

Delaware Survey of Children’s Health: Childhood Asthma in Delaware

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The Delaware Survey of Children’s Health (DSCH), sponsored by Nemours Children’s Health System (Nemours), is one of the most comprehensive health surveillance instruments for Delaware children, with results from more than 2,600 households with children ages birth through 17 in 2014. Administered in 2006, 2008, 2011 and 2014, the DSCH provides valuable data on multiple aspects of children’s health — including general health status, weight status (BMI), physical activity, healthy eating, health conditions, and children’s family and neighborhood environments — that can be used to inform data-driven decisions to improve children’s health.¹

The 2014 administration of the DSCH was the first to include questions regarding childhood asthma. Childhood asthma is a lifelong, chronic disease impacting nearly 10 million children in the United States in 2014.² Asthma can impact a child’s quality of life; however, symptoms can be controlled and asthma attacks can be avoided through patient compliance with prescribed medications and avoidance of asthma triggers such as dust mites and tobacco smoke.³ This data brief highlights the prevalence of lifetime asthma, defined as children who had ever been diagnosed with asthma; asthma management through education; barriers to asthma medication management; the relationship between lifetime asthma and weight status; and the prevalence of lifetime asthma and physical activity limitations.

Lifetime Asthma Prevalence in Delaware: Higher Than the National Prevalence & Varies by Demographic Group

To assess lifetime asthma prevalence, parents were asked, “Has a doctor, nurse or other health professional ever told you that [your child] has asthma?” DSCH data show that 17 percent of Delaware children, ages 0-17, had ever been diagnosed with asthma (referred to as “lifetime asthma”) in 2014. This is higher than the national prevalence of 14 percent.²

Data from DSCH show statistically significant differences ($p < .05$) by gender, age and racial/ethnic groups regarding lifetime asthma prevalence (Figure 1).

Figure 1. Prevalence of Lifetime Asthma for Delaware by Gender, Age, and Race/Ethnicity¹ and the United States²

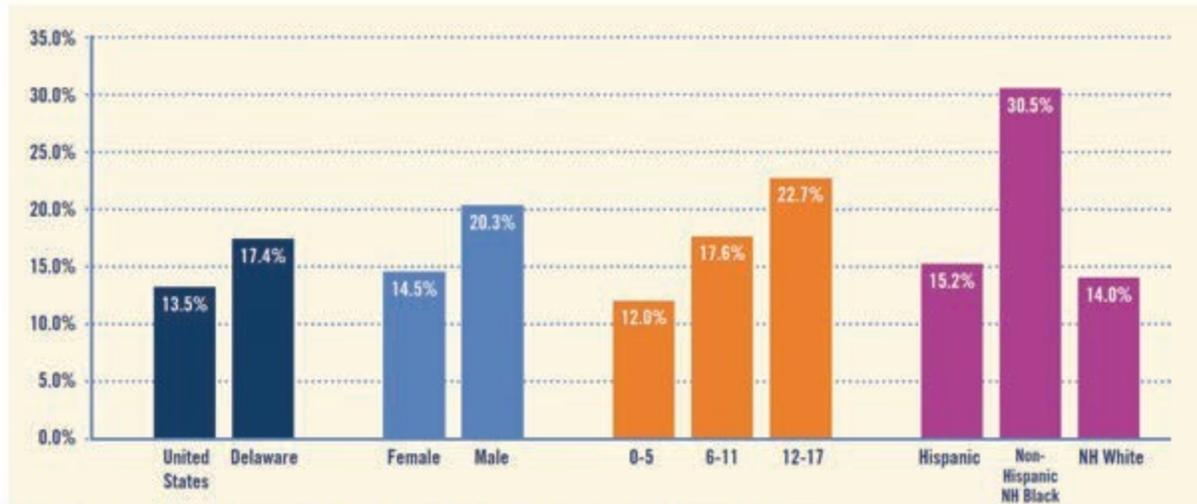


Figure 1. Prevalence of Lifetime Asthma for Delaware by Gender, Age and Race/Ethnicity¹ and the United States²

- Male children were more likely to have lifetime asthma (20 percent), compared to female children (15 percent). However, there is some variation in gender differences by race. Among non-Hispanic Black children, ages 0-17, females were more likely to have lifetime asthma (38 percent) than males (23 percent);
- Adolescents ages 12-17 were more likely to have lifetime asthma (23 percent) than children ages 6-11 (18 percent) and children ages 0-5 (12 percent);
- Non-Hispanic Black children were more likely to have lifetime asthma (31 percent) than Hispanic children (15 percent) and non-Hispanic White children (14 percent).

