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Receipt of Diabetes Preventive Services Differs by Insurance Status at Visit

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Abstract

Background—Lack of insurance is associated with suboptimal receipt of diabetes preventive care. One known reason for this is an access barrier to obtaining healthcare visits; however, little is known about whether insurance status is associated with differential rates of receipt of diabetes care during visits.

Purpose—To examine the association between health insurance and receipt of diabetes preventive care during an office visit.

Methods—This retrospective cohort study used electronic health record and Medicaid data from 38 Oregon community health centers. Logistic regression was used to test the association between insurance and receipt of four diabetes services during an office visit among patients who were continuously uninsured ($n=1,117$), continuously insured ($n=1,466$), and discontinuously insured ($n=336$) in 2006–2007. Generalized estimating equations were used to account for within-patient correlation. Data were analyzed in 2013.

Results—Overall, continuously uninsured patients had lower odds of receiving services at visits when due, compared to those who were continuously insured (AOR=0.73, 95% CI=0.66, 0.80). Among the discontinuously insured, being uninsured at a visit was associated with lower odds of receipt of services due at that visit (AOR=0.77, 95% CI=0.64, 0.92) than being insured at a visit.

Conclusions—Lack of insurance is associated with a lower probability of receiving recommended services that are due during a clinic visit. Thus, the association between being uninsured and receiving fewer preventive services may not be completely mediated by access to clinic visits.

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Introduction

Preventive diabetes care decreases the risk of complications.^{1–4} Yet, despite the effectiveness of preventive care, many patients delay or forgo recommended services.^{5,6} One factor contributing to this phenomenon is lack of health insurance; uninsured people are less likely to receive healthcare services than insured,^{7–17} even at community health centers (CHCs) providing services at low or no cost to many uninsured patients.^{10,12,15}

Lack of insurance is associated with fewer office visits.^{18–24} It is unclear, however, whether access to primary care visits is sufficient to ensure that uninsured patients receive needed services, or whether insurance status is related to differential receipt of care even when patients have visits. It is hypothesized that there is a significant association between insurance status and receipt of recommended diabetes services at visits when services are due.

Methods

This study used electronic health record (EHR) data from 38 Oregon clinics in the OCHIN network (originally called the Oregon Community Health Information Network, but shortened to OCHIN when membership expanded beyond Oregon) with fully operational EHRs by 2005. Each patient has a single medical record shared across all OCHIN network clinics.¹³ Adults (aged ≥18 years) with diabetes were identified who had ≥2 primary care visits associated with an ICD-9 code for diabetes (type 1 or 2) at a study clinic before December 31, 2005, and ≥1 visit for any reason in 2006 and in 2007 (to ensure a minimum of care continuity). The combined EHR and Medicaid data sets used for this study provided detailed information about each patient's precise duration of coverage. Health insurance coverage start and stop dates from the EHR data were confirmed and supplemented for patients with Medicaid by creating linkages to Oregon's Medicaid enrollment data; these were assessed over a 2-year study period (January 1, 2006–December 31, 2007). Patients with a Medicare start date in the EHR data were assumed to have continuous coverage after that date. Patients with any private insurance were excluded because coverage intervals could not be verified ($n=521$). Patients in the final study population ($N=2,919$) were categorized as: continuously insured ($n=1,466$), continuously uninsured ($n=1,117$), or discontinuously insured (insured for part of the period; $n=336$). For discontinuously insured patients, the 2-year study period was segmented into insured and uninsured intervals. The appropriate IRBs approved the study protocol.

Standard procedure codes from the EHR were used to measure hemoglobin (HbA1c) monitoring, low-density lipoprotein (LDL) screening, influenza vaccination, and nephropathy screening (urine microalbumin). Patients were classified as due for HbA1c monitoring if last receipt was >180 days prior (recommended ≥2 times annually²⁵) or >365 days prior (LDL and microalbumin; recommended annually). Patients were considered due for an influenza vaccination if a visit occurred in October–April, with no influenza vaccination recorded for that season. The dependent variable was dichotomous, indicating receipt of service due at each visit such that if all four services were needed at a visit, then that visit contributed four times in the analysis.

