FEATURE ARTICLE

Real-World Prevalence of Type 2 Diabetes Remission in a U.S. Insured Population Using a Large Administrative Claims Database

Natalie E. Sheils,[1] Megan S. Jarvis,[1] Lauren R. Bangerter,[1] David A. Asch,[2] and Callahan N. Clark[1]

[1]*Optum Labs, Minnetonka, MN;* [2]*University of Pennsylvania, Philadelphia, PA*

OBJECTIVE | A 2021 international consensus statement defined type 2 diabetes remission as A1C <6.5% measured at least 3 months after cessation of glucose-lowering therapy. We aimed to investigate whether retrospective claims-based data can assess remission based on this definition, whether three increasingly strict alternative definitions affect the prevalence of remission and characteristics of remission cohorts, and how cohorts with and without sufficient data to assess for remission differ.

RESEARCH DESIGN AND METHODS | We used de-identified administrative claims from commercially insured and Medicare Advantage members, enriched with laboratory values, to assess diabetes remission. We used alternative glycemic, temporal, and pharmacologic criteria to assess the sensitivity of remission definitions to changes in claims-based logic.

RESULTS | Among 524,076 adults with type 2 diabetes, 185,285 (35.4%) had insufficient additional laboratory and/or enrollment data to assess for remission. While more likely to be younger, these individuals had similar initial A1C values and geographical distribution as the 338,791 (64.6%) assessed for remission. Of those assessed for remission, 10,694 (3.2%) met the 2021 consensus statement definition. The proportion of individuals meeting the three alternative definitions ranged from 0.8 to 2.3%. Across all criteria, those meeting the remission definition were more likely to be female, had a lower initially observed A1C, and had a higher prevalence of bariatric surgery.

CONCLUSION | This study demonstrates the feasibility of laboratory-value enriched claims-based assessments of type 2 diabetes remission. Establishing stable claims-based markers of remission can enable population assessments of diabetes remission and evaluate the association between remission and clinical outcomes.

Nearly 100 distinct definitions of diabetes remission were used across prospective and retrospective studies from 2009 to 2020, challenging consistency in research and clinical settings (1). In 2021, an international consensus group with representation from the Endocrine Society, the European Association for the Study of Diabetes, Diabetes UK, and the American Diabetes Association (ADA) created a unified definition of diabetes remission as A1C <6.5% (48 mmol/mol) measured at least 3 months after cessation of glucose-lowering pharmacotherapy (2–5).

Although a single definition provides clarity in clinical contexts and prospective trials, its value in retrospective analyses depends on how easily and completely the components of that definition can be demonstrated within observational data. Retrospective studies using real-world data sources such as administrative claims are essential to assess population-level diabetes outcomes and guideline-concordant care delivery, but often require translation of clinical end points into claims-assessable definitions. The potential gain from claims-based analysis is large; if administrative claims data could validly and comprehensively assess whether patients with diabetes have or have not entered remission, then one could supplement the usually more expensive and less extensive prospective trial data with substantially larger and more representative real-world data sets. Claims data could reveal the sociodemographic distribution, the clinical and sociodemographic correlates, and duration and trajectory of remission and the association of remission with later complication rates, mortality, and costs of care. Such assessments are crucial to understanding the population effects of diabetes

Corresponding author: Callahan N. Clark, callahan.clark@optum.com

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care; yet, prospective trials are often too small, expensive, or unrepresentative to provide them.

To investigate the consensus statement definition's applicability in real-world data sources, this analysis had three aims. First, we evaluated the feasibility of using administrative claims enriched with laboratory values to reflect the 2021 consensus statement by measuring the prevalence of remission. Second, we investigated how three alternative remission definitions implementing more stringent variations on the glycemic, temporal, and pharmacologic components of the 2021 remission definition altered the prevalence of remission to assess its sensitivity to changes in claims-based definitions. Third, we evaluated the characteristics of the populations with and without sufficient data to assess for remission to better understand potential biases introduced by using laboratory value–enriched administrative claims data.

