

Asthma and Adolescence: Asthma in Schools



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Executive Summary

This report utilizes data from the Youth Risk Behavior Survey (YRBS) to highlight the asthma burden among Utah youth in grades 9-12. This report is intended to identify student groups with poor asthma control, highlight disproportionately affected groups, and help guide school personnel in making their school asthma friendly.

Asthma is an important public health issue especially for children because it is one of the leading causes of school absences due to illness. Missing school due to asthma can have far-reaching academic and social consequences. Students who miss school due to asthma cannot maximize their full academic potential leading to negative impacts on future health and academic success.

Schools can play an important role in helping students manage their asthma. Schools that strive to be asthma friendly minimize the risk of poor asthma outcomes thereby creating a healthy and safe environment where students with asthma can thrive.

Key findings

- Those with an asthma action plan were 2.4 times more likely to miss school due to asthma compared to those without an asthma action plan. Having an asthma action plan does not mean a person with asthma will have poor asthma outcomes, but can be an indicator of poorly controlled asthma (see the conclusion section for additional details).
- Females were 2.3 times more likely to miss school due to asthma when compared to males.
- 9th graders were 2.5 times more likely to miss school due to asthma when compared to 12th graders.
- Hispanics (12.4%) had a lower rate of visiting a doctor for worsening asthma symptoms when compared to whites (18.1%); however, Hispanics (11.7%) had a higher rate of missing at least one day of school due to asthma when compared to whites (8.9%); differences were not statistically significant for either measure.

Recommendations

- Schools can ensure that the most vulnerable students are referred to specialist care by using asthma action plans as a way to identify students with poor asthma control. Schools should track, monitor, and offer self-management education to all students with asthma. All children with asthma should receive a written asthma action plan to guide their self-management efforts (NIH, 2013).
- School personnel should ensure that those at highest risk (i.e. females, younger students, and Hispanics) for poor asthma outcomes are referred to primary and/or specialist care.
- Schools should strive to become asthma-friendly in order to reduce the risk for poor asthma outcomes like missed school days. Resources for schools can be found here: <http://www.nhlbi.nih.gov/health/resources/lung/asthma-friendly.html>.

Introduction

Asthma is one of the most common chronic conditions in children. It is a leading cause of emergency department visits (ED) and hospitalizations and a major cause of missed school days. These outcomes have important economic and social implications. In Utah during 2013, total ED (treat and release) and hospitalization charges for school-aged children (5-17) approximated \$5 million dollars. In the United States in 2008, children aged 5-17 who had one or more asthma attacks in the previous 12 months missed 10.5 million days of school (Asthma Facts, 2013). Children who are chronically absent from school due to chronic illnesses like asthma tend to fall behind in schoolwork leading them to dislike school and experience lower levels of academic success (Lynch, 1992). Low levels of academic success can have lasting effects on future success and health (Herd, 2010).

Asthma prevalence and outcomes vary across demographic groups. Females tend to have a higher prevalence, utilize more emergency health care, and have longer hospitalizations than males (Becklake, 1999). They also tend to have more severe asthma symptoms, miss more school/work days, and limit their usual activities more than males (Krisahn, 2001). However, in children, males tend to experience more poor asthma outcomes when compared to females (Becklake, 1999). These differences have been attributed to age, biology, and sociocultural differences in utilization of specialist care, which is associated with proper medical management and self-management education (Trawick, 2001).

Racial and ethnic differences are also commonly reported for asthma and have been attributed to biology and sociocultural differences. Hispanics, depending on the subgroup, typically report lower rates of asthma when compared to other minorities and white non-Hispanics (Akinbami, 2012). One study found that when compared to other subgroups of Hispanics (i.e. Cubans and Puerto Ricans) and non-Hispanic whites, Mexican-Americans had significantly lower rates of asthma prevalence (Homa, 2000). This study concluded that Hispanics of Mexican-American origin may have a smaller genetic/biologic predisposition to asthma when compared to other Hispanic subgroups and non-Hispanic whites (Homa, 2000). However, although some Hispanic sub-groups tend to have a lower asthma prevalence, it does not mean they experience less of an asthma burden. In fact, Hispanic children visit the emergency department for asthma more often than white children (Asthma's Impact on the Nation, 2015). Racial and ethnic differences have also been attributed to sociocultural differences in health care utilization. One study found that disparities among racial/ethnic minorities were due to lower usage of asthma specialists and inhaled corticosteroids (Krishan, 2001). This study also found that African American patients were significantly less likely than whites to report self-management education and avoidance of asthma triggers.

