

Adult Asthma Control and Self-Management, Wisconsin 2012–2016

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ABSTRACT

Introduction: This report describes the current state of asthma control and management among adults in Wisconsin.

Methods: Data from the 2012-2016 Wisconsin Behavioral Risk Factor Surveillance System Asthma Call-back Survey were analyzed. Asthma control, self-management, and work-related asthma were described using prevalence estimates.

Results: Among adults with asthma, 40.1% (95% CI, 35.7-44.5) were well-controlled, 36.7% (95% CI, 32.5-40.9) were not well-controlled, and 23.2% (95% CI, 19.5-26.9) were very poorly controlled. One third (35.1%, 95% CI, 30.8-39.4) of adults were given a written asthma action plan by their health care providers.

Discussion/Conclusion: Many adults did not have well-controlled asthma during the study period. Health care providers should consider providing additional self-management education to help patients manage their asthma symptoms.

INTRODUCTION

Asthma is a chronic disease affecting the lung characterized by airflow obstruction, bronchial hyperresponsiveness, and underlying inflammation.¹ Nationally, asthma affects over 22 million Americans, with 8.3% of adults in the United States reporting a current diagnosis of asthma in 2016. In Wisconsin, 8.5% of adults 18 years and older report currently having asthma.² Poorly controlled asthma can result in significant morbidity and high health care utilization. In 2016 alone, there were 12,751 asthma-related

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emergency department (ED) visits and 1,514 hospitalizations among Wisconsin adults.³ These ED and hospital visits are costly; Wisconsin ED visit charges for asthma exceeded \$24.5 million in 2011.⁴

Health care providers play a central role in helping their patients achieve asthma control. Self-management techniques, identification of environmental and work-related triggers, and regular checkups are necessary to properly manage symptoms.¹ However, a recent review of asthma care interventions suggests that health care providers do not consistently adhere to asthma care guidelines.⁵

This report aims to estimate asthma control among adults with asthma in Wisconsin and to assess the prevalence of routine checkups and asthma self-management knowledge by asthma control categories. Additionally, this report provides estimates of work-related asthma among adults.

METHODS

Data were obtained from the Wisconsin Behavioral Risk Factor Surveillance System (BRFSS) Asthma Call-back Survey (ACBS) during 2012 to 2016. The BRFSS is a cross-sectional telephone survey conducted by state health departments with assistance from the Centers for Disease Control and Prevention (CDC). Random digit dialing techniques are used on both landlines and cell phones to recruit participants. In Wisconsin, the response rate was 49.8% for 2016.⁶ Survey weights were developed to make the data generalizable to Wisconsin's population demographics. More details on the BRFSS sampling methodology can be found in the CDC ACBS guidance.⁷ All BRFSS participants who reported ever having been diagnosed with asthma were invited to participate in the

Table 1. Behavioral Risk Factor Surveillance System Asthma Call-Back Survey Asthma Control Categories

Element	Well-Controlled	Not Well-Controlled	Very Poorly Controlled
Symptoms ^a	≤8 days in past 30 days	>8 days in past 30 days but not throughout the day	Every day in the past 30 days and throughout the day
Nighttime Awakenings ^a	≤2 times in past 30 days	≥3 and ≤12 times in the past 30 days	≥13 times in the past 30 days
Rescue Medication Use ^b	≤0.29 uses per day	>0.29 and <2.00 uses per day	≥2.00 uses per day
Limited Activity ^a	No limitations in past 30 days	Some limitation past 30 days	Extremely limited past 30 days
Overall	All elements well-controlled	At least 1 element not well-controlled; no elements very poorly controlled	At least 1 element very poorly controlled

^aAsked frequency over last 30 days.

^bFrequency of inhaler rescue medication uses per day or week for all medications taken in last 3 months was converted to the number of uses per day and summed. Rescue medications used only for treatment before exercise were excluded.

