

Research Paper

Asthma and asthma-related health care utilization among people without disabilities and people with physical disabilities

Michelle L. Stransky, Ph.D.^{a,*}, Robert McGrath, Ph.D.^b, Amanda Reichard, Ph.D.^a,
Monica McClain, Ph.D.^a, Kimberly G. Phillips, M.A.^a, Andrew Houtenville, Ph.D.^{a,c}, and
Charles E. Drum, M.P.A., J.D., Ph.D.^{a,b}

^a*Institute on Disability, University of New Hampshire, 10 West Edge Drive Suite 101, Durham, NH 03824, USA*

^b*Department of Health Management and Policy, Hewitt Hall, University of New Hampshire, 4 Library Way, Durham, NH 03824, USA*

^c*Department of Economics, Peter T. Paul College of Business and Economics, University of New Hampshire, 10 Garrison Avenue, Durham, NH 03824, USA*

Abstract

Background: Previous research has shown that people with disabilities have higher rates of some chronic diseases and receive poorer disease-specific care than their counterparts without disabilities. Yet, little is known about the relationship between asthma and disability.

Objective: This study examines whether differences in the prevalence of asthma, asthma flare, and asthma-related measures of health care quality, utilization and cost exist among people with physical limitations (PL) and without any limitations.

Methods: Data from the 2004–2010 Medical Expenditure Panel Survey were pooled to compare outcomes for working-age adults (18–64) with PL to those with no limitations.

Results: People with PL had higher rates of asthma (13.8% vs. 5.9%, $p < 0.001$) and recent asthma flare (52.6% vs. 39.6%, $p < 0.001$) than people without limitations. There were no differences in health care quality, utilization or cost between people with PL and people without limitations in multivariate analyses.

Conclusions: Although there are no differences in asthma-related quality or utilization of health care, people with PL have poorer asthma control than people without limitations. Research is needed to determine what factors (e.g., focus on other acute ailments, perceptions that asthma control cannot improve) are related to this outcome. Future research must also examine differences in asthma severity, and its impact on asthma control and health care-related outcomes, among people with and without disabilities. © 2016 Elsevier Inc. All rights reserved.

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Asthma is a significant health problem affecting 18.9 million adults¹ and 7.1 million children² in the US, annually resulting in 1.8 million emergency department (ED)

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* Corresponding author. Tel.: +1 603 862 4320, +1 603 862 0791.

E-mail address: michelle.l.stransky@gmail.com (M.L. Stransky).

visits,³ 439,000 hospitalization,⁴ and 3404 deaths.⁵ The associated economic and social costs of asthma care and management^{6–14} have received significant attention by public health initiatives over the last two decades. For example, asthma has been declared a priority health condition by several federal health agencies, including the Agency for Healthcare Research and Quality (AHRQ)¹⁵ and the Centers for Disease Control and Prevention.¹⁶

At the same time, public health initiatives, such as Healthy People (HP) 2010 and 2020,^{17,18} elevated people with disabilities to a priority population due to the health disparities they face relative to people without disabilities.^{19,20} Compared to the general population, people with disabilities commonly experience higher prevalence of secondary conditions, such as fatigue and pain,^{21–25} as well as chronic conditions, such as diabetes and heart diseases.^{21,26–31} Research has also shown that people with disabilities report lower rates of preventive care and health

promotion,^{32–38} as well as more delays in receipt of needed medical care^{32,39} than people without disabilities.

The relationship between asthma and disability is not well understood, because the populations of people with asthma and disabilities overlap, although they are conceptually distinct.^{40,41} Some people with asthma are disabled due to their asthma; others have asthma but are disabled by entirely separate conditions. Previous studies report inconsistent findings regarding prevalence of asthma among people with disabilities compared to people without disabilities. Higher asthma prevalence among people with an activity limitation or who use special equipment was found in state-based samples^{23,26} and among individuals with physical or cognitive limitations in a nationally representative sample,⁴² compared to non-disabled peers. However, studies using community-based samples found no significant differences between people with sensory, developmental, trauma, and psychiatric disabilities and people without disabilities.^{27,28} Reichard et al.⁴² found that people with physical limitations (PL) report significantly higher rates of asthma than people with cognitive limitations, demonstrating that public health efforts should consider differences in health and health care according to disability type.⁴³ The few studies cited here have been unable to explicate the relationship between asthma severity and disability because of the lack of available items.

