

Real-world clinical and demographic characteristics associated with progression to type 2 diabetes in patients with prediabetes

Poster code:
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Aim

- To conduct a real-world observational study to understand the clinical and demographic characteristics of US patients living with prediabetes one year prior to progression to type 2 diabetes (T2D).
- To compare these characteristics with those who did not progress to T2D.

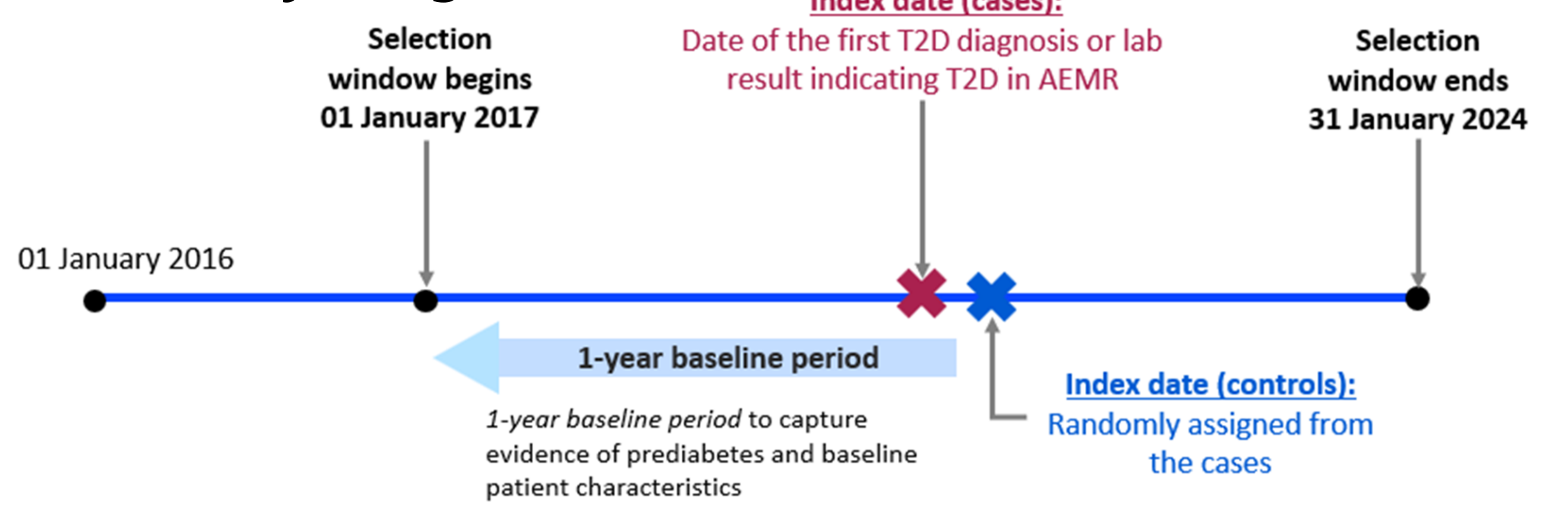
Introduction

- More than 88 million (approximately one in three) adults in the US have prediabetes¹, defined as a fasting blood glucose level ≥ 100 and < 126 mg/dL (5.5-6.9 mmol/L), a hemoglobin A1c (HbA_{1c}) level $\geq 5.7\%$ and $< 6.5\%$, or an impaired glucose tolerance where the plasma glucose level is ≥ 140 and < 200 mg/dL (7.8-11.0 mmol/L) during a 2-hour 75 g oral glucose tolerance test².
- Individuals with prediabetes are at an increased risk of disease progression to T2D, defined as a fasting blood glucose level ≥ 126 mg/dL (7.0 mmol/L), an HbA_{1c} level $\geq 6.5\%$, or an impaired glucose tolerance where the plasma glucose level is ≥ 200 mg/dL (11.1 mmol/L) during a 2-hour 75 g oral glucose tolerance test or any random blood glucose ≥ 200 mg/dL accompanied by hyperglycemic symptoms².
- Around 70% of people with prediabetes progress to T2D³, with risk positively associated to excess BMI and elevated HbA_{1c}⁴.
- There is currently no real-world evidence (RWE) on the characteristics present in the year leading up to this development, and how this compares to those who do not develop T2D.

