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Asthma Among Employed Adults, by Industry and Occupation — 21 States, 2013

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Workers in various industries and occupations are at risk for work-related asthma* (*1*). Data from the 2006–2007 adult Behavioral Risk Factor Surveillance System (BRFSS) Asthma Call-back Survey (ACBS), an in-depth asthma survey conducted with respondents who report an asthma diagnosis, from 33 states indicated that up to 48% of adult current asthma might be related to work and could therefore potentially be prevented (*2*). Identification of the industries and occupations with increased prevalence of asthma might inform work-related asthma intervention and prevention efforts. To assess the industry-specific and occupation-specific proportions of adults with current asthma by state, CDC analyzed data from the 2013 BRFSS industry and occupation module, collected from 21 states for participants aged ≥18 years who, at the time of the survey interview, were employed or had been out of work for <12 months. Among these respondents, 7.7% had current asthma; based on the Asthma Call-back Survey results, this finding means as many as 2.7 million U.S. workers might have asthma caused by or exacerbated by workplace conditions. State-specific variations in the prevalence of current asthma by industry and occupation were observed. By state, current asthma prevalence was highest among workers in the information industry (18.0%) in Massachusetts and in health care support occupations (21.5%) in Michigan. Analysis of BRFSS industry and occupation and optional asthma modules can be used to identify industries and occupations to assess for asthma among workers, identify workplace exposures, and guide the design and evaluation of effective work-related asthma prevention and education programs (*1*).

BRFSS is a state-based, random-digit–dialed telephone survey of the noninstitutionalized U.S. population aged ≥18 years that collects information on health risk factors, preventive health practices, and disease status. The survey includes core questions, optional modules, and state-specific questions.† During 2013, the industry and occupation module§ was administered for the first time in 19 states. The module collected information on the industry and occupation of respondents employed in the 12 months preceding the interview for their current or most recent job. Two additional

*Work-related asthma includes occupational asthma (i.e., new-onset asthma caused by factors related to work) and work-exacerbated asthma (i.e., preexisting or concurrent asthma worsened by factors related to work). http://www.cdc.gov/niosh/topics/asthma/occasthmaprevention.html.

† http://www.cdc.gov/brfss/annual_data/annual_2013.html.
§ http://www.cdc.gov/brfss/questionnaires/index.htm.

INSIDE

Continuing Education examination available at http://www.cdc.gov/mmwr/cme/conted_info.html#weekly.

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states (Washington[¶] and Wyoming[**]) collected industry and occupation information using state-added questions. The median American Association of Public Opinion Research response rate among the 21 states collecting information on industry and occupation was 44.0% (range = 31.1%–59.2%).[††]

BRFSS participants who responded "yes" to both questions: "Has a doctor, nurse, or other health professional ever told you that you had asthma?" and "Do you still have asthma?" were considered to have current asthma. Participants who, at the time of the interview, indicated that they were employed for wages, out of work for <1 year, or self-employed were considered employed in the 12 months before the interview. Information on respondent's industry of employment and occupation was coded by CDC coders based on the 2002 North American Industry Classification System and the 2000 Standard Occupational Classification System, respectively.[§§] The current analysis used 21 industry categories and 23 occupation categories.

Landline and cellular telephone household data were weighted to produce estimates representative of the state populations using the survey sample weight for each BRFSS participant. Estimated proportions with corresponding 95% confidence intervals (CIs) were calculated. Statistically significant differences in distribution were determined using the Rao-Scott chi-square test with statistical significance at $p \leq 0.05$.

A sample of 208,788 adults in the 21 states, representing an estimated 125 million persons, participated in BRFSS and completed the industry and occupation module. Among these participants, 107,327 adults, representing an estimated 74 million persons (59.8% of the estimated survey population) were employed in the 12 months before the interview during 2013. Among adults employed at any time in the 12 months preceding the interview, 7.7% had current asthma.