There were no significant differences among four locations within Delaware, although the highest lifetime asthma prevalence was observed in the City of Wilmington (24 percent), followed by Kent County (19 percent), New Castle County excluding the City of Wilmington (17 percent), and Sussex County (14 percent).

Asthma Management Through Education

Asthma education can lead to enhanced asthma management, improved health outcomes and lower utilization of emergency health care services.^{4,5}

The 2014 DSCH data provide information on the extent to which health professionals are educating parents of children with lifetime asthma to manage their child's asthma, including how to recognize the signs or symptoms of their child's asthma episodes; what to do during their child's asthma attack; how their child should use a peak flow monitor to adjust daily medications; and how to make changes to their child's environment (e.g., home, school) to improve their child's asthma. The findings are encouraging and suggest areas of opportunity to manage children's asthma.

Among children ages 0-17 with lifetime asthma, 88 percent of parents were taught to recognize early signs or symptoms of asthma episodes by a health professional. Significantly more parents of adolescents with lifetime asthma, ages 12-17, were taught to recognize early signs or symptoms of asthma episodes (95 percent) compared to parents of children ages 6-11 (84

percent), or parents of children ages 0-5 (83 percent) ($p < .05$). In addition, 92 percent of parents of children with lifetime asthma, ages 0-17, were taught what to do during an asthma attack.

However, according to DSCH data, fewer parents of children (62 percent) with lifetime asthma, ages 0-17, were taught how their child should use a peak flow meter, a device that measures how much air people can blow out of their lungs to adjust daily medications. Additionally, only half (50 percent) of parents of children with lifetime asthma, ages 0-17, were advised by a health professional to change things in their child's home, school or other environment to improve the child's asthma (Figure 2). Examples of environmental changes to improve asthma include family members not smoking inside the home, cleaning the environment of dust, and addressing mold and mildew issues.

