Direct and Indirect Costs Associated With Major Depressive Disorder

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MDD Is a Disabling Mental Health Condition That Is Common, Costly, and Burdensome

Estimated **annual** prevalence of MDD[1]

10.4%

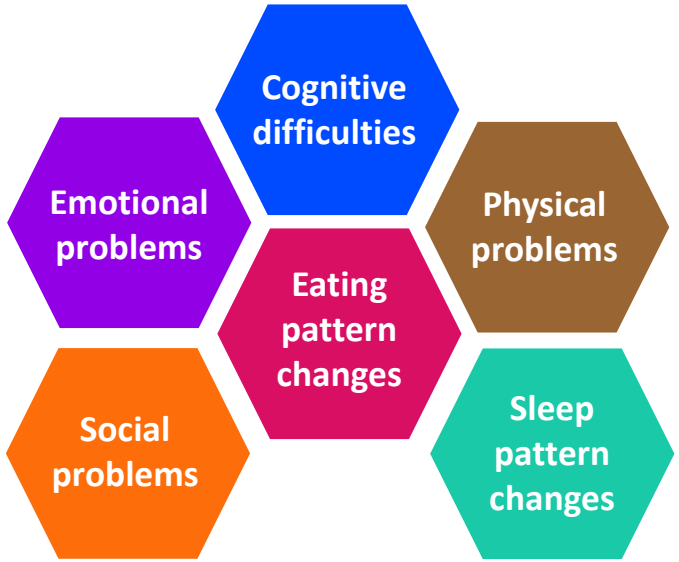
Estimated **lifetime** prevalence of MDD[1]

20.6%

Overall **economic burden** of MDD in the U.S. adult population[2]

$326.2B

MDD is associated with a range of **burdensome symptoms**[3]



Impaired QoL is experienced by ~97% of patients with MDD who are inadequately treated[4]

MDD, major depressive disorder; QoL, quality of life.

[1]Hasin DS, et al. *JAMA Psychiatry*. 2018;75(4):336-346. [2]Greenberg PE, et al. *Pharmacoeconomics*. 2021;39(6):653-665. [3]American Psychiatric Association. *Diagnostic and Statistical Manual of Mental Disorders*, 5th ed. Arlington, VA: American Psychiatric Association. 2013. [4]IsHak WW, et al. *Acta Psychiatr Scand*. 2015;131(1):51-60.

Study Objectives

The Objectives of This Study Were to Evaluate and Characterize:

- Direct and indirect healthcare costs of patients with MDD
- Incremental cost differences associated with increasing MDD severity

