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Medical Debt in the US, 2009-2020

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IMPORTANCE Medical debt is an increasing concern in the US, yet there is limited understanding of the amount and distribution of medical debt, and its association with health care policies.

OBJECTIVE To measure the amount of medical debt nationally and by geographic region and income group and its association with Medicaid expansion under the Affordable Care Act.

DESIGN, SETTING, AND PARTICIPANTS Data on medical debt in collections were obtained from a nationally representative 10% panel of consumer credit reports between January 2009 and June 2020 (reflecting care provided prior to the COVID-19 pandemic). Income data were obtained from the 2014-2018 American Community Survey. The sample consisted of 4.1 billion person-month observations (nearly 40 million unique individuals). These data were used to estimate the amount of medical debt (nationally and by geographic region and zip code income decile) and to examine the association between Medicaid expansion and medical debt (overall and by income group).

EXPOSURES Geographic region (US Census region), income group (zip code income decile), and state Medicaid expansion status.

MAIN OUTCOMES AND MEASURES The stock (all unpaid debt listed on credit reports) and flow (new debt listed on credit reports during the preceding 12 months) of medical debt in collections that can be collected on by debt collectors.

RESULTS In June 2020, an estimated 17.8% of individuals had medical debt (13.0% accrued debt during the prior year), and the mean amount was $429 ($311 accrued during the prior year). The mean stock of medical debt was highest in the South and lowest in the Northeast ($616 vs $167; difference, $448 [95% CI, $435-$462]) and higher in poor than in rich zip code income deciles ($677 vs $126; difference, $551 [95% CI, $520-$581]). Between 2013 and 2020, the states that expanded Medicaid in 2014 experienced a decline in the mean flow of medical debt that was 34.0 percentage points (95% CI, 18.5-49.4 percentage points) greater (from $330 to $175) than the states that did not expand Medicaid (from $613 to $550). In the expansion states, the gap in the mean flow of medical debt between the lowest and highest zip code income deciles decreased by $145 (95% CI, $95-$194) while the gap increased by $218 (95% CI, $163-$273) in the nonexpansion states.

CONCLUSIONS AND RELEVANCE This study provides an estimate of the amount of medical debt in collections in the US based on consumer credit reports from January 2009 to June 2020, reflecting care delivered prior to the COVID-19 pandemic, and suggests that the amount of medical debt was highest among individuals living in the South and in lower-income communities. However, further study is needed regarding debt related to COVID-19.

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Supplemental content

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Due to rising health care prices,[1,2] increased cost sharing,[3] and 26.1 million individuals without insurance in 2019,[4] the US health care system leaves patients with high out-of-pocket costs.[1,5] If these medical bills are unpaid, the outstanding amount can be classified as medical debt and sent to debt collectors.

Medical debt is associated with reduced health care use.[6] Personal debt, broadly defined, is associated with worse mental health[7,8] and a deterioration of personal finances.[9] Despite widespread concern, there is only limited evidence on recent trends in medical debt, its distribution across individuals, and how health policy has affected the distribution of medical debt. To our knowledge, no studies have estimated the total amount of medical debt. Moreover, even though recent studies have estimated the effect of the Affordable Care Act (ACA) coverage expansion on individual consumer debt,[9,10] no study has investigated its association with differences across geographic areas and socioeconomic groups.

To study these issues, a nationally representative person-level 10% sample of all consumer credit reports observed monthly from 2009 through 2020 was used to (1) document the scale and prevalence of medical debt nationally, (2) characterize differences in medical debt across geographic regions and income groups, and (3) examine the association between ACA Medicaid expansion and the distribution of medical debt across individuals.

Key Points

Question What is the total amount and distribution of medical debt in collections in the US?

Findings In this retrospective analysis of credit reports for a nationally representative 10% panel of individuals, an estimated 17.8% of individuals in the US had medical debt in collections in June 2020 (reflecting care provided prior to the COVID-19 pandemic). Medical debt was highest among individuals who lived in the South and in zip codes in the lowest income deciles and became more concentrated in lower-income communities in states that did not expand Medicaid.

