

Out-of-pocket cost burden among patients diagnosed with breast cancer and mental health comorbidities: A survey analysis (2018-2022)

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Introduction

- Breast cancer (BC) imposes a substantial financial burden on patients, with out-of-pocket (OOP) costs reaching \$3.14 billion, according to the National Cancer Institute.¹
- OOP burden is driven by insurance coverage gaps, indirect medical and long-term prescription costs, and financial hardships from job loss.²
- Patients with comorbid mental health (MH) disorders, including anxiety and mood disorders, have been shown to exacerbate overall economic burden of BC,³ with some data suggesting that low-income groups and lack of insurance are primary drivers of high OOP burden among MH.⁴
- As a result, between 2018 and 2022, patients with BC and comorbid MH were a vulnerable population with high-cost bearing potential, with limited access to mental health resources, exacerbated by the COVID-19 pandemic.⁵

Objectives

- To compare annual OOP costs between BC patients with and without comorbid MH diagnoses and estimate the incremental cost difference over 5 years (2018–2022).

Methods

Study Design and Data Source

- This was a retrospective, observational cohort study using a serial cross-sectional design. Pooled data from the 2018–2022 Medical Expenditure Panel Survey were analyzed among non-institutionalized U.S. adults with BC, stratified by the presence or absence of comorbid MH diagnoses.

Statistical Analysis

- Descriptive statistics were generated using pooled data to produce annualized estimates across the 5-year study period. All analyses incorporated person-level survey weights to yield nationally representative estimates for the U.S. population. Annual out-of-pocket (OOP) expenses were adjusted to 2022 U.S. dollars and compared between BC patients with and without MH comorbidities.
- Bivariate comparisons were stratified by income level, age group, comorbidity burden, and insurance type, with differences assessed using survey-weighted Wilcoxon rank-sum tests.
- A survey-weighted generalized linear model with a gamma distribution and log link function was used to estimate rate ratios for OOP costs associated with MH comorbidity. The model was adjusted for demographics, census region, employment status, Federal Poverty Level (FPL), gaps in insurance coverage, and comorbidity burden.

Results

Population characteristics (See Table 1)

- Our analytical cohort included a weighted sample of 1,509,242 BC-diagnosed patients; of whom, 30.9% (n=466,789) had MH diagnoses.
- Median age was 68 years, and most patients with MH were dual enrollees (10.1% vs 5.7%), compared to those without.

Table 1. Demographic and clinical characteristics of patients diagnosed with BC (NHANES, 2018-2022)