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Schools can play an important role in reducing asthma disparities by helping students manage their asthma. Effective asthma management in school means an improved learning environment and reduced absences. Schools that adopt policies and procedures and coordinate care to better assist students with asthma will have students with better controlled asthma. The CDC recommends six specific strategies to address asthma in schools: 1) Establish management and support systems for asthma-friendly schools; 2) Provide appropriate school health and mental health services for students with asthma; 3) Provide asthma education and awareness programs for students and school staff; 4) Provide a safe and healthy school environment to reduce asthma triggers; 5) Provide safe, enjoyable physical education and activity opportunities for students with asthma; and 6) Coordinate school, family, and community efforts to better manage asthma symptoms and reduce school absences among students with asthma (Addressing Asthma in Schools, 2015). School staff should be trained on basic information on asthma, including common triggers or stimuli that cause asthma episodes; ways to effectively manage asthma in school; when to use control medications; how to discuss a child's needs with his/her caregiver; how to reach the child's physician; the location of each child's asthma action plan; how to administer rescue medications; and how to keep a classroom free of common triggers and stimuli (The Breathing Association, 2015). Finally, the National Asthma Education and Prevention Program (NAEPP) has created a guide to assist schools in helping students better manage asthma, available online at http://www.nhlbi.nih.gov/files/docs/resources/lung/asth_sch.pdf.

Schools can help improve asthma outcomes by providing school-based asthma self-management programs. School-based asthma self-management education has been found to increase asthma knowledge and self-efficacy, improve skills for peak flow meter and inhaler use, and reduce the severity of asthma symptoms (Christiansen, 1997; Coffman, 2009). Furthermore, a review found that asthma self-management education works well for persons with moderate-to-severe asthma as well as for those with mild-to-moderate asthma (Wolf, 2003). The American Lung Association (ALA) in Utah in partnership with the Utah Asthma Program (UAP) offers free school-based asthma management classes. Please contact <http://www.lung.org/associations/states/utah/asthma/open-airways-for-schools.html> or the UAP for more information.

Asthma action plans are another important component of school-based asthma management. All children in school with asthma should have an action plan on file at the school. An asthma action plan works as a treatment communication tool between the health care professional and the child. The asthma action plan is tailored to the

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child and the type and severity of asthma. It specifies which medications should be used as maintenance therapy, when and for how long to modify medications in case of deterioration, and when to access the medical system in the event of worsening asthma. It is the individualization of the asthma action plan that makes it effective and crucial to asthma management.

Asthma action plans have been shown to reduce the likelihood of hospitalizations and other poor asthma outcomes (Adama, 2000); however, they are often not used with the diligence required for them to be effective by either the patient or the doctor. One study found that 44% of study participants had previously been given an asthma action plan but only 9% of them had used it before a recent hospital admission (Ordoneza, 1998). Furthermore, health care providers have reported only giving action plans to the most severe asthma cases due to time constraints in creating them and the lack of willingness in patients to use them (Sugiyama, 2011). Because asthma action plans seem to be given to only the most severe cases they could be used as a marker for poor asthma management or disease severity.

Data for this report came from the Youth Risk Behavior Survey (YRBS) 2011 and 2013. The YRBS is a self-report survey designed to assess behaviors among youth related to the leading causes of mortality and morbidity. The 2011 and 2013 combined YRBS was completed by 3,756 Utah students in grades 9-12. The school response rate was 96% in 2011 (n=53) and 90% in 2013 (n=57). The student response rate was 68% and 74% in 2011 and 2013, respectively. There were 829 students in 2011-2013 that reported ever having been diagnosed with asthma (lifetime asthma) and 417 who reported that he/she still had asthma (current asthma). The following report includes those with lifetime asthma (n=829). Bulleted results are statistically significant unless otherwise noted.

There are several data limitations to be considered. Because this sample includes those with lifetime asthma there may be some who are not currently experiencing symptoms. This sample provides a conservative bias to the data because differences become harder to detect. The larger sample allowed for more refined analyses across grade, sex, and race/ethnicity. Secondly, this data is subject to recall bias due to the self-report nature of the data. Finally, even though the larger sample was used, due to stratification, some groups may have small sample sizes that limit statistical power.