Patient Populations and MDD Severity Definitions

2019 National Health and Wellness Survey

- **Patient-reported** outcomes
- **Nationally representative** population

Respondent Cohorts

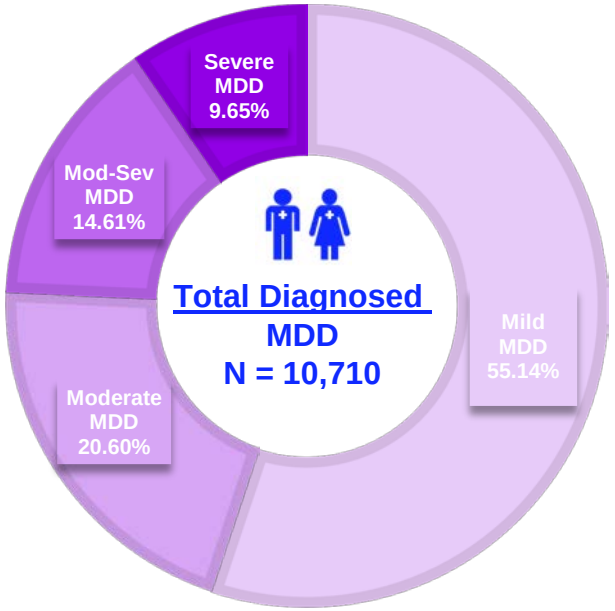
- ✓ 18+ years of age
- ✓ U.S. resident

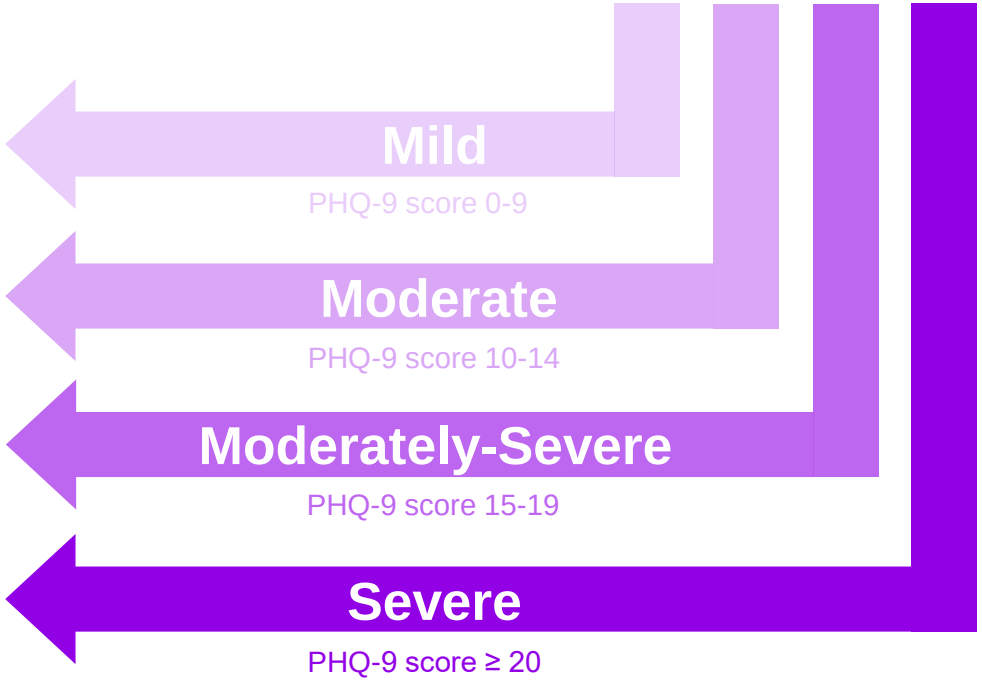
General Population
N = 52,687

- ✓ No diagnosis for MDD, BP-I, or SCZ in past 12 months

MDD Population
N = 10,710

- ✓ Self-reported physician diagnosis for depression
- ✓ No diagnosis of BP-I or SCZ in past 12 months
- ✓ MDQ negative for probable BP-1[a]





BP-I, bipolar I disorder; MDD, major depressive disorder; MDQ, Mood Disorder Questionnaire-9; PHQ-9, Patient Health Questionnaire-9; SCZ, schizophrenia.
[a]All MDD patients were required to screen as negative for probable BP-1 on the MDQ, in addition to reporting a physician diagnosis of MDD.

Direct and Indirect Cost Outcomes of Interest

6-month Direct Cost Outcomes

Self-reported HCRU:

- HCP visits
- ER visits
- Hospitalizations

Direct Costs:

- For each participant, the number of each type of visit was multiplied by its average unit cost reported in MEPS
- Costs were annualized to 12 months[a]

7-day Indirect Cost Outcomes

Lost productivity via the WPAI:

- Work hours missed due to health (absenteeism)
- Hours during which health problems affected work productivity (presenteeism)

Indirect Costs:

- Productivity hours multiplied by median hourly wages reported by the BLS
- Costs were annualized to 12 months[b]

Data Analyses[c]

- Via multivariable regression analysis, 12-month costs were compared between:
  - MDD and general population cohorts
  - More severe MDD cohorts versus the mild MDD cohort
  - Adjusted for demographic, socioeconomic, and disease characteristics
  - Mean cost estimates were reported

BLS, Bureau of Labor Statistics; ER, emergency room; HCP, healthcare professional; HCRU, healthcare resource utilization; MEPS, Medical Expenditure Panel Survey; MDD, major depressive disorder; WPAI, Work Productivity and Activity Impairment Questionnaire. [a]Results were assessed over 6 months and annualized to 12 months by doubling the 6-month HCRU and applying typical unit cost per visit. [b]Work productivity and activity impairment was assessed over 7 days and annualized to 12 months. [c]Patient and clinical characteristics were evaluated between cohorts via chi squares and ANOVA tests. Multivariable regression analyses were conducted, adjusting for the following covariates: sex (M/F), Age (<35, 35-54, 55+), race/ethnicity (Non-Hispanic White, Non-Hispanic Black, Hispanic, other), education (<high School, high school level, college level, graduate level), employed (Y/N), income (<25k/decline, 25-49k, 50k+), insurance (private, public, neither), current or former smoker (Y/N), Charlson Comorbidity Index (mean), BMI (mean), married or living with partner (Y/N), **number of total comorbid mental health diagnoses, **early-onset diagnosis of MDD/BP-I (diagnosed between age 12-24 , **diagnosed after age 25, unknown), **currently uses medication for their MDD/BP-I (Y/N). **Additional covariates included when comparing severity subgroups.

