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Disability, self-rated health, and time seeking medical care

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ABSTRACT

Background: Population-level estimates of patient-reported time seeking medical care in the United States by disability status are unknown.
Objective: To estimate the likelihood of seeking medical care on an average day and the number of minutes spent traveling to, waiting for, and receiving medical care among those receiving care, by disability status.
Methods: Data are analyzed from the nationally representative 2008, 2010, and 2012—2016 American Time Use Surveys. Weighted logistic and linear regression models evaluate the association between sensory, cognitive, physical, or multiple disabilities and time spent seeking medical care, net of age, sex, race/ethnicity, education, employment, nativity, marital status, parental status, income, metropolitan area, and self-rated health.
Results: The presence of a disability positively associates with the likelihood of seeking medical care on an average day. Patients with disabilities spend more total time in medical care than patients without disabilities as a result of longer clinical and travel time. These differences cannot be explained by sociodemographic disparities or by poorer self-rated health.
Conclusions: Patient time burden is exacerbated by the presence of a disability. It is important to consider disability status along with other social disparities when evaluating the delivery of timely and equitable care.

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In 2001, the Institute of Medicine (IOM) proposed six aims for improvement to address aspects of the health care system that function "at far lower levels than it can and should".[1] Specifically, health care should be safe, effective, patient-centered, efficient, equitable, and timely. Yet, over a decade later, the total time that patients in the United States (US) spend traveling to, waiting for, and receiving care are estimated at $52 billion in patient opportunity costs, annually—15 cents per every dollar spent in medical expenditures for ambulatory physical visits.[2]

But not all time spent seeking medical care is equal. Increased travel time to receive care may signal barriers to access to care, or to appropriate and quality access to care.[3,4] Time spent waiting for care negatively associates with patient satisfaction, confidence in the care provider and perceived quality of care.[5,6] Conversely, time spent with a provider positively associates with patient satisfaction.[5,7] It is important to disaggregate these care-seeking components when evaluating patient experiences.

Additionally, time spent seeking care is also not equally distributed across patient populations. Patients who are Black and Hispanic spend more total time in care than patients who are white, including time traveling. Additionally, those who are Hispanic spend more time waiting for care and those who are Black spend more time receiving care. Patients with advanced degrees spend less total time in care, including significantly less time waiting than those with less education. Likewise, those who are unemployed or out of the labor force spend the most total and travel time, relative to those who are employed. In sum, there are significant sociodemographic differences in time seeking medical care.[8,9]

However, little is known at the population level about how patients with disabilities *report* time seeking care in the United States—despite nearly 1 in 5 people having a disability[10] and patients with disabilities reporting disproportionately more medical visits than those without disabilities.[11] Patients with disabilities also experience other barriers, including the identification of practitioners with condition-specific knowledge, building and examination room accessibility, communication accommodations, and transportation.[12—16]

A review of the research evidence suggests that patients with disabilities are often unrecognized as a health disparity

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population.[17] Yet it is additionally important to understand the experiences of patients with disabilities because disability status associates with other sociodemographic characteristics. People with disabilities have lower levels of education, lower income, and are less likely to be employed than people without disabilities.[10] Disability status and sociodemographic characteristics interact to affect health outcomes[18—20]; the same may be true when considering the time burden of patient care.

Furthermore, on average, individuals with disabilities experience worse self-rated health[21] and are at greater risk of other adverse health outcomes[17] than individuals without disabilities. Social science research has largely shifted away from a medical model of disability and toward a social model[22,23] whereby disability is not defined by health and deviation from ideal function—but by the disadvantages experienced by people with disabilities in tandem with their impairments. Thus, health and disability are two different concepts.[24] However, because those with poor health may experience more time-consuming and more specialized care needs than those in better health, health may mediate the effect of disability on time spent seeking and receiving patient care.

This study uses nationally representative data from the 2008, 2010, and 2012—2015 American Time Use Surveys to assess how the presence of a sensory disability, cognitive disability, physical disability, or multiple disabilities associate with time traveling to, waiting for, and receiving medical care in the United States. These data have been used previously to document sociodemographic disparities in patient time burden[8,9,25]; however, none of these studies considered disability or self-rated health. Other analyses of data from the National Household Travel Survey[26] have documented that disability positively associates with time traveling to medical care; however, information about waiting for or receiving care was unavailable.

The current analyses have two aims: to estimate the amount of time traveling, waiting for, and receiving medical care by disability status and to evaluate if differences in medical care time persist net of sociodemographic characteristics and self-rated health. In doing so, these results document if—and how—people with disabilities experience medical care-seeking activities differently than people without disabilities.