Meaning This study provides an estimate of the amount of medical debt in collections in the US based on consumer credit reports from January 2009 to June 2020, reflecting care delivered prior to the COVID-19 pandemic, and suggests that the amount of medical debt was highest among individuals living in the South and in lower-income communities, although further study is needed regarding debt related to COVID-19.

Methods

Data Sources and Study Population

We measured unpaid medical debt in collections using a nationally representative, randomly selected 10% panel of all individuals with credit reports maintained by TransUnion, which is 1 of the 3 nationwide credit reporting agencies. The data were deidentified and included birth dates, zip codes, loan repayment history, public records, and medical and nonmedical accounts in collections. Because the data were not specifically collected for this study and were deidentified, the study was not considered human subjects research.[11]

Persons in the credit panel were monitored each month from January 2009 through June 2020. We excluded persons with a missing age or zip code, those residing outside the 50 states or the District of Columbia, and those with empty reports (defined as reports with no credit records of any kind). We also replicated the analyses using a sample that retains these empty accounts (eMethods, eFigures 1-4, and eTable 1 in the Supplement). Additional details on the sample construction appear in the eMethods in the Supplement.

Medical debt is reported to TransUnion by third-party debt collectors. It is typically reported at least 180 days after the bill was incurred and must be removed from the credit report after 7 years.[12] For each medical debt item, we observed the date when the bill became delinquent, its current balance, and whether the debt was in dispute or had been closed. We excluded medical debts that had been paid, were in dispute, or that had been closed. Dollar amounts were adjusted for inflation to June 2020 using the consumer price index for all urban consumers and censored at the 99.99th percentile to reduce the influence of extreme outliers.

Exposures

We documented regional patterns by reporting measures of medical debt by US Census region (a list of states by US Census region appears in eTable 2 in the Supplement) and by constructing county-level maps of mean medical debt.

To analyze differences in medical debt by income, we computed the mean stock (all unpaid debt listed on credit reports) of medical debt by zip code income decile. We assigned each zip code to a decile using per-capita income estimates from the 5-year American Community Survey (2014-2018), weighting each zip code by its population in the survey. We then calculated the measures of medical debt separately for each decile group.

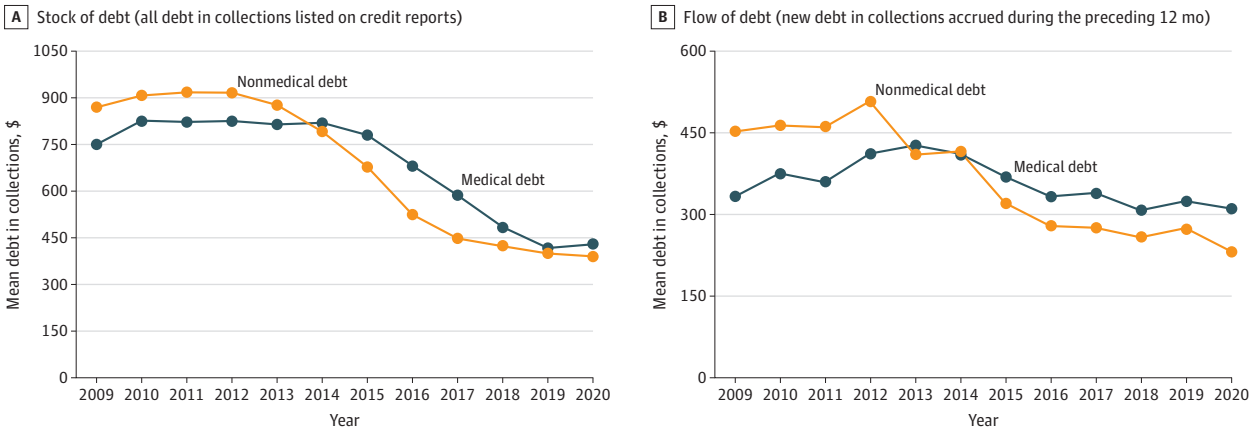
To analyze the association between medical debt and Medicaid expansion, we assigned states to 1 of 3 groups: (1) states that expanded Medicaid in 2014 (28 states), (2) states that expanded Medicaid after 2014 (11 states); and (3) states that did not expand Medicaid (12 states). Except for a small number of states with limited early expansion, Medicaid expansion was first implemented in 2014.[13] A list of states by Medicaid expansion status appears in eTable 3 in the Supplement.