Methods

- This non-interventional, RWE, observational, case-controlled study was conducted in a population with prediabetes with an incident diagnosis of T2D progressors (cases) and non-progressors (controls).
- The IQVIA PharMetrics® Plus database and the linked Ambulatory Electronic Medical Records (AEMR) databases were utilized to identify cases and controls between January 2017 and January 2024 (Figure 1).
- For cases, the date of T2D diagnosis was the index date.
- For controls, index dates were randomly assigned as pseudo-index dates.
- All patients included in this study demonstrated prediabetes within a 12-month-pre-index period.
- Demographic characteristics at index, and clinical characteristics, healthcare resource use, and cost over the 12-month pre-index period were compared between cases and controls.
- Baseline characteristics were compared using independent statistical testing: Chi-square testing or Fisher's exact test for categorical variables, and independent t-test (mean) and Wilcoxon rank-sum test (median) for continuous variables.

Figure 1: Study design



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Key Results

- Compared to controls, cases were younger (mean [SD]; 55.8 [10.9] vs 56.8 [11.8] years) and more likely to be female (53.1% vs 50.8%). There was a notably higher ($\geq 5\%$ difference) proportion of cases located in the **US South region** (47.6% vs 40.8%), with **self-insured payer type** (28.6% vs 23.1%), **preferred provider organization (PPO)** (68.1% vs 63.0%) health plan type, and **index month before March 2020** (39.2% vs 33.7%), compared to controls (Figure 2).
- Baseline comorbidities were more frequent in cases compared to controls as measured by the Charlson Comorbidity Index (CCI). The mean (SD) CCI value was 1.1 (2.0) for cases and 0.8 (1.7) for controls. Prevalence was higher for several comorbidities of interest in cases vs controls: **obesity** (47.1% vs 31.9%), **rheumatologic disease** (47.5% vs 41.0%), and **sleep disorders** (28.2% vs 19.5%) (Figure 3).
- Overall baseline anti-diabetic medication (ADM) utilization was significantly higher ($p < 0.0001$) in cases compared to controls. Almost all controls (94.4%) had **no ADM prescription** during the baseline period, as compared to 64.0% of cases. In cases, **31.3% used oral ADM only**, as compared to **4.3%** of controls (Figure 4).
- Cases had a significantly higher ($p < 0.0001$) proportion with ≥ 1 inpatient hospitalization (8.1% vs 5.3%) and ER visit (23.7% vs 16.9%), compared to controls (Figure 5). Cases had a higher mean number of outpatient medical services (45.9 vs 36.4), physician offices visits (12.3 vs 10.4), primary care visits (4.7 vs 4.0), and outpatient drug claims (30.5 vs 21.9) (Figure 5).
- The mean total all-cause healthcare cost was higher for cases (\$16,120) than controls (\$10,917) and was driven by **higher mean outpatient medical** (\$6,634 vs \$5,128) and **outpatient drug costs** (\$4,682 vs \$3,240), and **inpatient costs** (\$4,230 vs \$2,164) (Figure 6).

