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Patient–physician communication about work-related asthma: what we do and do not know

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Abstract

Background—Effective patient–physician communication is the key component of the patient–physician relationship.

Objective—To assess the proportion of ever-employed adults with current asthma who talked about asthma associated with work with their physician or other health professional and to identify factors associated with this communication.

Methods—The 2006 to 2010 Behavioral Risk Factor Surveillance System Asthma Call-Back Survey data from 40 states and the District of Columbia for ever-employed adults (≥18 years old) with current asthma (N = 50,433) were examined. Multivariable logistic regression analyses were conducted to identify factors associated with communication with a health professional about asthma and work.

Results—Among ever-employed adults with current asthma, 9.1% were ever told by a physician that their asthma was related to any job they ever had and 11.7% ever told a physician or other health professional that this was the case. When responses to the 2 questions were combined, the proportion of those who communicated with a health professional about asthma and work was 14.7%. Communication with a health professional about asthma and work was associated with age, race or ethnicity, employment, education, income, insurance, and urgent treatment for worsening asthma.

Conclusion—A small proportion of patients with asthma might communicate with a health professional about asthma associated with work. Future studies should examine whether patients with asthma ever discussed with a health professional the possibility that their asthma might be

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Supplementary Data

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related to work to provide information on the frequency of patient–clinician communication about asthma related to work.

Introduction

Asthma is one of the most common chronic conditions in the United States. From 2001 through 2010, overall asthma prevalence increased from 7.3% to 8.4%.[1] In 2010, 18.7 million adults at least 18 years old (8.2%) had asthma.[2] Asthma in adults has been associated with considerable morbidity, mortality, and cost to the society.[1,3]

Work-related asthma (WRA) is a preventable condition that includes asthma caused by exposures in the workplace (occupational asthma) and concurrent asthma worsened by exposures in the workplace (work-exacerbated asthma).[4,5] Based on a review of the published scientific literature, Toren and Blanc[6] reported that 7% to 51% (median 17.6%) of asthma in adults is attributable to occupational exposure. A 2011 American Thoracic Society statement concluded that among all working adults with asthma, work-exacerbated asthma prevalence ranges from 13% to 58% (median 21%).[7] Those with WRA might need to change or leave employment and subsequently lose income and benefits.[5,7–9] In addition to adverse socioeconomic outcomes, WRA has been associated with disability and mortality.[5,9–14]

Establishing effective patient–physician communication offers multiple benefits to patients and physicians.[15–20] Good communication increases patient involvement and treatment compliance, increases patient satisfaction, improves quality of care and health outcomes, and decreases the frequency of malpractice claims. Satisfied patients also are more likely to share pertinent health information. A thorough occupational history is critical for establishing a WRA diagnosis and implementing prevention.[5,21,22] Inadequate screening of workers for occupational exposures by health providers and lack of recognition of associations between workplace exposures and asthma symptoms remain the main reasons for under-recognition and underdiagnosis of WRA.[23–25] Delayed or inadequate medical care for WRA can result in poorer asthma outcomes, including death.[5,11,12]

Using the 2010 National Health Interview Survey data, a previous study reported that an estimated 13.5% of adults with current asthma employed in the prior year had ever discussed with a health professional that their asthma was likely related to work.[26] However, the estimate excluded unemployed adults and thus the reported results could be underestimated. Moreover, no state-specific information was available. To address these gaps, the authors used the 2006 to 2010 Behavioral Risk Factor Surveillance System (BRFSS) Asthma Call-Back Survey data from 40 states and the District of Columbia to estimate the proportion of ever-employed adults with current asthma who were ever diagnosed with WRA and/or ever told a health professional that their asthma was related to work and to identify factors independently associated with telling and/or being told by a health professional about asthma association with work.