The proportion of workers with current asthma differed significantly by age, sex, race/ethnicity, household income, and state (Table 1). Overall, prevalence of current asthma among workers ranged from 5.0% in Mississippi to 10.0% in Michigan, and was highest in the health care and social assistance industry (10.7%) and in health care support occupations (12.4%) (Table 2). Industry-specific, and occupation-specific prevalence of current asthma was highest among workers in the information industry (18.0%) in Massachusetts and in health care support occupations (21.5%) in Michigan (Table 3). Among the five industries with the highest current asthma prevalence, health care and social assistance was identified in 20 of the 21 states, retail trade in 16 states, and education in 14 states. Among the five occupations with the highest current asthma prevalence, office and administrative support was identified in 16 of the 21 states, health care practitioners and technical in 15 states, and sales and related in 13 states.

¶ Washington State Department of Health, Center for Health Statistics, Behavioral Risk Factor Surveillance System.
** Wyoming Department of Health, Public Health Division, Behavioral Risk Factor Surveillance System.
†† http://www.cdc.gov/brfss/annual_data/2013/pdf/2013_dqr.pdf.
§§ https://wwwn.cdc.gov/niosh-nioccs/.

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TABLE 1. Prevalence of current asthma* among adults employed during the 12 months preceding the interview,† by selected characteristics and state of residence — Behavioral Risk Factor Surveillance System (BRFSS), 21 states, 2013

Characteristic/State	No. in sample§	Weighted no. (thousands)¶	Current asthma %¶ (95% CI)
Total	**107,327**	**74,111**	**7.7 (7.4–8.1)**
Age group (yrs)**			
18–44	42,441	40,877	8.2 (7.7–8.7)
45–64	53,509	29,157	7.4 (6.9–7.9)
≥65	10,398	3,611	5.8 (4.9–6.7)
Sex**			
Men	50,730	40,516	5.7 (5.3–6.2)
Women	56,597	33,595	10.2 (9.6–10.8)
Race/Ethnicity**			
White, non-Hispanic	83,935	44,493	8.1 (7.7–8.5)
Black, non-Hispanic	7,217	7,478	8.9 (7.7–10.2)
Hispanic	8,551	13,879	6.5 (5.5–7.4)
Other	5,980	7,033	6.9 (5.5–8.4)
Education			
High school diploma or less	31,254	27,023	7.5 (6.9–8.2)
Some college	30,274	22,835	8.2 (7.5–8.8)
College graduate	45,565	24,089	7.6 (7.1–8.2)
Household income**			
<$15,000	5,302	5,557	11.4 (9.5–13.3)
$15,000–$24,999	12,154	9,388	8.0 (7.1–9.0)
$25,000–$34,999	9,558	6,608	7.5 (6.3–8.7)
$35,000–$49,999	14,212	9,114	6.9 (6.1–7.7)
≥$50,000	56,542	36,608	7.5 (7.0–8.0)
State**			
California	3,966	16,866	7.6 (6.6–8.6)
Florida	13,737	8,520	6.7 (5.8–7.5)
Illinois	2,962	6,069	6.7 (5.5–7.9)
Louisiana	2,356	1,998	6.5 (4.9–8.1)
Maryland	7,126	2,956	8.6 (7.5–9.7)
Massachusetts	8,238	3,287	9.9 (8.9–10.9)
Michigan	6,262	4,279	10.0 (9.0–11.1)
Minnesota	8,725	2,828	7.3 (6.4–8.2)
Mississippi	3,190	1,260	5.0 (4.0–6.0)
Montana	5,270	480	7.1 (6.2–7.9)
Nebraska	4,877	922	6.3 (5.2–7.3)
New Hampshire	3,582	666	8.2 (7.1–9.4)
New Jersey	2,616	4,285	7.7 (6.0–9.4)
New Mexico	4,661	885	8.2 (7.1–9.3)
New York	2,327	9,162	7.9 (6.5–9.3)
North Dakota	4,817	380	7.8 (6.6–8.9)
Oregon	2,825	1,709	9.3 (7.9–10.7)
Utah	7,400	1,322	8.2 (7.4–9.0)
Washington	5,607	3,224	8.5 (7.6–9.4)
Wisconsin	3,581	2,728	7.9 (6.6–9.2)
Wyoming	3,202	286	8.3 (7.0–9.6)

Abbreviation: CI = confidence interval.
* "Yes" response to both questions: "Have you ever been told by a doctor or other health professional that you have asthma?" and "Do you still have asthma?"
† Participants who, at the time of the interview, indicated they were employed for wages, out of work for <1 year, or self-employed.
§ Unweighted sample size.
¶ Weighted to the state population using the survey sample weights for each BRFSS participant.
** For differences in current asthma prevalence: Rao-Scott chi-square test; p-value <0.05.