Further, little research has examined the quality of asthma care among individuals with disabilities. Health care quality, and its improvement, has become a key focus of the health care system,^{44,45} with the goal of reducing health care costs and unnecessary inpatient and ED events while improving quality of life.⁴⁶ In fact, a number of disease-specific quality measures have been developed, including some related to asthma.⁴⁷ Studies that have examined the confluence of disability and disease have shown that, despite higher rates of chronic disease, people with disabilities often receive poorer disease-related quality of care.^{31,48} Similarly, few studies have examined health care utilization and cost-of-illness for asthma among people with disabilities. HP 2020 includes items with the intention of reducing hospital stays and ED visits related to asthma. In their systematic review, Bahadori et al.⁴⁹ report that people with comorbid conditions and poorer overall health have higher total asthma-related health care costs than their healthier peers.

Accordingly, the purpose of this study was to examine prevalence of asthma and recent asthma flare, care quality measures, and asthma-related health care utilization and cost among a nationally representative sample of working-age adults, comparing those with PL to those without any disabilities. We did not attempt to disentangle the complex causal relationship between asthma and disability because of our reliance on cross-sectional data. In doing so, we used a narrow definition of disability, focusing on only one type of limitation at a single point in time. People with different types of limitations have unique characteristics and health care needs⁴³ and it is important to determine whether asthma,

and other health conditions and needs differ across disability subtypes. Here, we only examined people with PL because other disability subgroups were represented by sample sizes too small to be analyzed. Similar to previous research, we are unable to assess the potential confounding impact of asthma severity on the relationship between disability and asthma-related health care outcomes because our data does not include such a measure.

Methods

The Medical Expenditures Panel Survey (MEPS) collects health, disability, and health care utilization information on a nationally representative sample of the non-institutionalized civilian US population through a randomly selected subsample of the National Health Interview Survey.⁵⁰ Data from the 2004–2010 Household Component, Self-Administered Questionnaire (SAQ), and medical conditions and events files were pooled to achieve a sample of sufficient size for examining small analytic groups. Unless noted, measures were derived from the Household Component. The MEPS data are publicly available and, therefore, exempt from Institutional Review Board approval by our University.⁵¹

The analytic sample ($n = 114,950$) included working-age adults (age 18–64) who reported a PL or no limitation. Respondents with emphysema were excluded because asthma treatments differ when emphysema co-occurs with asthma.⁵² The subsample ($n = 7354$) included those who self-reported a diagnosis of asthma and were eligible to participate in MEPS for the entire year to obtain comparable counts of health care utilization.

Measures

Physical Limitations (PL)

Working-age adults were coded as having PL if they reported having “difficulties walking, climbing stairs, grasping objects, reaching overhead, lifting, bending or stooping, or standing for long periods of time” at least one time during the calendar year.⁵⁰ Respondents were categorized as having a cognitive limitation if they reported “confusion or memory loss” or “problems making decisions” to the point that “it interferes with daily activities” at two points in time during the calendar year.⁵⁰ Working-age adults were categorized as having vision limitations if they reported being visually impaired near (but not far), both near and far, or blind. Respondents were coded as being deaf or hard of hearing if they reported having a moderate or major hearing difficulty or were deaf. Working-age adults who reported no physical, visual, hearing, or cognitive difficulties were categorized as having no limitations.

Asthma and asthma flare

Working-age adults were coded as currently having asthma if they reported ever having received a diagnosis of asthma and reported still having asthma⁵⁰; all others

were coded as not having asthma. Occurrence of an “episode of asthma or asthma attack” (here, called ‘asthma flare’) during the past 12 months was assessed among adults who reported a current diagnosis of asthma.

Health care quality measures

This research used AHRQ’s asthma-specific process-based quality measures that are available in MEPS.⁴⁷ Respondents were coded as currently using preventive asthma medication if they reported current use of “the preventive kind of asthma medicine used every day to protect your lungs and keep you from having attacks” “daily or almost daily”⁵⁰; all others were coded as not currently using preventive asthma medications. Respondents were coded as using acute asthma medication if they reported using “the kind of prescription inhaler that you breathe in through your mouth that gives quick relief from asthma symptoms” during the past 3 months.⁵⁰ Adults who reported using three or more acute inhaler canisters during the past 3 months were coded as having uncontrolled asthma. Influenza vaccine is an important aspect of asthma-related health care because people with asthma, similar to people with other chronic conditions, are vulnerable to common health conditions, making preventive care necessary to maintaining health. Respondents were coded as having received an influenza vaccine if they reported receipt of the shot or nasal spray.⁵⁰ Smoking and recommendations to stop smoking were assessed on the SAQ. First, respondents were asked if they currently smoke; those who reported smoking were asked whether a doctor had advised them to quit smoking in the last 12 months.

