BRIEF REPORT

Insurance Instability Among Community-Based Health Center Patients with Diabetes Post-Affordable Care Act Medicaid Expansion

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Background: **To evaluate insurance instability (churn) among adults with diabetes receiving care at community-based health centers (CHCs).**

Methods: **Retrospective cohort study using patients' electronic health records data for 300,158 adults aged 19 to 64 with ≥3 ambulatory visits between 2014 and 2019 of which 39,542 churned out of insurance. Generalized estimating equation-based (GEE) logistic regression models were fitted to assess the odds of churning.**

Results: **Among CHC patients, those with diabetes had 1.25 greater odds of churning than those without diabetes (aOR = 1.25; 95%CI = 1.18, 1.33). Among CHC patients with diabetes, the odds of churning were higher for those with uncontrolled diabetes, more complex medication regimens, and acute diabetes complication.**

Conclusions: **CHC patients with diabetes are more likely to experience insurance instability than those without diabetes. Outreach efforts to reduce the impact of the postpandemic Medicaid disenrollment among patients with diabetes and lower income will be critical to reduce harmful health consequences. (J Am Board Fam Med 2025;00:000–000.)**

Keywords: **Access to Care, Community Health Centers, Diabetes, Health Insurance, Insurance Coverage, Low-Income Population, Medicaid, Primary Health Care, Secondary Data Analysis, Social Determinants of Health**

Introduction

In March 2020, states received funding for their Medicaid programs if they allowed beneficiaries to remain enrolled – referred to continuous enrollment - until the end of the public health emergency, which expired May 2023.[1] As Medicaid continuous enrollment unwinds, millions of Americans have lost, and will continue to lose, insurance coverage – over 21 million as of May 2024.[2,3] Evidence shows that up to 65% of people who disenroll from Medicaid experience a period of uninsurance during the following year.[4] This pattern of short-term disenrollment has been associated with difficulty accessing care or medication, unmet health care needs, discontinuity of care,[5–8] and poor health outcomes.[8–10] Health insurance instability may be particularly challenging for patients with diabetes needing regular chronic care management to reduce the risk of diabetes complications. Yet little is known about the frequency of insurance instability (churning) among patients with diabetes and what factors may be associated with

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churning. Understanding churning among patients with diabetes could provide critical information for clinics serving patients at risk for Medicaid disenrollment.

Patients receiving care in community-based health centers (CHCs) may be at particularly high risk for insurance instability following unwinding of Medicaid continuous enrollment. CHCs serve over 30 million patients yearly and provide services regardless of patients' ability to pay. A substantial proportion of CHC patients have low income, are more likely to belong to racial and ethnic minority groups, and have multimorbidity.[11,12] Further, a large proportion of CHC patients do not have health insurance or are Medicaid beneficiaries.[11] Therefore, this study estimates the prevalence of, and factors associated with, churning out of health insurance coverage (lost Medicaid or lost Private insurance) among patients with diabetes receiving care in CHCs.

Methods

This retrospective cohort study uses electronic health records (EHR) data from the Accelerating Data Value Across a National Community Health Center Network (ADVANCE) of CHCs.[13] ADVANCE data are from OCHIN and Health Choice Network (HCN). OCHIN offers a fully hosted and tailored instance of OCHIN Epic practice management and EHR solutions. Similarly, HCN consists of a group of CHCs on a single EHR system. The data from OCHIN and HCN are centralized and standardized in the ADVANCE data warehouse using the PCORnet common data model.

We extracted data for 1,713,977 patients aged 19 to 64 seen in 354 clinics across 20 states, including Medicaid expansion and nonexpansion states, between January 2014 and December 2019 (the study period). We excluded patients who were pregnant between 2012 and 2019 or had Medicare coverage (n = 350,804) as they have different health care needs and access options. To determine longitudinal health insurance and churning status, we restricted the sample to patients with multiple ambulatory visits. Patients included had a baseline insured visit between 2014 and 2017, with ≥3 ambulatory visits occurring within the subsequent 3-year period, and ≥12 months separating the first and last of these visits (n = 300,158). Our sample included 44,864 patients with a diagnosis of diabetes (4.7% with type 1 and 95.3% with type 2 diabetes) at any time between 2012 and 2019 who were identified using ICD-9-CM and ICD-10-CM codes from problem list and encounter diagnoses, and 255,294 patients who did not have diabetes (no diagnosis, HbA1c ≥9 or insulin prescription during the study period).