TABLE 2. Prevalence of current asthma* among adults employed in the 12 months preceding the interview,† ranked by industry and occupation categories — Behavioral Risk Factor Surveillance System (BRFSS), 21 states, 2013

Industry	%§ (95% CI)	Occupation	%§ (95% CI)
Health care and social assistance	10.7 (9.6–11.8)	Health care support	12.4 (9.7–15.2)
Education	9.1 (7.8–10.3)	Community and social services	12.2 (7.9–16.6)
Arts, entertainment, and recreation	9.0 (5.1–13.0)	Personal care and service	12.1 (9.3–14.9)
Information	8.7 (6.3–11.1)	Arts, design, entertainment, sports, and media	11.7 (8.5–14.8)
Retail trade	8.7 (7.3–10.2)	Office and administrative support	10.2 (8.7–11.7)
Finance and insurance	8.4 (6.4–10.3)	Health care practitioners and technical	9.2 (7.9–10.5)
Other services (except public administration)	8.3 (6.6–9.9)	Legal	9.2 (5.9–12.5)
Professional, scientific, and technical services	7.6 (6.1–9.1)	Food preparation and serving	8.3 (6.5–10.2)
Accommodation and food services	7.4 (6.0–8.7)	Education, training, and library	8.2 (6.8–9.5)
Transportation and warehouse	7.1 (4.8–9.3)	Sales and related	7.6 (6.5–8.8)
Public administration	7.0 (5.8–8.2)	Life, physical, and social science	7.5 (4.6–10.4)
Real estate, rental, and leasing	6.9 (4.4–9.4)	Business and financial operations	7.2 (5.6–8.9)
Administrative and support, waste management, and remediation	6.4 (4.4–8.3)	Building and grounds cleaning and maintenance	7.1 (5.4–8.9)
Manufacturing	6.1 (5.1–7.2)	Management	6.9 (5.7–8.0)
Mining, oil and gas	6.0 (3.6–8.3)	Transportation and material moving	6.7 (4.7–8.7)
Construction	5.9 (4.5–7.2)	Computer and mathematical	6.7 (4.9–8.6)
Wholesale trade	5.8 (3.4–8.3)	Protective service	6.6 (4.1–9.2)
Agriculture, forestry, fishing and hunting	4.2 (2.0–6.4)	Production	5.7 (4.1–7.3)
Utilities	—¶	Installation, maintenance, and repair	5.7 (3.9–7.5)
Management of companies and enterprises	—	Construction and extraction	4.6 (3.4–5.8)
Armed forces	—	Architecture and engineering	4.1 (2.8–5.4)
		Farming, fishing, and forestry	2.6 (1.1–4.1)
		Military active duty	—

Abbreviation: CI = confidence interval.
* "Yes" response to both questions: "Have you ever been told by a doctor or other health professional that you have asthma?" and "Do you still have asthma?"
† Participants who, at the time of the interview, indicated they were employed for wages, out of work for <1 year, or self-employed.
§ Weighted to the state population using the survey sample weights for each BRFSS participant.
¶ Unreliable estimates with a relative standard error ≥30 are not reported.