Health care utilization and expenditures

Person-level health care use for the calendar year was calculated by separately summing the number and expenditures of outpatient visits, ED visits, and inpatient hospitalizations reported with an ICD-9-CM code for asthma (ICD-9-CM code = 493) from the medical conditions and events files. Multiple events occurring on the same day were counted separately. Outpatient visits included all face-to-face events occurring at hospital outpatient locations, office-based visits, and zero-night hospital stays.⁵³ ED visits included all visits to EDs that did not result in a hospital inpatient stay; ED visits resulting in an inpatient stay were counted as part of the inpatient stay. The inpatient stay count included all hospital stays lasting at least one night. A total asthma-related health care measure was created by summing the counts for outpatient visits, ED visits, and inpatient hospital stays. Expenditures for each health care service type included paid amounts for facilities and physicians across all payers. MEPS recommends using paid amounts instead of charges due to changes in health insurance payment methodologies during the 1990s.⁵⁰ All paid amounts were inflated to 2010 dollars using the personal health care expenditure components.⁵⁴

Controls

Health- and health care-related control measures included health insurance type, usual source of care (USC), unmet need for care, any (non-asthma) chronic health conditions, and activities of daily living (ADL) or instrumental activities of daily living (IADL) assistance needs. USC was categorized as no USC, USC in an office-based setting, or USC in a hospital setting. Less than 0.5% ($n = 607$) of respondents reported that their USC was an ED. Because, this group was too small to analyze separately, they were categorized with respondents who reported that they did not have a USC. Respondents who reported delaying or foregoing medical or dental care or prescription medications for any reason were coded as having an unmet need for care. Working-age adults were coded as having any (non-asthma) chronic condition if they reported that they had ever been told by a physician or other health professional that they had hypertension, a stroke or transient ischemic attack, diabetes not related to pregnancy, arthritis, coronary heart disease, angina, heart attack or any other heart condition. Need for ADL/IADL assistance was coded affirmatively for any adult who reported needing help “using the telephone, paying bills, taking medications, preparing light meals, doing laundry, or going shopping” or “bathing, dressing or getting around the house” due to “an impairment or a physical or mental health problem.”⁵⁰

Sociodemographic control measures include age, sex, race/ethnicity, married (including currently married and separated), educational attainment, employment status, residence in a metropolitan statistical area (MSA), and region of residence. Poverty status was calculated as the family income as a percent of the family-size adjusted federal poverty line (FPL); categories were poor ($<100\%$ FPL), low income (100% to $<200\%$ FPL), middle income (200% to $<400\%$ FPL), and high income ($\leq 400\%$ FPL).

Statistical analysis

Analyses were conducted using Stata/IC 11.2 (College Station, TX), accounting for the MEPS person weights and design factors. The SAQ weight was used instead of the Household Component weight, as is recommended for analyses using measures from the SAQ.⁵⁰ The weight variable was divided by seven to correct for the pooling of the data files.⁵⁵ Design factors for the sample of working-age adults were accounted for using variance and strata provided by MEPS. The subsample of working-age adults with asthma resulted in singleton strata; the balanced repeated replications provided by MEPS were used to correct for the design features in these analyses.⁵⁶

Analyses compared adults with PL to adults without any limitations. Prevalence of asthma and asthma flare and care quality measures were examined using weighted chi-square tests and logistic regression. Health care utilization was first examined using logistic regression comparing any use versus no use and, subsequently, using negative binomial

regression. Weighted least squares regression was used to examine expenditures among people who had at least one asthma-related health care encounter. Regression models presented control for all sociodemographic and health- and health care-related measures.

Additional analyses compared adults with no limitations, adults with PL only, and adults with multiple limitations. Multiple limitations was defined as having a cognitive or vision limitation or being deaf or hard of hearing, in addition to having a physical limitation. Less than two percent of the sample of working-age adults had multiple limitations (1.6%, $n = 2128$). Analyses showed few statistically significant differences between adults with PL only and adults with multiple limitations. These results are not reported or shown for ease of presentation, but are available from the authors upon request.

