

# Alleviating Financial Hardships Associated with High-Deductible Health Plans for Adults with Chronic Conditions Through Health Savings Accounts



Kristen E. Park, BA<sup>1</sup> , Sonali Saluja, MD, MPH<sup>2</sup>, and Cameron M. Kaplan, PhD<sup>2</sup>

<sup>1</sup>Keck School of Medicine, University of Southern California, Los Angeles, CA, USA; <sup>2</sup>The Gehr Family Center for Health Systems Science and Innovation, Department of Medicine, Keck School of Medicine, University of Southern California, 2020 Zonal Ave, Los Angeles, CA, USA.

**BACKGROUND:** High-deductible health plans (HDHPs) are becoming increasingly common, but their financial implications for enrollees with and without chronic conditions and the mitigating effects of health savings accounts (HSAs) are relatively unknown.

**OBJECTIVE:** Our aim was to compare financial hardship between non-HDHPs and HDHPs with and without HSAs, stratified by enrollees' number of chronic conditions.

**DESIGN:** We used data from 2015 to 2018 Medical Expenditure Panels Surveys (MEPS) to compare rates of financial hardship across individuals with HDHPs and non-HDHPs using linear and logistic regression models.

**PARTICIPANTS:** A nationally representative sample of 30,981 adults aged 18–64 enrolled in HDHPs and non-HDHPs.

**MAIN MEASURES:** We examined several measures of financial hardship, including total yearly out-of-pocket medical spending as well as rates of delaying medical care or prescriptions in the past year due to cost, forgoing medical care or prescriptions in the past year due to cost, paying medical bills over time, or having problems paying medical bills. We compared rates using the non-HDHP as the control.

**KEY RESULTS:** On most measures, HDHPs are associated with greater financial hardship compared to non-HDHPs, including average annual out-of-pocket spending of \$637 for non-HDHPs, \$939 for HDHPs with HSAs, and \$825 for HDHPs without HSAs ( $p < 0.01$ ). However, for HDHP enrollees with multiple chronic conditions, having an HSA was associated with less financial hardship ( $p < 0.05$ ).

**CONCLUSIONS:** Our findings suggest that HSAs may be most beneficial for those with chronic conditions, in part due to the tax benefits they offer as well as the fact that those with chronic conditions are more likely to take advantage of their HSAs than their younger, healthier counterparts. However, as HDHPs are more likely to be correlated with worse financial outcomes regardless of health status, recent trends of increasing participation may be a reason for concern.

**KEY WORDS:** health insurance; high deductible; financial hardship; chronic condition; health savings account.

---

Prior Presentations: none

Received May 24, 2022

Accepted December 13, 2022

Published online January 4, 2023

J Gen Intern Med 38(7):1593–8

DOI: 10.1007/s11606-022-07985-5

© The Author(s), under exclusive licence to Society of General Internal Medicine 2022

## INTRODUCTION

High-deductible health plans (HDHPs), which are plans with higher deductibles than traditional insurance plans, were popularized following the tax benefits created by the Medicare Modernization Act in 2003.<sup>1,2</sup> Since then, they have gained a considerable foothold in the insurance market, comprising a third of employer-based enrollees in 2020, up from a quarter in 2015, as well as 90% of enrollees in state exchange plans, which were established by the Affordable Care Act and began open enrollment in 2013.<sup>3,4</sup> As such, there has been a growing interest in HDHPs and their financial impact on their enrollees. In 2020, the average deductible for an individual enrolled in an HDHP was \$2303; for those with non-HDHPs, it was \$1373.<sup>3</sup> With several exceptions, HDHP enrollees qualify for a health savings account (HSA), a tax-exempt account that serves to help offset out-of-pocket costs.<sup>5</sup> Money that is deposited into an HSA may be used for qualified healthcare expenses and is tax-free, with the balance rolling over at the end of the year. However, there is mixed evidence on their effectiveness, as more than half of those with HSAs do not contribute to it.<sup>6,7</sup> Further, HSAs are less likely to be utilized by lower-income individuals, who may not have the financial capability to contribute to their accounts and have less to benefit from due to their lower marginal tax rates.<sup>7,8</sup>