Research Design and Methods

Data Source

We used Optum Labs' de-identified administrative claims data, which contain medical and pharmacy claims and some laboratory values for services in the United States. A portion of laboratory procedure–related medical claims also have accompanying laboratory values, provided by select third-party laboratory vendors. Absence of laboratory values does not automatically equate to a lack of billed laboratory claims. Structured data reflect *International Classification of Diseases*, 10th revision (ICD-10), codes; Current Procedural Terminology codes; Logical Observation Identifiers Names and Codes; and National Drug Codes claims. This nomenclature ensures consistency of data collection across geographic regions, health systems, and payers throughout the United States.

Study Population

We identified adults (≥18 years of age at first available type 2 diabetes diagnosis) with medical and pharmacy coverage in either a commercial or Medicare Advantage plan. For inclusion, individuals were required to have at least one medical claim with a primary, secondary, or tertiary diagnosis code for type 2 diabetes (ICD-10 E11%) between 1 January 2017 and 31 December 2019 and available demographic details. The population includes adults from all 50 states and the District of Columbia (Supplementary Table S1). We required at least 12 months of enrollment after their earliest type 2 diabetes diagnosis (ICD-10 claim) to adequately assess comorbidity prevalence and medication fills and to permit an observation period to document remission. Given that laboratory values to accompany billed laboratory services were available for a subset of those with medical and pharmacy claims, we also required evidence of an A1C value of ≥6.5% (48 mmol/mol) any time in the period, followed by a second A1C value occurring ≥6 months after the first. We required a minimum of 6 months before a follow-up A1C value to account for typical drug fill periods and allow for observation of remission, which required a minimum of 90 days of no glucose-lowering pharmacotherapies in advance of an A1C value below the threshold. For the <2.5% of cases for which more than one A1C value was reported on the same day, we used the average value. We required 12 months of enrollment after the second A1C value to allow sufficient time for observation of either remission or evidence of pharmacotherapy reinitiation. Additional claims-based definition details are included in Supplementary Tables S2–S6.

Measures

We defined glucose-lowering pharmacotherapy in accordance with the ADA's *Standards of Medical Care in Diabetes—2021* (Supplementary Table S4) (6). Fixed-dose combination drugs were considered equivalent to fills for each of the component drugs. To quantify fills for diabetes drugs (Supplementary Table S3), we calculated an individual's last date having available medication on hand (7) by adding the prescription claim days' supply to the fill date. For those with fill histories for multiple diabetes drugs, we considered the latest date on hand. To measure prevalence of remission as defined by the 2021 consensus statement, we required individuals' final date on hand to have occurred >90 days before an A1C value <6.5% (48 mmol/mol) was obtained.

Alternative Diabetes Remission Definitions

We designed three progressively stricter claims-based criteria for the consensus definition of remission. The first alternative (Alt1) tightened the pharmacologic component of the consensus statement definition by additionally requiring zero diabetes drug fills in the 90 days after the A1C laboratory value <6.5% (48 mmol/mol). This alternative was designed to prevent misclassification from unintentional missed observation of a diabetes drug fill as a consequence of imperfect real-world adherence and drug fill patterns. The second alternative (Alt2) tightened the temporal component by extending the observation window for zero diabetes drug fills to 180 days after the A1C laboratory value <6.5% (48 mmol/mol) to prevent misclassification related to possible reinitiation of glucose-lowering pharmacotherapy. The third alternative (Alt3) built on Alt2, with additional stringency around the glycemic component, by also requiring a follow-up A1C value <6.5% (48 mmol/mol) at least 180 days after the initial remission A1C to assess for durability of remission. We were able to

assess Alt3 on a subset of our study population (336,984 [99.2%]) who had a follow-up A1C value available. These three alternative criteria have the effect of progressively increasing the specificity of the claims data as a measure of the consensus definition of remission.

Ethical Approval

The study was deemed exempt from Institutional Research Board review by the UnitedHealth Group Office of Human Research Affairs and followed the STROBE (Strengthening the Reporting of Observational Studies in Epidemiology) reporting guideline for cross-sectional studies.