Data and methods

Data

The American Time Use Survey (ATUS)[27] is a nationally representative survey sponsored by the U.S. Bureau of Labor Statistics that collects information on daily time use. Respondents aged 15 and over were chosen randomly from households that had undergone their final interview for the Current Population Survey (CPS), with ATUS collected two to five months after the final CPS interview. The sample was randomized by day such that half the respondents reported on a weekday and half reported on a weekend day. Computer-assisted telephone interviewing was used to ask respondents to provide demographic information, as well as a detailed account of their activities during a 24-h period beginning at 4:00 a.m. The "diary day" is the day about which the respondent reports, with pooled data from years 2003—2016 resulting in a total initial sample size of 191,558 diary days.

Although the ATUS includes detailed information on time use and sociodemographic characteristics for every year, information on both disability and health is available more sporadically. Detailed disability data was introduced in mid-2008, for an initial sample size of 89,407 diary days. Self-rated health as collected at the time of the ATUS interview was included in separate modules administered to a subset of respondents.

Among the years that include disability information, data on self-rated health was only collected in the Eating and Health Module fielded in 2008 and 2014—2016 and the Well-being Module fielded in 2010, 2012, and 2013 (another 2011 module only collects self-rated health from employed respondents, and thus is excluded here). Of these 74,288 eligible respondent with disability data, 70,454 had valid information on self-rated health and an additional 289 were excluded due to any interviewer-reported data quality problem. No other eligibility exclusions were made, leaving a total analytic sample of 70,165 respondents aged 15 and older ("total sample")—1,925 ("clinical sample") of whom reported the receipt of medical care outside of the home on diary day. All analyses were weighted using the corresponding module weights and Stata's[28] subpopulation command.

Dependent measures

Five outcome measures were considered, informed by previous studies using these data.[8,9,25] Analyses began by estimating—among the total sample—the odds of receiving any medical care outside the home. This dichotomous measure differentiated between respondents who reported any minutes using health and care services outside the home ("receiving care"; ATUS code 080401) from those who did not. Next, among those who reported any time receiving care—the clinical sample—the number of minutes receiving care, traveling to receive medical care ("traveling" code 180804) and waiting associated with medical services ("waiting" code 080403) were estimated. Final models estimated the total minutes spent seeking care by combining time traveling, waiting, and receiving care as an overall indicator of patient time burden.

Disability measurement

Disability in the ATUS was measured in the CPS interview to assess six aspects of disability, including hearing difficulty, vision difficulty, difficulty remembering, physical difficulty, mobility limitation, and personal care limitation. These questions were designed to correspond to "four basic areas of functioning (vision, hearing, mobility, and cognitive functioning) that identified the largest component of the population of people with disabilities … [and] two key elements that could be used for monitoring independent living and the need for services".[29] These analyses examine impairments from the four basic areas of functioning in the six-category CPS sequence. Sensory impairment indicated respondents who were deaf/had serious difficulty hearing and who were blind/had serious difficulty seeing when wearing glasses. Cognitive impairment indicated respondents who—because of a physical, mental, or emotional condition—had serious difficulty concentrating, remembering, or making decisions. Physical impairment indicated respondents who had serious difficulty walking or climbing stairs. Multiple impairments indicated respondents who reported difficulty in more than one (sensory, cognitive, physical) category. These measures were constructed to be mutually exclusive to compare across disability categories and to respondents without disability.[1]

The number of respondents with each type of disability was sizeable in the overall sample, as 7979 respondents reported any

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[1] The disability measures included in these models were constructed to differentiate between types of functional limitations. The CPS includes two additional independent living measures (difficulty performing basic activities outside the home alone; difficulty taking care of personal needs inside the home) that were not included here, as 91% of respondents who reported either of these independent living disabilities also reported a functional limitation. Alternate disability specifications are available upon request.

disability. Of these, 1,608 respondents reported sensory disability, 912 reported cognitive disability, 3,399 reported physical disability, and 2,060 reported disabilities in multiple domains. Among the smaller clinical sample, 401 reported any disability. Of these, 62 respondents reported sensory disability, 41 cognitive disability, 191 physical disability, and 107 with disabilities in multiple domains. To address this potential power issue, all analyses were also run with a dichotomous measure of any disability (combining the aforementioned categories) versus no disability.

Health and sociodemographic measures

Self-rated health asked respondents: "Would you say your health in general is excellent, very good, good, fair, or poor?" All levels were included categorically, using "excellent" as the reference category. Sex compared males and females, while race/ethnicity compared between non-Hispanic white, non-Hispanic Black, Hispanic, or another non-Hispanic race/ethnicity. Respondents who reported multiple backgrounds were first coded as Hispanic, then as Black. Education indicated the respondent's highest completed level of education and included less than high school, high school diploma (including GED and some college), and bachelor's degree or higher. Marital status differentiated between those who are married or cohabiting, widowed or divorced or separated, and single (never married and not cohabiting). Immigrant status compared those who were foreign-born to those who were born in the US, Puerto Rico or US Outlying Areas, or abroad of American parent/s.