Numerous studies have shown that individuals enrolled in HDHPs defer or forgo emergent care, follow-up care, and essential medications, with low-income individuals disproportionately impacted.<sup>1,9–16</sup> Additionally, HDHPs have been associated with higher financial hardship in low-income individuals with multiple chronic conditions.<sup>17–19</sup> Given that the majority of Americans have at least one chronic condition, and 42% have multiple chronic conditions, understanding the implications of health care coverage on these individuals is critical.<sup>20</sup> Additionally, as the number of chronic conditions an individual has increases, so does their healthcare utilization and healthcare spending.<sup>20</sup> Because of the particularly high financial hardships those with chronic conditions face, it is

vital to examine whether HDHPs can adequately serve their needs. In this study, we compare the financial hardship experienced by those with HDHPs to those with non-HDHPs with stratification by number of chronic conditions. Further, as there is limited prior research on the efficacy of HSAs, we studied whether HSA ownership is associated with lower financial hardship. Finally, we wanted to shed light on state exchange HDHPs since a large proportion of state exchange plans feature high deductibles, and there are few studies focused on financial hardship associated with state exchange plans due to the fact that they are relatively new, having only been established in 2014.

## METHODS

We examined data from the 2015 to 2018 Medical Expenditure Panels Surveys (MEPS), a nationally representative set of surveys conducted annually in the USA by the Agency for Healthcare Research and Quality. It contains information on measures related to healthcare coverage, expenditures, and utilization.<sup>21</sup> Since the public-use MEPS data do not contain identifiable private information, the data do not constitute “human subjects” under federal guidance. Thus, IRB approval was not needed for this study.

Our study population included adults aged 18–64 who were enrolled in four categories of health insurance during the study period: employer-based non-HDHPs, employer-based HDHPs with an HSA, employer-based HDHPs without an HSA, or state exchange HDHPs. We focused on employer-based health insurance as it comprises 61% of coverage for Americans between 19 and 64 years of age.<sup>3</sup> We excluded those who were enrolled in multiple types of health insurance. We defined the threshold for an HDHP based on the annual limits released by the Internal Revenue Service; for context, the HDHP threshold in 2018 was \$1350 for the individual and \$2700 for a family.<sup>22</sup> The final sample size was 30,981.

We defined chronic conditions as the enrollee ever having been diagnosed with hypertension, high cholesterol, stroke, emphysema, chronic bronchitis, arthritis, cardiovascular disease, diabetes, cancer (excluding non-melanomatous skin cancer), or current asthma. Total out-of-pocket spending was defined as any deductible, coinsurance, and copayment amounts not covered by other sources, as well as payments for services and providers not covered by the person’s insurance or other sources. To assess financial hardship, we examined several factors, including total personal out-of-pocket medical spending in a year (which includes any deductible, coinsurance, and copayment amounts not covered by other sources, as well as payments for services and providers not covered by the person’s insurance), whether the individual delayed medical care or prescriptions in the past year due to cost, was completely unable to receive medical care or prescriptions in the past year due to cost, was paying medical bills over time, or was having problems paying medical bills.

We categorized the study population by the following demographic variables: age (18–34, 35–44, 45–54, 55–64), sex (male vs female), race/ethnicity (Hispanic, White, Black, Asian, or other), marital status (currently married vs not married), educational attainment (less than high school, high school degree, bachelor’s degree, higher graduate degree), annual family income as a percentage of the federal poverty level in a given year (< 100%, 100–199%, 200–299%, 300–399%, ≥ 400%), and US region (Midwest, Northeast, South, West).

All analyses were conducted using Stata version 16.1. For all analyses, we used survey weights, primary sampling units, and strata provided by MEPS to produce nationally representative estimates. We determined rates of each insurance group (non-HDHPs, HDHPs with an HSA, HDHPs without an HSA, or state exchange HDHPs) experiencing the measures of financial hardship as well as total yearly medical spending, measuring significance using the non-HDHP as the control. We derived adjusted estimates using multiple linear and logistic regression models that included terms for potential confounders, including age, sex, race/ethnicity, marital status, education level, and federal poverty level. We also calculated confidence intervals. To further compare the impact of HSAs, we conducted Wald tests to compare coefficient differences between HDHPs with HSAs and HDHPs without HSAs. For all analyses, a value of  $p < 0.05$  was considered statistically significant, and we further differentiate between  $p < 0.05$  and  $p < 0.01$  in the “Results” section.

## RESULTS

Table 1 shows the demographic characteristics of our study population. Compared to those with HDHPs with HSAs, individuals with HDHPs without HSAs are more likely to be of racial/ethnic minority backgrounds, have lower incomes, and have lower educational attainment.