Figure 2. Parent Education to Manage Their Child's Asthma

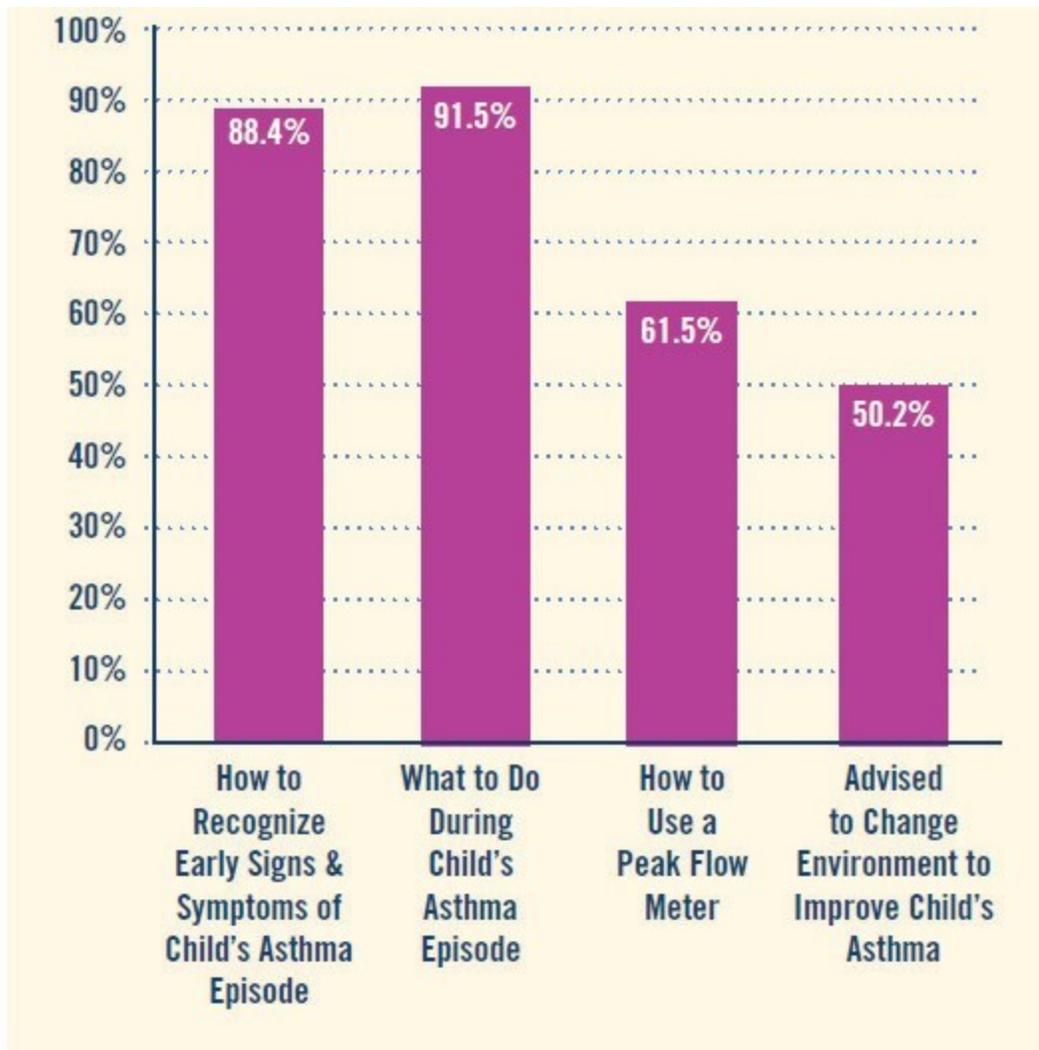


Figure 2. Parent Education to Manage Their Child's Asthma¹

Barriers to Asthma Medication

Management

Results from DSCH indicate that nearly two-thirds (65 percent) of children, ages 0-17, with lifetime asthma had an asthma-related visit with a health professional in the past year. Most (93 percent) of these children were prescribed medication for their asthma.

Among children with lifetime asthma who were prescribed medication, 57 percent of parents experienced at least one difficulty in filling their child's asthma medication prescriptions. The most commonly reported challenges to filling a prescription were related to insurance coverage, cost and knowledge, including insurance did not cover the medication (22 percent), co-pay too expensive (15 percent), not knowing how to fill the prescription (7 percent), and lack of insurance (6 percent).

Of note, the location of the household was associated ($p < .05$) with insurance coverage for the medication. Parents of roughly one-third (34 percent) of children in New Castle County,

excluding the City of Wilmington, indicated that insurance did not cover their asthma medication, followed by Kent County (11 percent), Sussex County (11 percent), and the City of Wilmington (3 percent).

Lifetime Asthma and Weight Status

Similar to previous studies, the 2014 DSCH results point to an association between lifetime asthma and weight status among Delaware children, ages 2-17 ($p < .05$).⁶⁻⁸ The DSCH data indicate that children, ages 2-17, who were obese were more likely to have lifetime asthma (26 percent) compared to normal weight children (17 percent) (Figure 3).