Sensitivity analyses among working-age adults with asthma who had an asthma flare were conducted on all quality measures and health care event measures. Findings were similar to those reported among all working-age adults with asthma.

Results

The sample of working-age adults and subsample of working-age adults with asthma represent approximately 175.7 million and 11.5 million people, respectively (Table 1). Approximately 11% of all working-age adults, and 23% of working-age adults with asthma, reported any PL. Both the sample and subsample are demographically diverse.

Nearly 7% of working-age adults self-reported asthma (Table 2). The prevalence of asthma is significantly higher among working-age adults with PL than adults with no limitations (13.8% vs. 5.9%, $p < 0.001$). Effective control of the disease varied by population subgroup. Approximately 43% of working-age adults with asthma reported an asthma flare in the past year; adults with PL were more likely to report an asthma flare than were their counterparts who had no limitations (52.6% vs. 39.6%, $p < 0.001$).

Bivariate analyses revealed that working-age adults with asthma and PL more frequently reported preventive medication (28.3% vs. 24.4%, $p < 0.05$) and quick relief inhaler use (61.3% vs. 53.2%, $p < 0.001$) (including use of at least three acute inhaler canisters in the past three months (18.2% vs. 10.9%, $p < 0.001$)) compared to their peers without limitations. Adults with PL also more frequently reported influenza vaccination (45.0% vs. 36.8%, $p < 0.001$), and receiving a recommendation for tobacco cessation (79.2% vs. 70.6%, $p < 0.05$) compared to adults without limitations. However, no statistically significant differences between adults with PL and no limitations were found in multivariate regression analyses.

Table 3 shows asthma-related health care utilization and expenditures by limitation status. Overall, 21% of adults reported an asthma-related outpatient visit during the calendar year. Bivariate analyses show that working-age adults

with asthma and PL were significantly more likely to report at least one asthma-related outpatient visit (26.9% vs. 19.3%, $p < 0.001$) and significantly more visits (1.0 vs. 0.5, $p < 0.001$) than adults with asthma who did not have any limitations. Costs were also higher for people with PL compared to people without limitations (\$479.6 vs. \$356.9, $p < 0.05$). There were no significant differences in the use or cost of asthma-related outpatient visits by limitations in regression analyses.

Nearly 3% of working-age adults with asthma reported an asthma-related ED visit during the calendar year; adults with asthma and PL were more likely to report an ED visit (3.7% vs. 2.3%, $p < 0.05$) and reported more visits (0.1 vs. 0.0, $p < 0.01$) than their counterparts who had asthma and no limitations. However, these associations became non-significant in regression models. No differences in inpatient hospital stays by limitation were found.

Overall, nearly 22.4% of adults reported at least one asthma-related stay or visit during the calendar year. Adults with asthma and PL were more likely to report at least one event (28.6% vs. 20.6%, $p < 0.001$) and significantly more events (1.1 vs. 0.6, $p < 0.001$) in bivariate analyses. Costs (\$907.9 vs. \$623.7, $p < 0.05$) were significantly higher for people who had any visits among people with PL compared to people without limitations. However, the use and costs of asthma-related health care were no different for adults with PL and their counterparts who had no limitations in regression analyses.

Discussion

In this study, we explored the prevalence of asthma and asthma flares as well as asthma-related health care quality, utilization, and expenditures among working-age adults with PL and without any limitations. Consistent with previous research using representative population-based samples,^{23,26,42} people with PL were found to have higher prevalence of asthma than people with no limitations. Working-age adults with PL were more likely to report an asthma flare in the past year but were, surprisingly, no less likely to have received indicators of quality care or to use more health care than people without any limitations.

More than 40% of all working-age adults with asthma reported having an asthma flare in the previous 12 months, yet only 25% of respondents with asthma report using preventive medications to manage their asthma. The National Heart, Lung, and Blood Institute (NHLBI) recommends the use of preventive asthma medications as the “most effective long-term therapy available for patients who have persistent asthma.”⁵⁷ Accordingly, physicians and persons with asthma should discuss asthma severity to determine if preventive medication may help manage symptoms.⁵⁷ However, research has found that many people with asthma tolerate poor control because they think that they cannot achieve greater control,⁵⁸ and may, therefore, be less likely

Table 1

Characteristics of working-age adults included in the sample of working-age adults and subsample of working-age adults with asthma