Methods

A detailed description of the survey methods is available elsewhere.[27–29] The 2006 to 2010 median response rates among the 40 states and District of Columbia, providing comparable data for this report, ranged from 47.5% in 2007 to 52.6% in 2010 for the BRFSS and from 47.2% in 2009 to 54.3% in 2007 for the Asthma Call-Back Survey. Ever-employed survey participants were those who reported they were “employed full time” or “employed part time” at the time of the interview or had ever been employed outside the home. Survey participants who responded “yes” to the questions “Have you ever been told by a physician, nurse, or other health professional that you had asthma?” and “Do you still have asthma?” were classified as having current asthma. Asthma diagnosis, outcomes, and control were classified based on previously used definitions.[30–32] In accord with the Expert Panel Report 3 guidelines for the diagnosis and management of asthma,[15] the authors combined participant responses to questions on asthma symptoms, nighttime awakenings, and use of rescue medication to categorize asthma control as very poorly controlled, not well controlled, or well controlled (eTable 1). Respondents were considered to have adverse asthma outcomes if, in the past 12 months, they had an episode of asthma or an asthma attack, had to visit an emergency department or urgent care center because of their asthma, or had to stay overnight in a hospital because of asthma. Respondents who indicated that their asthma was possibly related to work (ie, had possible WRA) were those who positively responded to any of the following 4 questions: “Was your asthma caused by chemicals, smoke, fumes or dust in your current job?” “Was your asthma caused by chemicals, smoke, fumes or dust in any previous job you ever had?” “Is your asthma made worse by chemicals, smoke, fumes or dust in your current job?” “Was your asthma made worse by chemicals, smoke, fumes or dust in any previous job you ever had?” Two questions addressed patient–physician communication about asthma associated with work: “Were you ever told by a physician or other health professional that your asthma was related to any job you ever had?” (ie, had diagnosed WRA) and “Did you ever tell a physician or other health professional that your asthma was related to any job you ever had?”

The BRFSS has surveillance exemption from the institutional review board at the Centers for Disease Control and Prevention. Participating states are subject to state-specific institutional review board requirements.[29]

Statistical Analysis

SAS 9.3 (SAS Institute, Cary, North Carolina) and SUDAAN 10.0.1 (Research Triangle Institute, Research Triangle Park, North Carolina) procedures for complex survey design were used for the analysis.[29,31] Data from 2006 through 2010 for the District of Columbia and each of the 40 states participating in the Asthma Call-Back Survey during multiple years were combined to increase the reliability and precision of estimates. Data were weighted to account for nonresponse differences in the sample, the unequal probability of sample selection, and allow for generalizability of study findings to the populations of surveyed areas. Weights were established by multiplying the proportion of respondents in each survey year by the corresponding survey year's weight. Records for respondents not included in the

study population were processed but not analyzed to account for the complex sample design in the computation of SEs for the study population estimate.

The authors examined the proportion of patients who communicated with a health professional about asthma associated with work among ever-employed adults with current asthma by WRA status. Logistic regression models were used to estimate prevalence ratios for the associations between communication about work related to asthma and demographic factors and asthma outcomes. Separate multiple logistic regression models were used to assess these associations while controlling for age, sex, race, education level, health insurance, and employment status. The authors adjusted for these variables because they were associated with WRA diagnosis or telling a health professional about asthma associated with work in bivariate analysis or in previous studies.[33–36] To account for sampling error, 95% confidence intervals (CIs) around the estimates and prevalence ratios were reported.

Results

From 2006 through 2010, 73,637 adults were interviewed for the Asthma Call-Back Survey in 40 states and the District of Columbia. Of these, 19,335 (26.3%) did not have current asthma, 1,606 (2.2%) were never employed, 404 (0.5%) did not have current asthma and were never employed, and 1,859 (2.5%) had missing data on asthma or employment status and were excluded from analyses. The remaining 50,433 respondents (68.5%), representing an estimated annual average of 17 million ever-employed adults with current asthma in the 40 states and District of Columbia, were included in the analyses. Most ever-employed adults with current asthma were women (63.0%), non-Hispanic white (75.4%), had more than a high school education (65.3%), had health insurance (86.8%), and were employed at the time of the interview (55.5%; Table 1). An estimated 55.3% were at least 18 years old at the time of asthma diagnosis and 14.1% had asthma diagnosed within the previous 5 years.