Outcomes

The main outcomes were the stock (defined above) and flow (new debt listed on credit reports during the preceding 12 months) of medical debt. The stock is the preferred measure of total medical debt.

Because debt in collections can remain on credit reports for 7 years, it can take up to 7 years for changes in policy to be fully reflected in the stock of medical debt. To analyze the association between Medicaid expansion under the ACA and medical debt, we constructed a measure of the flow of medical debt. The flow measure is unaffected by outflows (arising from repayment or because a collector stops reporting on the debt) and thus

Figure 1. Stock and Flow of Medical and Nonmedical Debt in Collections by Year



can be used to assess the sensitivity of the estimates to the potential differences in outflows across industries, regions, or income groups.

To maintain a consistent reference point, we computed statistics as of June for each year. Because of the 180-day delay in credit reporting, statistics from June 2020 (the most recent month in the study sample) did not reflect medical care received by patients in 2020 and were unaffected by the COVID-19 pandemic.

For comparison, we constructed analogous measures of nonmedical debt in collections. Nonmedical debt combines all other sources of debt in collections, including credit cards, personal loans, utilities, and phone bills. As with medical debt, these amounts represent bills that are unpaid and can be collected on by debt collectors.

Statistical Analysis

To analyze the association between medical debt and Medicaid expansion, we conducted a difference-in-differences analysis that compared percentage changes over time in the flow of medical debt in states that expanded Medicaid vs the percentage changes over time in states that did not expand Medicaid. Specifically, we normalized the level of medical debt for each group of states to 1 in 2013 (the year before Medicaid expansion in the intervention group) and calculated the percentage change relative to this year. This normalization adjusts for any cross-sectional differences among groups of states that would otherwise confound the estimates. The trends without this normalization appear in eFigure 5 in the Supplement.

In the sensitivity analysis, we estimated the association between medical debt and Medicaid expansion with linear regressions of the percentage change in the mean flow of medical debt between 2013 and 2020 on indicators for the Medicaid expansion groups and a constant, controlling for state-level changes in economic factors (unemployment rate, the percentage of the population aged ≥65 years, the percentage of individuals aged ≥25 years and with a bachelor's degree or higher, and median income), the state-level share of beds at for-profit hospitals, and state-level policies (debt collection laws and surprise out-of-network billing laws). For some of the control variables, data for 2020 were not available, so we used data from 2013 and 2019. Additional details appear in eTables 4-5 in the Supplement.

To assess whether the association between Medicaid expansion and medical debt reflected confounding factors (such as differential economic trends), we conducted the analyses separately using nonmedical debt as the outcome. To analyze the relationship between Medicaid expansion and income-based differences in medical debt, we estimated the mean flow of medical debt between 2009 and 2020 by zip code income decile separately for Medicaid expansion and nonexpansion states. To maintain consistent zip code income deciles across Medicaid expansion and nonexpansion states, we continued to assign zip codes to income deciles based on their population-weighted rank in the national distribution.

The raw data were extracted and collapsed to the zip code year using Spark SQL version 2.2.1 (Apache Software Foundation) via Python version 3.6.3 (Python Software Foundation). The processed data were analyzed using Stata/MP version 16.0 (StataCorp). The 95% CIs for the national, regional, and zip code income decile estimates were based on standard errors constructed using the zip code year data. Tests of statistical significance were based on 2-sided tests with a significance threshold of .05. Because of the potential for type I error due to multiple comparisons, the findings for the secondary analyses should be interpreted as exploratory.