Our primary outcome was a binary indicator distinguishing patients who churned out of insurance coverage vs those who did not. Those who churned (n = 39,542) were defined as having ≥2 consecutive uninsured visits. Those who did not churn included patients who had every visit insured (217,894) or a single uninsured visit (42,722). Among this last group, the uninsured visit could have been in between insured visits, possibly due to delay in enrollment (n = 30,910), or as their last visit (n = 11,812). Among the 30,910 group, 89% had their next insured visit within 12 months of the uninsured one. Insured visits were mostly paid for by Medicaid (55%), followed by Private insurance (29%), then a mix of payors (16%). Health insurance status from the EHR data are primarily based on information collected at each visit for billing purposes,[14] represent a reliable source of information on insurance status and services received at each visit, and demonstrated to have excellent agreement with Medicaid data in CHC settings.[15]

Characteristics of patients include sex, age, race and ethnicity, federal poverty level, and patient rural/urban residential classification. We assessed multimorbidity status (2+ conditions excluding diabetes diagnosis), baseline payor type (Medicaid or Private), and the average number of ambulatory visits during the study period. For patients with diabetes, we evaluated glycohemoglobin (HbA1c) following Centers for Medicare & Medicaid Services quality metric[16] to determine uncontrolled status (HbA1c >9.0 averaged over 3 years from the baseline visit); whether insulin was ever prescribed during the study period; and whether other diabetes medications were prescribed over the entire study period, categorized by the complexity of the medication regimen (eg, prior authorization, demonstrated nonresponse to prior medication). Acute diabetes-related complications (abnormal blood glucose, acute kidney failure, cardiac arrest, cardiac arrythmias, congestive heart failure, diabetic ulcer, glaucoma, hyperkalemia, hypertensive emergency, hypotension or shock, infections or closely related conditions, myocardial infarction, neuropathy, noncardiac, noncerebral artery complications, stroke, transient neurological deficit, or cerebral artery occlusion) were identified using ICD-9-CM and ICD-10-CM code classifications, had to occur on or after the

Table 1. Percent and Adjusted Odds of Insurance Churning Among Patients Seen in Community-Based Health Centers from 2014 to 2019*

	Total N = 300,158		Churned out of Insurance N = 39,542		Did Not Churn out of Insurance N = 260,616		aOR of Churning (95% CI)
	N	Col %	N	Row %	N	Row %	
Diabetes diagnosis							
Yes	44,864	14.9	7,954	17.7	36,910	82.3	**1.25 (1.18, 1.33)**
No	255,294	85.1	31,588	12.4	223,706	87.6	Reference
Sex							
Female	184,675	61.5	26,990	14.6	157,685	85.4	Reference
Male	115,483	38.5	12,552	10.9	102,931	89.1	**0.76 (0.71, 0.82)**
Age at baseline visit							
19 to 44	166,869	55.6	21,819	13.1	145,050	86.9	Reference
45 to 64	133,289	44.4	17,723	13.3	115,566	86.7	**0.86 (0.81, 0.90)**
Race/Ethnicity							
Non-Hispanic White	129,756	43.2	11,940	9.2	117,816	90.8	Reference
Hispanic	94,817	31.6	16,986	17.9	77,831	82.1	**1.87 (1.58, 2.22)**
Non-Hispanic Black	46,497	15.5	7,742	16.7	38,755	83.3	**1.73 (1.50, 1.99)**
Non-Hispanic Other	13,880	4.6	1,183	8.5	12,697	91.5	**0.85 (0.75, 0.98)**
Missing	15,208	5.1	1,691	11.1	13,517	88.9	**1.24 (1.09, 1.41)**
Federal poverty level							
≤138%	211,177	70.4	30,672	14.5	180,505	85.5	**1.31 (1.17, 1.47)**
>138%	54,467	18.1	6,662	12.2	47,805	87.8	Reference
Missing	34,514	11.5	2,208	6.4	32,306	93.6	**0.59 (0.46, 0.76)**
Patients' residence							
Rural	81,695	27.2	8,548	10.5	73,147	89.5	Reference
Urban	218,463	72.8	30,994	14.2	187,469	85.8	1.16 (0.93, 1.46)
Baseline payor type							
Medicaid	194,208	64.7	22,863	11.8	171,345	88.2	Reference
Private insurance	105,950	35.3	16,679	15.7	89,271	84.3	**1.68 (1.47, 1.92)**
Comorbidities excluding diabetes							
Mental health disorder only	37,487	12.5	4,582	12.2	32,905	87.8	1.06 (0.99, 1.14)
Physical comorbidity only	76,575	25.5	12,009	15.7	64,566	84.3	**1.16 (1.10, 1.24)**
Mental health and physical comorbidity	44,404	14.8	5,741	12.9	38,663	87.1	1.00 (0.91, 1.09)
None	141,692	47.2	17,210	12.1	124,482	87.9	Reference
Mean ambulatory visits, N (SD)	12.6	11.4	15.4	13.7	12.2	11.0	**1.02 (1.01, 1.03)**