TABLE 3. The five industries and occupations with the highest prevalence of current asthma* among adults employed in the 12 months preceding the interview,† by state — Behavioral Risk Factor Surveillance System (BRFSS), 21 states, 2013

State/Industry	%§ (95% CI)	Occupation	%§ (95% CI)
California			
Education	11.4 (7.0–15.8)	Personal care and service	16.0 (7.4–24.6)
Health care and social assistance	10.9 (6.8–15.1)	Office and administrative support	13.0 (7.9–18.2)
Professional, scientific, and technical services	9.5 (5.0–13.9)	Education, training, and library	8.6 (4.5–12.6)
Construction	7.8 (4.3–11.4)	Management	7.5 (4.0–11.1)
Retail trade	7.6 (3.7–11.5)	Sales and related	7.1 (3.8–10.4)
Florida			
Retail trade	10.0 (5.6–14.4)	Health care practitioners and technical	13.4 (8.1–18.6)
Education	9.2 (5.2–13.1)	Education, training, and library	7.0 (3.1–10.9)
Health care and social assistance	9.1 (7.0–11.2)	Office and administrative support	6.9 (4.5–9.3)
Other services (except public administration)	8.3 (3.9–12.6)	Sales and related	6.9 (4.2–9.6)
Finance and insurance	4.2 (2.0–6.5)	Management	4.1 (2.3–5.9)
Illinois			
Health care and social assistance	10.9 (6.7–15.2)	Health care practitioners and technical	14.7 (7.9–21.4)
Retail trade	10.2 (4.3–16.0)	Office and administrative support	9.5 (5.3–13.8)
Education	6.1 (3.3–9.0)	—¶	—
Louisiana			
Health care and social assistance	10.8 (5.1–16.4)	—	—
Maryland			
Other services (except public administration)	14.8 (7.5–22.1)	Arts, design, entertainment, sports and media	14.6 (6.1–23.2)
Health care and social assistance	10.4 (7.2–13.6)	Community and social services	13.7 (5.9–21.5)
Education	9.4 (6.3–12.4)	Office and administrative support	10.8 (7.1–14.6)
Public administration	9.2 (6.7–11.6)	Education, training, and library	10.0 (6.2–13.7)
Professional, scientific, and technical services	8.1 (4.5–11.8)	Health care and technical	9.4 (5.7–13.1)
Massachusetts			
Information	18.0 (7.7–28.3)	Community and social services	13.8 (7.2–20.5)
Accommodation and food services	14.5 (7.9–21.2)	Education, training, and library	12.8 (8.8–16.9)
Public administration	13.5 (7.0–20.0)	Food preparation and service	12.8 (5.6–19.9)
Health care and social assistance	13.1 (10.1–16.1)	Health care practitioners and technical	12.4 (8.8–16.1)
Retail trade	10.7 (6.5–14.8)	Office and administrative support	11.8 (8.3–15.4)
Michigan			
Health care and social assistance	15.2 (12.1–18.3)	Health care support	21.5 (12.8–30.2)
Accommodation and food services	14.9 (9.4–20.4)	Food preparation and service	14.4 (8.4–20.5)
Education	11.5 (8.5–14.4)	Community and social services	13.4 (7.8–19.0)
Retail trade	11.4 (7.7–15.0)	Sales and related	12.4 (8.3–16.4)
Transportation and warehouse	10.9 (5.2–16.7)	Personal care and service	12.3 (6.8–17.9)
Minnesota			
Finance and insurance	13.2 (6.1–20.3)	Personal care and service	13.4 (6.1–20.7)
Accommodation and food services	12.9 (6.3–19.5)	Health care practitioners and technical	10.1 (5.9–14.3)
Health care and social assistance	10.3 (7.5–13.0)	Sales and related	9.3 (4.9–13.7)
Manufacturing	7.5 (4.4–10.7)	Business and financial operations	8.5 (4.0–13.1)
Retail trade	6.4 (3.5–9.4)	Office and administrative support	6.5 (3.7–9.2)
Mississippi			
Health care and social assistance	7.5 (4.3–10.7)	Health care practitioners and technical	6.8 (2.8–10.9)
Retail trade	6.1 (2.7–9.4)	—	—
Education	4.3 (1.9–6.7)	—	—
Montana			
Accommodation and food services	9.4 (5.0–13.9)	Office and administrative support	8.0 (4.8–11.3)
Retail trade	8.3 (5.3–11.4)	Management	7.9 (5.0–10.8)
Health care and social assistance	8.1 (5.4–10.7)	Health care practitioners and technical	7.7 (4.0–11.4)
Construction	7.9 (4.2–11.6)	Construction and extraction	7.6 (4.0–11.1)
Education	7.8 (4.7–11.0)	Sales and related	7.3 (4.0–10.7)
Nebraska			
Retail trade	7.5 (3.3–11.8)	Sales and related	9.5 (4.2–14.7)
Education	6.5 (3.6–9.3)	Office and administrative support	7.6 (4.2–11.1)
Health care and social assistance	6.2 (4.0–8.4)	Health care practitioners and technical	6.7 (3.0–10.4)
Public administration	5.7 (2.5–9.0)	Management	3.9 (2.0–5.8)
Agriculture, forestry, fishing, and hunting	5.0 (2.4–7.6)	—	—