Results

National Trends in the Mean Stock and Flow of Medical Debt

The 10% panel of consumer credit reports held 4.1 billion person-month observations and nearly 40 million (n = 39 788 671) unique individuals. The mean stock of medical debt increased from $750 in 2009 to a peak of $827 in 2010 (difference, $76 [95% CI, $61-$92]) before decreasing to $429 in 2020 (difference, $397 [95% CI, $384-$411]) (**Figure 1**A). During this period, medical debt overtook nonmedical debt as the largest source of debt in collections. In 2009, mean medical debt was $119 (95% CI, $112-$127) less than nonmedical debt, whereas in 2020 medical debt exceeded nonmedical debt by $39 (95%

Table. Medical Debt Summary Statistics for 2020 Across the US and by US Census Region

	Across US	US Census region			
		Northeast	South	Midwest	West
Stock of medical debt[a]					
Medical debt in collections, %[b]	17.8	10.8	23.8	17.8	12.7
Mean, $					
Medical debt	429	167	616	385	347
Medical debt for those with debt	2424	1549	2595	2169	2733
Nonmedical debt	390	320	464	337	365
Sample sizes for June 2020[c]					
Medical debt in collections	5 803 567	595 662	3 029 355	1 188 722	989 828
Nonmedical debt in collections	6 204 151	840 501	2 867 876	1 223 042	1 272 732
All individuals	32 669 823	5 494 448	12 726 234	6 683 049	7 766 092
Flow of medical debt[d]					
Medical debt in collections, %[b]	13.0	7.1	18.8	13.0	7.6
Mean, $					
Medical debt	311	109	513	262	165
Medical debt for those with debt	2396	1536	2727	2021	2173
Nonmedical debt	233	184	286	215	195
Sample sizes for July 2019 to June 2020[c]					
Medical debt in collections	4 240 869	388 993	2 392 718	867 806	591 352
Nonmedical debt in collections	4 519 576	576 849	2 157 779	917 615	867 333
All individuals	32 669 823	5 494 448	12 726 234	6 683 049	7 766 092

[a] Measures all debt in collections listed on credit reports.

[b] Ratio of persons with medical debt in collections to all individuals.

[c] Nationally representative, randomly selected 10% panel of all individuals with credit reports maintained by TransUnion.

[d] Measures new debt in collections accrued during the preceding 12 months.

CI, $34-$43). Numerical values for each year appear in eTable 6 in the Supplement.

The mean flow of medical debt also increased from $332 in 2009 to a peak of $427 in 2013 (difference, $95 [95% CI, $87-$103]) before decreasing to $311 in 2020 (difference, $116 [95% CI, $108-$124]) (Figure 1B). Similar to the stock, the flow of medical debt overtook nonmedical debt as the largest source of new debt in collections during this period. In 2009, medical debt was $120 (95% CI, $116-$124) less than nonmedical debt, whereas in 2020 medical debt exceeded nonmedical debt by $78 (95% CI, $75-$82).

Summary statistics on the amount of US debt in 2020 and by US Census region appear in the **Table**. At the national level, 17.8% of persons with a credit report had medical debt in collections and 13.0% accrued medical debt during the prior year. Conditional on having medical debt, the mean stock was $2424 and the mean flow was $2396.