MDD Was Associated With Poorer Socioeconomic Outcomes

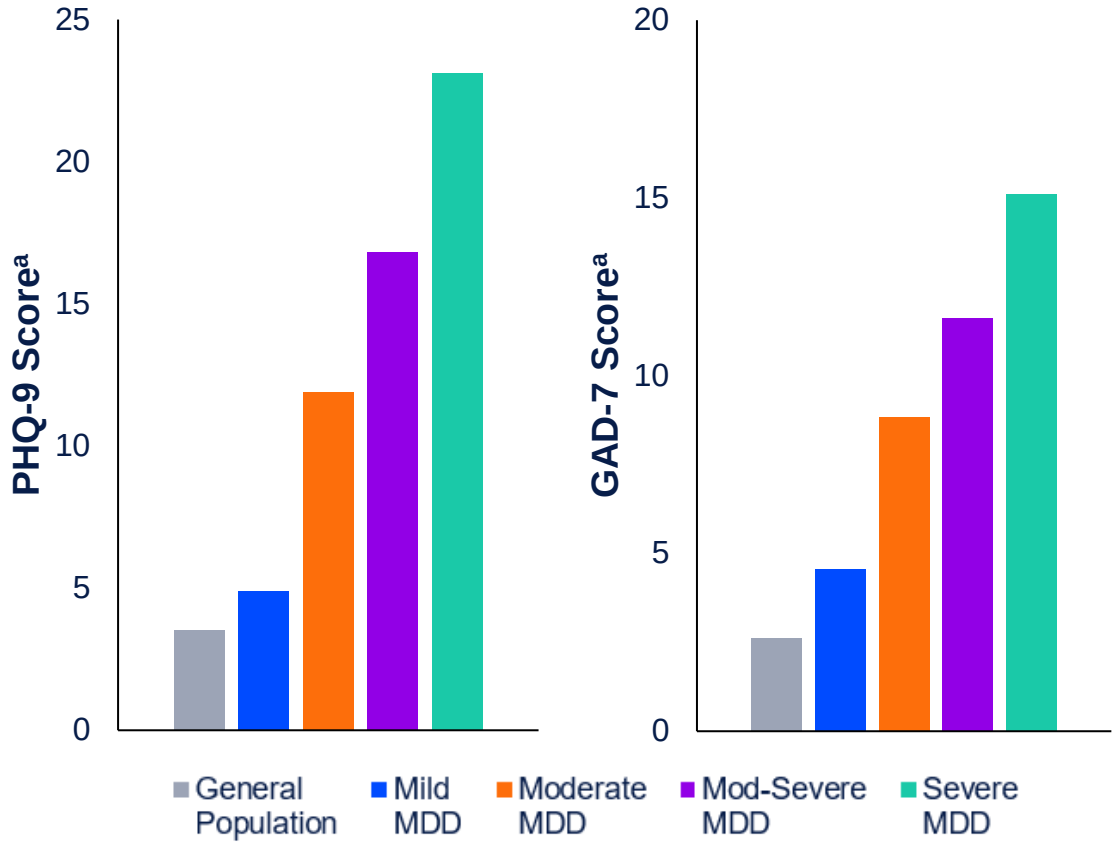
Unadjusted Baseline Demographic and Clinical Characteristics by MDD Severity

Characteristic		Mild MDD (n = 5,905)	Moderate MDD (n = 2,206)	Mod-Severe MDD (n = 1,565)	Severe MDD (n = 1,034)	General Population (n = 52,687)
Age, Mean (SD), Years		46.8 (16.4)[a]	43.0 (16.0)[b]	40.8 (15.7)[c]	39.9 (15.0)[c]	49.4 (17.4)[d]
Female, n (%)		4135 (70.0)[a]	1615 (73.2)[b]	1083 (69.2)[a,b]	725 (70.1)[a,b]	27,957 (53.1)[c]
Ethnicity/Race, n (%)	Non-white[†]	1552 (26.3)	696 (31.6)	529 (33.8)	360 (34.8)	17,764 (33.7)
	White	4353 (73.7)[a]	1510 (68.4)[b]	1036 (66.2)[b]	674 (65.2)[b]	34,923 (66.3)[b]
Marital Status Single, n (%)		2947 (49.9)[a]	1206 (54.7)[b]	922 (58.9)[b,c]	631 (61.0)[c]	20,994 (39.9)[d]
Unemployed, n (%)		2539 (43.0)[a]	1032 (46.8)[b]	774 (49.5)[b,c]	544 (52.6)[c]	20,597 (39.1)[d]
University Education or Higher, n (%)		2702 (45.8)[a]	810 (36.7)[b]	556 (35.5)[b]	297 (28.7)[c]	28,666 (54.4)[d]
Disability, n (%)		370 (6.3)[a]	225 (10.2)[b]	186 (11.9)[b]	163 (15.8)[c]	887 (1.7)[d]
Health insurance, n (%)	No	471 (8.0)[a]	215 (9.8)[a,b]	171 (10.9)[b]	159 (15.4)[c]	5781 (11.0)[b,d]
	Medicare	1277 (21.6)[a,b]	420 (19.0)[a]	309 (19.7)[a]	188 (18.2)[a]	12,217 (23.2)[b]
BMI, Mean (SD) kg/m^2		29.6 (7.9)[a]	30.3 (8.6)[b]	30.1 (8.8)[a,b]	30.8 (9.2)[b]	27.2 (6.5)[c]

