2014, 2016, 2018 only<sup>19</sup>:

1. Does your school routinely use school records to identify and track students with a current diagnosis of the following 7 chronic conditions? School records might include student emergency cards, medication records, health room visit information, emergency care and daily management plans, physical exam forms, or parent notes.
2. Does your school provide referrals to any organizations or health care professionals not on school property for students diagnosed with or suspected to have any of the following 7 chronic conditions? Include referrals to school-based health centers, even if they are located on school property.

The following 4 questions included asthma as a response category from the 2008 to 2018 LHET surveys<sup>20</sup>:

1. During this school year, have teachers in your school tried to increase student knowledge on each of the following 18 topics in a required course in any of grades 6 through 12?
2. During this school year, did your school provide parents and families with health information designed to increase parent and family knowledge of each of the following 9 topics?
3. During the past 2 years, did you receive professional development (eg, workshops, conferences, continuing education, any other kind of in-service) on each of the following 18 topics?
4. Would you like to receive professional development on each of the following 18 topics?

## Procedures

Self-administered questionnaires were sent to the principal and LHET at each selected school and returned to the agency conducting the survey, either by mail or using a web-based system. Participation in the Profiles surveys was confidential and voluntary. Follow-up telephone calls, emails, and written reminders were used to encourage participation. Data were included in this article only if the state provided appropriate documentation of methods and obtained a school response rate 70% for each survey year. Results were weighted to adjust for non-response in all states and were adjusted for the likelihood of selection in states that chose to administer questionnaires to a sample of schools.

## Data Analysis

Weighted data from the 2014 to 2018 surveys of principals from 36 states (Table 1) and from the 2008 to 2018 surveys of LHETs from 36 states (Table 2) were used for the analyses. We included states that had at least 5 of the 6 data points from 2008–2018 in the trend analysis. Trends were assessed using logistic regression analyses and JoinPoint statistical software to determine inflection points.<sup>21</sup> The statistical significance of linear time effects was determined at  $p < .05$ . We also calculated the median percentage of schools across states for each variable. Statistical software SUDAAN 11.1 was used to account for the sampling design and unequal weights.

## RESULTS

Table 1 shows results for the 2 questions from the 2014 to 2018 principal questionnaires. The median percentage of schools that routinely use school records to identify and track students with a current diagnosis of asthma was 96.8% in 2014, 97.2% in 2016, and 95.6% in 2018. The percentage ranged from 89.1% in North Dakota to 99.0% in New Hampshire in 2014, from 88.4% in North Dakota to 100% in Delaware in 2016, and from 84.1% in North Dakota to 100% in Hawaii and West Virginia in 2018. Among the 36 participating states, the percentage of schools identifying and tracking students with a current diagnosis of asthma

did not change significantly over time in 31 states but significantly decreased in 3 states and significantly increased in 2 states (Figure 1).

The percentage of schools that referred students with a current diagnosis of asthma to any organization or health care professional during the 2 years preceding the survey varied widely across states. The median percentage was 56.0% in 2014, 52.2% in 2016, and 50.5% in 2018. The percentages ranged from 31.2% in Hawaii to 78.9% in Vermont in 2014, from 26.0% in Utah to 80.2% in Vermont in 2016, and from 25.2% in Utah to 82.2% in Vermont in 2018. Among the 36 participating states, the percentage did not change significantly over time in 23 states but significantly decreased in 11 states and significantly increased in 2 states (Figure 1).

Table 2 shows the percentage of schools with affirmative responses to the 4 questions from the LHET questionnaire, by state, using the latest available data (2016 or 2018). For all 4 topics, the percentage varied across states. Table 3 shows the trend analysis results for the 4 questions, by state, during 2008–2018. The median percentage of schools that tried to increase student knowledge on asthma during the school year was 54.3%, ranging from 25.8% in Arizona to 76.0% in West Virginia (Table 2). During 2008 to 2018, among the 36 participating states, the percentage did not change significantly over time in 24 states, significantly decreased in 1 state, and significantly increased in 11 states (Table 3, Figure 2).

The median percentage of schools that provided health information designed to increase parent and family knowledge of asthma during the school year was 22.1%, ranging from 7.8% in Oregon to 44.8% in New Jersey (Table 2). During 2008 to 2018, among the 36 participating states, the percentage did not change significantly over time in 29 states, significantly decreased in 1 state, and significantly increased in 6 states (Table 3, Figure 2).

