

Supplementary Online Content

Khera R, Valero-Elizondo J, Okunrintemi V, et al. Association of out-of-pocket annual health expenditures with financial hardship in low-income adults with atherosclerotic cardiovascular disease in the United States. *JAMA Cardiol*. Published online July 3, 2018. doi:10.1001/jamacardio.2018.1813

eResults. Sensitivity analyses

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eFigure 12. Sensitivity Analysis: Predictors for catastrophic financial burden from out-of-pocket health expenditures in low-income families

eTable 1. Proportional out-of-pocket spending on different categories of healthcare services, by income group

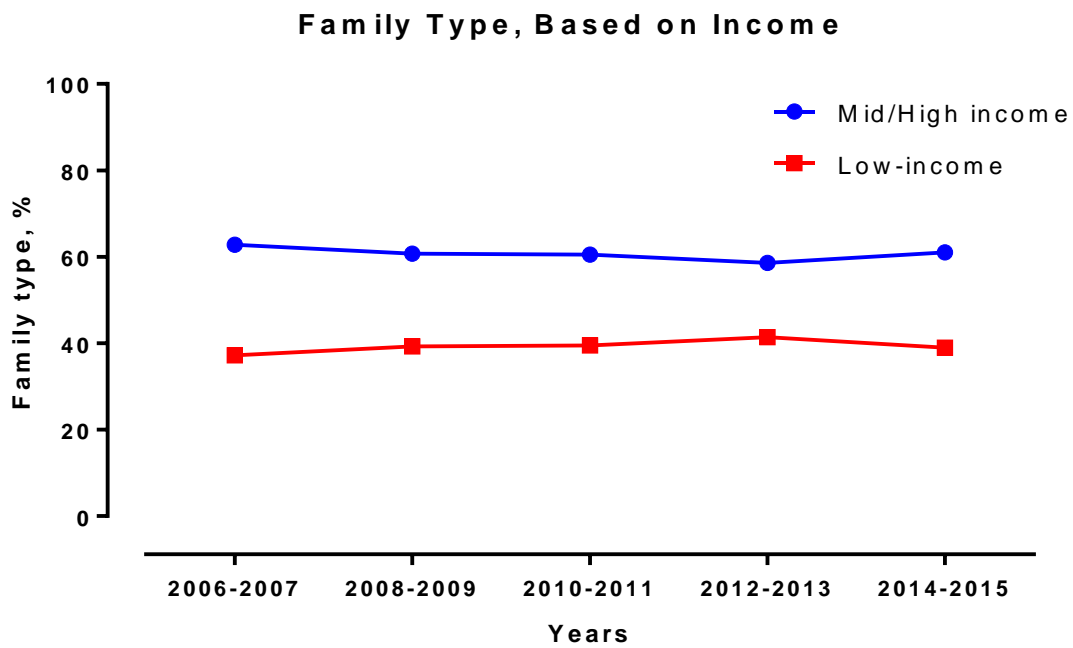
eTable 2. Predictors for catastrophic financial burden from out-of-pocket health expenditures in low-income families

This supplementary material has been provided by the authors to give readers additional information about their work.

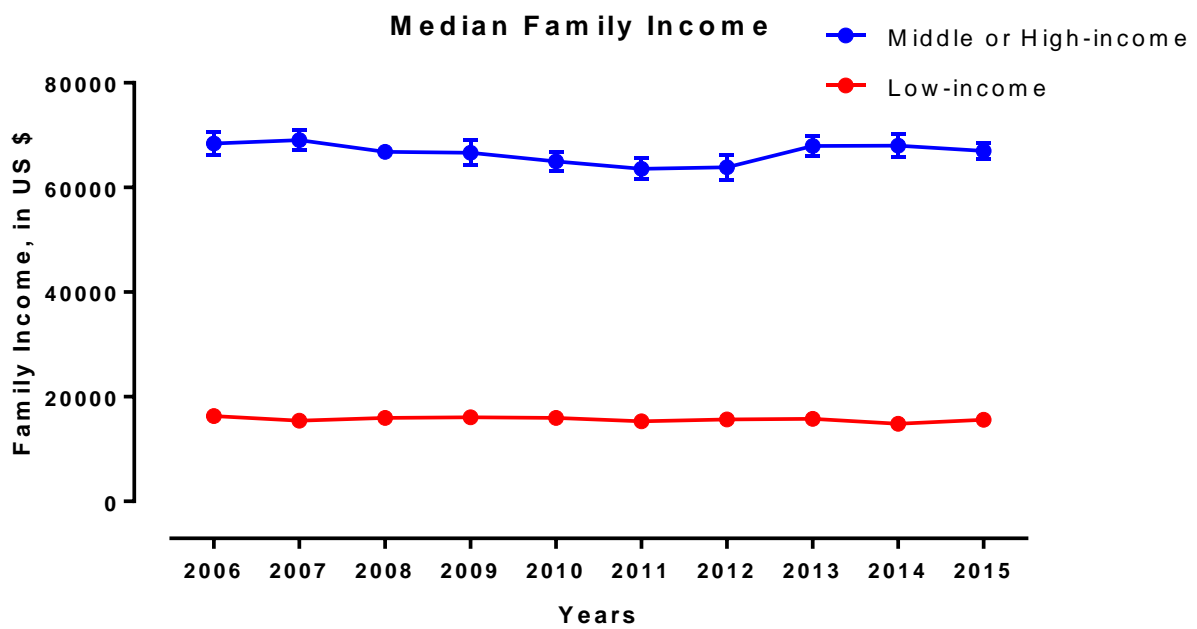
eResults. Sensitivity analyses

In a set of sensitivity analyses, we also included families with very low incomes, such that their food expenses exceeded their incomes and all healthcare expenses would be considered catastrophic in this group. These analyses indicate that low-income families may be even more prone to financial adversity from out-of-pocket than suggested in our primary analyses. With these less conservative study criteria, compared with the mid/high-income families, low-income families had nearly 6-fold higher odds of experiencing high financial burden (31.2% vs 7.0%, OR 6.04; 95% CI 5.36, 6.80) and a nearly 20-fold higher odds of experiencing catastrophic financial burden from out-of-pocket health costs (18.7% vs 1.1%, OR 19.78; 95% CI 16.03, 24.41). This represents an average 2.5 million low-income and 878 thousand mid/high income families with high financial burden, and 1.5 million low-income and 144 thousand mid/high-income families with catastrophic financial burden, respectively, each year. The temporal trends in these expenses, and the association across insurance groups was consistent with our primary analyses (**eFigures 5-8**).