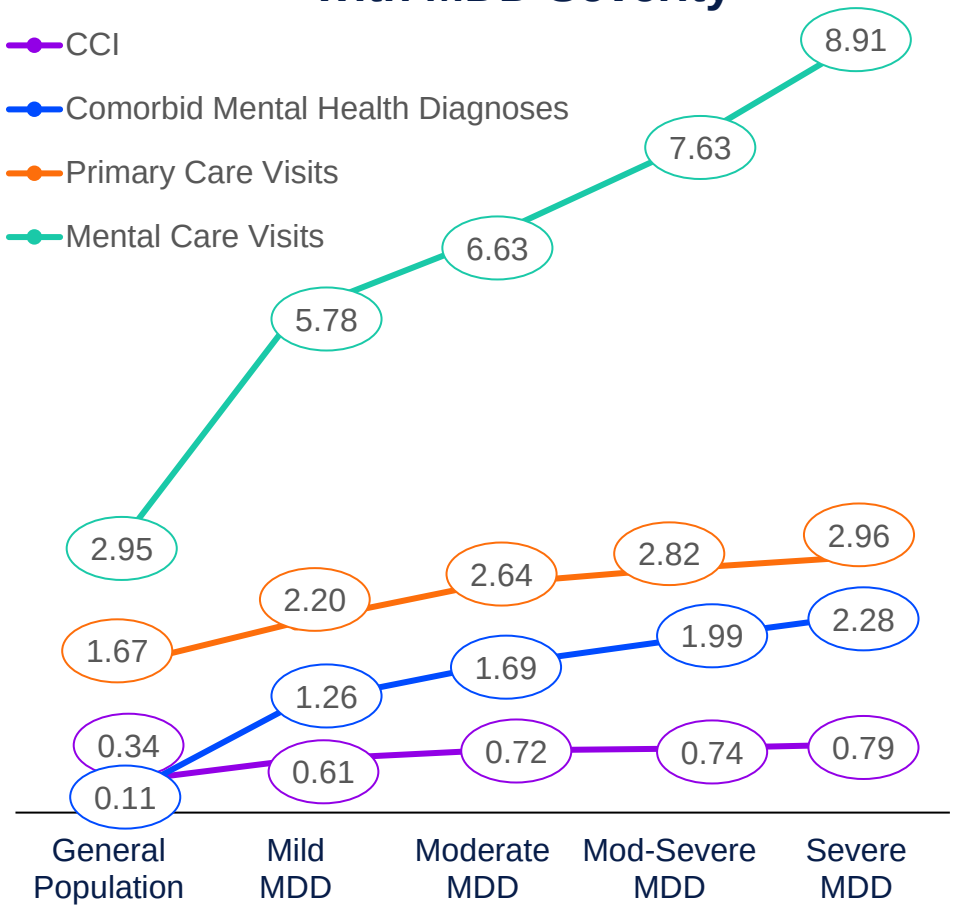
BMI, body mass index; MDD, major depressive disorder; Mod-Severe, moderately-severe; SD, standard deviation. Superscript letters describe pairwise comparisons between cohorts. Values in the same row not sharing the same superscript are significantly different at *P*<.05 in the two-sided test of equality for column proportions. Demographics and clinical characteristics represent results from bivariate analysis. [†] Significance for combined ethnic/racial demographics was not evaluated.