The median percentage of schools in which LHETs received professional development on asthma during the past 2 years was 18.3%, ranging from 7.4% in Wyoming to 58.7% in New Jersey (Table 2). During 2008 to 2018, among the 36 participating states, the percentage did not change significantly over time in 21 states, significantly decreased in 9 states, and significantly increased in 6 states (Table 3, Figure 2).

The median percentage of schools in which LHETs would like to receive professional development on asthma was 46.4%, ranging from 26.6% in Maine to 61.8% in Mississippi (Table 2). During 2008 to 2018, among the 36 participating states, the percentage did not change significantly over time in 1 state and significantly decreased in 35 states (Table 3, Figure 2).

## DISCUSSION

Profiles is a system of surveys assessing school health policies and practices in states, large urban school districts, and US territories. We analyzed Profiles data to assess the extent to which the asthma-related school health policy and practices were implemented across states and if use patterns changed over time. In 2018, the majority of schools (95.6%) identified and tracked students with a current diagnosis of asthma; however, only about half of schools referred students with a current diagnosis of asthma to health care professionals.

Improving schools' referrals of students with asthma to health care professionals could strengthen linkages and coordination of care for these students, and boost students' access to effective asthma management and encourage regular follow-up visits. Those students might then obtain an up-to-date written asthma action plan and quick and easy access to prescribed medications. Action plans can be used in schools to provide instruction for medication use, control of asthma triggers, and to recognize and handle worsening asthma symptoms.<sup>22</sup> Effective asthma management leads to better long-term asthma control and prevents asthma attacks. It also can reduce school absenteeism and improve learning and academic success.<sup>9,22</sup>

Trends in implementing 4 asthma education policies and practices were mostly stable across states from 2008 to 2018. One exception was that fewer LHETs expressed interest in receiving professional development on asthma in nearly all states. The Profiles dataset did not provide sufficient information to determine reasons for the decline. Educating students, their parents and families, and school staff members about asthma can raise awareness about the disease, improve knowledge of the basics of asthma care, and help students and families improve asthma self-management skills.<sup>10,23</sup> The study findings suggest further improvement is needed in educating students, their parents and families, and school staff about asthma, considering that across states, a median of 54.3% of schools increased students' knowledge on asthma, a median 22.1% of schools increased parents' and family's knowledge on asthma, and a median 18.4% of LHETs received professional development on asthma. CDC has publicly available tools which can help students, families, and schools learn more about asthma and how to control it.<sup>24,25</sup>

Tracking these school health policies and practices is important in assessing state-level efforts to create safe learning environments, improve the health and well-being of students, and ensure disease management of students with chronic health conditions such as asthma.<sup>8</sup> Identifying and tracking students with a current diagnosis of asthma, increasing students' and parents' knowledge about asthma, and professional development of school staff on asthma could foster partnerships among families, clinicians, and school nurses centered on the child, and assist in establishing a circle of support for asthma care.<sup>10,12,14–16</sup>

School policies and practices can provide the support and infrastructure needed for chronic disease management of students and professional development of staff members. Those steps are crucial in reducing school absenteeism, increasing academic success, and promoting and maintaining the health and well-being of students, including those with asthma.<sup>10–13</sup> School districts with a policy requiring schools to provide health services to address chronic health conditions of students also are more likely to provide funding for or offer professional development on health services.<sup>25</sup> Having a school nurse on-site and easy access to a school-based health center for consultation could improve health services offered at schools. Such services might include identification or school-based management of health conditions, tracking, case management, and referrals for chronic health conditions, such as asthma or diabetes.<sup>25,26</sup>

CDC provides guidance on addressing asthma management at schools through coordinated school health programs.<sup>10,23,24</sup> CDC's National Asthma Control Program established

strategies to help people with asthma achieve better health and improved quality of life. The program also funds states and non-government organizations to help them improve surveillance of asthma, train health professionals, and educate persons with asthma and their families.<sup>24</sup>

The findings in this report are subject to at least three limitations. First, the cross-sectional design and data used were school-based and not at the individual level. Therefore, the effects of implemented school policies and practices on students' health and safety could not be established. Second, data were self-reported and thus are prone to response or recall bias because of inaccurate recall or social desirability of providing positive responses. However, the reporting bias might be minimal because school principals and LHETs are more likely to know more about the school health policies and professional development opportunities for asthma than are other school staff members. Finally, the study population included schools in only 36 of the 50 states. Although the number of states represent the majority, the findings cannot be generalized to the states that did not participate in Profiles during the study period.