See table footnotes on the next page.

TABLE 3. (*Continued*) The five industries and occupations with the highest prevalence of current asthma* among adults employed in the 12 months preceding the interview,† by state — Behavioral Risk Factor Surveillance System (BRFSS), 21 states, 2013

State/Industry	%§ (95% CI)	Occupation	%§ (95% CI)
New Hampshire			
Public administration	12.3 (5.7–18.9)	Office and administrative support	12.3 (7.1–17.4)
Health care and social assistance	9.9 (7.0–12.8)	Sales and related	11.7 (7.0–16.5)
Manufacturing	9.2 (5.5–12.9)	Computer and mathematical	11.4 (5.0–17.8)
Retail trade	8.7 (4.7–12.6)	Health care practitioners and technical	10.8 (6.0–15.6)
Other services (except public administration)	8.1 (3.9–12.3)	Education, training, and library	7.6 (4.1–11.1)
New Jersey			
Education	9.5 (5.3–13.7)	Education, training, and library	8.9 (3.9–13.9)
Health care and social assistance	9.0 (4.7–13.3)	Health care practitioners and technical	8.5 (3.6–13.4)
Retail trade	7.7 (3.2–12.2)	Management	7.5 (3.4–11.7)
New Mexico			
Education	11.2 (7.3–15.2)	Personal care and service	12.7 (6.6–18.8)
Public administration	10.6 (5.6–15.6)	Health care practitioners and technical	11.7 (6.3–17.1)
Retail trade	9.5 (5.2–13.8)	Education, training, and library	11.3 (6.2–16.3)
Other services (except public administration)	9.4 (4.1–14.7)	Sales and related	11.1 (6.5–15.6)
Health care and social assistance	8.9 (6.2–11.7)	Office and administrative support	9.3 (5.6–13.0)
New York			
Health care and social assistance	9.5 (6.1–12.8)	Office and administrative support	10.3 (4.2–16.3)
Education	8.1 (4.3–12.0)	Management	9.8 (4.2–15.5)
North Dakota			
Manufacturing	11.2 (5.6–16.7)	Office and administrative support	11.2 (6.9–15.5)
Health care and social assistance	9.2 (6.0–12.4)	Health care practitioners and technical	8.8 (4.2–13.5)
Mining, oil, and gas	8.8 (4.2–13.5)	Construction and extraction	8.1 (3.4–12.7)
Construction	7.6 (3.2–11.9)	Education, training, and library	7.6 (3.9–11.3)
Retail trade	6.4 (3.5– 9.3)	Sales and related	5.9 (3.2–8.5)
Oregon			
Public administration	16.7 (9.1–24.2)	Sales and related	14.7 (6.7–22.8)
Health care and social assistance	14.0 (9.8–18.1)	Office and administrative support	12.5 (7.6–17.4)
Manufacturing	9.9 (5.6–14.2)	Health care practitioners and technical	10.9 (5.9–15.8)
Education	8.9 (5.0–12.9)	Education, training, and library	8.7 (4.0–13.4)
Utah			
Mining, oil, and gas	13.5 (5.8–21.2)	Personal care and service	14.0 (7.3–20.7)
Other services (except public administration)	12.4 (7.4–17.4)	Production	12.9 (8.1–17.8)
Manufacturing	10.4 (7.3–13.6)	Transportation and material moving	10.9 (5.9–15.9)
Transportation and warehouse	10.1 (5.3–15.0)	Education, training, and library	10.1 (6.8–13.4)
Professional, scientific, and technical services	9.9 (5.9–13.9)	Office and administrative support	9.2 (6.7–11.6)
Washington			
Accommodation and food services	16.1 (9.0–23.1)	Personal care and service	17.4 (9.6–25.2)
Retail trade	12.5 (8.6–16.4)	Food preparation and service	16.1 (8.3–23.8)
Health care and social assistance	12.5 (9.4–15.6)	Building and grounds cleaning and maintenance	14.2 (6.6–21.8)
Administrative, support, waste management, and remediation	11.5 (5.6–17.4)	Health care practitioners and technical	11.8 (7.4–16.1)
Professional, scientific, and technical services	9.4 (6.3–12.4)	Sales and related	11.6 (7.0–16.2)
Wisconsin			
Health care and social assistance	11.4 (6.8–15.9)	Office and administrative support	9.6 (5.1–14.1)
Manufacturing	8.1 (4.8–11.5)	Sales and related	7.8 (3.3–12.2)
Retail trade	7.5 (3.8–11.2)	—	—
Education	7.3 (3.3–11.3)	—	—
Wyoming			
Accommodation and food services	15.0 (7.3–22.6)	Production	14.1 (6.1–22.2)
Education	10.9 (6.7–15.1)	Education, training, and library	12.5 (7.1–17.8)
Health care and social assistance	10.4 (6.2–14.6)	Sales and related	9.7 (4.2–15.2)
Mining, oil, and gas	7.6 (3.6–11.6)	Office and administrative support	8.4 (4.3–12.5)
Retail trade	7.4 (3.1–11.7)	Health care practitioners and technical	8.1 (3.4–12.9)