Figure 2: Baseline demographic characteristics

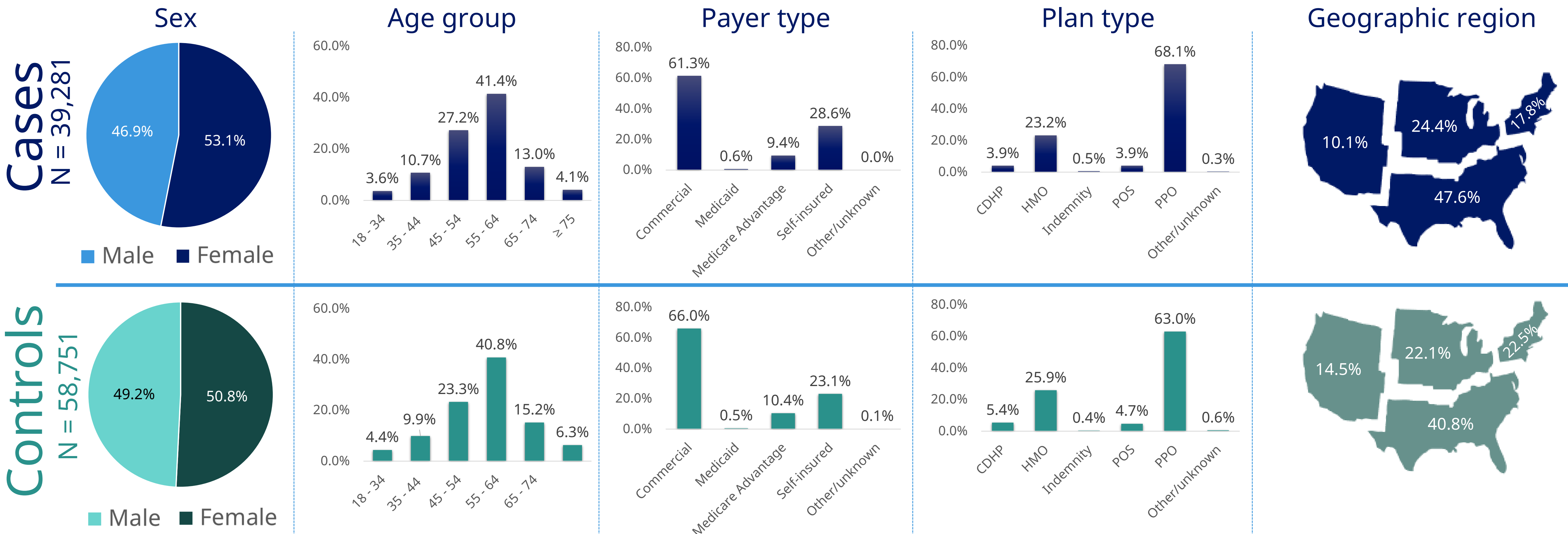


Figure 3: Baseline clinical characteristics

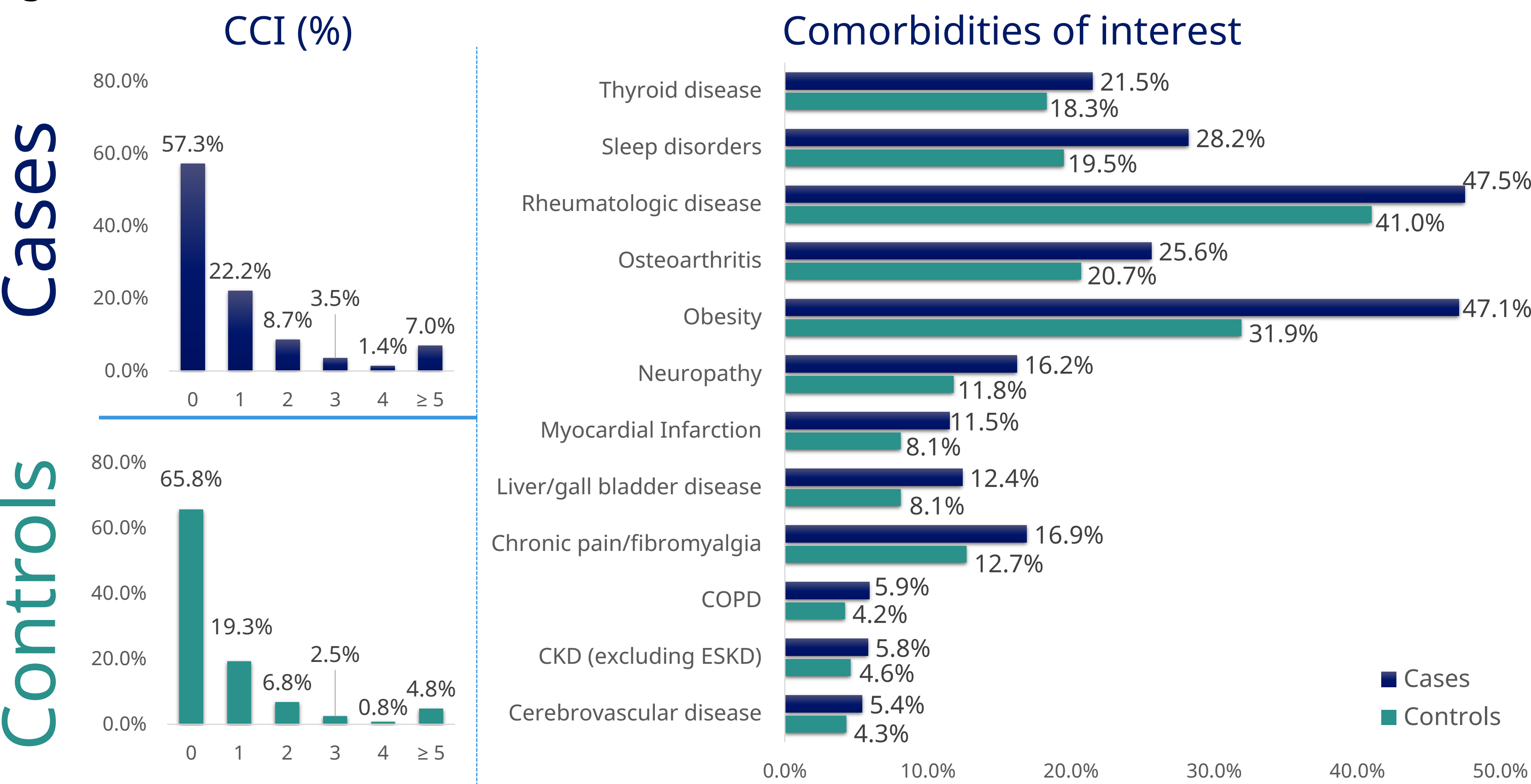