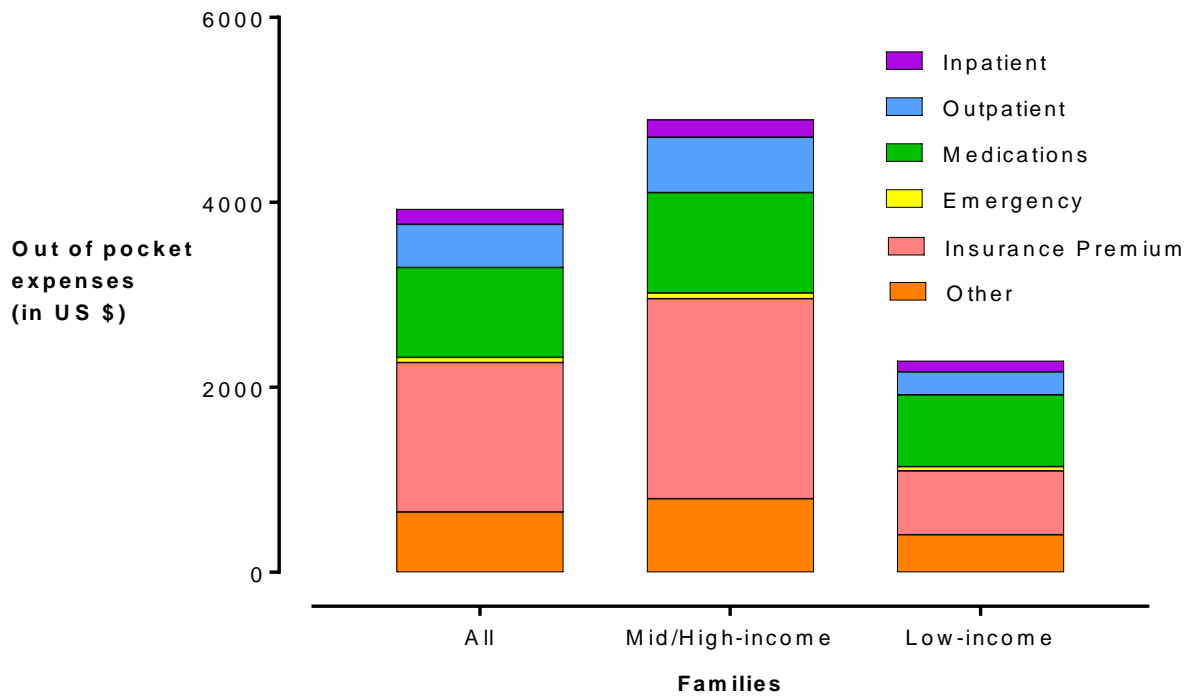
eFigure 1. Proportion of low-income and mid/high-income families with a member with atherosclerotic cardiovascular disease



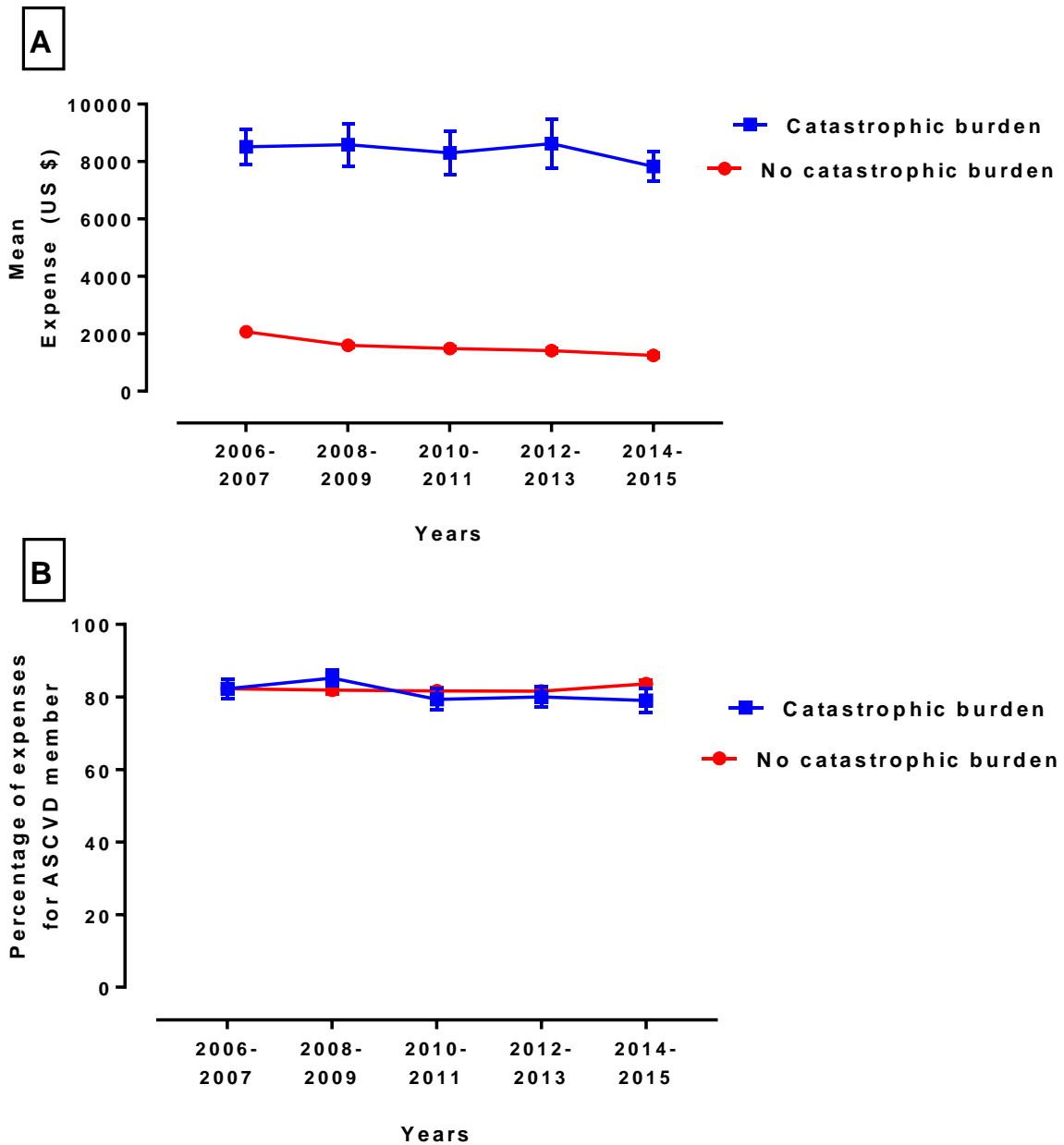
eFigure 2. Median family income by calendar-year in the mid/high-income and low-income families