Abbreviations: aOR, Adjusted odds ratio; CI, Confidence interval; SD, Standard deviation.
*Sample included non-pregnant patients aged 19-64 without Medicare coverage who had a baseline insured visit between 2014 and 2017, with ≥3 ambulatory visits occurring within the subsequent 3-year period, and at least 12 months separating the first and last of these visits between 2014 and 2019. Those who churned were defined as having ≥2 consecutive uninsured visits. Those who did not churn included those who had every visit insured or those who had one single uninsured. χ^2 tests for categorical variables and *t* test for continuous variables were used to test for differences between churning groups, except for age groups, all were significant at $P < .001$. Bolded estimates are significant at $P < .05$.

first diagnosis of diabetes, and were counted as distinct complications if the interval between diagnostic encounters was at least 10 days.[17]

Statistical Analysis

We conducted descriptive statistics to examine characteristics and health-related factors of the study population, both overall and stratified by churning and diabetes status and compared those who churn out of insurance with those who did not using χ^2 tests and *t* test. First, we evaluated the odds of churning by diabetes status using a generalized estimating equation-based (GEE) logistic regression model. This GEE model included an

Table 2. Percent and Adjusted Odds of Insurance Churning Among Patients with Diabetes Seen in Community-Based Health Centers from 2014 to 2019*

	Churned out of Insurance (n = 7954)		Did Not Churn out of Insurance (n = 36,910)		aOR of Churning (95% CI)
	N	Row %	N	Row %	
Sex					
Female	4,970	19.7	20,235	80.3	Reference
Male	2,984	15.2	16,675	84.8	**0.78 (0.72, 0.84)**
Age					
19 to 44	2,421	18.3	10,832	81.7	Reference
45 to 64	5,533	17.5	26,078	82.5	**0.87 (0.81, 0.93)**
Race/Ethnicity					
Non-Hispanic White	1,694	12.1	12,296	87.9	Reference
Hispanic	3,897	22.1	13,725	77.9	**1.81 (1.50, 2.19)**
Non-Hispanic Black	1,803	19.8	7,305	80.2	**1.58 (1.35, 1.85)**
Non-Hispanic Other	266	12.4	1,872	87.6	0.96 (0.81, 1.14)
Missing	294	14.7	1,712	85.3	**1.21 (1.04, 1.42)**
Federal poverty level					
≤138%	6,354	18.7	27,595	81.3	**1.33 (1.15, 1.54)**
>138%	1,276	16.9	6,283	83.1	Reference
Missing	324	9.7	3,032	90.3	0.68 (0.45, 1.03)
Patients' residence					
Rural	1,566	15.6	8,496	84.4	Reference
Urban	6,388	18.4	28,414	81.6	1.12 (0.87, 1.44)
Baseline payor type					
Medicaid	4,464	15.0	25,306	85.0	Reference
Private insurance	3,490	23.1	11,604	76.9	**1.94 (1.68, 2.25)**
Comorbidities excluding diabetes					
Mental health disorder only	310	16.1	1,616	83.9	0.99 (0.83, 1.18)
Physical comorbidity only	4,423	19.1	18,708	80.9	1.08 (0.99, 1.17)
Mental health and physical comorbidity	1,864	15.7	10,002	84.3	0.93 (0.84, 1.04)
None	1,357	17.1	6,584	82.9	Reference
Mean ambulatory visits, N (SD)	19.5	15.7	16.9	12.8	**1.01 (1.00, 1.01)**
HbA1c control					
≤9	5,343	16.4	2,7182	83.6	Reference
>9	2,465	21.9	8,782	78.1	**1.33 (1.24, 1.43)**
Missing	146	13.4	946	86.6	1.10 (0.87, 1.39)
Diabetes medication regimen complexity					
No medication	946	12.7	6,498	87.3	Reference
Lower complexity	4,874	18.0	22,155	82.0	**1.35 (1.24, 1.47)**
High complexity	2,134	20.5	8,257	79.5	**1.33 (1.19, 1.49)**
Ever with insulin					
Yes	3,496	19.6	14,360	80.4	1.06 (0.98, 1.13)
No	4,458	16.5	22,550	83.5	Reference