Table 2 demonstrates that annual out-of-pocket expenditures increased with the number of chronic conditions an individual had. We further stratified the analysis to determine whether plan type made a difference in annual out-of-pocket expenditures. Overall, non-HDHP enrollees had the lowest spending (\$636.61 versus \$939.22, \$824.66, and \$976.79 for HDHPs with HSAs, HDHPs without HSAs, and state exchange HDHPs, respectively) ( $p < 0.01$ ). For HDHP enrollees with zero or one chronic condition, spending was lower for those without HSAs ( $p < 0.05$ ). For HDHP enrollees with multiple chronic conditions, spending was lower for those with HSAs ( $p < 0.05$ ).

Table 3 presents rates of four measures of financial hardship by health plan type and number of chronic conditions. For individuals without any chronic conditions, there were significantly higher rates of delaying medical care or prescriptions, foregoing medical care or prescriptions, paying medical bills over time, and having problems paying medical bills when

**Table 1 Demographic Characteristics Categorized by Insurance Type**

	Employer-based non-HDHP (Control) (n = 17,588)		Employer-based HDHP with HSA (n = 6455)		Employer-based HDHP without HSA (n = 5993)		State exchange HDHP (n = 945)	
	Number	Weighted (%)	Number	Weighted (%)	Number	Weighted (%)	Number	Weighted (%)
<b>Current age</b>								
18–34	5707	33.90	1771	28.98	1718	29.25	221	24.72
35–44	4248	23.16	1429	20.23	1412	21.98	177	18.09
45–54	4487	24.37	1431	22.30	1449	23.66	244	22.01
55–64	3286	18.57	1871	28.48	1488	25.11	316	35.18
<b>Sex</b>								
Male	11,609	49.22	5342	48.74	3831	49.54	507	44.53
Female	12,112	50.78	5684	51.26	3946	50.46	607	55.47
<b>Marital status</b>								
Married	10,698	61.15	5824	65.53	3771	62.82	561	55.99
Other	7860	38.85	3335	34.47	2536	37.18	457	44.01
<b>Race/ethnicity</b>								
Hispanic	5241	14.18	1108	7.03	1576	13.26	168	9.50
Non-Hispanic White	11,801	64.74	7509	77.51	4315	69.16	706	74.50
Non-Hispanic Black	3623	11.36	1178	6.90	1056	10.01	66	3.97
Non-Hispanic Asian	2060	6.72	840	6.15	567	5.06	148	10.38
Other	996	3.00	391	2.42	263	2.52	26	1.66
<b>Educational attainment</b>								
No degree	3047	6.80	855	5.16	880	6.65	106	5.15
High school graduate	7247	40.09	3395	33.71	2578	40.89	442	44.00
Bachelor’s degree	6357	38.00	3405	42.53	2229	39.07	358	37.51
Higher graduate degree	2468	15.11	1599	18.60	741	13.39	112	13.33
<b>Family income as % of FPL</b>								
< 100%	676	1.54	492	2.33	191	1.46	48	3.82
100–199%	2612	7.02	934	5.85	848	6.94	220	17.22
200–299%	4289	14.10	1515	10.27	1500	15.74	289	22.59
300–399%	4233	15.89	1729	14.34	1524	18.25	170	14.11
≥ 400%	11,925	61.59	6320	66.70	3736	57.67	393	42.93
<b>Region</b>								
Northeast	3927	20.12	1679	16.33	931	14.14	118	10.99
Midwest	4832	19.96	2939	27.05	1952	23.66	282	25.45
South	8072	35.00	3878	36.48	3136	42.26	428	37.67
West	6850	24.92	2474	20.14	1744	19.95	283	25.90
<b>Chronic conditions</b>								
0	14,318	60.34	5405	45.11	4239	55.15	704	50.99
1	4633	19.24	1999	18.11	1528	19.55	231	20.62
2 or more	4808	20.41	4191	36.77	1985	20.62	309	28.39

Chronic condition is defined as ever having been diagnosed with hypertension, high cholesterol, stroke, emphysema, chronic bronchitis, arthritis, cardiovascular disease, diabetes, cancer (excluding non-melanomatous skin cancer), or current asthma

enrolled in an HDHP in comparison to those with non-HDHPs, regardless of whether one had an HSA or not ( $p < 0.01$ ). The only exceptions are that compared to those with non-HDHPs, those with HDHPs without HSAs were not more likely to delay care, and those with HDHPs with HSAs were not more likely to

forego care. Those with state exchange plans fared the worst on all measures of financial hardship ( $p < 0.01$ ).

