

INSIGHTS IN PUBLIC HEALTH

Could School-based Asthma Initiatives in Hawai'i Help Keep Kids in Class?

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Background

Asthma is a chronic inflammatory disorder caused by episodes of reversible breathing problems due to narrowing and obstruction of the airway.¹ The prevalence of asthma has increased since 1980 and is now the most common chronic childhood disease in the United States (US) and in Hawai'i.¹⁻³ In 2014, approximately 47,200 (16.0%) of Hawai'i's children and 102,100 (9.2%) of Hawai'i's adults were diagnosed with asthma by a health care professional and currently still have asthma, providing a recent measure of asthma prevalence.^{4,5}

Asthma is associated with high health care utilization and is the primary diagnosis for 10.5 million physician office visits, 1.6 million emergency department (ED) visits, and over 400,000 inpatient services annually in the US.⁶ The treatment and management for children and adults with asthma costs the US \$56 billion annually.⁷ Asthma costs Hawai'i's economy approximately \$10.5 million in emergency department (ED) visits and more than \$24 million in hospitalizations each year.⁸

Asthma Disparities

People of every race, sex, and age are affected by asthma; however, asthma prevalence differs by race/ethnicity and income.⁹⁻¹⁷ Racial/ethnic minorities are disproportionately affected by asthma compared to Caucasian children. For example, in 2015, the asthma prevalence in non-Hispanic black (13.4%) and Puerto Rican (13.9%) children younger than 18 years was about twice that of Caucasian children (7.4%).⁹ Asthma prevalence among families was significantly lower for each successively higher poverty level group in the US.¹⁰ For example, in 2015, the asthma prevalence among persons with family income below 100% of the federal poverty level was 11.1% compared to 8.4% for 100% to less than 250% of the poverty level, 6.3% for 250% to less than 450% of the poverty level, and 6.9% for at or above 450% of the poverty level.⁹

In Hawai'i, Native Hawaiian (NH) children have the highest asthma prevalence (28.3% or 25,700) compared to Caucasian (17.1% or 9,400), Chinese (16.4% or 2,200), Filipino (20.4% or 8,200), Japanese (17.7% or 6,100), or all other (19.8% or 9,900) children.¹⁸ Therefore, NHs experience disproportionate

rates of asthma compared to the other major ethnic groups in Hawai'i, and thus experience the greatest burden in regards to missed days from work for parents and school for children, increased urgent care services, outpatient physician office visits, and inpatient services.

Disparities in asthma prevalence are also seen by region. Children living in the Hawai'i and Maui county areas and the Nanakuli/Waianae sub-county area on the island of O'ahu were more likely to have asthma compared to children living in other areas throughout the state.^{18,19} As reported in a recent Civil Beat article in 2015, about one-third of the 890 children at Nanaikapono Elementary in Waianae reported having a chronic illness, with one in four children having asthma.²⁰

Asthma-related School Absenteeism and Academic Achievement

Asthma-related school absenteeism affects 59% of school-aged children with asthma.¹³ This absenteeism can be a result of asthma exacerbations, poor asthma control, poor health care access (ie, financial costs), routine clinic visits, poor air quality (eg, vog, secondhand- smoke exposure), prolonged hospitalizations, and/or home environmental triggers (eg, dust mites, mold, and cockroaches).^{8,13,14,21} In 2013, childhood asthma was responsible for 13.8 million missed school days and was the leading cause of chronic disease-related school absenteeism in the US.^{21,22}

Pediatric asthma is associated with poor academic outcomes such as learning disabilities, reading problems, behavior problems, grade repetition, and high school drop-out rates.²³ Increased school absences among students with asthma are likely to help explain these associations of strained peer relationships, the disruption of the learning process, and reduced involvement in physical activities, including extracurricular activities.¹⁴ Previous data showed both prolonged and multiple, intermittent or asthma-related absences contribute negatively to a child's academic performance.¹⁷ Interestingly, research has found racial/ethnic minority children with asthma were more likely to be absent from school compared to Caucasian peers with asthma.¹⁹

Chronic absenteeism is one of the most powerful predictors of a student's academic success. Even after controlling for other confounding variables like socioeconomic status (SES) or previous performance, children who are chronically absent still perform worse than their counterparts. Research has shown chronic absenteeism accounts for lower grade-point averages (GPAs) in the year the child was chronically absent as well as in the following school-year. Chronic absenteeism is also associated with lower reading and math standardized test scores and slower academic performance gains.^{24,25} For example, a study conducted by Indiana State University investigated the effects of absenteeism and cognitive skills index on various achievement indicators, such as school-based English and math tests. Results showed a negative correlation between absenteeism and achievement on certain standardized scores (eg, math, reading comprehension, reading vocabulary, and reading total). Therefore, as the number of absences increased, reading and math scores decreased.²⁶

Previous studies indicated children with asthma perform worse than their non-asthmatic peers on classroom performance measures of academic functioning, particularly reading.^{14,25,27,28} Furthermore, recent evidence suggests that asthma-related absenteeism can negatively impact a student's achievement not just in classroom performance, but also on standardized tests.²⁵ A study that included a majority of African-American students in a Missouri school district investigated the relationship between asthma severity level and standardized test level performance. They found a non-significant association with asthma severity and decreasing standardized test scores.²⁶ For example, students with persistent asthma were 90% more likely to score below 'Nearling Proficient' when compared to students with mild asthma.