Results

Among the 524,076 individuals with laboratory values available to confirm their claims-based type 2 diabetes diagnosis, 338,791 (64.6%) had a second A1C value occurring ≥6 months after the first and ≥12 months of enrollment after their second A1C value, allowing for assessment of remission (Figure 1). Among the 185,285 whom we were unable to assess for remission, 127,272 (68.7%) did not have a follow-up A1C value available and the remaining 58,013 (31.3%) did not have 12 months of continuous follow-up enrollment (Table 1 and Supplementary Table S7). Compared with those who could be assessed for remission, those with claims and laboratory data insufficient to assess remission were younger and less likely to be Medicare beneficiaries; had a lower mean number of Diabetes Complications and Severity Index (DCSI) comorbidities (8), a lower prevalence of all seven DCSI index conditions, and lower fill rates across all diabetes drug classes; and were more likely to have no diabetes drug fills. The two populations were similar in residential setting and median initial A1C value (Table 1).

The population with data sufficient for assessment was distributed throughout rural, suburban, and urban zip codes, with geographic distribution throughout the United States (58.5% South, 16.3% Midwest, 15.9% Northeast, 9.3% West), and predominantly reflected patients >65 years of age and Medicare beneficiaries. This population was also predominantly White as opposed to Black, Asian, or Native North American; however, race was missing for 19.0% of the group, including all of those with commercial insurance.

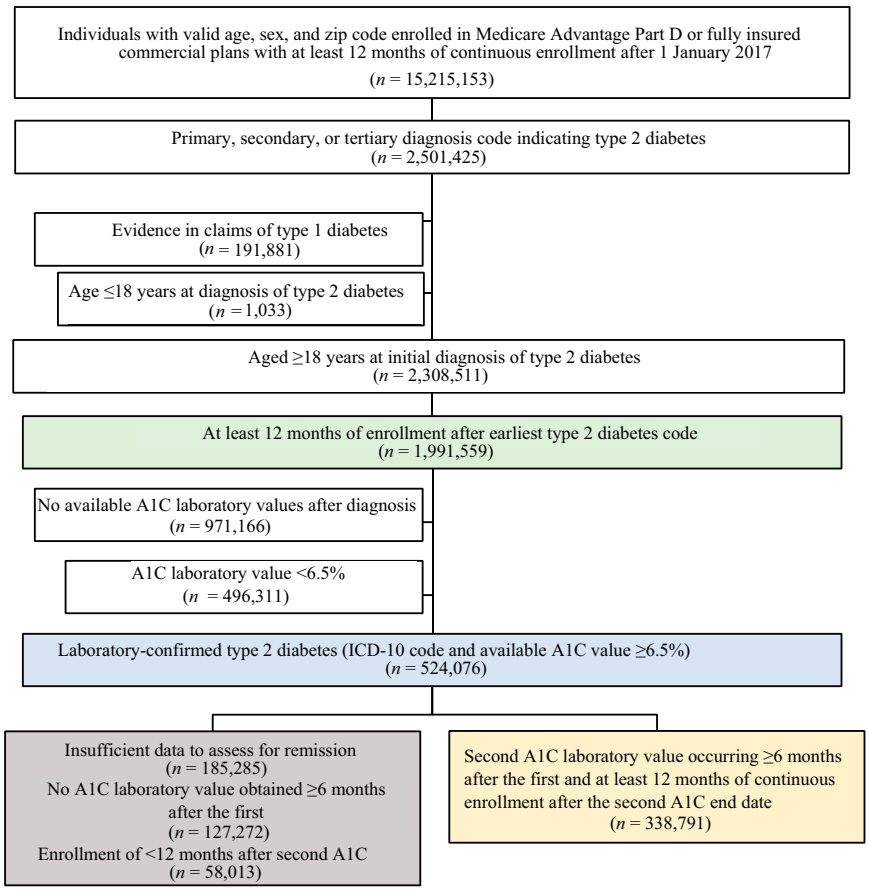

FIGURE 1 CONSORT (Consolidated Standards of Reporting Trials) diagram showing participant selection. An alternative visualization is presented in Supplementary Figure S1.