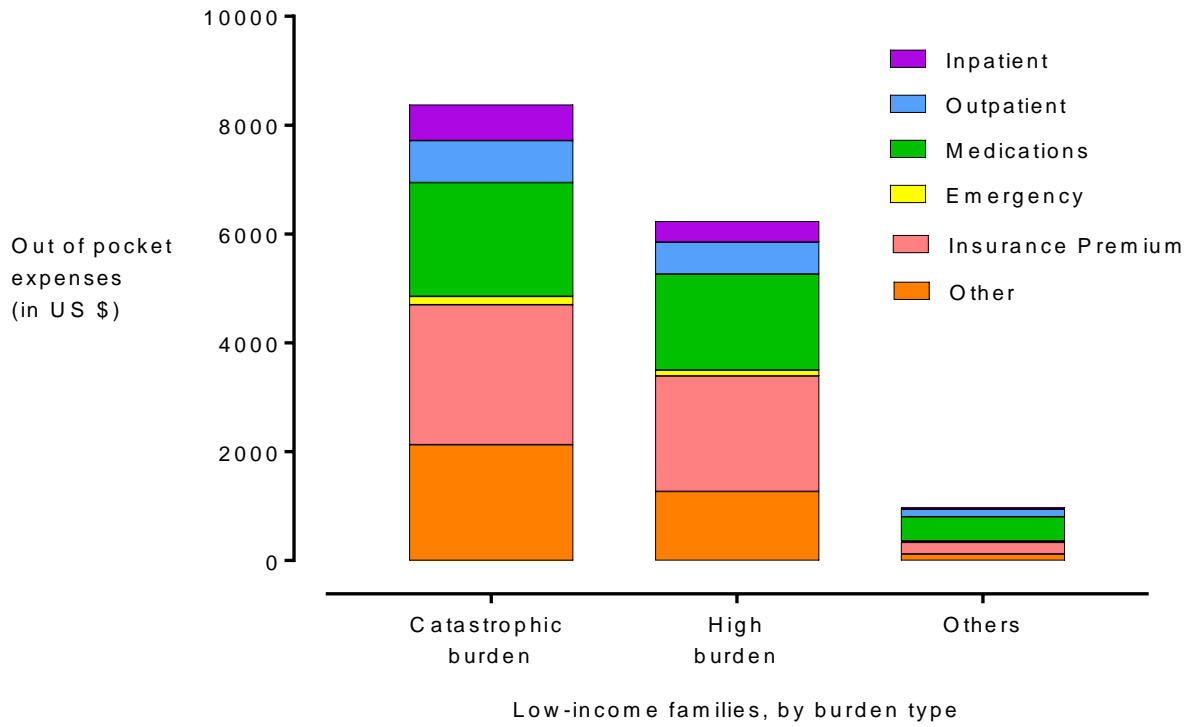
eFigure 3. Mean out-of-pocket expenses across categories of healthcare, by family income group



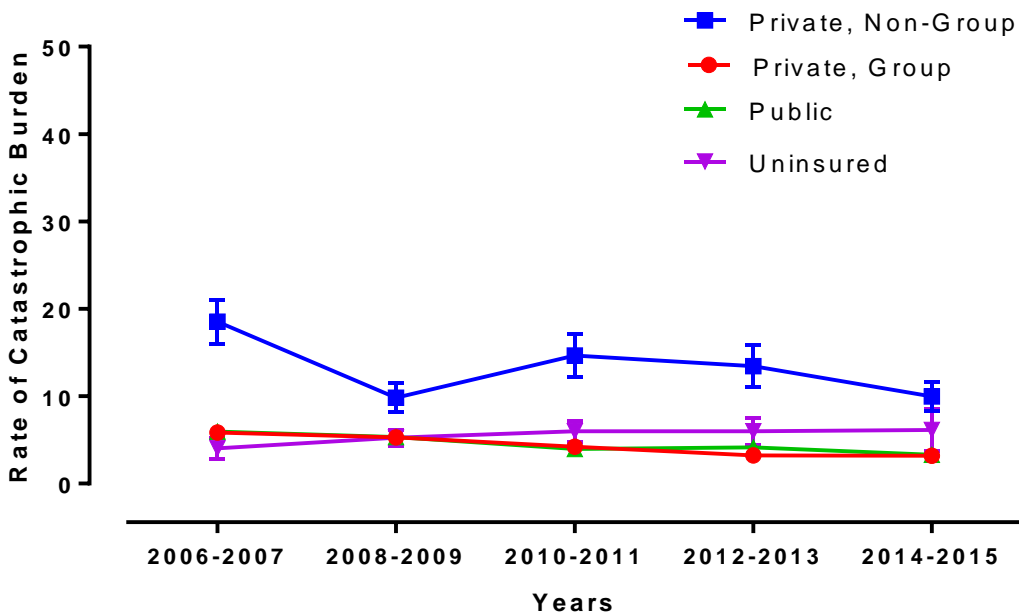
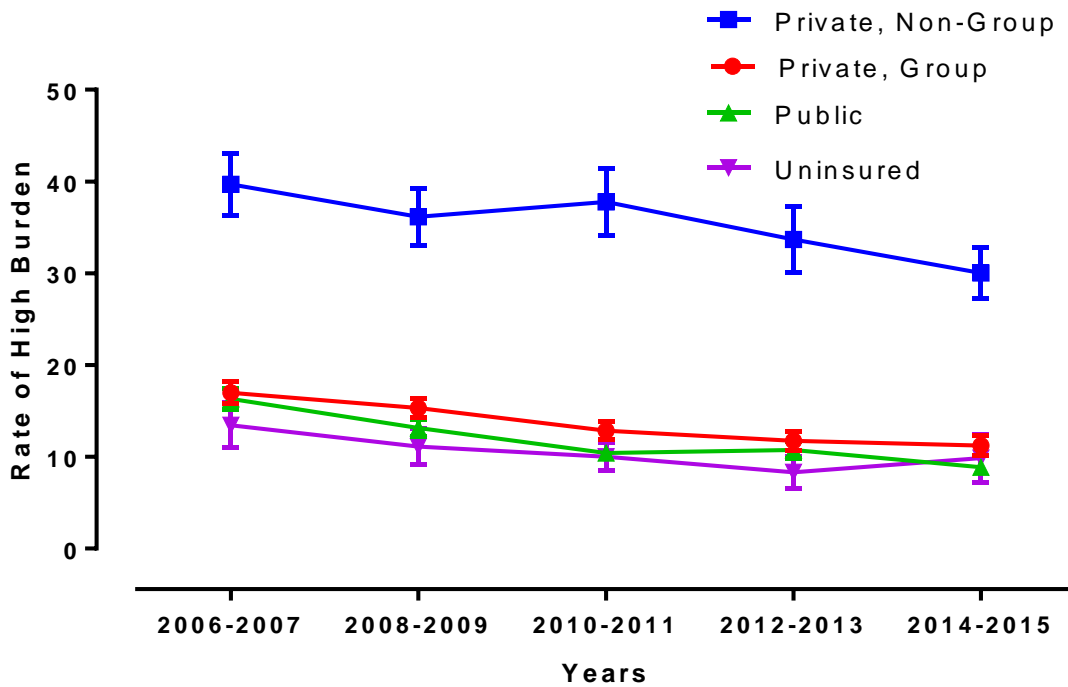
eFigure 4. Mean healthcare expenses in low-income families incurring a catastrophic financial burden from out-of-pocket health costs (A), and relative spending on member with ASCVD among these families (B)