Abbreviation: CI = confidence interval.
* "Yes" response to both questions: "Have you ever been told by a doctor or other health professional that you have asthma?" and "Do you still have asthma?"
† Participants who, at the time of the interview, indicated they were employed for wages, out of work for <1 year, or self-employed.
§ Weighted to the state population using the survey sample weights for each BRFSS participant.
¶ Unreliable estimates with a relative standard error ≥30 are not reported.

Discussion

The findings in this report provide the first state-specific estimates of current asthma by industry and occupation category for 21 states administering BRFSS and collecting industry and occupation data, and indicate state-specific variations in current asthma prevalence by industry and occupation. These variations are consistent with previous findings (*3*) and likely reflect differences in the characteristics of state working populations (e.g., age, race/ethnicity, and education), socioeconomic factors (e.g., state-specific distribution of industries and occupations and unemployment rate), health insurance coverage (e.g., type of insurance and access to medical care), state laws (e.g., workers' compensation), geographic differences in prevalence of sensitization to aeroallergens (*4*,*5*), and risk for exposure to agents causing asthma in the workplace. For example, sales and related occupations were the top employers in 2015 for all 21 states assessed in this study according to the Bureau of Labor and Statistics (http://www.bls.gov/home.htm) and that might explain why this occupation appears consistently across several states.

Work-related asthma includes occupational asthma (i.e., new-onset asthma caused by factors related to work) and work-exacerbated asthma (i.e., preexisting or current asthma worsened by factors related to work) (*1*). Persons with work-related asthma have more symptomatic days, use more health care resources, and have lower quality of life (*6*). Moreover, asthma exacerbations accelerate decline in lung function (*7*). Each of the industries and occupations identified in this report is associated with a specific set of existing and emerging workplace exposures, including irritant chemicals, dusts, secondhand smoke, allergens, emotional stress, temperature, and physical exertion, that have been associated with new-onset and work-exacerbated asthma (*8*,*9*). For example, it is well recognized that workers in the health care and social assistance industry who are exposed to cleaning and disinfection products, powdered latex gloves, and aerosolized medications have a twofold increased likelihood of new-onset asthma (*9*). A previous study reported that as much as 48% of adult asthma is caused or made worse by work (*2*); therefore, as many as 2.7 million workers might have asthma caused or exacerbated by workplace conditions in these 21 states. To assist clinicians in assessing potential workplace exposures among employed patients with new-onset or exacerbated asthma, the Association of Occupational and Environmental Clinics published a list of substances that meet criteria for causing work-related asthma by sensitization or acute irritant-induced asthma.¶¶

¶¶ http://www.aoecdata.org/ExpCodeLookup.aspx.

