



The COVID-19 Pandemic and Changes in Health Care Utilization Among Patients With Type 2 Diabetes

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The coronavirus disease 2019 (COVID-19) pandemic has significantly disrupted the provision of non-COVID-19–related medical care (1). This may disparately impact patients with type 2 diabetes, as prolonged disruptions to physician services and regular hemoglobin A_{1c} (HbA_{1c}) testing could negatively impact glycemic control and increase the probability of acute complications (2). While recent research finds no observable changes in medication fill rates or HbA_{1c} levels (3), evidence of how pandemic-induced disruptions impact health outcomes remains limited. In this study, we leveraged electronic health record data from Epic's Cosmos research platform to identify a large, geographically diverse cohort of adults (aged ≥18 years) with type 2 diabetes and examined changes in utilization of diabetes-related outpatient services and acute care for diabetes-related complications during the pandemic.

We constructed a cohort of 41,821 adults (mean age 63.4 years; 57.5% female) with type 2 diabetes without evidence of complications, identified using billing diagnosis codes from 1 March 2018 to 28 February 2019. We assessed changes in utilization of HbA_{1c} tests, outpatient visits (in-person and telehealth), emergency department (ED) visits, and inpatient admissions between the prepandemic period (1 March 2019 to 29 February 2020) and during-pandemic period (1 March 2020 to 28 February 2021). We used an asymptotic McNemar

test to compare the proportion of patients who utilized at least one of a given service during each period and calculated a 95% Wald CI for the difference (during-pandemic proportion minus prepandemic proportion). For select services, we performed a paired *t* test to assess the mean patient-level difference in utilization between the two periods (during-pandemic volume minus prepandemic volume). We performed analyses using Python v.3.8.5. The Columbia University Institutional Review Board determined that this study did not require review.

Table 1 presents our results. We first evaluated changes in routine outpatient utilization. There were decreases in the proportion of patients who obtained HbA_{1c} testing (−8.3 percentage points [pp]; 95% CI −8.6, −7.9) and number of tests per patient (−0.36; 95% CI −0.37, −0.35). While the proportion of patients with diabetes-related telehealth visits increased by 18.0 pp (95% CI 17.6, 18.4) and the number of visits per patient increased by 0.31 (95% CI 0.31, 0.32), greater telehealth engagement only partially offset a larger, concurrent decline for in-person visits. There were decreases in both the proportion of patients with diabetes-related in-person office visits (−17.2 pp; 95% CI −17.7, −16.8) and the number of visits per patient (−1.11; 95% CI −1.13, −1.08). Overall utilization of nonemergent outpatient visits declined, with decreases in both the proportion

of patients with diabetes-related outpatient visits (−13.5 pp; 95% CI −13.9, −13.1) and number of visits per patient (−0.79; 95% CI −0.82, −0.77).

We then examined changes in acute care utilization. Despite declining proportions of patients with all-cause ED visits (−4.9 pp; 95% CI −5.4, −4.4) or inpatient admissions (−1.2 pp; 95% CI −1.6, −0.9), the proportions with ED visits or inpatient admissions for diabetes-related complications did not change significantly. There were small-magnitude increases in the numbers of complication-related ED visits (0.004; 95% CI 0.0002, 0.009) and inpatient admissions (0.005; 95% CI 0.001, 0.009) per patient.

Lastly, to assess glycemic control, we evaluated the change in mean HbA_{1c} level for each patient. There was a small increase in HbA_{1c} (0.05%; 95% CI 0.04, 0.06) between the two periods.

The observed decrease in routine outpatient utilization during the pandemic is consistent with prior research (3,4). Despite this reduction in outpatient care, the proportion of patients who received ED or inpatient treatment for diabetes with newly documented complications did not change significantly, suggesting that the incidence of complications requiring acute care has not increased during the pandemic. However, our analysis may not capture gradual changes in disease severity. In particular, the observed slight increase in mean HbA_{1c}

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Table 1—Changes in service utilization and HbA_{1c} levels between 1 March 2019 to 29 February 2020 and 1 March 2020 to 28 February 2021

	Proportion of patients with any utilization during the period			Patient-level difference in utilization volume or HbA _{1c} level						
	Prepandemic proportion (%)	During-pandemic proportion (%)	Difference in proportions (pp)	95% CI	Mean HbA _{1c} prepandemic	Mean HbA _{1c} during-pandemic	Mean no. of services, prepandemic	Mean no. of services, during pandemic	Mean patient-level difference	95% CI
Outpatient services										
HbA _{1c} tests	80.6	72.4	-8.3	(-8.6, -7.9)			1.75	1.39	-0.36	(-0.37, -0.35)
In-person office visits										
All-cause	93.9	84.0	-9.9	(-10.2, -9.5)						
Diabetes-related	84.6	67.4	-17.2	(-17.7, -16.8)			3.03	1.93	-1.11	(-1.13, -1.08)
Telehealth visits										
All-cause	0.5	44.8	+44.2	(+43.7, +44.7)						
Diabetes-related	0.04	18.0	+18.0	(+17.6, +18.4)			0.0004	0.32	+0.31	(+0.31, +0.32)
Nonemergent outpatient visits										
All-cause	93.9	87.6	-6.3	(-6.6, -6.0)						
Diabetes-related	84.6	71.1	-13.5	(-13.9, -13.1)			3.03	2.24	-0.79	(-0.82, -0.77)
Acute care services										
ED visits										
All-cause	26.3	21.4	-4.9	(-5.4, -4.4)						
Diabetes-related complications	5.3	5.4	+0.1	(-0.1, +0.4)			0.071	0.075	+0.004	(+0.0002, +0.009)
Hospital inpatient admissions										
All-cause	9.8	8.6	-1.2	(-1.6, -0.9)						
Diabetes-related complications	3.9	4.2	+0.2	(-0.03, +0.5)			0.051	0.056	+0.005	(+0.001, +0.009)
HbA _{1c} % (mmol/mol)					7.13 (54)	7.18 (55)			+0.05	(+0.04, +0.06)

could forewarn deteriorating glycemic control or worsening of underlying complications over time. Moreover, we identified increases in the numbers of ED visits and inpatient admissions for diabetes-related complications, which appear to be concentrated among a small number of patients. Additional research is warranted to determine whether this higher intensity of care is associated with increased disease severity as well as how pandemic-driven changes to care-seeking behavior have influenced acute care utilization decisions (5).

Our study has several limitations. We assessed increased morbidity through acute care utilization 1 year into the pandemic, which may not capture incremental disease progression or longer-term effects. We did not control for patient-specific factors or secular trends impacting utilization. Lastly, our findings reflect trends among patients at Cosmos-participating health systems and may not generalize to other populations.

Despite these limitations, our study provides preliminary evidence that during the pandemic, reductions in outpatient care have not been accompanied by clear changes in acute care for diabetes-related complications. As the pandemic persists, continued research and careful monitoring are needed to better understand the extent to which pandemic-induced care disruptions adversely impact long-term health outcomes for patients with diabetes.

Duality of Interest. No potential conflicts of interest relevant to this article were reported.

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