Regional and Income-Based Differences in Medical Debt

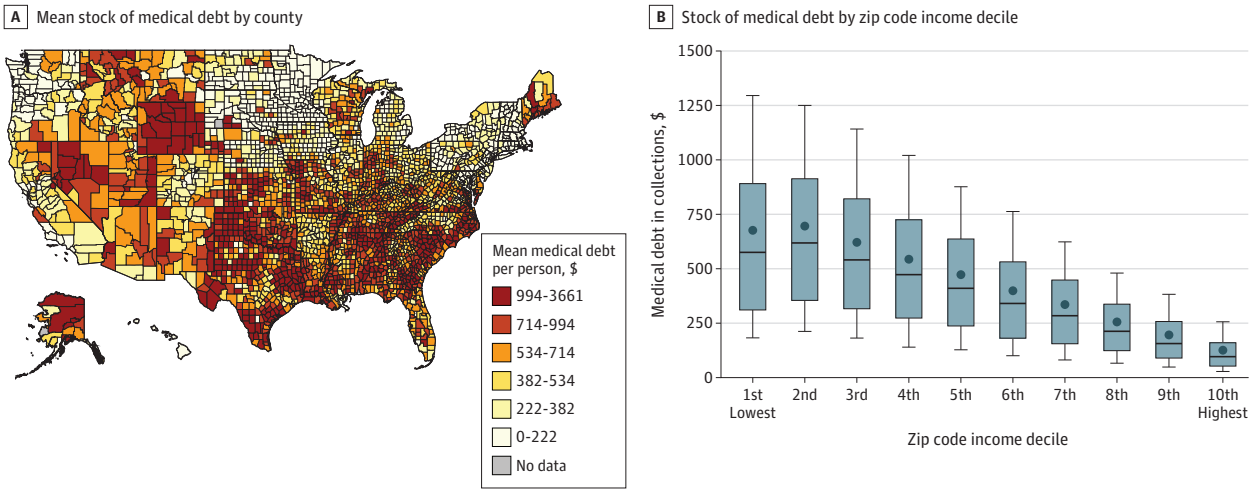
The mean stock of medical debt by county in 2020 appears in **Figure 2**A (the analogous map for the mean flow of medical debt by county appears in eFigure 6A in the Supplement). Medical debt was concentrated in the South as well as in some counties in the West. Of the 4 US Census regions, the South had the highest amount of medical debt, with medical debt held by 23.8% of persons and a mean stock of $616 (95% CI, $608-$623). The Northeast had the lowest amount of medical debt, with medical debt held by 10.8% of persons and a mean stock of $167 (95% CI, $163-$172). The difference between the South and Northeast was $448 (95% CI, $435-$462).

The mean stock of medical debt by zip code income decile appears in Figure 2B (the numerical values appear in eTable 7 and the statistics for the mean flow of medical debt by zip code income decile appear in eFigure 6B in the Supplement). The mean stock of medical debt was $677 (95% CI, $662-$692) in the 1st (lowest) zip code income decile, $473 (95% CI, $462-$484) in the 5th zip code income decile, and $126 (95% CI, $121-$131) in the 10th (highest) zip code income decile. The difference between the lowest and highest zip code deciles was $551 (95% CI, $520-$581).