Figure 4: Baseline utilization of oral ADMs by route

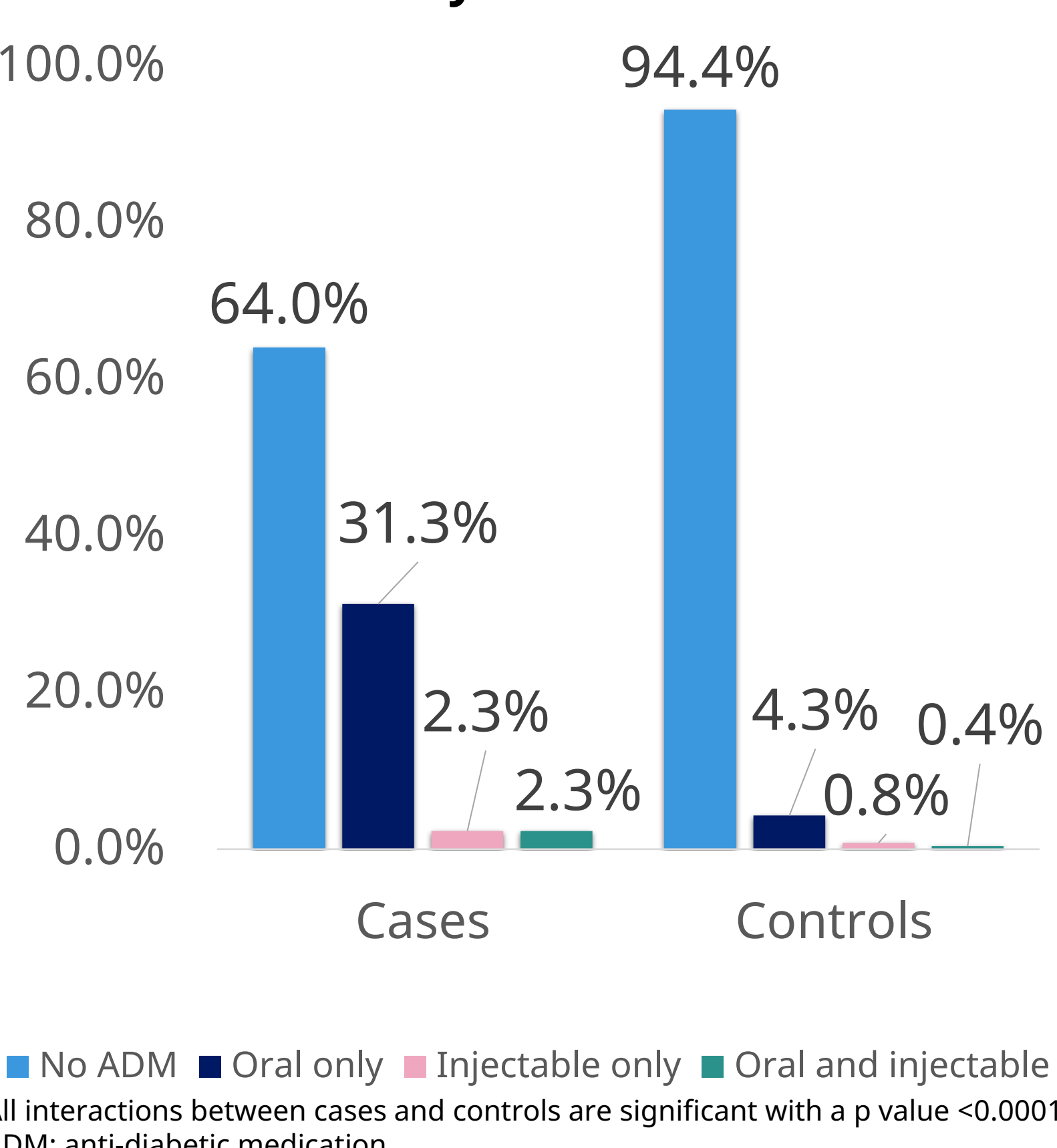


Figure 5: Baseline healthcare resource utilization (HCRU)

