

Understanding Drivers Of Healthcare Resource Utilisation Costs Among People Living With Obesity In UK Clinical Practice

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Aims

- We estimated contributions of key demographic and clinical characteristics, including BMI and obesity-related complications (ORCs) on HCRU (healthcare resource utilisation) costs among people living with obesity.

Introduction

- By 2030, an estimated 1.1 billion people will be living with obesity (defined as \geq BMI 30kg/m²) globally¹.
- Obesity is a complex, multifactorial disease that is associated with a wide range of ORCs, leading to high healthcare use and costs for healthcare systems globally.
- Previous research has demonstrated that HCRU and HCRU costs are increasing over time for individuals living with overweight and obesity².
- Understanding drivers of HCRU costs in people living with obesity is therefore essential to inform effective healthcare planning and resource allocation.

Methods

- We conducted a cross-sectional analysis using 2023 data from the Discover dataset, a linked electronic health record (EHR) database covering residents of North-West London, representative of the UK population by age and sex³.

 2.7 million individuals in the Discover dataset⁴

Study population


- Adults aged \geq 18 years with a BMI \geq 30 kg/m² were included.
- ORCs were identified by standard clinical coding (ICD-10, Read codes).
- Individuals with missing demographic or BMI information were excluded.

Variables and outcomes

- The primary outcome was HCRU costs, calculated as a total cost and across five healthcare settings:

- Primary care
- Inpatient care
- Emergency department visits
- Outpatient care
- Prescriptions

- Predictor variables included demographics:

 4 sociodemographic characteristics
3 obesity BMI classes
35 obesity-related complications

Statistical analysis

- Linear regression modelling was used to find associations between predictor variables and HCRU costs. Due to skewness observed in exploratory analysis, the cost variable was log-transformed.
- A complete-case approach was taken and individuals with missing values for demographics or BMI were excluded.
- Model fit metrics were evaluated through Akaike's Information Criterion and adjusted R-squared values. Additional correlation analyses between risk factors and ORCs were carried out using Spearman's rank correlation and phi coefficients.

Results

- There were 287,497 individuals in the obesity population in 2023 (**Table 1**).

Obesity-related complications

- When considering ORCs, the greatest drivers of HCRU costs in people living with obesity were found to be cancer ($\exp(\beta)$ =3.16, 95% confidence interval = 3.02-3.31), type 2 diabetes (T2D; 2.66, 2.59-2.72), idiopathic intracranial hypertension (IIH; 2.15, 1.83-2.54), prediabetes (1.89, 1.85-1.94), hypertension (1.87, 1.83-1.91) and rheumatoid arthritis (1.84, 1.71-1.99) (**Figure 1**).

Healthcare setting

- Drivers of HCRU cost varied by healthcare setting for those living with obesity.
- Cancer was the greatest driver of total HCRU costs (3.16, 3.02-3.31) (**Figure 2**), inpatient care (37.89, 34.68-41.40) and outpatient care costs (53.09, 48.22-58.45).
- Meanwhile, T2D was the strongest driver of HCRU costs for primary care (2.65, 2.59-2.71) and prescription costs (6.55, 6.33-6.78) (**Figure 2**).
- The greatest driver of HCRU costs in the emergency department was deep vein thrombosis/pulmonary embolism (DVT/PE; 3.65, 3.30-4.03) (**Figure 2**).

Sociodemographics

- Female gender was associated with higher HCRU costs than male gender (1.75, 1.72-1.78) in those living with obesity (**Figure 3**).
- Compared to the 18-25 year-old reference group, all other age groups incurred higher HCRU costs. The 66-75 year-old age group was associated with highest HCRU costs (1.76, 1.68-1.85) (**Figure 3**).
- Compared to the reference group of BMI 30-35kg/m², BMI \geq 40kg/m² was associated with slight increased HCRU costs (1.08, 1.05-1.11), whilst the effect for BMI 35-40kg/m² was not significant (**Figure 3**).