Outcomes like the ones illustrated above can negatively impact not only individuals and families, but also community-level economic sustainability. Research suggests that schools, parents, and caregivers are impacted by a child's asthma. Schools face an economic impact for absences as funding and accreditation are associated with attendance and school achievement measures. Parents and caregivers are placed in an economic disadvantage when their child is out from school as they are also forced to miss work and other activities due to their child's asthma.²² Additionally, missing substantial amounts of elementary or intermediate school increases the likelihood of the child dropping out of high school, which can impact the future of that individual, and may also negatively impact a community's economic sustainability.²⁴

Chronic Absenteeism in Hawai'i

In Hawai'i, a child is labeled as chronically absent when he/she is absent from school at least 15 days out of the school year.²⁹ The statewide chronic absenteeism rate for all 256 Department of Education (DOE) public schools and 36 public charter schools in Hawai'i is 15%.³⁰ The public schools in the Nanakuli/Waianae area on the Leeward Coast experience the highest

rates of chronic absenteeism in the state. For example, the rate of chronic absenteeism at Nanakuli Elementary School rose from 24% in the 2014-15 school year to 30% in 2015-16.²⁹ In Hawai'i, chronic absenteeism disproportionately affects racial/ethnic minority children and children living in poverty.³⁰ For example, NH and Pacific Islander children missed the most school days during the 2016-2017 academic year compared to all other ethnic groups in Hawai'i.

The dean of the University of Hawai'i at Manoa (UHM) School of Nursing, Mary Boland, attributes that "two-thirds of absenteeism is caused by health problems."²⁶ Asthma is a common health issue among school-aged children on the Leeward Coast, however it is unclear if this is associated with vog or non-vog factors (eg, indoor air quality).^{29,31,32}

School Nurses

The presence of school nurses is extremely important given the high rates of asthma among Hawai'i's children. Emerging research supports the belief that embedded school nurses have a positive impact on student health and academic outcomes. Research has shown that "higher nurse-to-student ratios have been associated with significant increases in referrals and follow-up care for students with asthma, diabetes, vision problems, psychosocial problems, and injury prevention and reporting, as well as fewer school absences and emergency room visits, in particular for students diagnosed with asthma."²² These results were evidenced among schools with nurses who were employed full-time.

Current federal guidelines recommend one trained nurse for every 750 students; however, the Hawai'i DOE only had three nurses on staff for every 180,000 students during the 2013-2014 academic year.²⁶ The lack of medically-trained personnel (ie, school nurses) to provide effective asthma management for children with asthma contributes to the high rates of school absenteeism.²⁶ At many Hawai'i public schools, all health-related issues are handled by school health assistants (SHAs) to reduce overall costs. However, the DOE contracts nurses from the Department of Health (DOH) for more medically compromised conditions.²⁰

The Hawai'i DOE requires SHAs to have a high school diploma and current completion in first aid and certification in child and adult cardiopulmonary resuscitation (CPR). Due to their limited scope of practice in providing health services, SHAs are unable to perform clinical assessments to determine a child's need for asthma medication or appropriateness to return to class.²⁶ They are only eligible to administer first aid for minor injuries.³¹ Therefore, children with asthma are often kept home if parents notice any respiratory distress. The Hawai'i self-carry law (HRS302A-1164) does allow children with asthma to carry and self-administer an emergency inhaler while in school.³³ However, the DOE's policies and legal forms make this a difficult practice to implement and children are ultimately sent home for the day after any use of the inhaler.^{26,28,31}

New Strategies/Initiatives

The burden of asthma and absenteeism due to asthma may have a direct impact on Hawaii's children and public schools. Efforts to curb asthma-related school absenteeism are thus imperative for Hawai'i public schools. School-based asthma interventions will not only mitigate chronic absenteeism, but also improve productivity and academic success among children with asthma.

Public health officials, educators, policy makers, investigators, and others working with schools can work to develop intensive clinical, environmental, or case management services for children with asthma to reduce asthma-related absenteeism and promote greater school performance. Identifying children with asthma who are chronically absent from school and are performing below their peers might also benefit from a home-based environmental intervention by public health practitioners, community health workers, and/or clinical specialists. Family, school, and community partnerships can help reduce asthma morbidity among NH children in Hawai'i by offering school-based health clinics where child asthma prevalence is the highest.