TABLE 1 Features of Type 2 Diabetes Cohorts Identified Using Claims Only or Claims and Available A1C Laboratory Value ≥6.5%

	Type 2 Diabetes Population Identified by Claims	Laboratory-Confirmed Type 2 Diabetes Population	Population Assessed for Remission*	Population With Insufficient Data to Assess for Remission*
Total population	1,991,559 (100.0)	524,076 (100.0)	338,791 (100.0)	185,285 (100.0)
Median age	70 (64–76)	69 (62–75)	69 (65–75)	67 (59–74)
Age range, years				
18–35	19,477 (1.0)	4,292 (0.8)	1,711 (0.5)	2,581 (1.4)
36–45	57,573 (2.9)	17,056 (3.3)	7,967 (2.4)	9,089 (4.9)
46–55	154,773 (7.8)	49,672 (9.5)	26,229 (7.7)	23,443 (12.7)
56–65	370,439 (18.6)	110,770 (21.1)	65,746 (19.4)	45,024 (24.3)
66–75	832,104 (41.8)	225,241 (43.0)	158,317 (46.7)	66,924 (36.1)
76–85	425,831 (21.4)	95,887 (18.3)	66,005 (19.5)	29,882 (16.1)
≥86	131,362 (6.6)	21,158 (4.0)	12,816 (3.8)	8,342 (4.5)
Sex				
Male	955,671 (48.0)	265,450 (50.7)	169,916 (50.2)	95,534 (51.6)
Female	1,035,888 (52.0)	258,626 (49.3)	168,875 (49.8)	89,751 (48.4)
Insurance type				
Medicare Advantage	1,635,201 (82.1)	412,077 (78.6)	282,343 (83.3)	129,734 (70.0)
Commercial	356,358 (17.9)	111,999 (21.4)	56,448 (16.7)	55,551 (30.0)
Census region				
Midwest	379,699 (19.1)	91,491 (17.5)	55,388 (16.3)	36,103 (19.5)
Northeast	269,737 (13.5)	81,420 (15.5)	53,928 (15.9)	27,492 (14.8)
South	961,754 (48.3)	299,501 (57.1)	198,080 (58.5)	101,421 (54.7)
West	380,369 (19.1)	51,664 (9.9)	31,395 (9.3)	20,269 (10.9)
Residential setting				
Urban	693,750 (34.8)	182,167 (34.8)	118,162 (34.9)	64,005 (34.5)
Suburban	723,055 (36.3)	206,605 (39.4)	134,691 (39.8)	71,914 (38.8)
Rural	574,754 (28.9)	135,304 (25.8)	85,938 (25.4)	49,366 (26.6)
Median annual household income by zip code, $	55,128 (47,343–63,668)	53,999 (46,426–63,339)	53,999 (46,338–63,926)	54,071 (46,720–63,001)
Annual income range, $				
<50,000	641,797 (32.2)	189,984 (36.3)	124,906 (36.9)	65,078 (35.1)
50,000–64,999	887,641 (44.6)	213,000 (40.6)	135,192 (39.9)	77,808 (42.0)
65,000–74,999	185,002 (9.3)	45,151 (8.6)	28,774 (8.5)	16,377 (8.8)
≥75,000	277,119 (13.9)	75,941 (14.5)	49,919 (14.7)	26,022 (14.0)
Race†				
Unavailable	461,126 (23.2)	125,734 (24.0)	64,302 (19.0)	61,432 (33.2)
Asian	40,157 (2.0)	11,319 (2.2)	8,179 (2.4)	3,140 (1.7)
Black	278,257 (14.0)	80,028 (15.3)	52,925 (15.6)	27,103 (14.6)
Hispanic	48,710 (2.4)	12,703 (2.4)	8,610 (2.5)	4,093 (2.2)
Native North American	3,622 (0.2)	594 (0.1)	340 (0.1)	254 (0.1)
Other	42,522 (2.1)	11,705 (2.2)	8,621 (2.5)	3,084 (1.7)
White	1,117,165 (56.1)	281,993 (53.8)	195,814 (57.8)	86,179 (46.5)
Mean number of DCSI conditions	2.35 ± 2.11	2.48 ± 2.19	2.63 ± 2.2	2.21 ± 2.16
DCSI conditions				
Retinopathy	350,709 (17.6)	113,497 (21.7)	80,514 (23.8)	32,983 (17.8)
Nephropathy	591,682 (29.7)	165,536 (31.6)	116,511 (34.4)	49,025 (26.5)
Neuropathy	585,620 (29.4)	178,619 (34.1)	123,338 (36.4)	55,281 (29.8)
Cardiovascular	942,866 (47.3)	245,149 (46.8)	165,472 (48.8)	79,677 (43.0)
Cerebrovascular	354,240 (17.8)	94,625 (18.1)	65,064 (19.2)	29,561 (16.0)
Peripheral vascular disease	463,127 (23.3)	127,302 (24.3)	88,675 (26.2)	38,627 (20.8)
Metabolic	85,948 (4.3)	30,247 (5.8)	20,154 (5.9)	10,093 (5.4)
Median first laboratory A1C, %	–	7.3 (6.7–8.3)	7.2 (6.7–8.1)	7.3 (6.8–8.5)
BMI range, kg/m^2				
Missing	835,404 (41.9)	194,677 (37.1)	118,539 (35.0)	76,138 (41.1)
25.0–29.9 (overweight)	245,859 (12.3)	67,245 (12.8)	47,139 (13.9)	20,106 (10.9)
30.0–34.9 (class I obesity)	71,592 (3.6)	21,289 (4.1)	13,577 (4.0)	7,712 (4.2)
35.0–39.9 (class II obesity)	36,496 (1.8)	11,730 (2.2)	7,174 (2.1)	4,556 (2.5)