Statistical Analyses

Data were analyzed in 2013 using SAS Enterprise, version 5.1 (SAS Institute Inc., Cary NC). Differences in demographic characteristics between the insurance groups were tested using Kruskal-Wallis and chi-square tests. Using the approach of Song and colleagues,²⁷ aggregate and individual measures of the odds of receiving services due at visit between insurance groups were estimated using a single covariate-adjusted generalized estimating equation (GEE) logistic model. The model included the type of service due (e.g., HbA1c, vaccination), interaction of service type, partial versus continuous insurance status, and insurance status at visit, allowing for estimation of aggregate and specific service ORs through contrast statements. Comparisons of continuously insured and uninsured were between groups. For the discontinuously insured group, comparisons were within group (i.e., uninsured versus insured periods). The specified within-patient correlation structure was compound symmetry and clinics were included as a fixed effect.²⁶ Only services due at any given visit were included in the analysis. The following potentially confounding characteristics were controlled for: age, gender, race, ethnicity, and income below the Federal Poverty Level (FPL).

Results

Demographic characteristics of the study population and visit characteristics by insurance status are shown in Table 1.

When considered in aggregate, continuously uninsured patients had lower odds of receiving services at visits when due, compared to the continuously insured (AOR=0.73, 95% CI=0.66, 0.80) (Figure 1A). When examining individual services, odds were significantly lower for all four services (HbA1c: AOR=0.86, 95% CI=0.77, 0.97; LDL: AOR=0.67, 95% CI=0.59, 0.76; microalbumin: AOR=0.73, 95% CI=0.62, 0.83; influenza vaccination: AOR=0.67, 95% CI=0.59, 0.76).

Discontinuously insured patients had lower aggregate odds of receiving services due at a visit when uninsured, compared to an insured visit (AOR=0.77, 95% CI=0.64, 0.92) (Figure 1B). Patients had lower odds of receiving HbA1c monitoring (AOR=0.71, 95% CI=0.56, 0.91) and microalbumin testing (AOR=0.73, 95% CI=0.56, 0.96) during uninsured versus insured visits. There were no statistically significant differences in receipt of LDL screening (AOR=0.81, 95% CI=0.62, 1.06) or influenza vaccination (AOR=0.83, 95% CI=0.63, 1.10) by insurance status at visit.

Discussion

Lack of health insurance is associated with poorer diabetes control.²³ Previous studies suggest that this could be due to uninsured patients utilizing fewer healthcare services than insured patients.^{10,15,23,28} This study adds new information to help explain this disparity: even when uninsured patients use healthcare services, they are still less likely to receive recommended diabetes preventive care at a visit compared to insured patients.

There are plausible reasons for why uninsured patients receive fewer services at visits when due. Out-of-pocket costs differ for insured versus uninsured patients; previous studies found that patients who lose their insurance often postpone services until they regain coverage.^{6,18,29,30} There may have also been differences in the nature of the visit (i.e., acute versus preventive) or in the number of competing demands for insured patients versus uninsured patients. Future research is warranted.

Given the health complications of uncontrolled diabetes, systems similar to those implemented for childhood immunizations³¹ might help ensure the delivery of diabetes services during office visits. EHR-based technologies could support such system-level interventions by generating reminders about services due,³² and by alerting patients to insurance renewal dates or coverage opportunities, especially with the expanded coverage options via the Affordable Care Act.³³ It is important for clinicians to know patient's insurance status at visits, and how it might affect decisions to decline or delay services that are due.³⁴

Limitations

These results might not generalize to privately insured patients. Services received outside of the OCHIN member clinics might have been missed; however, a previous study validated capture of diabetes preventive services in OCHIN's EHR data.³⁵ Patients were identified as having diabetes if they had two visits associated with a diabetes code; this excluded patients who had only one diabetes-related visit. Finally, the observational design of this study prevents the ability to draw causal inferences; however, the differential pattern of service receipt observed in the discontinuously insured subgroup suggests that insurance plays a key role, as patients served as their own controls, limiting changes in other characteristics that might confound the insurance effect.