Clinical Outcomes Worsen With Greater MDD Severity

Depression and Anxiety Outcomes Worsen with MDD Severity



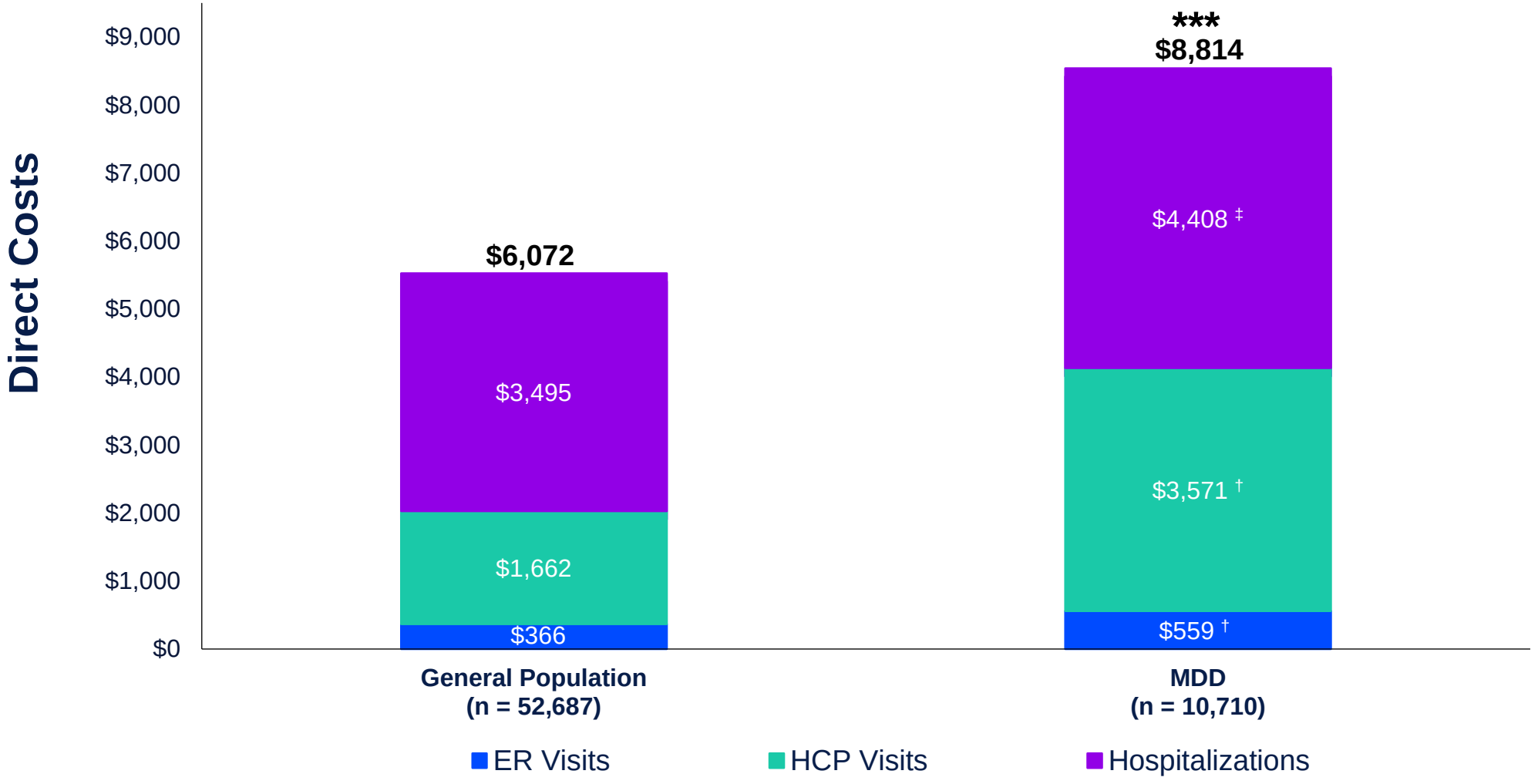
Other Clinical Outcomes Worsen with MDD Severity



CCI, Charlson Comorbidity Index; GAD-7, Generalized Anxiety Disorder Assessment-7; MDD, major depressive disorder; Mod-Severe, moderately-severe; PHQ-9, Patient Health Questionnaire-9. Demographics and clinical characteristics represent results from bivariate analysis. Results were significant across groups based on one-way ANOVA tests (*P*<.001). [a]All pairwise comparisons between cohorts were significantly different (*P*<.05).