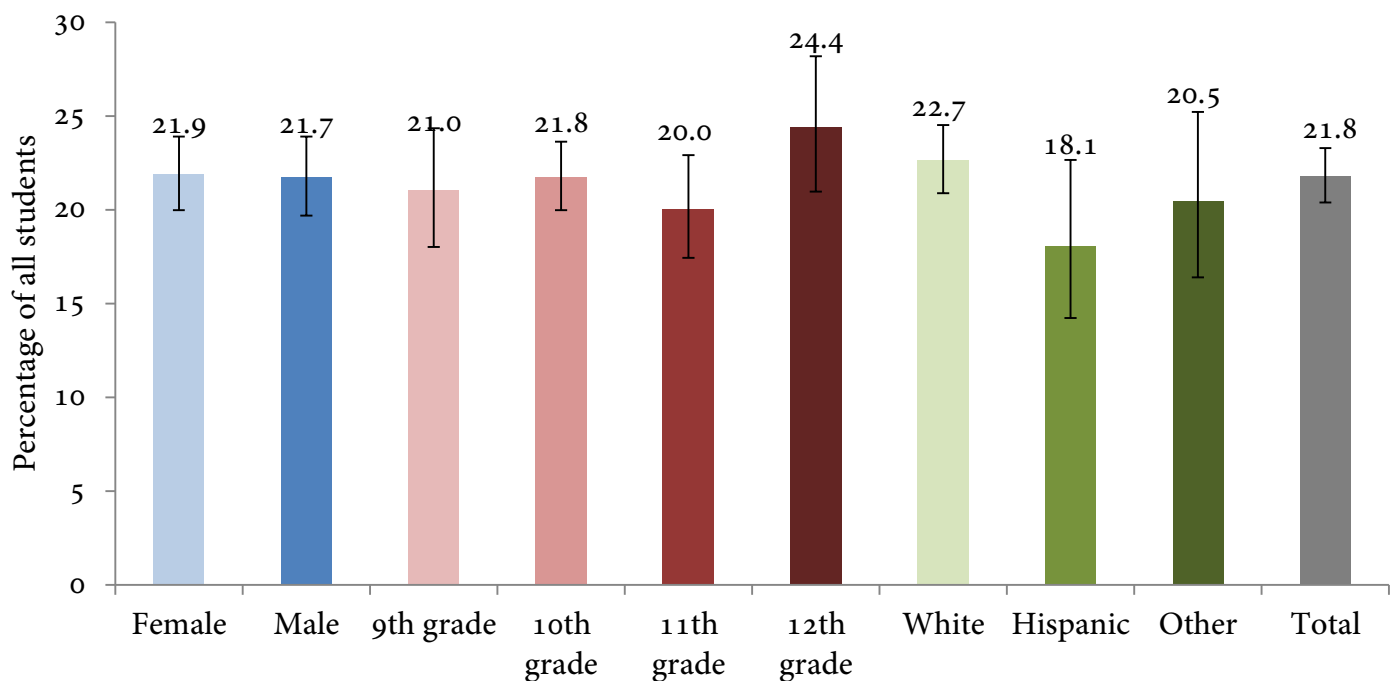
Results

All graphs include those with lifetime asthma unless otherwise noted. All results are statistically significant unless otherwise noted.

Asthma Prevalence

- Total lifetime asthma prevalence was 21.8%.
- Total current asthma prevalence was 11.0%.