Among ever-employed adults with current asthma, an estimated 9.1% (95% CI 8.6%–9.7%) were ever diagnosed with WRA and 11.7% (95% CI 11.1%–12.3%) had ever told a health professional that their asthma was related to any job they ever had (Table 1). When responses to the 2 questions were combined, the proportion of those who communicated about the relation of asthma to work with a health professional was 14.7% (95% CI 14.0%–15.3%). Results of multivariate analysis showed subgroups that were more likely to have ever told a health professional that their asthma was related to work or to be diagnosed with WRA (Table 1).

An estimated 45.9% of ever-employed adults with current asthma had possible WRA. Of these, 24.3% told a health professional that their asthma was related to any job they ever had, and 18.6% were ever diagnosed with WRA (Table 1). When responses to the 2 questions were combined, the proportion of those with possible WRA who communicated about the relation of asthma to work with a health professional was 29.9% (95% CI 28.5%–31.2%). Respondents with possible WRA were more than 19 times more likely to ever tell a health professional that their asthma was related to any job they ever had than those without WRA (Table 1).

An estimated 85.5% (95% CI 84.9%–86.2%) of ever-employed adults with current asthma were never told by a health professional that asthma was related to work and never told a health professional that asthma was related to work. Of these, 37.6% (95% CI 36.5%–38.6%) had possible WRA.

The proportion of ever-employed adults with current asthma who communicated with a health professional about the association of asthma with work by state is presented in Table 2. The proportion of respondents who ever told a health professional that asthma was related to work was highest in West Virginia (18.5%), Georgia (17.4%), and Mississippi (17.0%) and lowest in Illinois (8.9%), Massachusetts (7.7%), and Arizona (7.6%). The proportion of those who were diagnosed with WRA was highest in Mississippi (18.4%), West Virginia (13.6%), and Florida (13.1%) and lowest in Utah (6.0%), Massachusetts (5.2%), and Arizona (4.7%).

Discussion

In this study,14.7% of ever-employed adults with current asthma communicated about the relation of asthma to work with a health professional. However, of ever-employed adults with current asthma, 45.9% had possible WRA. Of those with possible WRA, 29.9% communicated about the relation of work to asthma with a health professional. These results are consistent with previous studies using BRFSS data.[37–40] Those research groups reported that the proportion of adults with current asthma who communicated about the relation of work to asthma with a health professional ranged from 7.4% to 16.9%.[37–40] Among adults with possible WRA, this proportion ranged from 21.5% to 25.1%. However, results of these and the present study likely underestimate the patiente clinician communication about asthma associated with work. The BRFSS Asthma Call-Back Survey was not designed to collect information to ascertain whether respondents who answered “no” to the 2 questions on asthma communication did so because they did not ask a health professional about the possibility that their asthma might be related to work or, if they did ask about the possibility, the physician determined that their asthma was not related to work. In 2012, a new question was administered as part of the Asthma Call-Back Survey that addresses this issue: “Did you and a physician or other health professional ever discuss whether your asthma could have been caused by, or your symptoms made worse by, any job you ever had?” This will allow for a better estimation of the proportion of patients with asthma who discuss the relation of work to asthma with a health professional.