Similar to their counterparts without chronic conditions, HDHP enrollees with chronic conditions experienced more financial hardship than non-HDHP enrollees (Table 3). For

**Table 2 Total Yearly Out-of-Pocket Medical Spending Categorized by Insurance Type and Number of Chronic Conditions<sup>†</sup>**

	Employer-based non-HDHP (Control)		Employer-based HDHP with HSA		Employer-based HDHP without HSA		State exchange HDHP	
	Average	95% conf. interval	Average	95% conf. interval	Average	95% conf. interval	Average	95% conf. interval
Overall (\$)	636.61	[605.23, 667.99]	939.22**	[887.21, 991.21]	824.66**	[771.23, 878.09]	976.79**	[842.08, 1111.51]
No chronic conditions <sup>^</sup> (\$)	405.63	[378.60, 432.65]	699.18**	[650.53, 747.83]	506.04**	[457.22, 554.86]	682.60**	[563.28, 801.92]
One chronic condition <sup>^</sup> (\$)	641.06	[594.37, 687.74]	950.8**	[874.44, 1027.31]	763.51**	[683.35, 843.67]	954.67**	[753.48, 1155.87]
Two or more chronic conditions (\$)	1013.37	[917.11, 1109.63]	1330.04**	[1188.71, 1471.36]	1393.53**	[1245.22, 1541.85]	1440.95*	[1046.52, 1835.38]

\*p value is < 0.05 for difference in coefficients between this group and the employer-based non-HDHP group

\*\*p value is < 0.01 for difference in coefficients between this group and the employer-based non-HDHP group

<sup>^</sup>p value is < 0.05 for the HDHP without HSA group coefficient differing from the HDHP with HSA group coefficient

<sup>†</sup>Model adjusted for age, sex, race/ethnicity, marital status, education level, and federal poverty level

Table 3 Measures of Financial Hardship Categorized by Insurance Type and Number of Chronic Conditions<sup>†</sup>

	Employer-based non-HDHP (Control)		Employer-based HDHP with HSA		Employer-based HDHP without HSA		State exchange HDHP	
	Unadjusted	Adjusted	Unadjusted	Adjusted	Unadjusted	Adjusted	Unadjusted	Adjusted
<b>Delay in receiving medical care or prescriptions in the past 12 months<sup>§</sup></b>								
Overall (%)	3.60	2.99	6.05**	4.35**	5.51**	4.24**	8.76**	6.20**
No chronic conditions (%)	1.89	1.70	3.01**	2.52*	2.41**	2.14	3.54**	3.21*
One chronic condition (%)	3.64	3.29	4.82**	4.11	5.39**	4.77*	10.98**	9.20**
Two or more chronic conditions (%)	6.89	6.55	10.94**	9.81**	10.09**	9.61**	15.46**	11.92**
<b>Unable to receive medical care or prescriptions in the past 12 months<sup>§</sup></b>								
Overall <sup>^</sup> (%)	1.97	1.52	2.90**	2.06**	3.25**	2.26**	5.29**	5.90**
No chronic conditions (%)	0.88	0.81	1.20	1.14	1.45**	1.32*	1.77**	1.79**
One chronic condition (%)	1.77	1.51	3.15**	2.76**	3.20**	2.60*	7.51**	5.74**
Two or more chronic conditions <sup>^</sup> (%)	4.27	3.84	4.91	4.41	5.88**	5.13*	9.18**	6.36*
<b>Medical bills being paid off over time</b>								
Overall <sup>^</sup> (%)	20.17	17.97**	19.97	20.86**	27.12	23.51**	29.32	25.69**
No chronic conditions (%)	15.74	14.49	19.01**	18.39**	22.37**	20.20**	22.05**	20.61**
One chronic condition <sup>^</sup> (%)	20.87	19.37	21.52	20.76	26.19**	23.04**	27.31*	25.04*
Two or more chronic conditions <sup>^</sup> (%)	24.37	22.97	26.12*	25.85*	33.00**	30.98**	36.88 <sup>†</sup>	34.98**
<b>Problems paying medical bills</b>								
Overall <sup>^</sup> (%)	8.51	6.63**	8.09	7.75**	13.02	9.73**	16.61	12.47**
No chronic conditions (%)	6.19	4.91	6.75**	6.42**	9.27**	7.27**	11.88**	9.33**
One chronic condition <sup>^</sup> (%)	8.06	6.46	7.77	7.09	13.6**	10.39**	17.89**	13.34**
Two or more chronic conditions <sup>^</sup> (%)	12.16	10.07	12.81*	11.72*	18.07**	15.35**	23.32**	18.43**