eFigure 5. Mean healthcare expenses across categories in low-income families

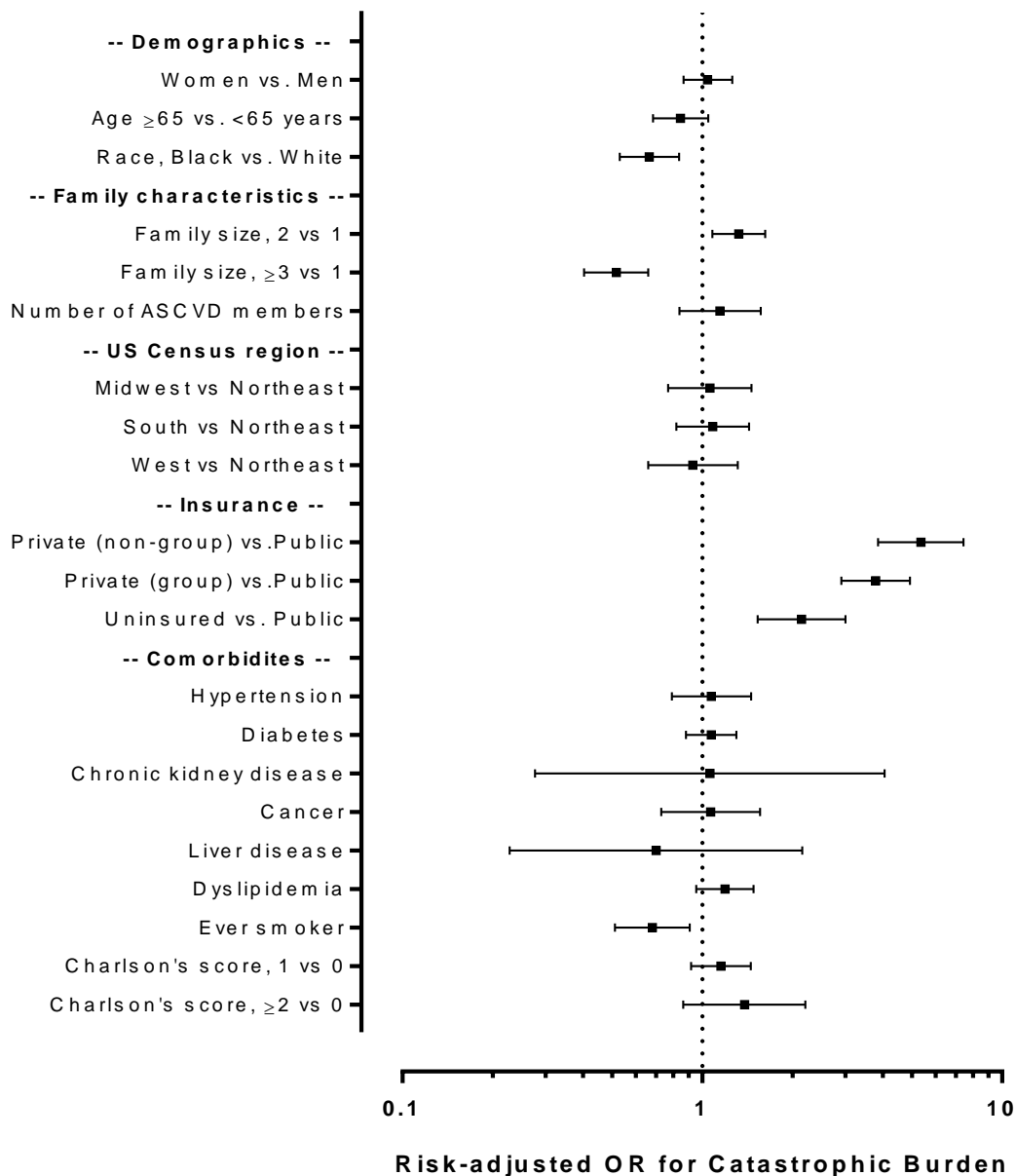


eFigure 6. Trends in overall rates of high and catastrophic financial burden from out-of-pocket health expenditures, by insurance group