Medicaid Expansion Under the ACA and Accrual of Medical Debt

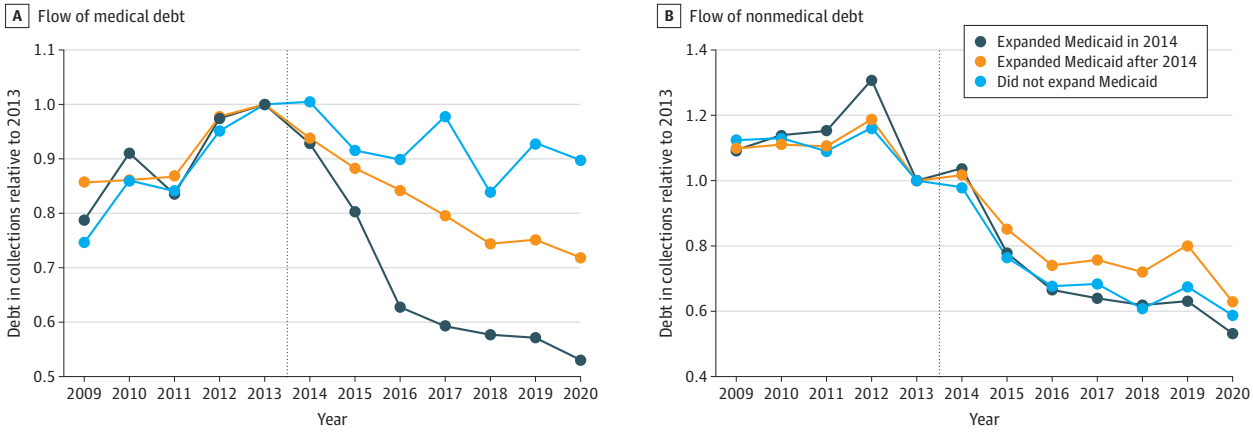
The flow of medical debt between 2009 and 2020 by Medicaid expansion status appears in **Figure 3**A, with the levels for each group of states normalized to 1 in 2013. Between 2013 and 2020, the states that expanded Medicaid in 2014 experienced a decline in the mean flow of medical debt that was 34.0 percentage points (95% CI, 18.5-49.4 percentage points) greater (from $330 to $175) than the states that did not expand Medicaid (from $613 to $550). States that expanded Medicaid after 2014 experienced a decline in the mean flow of medical debt that was 20.4 percentage points (95% CI, 1.2-39.6 percentage points) greater (from $401 to $288) than the states that did not expand Medicaid (from $613 to $550). The numerical values appear in eTable 8 in the Supplement. The regression tables

Figure 2. Stock of Medical Debt by County and Zip Code Income Decile



B, The dots are means, the black horizontal lines are medians, the boxes are the interquartile ranges, and the whiskers are the range (10-90) for stock by zip code income decile as of June 2020. The zip codes were assigned to income deciles using per-capita income estimates from the 5-year American Community Survey (2014-2018), weighting each zip code by its population in the American Community Survey. The median number of zip codes in each income decile was 3474 (interquartile range, 2398-3762) in 2020.

Figure 3. Trends in Medical and Nonmedical Debt in Collections by Medicaid Expansion Status



The plots show the flow of mean medical and nonmedical debt in collections, grouping states by Medicaid expansion status and normalizing values for each group to 1 in 2013 (eg, the normalized value for 2020 is calculated as the ratio of the unnormalized 2020 and 2013 values for that group). Values are from June of each year. The vertical line indicates the timing of initial Medicaid expansion.

that underlie these estimates show consistent results from the specifications that control for economic and policy factors (eTables 4-5 in the Supplement).

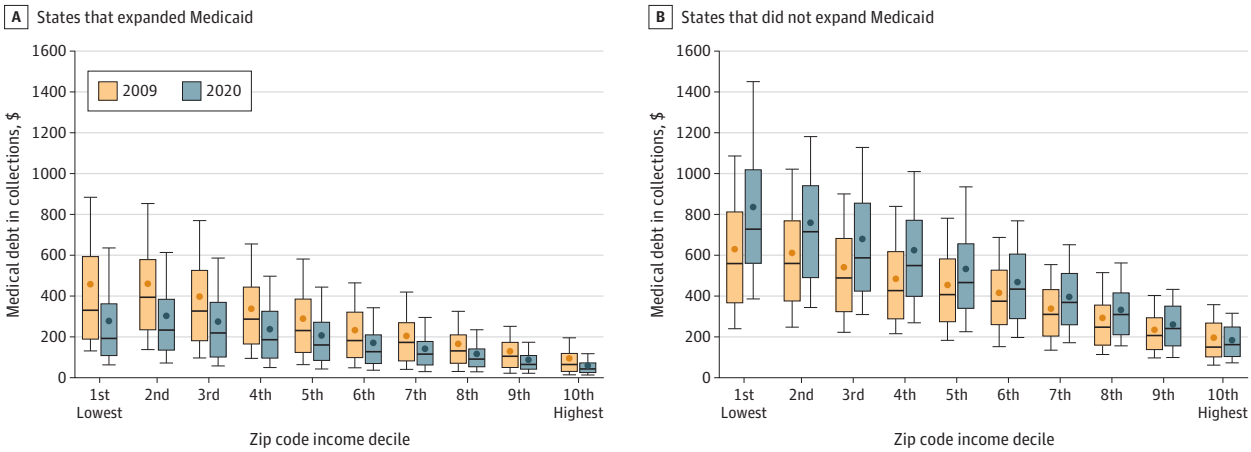
The analogous plots for nonmedical debt appear in Figure 3B and the estimates from the regression specifications appear in eTable 9 in the Supplement. For nonmedical debt, there were no significant differences across the groups. Expansion states experienced a decline in the mean flow of nonmedical debt of 45.4% (95% CI, 38.8%-52.1%) from $388 to $206; late expansion states experienced a decline of 37.7% (95% CI, 33.0%-42.4%) from $337 to $212; and nonexpansion states experienced a decline of 40.9% (95% CI, 35.3%-46.6%) from $488 to $287.