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TABLE 1 Features of Type 2 Diabetes Cohorts Identified Using Claims Only or Claims and Available A1C Laboratory Value ≥6.5%

	Type 2 Diabetes Population Identified by Claims	Laboratory-Confirmed Type 2 Diabetes Population	Population Assessed for Remission*	Population With Insufficient Data to Assess for Remission*
≥40.0 (class III obesity)	18,542 (0.9)	5,787 (1.1)	3,240 (1.0)	2,547 (1.4)
Unspecified	783,666 (39.3)	223,348 (42.6)	149,122 (44.0)	74,226 (40.1)
Diabetes drug therapy				
Biguanides	895,423 (45.0)	296,534 (56.6)	204,907 (60.5)	91,627 (49.5)
Sulfonylurea	427,428 (21.5)	170,240 (32.5)	120,365 (35.5)	49,875 (26.9)
Thiazolidinedione	107,767 (5.4)	40,835 (7.8)	29,941 (8.8)	10,894 (5.9)
DPP-4 inhibitor	174,449 (8.8)	72,478 (13.8)	52,318 (15.4)	20,160 (10.9)
SGLT2 inhibitor	111,968 (5.6)	49,722 (9.5)	36,186 (10.7)	13,536 (7.3)
GLP-1 receptor agonist	110,892 (5.6)	45,903 (8.8)	33,232 (9.8)	12,671 (6.8)
Long- or intermediate-acting insulin	289,877 (14.6)	117,410 (22.4)	79,239 (23.4)	38,171 (20.6)
Short- or rapid-acting insulin	143,732 (7.2)	59,112 (11.3)	39,576 (11.7)	19,536 (10.5)
None	833,943 (41.9)	132,474 (25.3)	72,763 (21.5)	59,711 (32.2)
Evidence of bariatric surgery	9,892 (0.5)	2,566 (0.5)	1,827 (0.5)	739 (0.4)

Data are *n* (%), median (interquartile range), or mean ± SD. *The subset of individuals with laboratory-confirmed type 2 diabetes who had at least one additional A1C laboratory value occurring ≥6 months after the first and 12 months of enrollment after their second laboratory value comprised the cohort assessed for remission; those not meeting these A1C or enrollment criteria comprised the insufficient data cohort. †Race data were available only from individuals with Medicare Advantage insurance and were clinician- or patient-reported. Individuals could select more than one option. DPP-4, dipeptidyl peptidase 4; GLP-1, glucagon-like peptide 1; SGLT2, sodium–glucose cotransporter 2.

The four increasingly strict assessments of remission defined progressively fewer patients in remission (3.2, 2.3, 1.9, and 0.8%, respectively), consistent with more specific claims algorithms (Table 2). Nevertheless, the distribution of patient characteristics was largely preserved across all definitions (Supplementary Table S7).

A higher mean number of DSCI index conditions was observed across the increasingly strict remission definitions (2.86, 3.48, 3.45, and 2.96, respectively) than the nonremission groups, driven by higher prevalence rates of nephropathy and cardiovascular, cerebrovascular, and peripheral vascular index conditions. Rates of missing BMI data were consistently lower among the remission groups (28.9–31.4%) compared with the nonremission groups (35.1%). Evidence of bariatric surgery during the study period increased along with the strictness of the remission definition (3.0, 3.7, 4.0, and 6.4%, respectively). Prevalence of diabetes drugs was consistently lower across all remission groups and drug classes compared with the nonremission groups (Table 2).