Summary

What is already known about this topic?

Data from the 2006–2007 adult Behavioral Risk Factor Surveillance System (BRFSS) Asthma Call-back Survey from 33 states indicated that up to 48% of adult current asthma might be related to work and could potentially be prevented. Asthma prevalence is higher among adults working in certain industries and occupations.

What is added by this report?

Among an estimated 74 million adults employed at some time in the 12 months preceding the interview in 21 states, 7.7% had current asthma (range = 5.0% [Mississippi]–10.0% [Michigan]). Based on the Asthma Call-back Survey results, this finding means as many as 2.7 million U.S. workers might have asthma caused by or exacerbated by workplace conditions. The findings indicate state-specific variation in the prevalence of current asthma by industry and occupation. State-specific prevalence of current asthma was highest among workers in the information industry (18.0%) in Massachusetts and in health care support occupations (21.5%) in Michigan.

What are the implications for public health practice?

Analysis of BRFSS industry and occupation and asthma module data might aid in identification of industries and occupations with high current asthma prevalence and facilitate assessment of workers for new-onset or work-exacerbated asthma who could benefit from work-related asthma prevention and education programs. Routine collection of industry and occupation information is needed to estimate state-specific work-related asthma prevalence by industry and occupation.

The findings in this report are subject to at least four limitations. First, information on asthma was self-reported and not validated by medical records or follow-up with health care providers; thus, estimates might be subject to misclassification. Second, although the BRFSS optional ACBS collects detailed information on asthma (e.g., work-related asthma), it was not possible to determine whether the current asthma was associated with work using 1 year of data because of the small number of respondents with both information on work-related asthma diagnosis and industry and occupation. Also, small sample sizes resulted in unreliable estimates for some industries and occupations. Combining multiple years of data from ACBS and industry and occupation module is needed to estimate the state-specific work-related asthma prevalence by industry and occupation. Third, workers with current asthma might leave employment in industries and occupations with workplace exposures that exacerbate their asthma (i.e., the healthy worker effect); thus, industry and occupation in this report might not accurately represent the industries and occupations where exposures occur. Finally, because data are limited

to 21 states, the results might not be nationally representative or representative of nonparticipating states.

Physicians should consider collecting a detailed occupational history among adults with asthma because this is critical for making a work-related asthma diagnosis and recommending optimal treatment and management (*1*). Reduction or elimination of workplace exposures (i.e., substitution of hazardous products with nonhazardous products or improved ventilation) or removal of the worker from the environment might be necessary for management of asthma symptoms related to work (*1*,*10*). For example, reduction in exposure to latex allergens by replacing powdered latex gloves with powder-free natural rubber latex or nonlatex gloves considerably reduced work-related asthma in the health care industry (*10*).

Twenty-two *Healthy People 2020* respiratory disease objectives*** for asthma address prevention, detection, treatment, and education efforts; in 2009, CDC funded 34 states, the District of Columbia, and Puerto Rico to help meet these objectives.††† The Council of State and Territorial Epidemiologists in its 2010 Position Statement§§§ recommends continued surveillance for and evaluation of the burden of asthma, including work-related asthma, to help target prevention programs and activities. BRFSS data provide a unique opportunity to assess state-level asthma prevalence by industry and occupation. The findings in this report might assist physicians and state public health officials in identifying workers in industries and occupations with a high current asthma prevalence who should be evaluated for work-related asthma in order to plan and target interventions. Potential work-related asthma exposures can be identified, and effective prevention and education strategies can be implemented (*8*). Routine collection of industry and occupation information is needed to estimate state-specific work-related asthma prevalence by respondents' industry and occupation.

*** https://www.healthypeople.gov/2020/topics-objectives/topic/respiratory-diseases/objectives.

††† http://www.cdc.gov/asthma/pdfs/asthma_facts_program_grantees.pdf.

§§§ http://c.ymcdn.com/sites/www.cste.org/resource/resmgr/PS/10-EH-01.pdf.

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