Characteristic, on the index date	Metric	Overall		Sub-cohorts				
		All BC patients N=1,509,242	BC with MH N=466,789	BC without MH N=1,042,453				
Age (continuous, years)	Mean, SD	65.5	13.3	62.8	14.3	66.7	12.6	
	Median, (P25 P75)	68.0	(56.0, 76.0)	65	(53.0, 75.0)	69.0	(58.0, 77.0)	
	Min, Max	24.0	85.0	24.0	85.0	27.0	85.0	
Age-group (categorical, years)								
	18-24	n, %	2,822	0.2%	2,822	0.6%	-	0.0%
	25-34	n, %	17,424	1.2%	8,753	1.9%	8,671	0.8%
	35-44	n, %	93,797	6.2%	45,830	9.8%	47,968	4.6%
	45-54	n, %	200,748	13.3%	66,150	14.2%	134,598	12.9%
55-64	n, %	335,315	22.2%	103,582	22.2%	231,733	22.2%	
65+	n, %	859,136	56.9%	239,653	51.3%	619,484	59.4%	
Race/ethnicity								
	Non-Hispanic White	n, %	1,162,492	77.0%	400,457	85.8%	762,035	73.1%
	Non-Hispanic Black	n, %	152,140	10.1%	19,050	4.1%	133,089	12.8%
	Hispanic	n, %	114,712	7.6%	29,868	6.4%	84,844	8.1%
Other/multiple race/non-Hispanic	n, %	79,898	5.3%	17,413	3.7%	62,485	6.0%	
Census geographic region								
	Northeast	n, %	314,731	20.9%	82,741	17.7%	231,990	22.3%
	Midwest	n, %	336,436	22.3%	100,377	21.5%	236,059	22.6%
	South	n, %	531,523	35.2%	182,357	39.1%	349,167	33.5%
West	n, %	326,552	21.6%	101,314	21.7%	225,238	21.6%	
Insurance payer type								
	Private	n, %	946,032	62.7%	287,519	61.6%	658,513	63.2%
	Public	n, %	554,764	36.8%	174,867	37.5%	379,898	36.4%
	Medicare and Medicaid (dual-eligible)	n, %	106,714	7.1%	47,323	10.1%	59,392	5.7%
Uninsured	n, %	8,445	0.6%	4,403	0.9%	4,043	0.4%	
Employment status								
	Employed	n, %	525,769	34.8%	161,950	34.7%	363,820	34.9%
	Unemployed	n, %	5,029	0.3%	-	0.0%	5,029	0.5%
	Not in labor force	n, %	42,582	2.8%	12,381	2.7%	30,201	2.9%
	Other/unknown	n, %	935,862	62.0%	292,458	62.7%	643,404	61.7%
Poverty category								
	Poor (<100% FPL)	n, %	142,918	9.5%	43,737	9.4%	99,181	9.5%
	Near Poor (100%-124% FPL)	n, %	58,752	3.9%	25,081	5.4%	33,671	3.2%
	Low income (125%-199% FPL)	n, %	150,031	9.9%	48,141	10.3%	101,889	9.8%
	Middle income (200%-399% FPL)	n, %	387,442	25.7%	110,401	23.7%	277,042	26.6%
High income (>400% FPL)	n, %	770,100	51.0%	239,429	51.3%	530,671	50.9%	
Comorbidities								
	Hypertension	n, %	720,095	47.7%	214,351	45.9%	505,744	48.5%
	Dyslipidemia	n, %	565,904	37.5%	179,679	38.5%	386,225	37.0%
	Arthritis	n, %	393,967	26.1%	143,960	30.8%	250,007	24.0%
	Diabetes	n, %	205,147	13.6%	78,454	16.8%	126,693	12.2%
	Asthma	n, %	174,671	11.6%	65,310	14.0%	109,361	10.5%
	Atherosclerotic CVD	n, %	115,578	7.7%	48,497	10.4%	67,081	6.4%
	Chronic obstructive pulmonary disease	n, %	61,130	4.1%	22,479	4.8%	38,651	3.7%
	Chronic kidney disease	n, %	8,900	0.6%	4,741	1.0%	4,159	0.4%