Continued

indicator denoting if a patient had diabetes (yes vs no) while controlling for demographic and health-related covariates. Second, we restricted our sample to patients with a diabetes diagnosis and further evaluated the associations between demographic/health-related factors and churning. All GEE models accounted for clustering of patients within clinics using an exchangeable working correlation and robust standard errors. All analyses were 2-sided with statistical significance set at type I error of 5%. Analyses were conducted using R Core Team (2021) and Stata version 17.0 (StataCorp

Table 2. Continued

	Churned out of Insurance (n = 7954)		Did Not Churn out of Insurance (n = 36,910)		aOR of Churning (95% CI)
	N	Row %	N	Row %	
Acute complications during study period					
0	6,614	17.2	31,764	82.8	Reference
1	807	21.6	2,922	78.4	**1.20 (1.08, 1.33)**
≥ 2	533	19.3	2,224	80.7	1.00 (0.87, 1.15)

Abbreviations: aOR, Adjusted odds ratio, CI, Confidence interval.
*Sample included non-pregnant patients aged 19-64 without Medicare coverage who had a baseline insured visit between 2014 and 2017, with ≥3 ambulatory visits occurring within the subsequent 3-year period, and at least 12 months separating the first and last of these visits between 2014 and 2019. Those who churned were defined as having ≥2 consecutive uninsured visits. Those who did not churn included those who had every visit insured or those who had one single uninsured. χ^2 tests for categorical variables and *t* test for continuous variables were used to test for differences between churning groups, except for age groups, all were significant at $P < .001$. Bolded estimates are significant at $P < .05$.

2021). The University's Institutional Review Board approved the study.

Results

Among the 300,158 patients in the cohort, 17.0% (n = 7,954) of patients with diabetes experienced churning, while 12.0% (n = 31,588) of patients without diabetes experienced churning. Overall, among those who experience churning, 58% lost Medicaid coverage and 42% lost private insurance. The median number of visits following churning over the study period was 4 visits (range 0 to 201). The rate of patients with diabetes experiencing churning varied by state of residence from 5.0% in Massachusetts to 48.2% in Texas (Appendix Tables 1). Among patients with diabetes who lost Medicaid coverage, 46% remained uninsured, 11% switched to private insurance, and 42% regained Medicaid. Among patients with diabetes who lost private coverage, 61% remained uninsured, 8% gained Medicaid insurance, and 31% reenrolled into private insurance. The multivariate analysis shows that patients with diabetes had 1.25 greater odds of insurance churning than patients without diabetes [adjusted odd ratio (aOR) = 1.25; 95%CI = 1.18, 1.33], after adjusting for demographic and health-related factors (Table 1).