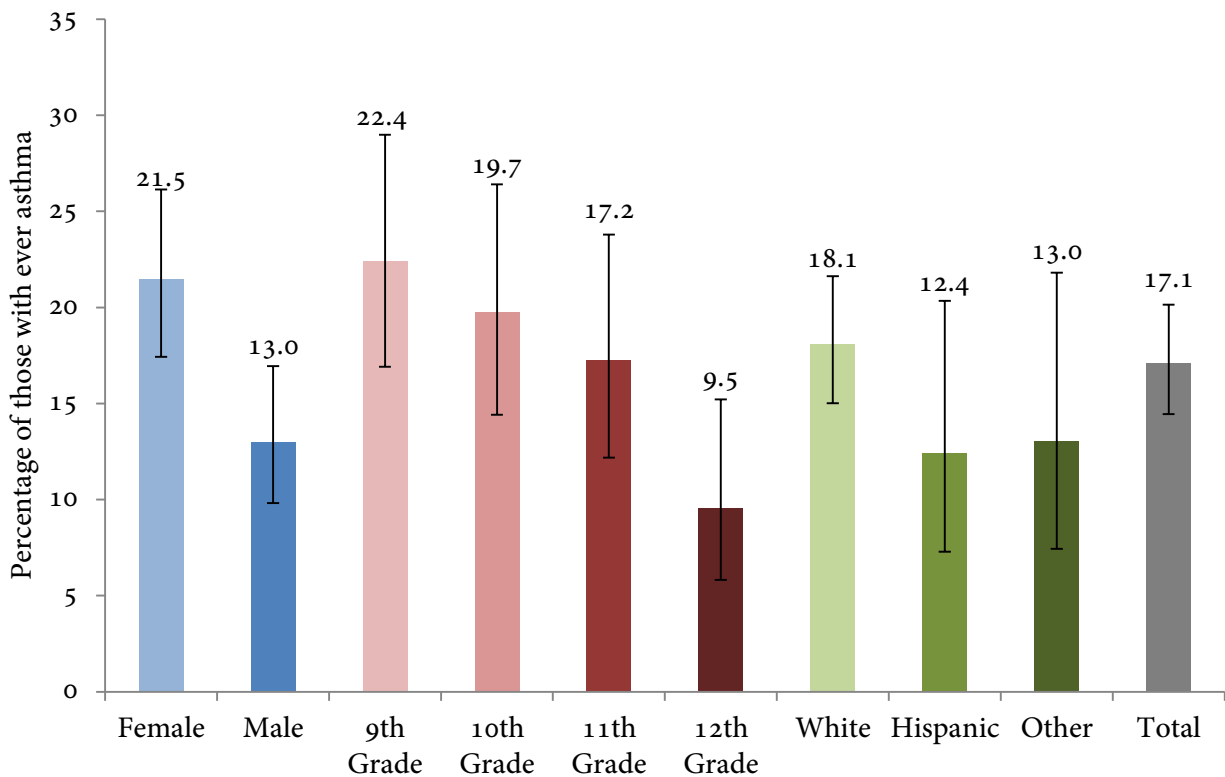
Figure 1. Ever been diagnosed with asthma by a doctor, Utah students.



Source: YRBS, 2011-2013. Grades 9-12

- Females (21.9%) had a similar asthma prevalence when compared to males (21.7%).
- Hispanics (18.1%) had a lower asthma prevalence than whites (22.7%) and other (20.5%), although results were not statistically different.

Figure 2. Visited a doctor at least once in the past 12 months for worsening asthma symptoms or for an asthma episode/attack, Utah students.