Age in years was included as 10-year age categories after the reference category of 15–19. Total annual family income distinguished between respondents who reported less than $25,000, and those who reported $25,000-$49,999, $50,000-$74,999, and $75,000 plus. CPS began imputing missing data for family income in 2010, with rates of missing data averaging over 13% for previous years. These missing values were replaced with the median income level by education, gender, and year. Dichotomous controls were included to differentiate between respondent who lived in metropolitan versus non-metropolitan or undefined areas, whether the respondent had an own child under the age of 18 living in the household, and if the interview occurred on a weekend or holiday versus a weekday or non-holiday. Year of interview was included as a series of categorical indicators.

Approach

The analyses first aimed to estimate the amount of time traveling, waiting for, and receiving medical care by disability status. To do so, bivariate differences in each outcome were examined by disability status. Among the total sample, analyses compared the percentage of respondents receiving any medical care outside the home on diary day. Among the clinical sample, they compared the mean time in total medical care, receiving care, waiting for care, and traveling to care. Hypothesis tests were calculated from Stata's *lincom* command.

The second aim was to evaluate if differences in medical care time persisted, net of sociodemographic characteristics and self-rated health. The first outcome, the dichotomous measure of whether any time was spent receiving care on diary day, was estimated using multivariate logistic regression among the full sample. To model the four remaining continuous outcomes of minutes of time, OLS regression of the clinical sample modeled medical care time (following previous analyses[8,9] of ATUS data). Variance inflation factors (VIFs) were examined to assess multicollinearity in unweighted models, with mean overall VIFs less than 2.1 and highest among the age (4.8) and education (3.5) measures.

Influential cases were assessed in unweighted models using Pregibon's beta (logistic) and Cook's D (OLS) statistics; all values fell below 0.13.

Time use data are methodologically unique in that they often contain a large percentage of zero values that, conceptually, can arise either because a respondent does not regularly perform an activity or because the respondent regularly performs the activity but does not do so on the day they are surveyed. In the latter case, there is a discrepancy between the occurrence of an observation and the observation window—which, for the ATUS, is 24 h. Although OLS was utilized to estimate linear outcomes in the main analyses, two robustness checks are performed using the full sample (N = 70,165) instead of focusing solely on the clinical sample (N = 1,925): OLS regression and a zero-inflated negative binomial (ZINB) approach. ZINB is advantageous for modeling excess zeroes with overdispersed count outcomes because it models each of these processes simultaneously and independently.[30] See Anand and Ben-Shalom[31] and Shandra and Penner[32] for additional applications of this model to ATUS data.

This approach also has the advantage of modeling two other potential limitations with the definition of the clinical sample. Among the total eligible sample, 69.3% and 6.1% of respondents who reported positive minutes of receiving care do not report minutes of waiting or of traveling, respectively. As both situations are plausible, they are assigned "0" values in the main analyses. Conversely, among those who reported positive minutes of waiting associated with medical services, 7.5% did not report receiving care. Among those who reported positive minutes of travel related to using medical services, 2.5% did not report receiving care. As these analyses focus on self-rated time spent seeking health services outside the home, these cases were excluded from the clinical sample. The robustness checks presented in Appendix Table 2 incorporated all cases. All analyses were performed using Stata 14.2.

Results

Bivariate results

Table 1 presents weighted means and percentages for the key variables used in the analysis, by disability status. With the exception of time waiting for care, significant differences are observed across all dependent measures. Individuals with disabilities are more likely than those without disabilities to report receiving care on diary day, regardless of disability type. Those with physical and multiple disabilities report more total care time, more time receiving care, and more time traveling to care. These results indicate that—in the bivariate context—the total reported time in medical care is higher for people with disabilities than for people without disabilities. Those with physical disabilities and multiple disabilities spend an average of 33 min and 44 min more, respectively.

These results also illustrate differences in sociodemographic status and self-rated health by disability status. Those with disabilities are significantly less likely than those without disabilities to be immigrants and have lower levels of educational attainment, employment, and family income. They are less likely to live in a metropolitan area, less likely to be parents of residential children, and less likely to be married or cohabiting. They also have worse health. With the exception of cognitive disability, those with disabilities are older. Overall, those with multiple disabilities tend to be least similar—and those with sensory disabilities most similar—to those without disabilities. Bivariate results for the clinical sample (Appendix Table 1) largely mirror these trends.

Table 1
Weighted means and percentages, by disability status.