Among patients with diabetes, those who were female, aged 19 to 44, non-Hispanic Black, or Hispanic had higher odds of churning than their counterparts (Table 2). Patients with diabetes who had private insurance before churning, had more ambulatory visits, or had both physical and mental health comorbidities also had higher odds of churning than their counterparts. Patients with uncontrolled diabetes had greater likelihood of churning (aOR = 1.33; 95%CI = 1.24, 1.43). Those with more complex diabetes medication regimens (aOR = 1.33; 95%CI = 1.19, 1.49) or with an acute diabetes complication (aOR = 1.20; 95%CI = 1.08, 1.33) had higher odds of churning. Having a prescription of insulin was not associated with churning likelihood.

We conducted a sensitivity analysis removing 42,722 patients with a single uninsured visit from the nonchurning group and found the same pattern of results (Appendix Tables 2 and 3).

Discussion

Overall, our findings suggest that, among patients who receive care at CHCs, those with diabetes are more likely to experience insurance instability than those without diabetes. This finding could be an artifact of visit data because patients with diabetes typically have more frequent visits and may be more likely to continue to visit their clinic during a period of uninsurance. In contrast, patients without diabetes may forgo care during a period of uninsurance leading to an underestimated rate of churning in this group. Future research is needed to evaluate the prevalence of churning among patients with other chronic health conditions to determine whether this result is specific to diabetes or not.

Notably, this analysis shows association and not causation; the methods used here do not demonstrate that churning leads to higher HbA1c, or the inverse. Future research is needed to assess the nature of the association between churning

and diabetes outcomes. Further, our sample was restricted to patients with at least 3 ambulatory visits and does not capture those who exited the health system within the network. This restriction likely underestimates the rate of churning; however, a previous study showed that patient attrition within CHCs over a 3-year period is less than 20%.[18] Lastly, among those who did not churn, 5% had their last encounter as uninsured and may have been misclassified; although the sensitivity analysis (Appendix Tables 2 and 3) removing these patients from the sample did not alter the results.

It is worrisome that patients with poorer diabetes outcomes, such as uncontrolled diabetes and acute complications, seem more likely to experience insurance instability than those with better diabetes management. As millions of Americans are disenrolled from Medicaid following the end of the public health emergency, CHCs must prepare for an influx of patients with diabetes experiencing insurance instability.[19] In addition, private insurance premiums are expected to increase which could lead to more patients becoming uninsured.[20] Fortunately, CHCs provide care regardless of patients' insurance coverage, but Medicaid is an important source of revenue for CHCs. In addition, while it may be expected that people churning out of Medicaid would enroll in marketplace plans, our study suggests that a large proportion will become and remain uninsured (51%) and few enroll in private insurance (11%). The Centers for Medicare and Medicaid Services have suggested strategies states can implement to reduce the impact of disenrollment on beneficiaries.[21] These strategies focus on reducing administrative burden and assisting beneficiaries with renewal efforts, but does not include patients who lose eligibility and are at risk of being uninsured. CHCs can provide limited assistance to help patients enroll in marketplace insurance but the increased demand may be prohibitive. State efforts should emphasize outreach and assistance to facilitate marketplace insurance enrollment and not focus exclusively on Medicaid re-enrollment and/or create state-sponsored insurance programs for people who are unable to afford or are ineligible for marketplace coverage.

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Appendix Table 1. Number and Percent of Insurance Churning Among Patients with Diabetes Seen in Community-Based Health Centers by State from 2014 to 2019*

State	Patients with Diabetes N	Patients with Diabetes who Churn out of Insurance N (%)
AK**	<150	<30 (17.9)
CA	6,588	892 (13.5)
FL	10,779	2,529 (23.5)
HI	441	43 (9.8)
IN	767	125 (16.3)
KS	248	69 (27.8)
MA	1,001	50 (5.0)
MD	899	120 (13.3)
MN	356	60 (16.9)
MO	706	184 (26.1)
MT	333	55 (16.5)
NC	1,756	437 (24.9)
NM	3,454	382 (11.1)
NV**	<50	<10 (17.0)
OH	2,334	383 (16.4)
OR	10,374	2,041 (19.7)
RI	2,238	195 (8.7)
TX	137	66 (48.2)
WA	1,372	158 (11.5)
WI	894	132 (14.8)

*Sample included non-pregnant patients aged 19-64 without Medicare coverage who had a baseline insured visit between 2014 and 2017, with ≥3 ambulatory visits occurring within the subsequent 3-year period, and at least 12 months separating the first and last of these visits between 2014 and 2019. Those who churned were defined as having ≥2 consecutive uninsured visits.
**Numbers <10 are masked to protect patients' identities.