<sup>§</sup>Due to changes in the MEPS questionnaire to questions pertaining to delaying or foregoing medical care or prescriptions beginning in 2018 that made it difficult to accurately assess the new questions alongside past years', we only included data from 2015 to 2017 in our analysis for these two portions of the table

\*p value is < 0.05 for difference in coefficients between this group and employer-based non-HDHP group

\*\*p value is < 0.01 for difference in coefficients between this group and employer-based non-HDHP group

<sup>^</sup>p value is < 0.05 for the HDHP without HSA group coefficient differing from the HDHP with HSA group

<sup>†</sup>Model adjusted for age, sex, race/ethnicity, marital status, education level, and federal poverty level

example, those with multiple chronic conditions enrolled in HDHPs without HSAs fared worse on all measures compared to those with non-HDHPs: they were more likely to delay care (9.61% versus 6.55%), forego care (5.13% versus 3.84%), pay medical bills over time (30.98% versus 22.97%), and have problems paying medical bills (15.35% versus 10.07%) ( $p < 0.05$ ). In contrast, those with only one chronic condition enrolled in HDHPs with HSAs did not have increased rates of delaying care, paying medical bills over time, or having trouble paying bills. State exchange plan HDHP enrollees with multiple chronic conditions had the highest rates on all measures, with more than a third of respondents (34.98%) having to pay medical bills over time.

We further analyzed whether there was a significant difference in financial hardship between those enrolled in HDHPs with HSAs and those enrolled in HDHPs without HSAs. We found that those with multiple chronic conditions had significantly lower rates of foregoing medical care (4.41% versus 5.13%), paying medical bills over time (25.85% versus 30.98%), or having problems paying medical bills (11.72% versus 15.35%) if they had an HSA ( $p < 0.05$ ) (Table 3). For those with one chronic condition, HSAs were associated with lower rates of having to pay bills over time or having problems paying bills, though they were not associated with lower rates of delayed or foregone care ( $p < 0.05$ ) (Table 3). For those with no chronic conditions, having an HSA made no difference on any measures (Table 3).

## DISCUSSION

Our findings suggest that even for individuals without any chronic conditions, HDHP enrollment is associated with higher financial hardship. While HDHP enrollees were not more likely to forego medical care or prescriptions, they still had higher rates of paying medical bills over time, having problems paying medical bills, having higher out-of-pocket medical spending, and delaying care. Notably, for those without chronic conditions, HSAs were not associated with lowered financial hardship. This may be due to a number of reasons. First, those without chronic conditions tend to spend much less on medical expenses than the average individual (Table 2). Since they incur significantly lower out-of-pocket costs, HSA funds may be less impactful. Second, while HDHP enrollees tend to be older in some studies, including our own, other studies have suggested that HDHPs tend to attract younger and healthier individuals who are much less likely than their older counterparts to contribute to their HSAs.<sup>23,24</sup> A 2015 study found that individuals under age 25 contributed an average of \$1023 while individuals aged 55–64 contributed \$3317.<sup>6</sup> Approximately half of HSA owners do not contribute to their HSAs at all, and thus may not be reaping any of the tax benefits.<sup>6,7</sup> Further, people may be making small-enough HSA contributions or may be in a low-enough tax bracket that the financial benefits are ultimately not significant. It is important to note that there is increased medical spending in those with HSAs (\$699.18 vs. \$506.04,  $p < 0.05$ ), perhaps suggesting

increased use of medical services by those with available HSA funds or even a degree of self-selection by individuals who conscientiously chose to use their HSA (Table 2).