	Working-age adults				Working-age adults with asthma			
	Total	No physical limitations	Any physical limitations	<i>p</i> -value	Total	No physical limitations	Any physical limitations	<i>p</i> -value
Unweighted <i>N</i>	114,950	101,224	13,726		7354	5399	1955	
Weighted <i>N</i>	175,713,271	155,760,154	19,953,117		11,462,048	8,782,263	2,679,785	
	% (<i>n</i>)	% (<i>n</i>)	% (<i>n</i>)		% (<i>n</i>)	% (<i>n</i>)	% (<i>n</i>)	
Age								
18–24	14.8 (17,178)	16.1 (16,615)	4.7 (563)	0.001	16.2 (1154)	19.3 (1057)	6.1 (97)	0.001
25–34	22.0 (25,591)	23.5 (24,208)	10.0 (1383)		21.2 (1503)	24.8 (1317)	9.4 (186)	
35–44	22.5 (26,813)	23.1 (24,345)	17.6 (2468)		22.1 (1699)	22.8 (1306)	19.5 (393)	
45–54	22.9 (26,030)	21.7 (21,558)	32.0 (4472)		22.9 (1686)	19.3 (1003)	34.6 (683)	
55–64	17.9 (19,338)	15.6 (14,498)	35.7 (4840)		17.7 (1312)	13.8 (716)	30.4 (596)	
Female	50.9 (62,199)	49.9 (53,607)	59.2 (8592)	0.001	65.5 (5042)	63.0 (3536)	73.7 (1506)	0.001
Race/ethnicity								
White, non-Hispanic	66.7 (56,293)	66.1 (48,522)	71.2 (7771)	0.001	70.6 (4088)	70.9 (3012)	69.6 (1076)	0.008
Black, non-Hispanic	11.7 (19,223)	11.4 (16,289)	13.8 (2934)		13.2 (1509)	12.4 (1027)	15.9 (482)	
Other, non-Hispanic	6.9 (8959)	7.1 (8134)	5.6 (825)		5.9 (501)	6.1 (387)	5.3 (114)	
Hispanic	14.8 (30,475)	15.5 (28,279)	9.3 (2196)		10.4 (1256)	10.7 (973)	9.3 (283)	
Married/separated	57.6 (66,287)	58.1 (59,184)	53.8 (7103)	0.001	52.2 (3683)	53.6 (2819)	47.6 (864)	0.002
Educational attainment								
Less than HS	14.2 (25,157)	14.0 (21,953)	16.3 (3204)	0.001	13.7 (1448)	12.4 (954)	18.0 (494)	0.001
HS Graduate/GED	49.4 (56,004)	48.5 (48,591)	56.2 (7413)		49.2 (3688)	47.3 (2664)	55.5 (1024)	
More than HS	36.4 (33,789)	37.5 (30,680)	27.4 (3109)		37.1 (2218)	40.3 (1781)	26.5 (437)	
Poverty status								
Poor	11.2 (19,500)	10.1 (15,725)	20.4 (3775)	0.001	15.7 (1684)	11.8 (956)	28.5 (728)	0.001
Low income	15.4 (24,372)	14.8 (21,143)	19.9 (3229)		15.4 (1463)	14.1 (1006)	19.6 (457)	
Middle income	31.3 (34,673)	31.6 (31,051)	29.0 (3622)		29.5 (2036)	30.1 (1586)	27.4 (450)	
High income	42.1 (36,405)	43.6 (33,305)	30.8 (3100)		39.4 (2171)	44.0 (1851)	24.4 (320)	
Employed	79.3 (86,376)	82.5 (79,821)	54.5 (6555)	0.001	70.3 (4732)	77.9 (4005)	45.5 (727)	0.001
Residence in MSA	84.3 (97,229)	84.8 (86,364)	80.4 (10,865)	0.001	83.7 (6143)	84.2 (4571)	82.1 (1572)	0.141
Region								
Northeast	18.3 (16,855)	18.6 (14,929)	16.1 (1926)	0.001	19.9 (1298)	20.5 (966)	17.8 (332)	0.085
Midwest	22.1 (22,907)	21.9 (19,940)	23.6 (2967)		23.1 (1641)	23.5 (1232)	21.9 (409)	
South	36.2 (44,179)	35.9 (38,385)	38.3 (5794)		33.6 (2626)	32.6 (1847)	37.2 (779)	
West	23.4 (31,009)	23.6 (27,970)	22.0 (3039)		23.4 (1789)	23.4 (1354)	23.1 (435)	
Health insurance								
Any private	73.4 (72,934)	75.1 (65,959)	60.6 (6975)	0.001	71.5 (4493)	77.1 (3668)	53.3 (825)	0.001
Public only	9.0 (15,647)	7.1 (11,195)	24.0 (4452)		16.0 (1795)	10.7 (922)	33.3 (873)	
Uninsured	17.6 (26,369)	17.9 (24,070)	15.5 (2299)		12.5 (1066)	12.2 (809)	13.4 (257)	
Usual source of care								
No USC	27.0 (34,959)	28.6 (32,810)	14.9 (2149)	0.001	17.6 (1361)	19.6 (1135)	11.1 (226)	0.001
USC, office	61.6 (64,900)	60.4 (55,566)	70.9 (9334)		70.8 (4932)	69.7 (3549)	74.2 (1383)	
USC, hospital	11.4 (15,091)	11.0 (12,848)	14.2 (2243)		11.6 (1061)	10.7 (715)	14.7 (346)	
Currently smoke	21.0 (24,066)	19.8 (19,784)	30.5 (4282)	0.001	22.7 (1859)	20.5 (1228)	29.7 (631)	0.001
Any comorbid condition	34.8 (39,973)	29.8 (29,588)	74.2 (10,385)	0.001	50.3 (3906)	40.6 (2271)	82.2 (1635)	0.001
ADL/IADL assistance needs	3.2 (4317)	0.8 (828)	22.5 (3489)	0.001	7.8 (690)	1.2 (74)	29.3 (616)	0.001