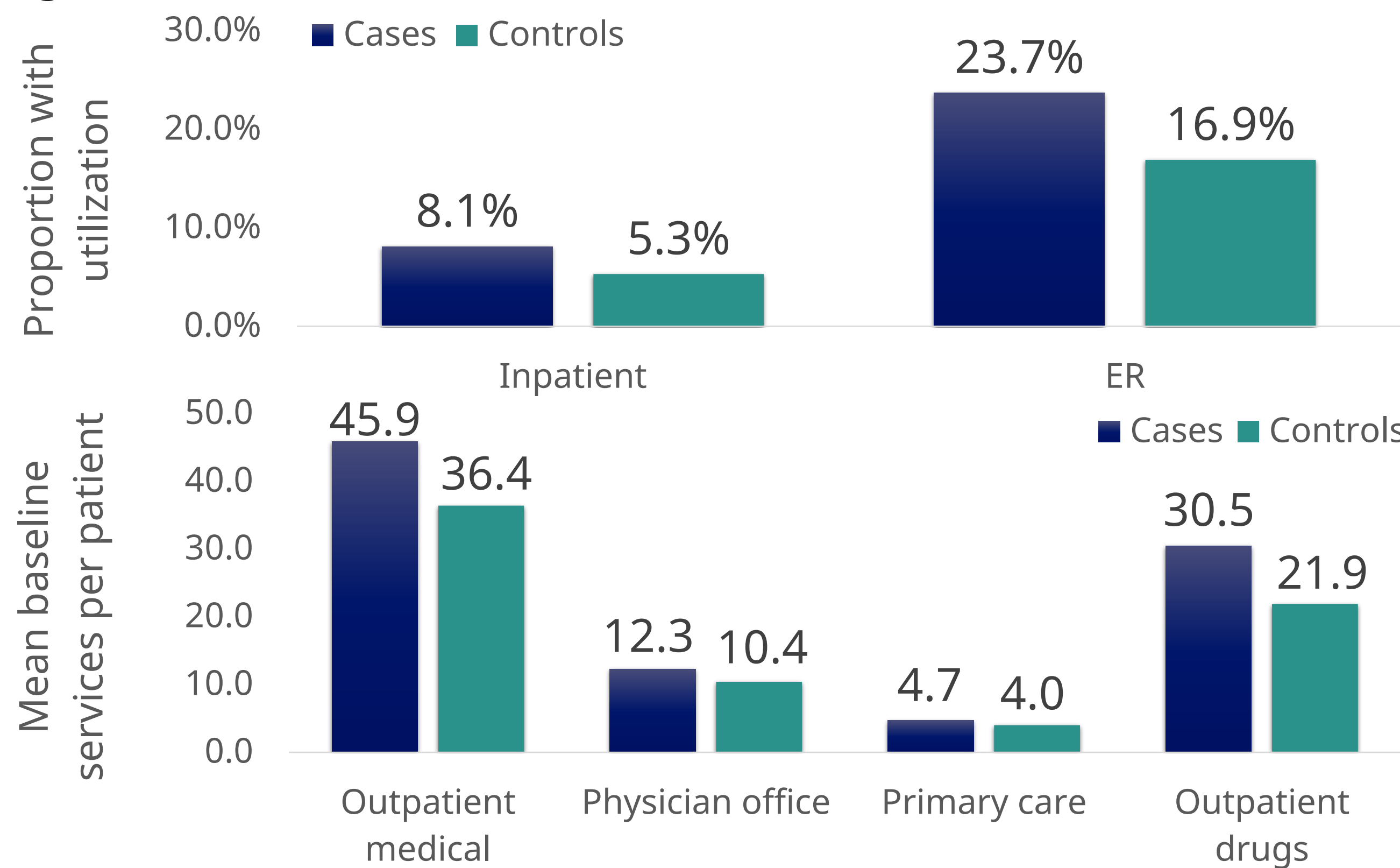