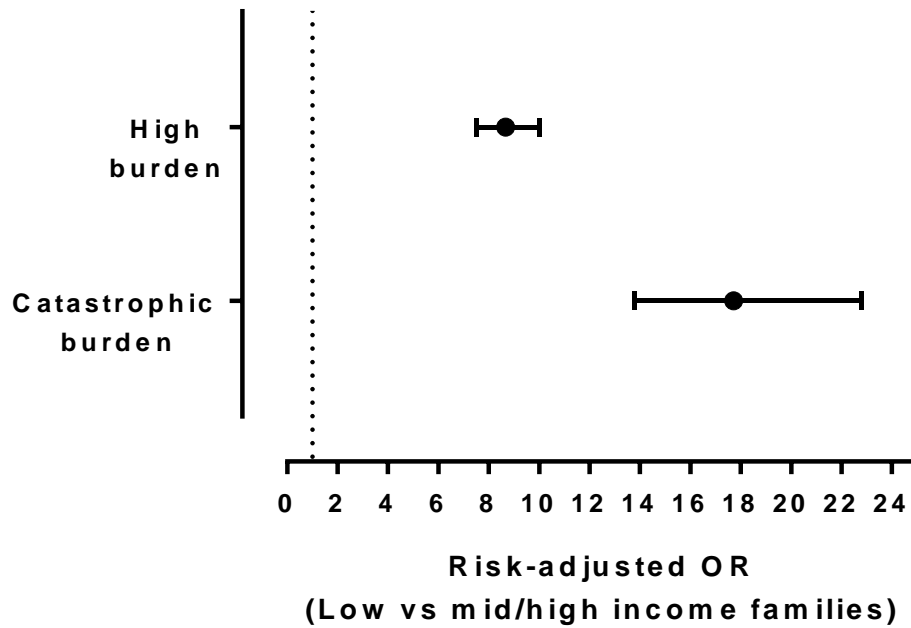
(A) High Financial Burden and (B) Catastrophic Financial Burden

eFigure 7. Predictors for catastrophic financial burden from out-of-pocket health expenditures in low-income families



Bars represents risk-adjusted odds-ratio (OR) and 95% confidence intervals from a survey-specific logistic regression model with a model c-statistic of 0.73. Demographics represent characteristics of the oldest person with atherosclerotic cardiovascular disease (ASCVD) in the family. The modified Charlson's score included here represents comorbidity burden in excess of atherosclerotic cardiovascular disease, to avoid collinearity with the exposure.¹²

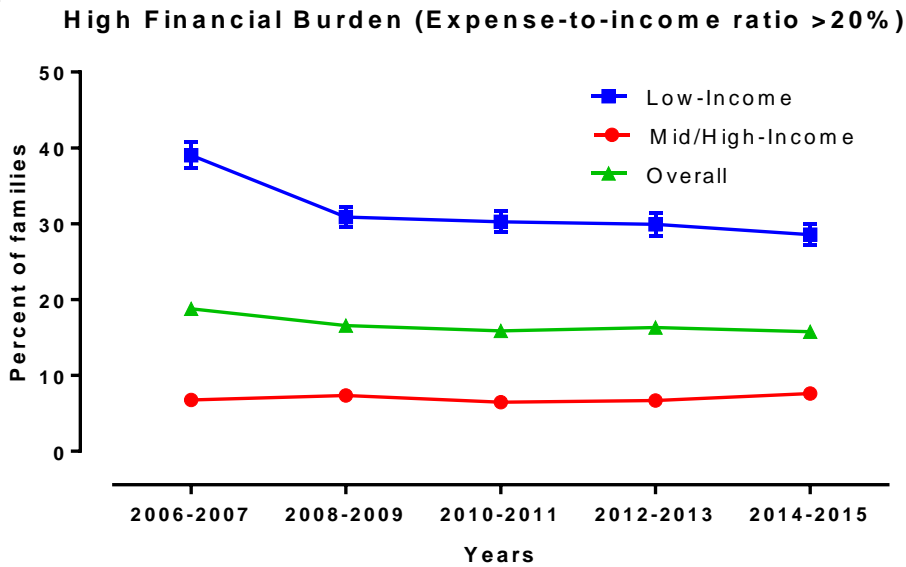
eFigure 8. Sensitivity analysis: Risk-adjusted odds ratio for high and catastrophic financial burden from out-of-pocket health expenses in low vs mid/high income families after adjusting for characteristics of members without atherosclerotic cardiovascular disease (characteristics listed in eTable 2)



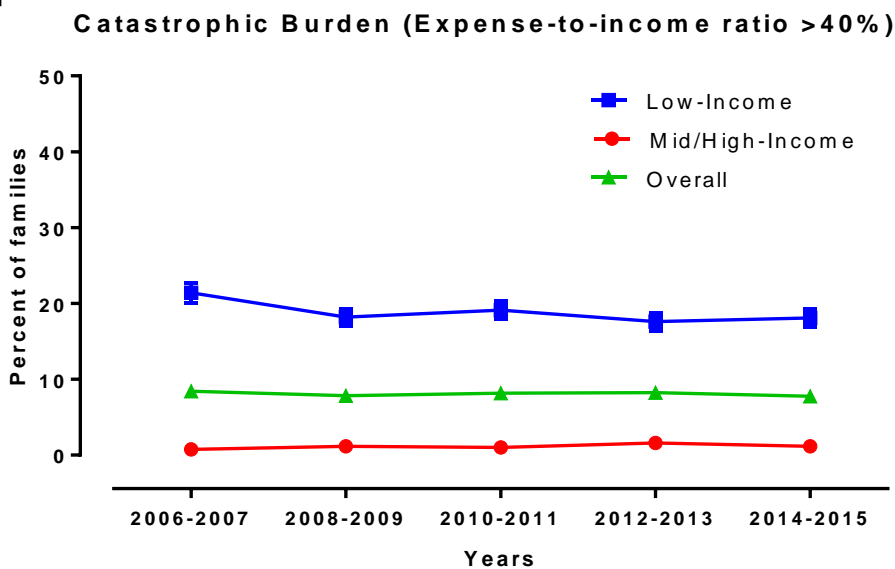
Dotted line represents an odds ratio of 1.

eFigure 9. Sensitivity analysis: Trends in rates of high and catastrophic financial burden from out-of-pocket health expenditures, by income group