Figure 3. Asthma Prevalence by Weight Status

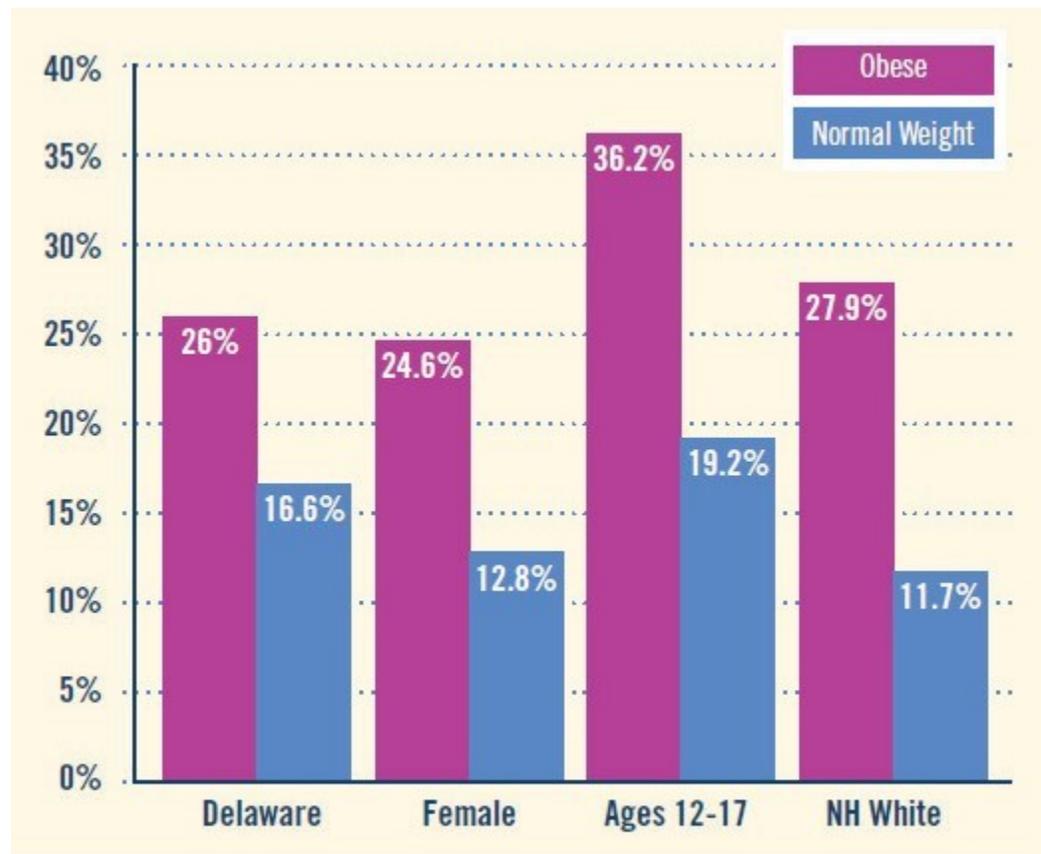


Figure 3. Asthma Prevalence by Weight Status¹

When stratified by weight status, there were statistically significant differences ($p < .05$) among female children, adolescents and non-Hispanic White children regarding lifetime asthma prevalence, according to the survey results.

Obese vs. Normal Weight Status

- Female children, ages 2-17, who were obese were more likely to have lifetime asthma (25 percent) compared to female children, ages 2-17, who were normal weight (13 percent);

- Adolescents, ages 12-17, who were obese were more likely to have lifetime asthma (36 percent) compared to normal weight adolescents (19 percent) of the same age group;
- Non-Hispanic White children, ages 2-17, who were obese were more likely to have lifetime asthma (28 percent) compared to non-Hispanic White children, ages 2-17, who were normal weight (12 percent).

Lifetime Asthma and Physical Activity Limitations

Parents were asked if their child was limited from mild activities or moderate-to-vigorous activities because of their asthma or to prevent an asthma attack during the past two weeks (from the time the survey was taken). Sixteen percent of children were “very limited” or “limited some” or “limited a little” from moderate-to-vigorous activities (jumping, dancing, swimming, climbing, crawling or running fast, playing sports, or walking upstairs), and 84 percent of children were not limited at all (Figure 4).

Figure 4. Distribution of Children with Asthma Limited from Moderate-to-Vigorous Activities