Appendix Table 2. Percent and Adjusted Odds of Insurance Churning Among Patients Seen in Community-Based Health Centers from 2014 to 2019* - Excluding 42,722 Patients with a Single Uninsured from Those Who Did Not Churn

	Total N = 257,436		Churned out of Insurance N = 39,542		Did not Churn out of Insurance N = 217,894		aOR of Churning (95% Cl)
	N	Col %	N	Row %	N	Row %	
Diabetes diagnosis							
Yes	37,775	14.7	7,954	21.1	29,821	78.9	**1.27 (1.19, 1.35)**
No	219,661	85.3	31,588	14.4	188,073	85.6	Reference
Sex							
Female	158,031	61.4	26,990	17.1	131,041	82.9	Reference
Male	99,405	38.6	12,552	12.6	86,853	87.4	**0.76 (0.71, 0.82)**
Age at baseline visit							
19-44	143,124	55.6	21,819	15.2	121,305	84.8	Reference
45-64	114,312	44.4	17,723	15.5	96,589	84.5	**0.85 (0.80, 0.90)**
Race/Ethnicity							
Non-Hispanic White	112,487	43.7	11,940	10.6	10,0547	89.4	Reference
Hispanic	81,149	31.5	16,986	20.9	64,163	79.1	**1.93 (1.61, 2.31)**
Non-Hispanic Black	38,512	15	7,742	20.1	30,770	79.9	**1.85 (1.59, 2.16)**
Non-Hispanic Other	12,019	4.7	1,183	9.8	10,836	90.2	**0.85 (0.73, 0.98)**
Missing	13,269	5.2	1,691	12.7	11,578	87.3	**1.25 (1.09, 1.43)**
Baseline payor type							
Medicaid	165,417	64.3	22,863	13.8	142,554	86.2	Reference
Private	92,019	35.7	16,679	18.1	75,340	81.9	**1.71 (1.49, 1.96)**
Federal poverty level							
≤138%	179,246	69.6	30,672	17.1	148,574	82.9	**1.34 (1.19, 1.51)**
>138%	47,195	18.3	6,662	14.1	40,533	85.9	Reference
Missing	30,995	12	2,208	7.1	28,787	92.9	**0.56 (0.44, 0.73)**
Patients' residence							
Rural	70,817	27.5	8,548	12.1	62,269	87.9	Reference
Urban	186,619	72.5	30,994	16.6	155,625	83.4	1.18 (0.92, 1.51)
Comorbidities excluding diabetes							
Mental health disorder only	32,046	12.4	4,582	14.3	27,464	85.7	1.06 (0.98, 1.14)
Physical comorbidity only	65,421	25.4	12,009	18.4	53,412	81.6	**1.16 (1.09, 1.23)**
Mental health and physical comorbidity	37,704	14.6	5,741	15.2	31,963	84.8	0.98 (0.89, 1.08)
None	122,265	47.5	17,210	14.1	105,055	85.9	Reference
Mean ambulatory visits, (SD)	12.4	10.9	15.4	13.7	11.8	10.3	**1.03 (1.02, 1.03)**

Abbreviations: aOR, Adjusted odds ratio, CI, Confidence interval; SD, standard deviation.
*Sample included non-pregnant patients aged 19-64 without Medicare coverage who had a baseline insured visit between 2014 and 2017, with ≥3 ambulatory visits occurring within the subsequent 3-year period, and at least 12 months separating the first and last of these visits between 2014 and 2019. Those who churned were defined as having ≥2 consecutive uninsured visits. Those who did not churn included those who had every visit insured. Those with one uninsured visit among those who did not churn were excluded
Chi-square tests for categorical variables and t-tests for continuous variables were used to test for differences between churning groups, except for age groups, all were significant at $p < .001$.
Bolded estimates are significant at $p < .05$.