Several factors could explain why patients with asthma might not communicate with a health professional about asthma in relation to work. First, health care providers might not take appropriate work histories that would indicate a clear relation between workplace exposures and asthma onset or exacerbation.[22,25] Studies have shown that physicians document asking about asthma in relation to work infrequently. Milton et al[23] found that physicians documented asking about WRA symptoms in 15% of medical charts. In a more recent study, Shofer et al[25] examined notes for 197 patients with asthma and found that although employment status was noted in 147 charts (75%), documentation of potentially significant respiratory exposures at work were present in the records of only 21 patients (11%). Moreover, descriptions of specific work duties were identified in only 9 patients

(5%). Second, health professionals might consider workplace triggers to be similar to or no different than other environmental triggers, might not be comfortable with diagnosing WRA, or might be unsure of how to manage the disease.[38,41] Third, patients might not discuss the possibility that their asthma is associated with work if they believe that nothing can be done, fear losing their job, have already left their job, worry that their fears of what is wrong with them will be confirmed, are not aware of associations of symptoms with work or of agents at work that could affect asthma, or do not have access to health care.[20,38,41–43]

Patients are encouraged to develop partnerships with their physician to prevent asthma symptoms, decrease the need for medicines, maintain normal activity levels, and prevent asthma attacks that could result in an emergency department visit or hospital admission.[15] Patients who actively ask about their symptoms and related medical history express more feelings about their illness, share thoughts about diagnosis and treatment, offer their opinions and preferences, and influence their physicians to adopt a more patient-centered style of communication.[44] Communication about asthma symptoms, exacerbations, and treatment could help patients better identify and avoid asthma attack triggers and better manage their disease.[45] Physicians can provide tailored self-management education and plans based on specific disease profiles and patient needs.[15,46] Patients who are knowledgeable about their asthma are more confident, have lower costs of asthma treatment, have fewer missed work days, and are less likely to have exacerbations and unscheduled health care use.[15,47]

The proportion of ever-employed adults with current asthma who communicated with a health professional about asthma associated with work varied by state. These variations might reflect differences in survey participants' age, race, sex, socioeconomic status (including education level attained and income level), state workers' compensation systems, availability and access to health care services (including preventive health care services), and patterns of reimbursement for health care services.[48,49]

The findings of this report are subject to some limitations. Participation in the Asthma Call-Back Survey could be subject to selection bias because BRFSS participants with asthma were called back for the Asthma Call-Back Survey and respondents with more severe disease might self-select to participate. The authors hypothesize that these respondents might be more active in discussing asthma in relation to work with their physicians, thus overestimating the present results.[50] Also, information on asthma and WRA was self-reported and not validated by medical records or follow-up with health care providers; thus, estimates could be subject to misclassification. Moreover, before 2011, the BRFSS contacted only persons with landline telephones and did not include persons who resided in households that lacked a landline telephone and those who used only cellular telephones. Hu et al[51] showed that adults using only cellular telephones were less likely to have any kind of health care coverage and to use preventive health care services. The present results are likely underestimates of patient–physician communication regarding WRA because no information was available to determine whether patients ever discussed the possibility of WRA with a health professional.

This study found that a small proportion of patients with asthma might communicate with their health professionals about asthma associated with work. New survey questions regarding patiente–clinician discussion about asthma associated with work should provide a full account of the actual frequency of patient–clinician communication about the relation of work to asthma. Patients should be encouraged to discuss the possible association between their asthma and work to identify and avoid exposures at the workplace and better manage their disease. Health providers should take an occupational history in all patients with new-onset or worsening asthma to identify and appropriately manage patients with WRA.[15,49]

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Table 1

Proportion of ever-employed adults with current asthma who communicated with a health professional about the association of asthma with work—Asthma Call-Back Survey, 40 states and District of Columbia, 2006–2010