Direct Medical Costs Were Significantly Greater in the Overall MDD Population

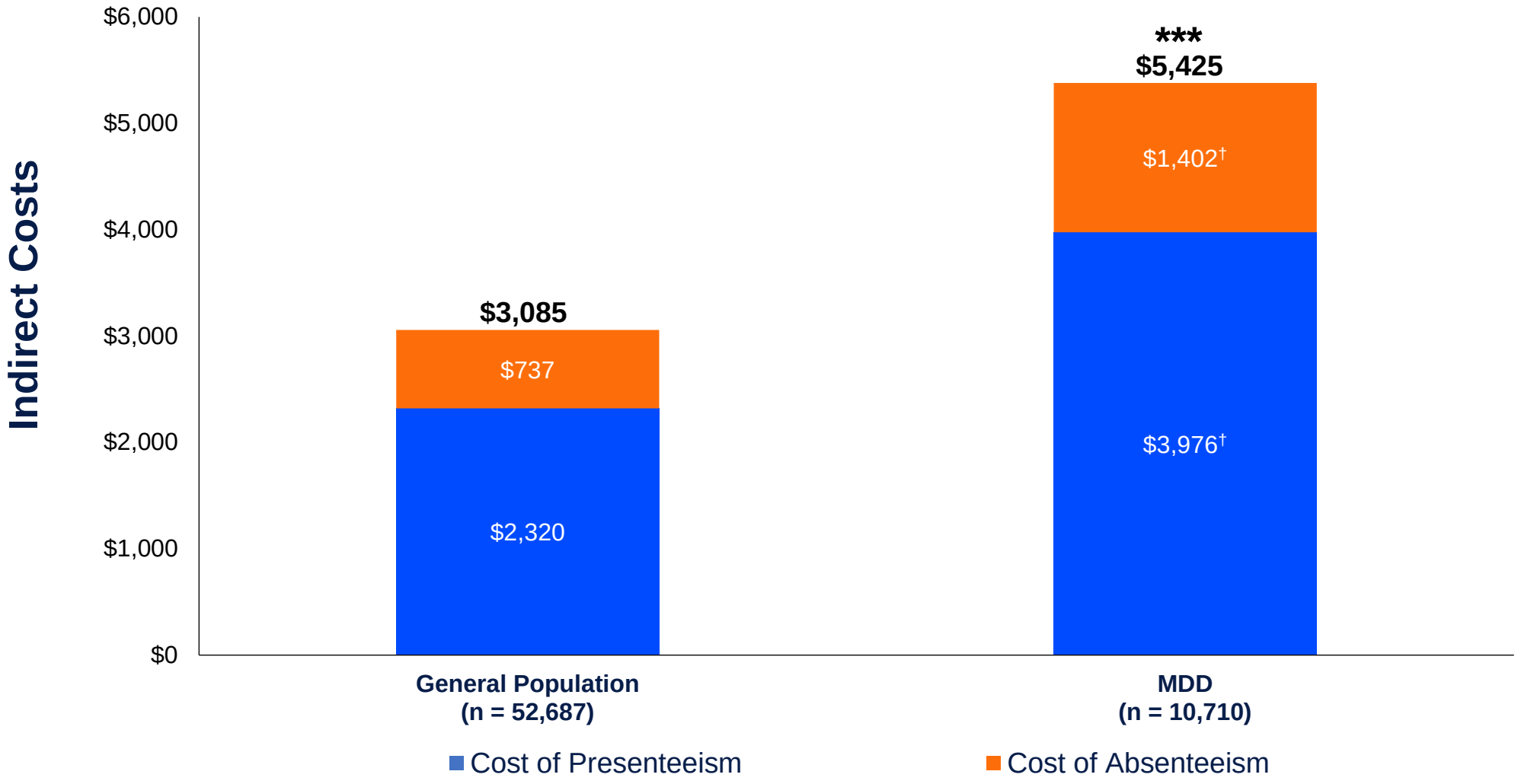
Adjusted Direct Costs of MDD Versus the General Population



***P<.001 total cost versus the general population; †P<.001; ‡P<.01 individual outcome versus the general population.
ER, emergency room; HCP; healthcare professional; MDD, major depressive disorder.