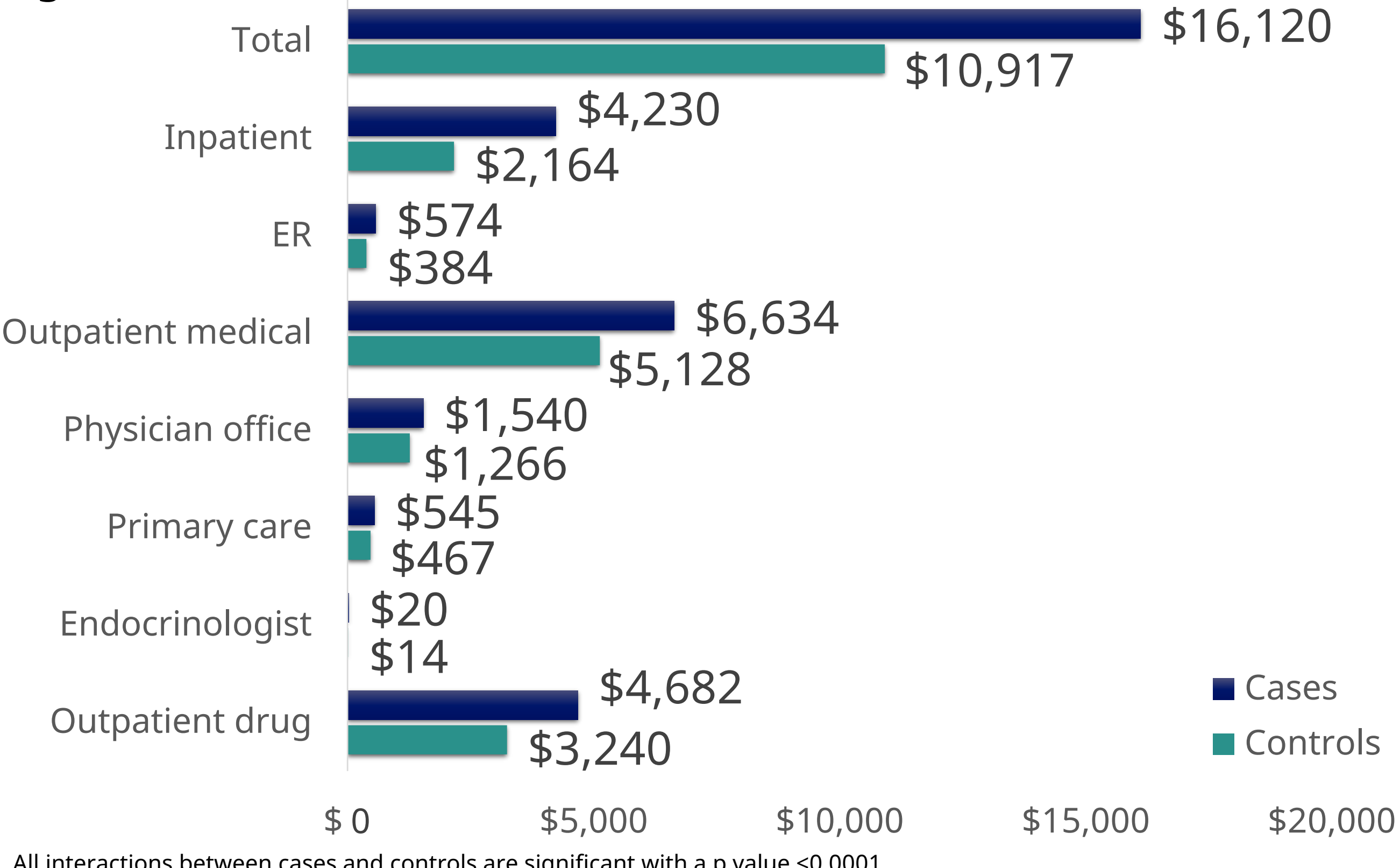