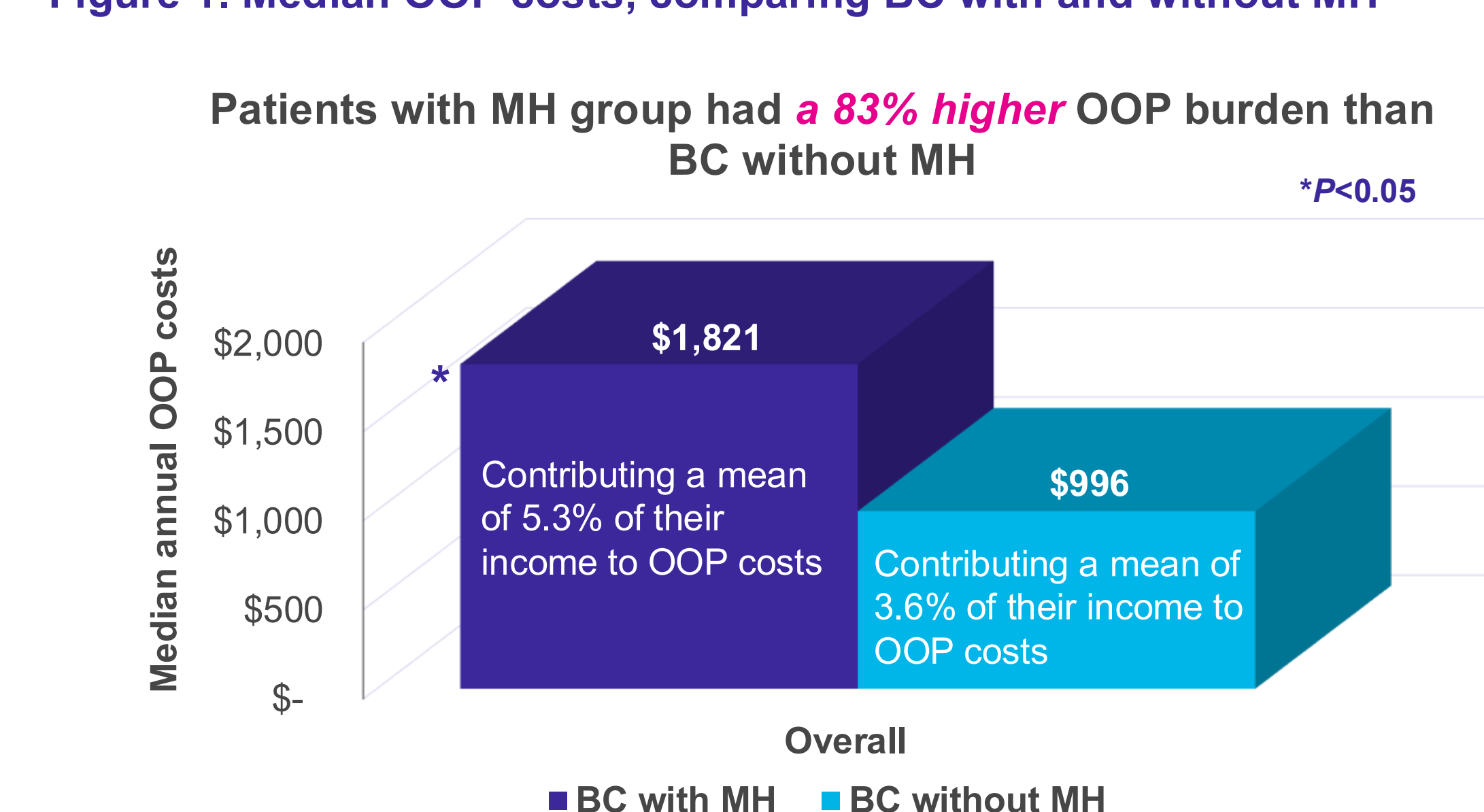
Key: BC – breast cancer; CVD – cardiovascular disease; FPL – Federal Poverty Level; MH – mental health; NHANES – National Health and Nutrition Examination Survey.