Indirect Costs Were Significantly Greater in the Overall MDD Population

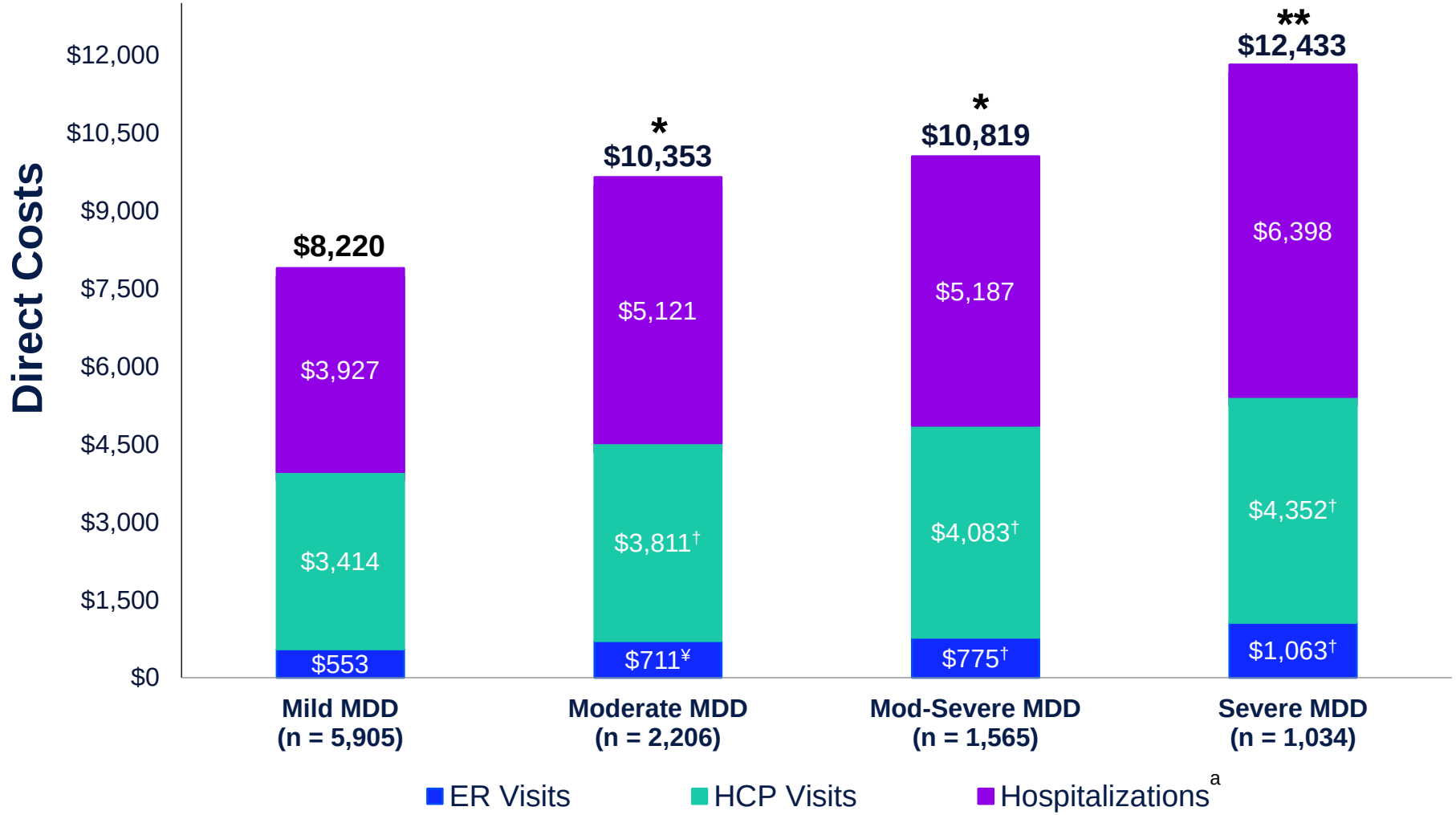
Adjusted Indirect Costs of MDD Versus the General Population



***P<.001 total cost versus the general population; †P<.001 individual outcome versus the general population.
MDD, major depressive disorder.

Relative to Mild MDD, Higher Levels of MDD Severity Were Associated With Increased Direct Costs

