Variation in obesity burden, multimorbidity, and healthcare costs across obesity class, sex, and race/ethnicity in the United States

EPH216

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Objective

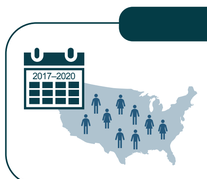
- To quantify disparities in obesity burden, obesity-related complications (ORCs), and healthcare resource utilization (HCRU) costs by obesity class, sex, and race/ethnicity among US adults.

Introduction

- Obesity is a chronic, complex disease with a growing prevalence and economic burden for both healthcare systems and payers.
- Globally, it is estimated that over 10% of adults living with higher levels of obesity (body mass index [BMI] ≥35 kg/m^2) will require medical intervention during their lifetime.[1]
- Individuals living with overweight or obesity are at higher risk of developing metabolic and chronic complications, resulting in high long-term HCRU and associated costs:[2,3] in 2019, the annual costs associated with obesity in the USA were estimated to exceed $170 billion (bn).[4]
- Real-world evidence demonstrates that the prevalence and economic burden of ORCs increase with higher BMI,[5] but there are limited data on how this burden of disease varies across obesity class, sex, and race/ethnicity.
- As next-generation obesity management medications (OMMs) are developed, a broader assessment of these disparities is required to facilitate more targeted healthcare planning and resource utilization.

Methods

Data source

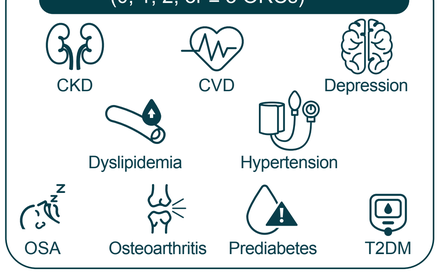


- Cross-sectional analysis of National Health and Nutrition Examination Survey (NHANES) 2017–2020 dataset, a national survey measuring the health and nutrition of adults and children in the USA
- NHANES 2017–2020 prevalence estimates were applied to 2025 US population estimates per stratified group of interest[a]

Prevalence of obesity



Prevalence of ORCs[b] and ORC MM[c] (0, 1, 2, or ≥ 3 ORCs)[d]



HCRU costs[d]



- Average HCRU costs per patient per year across obesity classes were sourced from published 2019 data[6]
- A 2019 to 2025 cumulative inflation rate for medical care of 16.47% was used to calculate inflated HCRU cost per patient per year values for 2025[6,7]

BMI=body mass index; CKD=chronic kidney disease; CVD=cardiovascular disease; HCRU=healthcare resource utilization; MM=multimorbidity; NHANES=National Health and Nutrition Examination Survey; ORC=obesity-related complication; OSA=obstructive sleep apnea; T2DM=type 2 diabetes mellitus.
[a] 2025 population estimates were derived from US Census data.[8,9] [b] ORCs selected represent the nine most reported ORCs in the NHANES dataset. [c] MM describes the co-occurrence of two or more ORCs. [d] All data were evaluated across obesity class, sex, and race/ethnicity.