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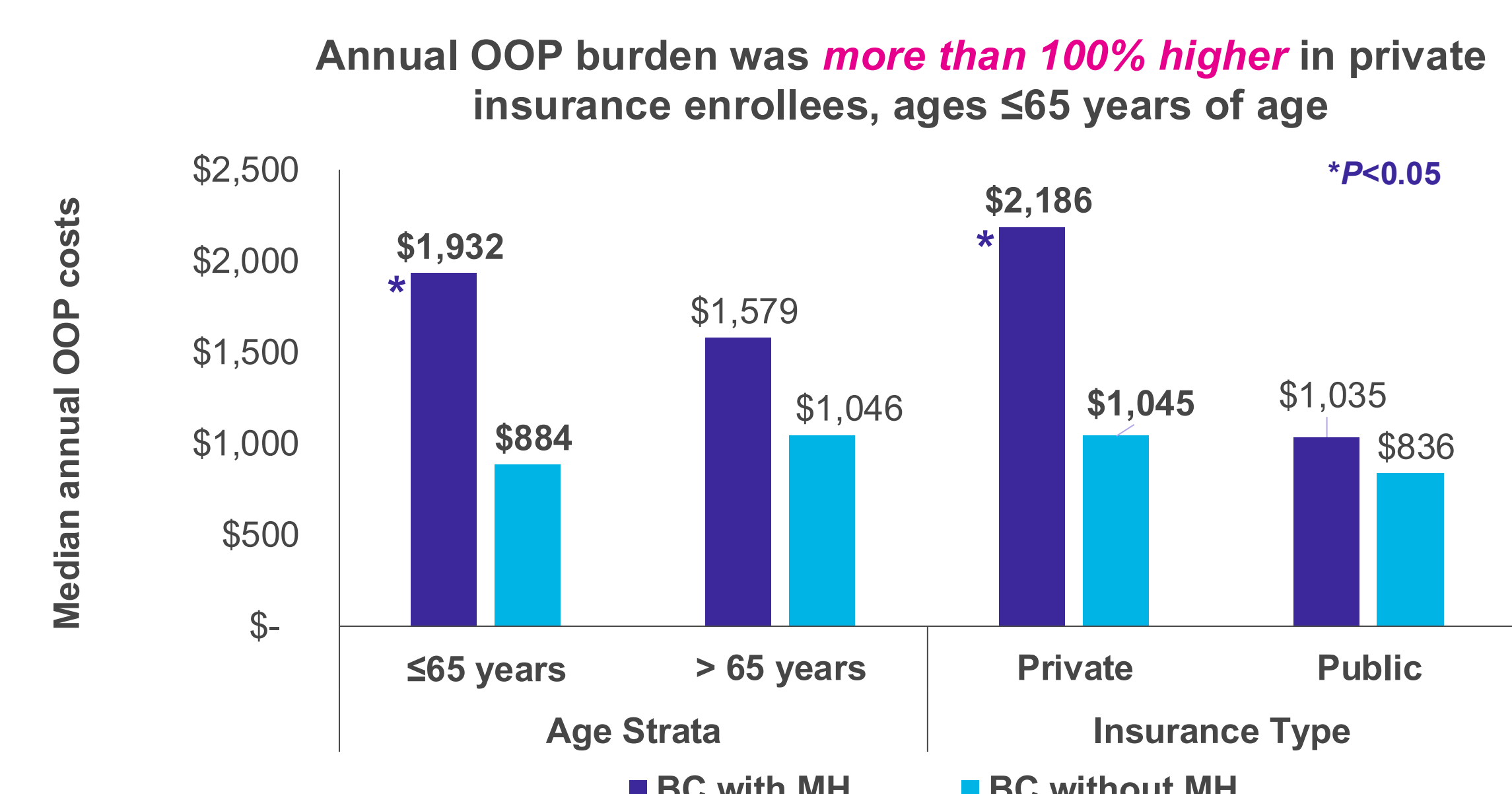
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Figure 1. Median OOP costs, comparing BC with and without MH



Key: BC – breast cancer; FPL – Federal Poverty Level; MH – mental health; OOP – out-of-pocket.

