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Effect of the Affordable Care Act on diabetes care at major health centers: newly detected diabetes and diabetes medication management

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The adoption of the Affordable Care Act (ACA)[1] in the USA expanded health insurance for low-income Americans and took two main forms: Medicaid expansion in some states and subsidized private health insurance through insurance exchanges available in all states, with deep subsidies for persons with incomes from 138% to 250% of the federal poverty limit (FPL) in Medicaid expansion states and from 100% to 250% of the FPL in non-expansion states. Prior studies found a statistically significant slightly negative[2] effects of the ACA on diabetes diagnoses and controversial (from insignificantly slightly positive[3] to significantly positive[4]) effects on diabetes therapies at county and state levels. We examined the effect of both forms of ACA reform on the improvement of diabetes diagnostics and management in low-income patients who had access to healthcare before the ACA expansion (2011–2013).

We used electronic health records (EHR) from 11 major academic health systems in 8 states in the USA (Illinois, Iowa, Wisconsin, Kansas, Nebraska, Missouri, Texas, Indiana). The sample (see table 1 for demographics) was limited to patients aged 55–74 over 2011–2018 who used care (any encounter type) at the study facilities at least once in the pre-expansion period. Due to inconsistent depiction of insurance status in EHR, patient residence in a socially deprived[5] census tract (see online supplemental appendix for details) was used as proxy for persons who were more likely to gain insurance under the ACA. Therefore persons aged 55–64 from the socially deprived census tracts were the treatment group. Persons aged 65–74 from socially deprived census tracts were the control group

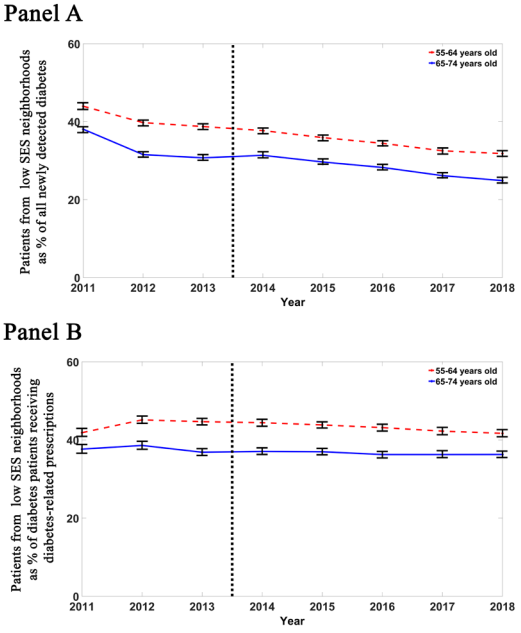

Figure 1 Annual trends in healthcare utilization outcomes before and during the Affordable Care Act Medicaid expansion (dotted vertical line). States are equally weighted. Bars are 95% CI. (A) Disadvantaged patients as per cent of all patients with newly detected diabetes. (B) Disadvantaged patients (with low socioeconomic status (SES)) as per cent of individuals with prevalent diabetes who received medical management at partnering health systems.

Table 1 Sample characteristics used to measure healthcare utilization outcomes

	2011–2013		2014–2018	
Sample demographic characteristics for outcome measures	**55–64**	**65–74**	**55–64**	**65–74**
(A) Total newly detected diabetes (305 726 patients aged 55–74 years old during 2011–2018)	73 479	56 371	90 948	84 928
% from socially deprived census tracts	41.9	34.3	34.7	28.3
Sex: % female	50.2	50.2	47.6	48.0
Race: % white	65.2	71.9	69.8	75.7
Race: % black	22.0	15.7	16.9	11.4
Race: % Asian	3.2	3.3	2.6	2.8
Race: % mixed	0.0	0.0	0.0	0.0
Race: % missing	9.6	9.1	10.7	10.1
Ethnicity: % Hispanic	11.9	8.1	9.5	6.9
Ethnicity: % missing	18.1	20.3	20.8	21.7
(B) Total with prevalent diabetes and relevant medical prescriptions (67 083 patients aged 55–74 years old during 2011–2018)	34 831	32 252		
% from socially deprived census tracts	44.1	37.6		
Sex: % female	51.0	49.9		
Race: % white	62.0	59.9		
Race: % black	15.7	11		
Race: % Asian	1.7	1.6		
Race: % mixed	0.3	0.3		
Race: % missing	6.1	5.2		
Ethnicity: % Hispanic	5.4	4.1		
Ethnicity: % missing	21.5	19.7		