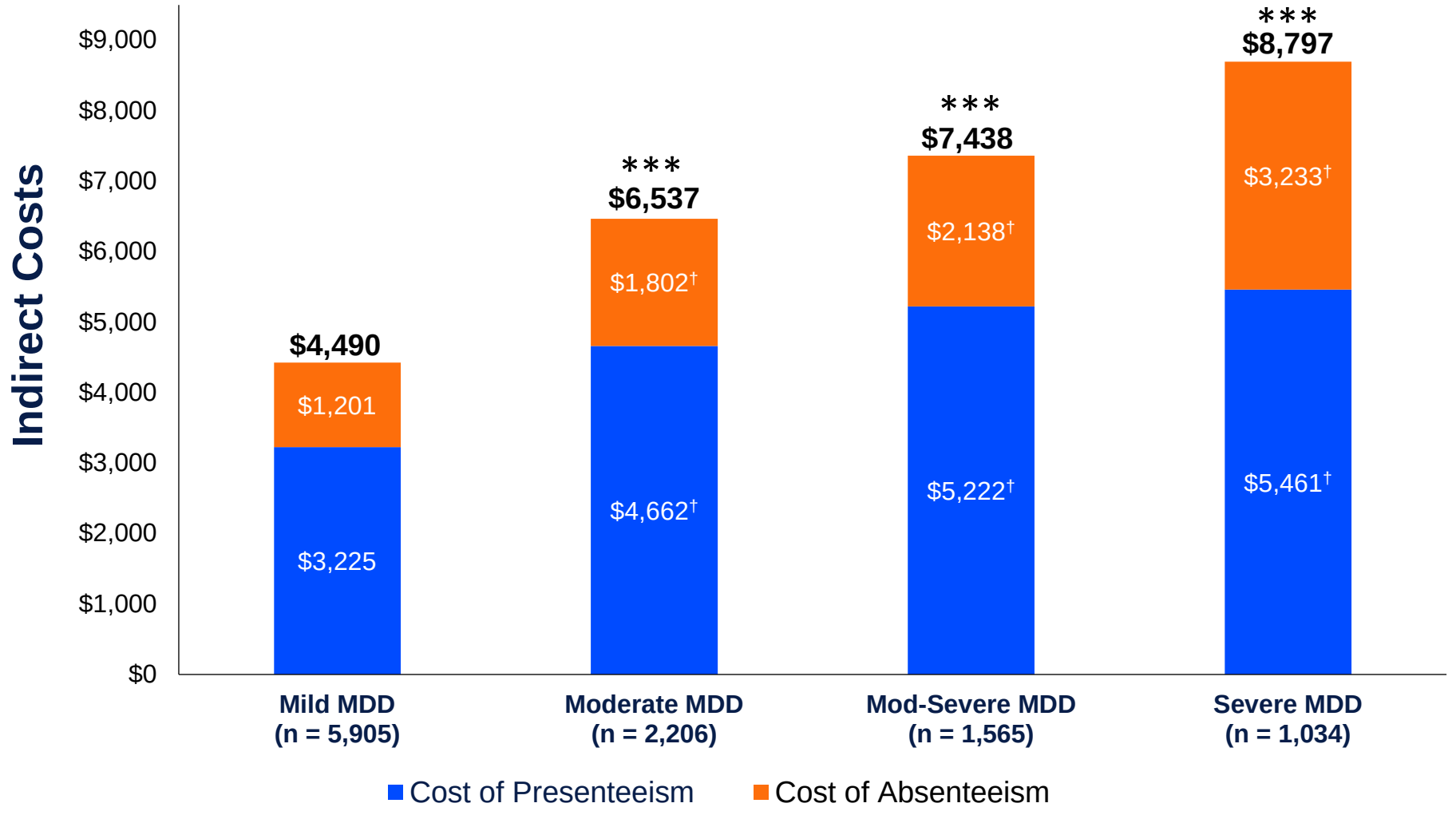
Adjusted Direct Costs by MDD Severity



**P<.01; *P<.05 total cost versus the mild cohort; †P≤.001; ¥P<.05 individual outcome versus the mild cohort. [a]Compared to the mild cohort, hospitalization costs were not significantly different among MDD cohorts. ER, emergency room; HCP; healthcare professional; MDD, major depressive disorder; Mod-Severe, moderately-severe.

Relative to Mild MDD, Higher Levels of MDD Severity Were Associated With Increased Indirect Costs

Adjusted Indirect Costs by MDD Severity



***P<.001 total cost versus the mild cohort; †P<.001 individual outcome versus the mild cohort.
MDD, major depressive disorder; Mod-Severe, moderately-severe.

Limitations and Considerations

Study data were self-reported, require participant recall, and may reflect biases[a]

This analysis of 2019 survey data may underestimate the burden of MDD after the COVID-19 pandemic which has presented increased mental health challenges

[a]Example biases include potential sampling bias, response order bias, recall bias, etc.

Conclusions

Compared to the general population, patients with MDD had worse socioeconomic (eg, disability, marital status) and clinical (eg, number of comorbidities, GAD-7 scores) outcomes, indicating a high overall burden

Patients with MDD reported significantly greater healthcare resource utilization and productivity loss, leading to higher direct and indirect healthcare costs

Compared with mild MDD, greater severity was associated with significantly greater direct and indirect costs

These results highlight the considerable costs of MDD and the need for effective treatment regimens to minimize disease severity and decrease the associated personal and economic burden

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