Results

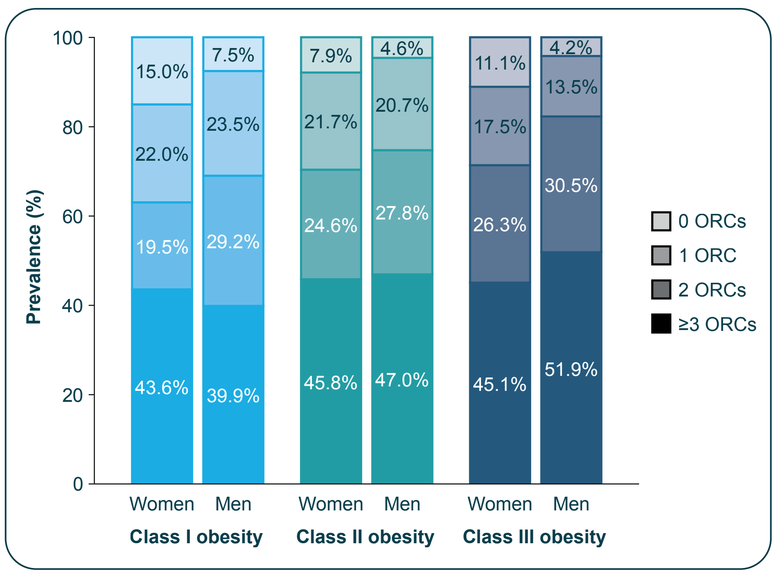
Prevalence of obesity

- The 2025 US Census reports a total of 269,763,509 adults (**Supplementary Table 1**),[8] of whom 111,789,999 (41.4%) were estimated to be living with obesity (**Table 1**).[9]
  - Respectively, 21.6%, 11.0%, and 8.9% were estimated to be living with class I, class II, and class III obesity (values are subject to rounding).[9]
- The prevalence of class II and III obesity was higher in women than men, with the greatest disparity among those living with class III obesity (11.3% and 6.3%, respectively) (**Supplementary Figure 1**).
- Regarding race/ethnicity, class II and III obesity were most prevalent in non-Hispanic Black individuals (14.0% and 13.9%, respectively) (**Supplementary Figure 2**).
- When assessed by sex and race/ethnicity, non-Hispanic Black women had the highest prevalence of class II and III obesity (16.1% and 18.8%, respectively) (**Supplementary Figure 3**).
- For comparison, data for class I obesity are presented in **Supplementary Figures 1–3**.

Prevalence of ORCs and ORC multimorbidity (MM)

- Across obesity classes, the most prevalent ORCs were dyslipidemia (67.4–72.8%), hypertension (45.0–53.1%), and prediabetes (39.9–41.8%) (**Supplementary Figure 4**).
  - The prevalence of hypertension, type 2 diabetes mellitus (T2DM), osteoarthritis, obstructive sleep apnea (OSA), and depression generally increased with obesity class.
- The prevalence of dyslipidemia, hypertension, and OSA were higher in men, whereas osteoarthritis was higher in women, irrespective of obesity class; sex differences in the remaining ORCs differed across classes (**Supplementary Figure 5**).
  - Among women, 5 of 9 ORCs were more prevalent in those living with class III versus class I obesity; the largest differences were observed for T2DM (25.8% vs 17.8%) and OSA (14.9% vs 8.3%).
  - Among men, all ORCs were more prevalent in those living with class III versus class I obesity; the largest differences were observed for hypertension (60.0% vs 45.6%) and OSA (30.0% vs 15.7%).
- Among non-Hispanic Black individuals, who had the highest prevalence of class II and III obesity, hypertension was the most prevalent ORC in women in classes II and III (55.7% and 60.5%, respectively), and dyslipidemia was most prevalent in men in classes II and III (67.5% and 67.9%, respectively) (**Supplementary Figure 6**).
- The presence of 2 or ≥3 co-occurring ORCs was generally highest among individuals living with class II and III obesity, and the presence of 0 or 1 ORC was highest in class I, irrespective of sex (**Figure 1**).

Figure 1. Prevalence of ORC MM by obesity class

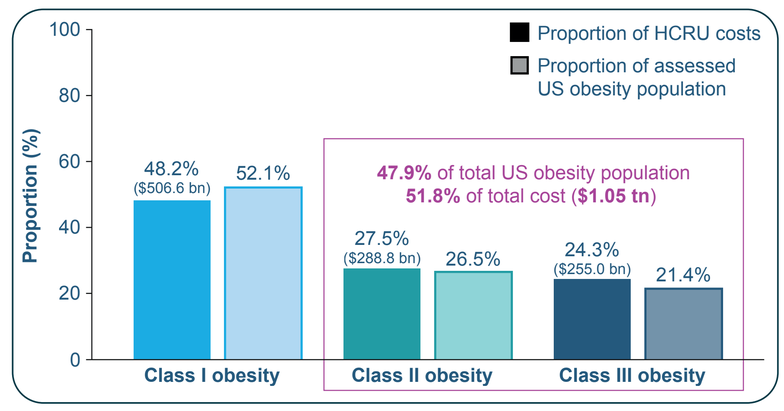


MM=multimorbidity; ORC=obesity-related complication.
Values are subject to rounding.