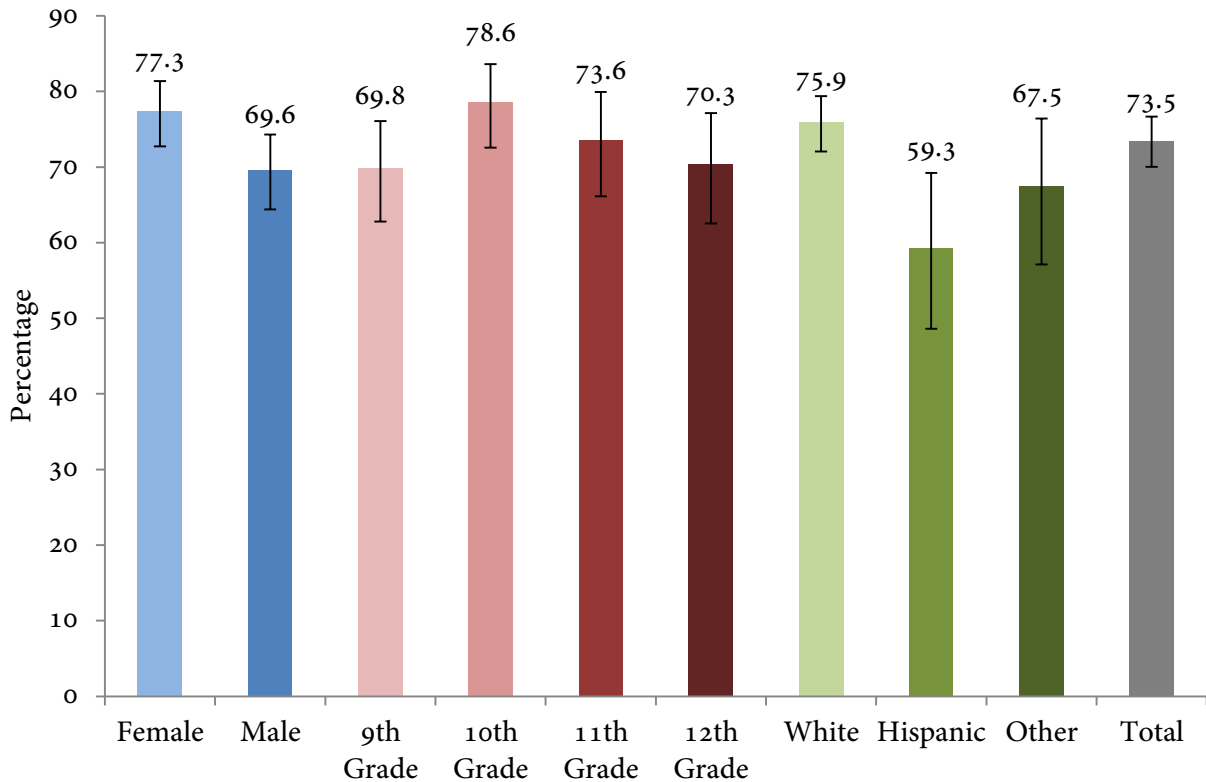


Source: YRBS, 2011-2013. Grades 9-12

- Females (21.5%) had a higher prevalence of visiting a doctor at least once in the past 12 months for worsening asthma symptoms when compared to males (13.0%).
- There appears to be a downward trend from 9th to 12th grade in the prevalence of visiting a doctor at least once in the past 12 months due to worsening asthma.
* Twelfth graders (9.5%) had a lower prevalence of visiting a doctor for worsening asthma symptoms when compared to 9th (22.4%), 10th (19.7%), and 11th (17.2%) graders; however, the difference was only statistically different for 9th graders.
- Although not statistically significant, Hispanics (12.4%) had a lower prevalence of visiting a doctor at least once in the past 12 months for worsening asthma symptoms when compared to whites (18.1%).

Results

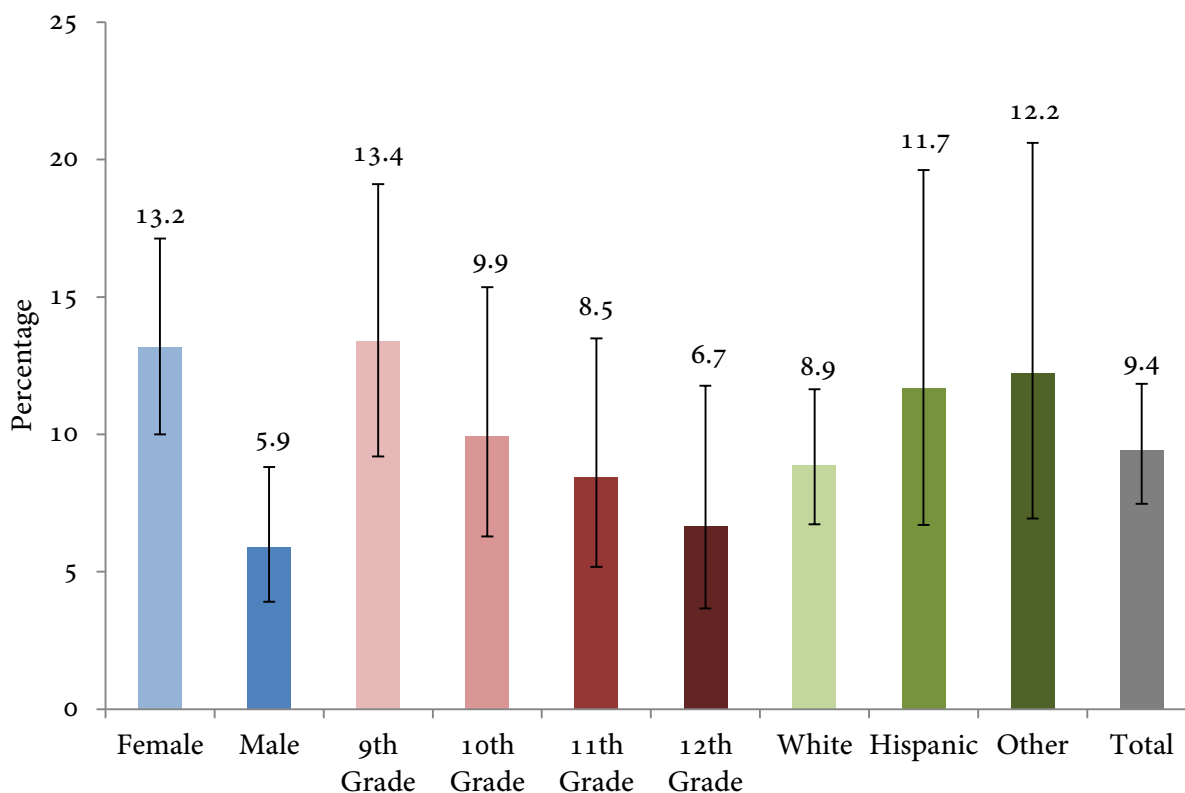
Figure 3. Shown how to use an inhaler by a doctor or nurse, Utah students.