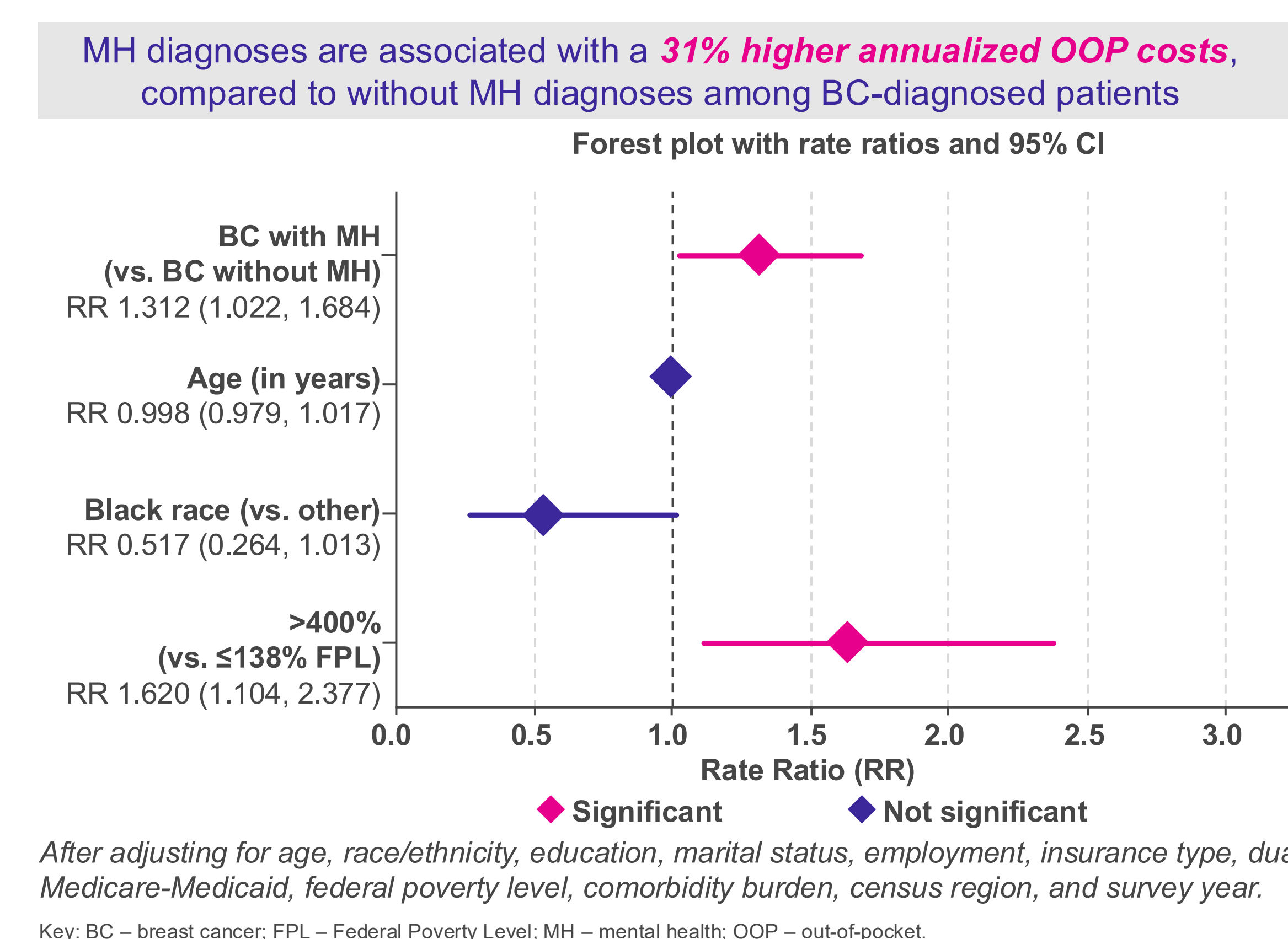
Figure 3. Median OOP costs, stratified by age and insurance type, between BC with and without MH



Private plans (from higher premiums) and participants younger than 65 years had significantly higher OOP burden among MH, vs without MH comorbidities

Key: BC – breast cancer; FPL – Federal Poverty Level; MH – mental health; OOP – out-of-pocket.

Figure 5. Adjusted rate ratios of annual OOP costs, comparing BC with and without MH comorbidities



After adjusting for age, race/ethnicity, education, marital status, employment, insurance type, dual Medicare-Medicaid, federal poverty level, comorbidity burden, census region, and survey year.

Key: BC – breast cancer; FPL – Federal Poverty Level; MH – mental health; OOP – out-of-pocket.