HS, High School; MSA, Metropolitan Statistical Area; USC, Usual Source of Care; ADL, Activities of Daily Living; IADL, Instrumental Activities of Daily Living.

to voice concerns about asthma control during health care encounters. This may be especially true among people with PL who we found have higher prevalence of asthma flare and may perhaps have more severe asthma. In addition to their asthma, people with PL must frequently negotiate the requirements of numerous chronic and secondary conditions^{21–31} while their health care providers may focus on conditions associated with disability (or, alternately, acute health issues) during encounters.^{59–61} The intersection of provider foci and competing health concerns may

jointly relegate concerns about asthma flares until an asthma crisis occurs. This process of putting off address asthma control among people with PL is evident in our analyses, which show that people with PL have similar number of inpatient and outpatient health care visits and receive similar asthma-related health care quality despite having more poorly controlled asthma. Additional research is needed to investigate ways to promote discussions of asthma control for both health care providers and people with asthma, especially those who have PL, and to examine

Table 2

Asthma, asthma attack, and quality of care by limitation status

	Percent (n)				Logistic regression ^a	
	Total	No limitations	Any physical limitations	p-value	OR (95% CI)	p-value
All working-age adults (n = 114,950)						
Asthma	6.8 (7622)	5.9 (5608)	13.8 (2014)	0.001	1.8 (1.6–2.0)	0.001
Working-age adults with asthma (n = 7354)						
Asthma attack in last 12 months	42.6 (3206)	39.6 (2164)	52.6 (1042)	0.001	1.4 (1.2–1.6)	0.001
Current use of preventive medications	25.4 (1793)	24.4 (1239)	28.3 (554)	0.010	0.9 (0.7–1.1)	
Quick relief inhaler use in past 3 months	55.1 (4179)	53.1 (2922)	61.3 (1257)	0.001	0.9 (0.8–1.1)	
≥3 canisters in past 3 months (n = 4165)	12.8 (647)	10.9 (368)	18.2 (279)	0.001	0.9 (0.7–1.3)	
Influenza vaccine in past year	38.7 (2778)	36.8 (1925)	45.0 (853)	0.001	1.0 (0.8–1.2)	
Tobacco cessation recommended for smokers (n = 1559)	73.4 (1134)	70.6 (695)	79.2 (439)	0.011	1.1 (0.8–1.6)	

^a Logistic regressions controlling for ADL/IADL assistance needs, age, sex, race/ethnicity, marital status, poverty status, residence in MSA, region of residence, usual source of care, any chronic condition, and smoking status. Models for quality outcomes (except asthma attack) also control for asthma attack. Reference category = no limitations.

potential disparities in processes not examined here, such as disease-specific care plans and education,⁴⁷ so that optimal management can be achieved.

