Primary Care Provides the Majority of Outpatient Care for Patients with Diabetes in the US: NAMCS 2009–2015

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INTRODUCTION

Diabetes affects 30.2 million adults in the US and contributes to substantial health and economic burdens.[1, 2] While there are many evidence-based interventions that are expected to improve diabetes outcomes,[3] many patients with diabetes do not achieve their goals for prevention and treatment,[4] particularly less educated individuals and racial/ethnic minorities.[5] To improve diabetes disparities and outcomes, resources for implementing evidence-based interventions are needed in the settings where patients with diabetes receive healthcare.[3] This study provides national estimates of the distribution of outpatient visits for US adults with diabetes across care settings to inform the delivery of resources for diabetes interventions.

METHODS

We analyzed the 2009 through 2015 National Ambulatory Medical Care Survey (NAMCS) which includes visits to non-federal office-based physicians engaged in direct patient care, and National Hospital Ambulatory Medical Care Survey (NHAMCS), which includes visits to non-federal hospital emergency departments, and outpatient departments through 2011: these provide annual, nationally representative samples of physician visits.[6] Surveys are completed by the sampled physicians and census staff for the designated reporting period. We included visits for adults aged ≥ 18 years, excluding surgical, pediatric, and obstetrics/gynecology visits. We examined two outcomes which are annual mean counts of visits: (1) visits in which a patient was identified as having diabetes by a direct survey question and (2) the subset of these visits in which diabetes was a patient reason for visit: either the chief complaint or one of up to two (2009–2013) or four (2014 onwards) additional reasons for visit. We specified four care settings: primary care offices (general/family practice,

internal medicine, geriatrics, and palliative medicine), specialist offices (other medical specialties), hospital outpatient departments, and hospital emergency departments. We compared visit characteristics across settings using survey-weighted Pearson χ^2 tests and conducted analyses using Stata (StataCorp) version 14.2 accounting for the complex sampling design. This study met criteria for exemption from institutional review board review.

RESULTS

Most visits for US adults with diabetes occurred in primary care offices, followed by specialist offices, hospital
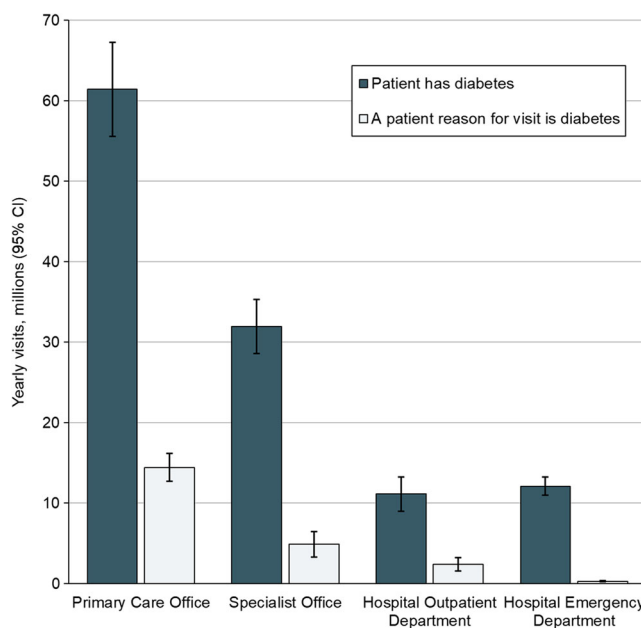

Figure 1 Outpatient visits for adults with diabetes by care setting, 2009–2015. The mean number of yearly visits (millions) for patients with diabetes was 61.4 (95% CI 55.6–67.2), 32.0 (28.6–35.3), 11.1 (9.0–13.3), and 12.1 (11.0–13.2) for primary care offices, specialist offices, hospital outpatient departments, and hospital emergency departments, respectively. The mean number of yearly visits (millions) for which diabetes was a patient reason for visit was 14.4 (95% CI 12.7–16.2), 4.9 (3.3–6.4), 2.4 (1.6–3.2), and 0.3 (0.2–0.4) for primary care offices, specialist offices, hospital outpatient departments, and hospital emergency departments, respectively. Hospital outpatient department data were only available from 2009 to 2011.

Table 1 Characteristics of Outpatient Visits for US Adults with Diabetes by Care Setting