Some useful solutions include hiring more medically trained nurses in Hawai'i public schools. That could reduce the amount of children being sent home from school as nurses are able to diagnose the severity of an asthma attack and administer asthma medications like an inhaler. Additionally, expanding the scope of practice of school health assistants (with additional training) to include the ability to administer medications could also help to keep children with asthma in school.

Adopting evidence-based, multi-sector interventions that have proven successful in other locations may be another way the state of Hawai'i can address the issue of asthma in schools. One such successful example is the Asthma 411 Initiative, a community-based, multi-organizational, and multi-institutional project developed and evaluated to reduce asthma morbidity among African American children from a school district in Saint Louis, Missouri.³⁴ The project began in 2001 when the St. Louis Regional Asthma Consortium was awarded funding from the Centers for Disease Control and Prevention. The Asthma 411 Initiative provides tools, methods, and strategies to school health and administrative entities to help control asthma-related symptoms, reduce asthma-related school absenteeism and improve academic achievement. The most critical element of the project is the utilization of a consulting physician to enhance the role of the school nurse. Many schools throughout the US who have adopted and implemented Asthma 411 have seen a statistically-significant increase in the identification of students with asthma. These schools have also seen an increase in the development of patient Asthma Action Plans by physicians, a decrease in children being sent home due to asthma-related symptoms, a decrease in 911 calls, and most importantly, a decrease in asthma-related absences. However, further research is needed to assess if school-based asthma interventions like the Asthma 411 Initiative are effective at reducing school absences and improving academic performance scores on standardized tests among other racial/ethnic minority children (ie, NHs or Pacific Islanders) with severe and persistent asthma.

Hawai'i Initiatives

Given the prevalence of asthma in Hawai'i, many innovative programs are currently underway to address this important health issue. In developing effective interventions, it is important to consider that the prevalence of asthma may be compounded by other social inequities like unsafe housing, homelessness, poverty, and access to health care.³⁵ The DOH's Public Health Nursing Branch (PHNB) convenes an Asthma Advisory Council to help identify and address issues related to asthma in the school setting. This Council includes various stakeholders, such as health care professionals (eg, pediatricians) and local organizations, including the DOH Chronic Disease Management Branch and the American Lung Association (ALAH) in Hawai'i.

The ALAH also delivers programs to provide direct asthma self-management education. For example, the ALAH delivers programs to caregivers or parents of children with asthma in order to improve asthma self-management skills, decrease asthma-related emergencies, and raise awareness of asthma among families and school personnel. Additionally, the ALAH is working on ways to address home-based interventions with community health workers to identify asthma triggers in the home setting.

In partnership with the Hawai'i Public Health Institute (H-Phi) and Hawai'i Primary Care Association (HPCA), local community health centers are also engaged in quality improvement activities and system-level linkages regarding asthma. For example, through the DOH's partnership with HPCA, there are now three school-based health clinics (Waianae High School, Waianae Intermediate School, and Ko'olauloa at Kahuku High and Intermediate School) that are successfully treating students for various medical conditions without being sent home.

The DOH's Hawai'i State Asthma Control Program (HSACP) partners with these local organizations to identify gaps in the delivery of asthma-related programs and services in order to improve Hawaii's existing asthma system of care. Currently, the HSACP is in the initial stages of developing a telehealth pilot program to address the issue of students with asthma being sent home after the use of their inhaler.

Furthermore, the DOE recently partnered with the UHM Nursing school in a program called Hawai'i Keiki. The goal of the Hawai'i Keiki program is to have UHM Nursing master's prepared registered nurses (eg, Nurse Practitioners) on-site at project schools to deliver screening, direct health services, and guarantee continuity of care for students with chronic conditions like asthma. The Hawai'i Keiki program also collaborates with Public Health Nurses from the DOH to ensure these responsibilities are met.³⁶

Conclusion

Asthma is one of the leading reasons for school absenteeism in the US and in Hawai'i. The consequences of chronic absenteeism from asthma are associated with lower standardized test scores, GPAs, and high school drop-out rates. Hawai'i public schools are significantly affected by the high rates of chronic absenteeism among children with asthma. Therefore, solutions for asthma in

the school setting in Hawai‘i must be addressed to reduce rates of chronic absenteeism and improve academic success. Critical local initiatives include partnerships with HIPHI, DOH, HPCA, and PHNB, to name a few, to address asthma disparities in the school setting. Public schools in Hawai‘i could also benefit by hiring more full time nurses, expanding the scope of practice among SHAs, adopting more school-based health clinics and evidence-based asthma interventions, and/or implementing telehealth services to help link students to appropriate health care services for asthma.

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