## IMPLICATIONS FOR SCHOOL HEALTH

We assessed the implementation of 6 asthma-related school health policies and practices in participating schools across 36 states and how use has changed over time. The study findings indicate that use of 6 asthma-related school health policies and practices varied across states. The stable to upward trends in use across states suggest that many schools have maintained and improved their efforts to identify and track students with a current diagnosis of asthma and increase students' and parents' asthma knowledge. Because of low implementation and mixed trend results among states, further improvement is needed in referral of students with a current diagnosis of asthma to health care professionals and encouraging LHETs receiving professional development on asthma. School policies can benefit the overall health and academic performance of students. Results from this study can help states in the study to further improve adaptation of asthma-related school health policies.

### Human Subjects Approval Statement

As a surveillance system, School Health Profiles has been determined to be exempt from review by the Centers for Disease Control and Prevention institutional review board. However, some individual states and school districts have chosen to submit their Profiles surveys for review; approval has been granted in all these cases.

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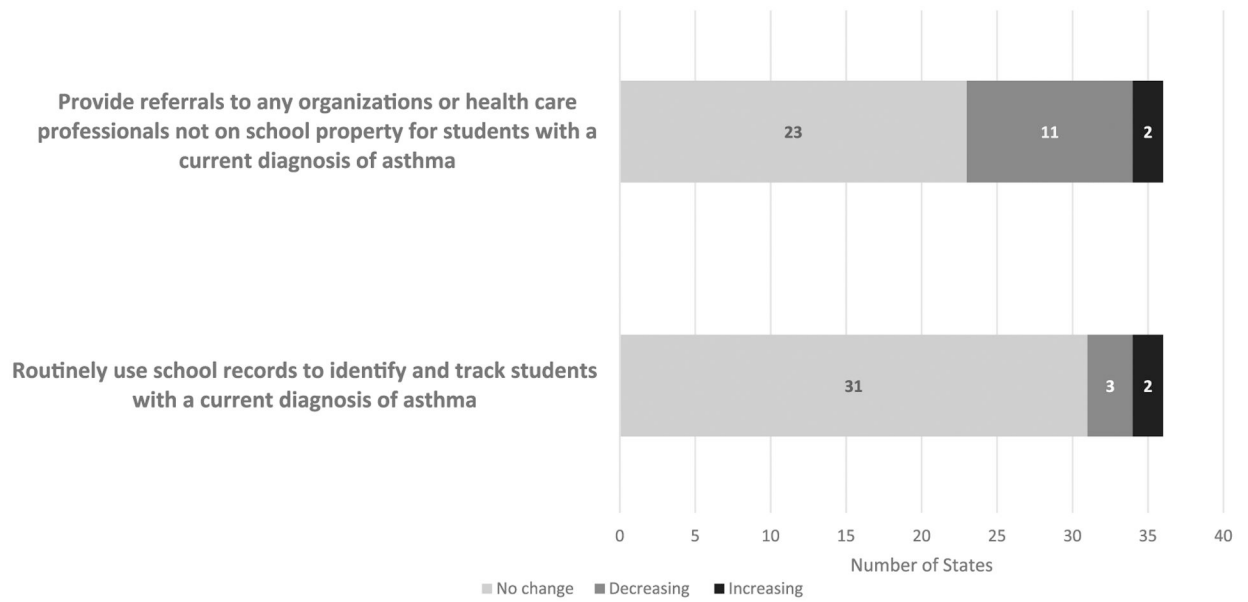
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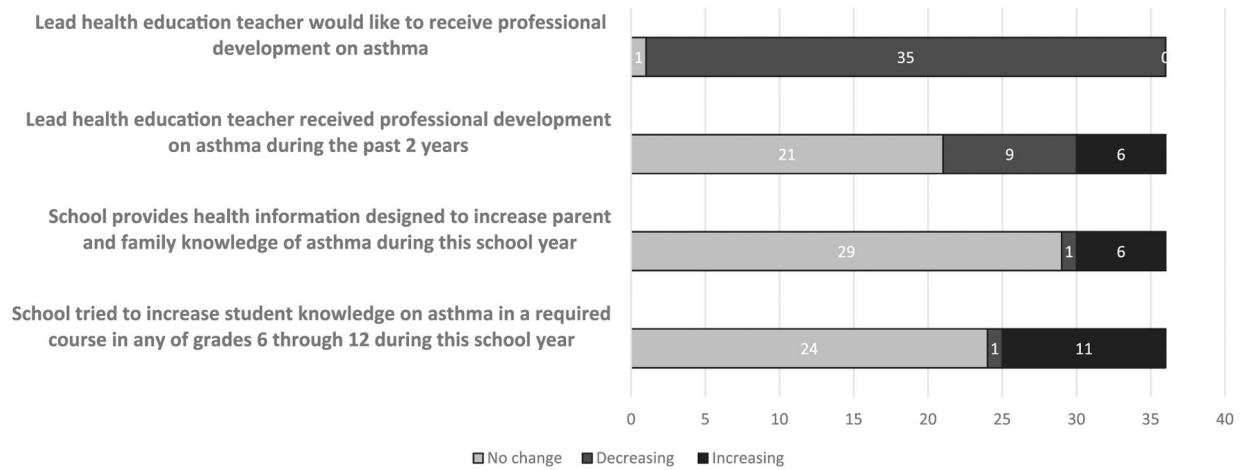
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**Figure 1.**  
Summary of Linear Time Effects of Percentage of Schools Identifying and Tracking  
Students with Asthma and Providing Referrals to Health Care Services - 36 States, 2014  
to 2018