Characteristics	Ever-employed adults with current asthma		Proportion of those who ever told a health professional that asthma was related to work[a]				Proportion of those who were diagnosed with WRA[b]			
	%[c]	95% CI	%[c]	95% CI	PR[d]	95% CI	%[c]	95% CI	PR[d]	95% CI
Total	100.0		11.7	11.1–12.3			9.1	8.6–9.7		
Age group (y)										
18–44	49.0	48.0–50.0	8.8	7.7–9.8	1.00	Ref	7.0	6.1–7.9	1.00	Ref
45–64	36.0	35.1–36.8	16.5	15.6–17.5	1.88	1.64–2.15	12.6	11.7–13.4	1.78	1.53–2.08
≥65	15.1	14.6–15.5	9.7	8.8–10.6	1.04	0.87–1.24	7.8	7.0–8.5	1.00	0.83–1.22
Sex										
Male	37.0	36.0–38.1	12.4	11.2–13.7	1.00	Ref	10.0	8.8–11.1	1.00	Ref
Female	63.0	61.9–64.0	11.3	10.6–12.0	0.86	0.77–0.97	8.6	8.0–9.2	0.82	0.72–0.93
Race or ethnicity										
White, non-Hispanic	75.4	74.4–76.3	10.9	10.2–11.5	1.00	Ref	8.3	7.8–8.9	1.00	Ref
Black, non-Hispanic	9.6	8.9–10.2	15.5	12.9–18.1	1.37	1.15–1.64	12.1	10.0–14.2	1.40	1.15–1.71
Hispanic	8.5	7.8–9.2	11.2	9.0–13.4	1.02	0.83–1.25	9.5	7.3–11.7	1.12	0.88–1.44
Other	6.6	6.0–7.2	15.8	11.9–19.7	1.38	1.06–1.79	13.0	9.7–16.3	1.48	1.13–1.93
Education										
≤High school	34.7	33.7–35.7	13.7	12.4–15.0	1.18	1.04–1.33	11.0	9.8–12.1	1.23	1.07–1.42
>High school	65.3	64.3–66.3	10.7	10.0–11.4	1.00	Ref	8.1	7.6–8.7	1.00	Ref
Income (US$)										
<15,000	13.6	12.9–14.4	16.1	14.2–18.1	1.44	1.20–1.72	13.4	11.6–15.2	1.61	1.32–1.97
15,000–49,999	40.6	39.6–41.7	13.5	12.3–14.8	1.35	1.18–1.54	11.0	9.9–12.1	1.49	1.27–1.74
≥50,000	45.8	44.7–46.8	9.3	8.5–10.0	1.00	Ref	6.9	6.2–7.6	1.00	Ref
Insurance										
Yes	86.8	86.0–87.7	11.2	10.6–11.9	1.00	Ref	8.8	8.2–9.4	1.00	Ref
No	13.2	12.3–14.0	14.9	12.4–17.4	1.26	1.05–1.51	11.2	9.3–13.1	1.18	0.96–1.44
Employment status										
Employed	55.5	54.5–56.5	10.2	9.4–11.1	1.00	Ref	7.8	7.1–8.5	1.00	Ref