Table 1: Baseline sociodemographic characteristics in the obesity population

Characteristic		Obesity population
Number of individuals		287,497
		n (%)
Sex	Female	165,381 (57.52)
	Male	122,116 (42.48)
Age group	18-25	16,603 (5.78)
	26-35	42,480 (14.78)
	36-45	53,161 (18.49)
	46-55	60,109 (20.91)
	56-65	57,557 (20.02)
	66-75	35,488 (12.34)
	Above 75	22,099 (7.69)
	Obesity class I	188,767 (65.66)
BMI	Obesity class II	62,647 (21.79)
	Obesity class III	36,083 (12.55)
IMD deprivation quintile	1 (Most deprived)	44,697 (15.55)
	2	101,770 (35.4)
	3	79,701 (27.72)
	4	42,314 (14.72)
	5 (Least deprived)	18,085 (6.29)
	Unknown	930 (0.32)
Ethnicity	White	121,244 (42.17)
	Asian	84,698 (29.46)
	Black	39,311 (13.67)
	Other	29,988 (10.43)
	Mixed	10,375 (3.61)
	Unknown	1,881 (0.65)

Figure 1: Top 10 ORCs with greatest impact on HCRU costs in people living with obesity.

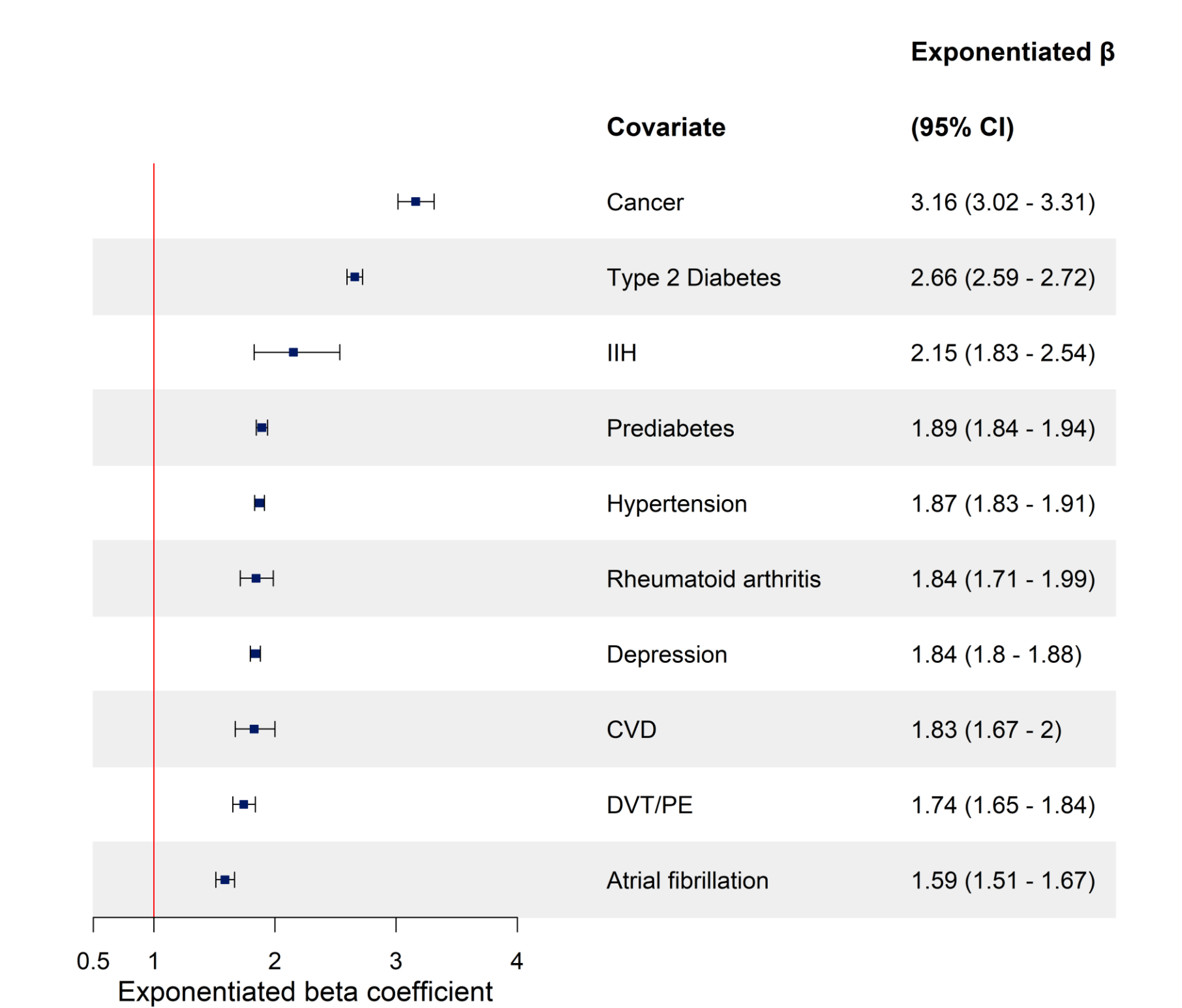


Figure 2: Impact of top 10 ORCs on HCRU costs across healthcare settings

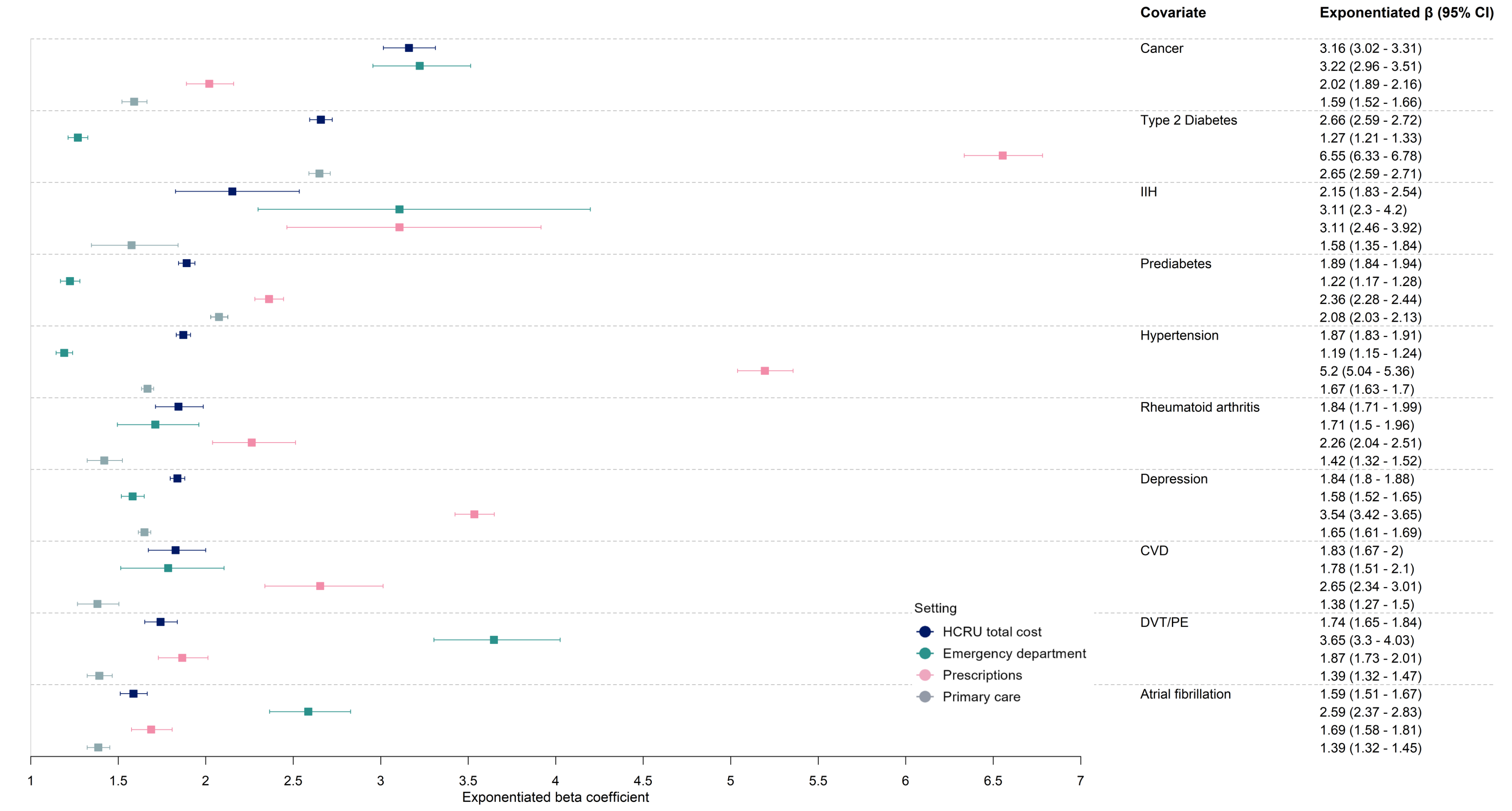
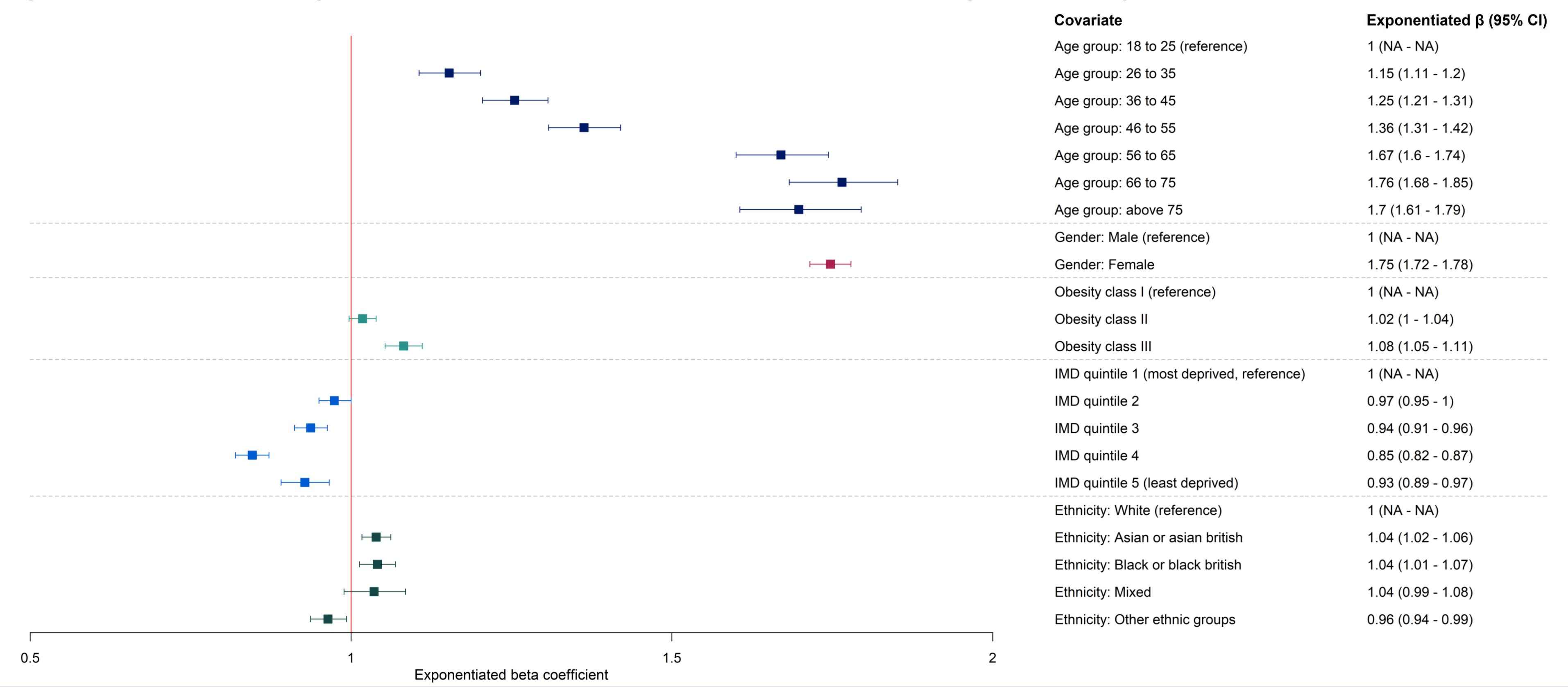


Figure 3: Impact of demographics and BMI on HCRU costs in individuals living with obesity



Discussion

- Cancer and type 2 diabetes were the strongest contributors to HCRU costs among obesity-related complications, highlighting key patient groups where targeted obesity management may help reduce healthcare burden.
- The impact of ORCs on HCRU costs varied significantly by healthcare setting, with cancer driving inpatient and outpatient costs, while T2D was the main contributor to primary care and prescription costs, and DVT/PE for ED costs.
- BMI alone was a weak predictor of HCRU costs. Higher BMI (\geq 40 kg/m²) was only modestly associated with increased HCRU costs, indicating that BMI alone may not fully capture the complexity of healthcare needs in people living with obesity.

Conclusion

- ORCs and demographic factors, particularly age and gender, are key drivers of healthcare costs, beyond BMI classification.
- Cost drivers vary by healthcare setting, informing targeted interventions towards where unmet needs are highest.
- A nuanced understanding of the HCRU cost drivers can support more effective, targeted strategies for managing obesity and its complications within healthcare systems.

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