**Figure 2.**  
Summary of Linear Time Effects in the Percentage of Schools with Health Education on Asthma by Topics - 36 States, 2008 to 2018

Table 1.

Percentage of Schools Identifying Students with Asthma and Providing Referrals to Health Care Services, by State, 36 States, 2014 to 2018

State	Routinely Use School Records to Identify and Track Students with a Current Diagnosis of Asthma				Provide Referrals to Any Organizations or Health Care Professionals for Students with a Current Diagnosis of Asthma			
	2014 % (CI) *	2016 % (CI) *	2018 % (CI) *	Linear trend <sup>†</sup>	2014 % (CI) *	2016 % (CI) *	2018 % (CI) *	Linear trend <sup>†</sup>
AL	96.6 (94.8–97.8)	97.0 (95.2–98.1)	97.6 (96.0–98.5)	No	48.8 (44.7–52.8)	29.9 (26.3–33.8)	40.2 (35.8–44.7)	Decreasing
AR	96.3 (93.9–97.8)	94.6 (92.4–96.1)	95.6 (93.6–97.0)	No	54.9 (49.8–59.9)	53.2 (48.6–57.8)	57.8 (52.7–62.6)	No
CA	98.4 (96.7–99.3)	97.3 (95.3–98.5)	97.6 (95.5–98.7)	No	66.9 (62.3–71.1)	57.3 (52.9–61.6)	56.0 (51.1–60.7)	Decreasing
DE	96.7 (93.1–98.4)	100 (—)	93.0 (89.0–95.6)	No	69.5 (62.8–75.4)	57.5 (50.8–63.9)	78.2 (71.9–83.4)	Increasing
FL	94.4 (91.8–96.2)	96.8 (94.7–98.1)	95.3 (92.9–97.0)	No	45.8 (40.9–50.6)	40.2 (36.0–44.6)	44.6 (40.4–48.9)	No
GA	96.8 (94.5–98.1)	94.2 (91.6–96.0)	93.2 (89.5–95.6)	No	44.6 (40.0–49.2)	39.8 (35.4–44.3)	47.5 (41.8–53.3)	No
HI	96.2 (93.8–97.7)	95.1 (93.1–96.5)	100 (—)	Increasing	31.2 (27.0–35.6)	28.0 (24.5–31.7)	29.2 (25.2–33.6)	No
ID	91.5 (88.4–93.8)	90.5 (87.2–93.0)	95.5 (92.9–97.1)	No	42.9 (38.2–47.8)	39.5 (35.0–44.2)	46.0 (41.0–51.1)	No
IL	96.9 (94.7–98.2)	97.5 (95.4–98.6)	99.1 (97.5–99.7)	No	51.1 (46.1–56.2)	49.4 (45.1–53.7)	46.4 (41.6–51.3)	No
KS	92.9 (90.6–94.7)	93.4 (90.6–95.4)	94.7 (92.2–96.4)	No	43.9 (39.8–48.1)	38.4 (33.9–43.1)	55.8 (50.6–60.8)	Increasing
KY	97.4 (95.4–98.6)	97.2 (95.2–98.4)	94.9 (92.4–96.7)	No	57.9 (53.1–62.6)	56.4 (52.2–60.4)	56.8 (52.3–61.2)	No
ME	97.8 (96.7–98.6)	99.1 (98.4–99.5)	97.1 (95.6–98.0)	No	70.0 (67.1–72.8)	63.5 (60.8–66.1)	64.2 (60.7–67.5)	Decreasing
MI	92.8 (89.6–95.0)	94.4 (91.4–96.4)	91.0 (87.3–93.7)	No	41.9 (36.8–47.1)	40.7 (36.0–45.6)	37.2 (31.6–43.2)	No
MN	97.6 (95.8–98.6)	96.2 (94.2–97.5)	95.3 (93.1–96.8)	No	70.3 (66.3–74.0)	57.4 (52.9–61.7)	56.5 (52.2–60.8)	Decreasing
MO	97.9 (95.8–98.9)	97.6 (95.5–98.7)	95.6 (93.1–97.3)	No	56.2 (51.4–61.0)	52.2 (47.1–57.1)	47.7 (42.7–52.8)	Decreasing
MS	95.8 (93.4–97.4)	98.7 (97.0–99.4)	92.1 (89.4–94.2)	No	44.4 (40.1–48.9)	60.4 (55.9–64.8)	45.1 (40.5–49.9)	No
MT	94.1 (92.8–95.2)	95.5 (94.6–96.2)	93.5 (92.5–94.5)	No	57.8 (55.2–60.3)	50.4 (48.6–52.3)	53.3 (51.2–55.3)	Decreasing
NC	98.1 (95.7–99.2)	98.5 (96.9–99.3)	96.4 (94.2–97.8)	No	62.3 (56.4–67.8)	54.7 (49.7–59.5)	53.0 (48.6–57.4)	No
ND	89.1 (86.8–91.1)	88.4 (85.8–90.5)	84.1 (81.8–86.1)	Decreasing	43.9 (40.5–47.4)	38.0 (34.5–41.6)	42.3 (39.4–45.2)	No
NE	98.7 (97.4–99.4)	99.1 (97.8–99.6)	96.4 (94.3–97.7)	No	54.2 (50.0–58.3)	56.9 (52.7–61.1)	57.3 (52.8–61.7)	No
NH	99.0 (98.4–99.3)	98.4 (97.5–99.0)	97.7 (96.5–98.5)	Decreasing	72.1 (70.2–74.0)	72.2 (69.5–74.6)	67.2 (64.2–70.1)	Decreasing
NJ	99.3 (97.9–99.8)	96.5 (94.3–97.9)	99.0 (97.3–99.6)	No	73.2 (68.3–77.7)	63.6 (59.0–68.0)	69.2 (64.4–73.6)	No
NV	97.0 (95.1–98.2)	98.0 (96.4–98.9)	95.7 (93.4–97.2)	No	61.6 (57.2–65.8)	47.5 (43.4–51.8)	49.5 (44.9–54.1)	Decreasing
NY	96.4 (93.8–97.9)	96.5 (94.2–97.9)	94.7 (91.5–96.7)	No	70.2 (65.4–74.7)	74.7 (70.4–78.6)	69.3 (64.5–73.7)	No
OH	94.4 (91.8–96.2)	97.5 (95.3–98.7)	95.3 (92.6–97.0)	No	51.8 (47.0–56.5)	43.1 (38.1–48.4)	46.8 (42.1–51.4)	No
OK	92.6 (89.6–94.8)	91.8 (88.8–94.1)	92.8 (89.9–94.8)	No	41.5 (36.7–46.4)	42.4 (37.7–47.2)	43.3 (38.6–48.1)	No
OR	93.5 (90.9–95.4)	94.4 (91.9–96.1)	93.8 (90.7–95.9)	No	66.5 (62.5–70.4)	57.6 (52.9–62.2)	60.5 (55.6–65.3)	No