Characteristics	Ever-employed adults with current asthma		Proportion of those who ever told a health professional that asthma was related to work[a]				Proportion of those who were diagnosed with WRA[b]			
	%[c]	95% CI	%[c]	95% CI	PR[d]	95% CI	%[c]	95% CI	PR[d]	95% CI
Not employed	44.5	43.5–45.5	13.6	12.6–14.5	1.25	1.11–1.42	10.8	9.9–11.6	1.31	1.13–1.50
Age at asthma onset (y)										
<18	44.7	43.6–45.7	8.6	7.6–9.5	1.00	Ref	7.1	6.2–8.0	1.00	Ref
≥18	55.3	54.3–56.4	14.4	13.5–15.2	1.56	1.35–1.81	10.8	10.1–11.6	1.40	1.20–1.64
Time of asthma diagnosis										
<12 mo	2.9	2.6–3.2	9.8	6.1–13.4	0.78	0.53–1.15	5.4	3.6–7.3	0.54	0.38–0.78
1–5 y previously	11.2	10.6–11.8	9.5	8.1–10.8	0.79	0.67–0.92	7.3	6.1–8.5	0.77	0.64–0.93
>5 y previously	85.9	85.2–86.6	12.1	11.4–12.8	1.00	Ref	9.5	8.8–10.1	1.00	Ref
Asthma control										
Well controlled	49.7	48.7–50.7	9.4	8.5–10.3	1.00	Ref	6.7	6.0–7.4	1.00	Ref
Not well controlled	26.2	25.3–27.1	11.4	10.3–12.5	1.19	1.04–1.36	9.0	8.0–10.0	1.33	1.13–1.55
Very poorly controlled	24.1	23.2–24.9	16.8	15.4–18.2	1.54	1.34–1.76	14.3	12.9–15.8	1.86	1.60–2.17
Asthma attack[e]										
Yes	52.1	51.0–53.1	14.2	13.3–15.1	1.52	1.35–1.72	11.5	10.6–12.3	1.69	1.48–1.94
No	47.9	46.9–49.0	9.0	8.1–9.9	1.00	Ref	6.6	5.9–7.3	1.00	Ref
Emergency department visit[e]										
Yes	12.2	11.6–12.9	18.5	16.4–20.5	1.57	1.37–1.79	14.3	12.5–16.0	1.54	1.32–1.79
No	87.8	87.1–88.4	10.8	10.1–11.4	1.00	Ref	8.3	7.8–8.9	1.00	Ref
Hospitalization[e]										
Yes	3.4	3.0–3.7	21.9	17.9–25.8	1.58	1.29–1.94	17.2	13.6–20.7	1.56	1.25–1.96
No	96.6	96.3–97.0	11.4	10.7–12.0	1.00	Ref	8.8	8.2–9.4	1.00	Ref
Urgent treatment[e]										
Yes	23.6	22.8–24.4	17.8	16.3–19.4	1.74	1.53–1.92	14.0	12.5–15.5	1.75	1.53–2.00
No	76.4	75.6–77.2	9.9	9.2–10.5	1.00	Ref	7.6	7.0–8.1	1.00	Ref
Possible WRA[f]										
Yes	45.9	44.9–46.9	24.3	23.0–25.5	19.17	15.40–23.86	18.6	17.5–19.7	15.06	11.50–19.71
No	17.5	16.4–18.6	1.2	0.9–1.4	1.00	Ref	1.1	0.8–1.4	1.00	Ref

Abbreviations: CI, confidence interval; PR, prevalence ratio; Ref, reference; WRA, work-related asthma.

[a] Responded “yes” to: “Did you ever tell a physician or other health professional that your asthma was related to any job you ever had?”

[b] Responded “yes” to: “Were you ever told by a physician or other health professional that your asthma was related to any job you ever had?”

[c] Weighted to provide estimates using the survey sample weights for each participant; average annual estimate.

[d] Prevalence ratio adjusted for age, sex, race or ethnicity, education level, employment status, and health insurance status.

[e] In the 12 months before the interview.

[f] Responded “yes” to: “Was your asthma caused by chemicals, smoke, fumes or dust in your current job?” or “Was your asthma caused by chemicals, smoke, fumes or dust in any previous job you ever had?” or “Is your asthma made worse by chemicals, smoke, fumes or dust in your current job?” or “Was your asthma made worse by chemicals, smoke, fumes or dust in any previous job you ever had?”