	Disability status		Type of disability			
	None	Any	Sensory	Cognitive	Physical	Multiple
Dependent measures						
Any medical care time	2.51	5.24 ***	3.92 **	4.71 **	5.91 ***	5.39 ***
Total medical care time (mean minutes)	118.25	150.37 ***	132.63	143.24	151.05 ***	162.19 ***
Time receiving care (mean minutes)	74.91	95.86 ***	83.66	83.88	96.47 **	106.44 **
Time waiting for care (mean minutes)	11.27	11.40	11.47	13.46	10.56	12.07
Time traveling to care (mean minutes)	32.08	43.11 ***	37.50	45.90	44.02 **	43.68 **
Independent measures						
Self-rated health						
Excellent (reference)	19.88	5.38 ***	10.70 ***	8.77 ***	3.30 ***	3.16 ***
Very good	36.15	15.01 ***	29.91 ***	17.65 ***	10.65 ***	9.42 ***
Good	31.03	28.96 ***	34.20 **	33.44	27.95 ***	24.56 ***
Fair	10.76	30.61 ***	19.28 ***	27.41 ***	34.39 ***	34.61 ***
Poor	2.17	20.04 ***	5.91 ***	12.72 ***	23.71 ***	28.25 ***
Age						
15–29 (reference)	18.11	4.90 ***	5.60 ***	22.81 ***	1.35 ***	2.28 ***
30-39	20.37	5.83 ***	6.16 ***	15.90 ***	3.74 ***	4.56 ***
40-49	19.70	9.85 ***	9.08 ***	18.20	8.53 ***	8.93 ***
50-59	17.23	19.76 ***	14.86 **	19.85 *	21.74 ***	20.29 ***
60-69	13.82	23.66 ***	19.84 ***	13.49	28.63 ***	22.96 ***
70+	10.77	35.99 ***	44.47 ***	9.76	36.01 ***	40.97 ***
Female	55.26	59.81 ***	47.39 ***	55.92	65.93 ***	61.12 ***
Race/ethnicity						
Non-Hispanic white (reference)	65.95	66.56	75.56 ***	68.86†	62.99 ***	64.42
Non-Hispanic Black	14.78	10.75 ***	9.89 ***	10.64 ***	10.94 ***	11.17 ***
Hispanic	13.93	19.45 ***	10.88 ***	17.43 **	23.27 ***	20.73 ***
Non-Hispanic other	5.33	3.23 ***	3.67 ***	3.07 ***	2.79 ***	3.69 ***
Immigrant	14.59	7.03 ***	7.96 ***	5.70 ***	7.50 ***	6.12 ***
Educational attainment						
Less than high school (reference)	12.90	21.49 ***	15.80 **	23.46 ***	21.04 ***	25.83 ***
High school diploma/GED	23.84	33.20 ***	30.60 ***	33.00 ***	34.77 ***	32.72 ***
Some college/Associate's degree	27.40	27.65	28.86	27.96	27.60	26.65
Bachelor's degree and higher	35.86	17.66 ***	24.75 ***	15.57 ***	16.59 ***	14.81 ***
Employment status						
Not employed (reference)	33.68	80.42 ***	65.98 ***	71.82 ***	84.47 ***	88.83 ***
Employed part-time	13.81	7.34 ***	9.83 ***	13.05	5.77 ***	5.49 ***
Employed full-time	52.51	12.23 ***	24.19 ***	15.13 ***	9.77 ***	5.68 ***
Family income						
Less than $25,000 (reference)	19.87	52.27 ***	34.70 ***	54.71 ***	53.31 ***	63.20 ***
$25,000–49,999	26.20	25.88	29.66 **	22.04 **	27.27	22.33 ***
$50,000–74,999	19.27	11.10 ***	17.35 *	9.87 ***	10.47 ***	7.82 ***
$75,000 and higher	34.66	10.74 ***	18.28 ***	13.38 ***	8.94 ***	6.65 ***
Marital status						
Single (reference)	23.04	17.62 ***	12.75 ***	40.24 ***	15.18 ***	15.44 ***
Married or cohabiting	55.79	32.64 ***	47.82 ***	26.43 ***	30.86 ***	26.46 ***
Widowed, divorced, or separated	21.17	49.74 ***	39.43 ***	33.33 ***	53.96 ***	58.11 ***
Parent of a residential child	37.36	11.94 ***	14.49 ***	23.46 ***	9.62 ***	8.69 ***
Lives in metropolitan area	83.72	76.83 ***	73.57 ***	80.15 **	77.73 ***	76.41 ***
N	62,186	7,979	1,608	912	3,399	2,060

Source: American Time Use Survey. Data shown are percentages unless otherwise noted. †<0.10; *p < .05; **p < .01; ***p < .001 (two-tailed tests). Tests difference from "no disability".