A

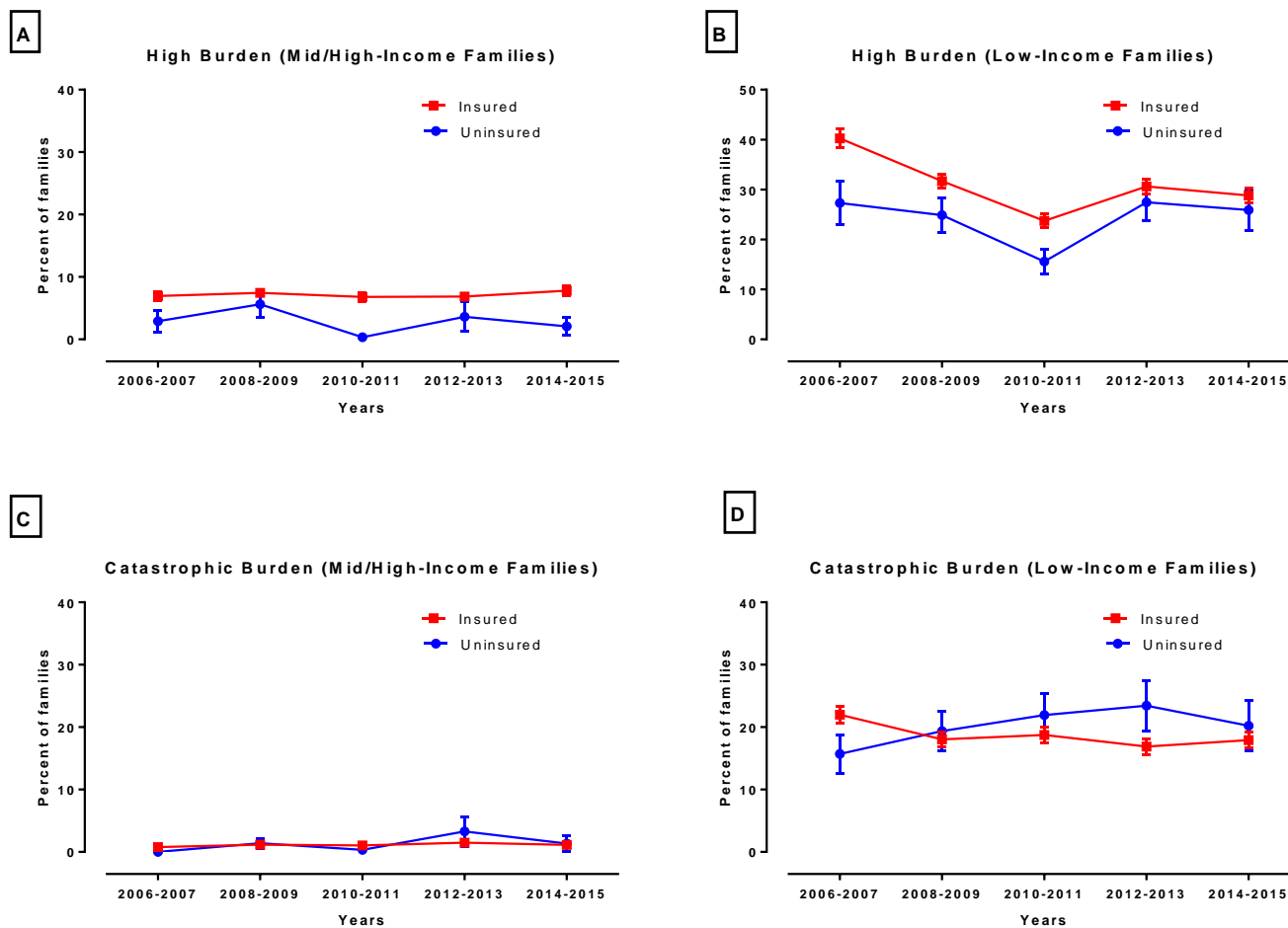


B



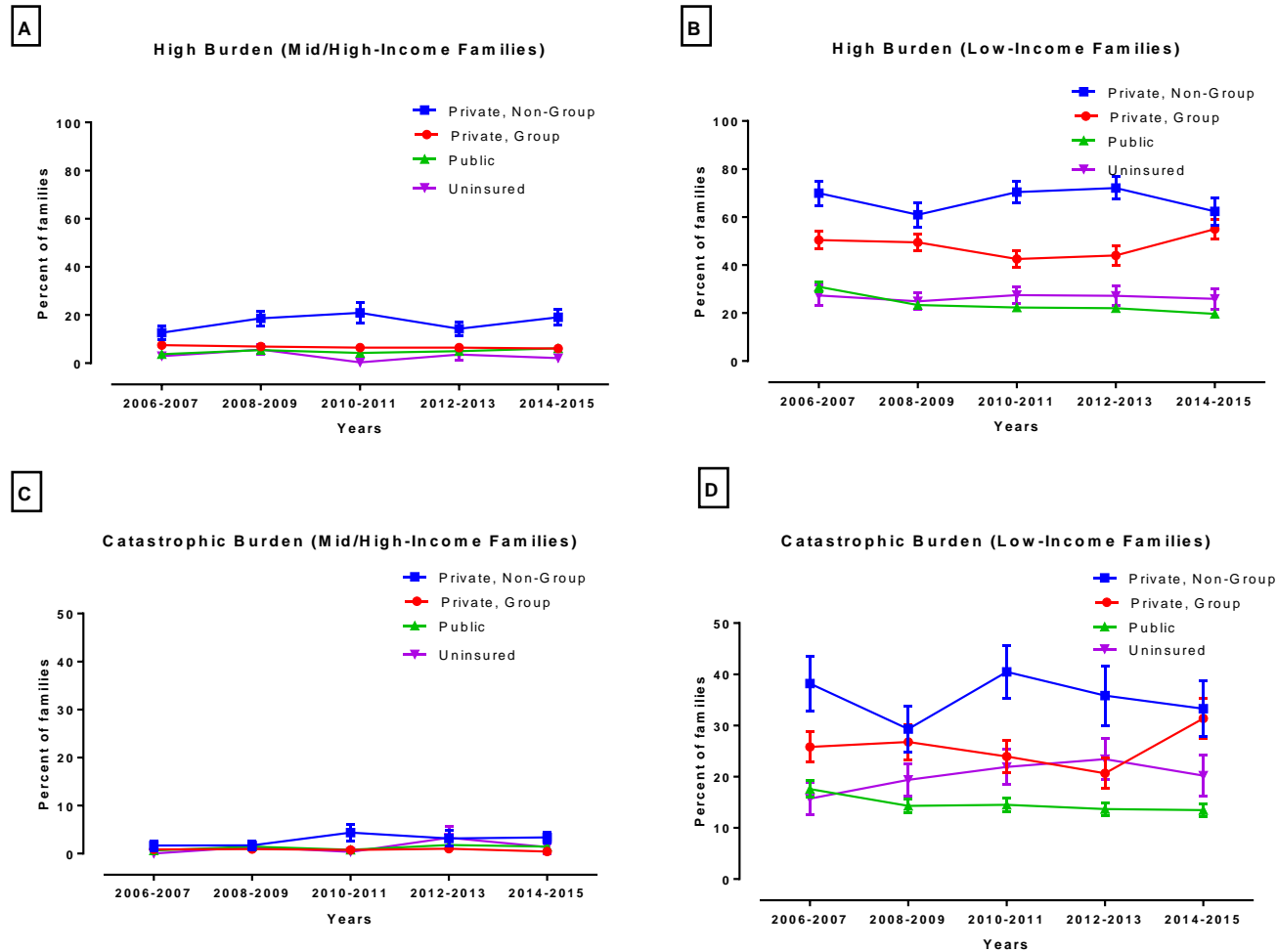
Sensitivity analyses including individuals with subsistence expenses exceeding annual income. (A) High Financial Burden, and (B) Catastrophic Financial Burden.