State	Routinely Use School Records to Identify and Track Students with a Current Diagnosis of Asthma				Provide Referrals to Any Organizations or Health Care Professionals for Students with a Current Diagnosis of Asthma			
	2014 % (CI) *	2016 % (CI) *	2018 % (CI) *	Linear trend <sup>†</sup>	2014 % (CI) *	2016 % (CI) *	2018 % (CI) *	Linear trend <sup>†</sup>
PA	97.4 (95.5–98.5)	96.6 (94.2–98.1)	98.2 (96.1–99.2)	No	62.2 (57.8–66.4)	56.5 (51.5–61.4)	63.0 (58.0–67.7)	No
SC	97.8 (96.2–98.7)	97.7 (96.1–98.6)	96.0 (93.7–97.4)	No	59.6 (55.7–63.3)	56.2 (52.4–60.0)	47.7 (42.8–52.7)	Decreasing
TN	97.2 (95.4–98.3)	97.2 (95.6–98.3)	96.7 (95.2–97.8)	No	48.3 (43.9–52.7)	48.7 (45.1–52.4)	44.2 (40.7–47.7)	No
UT	95.9 (94.4–97.0)	96.5 (95.0–97.5)	93.5 (91.5–95.1)	Decreasing	32.8 (29.7–36.0)	26.0 (23.0–29.1)	25.2 (22.1–28.5)	Decreasing
VA	98.8 (97.2–99.5)	98.3 (96.4–99.3)	98.5 (96.7–99.3)	No	56.0 (51.2–60.8)	38.8 (34.0–43.9)	44.9 (40.4–49.6)	Decreasing
VT	97.6 (96.1–98.5)	95.6 (94.4–96.5)	96.7 (95.1–97.8)	No	78.9 (75.7–81.8)	80.2 (78.0–82.2)	82.2 (79.2–84.8)	No
WA	98.6 (96.8–99.3)	97.3 (95.3–98.5)	97.8 (95.8–98.8)	No	63.6 (59.0–68.0)	59.7 (55.5–63.8)	60.7 (55.8–65.4)	No
WI	96.5 (94.1–97.9)	97.6 (95.4–98.7)	96.0 (93.7–97.4)	No	53.5 (48.9–58.0)	48.0 (43.2–52.9)	50.5 (45.8–55.2)	No
WV	97.3 (95.7–98.3)	97.6 (95.8–98.7)	100 (—)	Increasing	68.1 (64.4–71.5)	70.8 (66.6–74.7)	61.8 (57.2–66.2)	No
Median	96.8	97.2	95.6		56	52.2	50.5	
Minimum	89.1	88.4	84.1		31.2	26	25.2	
Maximum	99	100	100		78.9	80.2	82.2	
Range	(89.1–99.0)	(88.4–100)	(84.1–100)		(31.2–78.9)	(26.0–80.2)	(25.2–82.2)	

\* 95% confidence intervals (CI) for teacher question's percent estimates with finite population correction.

<sup>†</sup> Logistic regression was used to test statistical significance of the trends. "Increasing" is significant increased trend; "Decreasing" is significant decreased trend; "No" no statistically significant trend.