Source: YRBS, 2011-2013. Grades 9-12

- Hispanics (59.3%) report a lower prevalence of being shown how to use an inhaler by a doctor or a nurse when compared to whites (75.9%).
- Males (69.6%) report a lower prevalence of being shown how to use an inhaler by a doctor or a nurse when compared to females (77.3%).

Figure 4. Missed at least one day of school in the past 12 months due to asthma, Utah students.

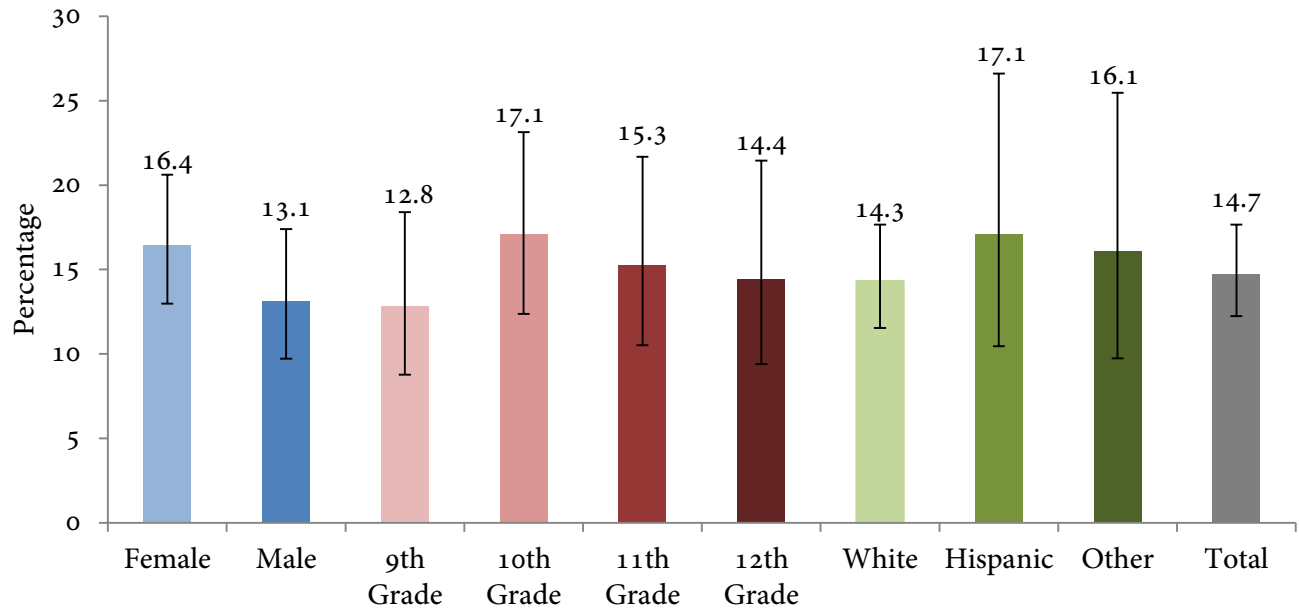


Source: YRBS, 2011-2013. Grades 9-12

- Males (5.9%) had a lower prevalence of missing at least one day of school in the past 12 months due to asthma when compared to females (13.2%).
- Missing at least one day of school in the past 12 months due to asthma showed a downward trend from 9th grade to 12th grade.
 - * Ninth graders had a prevalence of 13.4%, 10th graders 9.9%, 11th graders 8.5%, and 12th graders 6.7%. However, differences were not statistically significant.
- Whites (8.9%) had a lower prevalence of missing at least one day of school in the past 12 months due to asthma when compared to Hispanics (11.7%), although the differences were not statistically significant.