Discussion

This study has four main findings. First, in this broad, national database of commercial and Medicare claims, approximately two-thirds of individuals with both a type 2 diabetes diagnosis and available confirmatory laboratory value data could be classified as either meeting or not meeting the 2021

TABLE 2 Study Definitions of Type 2 Diabetes Remission

	Remission Definition	Remission Assessments Within a Total Population of 338,791 Individuals, *n* (%)
2021 Consensus statement	A1C <6.5% (48 mmol/mol) at least 3 months after cessation of glucose-lowering pharmacotherapy	Remission: 10,694 (3.2) No remission: 328,097 (96.8)
Alt1	. . . and having no subsequent evidence of glucose-lowering pharmacotherapy in the 90 days after the remission A1C	Remission: 7,685 (2.3) No remission: 331,106 (97.7)
Alt2	. . . and having no subsequent evidence of glucose-lowering pharmacotherapy in the 180 days after the remission A1C	Remission: 6,481 (1.9) No remission: 332,310 (98.1)
Alt3	. . . and having no subsequent evidence of glucose-lowering pharmacotherapy in the 180 days after the remission A1C *plus* a second A1C <6.5% (48 mmol/mol) at least 180 days after the remission A1C	Remission: 2,692 (0.8) No remission: 333,492 (98.4) No post-remission A1C data: 2,607 (0.8)

consensus statement definition of diabetes remission. This finding indicates that claims data, when enriched with laboratory value results, can be used to classify ~65% of people with laboratory-confirmed type 2 diabetes as being either in remission or not over a 3-year horizon. Second, there were small differences in sociodemographic and clinical characteristics of patients who could and could not be categorized. This finding suggests that bias may be introduced when using data from patients with sufficient information to make estimates of the overall population. The size and direction of those biases cannot be assessed here, but future observations of the patients with currently insufficient data may reveal the natural history of this indeterminate group and, for example, reveal whether their distribution of remission differs from those who could be assessed currently. Third, although the consensus definition of diabetes remission is fixed, the cross-walk between observable medical and pharmacy claims, laboratory value data, and that definition can vary in specificity. We found a fourfold difference in the percentage of the population identified as being in remission between our most and least specific claims-based definitions. That range reveals that even consistent clinical definitions offer choices when claims data are used to assess them. Fourth, despite that range, the characteristics of the patients found to be in remission were nearly identical regardless of how strict the claims-based definition was. The last two findings suggest that more rigorous claims-based criteria are likely to affect the proportion of patients in remission, but may be less likely to bias assessments of the association between patient characteristics and remission. Indeed, one conclusion of this analysis could be that the field should soon establish a single, standardized base-case claims-based definition of remission that, while arbitrary, will allow consistent reporting across studies and times. That base-case definition could be supplemented with a set of consistently used alternative definitions to serve as robustness checks, as we have done here.

Literature-reported type 2 diabetes remission rates vary by population, observation window, intensity of intervention, and rigor of remission definition. Reported remission rates (9) in the settings of randomized controlled trials over 2- or 3-year observation windows have included <2% with diabetes support and education, 6–9% with intensive lifestyle intervention, 36% with very-low-calorie diets (10), and ~60% among those undergoing Roux-en-Y gastric bypass surgery (11). Our rates, ranging from 0.8 to 3.2%, generally align with the literature-reported remission rates associated with lower-intensity interventions, although our analysis was not designed to distinguish between remission that was spontaneous versus remission induced by lifestyle, surgical, or pharmacologic intervention.

The evidence base continues to grow for nonsurgical remission interventions, such as the 2018 publication of the landmark primary care–led Diabetes Remission Clinical Trial (DiRECT) (10). As participant experiences with remission in primary care settings from DiRECT are shared (12), efforts to achieve type 2 diabetes remission by individual patients or their health care providers may increase in parallel, providing an additional rationale to develop population-level strategies to assess and track remission.