HCRU costs

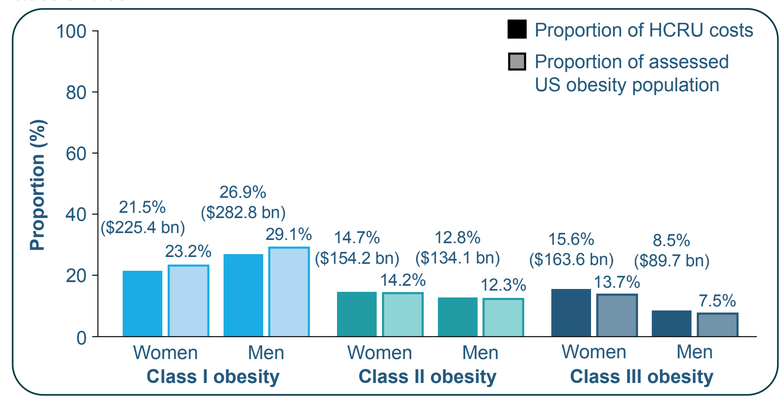
- The total cost of obesity in the US in 2025 was estimated to be $1.05 trillion (tn) (**Figure 2**).
  - Individuals living with class II and III obesity represented 47.9% of the total US obesity population assessed but accounted for 51.8% of the related total cost.
- The prevalence of class II and III obesity and associated costs were higher among women than men (**Figure 3**).
- The total cost among non-Hispanic Black women living with class III obesity was higher than those living with either class I or II obesity, respectively ($35.5 bn vs $34.6 bn, and $27.7 bn) (**Figure 4**).
- Notably, the population of non-Hispanic Black women living with obesity class III was similar in size to class II and 16.2% smaller than class I (**Supplemental Figure 3**).
- When stratifying by sex and race/ethnicity, class II/III obesity was associated with disproportionately higher HCRU costs relative to their prevalence within the obesity population; the opposite was observed for class I obesity (**Figure 5**).

Figure 2. Proportion of HCRU costs and proportion of obesity population by obesity class



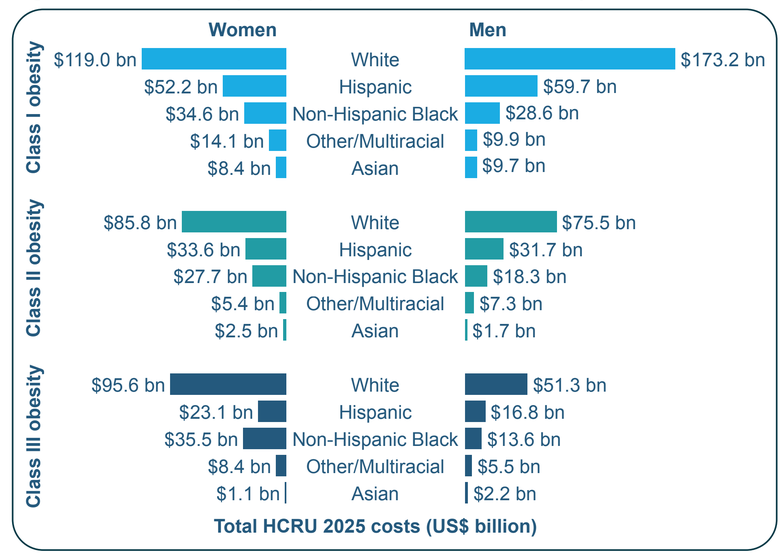
bn=billion; HCRU=healthcare resource utilization; tn=trillion.

Figure 3. Proportion of HCRU costs and proportion of obesity population by obesity class and sex