Results

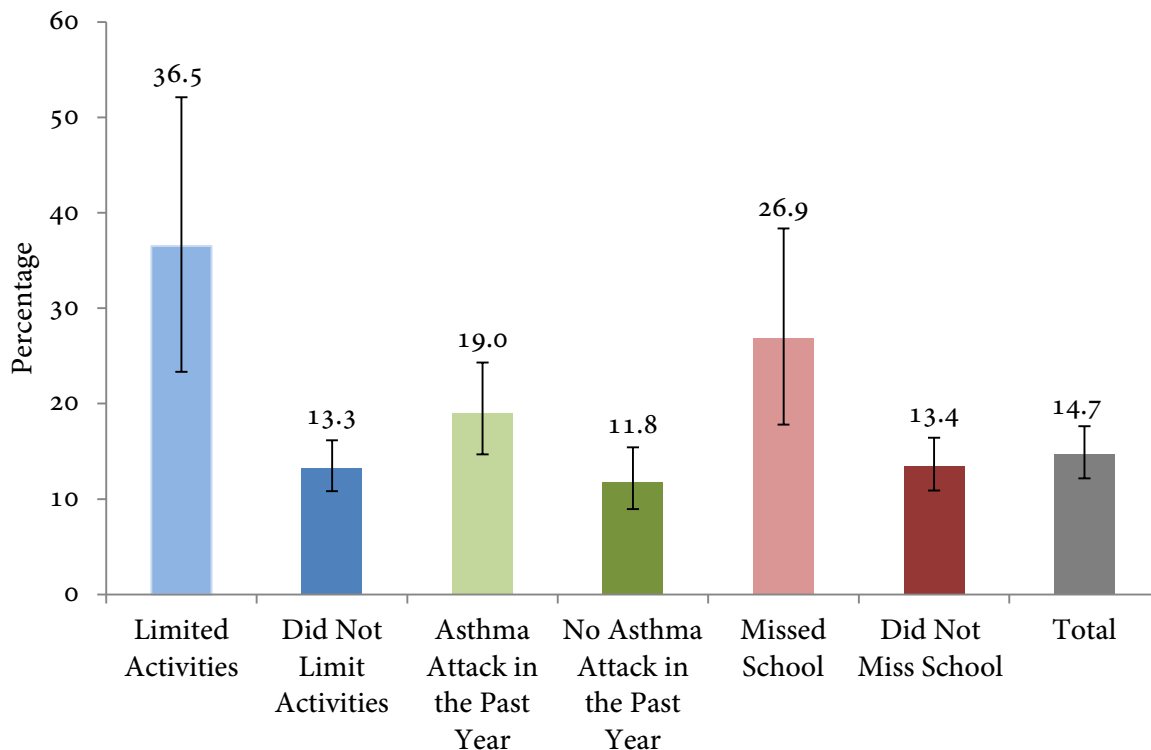
Figure 5. Has an asthma action plan, Utah students.



Source: YRBS, 2011-2013. Grades 9-12

- Although not statistically significant, females (16.4%) had a higher prevalence of having an asthma action plan when compared to males (13.1%).
- Although not statistically significant, Hispanics (17.1%) had a higher prevalence of having an asthma action plan when compared to whites (14.3%).

Figure 6. Has an asthma action plan by asthma outcomes, Utah students.



Source: YRBS, 2011-2013. Grades 9-12

- Those who reported limiting their activities at least once in the past 12 months due to asthma had a higher prevalence of having an asthma action plan than those who did not limit their activities (36.5% vs. 13.3%).
- Those who reported having had an asthma attack in the past 12 months had a higher prevalence of having an asthma action plan than those who did not have an asthma attack in the past 12 months (19.0% vs. 11.8%), although results were not statistically significant.
- Those who reported having missed at least one day of school in the past 12 months due to asthma had a higher prevalence of having an asthma action plan than those that did not miss any school in the past 12 months due to asthma (26.9% vs. 13.4%).