The pre-ACA period is 2011–2013; the ACA period is 2014–2018. For medical management of diabetes, patients with prevalent diabetes were studied (sample is the same before and during the ACA period).
ACA, Affordable Care Act.

because they had Medicare insurance. For each age group, we studied the per cent of patients of interest with newly detected diabetes[6] and the per cent of patients with prevalent diabetes receiving diabetes-related medications before (2011–2013) and during (2014–2018) the ACA expansion. Combined age discontinuity and difference-in-difference research design was employed.

Different from individuals who had no access to healthcare[2] before the ACA, our sample of patients from socially deprived tracts shows no increase in rates of newly diagnosed diabetes (figure 1). An insignificant drop of −0.72 (95% CI −3.22 to 1.77) in newly diagnosed diabetes for the treated group was detected. We have to note the identification of diabetes in the sample was not limited to ambulatory settings. This makes us conclude that the study centers may have already been using all available resources to accurately diagnose diabetes before 2014, including for low-income patients. Therefore, the ACA did not lead to an improvement in diagnostics for our sample. The decline in new diabetes cases may be a positive effect of the improved access to other preventive care[7] services and medications during the ACA.

We also assessed whether the ACA led to low-income persons with prevalent diabetes having better access to diabetes medications. We detected an insignificant increase of 0.21 (95% CI −2.10 to 2.52) in the prescription for diabetes medications in the treatment group. The observed trend for the prescribed diabetes medications matched the 2010–2016 dispensed medication trend detected with the Medicaid State Drug Utilization Data.[3] Overall, the reported increase in diabetes medication due to the ACA tended to be modest if a 'per enrollee'-like measure was selected as opposed to an 'all prescriptions'[4] one.

In summary, we would like to stress that selected health outcomes are not doing the ACA justice and, as a result, underestimating the presumed improvement in the health services for low-income patients-clients of the academic centers before the ACA implementation. Such patients would face a different level of improvement in access to care comparing with ones who were completely isolated from the healthcare system before the policy took place.

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Contributors BSB, ANK and AF conceived and designed the study. All authors interpreted the data, critically reviewed the manuscript for important intellectual content and approved the final manuscript. AF and BSB developed the analytical plan. AF performed the statistical analyses. AF and BSB drafted the initial manuscript. ANK supervised the study. AF, ML, XS, LRW, JRM, KO, AS, EC, LGC, RCS, JCM, UT, VM, ASMM, DG, FA, AP, WET, TWM and ANK contributed to data acquisition. AF and BSB contributed to analysis of data. RCS, ML, XS, JRM, KO, AS, EC, JCM, UT, ASMM, WET, TWM, LR-T, PJE and ANK contributed to interpretation of data and manuscript writing.

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REFERENCES

1 US Gov. *The Patient Protection and Affordable Care Act. Public Law 111–148, 124 STAT 855*, 2010.
2 Palanki R, Chamarthy S, Palanki S. Impact of the Affordable care act on diabetes diagnoses in the United States: a county-level analysis. *Economic Affairs* 2021;41:111–22.
3 Cher BAY, Morden NE, Meara E. Medicaid expansion and prescription trends: opioids, addiction therapies, and other drugs. *Med Care* 2019;57:208–12.
4 Ghosh A, Simon K, Sommers BD. The Effect of Health Insurance on Prescription Drug Use Among Low-Income Adults:Evidence from Recent Medicaid Expansions. *J Health Econ* 2019;63:64–80.
5 Townsend P. Deprivation. *J Soc Policy* 1987;16:125–46.
6 Nichols GA, Desai J, Elston Lafata J, *et al*. Construction of a multisite Datalink using electronic health records for the identification, surveillance, prevention, and management of diabetes mellitus: the SUPREME-DM project. *Prev Chronic Dis* 2012;9:E110.
7 IRS. IRS notice 2013-57, 2013. Available: https://www.irs.gov/pub/irs-drop/n-13-57.pdf [Accessed Apr 2021].