Similar to Captieux et al. (13), we observed that those in our remission groups had lower A1C values at the index date and a higher prevalence of bariatric surgery. The higher mean number of DCSI comorbidities observed across all of our remission definition groups is similar to findings by Captieux et al. related to history of severe comorbidities. Coupled with the parallel observation of lower prevalence of missing BMI data across the four remission definition groups, this finding suggests that the comorbidity observations may be associated with increased contact with the health care system, although the present analysis was not designed to confirm this.

Further study is needed to understand the durability of remission and associations with longitudinal outcomes (2), including whether differences in longitudinal micro- and macrovascular outcomes vary by the remission definition thresholds set here. Complicating this issue is the fact that 5,840 (54.6%) of the 10,694 individuals in our study who achieved remission by the 2021 consensus statement definition had an additional 1 year of continuous enrollment in our database after their remission date, dropping to 2,671 (25.0%) if 2 years of follow-up were required. To support future assessments, strategies to boost sample size and duration of follow-up could include the use of all-payer administrative claims databases in the United States, lifetime health care encounter data from single-payer settings outside of the United States, or observational registries designed for longitudinal follow-up.

Limitations and Strengths

This study must be interpreted in the context of limitations common to real-world data derived from administrative claims. First, the study population of continuously enrolled Medicare Advantage and commercial plan enrollees does not represent all payers, which limits generalizability to uninsured and underinsured populations. Second, all study definitions were dependent on an individual's history of procedures and diagnosis codes or fills for medications that were billed through insurance; diagnoses, medications, and procedures paid for with cash or obtained outside of the insurance system were not captured.

Third, claims were used as proxies for comorbidities and medication adherence, which may not fully represent an individual's clinical history or medication-taking behavior. Fourth, those with available A1C laboratory values to accompany laboratory service-related medical claims represented a subset of the population for whom laboratory values were supplied by third-party vendors; lack of A1C laboratory results in our sample does not equate to lack of billed laboratory services or screening for A1C. However, these subgroups appear clinically and demographically similar (Table 2). Fifth, there is missingness of important demographic and patient-reported features, including race among all commercial enrollees, ethnicity, and details related to socioeconomic status. Income-related results were derived from zip code–level census data rather than individually reported data. Additionally, key values related to diabetes remission, including duration of diabetes, lifestyle and nutritional interventions, and the recency, magnitude, or maintenance of weight loss, were not assessable in claims. Finally, a portion of our study observation period coincided with the coronavirus disease 2019 pandemic, which had a known impact on diabetes-related outpatient visits (14) and A1C testing during 2020 and may have contributed to an under-detection of comorbidities or laboratory-documented diabetes remission during that time period.

This study also has its strengths, including the continuous enrollment information conferred by administrative claims data, which enables consistent capture of an individual's health care utilization patterns over months to years without the information leak that can occur in clinically rich electronic health record–based data sets when continuous enrollment is required. In fact, in our study, the observation window was on average 49 months (SD 10 months). Additionally, our data set includes a geographically and sociodemographically diverse cohort of 524,076 patients in the United States with type 2 diabetes, 338,791 of whom had at least two A1C laboratory values to assess remission. This population is twice the size of those in the currently available literature on remission and the first of its kind in the United States (12).

Conclusion

Claims-based analyses enriched with A1C laboratory values can provide population-level estimates of diabetes remission that may supplement and extend prospective trials in assessing the sociodemographic distribution, clinical and sociodemographic correlates, and duration and trajectory of remission and its association with later complication rates, mortality, and costs of care.

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DUALITY OF INTEREST

N.E.S., M.S.J., L.R.B., and C.N.C. are employees of and stock shareholders in UnitedHealth Group. N.E.S. is an advisor for OptionsMD. No other potential conflicts of interest relevant to this article were reported.

AUTHOR CONTRIBUTIONS

N.E.S., D.A.A., and C.N.C. drafted the manuscript. M.S.J. performed the data analysis. All of the authors designed the study, interpreted the results of the analysis, reviewed and revised the manuscript, and approved the manuscript submission. N.E.S. and C.N.C. are the guarantors of this work and, as such, had full access to all the data in the study and take responsibility for the integrity of the data and the accuracy of the data analysis.

PRIOR PRESENTATION

Parts of this study were presented as posters at the American Diabetes Association's 82nd Scientific Sessions in New Orleans, LA, 3–7 June 2022, and at the 2022 Annual Research Meeting of Academy Health in Washington, D.C., 4–7 June 2022.

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