

Letters

RESEARCH LETTER

Diabetes Care and Glycemic Control During the COVID-19 Pandemic in the United States

Dramatic reductions in outpatient visits and laboratory testing early in the COVID-19 pandemic^{1,2} raised concerns about gaps in diabetes management and glycemic control.³ We therefore compared weekly rates of diabetes-related outpatient visits, screening tests, medication fills, and patients' hemoglobin A_{1c} (HbA_{1c}) levels in 2020 vs 2019 in a national cohort of adults with type 2 diabetes.



[Supplemental content](#)

Methods | Using deidentified claims from OptumLabs Data Warehouse,⁴ we created 2 cohorts of adults (age ≥18 years) with

type 2 diabetes and continuous enrollment in commercial or Medicare Advantage health plans (criteria are listed in the [Supplement](#)).⁵ The 2019 cohort was identified using 2018 data, and their outcomes were assessed during 2019. The 2020 cohort was identified using 2019 data and their outcomes were assessed during 2020.

We measured the proportion of patients in each cohort who received 1 or more of a given service in a week (services are defined in the [Supplement](#)). Outpatient visits included in-person or telemedicine visits. Glycemic control was assessed as the mean weekly HbA_{1c} level for the 41% of patients with available test results. Our study periods were the first 48 weeks of 2019 and 2020; we classified weeks 1 through 10 of 2020 as the prepandemic period and weeks 11 through 48 as the pandemic period.

Table. Characteristics of Patients With Type 2 Diabetes in the Study Cohorts (2019, 2020)

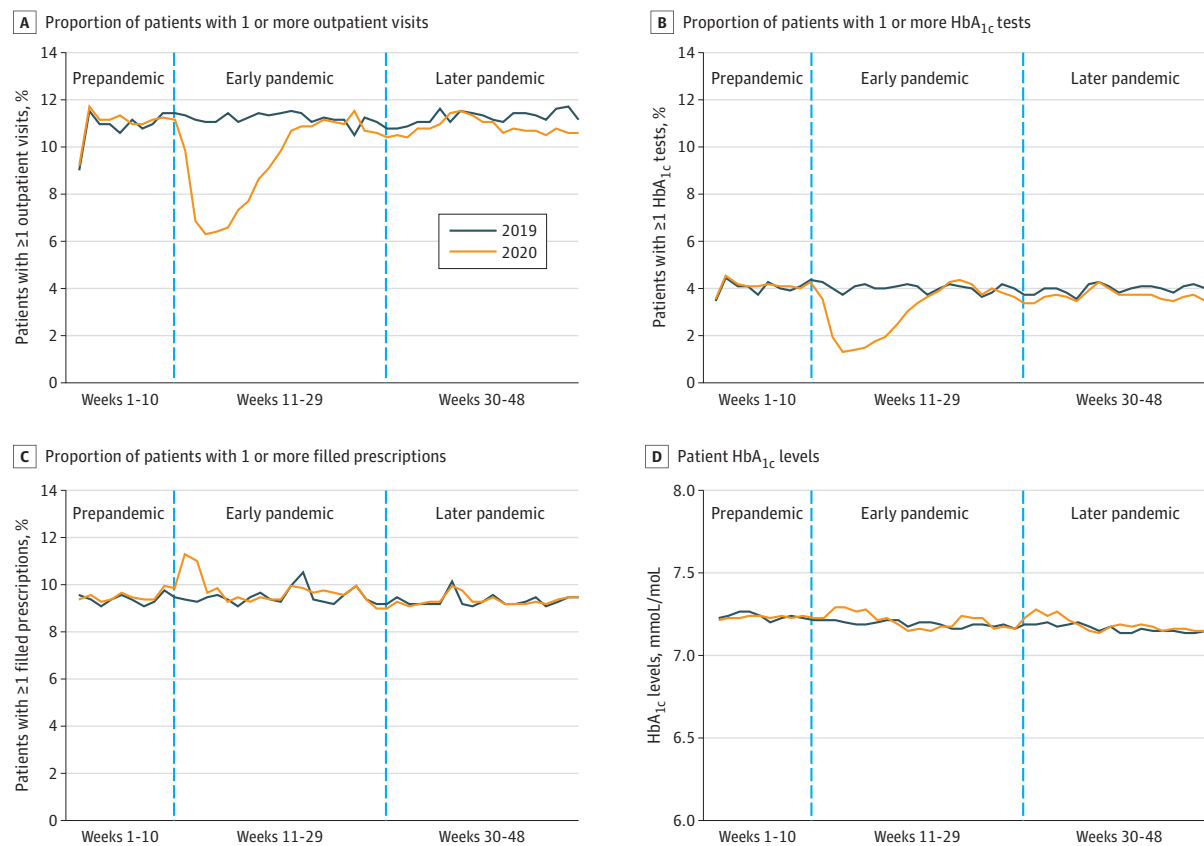
Characteristic	No. (%)		Standardized difference ^a
	2019	2020	
Total cohort	1 357 029	1 364 522	
Age (mean)	67.0	67.2	0.02
Medication type			
Insulin users	213 369 (16)	217 978 (16)	0.01
Sulfonylurea users	272 038 (20)	269 058 (20)	0.01
Proportion of patients receiving service in prior year (2018 for 2019 cohort, 2019 for 2020 cohort)			
Outpatient visit	1 254 176 (92)	1 262 357 (93)	0
Hemoglobin A _{1c} test	1 209 563 (89)	1 227 942 (90)	0.03
Prescription fill	891 135 (66)	914 222 (67)	0.03
Retinal examination	111 960 (8)	111 297 (8)	0
Nephropathy examination	738 832 (54)	759 800 (56)	0.02
Insurance type			
Commercial	510 053 (38)	496 984 (36)	0.02
Medicare advantage	846 976 (62)	867 538 (64)	0.02
Gender			
Female	685 280 (51)	690 323 (51)	0
Urban/rural designation ^b			
Urban	1 108 481 (82)	1 111 457 (82)	0
Large rural	133 905 (10)	136 810 (10)	0
Small rural	71 364 (5)	72 321 (5)	0
Rural isolated	40 750 (3)	41 196 (3)	0
County median household income, quartile ^c			
Low (<\$41 042)	409 442 (30)	411 807 (30)	0
2 (\$41 042-\$52 197)	356 664 (26)	359 837 (26)	0
3 (\$52 198-\$69 240)	281 847 (21)	283 502 (21)	0
High (>\$69 240)	305 351 (23)	305 442 (22)	0
County % White individuals, quartile ^c			
Low (<42.3%)	269 247 (20)	265 244 (19)	0.04
2 (42.3%-69.7%)	374 490 (28)	374 223 (28)	0.04
3 (69.8%-85.8%)	346 278 (26)	346 628 (25)	0.04
High (>85.8%)	363 289 (27)	374 493 (28)	0.04