Medicaid Expansion Under the ACA and Income-Based Differences in the Accrual of Medical Debt

The flow of medical debt in 2009 and 2020 by zip code income decile appears separately for states that expanded Medicaid (**Figure 4**A) and for states that did not expand Medicaid (Figure 4B). The states that expanded Medicaid after 2014 are not shown.

Within states that expanded Medicaid (Figure 4A), all zip code income deciles experienced reductions in medical debt from 2009 to 2020, with larger reductions in the lower zip code income deciles. In the lowest zip code income decile, the mean flow of medical debt decreased by $180 (95% CI, $131-$229) from $458 to $278. In the highest zip code income decile, the

Figure 4. Flow of Medical Debt by State Medicaid Expansion Status and Zip Code Income Decile in 2009 and 2020



The dots are means, the black horizontal lines are medians, the boxes are the interquartile ranges, and whiskers are the 10 to 90 range for flow of zip code level medical debt by zip code income decile as of June 2020. To maintain consistent income deciles across expansion and nonexpansion states, zip codes were assigned income deciles based on their population-weighted rank in the national distribution. The median number of zip codes in each income decile was 3474 (interquartile range, 2396-3764) in 2009 and 3474 (interquartile range, 2398-3762) in 2020.

mean flow of medical debt decreased by $35 (95% CI, $27-$44) from $95 to $60. The gap in the mean flow of medical debt between the lowest and highest zip code income deciles decreased by $145 (95% CI, $95-$194) from $363 to $218.

Within states that did not expand Medicaid (Figure 4B), most zip code income deciles experienced an increase in medical debt from 2009 to 2020; there were greater increases in the lowest zip code income deciles. In the lowest zip code income decile, the mean flow of medical debt increased by $206 (95% CI, $156-$256) from $630 to $836. In the highest zip code income decile, the mean flow of medical debt decreased by $12 (95% CI, $10-$35) from $196 to $184. The gap in the mean flow of medical debt between the lowest and highest zip code income deciles increased by $218 (95% CI, $163-$273) from $434 to $652.

Discussion

In a retrospective analysis of consumer credit reports, the mean amount of medical debt was high, and it was greater among individuals who lived in the South and in zip codes in the lowest income deciles. Medicaid expansion under the ACA was associated with reduced medical debt overall, and with reduced gaps in the amount of medical debt between low-income and high-income communities.

During the last decade, medical debt has become the largest source of debt in collections. The reductions in nonmedical debt in collections between 2009 and 2020 occurred simultaneously with the economic recovery from the Great Recession, consistent with the well-documented association between unemployment and loan delinquency.[14] In contrast, total medical debt in collections decreased by a more modest amount. As a result, as of June 2020 individuals had $39 more in mean medical debt in collections than they had in mean debt in collections from all other sources combined ($429 vs $390), including credit cards, utilities, and phone bills.