Conclusions

Lack of insurance is associated with lower probability of receiving recommended services that are due during a clinic visit. Thus, the association between being uninsured and receiving fewer preventive services may not be completely mediated by access to clinic visits.

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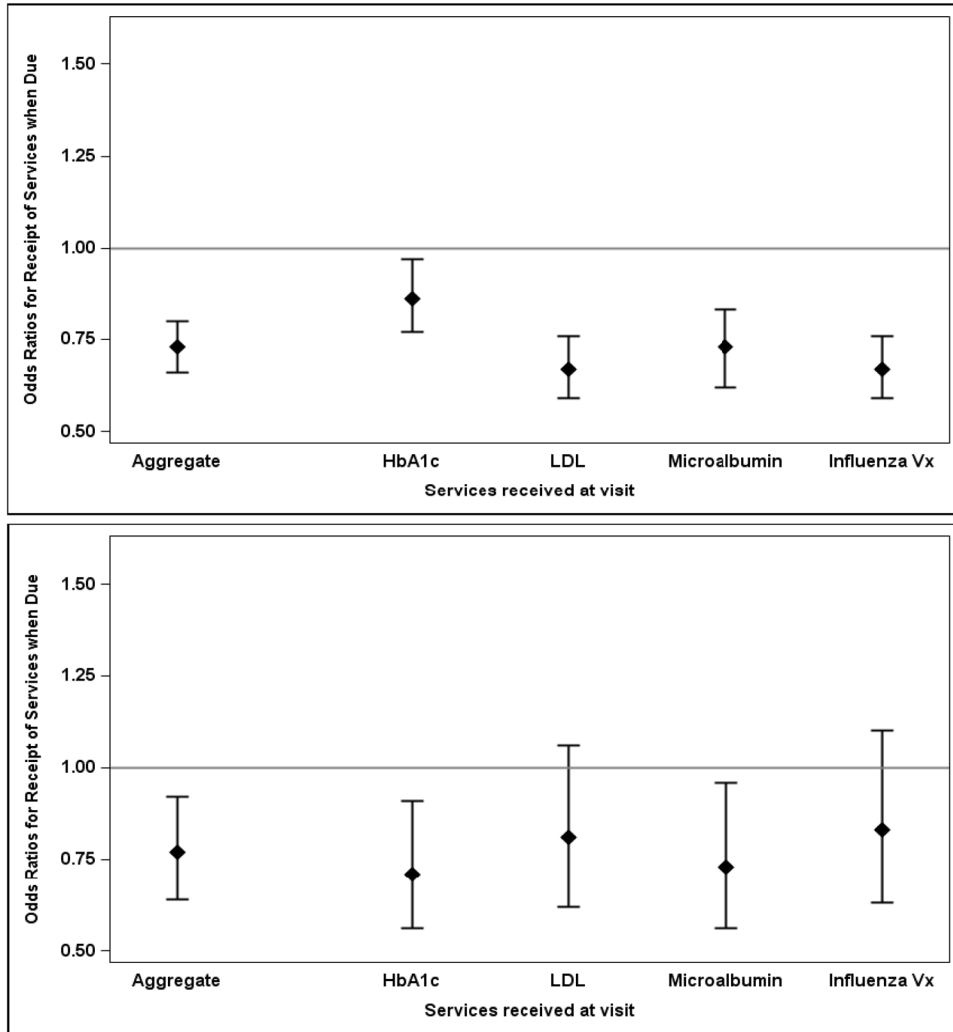