On the other hand, among HDHP enrollees with chronic conditions, HSAs were associated with lower financial hardship, especially for those with multiple chronic conditions (Table 3). Compared to those without chronic conditions, individuals with chronic conditions may be more likely to utilize their HSAs due to both past experiences with medical spending as well as anticipation for future spending. Additionally, those with chronic conditions tend to be older, which is associated with greater HSA contributions. One study showed that individuals aged 55 and over contributed \$945 more than people under 25 years of age.<sup>24</sup> In fact, individuals aged 55 and up are able to contribute an extra \$1000 to their HSAs annually. With consistent contributions, HSAs can be very financially advantageous, largely due to their “triple-tax advantage”—contributions to the account are not taxed, distributions for qualified expenses are not taxed, and any interest gained from the account are not taxed. Additionally, HSA owners may receive additional financial benefits through employer contributions. Currently, 75% of employers offering HSA-qualified HSAs contribute to their employees’ HSAs for an average contribution of \$550 for individuals and \$1018 for families.<sup>3</sup> Another factor to consider is that individuals with HSAs tend to have higher education levels and incomes, which correlate with greater health literacy and a greater likelihood of having healthcare savings.<sup>24–27</sup> With this in mind, our study controlled for income, education, and age, which may alleviate the concerns that the findings are driven by differences in demographic factors and increases the confidence that the results measure the impact of the insurance characteristics.

Individuals enrolled in state exchange HDHP plans had the highest rates on all measures of financial hardship. They had the highest medical spending and were the most likely to delay or avoid care. In 2020, 71% of all exchange HDHP plan enrollees reported a household income less than 250% of the federal poverty line. And while nearly 90% of offered plans are HDHPs, only 7% were enrolled in plans that were eligible for an HSA.<sup>4,28</sup> Though there is wide variation in cost-sharing across the tiers of state exchange plans, studies suggest that most exchange plans have higher out-of-pocket expenses than employer-sponsored plans, resulting in increased cost-barriers to care.<sup>15,20,29</sup> For example, state exchange plans tend to have poorer prescription drug coverage and higher out-of-pocket maximums.<sup>29</sup> Those with exchange plans also have more difficulty finding a physician or having their insurance accepted, and have decreased access to highly rated health plans than their non-exchange HDHP counterparts.<sup>30,31</sup>

Overall, given that both healthy individuals and those with chronic conditions have better access to care and decreased financial hardship with non-HDHP plans, the best option would be to encourage the use of non-HDHPs. However, for those who must enroll in HDHPs, HSAs are a potentially underutilized financial asset. Nearly half of those who do not contribute to their HSAs cited not considering it; however, a

third cited not being able to afford to.<sup>7</sup> One study found that those who saved for future healthcare expenses cited employer HSA contributions as the most helpful factor. Another found that while only 34% of employees opened HSA accounts when employers did not contribute, 84% did when employers contributed—regardless of the amount.<sup>24,27</sup>

There are several policy implications. One potential policy solution is to incentivize or require more employers to contribute to their employees’ HSAs. As tax deductions offered by HSAs primarily benefit higher-income individuals, employer contributions may especially aid lower-income individuals. In the case of exchange HDHP enrollees, research has shown that cost-sharing subsidies primarily benefit low-income individuals (federal poverty level < 250%), so additional state- or federal-level HSA subsidies may provide more financial flexibility for a greater pool of exchange plan enrollees.<sup>32</sup> Second, research on the use of financial incentives to improve health has shown potential for positive outcomes, especially for lower-income individuals, who have more to gain.<sup>33</sup> Multiple studies have shown positive impacts on vaccination and cancer screening rates through the use of financial incentives.<sup>34</sup> It may be worthwhile to see whether coupling financial incentives such as a monetary HSA deposit in exchange for undergoing preventive health screenings could further aid HDHP enrollees in terms of both health and finances. Lastly, low-income individuals with low health literacy are less likely to understand their health insurance, including their HSAs, so improving health literacy through community-based organizations may improve HSA utilization as well.<sup>26,35</sup>

Our study had several notable limitations. Our data source lacked information on HSA balances, and we were unable to include employer or enrollee contribution amounts in the analysis. It should also be noted that whether or not one has an HSA is self-reported. Additionally, while we did control for income in our analyses, we were unable to factor in other measures of wealth, such as assets or savings. All of this may contribute to a degree of selection bias that is not possible to account for. For example, we may want to consider that those who utilize their HSAs may be more financially literate overall, and that those with chronic conditions who select HDHPs may be relatively healthier. Additionally, we pooled data over several years and are not able to report on marginal yearly changes that may have occurred. Finally, we were unable to stratify state exchange HDHPs into those with or without HSAs due to their small sample size. Our study is valuable in that it provides further insight into how HDHPs impact people with chronic conditions differently, especially with regard to the role of HSAs, an area of research that is still lacking.