Results: Regression Analysis

Table 1. Asthma action plan and demographic predictors of missed school days due to asthma. Odds ratio (OR) and 95% confidence interval (CI).

Asthma Action Plan and Demographic Predictors of Missed School Days due to Asthma. Odds Ratio and 95% Confidence Interval.	
Variable	OR (CI)
Asthma Action Plan vs. No Asthma Action Plan	2.4 (1.3-4.3)
Female vs. Male	2.3 (1.3-4.0)
9th grade vs. 12th grade	2.5 (1.1-5.9)
10th grade vs. 12th grade	1.5 (.6-3.6)
11th grade vs. 12th grade	1.4 (.6-3.5)
Hispanic or Latino vs. White	1.0 (.5-2.1)
Other vs. White	1.5 (.7-3.1)
Source: YRBS, 2011- 2013.	
Highlighted areas represent significantly different effects between groups at the $p < .01$ level.	

Source: YRBS, 2011-2013. Grades 9-12

Regression analysis found that while controlling for confounders (sex, grade, and race):

- Those with an asthma action plan were 2.4 times more likely to have missed at least one day of school in the past 12 months due to asthma when compared to those that did not have an asthma action plan.
- Females were 2.3 times more likely to miss at least one day of school in the past 12 months due to asthma when compared to males.
- 9th graders were 2.5 times more likely to miss at least one day of school in the past 12 months due to asthma when compared to 12th graders.
- There was no association between race/ethnicity and missing school due to asthma.

Discussion

Findings from this report suggest that having an asthma action plan is a marker of disease severity. Not only will those with more severe or uncontrolled asthma be in contact with health care providers more often but their health care providers may feel a greater need to give them an asthma action plan when compared to patients with well-controlled asthma (Adams, 2005). Health care providers may be less likely to give those with well-controlled asthma an asthma action plan because of limited time, lack of training and education, a lack of willingness in the patients to use them, or lack of reimbursement incentives (Sugiyama, 2011; Andersson, 2013).

Some groups were more likely to experience poor asthma outcomes. Females were disproportionately affected by poor asthma outcomes when compared to males. They had higher rates of missed school, visits to the doctor for worsening asthma symptoms, and asthma action plans (when considered a marker for disease severity). However, they also had higher rates of quality care indicators like being shown how to use an inhaler by a health care provider. These findings suggest that females may have a greater biological sensitivity to the disease especially after puberty (Becklake, 1999). In a prospective study of differences in asthma prevalence between men and women, the authors concluded that sex differences were not related to different rates of diagnosis, environmental, or socio-cultural factors but to genetic or biological factors (Leynaert, 2012) possibly tied to hormone differences (Becklake, 1999).

Younger students were disproportionately affected by asthma when compared to older students. For example, the prevalence of missed school days and doctor visits due to worsening asthma symptoms decreased from 9th to 12th grade. These findings suggest that asthma outcomes may be affected by age-related changes. These changes include biology, risk factor exposure (respiratory infections, allergic sensitization, etc.), and lifestyle factors (Andersson, 2013).

For Hispanics, access to regular and specialist care may be an important factor in their asthma burden. Hispanics had a lower asthma prevalence and a lower prevalence of visiting a doctor due to worsening asthma symptoms but a higher rate of missed school days when compared to whites. This suggests that a large proportion of Hispanics with asthma do not receive needed health care which leads to poor outcomes like missed school days. A literature review of barriers to preventative care in the Hispanic population found that a lack of health insurance and no regular source of care were attributable to a lack of care resulting in poor outcomes (Flores, 1998).

Discussion

Because disparities in asthma cross racial/ethnic, sex, and age boundaries, school personnel can play an important role in helping vulnerable children with asthma avoid poor outcomes. Schools can provide healthy environments and asthma self-management education (through the UAP) thereby reducing the likelihood that students with asthma will suffer the lifelong effects of poor asthma outcomes. Also, school personnel can ensure that the most vulnerable students are referred to specialist care by using asthma action plans as a way to identify students with poor asthma control. School personnel should also track, monitor, and offer self-management education to all students with asthma.

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