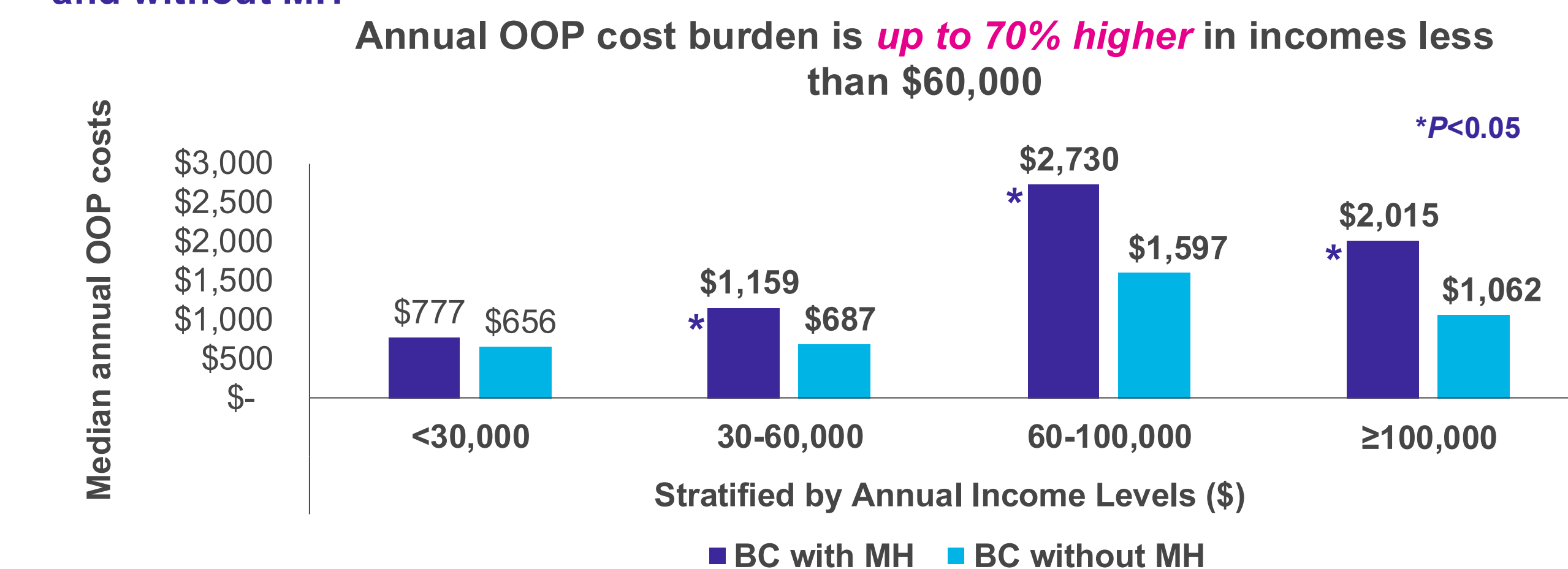


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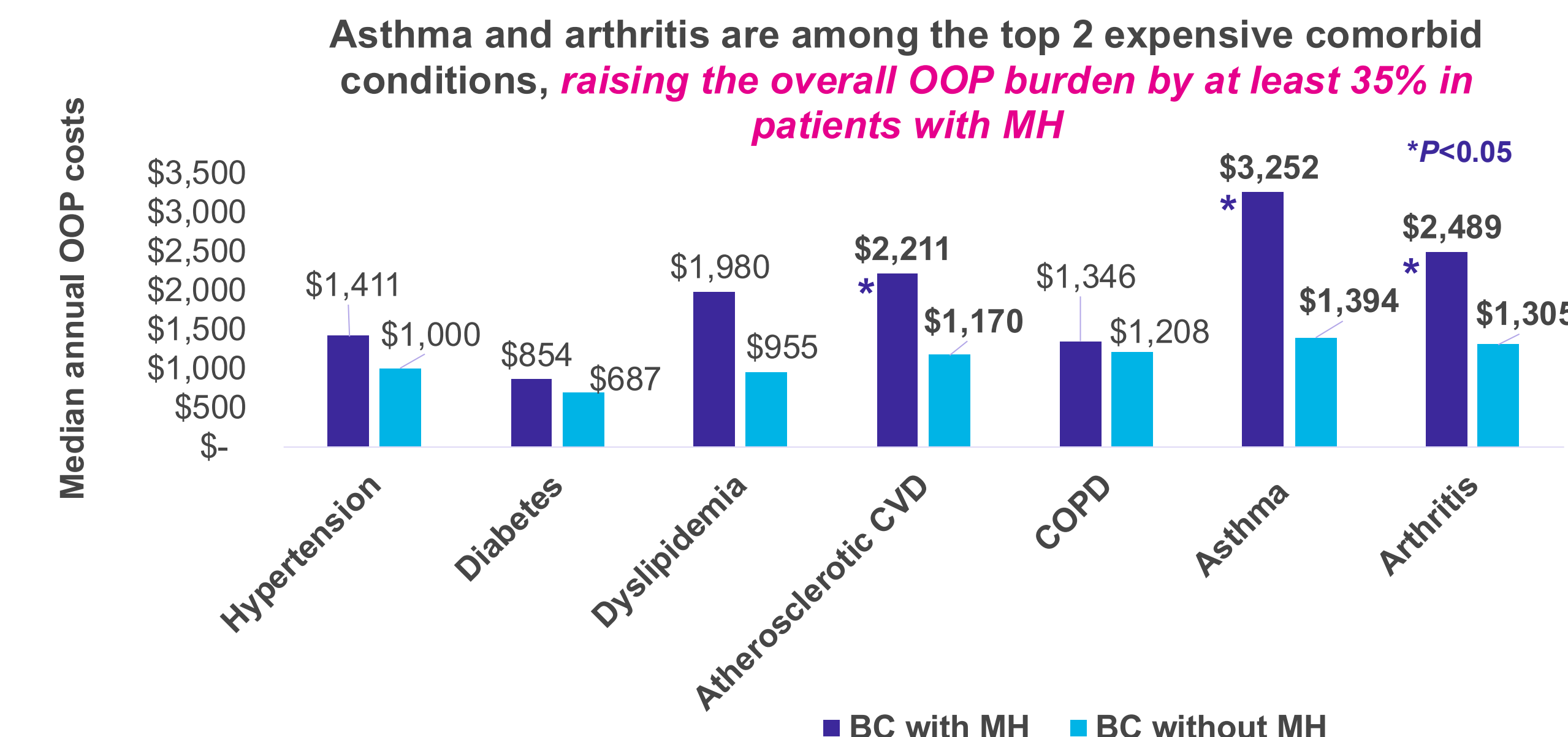
Figure 2. Median OOP costs, stratified by annual income levels, between BC with and without MH



Lower income groups had a noticeable higher OOP burden among MH, vs without MH comorbidities

Key: BC – breast cancer; CVD – cardiovascular disease; FPL – Federal Poverty Level; MH – mental health; OOP – out-of-pocket.

Figure 4. Median OOP costs, stratified by comorbid conditions, between BC with and without MH



Pharmacy costs for rheumatoid arthritis (e.g., biologics), and for asthma (inhaler costs, emergency room visits) may have been drivers

Key: BC – breast cancer; COPD – chronic obstructive pulmonary disease; CVD – cardiovascular disease; FPL – Federal Poverty Level; MH – mental health; OOP – out-of-pocket.

Conclusions

- Overall, 11% of all healthcare expenses are attributable to OOP spending; BC patients with comorbid MH diagnoses face a disproportionate OOP cost burden, particularly among private plan enrollees, lower-income strata, and those with coexisting chronic conditions such as arthritis and asthma.
- These findings identify BC patients with MH as an economically vulnerable population, underscoring the need for targeted policies to reduce OOP burden among low-income subgroups within this cohort.
- Further research is warranted to quantify the potential OOP savings after the enactment of Inflation Reduction Act (i.e., 2023-2025) in this high-need population.

Limitations

- Self-reported data in Medical Expenditure Panel Survey may introduce recall bias or inaccurate reporting, particularly regarding OOP expenses.
- Survey weights, while adjusting for complex survey design, may not fully compensate for non-sampling errors.
- Causal inferences cannot be drawn despite multivariable adjustment, given the observational, cross-sectional nature of this study.
- Residual confounding may persist, as the study does not fully account for differences in baseline health status between BC patients with and without MH comorbidities.