Multivariate regression results

Table 2 presents logistic regression models assessing if differences in the odds of receiving medical care on diary day persist, net of sociodemographic and health characteristics. Models 2.1 indicates a positive and significant association between the presence of any disability and the odds of reporting medical care on diary day. Model 2.2 disaggregates disability type to find a positive and significant association between cognitive and physical—but not sensory or multiple—disabilities and the odds of reporting care. Those with worse health have higher odds of reporting any medical care than those in excellent health.

Table 3 presents linear regression models examining the outcomes of total medical care time, time receiving care, waiting for care, and traveling to care. Model 3.1 indicates a positive and significant association between the presence of any disability (and

multiple disabilities; model 3.2) and total minutes of medical care. Disaggregating the outcome categories reveals that most of this time difference by disability status arises from receiving care (model 3.3 and 3.4). No significant differences emerge by disability status in waiting time (models 3.5 and 3.6), although the overall disability measure positively associates with minutes of travel time (model 3.7). Having worse health positively associates with minutes of total medical care time, receiving care time, and travel time.

The robustness checks reported in Appendix Table 2 indicate comparable patterns: having any disability—and multiple disabilities—positively associates with total, receiving, and travel time, net of sociodemographic characteristics and self-rated health. In addition, there is a positive and significant difference for those with physical disabilities, in line with their greater odds of reporting medical care on diary day (Table 2).

Table 2
Logistic regression of any medical care time.

	Odds of any time	
	(2.1)	(2.2)
Any disability	1.183 *	
Disability type		
Sensory		1.054
Cognitive		1.435 *
Physical		1.228 *
Multiple		1.108
Self-rated health		
Very good	1.068	1.068
Good	1.345 ***	1.343 ***
Fair	1.755 ***	1.749 ***
Poor	2.133 ***	2.127 ***
Age		
30-39	1.516 ***	1.513 ***
40-49	1.653 ***	1.650 ***
50-59	1.908 ***	1.909 ***
60-69	1.964 ***	1.972 ***
70+	2.399 ***	2.430 ***
Female	1.543 ***	1.540 ***
Race/ethnicity		
Non-Hispanic Black	1.062	1.064
Hispanic	0.918	0.917
Non-Hispanic other	0.830	0.832
Immigrant	0.963	0.963
Education		
High school diploma/GED	1.206 *	1.202 *
Some college/Associate's	1.426 ***	1.424 ***
Bachelor's degree and higher	1.636 ***	1.634 ***
Employment status		
Part-time	0.828 *	0.829 *
Full-time	0.516 ***	0.518 ***
Family income		
$25,000–49,999	0.997	0.997
$50,000–74,999	1.035	1.037
$75,000 and higher	1.116	1.117
Marital status		
Married or cohabiting	0.930	0.934
Widowed, divorced, separated	0.979	0.982
Parent of residential child	0.839 *	0.840 *
Metropolitan area	1.218 **	1.216 **
Constant	0.016 ***	0.016 ***

Source: American Time Use Survey. Results are odds ratios from weighted logistic regression models. Includes controls for weekend/holiday interview and survey year. †<0.10; *$p < .05$; **$p < .01$; ***$p < .001$ (two-tailed tests).

Discussion

Two key findings emerge from this study. First, people with disabilities—specifically, people with physical and multiple disabilities—spend significantly more time than people without disabilities in medical care. These differences occur for time traveling to medical care as well as time receiving care. Second, across most specifications, these differences persist for those with any and multiple disabilities net of sociodemographic characteristics and self-rated health.

The first finding quantifies the extent to which patient time burden[2] is higher among individuals with disability. Bivariate estimates indicate individuals reporting any disability spend 32 more minutes in total medical care time than individuals without disabilities. According to the National Health Interview Survey,[33] in 2013 the modal number of health care visits among adults without disability was 1–3 visits, while the modal number among adults with disability was 4–9 visits (although 29% reported 10 or more). Combined with the estimates here, this extrapolates to a total of 118–355 min per year for people without disability and 600–1350 min per year for people with disability. The additional patient time burden for patients with disabilities is substantial, and

should be considered an opportunity cost that detracts from a patient's capacity to engage in other types of activities.[2]

Next, multivariate results from Table 3 indicate that—among those reporting medical care—individuals with disabilities spend between 16 (those with any disability) to 25 (those with multiple disabilities) minutes more on total care than individuals without a disability, net of sociodemographic characteristics and self-rated health. These results fit with evidence that disability status—independent of health status—shapes everyday time use[24] and other health disparities.[17,34]

People with disabilities experience greater total medical care time because of their increased time receiving and traveling to care; however, no additional information on patient motivation for care seeking behaviors is available from these data. It may be that patients with greater levels of human and financial capital are able to leverage these resources to make different treatment decisions than those with lower levels of human and financial capital. A review of the literature on patient choice suggests that willingness to travel for care increases when seeking specialist care, care from reputed providers, care for more serious conditions, and when the patient is of higher sociodemographic background.[35] This contrasts with other reasons why patients may need to spend more time seeking care, such as inadequate transportation, underserved communities, or understaffed facilities.[36] Likewise, the reasons for longer care visits could result either from the longer time it takes to comprehensively treat potential comorbidities or inefficiencies in accommodating patients with disability-specific needs. Future research would be well-served to examine these trends in the context of other social disparities that constrain or facilitate access to timely, efficient, and effective care for patients with disabilities.