Figure 1.
 Figure 1A. Odds of a patient receiving services due at the time of visit: Continuously uninsured patients vs. continuously insured patients (reference group);
 Figure 1B. Odds of a discontinuously insured patient receiving services due at the time of visit: uninsured visits vs. visits when insured (reference group).
 Source. 2006–2007 data from 38 Oregon clinics in the OCHIN network that had fully operational electronic health records by 2005. Medicaid insurance status verified and supplemented by 2006–2007 Oregon Medicaid enrollment data.
 Notes. Diamonds represent estimated odds ratios; vertical lines represent corresponding 95% CIs. Odds ratios are estimated using a single generalized estimating equation (GEE) logistic regression of receipt of services at visits in which a service was due adjusted for fixed effects of the type of service due, clinic, gender, Hispanic ethnicity, race, age, and income below 100% of the Federal Poverty Level (FPL) ratios. Odds ratios of specific services and an aggregate measure of any service received when due are reported. HbA1c= hemoglobin

A1c; LDL=low-density lipoprotein; Microalbumin=urine microalbumin; Influenza vx=influenza vaccination.

Table 1
Demographic characteristics of study patients and visit characteristics: overall and by public insurance coverage, 2006–2007

DEMOGRAPHIC CHARACTERISTICS				P-value between groups*	
Patient Characteristics	Total	Continuously Insured	Discontinuously Insured	Continuously Uninsured	
Total N	2,919	1,466	336	1,117	
Median Age, years (25th%, 75th%)	54.9 (45.1–63.5)	58.8 (50.2–67.5)	54.9 (44.0–61.9)	49.6 (40.2–57.7)	<0.0001 ^a
Female, N (column %)	1780 (61.0%)	918 (62.6%)	191 (58.9%)	671 (60.0%)	0.1077 ^b
Hispanic, N (column %)	964 (33.0%)	166 (11.3%)	98 (29.2%)	700 (62.7%)	<0.0001 ^b
Minority Race ^c , N (column %)	430 (14.7%)	298 (20.3%)	50 (14.9%)	82 (7.3%)	<0.0001 ^b
<100% FPL ^d , N (column %)	2285 (78.3%)	1228 (83.8%)	262 (78.0%)	795 (71.2%)	<0.0001 ^b

VISIT CHARACTERISTICS				Total		Continuously Insured		Discontinuously Insured		Continuously Uninsured	
Visit Characteristics	Total	Continuously Insured	Discontinuously Insured	Continuously Insured	Discontinuously Insured	Insured Periods	Uninsured Periods	Insured Periods	Uninsured Periods	Insured Periods	Uninsured Periods
Visits where any service was due, N	47,965	26,421	3,358	2,179	16,007						
Visits where HbA1c was due, N (% of these visits in which service was received)	28,265 (18.5%)	10,792 (18.6%)	1,256 (20.7%)	918 (15.4%)	7,754 (18.5%)						
Visits where LDL was due, N (% of these visits in which service was received)	19,785 (8.2%)	9,558 (9.0%)	1,345 (8.0%)	1,050 (6.5%)	7,832 (7.6%)						
Visits where Microalbumin was due, N (% of these visits in which service was received)	32,847 (5.1%)	17,976 (5.2%)	2,382 (5.1%)	1,593 (3.5%)	10,896 (5.1%)						
Visits where Flu immunization was due, N (% of these visits in which service was received)	2,399 (9.8%)	1,398 (11.0%)	1,710 (8.9%)	1,180 (7.0%)	8,801 (8.7%)						

Source. Authors' analysis of 2006–2007 data from 38 Oregon clinics in the OCHIN network that had fully operational electronic health records by 2005. Medicaid insurance status verified and supplemented by 2006–2007 Medicaid enrollment data.

Boldface indicates statistical significance ($p < 0.05$).

^aKruskal-Wallis test.

^bChi-square test.

^cMinority race included patients with a designation of Black, Asian, Native American, Pacific Islander, Non-Caucasian, and "Other race."

^dFPL = Federal Poverty Level