Appendix Table 3. Percent and Adjusted Odds of Insurance Churning Among Patients With Diabetes Seen in Community-Based Health Centers from 2014 to 2019* - Excluding 42,722 Patients with a Single Uninsured from Those Who Did Not Churn

	Churned out of Insurance (N = 7,954)		Did not Churn out of Insurance (N = 29,821)		aOR of Churning (95% Cl)
	N	Row %	N	Row %	
Sex					
Female	4,970	23.4	16,277	76.6	Reference
Male	2,984	18.1	13,544	81.9	**0.78 (0.72, 0.85)**
Age					
19-44	2,421	21.6	8,782	78.4	Reference
45-64	5,533	20.8	21,039	79.2	**0.88 (0.82, 0.94)**
Race/Ethnicity					
Non-Hispanic White	1,694	14.3	10,155	85.7	Reference
Hispanic	3,897	26.1	11,037	73.9	**1.84 (1.51, 2.25)**
Non-Hispanic Black	1,803	24.1	5,675	75.9	**1.67 (1.41, 1.99)**
Non-Hispanic Other	266	14.8	1,536	85.2	0.97 (0.81, 1.16)
Missing	294	17.2	1,418	82.8	**1.21 (1.03, 1.43)**
Baseline payor type					
Medicaid	4,464	17.9	20,502	82.1	Reference
Private	3,490	27.2	9,319	72.8	**2.00 (1.71, 2.33)**
Federal poverty level					
≤138%	6,354	22.3	22,091	77.7	**1.37 (1.17, 1.59)**
>138%	1,276	20	5,109	80	Reference
Missing	324	11	2,621	89	**0.65 (0.42, 0.99)**
Patients' residence					
Rural	1,566	18.3	6,970	81.7	Reference
Urban	6,388	21.8	22,851	78.2	1.14 (0.86, 1.51)
Comorbidities excluding diabetes					
Mental health disorder only	310	19.3	1,298	80.7	0.99 (0.82, 1.20)
Physical comorbidity only	4,423	22.7	15,093	77.3	1.06 (0.97, 1.15)
Mental health and physical comorbidity	1,864	18.7	8,128	81.3	0.91 (0.81, 1.02)
None	1,357	20.4	5,302	79.6	Reference
Mean ambulatory visits, (SD)	19.5	15.7	16.4	12.2	**1.02 (1.01, 1.02)**
HbA1c control					
≤9	5,343	19.4	22,168	80.6	Reference
>9	2,465	26.5	6,850	73.5	**1.40 (1.30, 1.50)**
Missing	146	15.4	803	84.6	1.12 (0.88, 1.43)
Diabetes medication regimen complexity					
No medication	146	15.4	803	84.6	Reference
Lower complexity	4,874	21.3	1,7979	78.7	**1.38 (1.26, 1.51)**
High complexity	2,134	24.9	6,431	75.1	**1.39 (1.23, 1.58)**
Ever with insulin					
Yes	3,496	23.5	11,411	76.5	1.05 (0.97, 1.13)
No	4,458	19.5	18,410	80.5	Reference

Continued

Appendix Table 3. Continued

	Churned out of Insurance (N = 7,954)		Did not Churn out of Insurance (N = 29,821)		aOR of Churning (95% CI)
	N	Row %	N	Row %	
Acute complications during study period					
0	6,614	20.5	25,713	79.5	Reference
1	807	25.7	2,327	74.3	**1.19 (1.06 1.33)**
≥2	533	23	1,781	77	0.97 (0.84, 1.13)

Abbreviations: aOR, Adjusted odds ratio, CI, Confidence interval.
*Sample included non-pregnant patients aged 19-64 without Medicare coverage who had a baseline insured visit between 2014 and 2017, with ≥3 ambulatory visits occurring within the subsequent 3-year period, and at least 12 months separating the first and last of these visits between 2014 and 2019. Those who churned were defined as having ≥2 consecutive uninsured visits. Those who did not churn included those who had every visit insured. Those with one uninsured visit among those who did not churn were excluded. Chi-square tests for categorical variables and t-tests for continuous variables were used to assess differences between churning groups, except for age groups, all were significant at $p < .001$.
Bolded estimates are significant at $p < .05$.