The randomized sampling design can be used to extrapolate to the total amount of medical debt in collections reported to TransUnion. Multiplying mean medical debt of $429 in June 2020 by the sample size and a factor of 10 (because the sample is a 10% random sample of TransUnion credit reports) implies the existence of $140 billion in total medical debt. Even though this extrapolation can estimate total medical debt in collections listed on TransUnion credit reports, the limitations of the data preclude extrapolation to total medical debt in the US.

The analysis shows that Medicaid expansion was associated with reductions in medical debt in collections. Although the study design does not allow for causal interpretation, the absence of a meaningful association between Medicaid expansion and changes in nonmedical debt, and the stability of the estimates, controlling for economic and policy factors, reduce concerns about possible confounders.[15] These estimates are consistent with studies that have used experimental methods to establish a causal link between Medicaid coverage and reductions in medical debt.[16]

Many of the states with the highest pre-ACA levels of medical debt did not expand Medicaid and subsequently did not experience substantial reductions in medical debt. Specifically, 8 of the 12 states that did not expand Medicaid are in the South, the region with the highest pre-ACA levels of medical debt (eTable 3 in the Supplement). The mean medical debt decreased by 44.0% between 2013 and 2020 in states that immediately expanded Medicaid, but it only decreased by 10.0% in the nonexpansion states, exacerbating preexisting regional differences.

Within the states that expanded Medicaid, there were reductions in income-based differences. In states that expanded Medicaid, the gap in the flow of medical debt between those living in in the lowest and highest zip code income deciles decreased over the 2009 to 2020 period, whereas the gap in the flow of medical debt increased in states that did not expand Medicaid.

Taken together, the results on income and regional differences indicate that individuals in the lowest zip code income

deciles in states that did not expand Medicaid had the highest levels of medical debt in the country at the start of the study period and also experienced the largest subsequent increases in mean medical debt. For instance, the lowest zip code income decile in states that did not expand Medicaid had both the highest level of medical debt in 2009 and the largest increase over the 2009 to 2020 period.

Limitations

This study has several limitations. First, the measures of medical debt were derived from debts that were reported to TransUnion, which may not be identical to the debts reported to other credit bureaus.[17]

Second, the data did not allow for the measurement of medical debts that are not reported to credit bureaus, which may differ by industry, region, or income group. Third, the data may have included reports for persons who had emigrated or multiple reports for a person that were not linked.

Fourth, the stocks of debt in collection (but not the flows) were influenced by outflows from credit reports; outflows may differ by industry, region, and income group and are difficult to interpret. Fifth, the measures of medical debt did not capture medical expenses that were paid with a credit card or other financial products.

Sixth, even though the study examined the association between medical debt and income at the zip code level, it was not possible to study this (or other associations) at the individual level. Seventh, the regression specifications that examined the association between Medicaid expansion and medical debt were unable to control for individual-level factors or all potentially relevant time-varying state-level confounders.

Eighth, because medical debt is reported to credit bureaus after a 180-day delay, the measures of medical debt in 2020 did not capture debt incurred during the COVID-19 pandemic (or any debt from care provided in 2020).

Conclusions

This study provides an estimate of the amount of medical debt in collections in the US based on consumer credit reports from January 2009 to June 2020, reflecting care delivered prior to the COVID-19 pandemic, and suggests that the amount of medical debt was highest among individuals living in the South and in lower-income communities. However, further study is needed regarding debt related to COVID-19.

ARTICLE INFORMATION

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Author Contributions: Dr Mahoney 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: All authors.
Acquisition, analysis, or interpretation of data: All authors.
Drafting of the manuscript: All authors.
Critical revision of the manuscript for important intellectual content: All authors.
Statistical analysis: All authors.
Administrative, technical, or material support: Yin.
Supervision: Mahoney, Yin.

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