Finally, results suggest that medical care time is not experienced equally for patients with all types of disabilities. The presence of physical disability or multiply occurring disabilities—but not sensory or cognitive disabilities—associates with medical care time. Qualitative research suggests several mechanisms through which these differences might emerge. Interviews with women with spinal cord injury indicated that—in addition to experiencing inaccessible exam rooms and physical spaces—patients reported that doctors lacked the disability-specific knowledge or training necessary to provide comprehensive care.[12] Even when patients called ahead to ensure accessibility, a lack of staff knowledge meant that information was not always accurate.[12] Although it may be that accommodating patients with physical disabilities is more time-intensive than those for other types of conditions,[37] ensuring that personnel are informed of and prepared for differences in accessibility before patients arrive for examination can facilitate more efficient care.

These results quantify mean differences in patient time burden, but the tails of the distributions are also illustrative: The 75th percentile of travel time for patients with disabilities is 60 min—versus 40 min for patients without disabilities. At the 95th percentile, it's 90 min, versus 120 min. These patterns have implications for other measures of health equity, since time traveling to care positively associates with the likelihood of attrition from care[38] and health-related quality of life[39] (see Kelly et al.[40] for a review). Distributional differences are observed in time receiving (but not waiting for) care, as well, where the 75th percentile for patients with disabilities is 120 min—but only 90 among those without disabilities.

The ATUS is advantageous for understanding medical care seeking time because—unlike other surveys using provider or administrator data—it provides nationally representative estimates of *patient reports* of time spent traveling, waiting for, and receiving services. This perspective is an important component of patient-centered care. Likewise, because all minutes of the day must be

Table 3
Linear regression of time spent in medical care.

	Total		Receive		Wait		Travel	
	(3.1)	(3.2)	(3.3)	(3.4)	(3.5)	(3.6)	(3.7)	(3.8)
Any disability	15.678 **		11.919 *		−1.965		5.724 *	
Disability type								
Sensory		15.887		11.471		0.122		4.295
Cognitive		3.275		−5.019		−0.799		9.093
Physical		13.570 †		11.106		−3.447 †		5.911 †
Multiple		25.231 *		21.650 *		−1.266		4.847
Self-rated health								
Very good	1.090	0.898	−1.032	−1.262	0.124	0.124	1.997	2.037
Good	7.663	7.751	3.705	3.787	4.104 *	4.130 *	−0.146	−0.166
Fair	24.843 ***	24.393 ***	17.065 **	16.518 **	3.220	3.329	4.557 †	4.546 †
Poor	31.828 **	30.902 **	16.293 *	15.054 †	4.002	4.253	11.532 **	11.595 **
Age								
30-39	−0.741	−1.048	−7.366	−7.742	−0.789	−0.761	7.413 *	7.455 *
40-49	−2.487	−2.799	−5.740	−6.113	−3.941	−3.946	7.193 *	7.259 *
50-59	14.374	13.805	7.601	6.943	−0.922	−0.955	7.695 *	7.817 *
60-69	3.119	2.728	−0.402	−1.049	−3.337	−3.220	6.859 †	6.997 †
70+	−12.683	−13.650	−17.904 †	−19.206 *	−0.135	−0.112	5.356	5.668
Female	−16.479 ***	−16.210 **	−11.388 **	−11.164 **	0.115	0.224	−5.207 **	−5.270 **
Race/ethnicity								
Non-Hispanic Black	31.684 ***	31.620 ***	19.180 **	19.147 **	4.507 †	4.487 †	7.997 **	7.986 **
Hispanic	29.341 ***	29.632 ***	14.713 *	14.968 *	4.707 *	4.804 *	9.921 **	9.860 **
Non-Hispanic other	0.369	−0.044	−0.257	−0.698	−0.785	−0.814	1.411	1.468
Immigrant	20.380 *	20.591 *	12.201	12.392 †	5.834 †	5.879 †	2.345	2.319
Education								
High school diploma/GED	18.078 *	18.762 *	13.927 †	14.752 *	6.300 *	6.311 *	−2.149	−2.301
Some college/Associate's	12.222	12.647	9.523	10.051	3.807	3.777	−1.108	−1.181
Bachelor's degree and higher	10.869	11.130	9.015	9.376	2.797	2.740	−0.943	−0.986
Employment status								
Part-time	−12.003 *	−12.361 *	−12.846 **	−13.237 **	1.655	1.641	−0.812	−0.765
Full-time	−16.339 **	−16.415 **	−14.417 **	−14.599 **	−0.212	−0.144	−1.710	−1.671
Family income								
$25,000−49,999	−3.239	−3.476	0.558	0.300	0.705	0.638	−4.502 *	−4.414 †
$50,000−74,999	−2.250	−2.462	−0.133	−0.347	−2.650	−2.719	0.533	0.604
$75,000 and higher	−8.990	−9.206	−5.583	−5.814	−1.722	−1.757	−1.684	−1.635
Marital status								
Married or cohabiting	−5.263	−5.368	1.345	1.219	−2.634	−2.631	−3.974	−3.956
Widowed, divorced, separated	−3.838	−3.999	0.336	0.154	−1.229	−1.208	−2.945	−2.945
Parent of residential child	−0.236	−0.113	1.894	1.982	−0.855	−0.845	−1.276	−1.249
Metropolitan area	−5.712	−5.585	2.084	2.231	−3.450 †	−3.436 †	−4.346 †	−4.380 †
Constant	124.164 ***	124.325 ***	79.021 ***	79.373 ***	10.330 **	10.210 **	34.813 ***	34.742 ***
N	70,165	70,165	1,925	1,925	1,925	1,925	1,925	1,925