**Table 2.**  
Percentage of Schools with Health Education on Asthma by Topics - 36 States, 2016 or 2018

State	The Most Recent Available Data Year	School Tried to Increase Student Knowledge on Asthma in a Required Course for Students in Grades 6 through 12 during this School Year % (CI) <sup>†</sup>	School Provides Health Information Designed to Increase Parent and Family Knowledge of Asthma during this School Year % (CI) <sup>†</sup>	Lead Health Education Teacher Received Professional Development* on Asthma during the Past 2 years % (CI) <sup>†</sup>	Lead Health Education Teacher Would Like to Receive Professional Development* on Asthma % (CI) <sup>†</sup>
AL	2018	65.0 (60.4–69.3)	34.7 (30.1–39.6)	39.1 (34.6–43.7)	47.0 (41.9–52.2)
AR	2016	75.7 (71.6–79.3)	35.0 (31.1–39.0)	41.7 (37.3–46.2)	57.7 (53.7–61.7)
AZ	2016	25.8 (21.7–30.5)	16.9 (13.7–20.7)	17.0 (13.8–20.8)	47.5 (43.1–52.0)
CA	2018	38.1 (33.4–43.1)	20.8 (17.0–25.2)	16.1 (12.9–19.9)	44.0 (39.0–49.2)
DE	2018	49.2 (42.4–55.9)	35.5 (29.1–42.4)	16.9 (12.3–22.8)	48.9 (41.9–56.0)
FL	2018	56.8 (52.2–61.4)	24.1 (20.1–28.6)	31.3 (27.0–36.0)	52.3 (47.6–56.8)
GA	2018	61.0 (55.9–65.8)	25.3 (21.0–30.1)	25.5 (21.1–30.4)	43.6 (38.0–49.5)
HI	2018	44.0 (39.3–48.8)	12.6 (9.7–16.0)	11.9 (9.1–15.4)	51.1 (46.3–55.9)
IL	2018	69.2 (64.6–73.4)	20.7 (17.0–25.0)	43.1 (38.6–47.8)	47.2 (42.6–51.9)
KS	2018	41.5 (36.8–46.4)	12.2 (9.2–16.0)	11.0 (8.6–13.9)	41.3 (36.4–46.4)
KY	2018	64.7 (60.3–68.8)	22.8 (18.9–27.3)	20.6 (16.8–25.1)	41.1 (36.3–46.0)
ME	2018	43.2 (39.8–46.6)	15.0 (12.7–17.6)	9.8 (8.0–12.1)	26.6 (23.6–29.7)
MI	2018	44.0 (38.6–49.6)	14.1 (10.6–18.5)	18.1 (14.1–23.0)	46.1 (40.9–51.5)
MN	2018	48.3 (44.7–51.9)	17.2 (14.4–20.5)	15.8 (13.0–19.1)	31.3 (27.7–35.0)
MO	2018	68.7 (64.1–72.9)	28.3 (24.1–32.8)	27.8 (23.5–32.4)	41.5 (36.7–46.4)
MS	2018	71.3 (66.8–75.4)	38.1 (33.4–42.9)	44.2 (39.6–49.0)	61.8 (56.9–66.5)
MT	2018	59.7 (56.9–62.5)	15.1 (13.3–17.3)	18.4 (16.4–20.7)	46.7 (43.9–49.5)
NC	2018	69.9 (65.1–74.4)	29.0 (24.7–33.6)	36.0 (31.5–40.7)	53.4 (48.4–58.4)