	Yearly visits, 100,000s (% of visits in care setting)				Primary care vs. specialist, *P* value*
	Primary care office	Specialist office	Hospital OPD	Hospital ED	
Survey year[†]					n/a
2009 to 2011	632.4	304.9	111.3	110.4	
2012 to 2013	539.6	290.0	[†]	115.0	
2014 to 2015	661.3	371.3	[†]	143.0	
All survey years	614.1	319.6	111.3	121.0	
Age category					0.002
18–44 years	52.7 (8.7)	23.6 (7.5)	14.9 (13.6)	22.8 (19.1)	
45–64 years	257.7 (42.4)	121.3 (38.3)	54.8 (50.0)	47.7 (40.0)	
≥65 years	297.3 (48.9)	171.6 (54.2)	40.0 (36.5)	48.7 (40.9)	
Sex					0.031
Female	323.3 (52.6)	158.9 (49.7)	65.3 (58.7)	66.7 (55.1)	
Male	290.9 (47.4)	160.7 (50.3)	46.0 (41.3)	54.3 (44.9)	
Race/ethnicity[‡]					0.002
White, non-Hispanic	385.9 (62.8)	221.9 (69.4)	62.6 (56.3)	70.9 (58.6)	
Black, non-Hispanic	99.8 (16.3)	40.1 (12.6)	27.2 (24.5)	30.5 (25.2)	
Hispanic	94.5 (15.4)	32.5 (10.2)	17.6 (15.8)	15.6 (12.9)	
Other, non-Hispanic	34.0 (5.5)	25.1 (7.9)	3.8 (3.5)	4.0 (3.3)	
Minority race/ethnicity[‡]	228.3 (37.2)	97.7 (30.6)	48.7 (43.7)	50.1 (41.4)	0.005
Diabetes classification[§]					< 0.001
Type 1 diabetes	18.6 (2.8)	18.1 (4.9)	[§]	8.5 (6.0)	
Type 2 diabetes	433.1 (65.5)	183.9 (49.5)	[§]	54.2 (37.9)	
Unspecified diabetes	209.5 (31.7)	169.3 (45.6)	[§]	80.2 (56.1)	
Diabetes was a patient reason for visit	144.4 (23.5)	48.7 (15.2)	24.1 (21.6)	3.0 (2.5)	0.002
Diabetes was the chief complaint	85.6 (13.9)	28.7 (9.0)	19.2 (17.3)	0.4 (0.3)	0.025
Physician specialty					[‖]
Cardiovascular diseases	[‖]	68.7 (21.5)	[‖]	[‖]	
Dermatology	[‖]	18.7 (5.9)	[‖]	[‖]	
Psychiatry	[‖]	13.0 (4.1)	[‖]	[‖]	
Neurology	[‖]	15.6 (4.9)	[‖]	[‖]	
Other medical specialties	[‖]	203.2 (63.7)	[‖]	[‖]	
Source of payment for visit					< 0.001
Private insurance	231.6 (39.5)	112.0 (36.6)	30.2 (28.0)	24.9 (21.7)	
Medicare	279.4 (47.6)	162.7 (53.2)	43.9 (40.8)	55.5 (48.4)	
Medicaid	51.5 (8.8)	14.9 (4.9)	19.4 (18.0)	21.1 (18.4)	
Other	24.3 (4.1)	16.4 (5.4)	14.3 (13.2)	13.2 (11.5)	
Geographic region					0.209
Northeast	109.1 (17.8)	65.8 (20.6)	34.3 (30.8)	19.9 (16.5)	
Midwest	130.7 (21.3)	52.9 (16.5)	30.8 (27.7)	29.5 (24.4)	
South	236.5 (38.5)	126.6 (39.6)	35.3 (31.7)	49.1 (40.6)	
West	137.8 (22.4)	74.4 (23.3)	10.9 (9.8)	22.5 (18.6)	
Metropolitan statistical area					< 0.001
Yes	528.5 (86.1)	301.4 (94.3)	89.1 (80.1)	87.8 (83.6)	
No	85.6 (13.9)	18.3 (5.7)	22.2 (19.9)	17.3 (16.4)	

OPD, outpatient department; ED, emergency department

*P value < 0.005 for all three-way comparisons between primary care, medical specialist, and emergency department visits, except geographic region (P = 0.12). P value < 0.02 for all comparisons between all four care settings from 2009 to 2011, except metropolitan statistical area (P = 0.063)

[†]Hospital outpatient department data were available from 2009 to 2011

[†]Approximately 27% of values imputed by the National Center for Health Statistics using a model-based sequential regression including demographic, clinical, and visit characteristics

[§]Data for diabetes classification were available only from 2014 to 2015

[‖]Physician specialty subgroups are only relevant to specialist offices

emergency departments, and hospital outpatient departments (Fig. 1). Among non-hospital-based office visits, primary care comprised 65.8% (95% CI 63.1–68.4%) of visits for patients with diabetes and 75.8% (95% CI 67.9–80.7%) of visits in which diabetes was a patient reason for visit. In primary care offices, the proportion of visits for patients with diabetes in which diabetes was a patient reason for visit was 23.5% (95% CI 21.7–25.5%) which was higher than that in other settings: 15.2% (95% CI 11.5–19.9%), 21.6% (95% CI 17.1–27.0%), and 2.5% (95% CI 1.9–3.1%) in specialist offices, hospital outpatient departments, and emergency departments, respectively. Diabetes was the chief complaint in 59.6% (95% CI 55.3–63.7%) of visits in which diabetes was a patient reason for visit.

A greater proportion of patients in primary care office visits were younger, female, and of minority race/ethnicity, compared to specialist office visits (Table 1). Visits to hospital outpatient departments and emergency departments were relatively enriched with patients who were younger, female, and of minority race/ethnicity, compared to other settings. A greater proportion of patients in primary care office visits had type 2 diabetes compared to specialist office and emergency department visits which were relatively enriched with patients with type 1 or unspecified diabetes. There were also

significant differences across care settings in insurance payer and geographic location.

DISCUSSION

The majority of outpatient visits for US adults with diabetes, as well as visits in which diabetes was a patient reason for visit, occurred in primary care offices, followed by specialist offices. To improve the care of patients with diabetes, it is critical to target resources to the healthcare settings where patients with diabetes interact with their physicians.[3] Our findings suggest that most diabetes management occurs in primary care offices, which therefore presents a proportional opportunity to improve diabetes care delivery. Hospital-based settings saw a greater proportion of patients of minority race/ethnicity compared to other settings which may be important for targeting interventions to reduce diabetes health disparities in these populations. Limitations of this study include that data regarding certain specialties, including endocrinology, were not available. Nevertheless, the majority of care for US adults with diabetes occurred in the primary care setting where interventions are needed to improve diabetes practices and outcomes.

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Compliance with Ethical Standards:

Conflict of Interest: *The authors declare that they do not have a conflict of interest.*

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