Figure 6: Baseline all-cause healthcare costs (overall)



Summary

- There was a significant difference in baseline characteristics in cases compared to controls, and there was a significantly higher frequency of comorbidities associated with cases.
- Baseline utilization of oral ADMs was significantly higher in cases compared to controls, and metformin was the most commonly utilized ADM.
- The proportion with ≥ 1 inpatient hospitalization or ER visit was significantly higher in cases compared to controls, and the mean number of baseline all-cause services was higher overall in cases.
- The overall mean all-cause healthcare cost was higher in cases compared to controls.

Conclusions

- This study demonstrates that patients who progress from prediabetes to T2D have **greater disease burden, higher medication usage, and higher medical costs** compared to those who do not progress to T2D.
- Earlier preventative action may benefit** certain patient populations with prediabetes.
- The findings may be used to inform treatment strategies and **aid in identifying patients at risk, allowing for proactive intervention to mitigate disease progression.**

References:
(1) Centers for Disease Control and Prevention. Prediabetes – Your Chance to Prevent Type 2 Diabetes. 2024. <https://www.cdc.gov/diabetes/basics/prediabetes>. Accessed 25 March 2025; (2) American Diabetes Association. Understanding Diabetes Diagnosis. <https://www.diabetes.org/about-diabetes/diagnosis>. Accessed 25 March, 2025; (3) Reed et al., *Diabetes, Metabolic Syndrome and Obesity* 2021: 3567-3602; (4) Halalau et al., *Annals of medicine* (2023): 55; 371-378