^a Standardized difference <0.05 for each patient characteristic, below the 0.10 threshold signifying minimal difference consistent with established methodology.

^b Rural-urban commuting area per the 4-category US Census designation.

^c Enrollee county-level race and income indicators from the 2010 US Census. For meaningful interpretation, we divided county-level measures into quartiles (ie, percentage with White and median household income).

Figure. Proportion of Patients Receiving Diabetes-Related Care and HbA_{1c} Levels in a Given Week (January 1, 2020, through December 1, 2020) Compared With the Same Weeks in 2019



Among patients in the cohorts, 42% (n = 570 492) and 41% (n = 554 275) had at least 1 HbA_{1c} laboratory result in 2019 and 2020 cohorts, respectively.

To assess for differences in 2020 vs 2019, we calculated the average marginal effects from logistic and linear regression models adjusting for patient characteristics comparing weeks 1 through 10 and 11 through 48 of 2020 vs the same periods of 2019. Standard errors were clustered at the patient level. To address potential selection bias in which patients received a HbA_{1c} test result, we conducted sensitivity analyses testing HbA_{1c} levels within individual patients (detailed in the [Supplement](#)), with similar findings.

Statistical analyses were performed in SAS, version 9.4. The Harvard Medical School institutional review board exempted this study from review owing to the use of deidentified data.

Results | There were 1 357 029 and 1 364 522 adults with diabetes in the 2019 and 2020 cohorts, respectively, with similar baseline characteristics ([Table](#)). In 2019, 0.3% of cohort had 1 or more telemedicine visit, compared with 29.1% of the 2020 cohort during the pandemic period.

During the prepandemic period, there was no clinically meaningful difference between the cohorts across all 6 outcome measures ([Figure](#)). Early in the pandemic period, there were large reductions in visits and testing that rebounded to near-baseline levels by week 48. Across the entire pandemic period, adjusted use was lower in 2020 compared with 2019

for outpatient visits (85.0% vs 87.3% of patients in 2020 and 2019 cohorts with ≥1 outpatient visit during pandemic period; relative percent change -2.6%), HbA_{1c} testing (76.5% vs 81.8%; -6.5%), retinopathy testing (5.6% vs 6.9%; -18.8%), and nephropathy testing (40.1% vs 43.9%; -8.5%). In contrast, medication fill rates were similar during the pandemic period of 2020 as compared with 2019 (64.2% vs 62.2%; 3.6%). Levels of HbA_{1c} were nearly identical during the pandemic period of 2020 compared with 2019 (7.16% vs 7.14%; 0.3%). Due to sample size, all comparisons between 2020 and 2019 were statistically significant at $P < .001$.

Discussion | While diabetes-related outpatient visits and testing fell during the pandemic, we observed no evidence of a negative association with medication fills or glycemic control. One explanation for these patterns could be the small increase in medication fill rates during the pandemic that may have protected against any disruptions in diabetes self-management during the pandemic and hence staved off detrimental effects on glycemic control. Mail-order pharmacies and pharmacy delivery services may have been key during the pandemic in ensuring patients receive their medications. Together, these would be consistent with diabetes disaster preparedness guidelines, which emphasize prioritizing access to

medications over access to health care professionals during an emergency.⁶

The unprecedented increase in telemedicine visits we observe during the pandemic, although unable to overcome the overall decrease in visits, may have prevented substantive disruptions in medication prescribing. Our findings also emphasize that there is not a direct relationship between visit frequency and glycemic control. Limitations of our findings include that the results may not generalize to other populations such as those with Medicaid insurance or the uninsured.

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Author Contributions: Dr Patel had full access to all of the data in the study and takes responsibility for the integrity of the data and the accuracy of the data analysis.

Concept and design: Patel, Barnett, Mehrotra.

Acquisition, analysis, or interpretation of data: All authors.

Drafting of the manuscript: Patel.

Critical revision of the manuscript for important intellectual content: All authors.

Statistical analysis: Patel, Barnett.

Obtained funding: Mehrotra.

Administrative, technical, or material support: McCoy, Mehrotra.

Supervision: Mehrotra.

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