ND	2018	52.9 (49.7–56.1)	13.9 (11.8–16.2)	16.1 (13.8–18.6)	39.6 (36.5–42.8)
NE	2018	51.7 (47.1–56.2)	31.7 (27.6–36.2)	40.8 (36.8–45.0)	31.1 (27.3–35.3)
NH	2018	53.0 (49.3–56.7)	22.3 (19.4–25.6)	21.7 (18.8–24.9)	47.2 (43.5–51.0)
NJ	2018	75.1 (70.7–79.0)	44.8 (40.1–49.6)	58.7 (54.0–63.3)	53.2 (48.2–58.2)
NV	2016	67.7 (63.4–71.6)	17.0 (14.0–20.6)	18.3 (15.1–21.9)	48.8 (44.4–53.2)
NY	2018	54.6 (49.0–60.1)	23.1 (18.4–28.5)	17.3 (13.5–21.8)	55.1 (49.5–60.5)
OH	2018	54.4 (49.5–59.2)	18.3 (14.6–22.6)	20.9 (17.2–25.2)	36.8 (32.2–41.6)
OR	2018	46.7 (42.0–51.4)	7.8 (5.5–10.9)	12.4 (9.5–16.0)	35.1 (30.3–40.2)



State	The Most Recent Available Data Year	School Tried to Increase Student Knowledge on Asthma in a Required Course for Students in Grades 6 through 12 during this School Year % (CI) <sup>†</sup>	School Provides Health Information Designed to Increase Parent and Family Knowledge of Asthma during this School Year % (CI) <sup>†</sup>	Lead Health Education Teacher Received Professional Development* on Asthma during the Past 2 years % (CI) <sup>†</sup>	Lead Health Education Teacher Would Like to Receive Professional Development* on Asthma % (CI) <sup>†</sup>
PA	2018	54.0 (49.3–58.6)	17.3 (13.6–21.7)	17.2 (14.0–21.1)	39.8 (34.9–44.9)
SC	2018	57.1 (51.7–62.3)	22.3 (18.1–27.3)	24.3 (20.0–29.3)	49.8 (44.3–55.4)
TN	2018	59.1 (55.5–62.6)	33.5 (30.2–36.9)	42.4 (38.7–46.2)	49.0 (45.1–52.9)
UT	2018	54.1 (50.3–57.9)	11.1 (8.9–13.7)	18.1 (15.4–21.2)	47.3 (43.5–51.1)
VA	2018	65.4 (61.0–69.5)	31.5 (27.0–36.3)	42.8 (38.2–47.6)	50.0 (45.0–55.0)
VT	2018	31.9 (28.7–35.3)	21.9 (19.1–25.0)	16.2 (13.7–19.0)	27.1 (24.1–30.4)
WA	2018	46.1 (41.0–51.3)	24.2 (19.9–29.0)	33.4 (28.6–38.6)	32.0 (27.7–36.7)
WI	2018	50.2 (45.7–54.7)	14.5 (11.9–17.5)	13.0 (10.4–16.2)	34.0 (30.1–38.1)
WV	2018	76.0 (72.3–79.4)	27.9 (24.1–32.0)	15.7 (12.8–19.2)	44.0 (39.9–48.2)
WY	2016	44.0 (39.9–48.3)	11.0 (8.5–14.1)	7.4 (5.4–10.1)	28.5 (24.7–32.6)
Median		54.3	22.1	18.3	46.4
Minimum		25.8	7.8	7.4	26.6
Maximum		76	44.8	58.7	61.8
Range		(25.8–76.0)	(7.8–44.8)	(7.4–58.7)	(26.6–61.8)