Table 2. Prevalence Estimates With 95% CI for Individual Elements of Asthma Control Classification Among Adults With Current Asthma, Wisconsin Behavioral Risk Factor Surveillance System, 2012-2016

Asthma Control Element	Prevalence	(95% CI)
Symptoms ^a		
≤8 days in past 30 days	62.3	(58.2-66.4)
>8 days in past 30 days but not throughout the day	25.8	(22.1-29.4)
Every day in the past 30 days and throughout the day	11.9	(9.1-14.7)
Nighttime Awakenings ^a		
≤2 times in past 30 days	76.5	(72.9-80.2)
≥3 and ≤12 times in the past 30 days	12.6	(9.9-15.4)
≥13 times in the past 30 days	10.8	(8.2-13.5)
Rescue Medication Use ^b		
≤0.29 uses per day	93.1	(91.4-94.9)
>0.29 and <2.00 uses per day	2.2	(1.2-3.3)
≥2.00 uses per day	4.6	(3.2-6.0)
Limited Activity ^a		
No limitations in past 30 days	54.2	(49.9-58.5)
Some limitation past 30 days	39.9	(35.7-44.1)
Extremely limited past 30 days	5.9	(3.9-7.8)

^aAsked frequency over last 30 days.

^bFrequency of inhaler rescue medication uses per day or week for all medications taken in last 3 months was converted to the number of uses per day and summed. Rescue medications used only for treatment before exercise were excluded.

ACBS, which defines adults with current asthma as those who state that they currently have asthma.

Asthma control was assessed by examining 4 measures of impairment: symptoms, nighttime awakenings, rescue medication use, and activity limitations. To assess each measure, survey respondents were asked about frequency of symptoms and nighttime awakenings in the past 30 days, if activity was limited because of asthma symptoms in the past 30 days, and how often rescue medication was used in the past 3 months. Answers to these questions were ranked and put into categories of “well-controlled” to “very poorly controlled,” as shown in Table 1. The overall level of asthma control was based on the most severe measure of impairment (eg, a respondent’s asthma was classified as “very poorly controlled”

if any individual measure was “very poorly controlled”). All measures must have been “well-controlled” for asthma to be classified as “well-controlled.” This classification method is recommended by CDC’s ACBS guidance and is consistent with the National Heart, Lung, and Blood Institute (NHLBI) Expert Panel Report-3 (EPR-3) asthma guidelines.^{1,8}

Self-management was assessed using dichotomous yes/no questions regarding respondent experiences with health care providers when discussing their asthma. Work-related asthma estimates were based on: (1) respondents who reported that workplace exposures either caused or

aggravated their asthma; and (2) respondents who reported doctor-diagnosed or self-diagnosed work-related asthma.

Measures of asthma control, the overall asthma control category, self-management knowledge, and work-related asthma were described using prevalence estimates and 95% confidence intervals (CI). Chi-square analysis was used to test for differences in categorical variables, such as income, routine checkups, and self-management knowledge between asthma control categories. Frequencies, prevalence estimates, 95% CIs, and chi-square statistics were obtained using weighted survey procedures to address the complex sampling design. All analyses were conducted using SAS software version 9.4 (SAS Institute, Cary, North Carolina).

RESULTS

Asthma Control

Among adults who currently had asthma, 40.1% (95% CI, 35.7-44.5) had well-controlled asthma, 36.7% (95% CI, 32.5-40.9) had asthma that was not well-controlled, and 23.2% (95% CI, 19.5-26.9) had very poorly controlled asthma. Prevalence estimates and 95% CIs for individual measures of asthma control are detailed in Table 2.

Among individuals with very poorly controlled asthma, 51.3% (95% CI, 42.4-60.2) reported symptoms every day and throughout the day in the past 30 days. Among this same group, 46.8% (95% CI, 37.7-55.8) had nighttime awakenings ≥13 times in the past 30 days, and 26.2% (95% CI, 18.5-33.8) were extremely limited in the past 30 days. Lastly, 19.9% (95% CI, 14.0-25.9) of those with very poorly controlled asthma reported ≥2 rescue medication usages per day. Symptoms and nighttime awakenings were the main drivers for being categorized as very poorly controlled.

There were significant differences between asthma control groups in the proportion of those who had routine checkups for their asthma. Those with well-controlled asthma (39.4%, 95% CI, 31.8-47.0) were less likely to report a routine doctor’s visit for their asthma compared to their counterparts in the not well-

controlled (62.3%; 95% CI, 55.6-69.0) or very poorly controlled (71.9%; 95% CI, 63.3-80.5) categories (χ^2 , $P < 0.0001$).