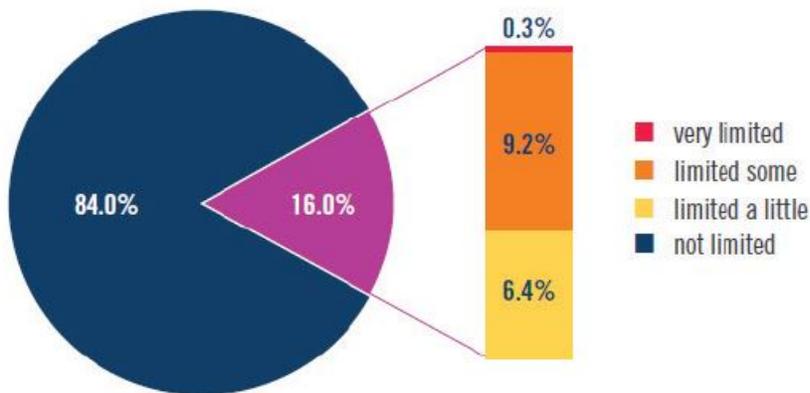


Figure 4. Distribution of Children with Asthma Limited from Moderate-to-Vigorous Activities¹

Children, ages 2-17, with any limitations from participating in moderate-to-vigorous activities had a higher prevalence of obesity (50 percent) than children who were not limited from those activities (24 percent) (Figure 5). It is important to note, however, we cannot determine from this data if asthma, physical activity and obesity have a direct effect on each other.

Figure 5. Obesity Prevalence by Limitation from Moderate-to-Vigorous Activities (Among Children With Asthma)

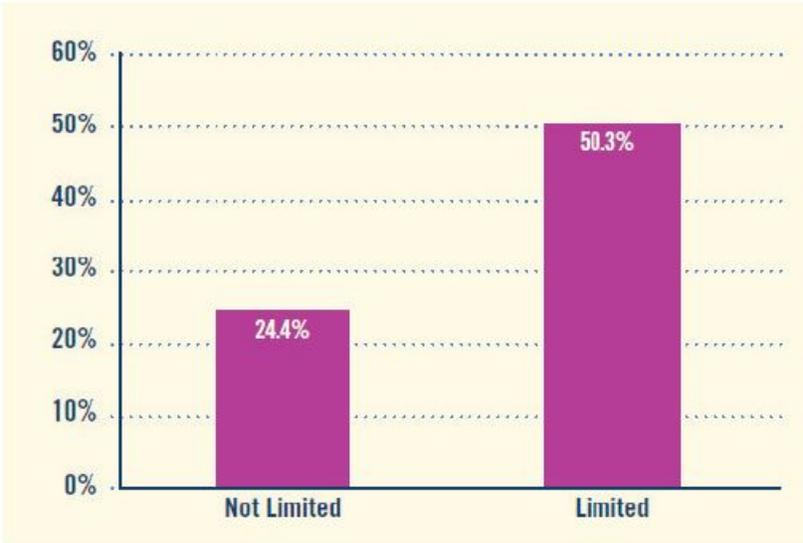


Figure 5. Obesity Prevalence by Limitation from Moderate-to-Vigorous Activities (Among Children with Asthma)¹

Eleven percent of children were “very limited” or “limited some” or “limited a little” from mild activities (such as walking, being outside, playing gently) because of their asthma or to prevent an asthma attack, and 89 percent of children were not limited at all (Figure 6). However, there were no differences in obesity prevalence between the children, ages 2-17, limited from mild activities and the children without mild activity limitations.