\* Professional development, such as workshops, conferences, continuing education, or any other kind of in-service.

<sup>†</sup> 95% confidence intervals (CI) for teacher question's percent estimates, with finite population correction.

Linear Time Effects in the Percentage of Schools with Health Education on Asthma by Topics - 36 States, 2008 to 2018

Table 3.

State	Years Available	School Tried to Increase Student Knowledge on Asthma in a Required Course for Students in Grades 6 through 12 during this School Year	School Provides Health Information Designed to Increase Parent and Family Knowledge of Asthma during this School Year	Lead Health Education Teacher Received Professional Development* on Asthma during the Past 2 years	Lead Health Education Teacher Would Like to Receive Professional Development* on Asthma
AL	2008–2018	No <sup>†</sup>	No <sup>†</sup>	Increasing <sup>†</sup>	Decreasing <sup>†</sup>
AR	2008–2016	No	No	Increasing	Decreasing
AZ	2008–2016	No	No	No	Decreasing
CA	2008–2018	No	No	No	Decreasing
DE	2008–2018	No	Increasing	No	Decreasing
FL	2008–2018	Increasing	No	No	Decreasing
GA	2010–2018	No	Decreasing	No	Decreasing
HI	2008–2018	No	No	Decreasing	Decreasing
KS	2008–2018	No	No	No	Decreasing
KY	2008–2018	No	No	No	Decreasing
ME	2008–2018	Increasing	No	Decreasing	Decreasing
MI	2008–2018	No	No	No	Decreasing
MN	2008–2018	Increasing	No	Decreasing	Decreasing
MO	2008–2018	No	No	No	Decreasing
MS	2008–2018	Increasing	Increasing	Increasing	Decreasing
MT	2008–2018	Increasing	No	No	Decreasing
NC	2008–2018	Increasing	Increasing	No	Decreasing
ND	2008–2018	Increasing	No	No	Decreasing
NE	2008–2018	No	No	Decreasing	Decreasing
NH	2008–2018	Increasing	Increasing	Increasing	No
NJ	2008–2018	Increasing	Increasing	Increasing	Decreasing
NV	2008–2016	Increasing	No	No	Decreasing
NY	2008–2018 <sup>‡</sup>	Decreasing	No	Decreasing	Decreasing
OH	2008–2018	No	No	No	Decreasing
OR	2008–2018	No	No	No	Decreasing
PA	2008–2018	No	No	No	Decreasing

State	Years Available	School Tried to Increase Student Knowledge on Asthma in a Required Course for Students in Grades 6 through 12 during this School Year	School Provides Health Information Designed to Increase Parent and Family Knowledge of Asthma during this School Year	Lead Health Education Teacher Received Professional Development* on Asthma during the Past 2 years	Lead Health Education Teacher Would Like to Receive Professional Development* on Asthma
SC	2008–2018 <sup>‡</sup>	No	No	Decreasing	Decreasing
TN	2008–2018	No	No	No	Decreasing
UT	2008–2018	Increasing	No	No	Decreasing
VA	2008–2018	No	Increasing	Increasing	Decreasing
VT	2008–2018	No	No	Decreasing	Decreasing
WA	2008–2018 <sup>‡</sup>	No	No	Decreasing	Decreasing
WI	2008–2018	No	No	No	Decreasing
WV	2008–2018	No	No	No	Decreasing
WY	2008–2016	No	No	Decreasing	Decreasing

\* Professional development, such as workshops, conferences, continuing education, any other kind of in-service.

<sup>‡</sup> Logistic regression was used to test statistical significance of the trends. “Increasing” is significant increased trend; “Decreasing” is significant decreased trend; “No” is no statistically significant trend.

<sup>‡</sup> No data for 2012.