## CONCLUSION

Our findings suggest that non-HDHP enrollees report less financial hardship than HDHP enrollees regardless of presence

of chronic conditions. HSAs may partially mitigate the financial strain for those with multiple chronic diseases. Overall, non-HDHP plans likely remain the best option for avoiding financial strain, particularly in low-income or disease-burdened populations. For individuals with chronic diseases who are only able to enroll in HDHPs, encouraging HSA participation, perhaps through government or employer contributions, may also reduce financial hardship.

---

**Corresponding Author:** Kristen E. Park, BA; Keck School of Medicine, University of Southern California, Los Angeles, CA, USA (e-mail: [kepark@usc.edu](mailto:kepark@usc.edu)).

#### Declarations:

**Conflict of Interest:** The authors declare that they do not have any conflicts of interest.

## REFERENCES

- Davis K, Doty MM, Ho A. How high is too high? Implications of high-deductible health plans. *Commonwealth Fund* 2005;20.
- HealthCare.gov. High deductible health plan (HDHP) - [healthcare.gov](https://www.healthcare.gov/glossary) glossary. Accessed February 9, 2022.
- Kaiser HJ Family Foundation. 2020 Employer Health Benefits Survey. Available at: <https://www.kff.org/health-costs/report/2020-employer-health-benefits-survey>. Accessed February 9, 2022.
- Dolan R. High-deductible health plans. Project HOPE; 2016.
- Internal Revenue Service. Publication 969 (2021), Health Savings Accounts and Other Tax-Favored Health Plans, Available at: <https://www.irs.gov/publications/p969>. Accessed September 11, 2002.
- Fronstin P. Health Savings Account Balances, Contributions, Distributions, and Other Vital Statistics, 2014: Estimates from the EBRI HSA Database. EBRI Issue Brief 2015;416(July 2015).
- Kullgren JT, Cliff EG, Krenz C, West BT, Levy H, Fendrick M, Fagerlin A. Use of health savings accounts among US adults enrolled in high-deductible health plans. *JAMA Network Open*. 2020;3(7):e2011014.
- Helmchen LA, Brown DW, Lurie IZ, Lo Sasso AT. Health savings accounts: growth concentrated among high-income households and large employers. *Health Affairs* 2015;34(9):1594-8.
- Wharam JF, Zhang F, Landon BE, Soumerai SB, Ross-Degnan D. Low-socioeconomic-status enrollees in high-deductible plans reduced high-severity emergency care. *Health Affairs* 2013;32(8):1398-406.
- Wharam JF, Zhang F, Landon BE, Soumerai SB, Ross-Degnan D. Low-socioeconomic-status enrollees in high-deductible plans reduced high-severity emergency care. *Health Affairs* 2013;32(8):1398-406.
- Lewey J, Gagne JJ, Franklin J, Lauffenburger JC, Brill G, Choudhry NK. Impact of high deductible health plans on cardiovascular medication adherence and health disparities. *Circul: Cardiovasc Qual Outcomes* 2018 Nov;11(11):e004632.
- Zheng Z, Jemal A, Banegas MP, Han X, Yabroff KR. High-deductible health plans and cancer survivorship: what is the association with access to care and hospital emergency department use?. *J Oncol Pract* 2019;15(11):e957-68.
- Fendrick AM, Buxbaum JD, Tang Y, Vlahiotis A, McMorrow D, Rajpathak S, Chernew ME. Association between switching to a high-deductible health plan and discontinuation of type 2 diabetes treatment. *JAMA Network Open* 2019;2(11):e1914372-.
- Kozhimannil KB, Law MR, Blauer-Peterson C, Zhang F, Wharam JF. The impact of high-deductible health plans on men and women: an analysis of emergency department care. *Medical care*. 2013;51(8):639.
- Saluja S, Kaplan C, Dhupati P, McCormick D. Preventing financial strain for low-and moderate-income adults: a comparison of Medicaid, Marketplace, and employer-sponsored insurance. *Journal of general internal medicine*. 2021 15:1-9.
- Segel JE, Kullgren JT. Health insurance deductibles and their associations with out-of-pocket spending and affordability barriers among US adults with chronic conditions. *JAMA Int Med* 2017;177(3):433-6.