eFigure 10. Sensitivity Analysis: Trends in rates of high and catastrophic financial burden from out-of-pocket health expenditures, by access to insurance



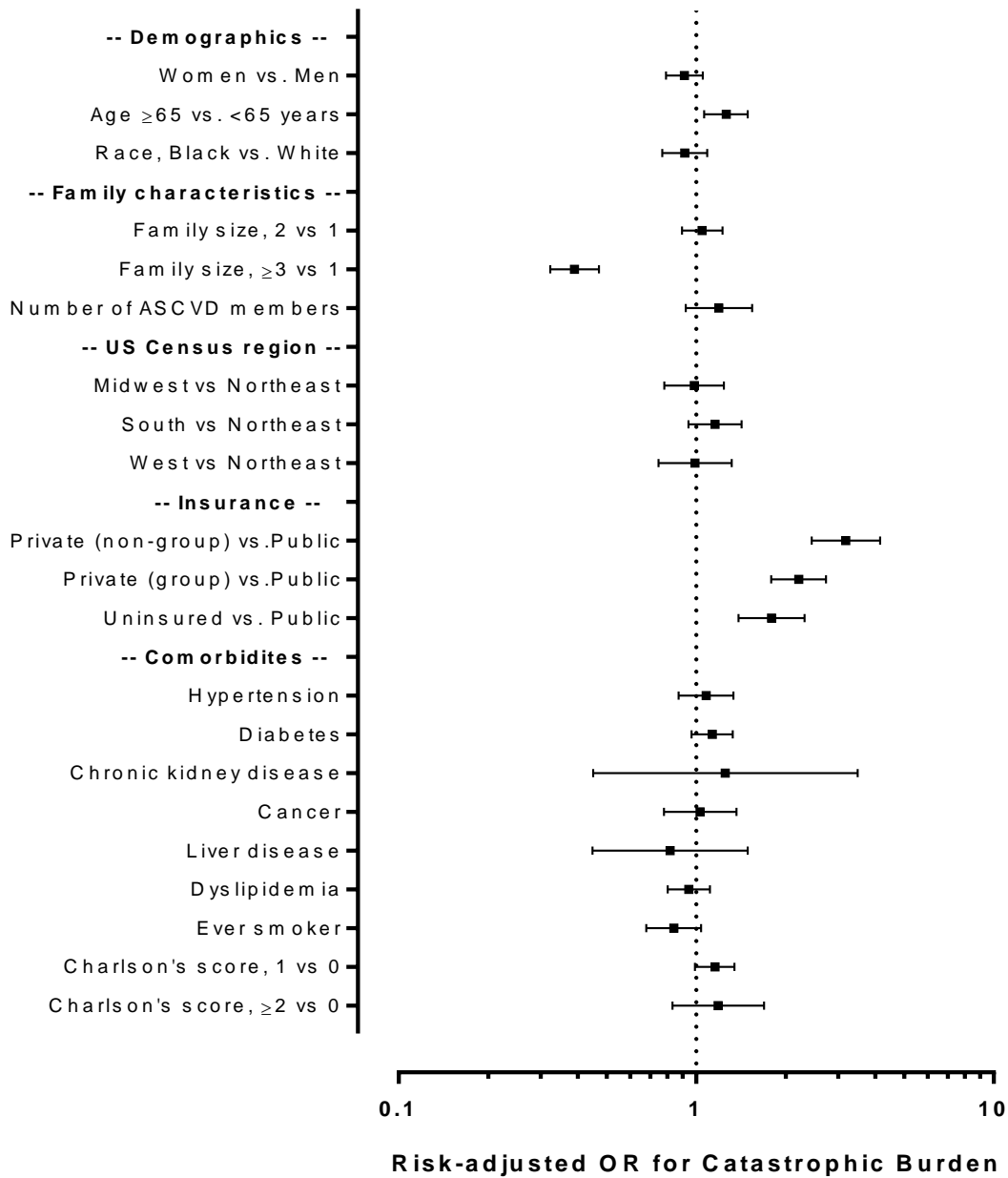
Sensitivity analyses including individuals with subsistence expenses exceeding annual income. High Financial Burden in (A) mid/high-income and (B) low-income families, and Catastrophic Financial Burden in (C) mid/high-income and (D) low-income families.

eFigure 11. Sensitivity Analysis: Trends in rates of high and catastrophic financial burden from out-of-pocket health expenditures, by insurance group



Sensitivity analyses including individuals with subsistence expenses exceeding annual income. High Financial Burden in (A) mid/high-income and (B) low-income families, and Catastrophic Financial Burden in (C) mid/high-income and (D) low-income families.