Source: American Time Use Survey. Results are coefficients from weighted ordinary least squares regression models. Includes controls for weekend/holiday interview and survey year. †<0.10; *p < .05; **p < .01; ***p < .001 (two-tailed tests).

accounted for, time use as estimated from time diaries may be less prone to aggregation bias, social desirability bias, and recall bias than other data collection techniques.[41,42]

However, as others note,[8,9,25] the ATUS also has several limitations when used to study time spent seeking medical care. Because its primary objective is to capture daily time use, there is no further information available on patient satisfaction, type of clinical encounter, reasons for the outpatient visit, the site of care, or the type of provider. Despite these limitations, the results presented here contribute to our understanding of disability and time spent seeking medical care. They expand upon the growing knowledge of the ways disability relates to time use,[31] transportation,[14] and health-related activities such as sleep and health self-care.[43,44]

Conclusion

Disability status is often omitted from existing studies of patient experiences, despite patients with disabilities experiencing a disproportionate number of clinical encounters. These results indicate that patients with disabilities—particularly those with physical or multiple conditions—experience significantly greater time burden when seeking medical care than patients without disabilities. This difference cannot be explained by sociodemographic characteristics or self-rated health. Understanding the needs and constraints of patients with disabilities is a necessary first step toward meeting the IOM goals of timely and equitable care.

Appendix

Appendix Table 1
Weighted percentages, by disability status–clinical sample.

	Disability status		Type of disability			
	None	Any	Sensory	Cognitive	Physical	Multiple
Self-rated health						
Excellent (reference)	15.42	5.99 ***	12.90	9.76	4.19 ***	3.74 ***
Very good	30.58	11.72 ***	27.42	7.32 ***	8.38 ***	10.28 ***
Good	33.73	24.94 ***	37.10	34.15	24.61 **	14.95 ***
Fair	15.09	34.66 ***	16.13	36.59 **	36.13 ***	42.06 ***
Poor	5.18	22.69 ***	6.45	12.20	26.70 ***	28.97 ***
Age						
15−29 (reference)	9.91	2.74 ***	1.61 ***	14.63	1.57 ***	0.93 ***
30-39	15.42	4.49 ***	1.61 ***	14.63	4.19 ***	2.80 ***
40-49	15.94	9.23 ***	8.06 *	17.07	7.85 ***	9.35 *
50-59	17.85	18.95	16.13	26.83	15.18	24.30
60-69	19.82	22.69	12.90	19.51	28.80 **	18.69
70+	21.06	41.90 ***	59.68 ***	7.32 **	42.41 ***	43.93 ***
Female	69.09	64.34†	48.39 **	68.29	71.73	58.88 *
Race/ethnicity						
Non-Hispanic white (reference)	69.09	63.59 *	82.26 **	56.10†	58.64 **	64.49
Non-Hispanic Black	12.99	11.97	6.45 *	17.07	11.52	14.02
Hispanic	13.98	20.95 **	8.06†	24.39	26.70 ***	16.82
Non-Hispanic other	3.94	3.49	3.23	2.44	3.14	4.67
Immigrant	12.60	7.98 **	4.84 **	7.32	9.42	7.48†
Educational attainment						
Less than high school (reference)	10.17	18.95 ***	14.52	12.20	19.90 **	22.43 **
High school diploma/GED	23.69	32.42 ***	19.35	46.34 **	35.60 **	28.97
Some college/Associate's degree	28.08	27.68	29.03	29.27	28.27	25.23
Bachelor's degree and higher	38.06	20.95 ***	37.10	12.20 ***	16.23 ***	23.36 ***
Employment status						
Not employed (reference)	49.93	86.78 ***	82.26 ***	80.49 ***	89.53 ***	86.92 ***
Employed part-time	14.96	5.99 ***	6.45 **	9.76	3.14 ***	9.35†
Employed full-time	35.10	7.23 ***	11.29 ***	9.76 ***	7.33 ***	3.74 ***
Family income						
Less than $25,000 (reference)	22.70	52.87 ***	30.65	60.98 ***	58.64 ***	52.34 ***
$25,000−49,999	26.84	24.94	33.87	17.07	24.08	24.30
$50,000−74,999	17.85	10.72 ***	17.74	9.76†	8.90 ***	10.28 *
$75,000 and higher	32.61	11.47 ***	17.74 **	12.20 ***	8.38 ***	13.08 ***
Marital status						
Single (reference)	18.83	14.71 *	9.68 *	29.27	14.14†	13.08†
Married or cohabiting	51.77	33.67 ***	46.77	31.71 **	30.37 ***	32.71 ***
Widowed, divorced, separated	29.40	51.62 ***	43.55 *	39.02	55.50 ***	54.21 ***
Parent of a residential child	27.82	9.98 ***	11.29 ***	21.95	9.42 ***	5.61 ***
Lives in metropolitan area	86.35	79.05 **	75.81†	82.93	79.58 *	78.50†
N	1,524	401	62	41	191	107