Figure 6. The Distribution of Children with Asthma Limited from Mild Activities

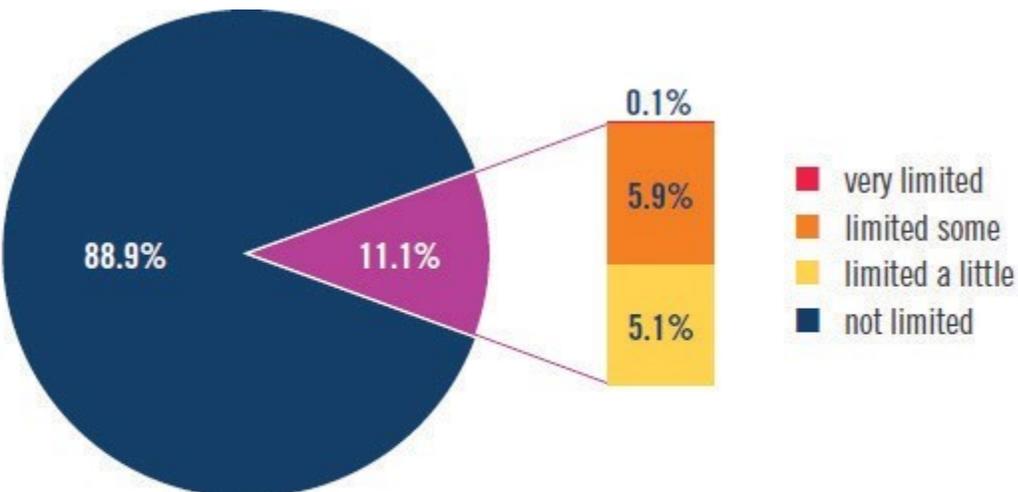


Figure 6. The Distribution of Children with Asthma Limited from Mild Activities¹

Summary

The usefulness of a surveillance tool such as the DSCH lies in its ability to draw attention to important patterns. The prevalence of lifetime asthma, defined as ever being diagnosed with

asthma, among Delaware children is higher than the national prevalence and it varied within Delaware by age, gender and race/ ethnicity. A relationship between children's weight status and asthma prevalence was observed; and a higher obesity prevalence was observed among the children with asthma who were limited from moderate- to-vigorous activities compared to those who were not. The DSCH is one of the most comprehensive health surveillance instruments for Delaware children.

Nemours hopes that by administering the DSCH and publicizing the findings, more data-driven decisions will be made in the field of child health promotion. The statewide sample was specifically designed to allow for the analysis and comparison of children living in five geographic locations: New Castle County, the City of Wilmington, New Castle County excluding the City of Wilmington, Kent County and Sussex County. The sample also supports comparisons among children of various age groups (0-5 years, 6-11 years and 12-17 years), and racial and ethnic groups (Hispanics, non-Hispanic Blacks, non-Hispanic Whites and non-Hispanic Others). The Nemours Health & Prevention Services (NHPS) Datacenter allows for further comparison, download and visualization of the DSCH data. For more information about the DSCH, please visit the NHPS Datacenter <http://datacenter.nemours.org>, call (302) 298-7600, or email nhps_info@nemours.org.

References

1. Nemours Children's Health System. (2017). NHPS datacenter. Retrieved from: <http://datacenter.nemours.org>
2. Centers for Disease Control and Prevention. National Center for Health Statistics. (2016). Lifetime asthma population estimates in thousands, by age, United States: national health interview survey, 2014 [Data file]. Retrieved from: <http://www.cdc.gov/asthma/nhis/2014/table1-1.htm>
3. Centers for Disease Control and Prevention. (2017). Learn how to control asthma. Retrieved from: <http://www.cdc.gov/asthma/faqs.htm>
4. Wolf, F., Guevara, J. P., Grum, C. M., Clark, N. M., & Cates, C. J. (2002). Educational interventions for asthma in children. *Cochrane Database of Systematic Reviews*. <https://doi.org/10.1002/14651858.CD000326> [PubMed](#)
5. Coffman, J. M., Cabana, M. D., & Yelin, E. H. (2009, August). Do school-based asthma education programs improve self-management and health outcomes? *Pediatrics*, *124*(2), 729–742. [PubMed](#) <https://doi.org/10.1542/peds.2008-2085>
6. Gennuso, J., Epstein, L. H., Paluch, R. A., & Cerny, F. (1998, December). The relationship between asthma and obesity in urban minority children and adolescents. *Archives of Pediatrics & Adolescent Medicine*, *152*(12), 1197–1200. [PubMed](#) <https://doi.org/10.1001/archpedi.152.12.1197>
7. Figueroa-Muñoz, J. I., Chinn, S., & Rona, R. J. (2001, February). Association between obesity and asthma in 4-11 year old children in the UK. *Thorax*, *56*(2), 133–137. [PubMed](#) <https://doi.org/10.1136/thorax.56.2.133>
8. Ahmad, N., Biswas, S., Bae, S., Meador, K. E., Huang, R., & Singh, K. P. (2009, September). Association between obesity and asthma in US children and adolescents. *J Asthma*, *46*(7), 642–646. [PubMed](#) <https://doi.org/10.1080/02770900802503123>

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