Some general considerations about the care received by people with asthma, regardless of PL, should also be noted. The NHLBI recommends that people with asthma see a physician at least every 6 months to review asthma symptoms, treatments, and management plans.⁵⁷ In this study, only 23% of people with asthma reported having at least one asthma-related health care visit during the calendar year, well below this recommendation. Rates were only slightly higher (30%) among working-age adults with asthma who had a recent asthma flare. While this discrepancy may be related to self-reporting of reasons for health

care visits, public health initiatives should promote these visits as part of disease management strategies. It is also concerning that influenza vaccination rates well below the HP 2020 benchmark of 80%.⁶² On a positive note, reported rates of tobacco cessation recommendation well above the HP 2020 target⁶² and most asthma-related health care visits examined here were for outpatient care, which is preferred for ambulatory care sensitive conditions, such as asthma.⁶³

This study has limitations in addition to those previously discussed. MEPS data are collected from a single household respondent, resulting in concerns about the accuracy of reported health conditions and disability. Previous research has found that the accuracy of self-reports of

Table 3

Asthma-related health care utilization and expenditures by limitation status among working-age adults with asthma (n = 7354)

	Any asthma-related events ^a	Number of asthma-related events ^b		Cost of asthma-related events ^c	
	% (n)	Mean (SD)	Range	Mean (SD)	Range
Outpatient visits					
No limitations	19.3 (1052)	0.5 (1.6)	61	356.9 (564.4)	16,512.2
Any physical limitations	26.9 (549)	1.0 (2.7)	53	479.6 (1088.6)	16,796.3
Total	21.1 (1601)	0.6 (1.9)	61	393.5 (740.5)	16,796.3
Emergency department visits					
No limitations	2.3 (163)	0.0 (0.2)	7	883.8 (1094.7)	11,362.3
Any physical limitations	3.7 (84)	0.1 (0.3)	13	1057.5 (1411.5)	11,004.2
Total	2.6 (247)	0.0 (0.2)	13	940.6 (1205.9)	11,362.3
Inpatient hospital stays					
No limitations	0.5 (38)	0.0 (0.1)	3	7183.7 (6002.9)	27,707.1
Any physical limitations	1.0 (27)	0.0 (0.1)	7	9458.0 (16,755.9)	116,481.0
Total	0.6 (65)	0.0 (0.1)	7	7987.4 (10,543.4)	116,481.0
Total events					
No limitations	20.6 (1143)	0.6 (1.6)	61	623.7 (1466.7)	29,608.2
Any physical limitations	28.6 (585)	1.1 (2.8)	55	907.9 (3243.0)	117,070.7
Total	22.4 (1728)	0.7 (1.9)	61	708.4 (2091.1)	117,070.7

SD = standard deviation.

^a Statistical significance from logistic regression analyses controlling for factors listed below.

^b Statistical significance from negative binomial regression controlling for factors listed below.

^c Among adults with any asthma-related visits. Statistical significance from regression analyses on the natural log of expenditures controlling for factors listed below.

All regression analyses controlled for ADL/IADL assistance needs, age, sex, race/ethnicity, marital status, educational attainment, poverty status, employment status, health insurance type, residence in MSA, region of residence, usual source of care, and any chronic condition.

health conditions^{64–66} and health care visits^{67–71} are adequate. This study focuses only on direct costs and does not examine the indirect costs of asthma, which may be higher for people with disabilities due to transportation assistance needs and comorbidities that require extra health care visits.⁷² This research is also unable to control for age of asthma onset, as it was not asked in MEPS. Asthma severity, which may be an important confounder in the relationship between asthma and disability, was also not assessed or included in the analyses, because it was not asked in the MEPS. Future research should extend this line of research, including assessments of asthma health care quality, use, and cost among people with cognitive, visual, and hearing limitations who could not be examined here due to sample size issues.

Conclusion

Overall, working-age adults with PL were shown to have higher prevalence of asthma and recent asthma flares than do adults without limitations and to receive similar asthma-related health care quality and utilize similar amounts of asthma-related health care. Future research should examine the reasons why people with and without limitations are not meeting the NHLBI and HP 2020 recommendations for asthma-related care. The reasons, including asthma severity, comorbid conditions, tolerance for symptoms, that these benchmarks are not met may be different for people with and without limitations. Researchers and health care providers must be sensitive to these differences in order to improve asthma-related outcomes for all people.

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