Source: American Time Use Survey. Data shown are percentages unless otherwise noted. †<0.10; *p < .05; **p < .01; ***p < .001 (two-tailed tests). Tests difference from "no disability".

Appendix Table 2
Regression of time spent in medical care–alternative model specifications.

	Total		Receive		Wait		Travel	
	(A2.1)	(A2.2)	(A2.3)	(A2.4)	(A2.5)	(A2.6)	(A2.7)	(A2.8)
Panel 1. Ordinary least squares regression; total sample								
Any disability	1.994 ***		1.295 ***		0.056		0.643 ***	
Disability type								
Sensory		0.725		0.557		−0.033		0.201
Cognitive		2.283 †		0.961		0.406		0.917 †
Physical		2.411 **		1.595 **		0.008		0.808 **
Multiple		2.351 *		1.676 *		0.037		0.638 †
Self-rated health								
Very good	0.092	0.096	0.033	0.034	0.011	0.012	0.047	0.048
Good	0.843 ***	0.837 ***	0.508 **	0.505 **	0.167 **	0.117 **	0.168 *	0.165 *
Fair	2.795 ***	2.748 ***	1.715 ***	1.681 ***	0.384 ***	0.384 ***	0.697 ***	0.683 ***
Poor	4.848 ***	4.701 ***	2.900 ***	2.787 ***	0.452 ***	0.457 ***	1.496 ***	1.457 ***
Constant	3.299 ***	3.292 ***	1.982 ***	1.991 ***	0.293**	0.283*	1.024***	1.018***
N	70,165	70,165	70,165	70,165	70,165	70,165	70,165	70,165

	Total		Receive		Wait		Travel	
	(B2.1)	(B2.2)	(B2.3)	(B2.4)	(B2.5)	(B2.6)	(B2.7)	(B2.8)
Panel 2. Zero-inflated negative binomial; total sample								
Any disability	4.251 **		2.699 **		0.332		1.201 **	
Disability type								
Sensory		3.707		2.293		0.332		1.028
Cognitive		4.873 †		2.672		0.615		1.496 †
Physical		4.305 *		2.777 *		0.292		1.225 *
Multiple		4.314 †		2.866 *		0.322		1.173
Self-rated health								
Very good	2.637	2.642	1.638	1.642	0.233	0.235	0.765	0.766
Good	3.502 ***	3.509 ***	2.206 ***	2.216 ***	0.382 ***	0.380 ***	0.920 **	0.922 **
Fair	4.978 ***	4.949 ***	3.063 ***	3.040 ***	0.571 ***	0.565 ***	1.338 ***	1.329 ***
Poor	6.258 ***	6.210 ***	3.761 ***	3.692 ***	0.533 ***	0.549 ***	1.877 ***	1.868 ***
N	70,165	70,165	70,165	70,165	70,165	70,165	70,165	70,165

Source: American Time Use Survey. Panel 1 results are coefficients from weighted ordinary least squares regression models. Panel 2 results are predicted counts from weighted zero-inflated negative binomial models, with all coviates held at their means. Models include all covariates from Table 2. †<0.10; *$p < .05$; **$p < .01$; ***$p < .001$ (two-tailed tests).

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