- Abdus S, Selden TM, Keenan P. The financial burdens of high-deductible plans. *Health Affairs* 2016;35(12):2297-301.
- Abdus S, Keenan PS. Financial burden of employer-sponsored high-deductible health plans for low-income adults with chronic health conditions. *JAMA Int Med* 2018;178(12):1706-8.
- Galbraith AA, Ross-Degnan D, Soumerai SB, Rosenthal MB, Gay C, Lieu TA. Nearly half of families in high-deductible health plans whose members have chronic conditions face substantial financial burden. *Health Affairs* 2011;30(2):322-31.
- Buttorff C, Ruder T, Bauman M. Multiple chronic conditions in the United States. Santa Monica, CA: Rand; 2017.
- Agency for Healthcare Research and Quality. Medical Expenditure Panel Survey (MEPS). Available at: <https://www.ahrq.gov/cpi/about/otherwebsites/meps.ahrq.gov/index.html>. Accessed February 9, 2022.
- Internal Revenue Service. Rev. Proc. 2017-37. Available at: <https://www.irs.gov/pub/irs-drop/rp-17-37.pdf>. Accessed January 15, 2022.
- Tollen LA, Ross MN, Poor S. Risk Segmentation Related to the Offering of a Consumer-Directed Health Plan: A Case Study of Humana Inc. *Health Services Res*. 2004;39(4p2):1167-88.
- Chen S, Lo Sasso AT, Nandam A. Who funds their health savings account and why? *Int J Health Care Finance Econ* 2013;13(3):219-32.
- Cohen RA, Martinez ME. Consumer-directed health care for persons under 65 years of age with private health insurance: United States, 2007.
- Hageman SA, St. George DM. Health savings account ownership and financial barriers to health care: what social workers should know. *Social Work Public Health* 2019;34(2):176-88.
- Kullgren JT, Cliff EG, Krenz CD, Levy H, West B, Fendrick AM, So J, Fagerlin A. A survey of Americans with high-deductible health plans identifies opportunities to enhance consumer behaviors. *Health Affairs* 2019;38(3):416-24.
- Centers for Medicare and Medicaid Services. Health Insurance Exchanges 2020 Open Enrollment Report. Available at: <https://www.cms.gov/files/document/4120-health-insurance-exchanges-2020-open-enrollment-report-final.pdf>. Accessed February 9, 2022.
- Gabel J, Whitmore H, Green M, Stromberg S, Oran R. Consumer Cost-Sharing in Marketplace vs. Employer Health Insurance Plans, 2015. Issue Brief (Commonwealth Fund) 2015; 38:1-1.
- Chen W, Page TF. Impact of health plan deductibles and health insurance marketplace enrollment on health care experiences. *Medical Care Research and Review*. 2020;77(5):483-97.
- Tsai TC, Jacobson BH, Griggs D, Jha AK, Orav EJ, Epstein AM. Marketplace health insurance ratings: most potential enrollees have access to plans of medium or high quality: study examines access to medium or high quality marketplace health insurance plans. *Health Affairs* 2022;41(3):390-7.
- Liu C, Gotanda H, Khullar D, Rice T, Tsugawa Y. The Affordable Care Act's insurance marketplace subsidies were associated with reduced financial burden for US adults: study examines the ACA's insurance marketplace subsidies and financial burden on US adults. *Health Affairs* 2021;40(3):496-504.
- Vlaev I, King D, Darzi A, Dolan P. Changing health behaviors using financial incentives: a review from behavioral economics. *BMC Public Health*. 2019;(1):1059.
- Sutherland K, Christianson JB, Leatherman S. Impact of targeted financial incentives on personal health behavior: a review of the literature. *Medical Care Research and Review* 2008;65(6\_suppl):36S-78S.
- Maciejewski ML, Hung A. High-deductible health plans and health savings accounts: a match made in heaven but not for this irrational world. *JAMA Network Open* 2020;3(7):e2011000-.

**Publisher's Note** Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

Springer Nature or its licensor (e.g. a society or other partner) holds exclusive rights to this article under a publishing agreement with the author(s) or other rightsholder(s); author self-archiving of the accepted manuscript version of this article is solely governed by the terms of such publishing agreement and applicable law.