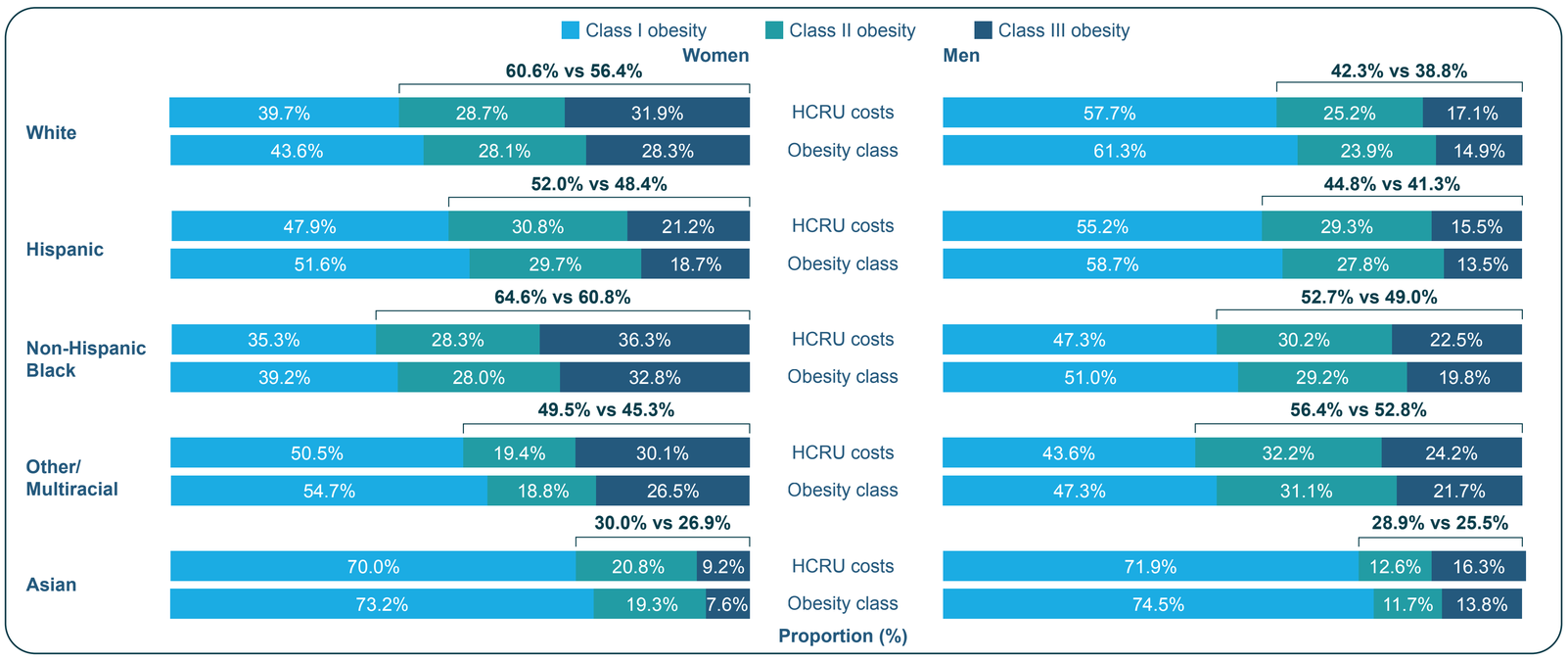
bn=billion; HCRU=healthcare resource utilization.

Figure 4. HCRU costs by obesity class, sex, and race/ethnicity



bn=billion; HCRU=healthcare resource utilization.
Racial/ethnic groups have been ordered from most to least prevalent according to data from men with class I obesity.
Values are subject to rounding.

Figure 5. Proportion of HCRU costs and proportion of obesity population by sex and race/ethnicity



HCRU=healthcare resource utilization.
Proportions are calculated for individual sex and race/ethnicity populations, not the total obesity population. Order of race/ethnicity based on order in **Figure 4**.
Values above the bars represent the combined proportion of HCRU costs for class II and class III obesity versus the corresponding proportion of each sex and race/ethnicity population. Values are subject to rounding.

Table 1. Demographics

	Total	Women	Men
Population living with obesity, n	111,789,999	57,091,912	54,670,691
Race/ethnicity, n			
White	63,769,515	31,366,590	32,459,834
Asian	2,797,723	1,320,927	1,487,217
Non-Hispanic Black	16,797,068	10,159,088	6,437,712
Hispanic	23,291,300	11,623,279	11,685,076
Other/Multiracial	5,338,173	2,967,066	2,404,396

NHANES=National Health and Nutrition Examination Survey.
NHANES 2017–2020 prevalence estimates were applied to 2025 US population estimates per stratified group of interest.[8,9]
Each value in the table represents the sum of three individually calculated estimates for obesity classes I, II, and III, and each value stands alone.

Conclusions

- Obesity prevalence varied substantially by obesity class, sex, and race/ethnicity.
- Higher levels of obesity were associated with greater ORC and MM burden and disproportionately higher HCRU costs relative to their prevalence within the obesity population, with notable disparities among non-Hispanic Black women.
- These findings highlight the important sociodemographic, clinical, and economic disparities of obesity and may help to inform healthcare planning and resource allocation, particularly as the next generation of high-efficacy OMMs becomes available.

Abbreviations

BMI=body mass index, bn=billion, CKD=chronic kidney disease, CVD=cardiovascular disease, HCRU=healthcare resource utilization, MM=multimorbidity, NHANES=National Health and Nutrition Examination Survey, OMM=obesity-management medication, ORC=obesity-related complication, OSA=obstructive sleep apnea, T2DM=type 2 diabetes mellitus, tn=trillion.

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Disclosures

MP and **BÓH**: employees of Kailera Therapeutics and may own stock/options in the company. **MIC**: employee of Kailera Therapeutics and may own stock/options in the company, and shareholder at WW International, Inc. **GM** and **SH**: employees of Lane Clark & Peacock, which received consultancy fees from Kailera Therapeutics to perform this analysis. **JPS**: partner at Lane Clark & Peacock, which received consultancy fees from Kailera Therapeutics to perform this analysis, and reports personal fees from Novo Nordisk outside of the submitted work.

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