Table 2

Proportion of ever-employed adults with asthma who communicated with a health professional about the association of asthma with work by state—Asthma Call-Back Survey, 40 states and District of Columbia, 2006–2010

State	Ever-employed adults with current asthma (in thousands)[a]	Proportion of those who ever told a health professional that asthma was related to work[b]		Proportion of those who were ever diagnosed with WRA[c]	
		%[a]	95% CI	%[a]	95% CI
Alabama	267	16.0	10.5–21.5	10.7	6.4–15.0
Alaska	28	10.3	5.0–15.7	__ [d]	—
Arizona	462	7.6	4.9–10.4	4.7	2.6–6.9
California	2,299	9.5	8.0–11.1	8.8	7.2–10.5
Colorado	250	9.2	5.4–13.1	7.2	4.6–9.8
Connecticut	243	13.9	10.6–17.1	8.4	6.1–10.6
District of Columbia	43	9.0	6.3–11.7	6.6	4.2–8.9
Florida	936	15.7	12.2–19.3	13.1	9.6–16.5
Georgia	522	17.4	13.6–21.2	12.7	9.5–15.9
Hawaii	90	10.5	8.0–13.0	7.5	5.6–9.5
Illinois	804	8.9	6.5–11.3	6.8	4.9–8.6
Indiana	436	15.0	12.5–17.6	11.6	9.3–13.9
Iowa	159	11.8	9.2–14.4	7.5	5.7–9.3
Kansas	177	9.7	8.1–11.3	9.0	7.2–10.9
Louisiana	215	9.7	6.2–13.2	7.7	4.3–11.0
Maine	106	13.0	10.6–15.3	9.8	7.8–11.8
Maryland	357	11.5	8.6–14.3	8.0	6.1–9.9
Massachusetts	487	7.7	5.9–9.5	5.2	3.3–7.1
Michigan	765	12.7	10.7–14.6	12.4	10.2–14.5
Mississippi	168	17.0	11.3–22.8	18.4	12.2–24.6
Missouri	377	13.0	9.1–16.9	8.4	5.7–11.2
Montana	63	11.9	9.4–14.5	10.3	8.0–12.7
Nebraska	96	10.7	8.6–12.7	7.8	6.1–9.5
Nevada	168	11.1	7.9–14.2	11.4	6.0–16.8
New Hampshire	105	10.0	7.8–12.2	7.1	5.3–8.9
New Jersey	535	9.0	6.5–11.6	7.9	5.5–10.3
New Mexico	128	13.9	10.3–17.4	8.9	6.4–11.4
New York	1,329	13.0	10.5–15.6	9.6	7.4–11.8
North Dakota	40	11.2	7.7–14.7	9.8	6.4–13.1
Ohio	810	10.4	8.2–12.6	8.5	6.3–10.7
Oklahoma	257	12.9	9.4–16.4	9.7	7.6–11.9
Oregon	259	10.7	8.3–13.2	7.7	5.8–9.7
Pennsylvania	889	12.8	8.6–17.1	9.7	5.6–13.8
Rhode Island	86	10.3	7.2–13.3	8.4	5.6–11.2

State	Ever-employed adults with current asthma (in thousands)[a]	Proportion of those who ever told a health professional that asthma was related to work[b]		Proportion of those who were ever diagnosed with WRA[c]	
		%[a]	95% CI	%[a]	95% CI
Texas	1,261	12.0	8.2–15.7	8.0	5.1–10.9
Utah	158	9.2	7.4–11.0	6.0	4.6–7.4
Vermont	51	9.6	7.9–11.3	8.2	6.6–9.9
Virginia	552	13.7	8.7–18.7	9.6	5.9–13.2
Washington	427	9.6	8.5–10.8	6.9	5.9–7.8
West Virginia	112	18.5	14.7–22.2	13.6	10.6–16.7
Wisconsin	387	11.3	8.3–14.3	8.2	6.1–10.3
Total	16,996	11.7	11.1–12.3	9.1	8.6–9.7

Abbreviations: CI, confidence interval; WRA, work-related asthma.

[a] Weighted to provide estimates using the survey sample weights for each participant; average annual estimate.

[b] Responded “yes” to: “Did you ever tell a physician or other health professional that your asthma was related to any job you ever had?”

[c] Responded “yes” to: “Were you ever told by a physician or other health professional that your asthma was related to any job you ever had?”

[d] Estimate suppressed; relative SE for the estimate higher than 30%.