There was also a significant difference in the proportions of asthma control by income. Among adults with asthma who reported an annual household income $< \$15,000$, 40% (95% CI, 27.4-52.6) had very poorly controlled asthma, compared to 9.3% (95% CI, 5.6-12.9) of those with a household income $> \$50,000$ (χ^2 , $P < 0.001$). Conversely, asthma was well-controlled in 52.9% (95% CI, 45.6-60.3) of adults with asthma who reported a household income $> \$50,000$, compared to 25.5% (95% CI, 11.9-39.2) of those with a household income $< \$15,000$ (χ^2 , $P < 0.001$).

Self-Management

Almost all adults with current asthma (97.7%; 95% CI, 96.8-99.0) reported having been taught how to use their inhaler by their health care provider, but only 78.9% (95% CI, 75.5-82.3) reported that their provider had observed them using it. Furthermore, only 49.9% (95% CI, 45.5-54.4) reported having been taught how to use a peak flow meter to monitor their asthma symptoms.

Approximately one-third of adults with current asthma (35.1%; 95% CI, 30.8-39.4) were given a written asthma action plan with instructions detailing when to use medication, when to call the doctor for advice, and when to go to the ED; however, 64.6% (95% CI, 60.4-68.9) were taught to recognize asthma symptoms, and 77.7% (95% CI, 74.1-81.3) were taught what to do during an attack. There were no significant differences in self-management knowledge by asthma control category (χ^2 , $P > 0.05$).

Work-Related Asthma

Among ever-employed adults with current asthma, 54.8% (95% CI, 50.3-59.2) reported that their asthma was caused or aggravated by their current or previous job, and 21.8% (95% CI, 18.5-25.1) reported that they had either self-identified or doctor-diagnosed work-related asthma.

DISCUSSION

This analysis indicates that many adults in Wisconsin do not have well-controlled asthma, which is a likely contributor to the thousands of ED visits and hospitalizations every year for exacerbations. Further, in this group of respondents, asthma symptoms and nighttime awakenings were the most common drivers of having very poorly controlled asthma.

Self-management education is an effective strategy for achieving asthma control. A meta-analysis of self-management education on chronic disease outcomes found that there was a 41% reduction in asthma attacks (log rate ratio, 0.59; 95% CI, 0.35-0.83) among individuals receiving self-management education. This analysis also suggested that using a peak flow meter to monitor disease activity is beneficial.⁹ A systematic review of the asthma literature found that self-management education involving self-monitoring with a peak flow meter and regular doctor visits significantly reduced hospitalizations, ED visits, unscheduled visits

to the doctor, days off work or school, and nocturnal asthma. The authors concluded that self-management education that includes a written action plan and allows patients to adjust their medication use is most effective.¹⁰ Despite the benefits of self-management education, an analysis using the 2012 National Asthma Survey of Physicians found low adherence to asthma guidelines. Only 16.4% of primary care physicians provided patients written asthma action plans, and only 11.2% recommended at-home peak flow monitoring to their patients.⁵ While our analysis found higher estimates of asthma patients being taught to use a peak flow meter (49.9%) and receiving an asthma action plan (35.1%), there is still substantial room for improvement.

Work-related asthma is a common but underdiagnosed issue in adults with asthma. This underdiagnosis is attributed to low awareness by physicians and a lack of knowledge and time.¹¹ In Wisconsin, over half of adults with asthma reported that their work either caused or aggravated their asthma. Physicians should ask patients about occupational exposures and timing of asthma symptoms to improve diagnosis and management of work-related asthma.

Given the need for improved self-management education by providers, the CDC-funded Wisconsin Asthma Program, housed within the Wisconsin Division of Public Health, funds a variety of projects to help improve asthma control in high-burden communities. The Wisconsin Asthma Program partners with the American Lung Association of the Upper Midwest to implement comprehensive asthma quality improvement projects within clinics in high-burden areas of the state. These projects ensure that clinic staff consistently provide asthma diagnosis, treatment, and patient education for children and adults that meet the NHLBI EPR-3 asthma guidelines. The Asthma Care program is another initiative available in southeastern Wisconsin to children and adults with poorly controlled asthma. The program offers targeted services, including intensive asthma self-management education and environmental home assessments, in an effort to improve asthma control. In addition, referrals are provided to clients who do not have a primary care provider and/or health insurance.¹²

CONCLUSION

State survey data indicate that the majority of Wisconsin adults do not have well-controlled asthma. Increased provider adherence to consensus guidelines for self-management education can improve control and reduce asthma-related morbidity.

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