eFigure 12. Sensitivity Analysis: Predictors for catastrophic financial burden from out-of-pocket health expenditures in low-income families



Bars represents risk-adjusted odds-ratio (OR) and 95% confidence intervals from a survey-specific logistic regression model. The modified Charlson's score included here represents comorbidity burden in excess of atherosclerotic cardiovascular disease.

eTable 1. Proportional out-of-pocket spending on different categories of healthcare services, by income group

Mid/High income families	2006-2007	2008-2009	2010-2011	2012-2013	2014-2015
Total out-of-pocket expenses, in US\$	5292 (171)	5039 (134)	4567 (126)	4869 (188)	4801 (143)
Family insurance premiums	32.8 (0.9)	33.2 (1.1)	33.7 (1)	37.1 (1.1)	38.2 (1.1)
Member(s) with ASCVD					
Inpatient	1.7 (0.2)	2.0 (0.2)	2.0 (0.2)	1.7 (0.2)	2.3 (0.2)
Outpatient	8.6 (0.4)	11.0 (0.5)	10.1 (0.5)	10 (0.5)	10.7 (0.4)
Medications	27.9 (0.8)	25.5 (0.8)	27 (0.8)	22.7 (0.7)	20.6 (0.8)
Emergency services	0.7 (0.1)	0.7 (0.1)	0.8 (0.1)	1.0 (0.2)	0.9 (0.2)
Others	9.8 (0.5)	9.7 (0.5)	9 (0.5)	9.8 (0.5)	10.8 (0.6)
Member(s) without ASCVD					
Inpatient	0.6 (0.1)	0.6 (0.1)	0.7 (0.1)	0.8 (0.2)	0.6 (0.1)
Outpatient	5.2 (0.3)	6.5 (0.3)	6.9 (0.5)	6.4 (0.3)	7.6 (0.5)
Medications	11.9 (0.6)	10 (0.6)	9.6 (0.5)	9.7 (0.5)	7.7 (0.4)
Emergency services	0.6 (0.1)	0.5 (0.1)	0.3 (0.1)	0.5 (0.1)	0.5 (0.1)
Others	7.3 (0.5)	8 (0.5)	6.8 (0.5)	7.4 (0.5)	6.9 (0.5)
Low-income families					
Total out-of-pocket expenses	2937 (132)	2412 (129)	2192 (107)	2057 (135)	1899 (107)
Family insurance premiums	14.4 (1)	14.4 (0.8)	13.9 (0.9)	14.7 (1)	14.2 (1.1)
Member(s) with ASCVD					
Inpatient	2.3 (0.3)	2.5 (0.3)	2.7 (0.3)	2.6 (0.4)	2.1 (0.3)
Outpatient	8.8 (0.5)	11.7 (0.6)	10.1 (0.5)	11.4 (0.6)	13.3 (0.6)
Medications	50.9 (1.2)	45.4 (1.1)	49.7 (1.2)	45 (1.2)	44.8 (1.3)
Emergency services	1 (0.1)	1.8 (0.2)	1.6 (0.2)	2.7 (0.3)	1.6 (0.3)
Others	8.5 (0.6)	10.1 (0.8)	7.9 (0.5)	9.8 (0.8)	11.6 (0.7)
Member(s) without ASCVD					
Inpatient	1.2 (0.3)	0.8 (0.3)	1.1 (0.3)	1.0 (0.3)	0.5 (0.2)
Outpatient	4.7 (0.4)	6.8 (0.6)	6.8 (0.5)	6.1 (0.5)	6.6 (0.6)
Medications	18.5 (1.2)	16.3 (0.9)	15.7 (0.9)	14.7 (1.0)	13.8 (1)
Emergency services	1.1 (0.3)	1.5 (0.3)	0.9 (0.2)	1.8 (0.4)	0.6 (0.2)
Others	5.9 (0.7)	5.9 (0.7)	6.5 (0.6)	5.8 (0.7)	5.9 (0.6)

eTable 2. Predictors for catastrophic financial burden from out-of-pocket health expenditures in low-income families

	Odds ratio and 95% confidence limits		
	Odds ratio	Lower limit	Upper limit
Demographics			
Age ≥65 vs. <65 years	0.74	0.58	0.93
Women vs. Men	0.99	0.80	1.22
Race, Black vs. White	0.55	0.43	0.72
Race, Others vs White	0.53	0.30	0.94
Family characteristics			
Family size, ≥3 vs 1	1.33	1.02	1.74
Family size, 2 vs 1	0.96	0.67	1.36
Number of members with ASCVD	2.12	1.47	3.05
US census region of residence			
Midwest vs Northeast	1.15	0.82	1.61
South vs Northeast	1.15	0.84	1.56
West vs Northeast	1.07	0.73	1.56
Insurance			
Private (group) vs. Public	6.78	5.04	9.11
Private (non-group) vs. Public	8.59	5.88	12.57
Uninsured vs. Public	2.52	1.74	3.65
Financial characteristics			
Percentage spending non-ASCVD members	1.00	1.00	1.01
Total family income (log-scale)	0.09	0.07	0.11
Comorbidities, ASCVD members			
Charlson's score, 1 vs 0	1.07	0.83	1.37
Charlson's score, ≥2 vs 0	1.20	0.67	2.16
Ever smoker	0.65	0.48	0.88
Dyslipidemia	1.17	0.91	1.50
Hypertension	1.00	0.72	1.38
Diabetes	1.06	0.85	1.31
Liver disease	0.73	0.23	2.32
Chronic kidney disease	0.95	0.26	3.54
Cancer	1.27	0.81	2.00
Comorbidities, non-ASCVD members			
Charlson's score, 1 vs 0	1.10	0.67	1.81
Charlson's score, ≥2 vs 0	1.24	0.55	2.79
Ever smoker	1.37	0.89	2.13
Dyslipidemia	1.15	0.82	1.61
Hypertension	1.78	1.18	2.66
Diabetes	1.11	0.78	1.59

Liver disease	1.60	0.89	2.88
Cancer	1.37	0.66	2.84

In addition to the base model, this includes comorbidities among those without ASCVD and their spending on healthcare services. The modified Charlson's score included here represents comorbidity burden in excess of atherosclerotic cardiovascular disease (model c-statistic 0.82).