Research Article

Budgetary Consequences of High Medical Spending Across Age and Social Status: Evidence from the Consumer Expenditure Surveys

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Abstract

Background and Objectives: This study examines high medical spending among younger, midlife, and older households. **Research Design and Methods:** We investigate high medical spending using data from the 2010 through March 2018 Consumer Expenditures Surveys ($n = 92,951$). We classify and describe high medical spenders relative to others within three age groups (household heads age 25–44, 45–64, and 65+) using finite mixture models and multinomial logistic regression, respectively. We then use hierarchical linear models to estimate the effects of high medical spending on nonmedical spending. **Results:** Among younger households, high medical spending is positively associated with higher education and increased spending on housing and food. Among older households, high medical spending is associated with lower education and decreased nonmedical spending. **Discussion and Implications:** Earlier in the life course, high medical spending is more likely to indicate an investment in future household well-being, while at older ages, high medical spending is likely to indicate medical consumption.

Keywords: Life course/life span, Sociology of aging/social gerontology, Quantitative research methods

Health spending continues to grow at a rapid rate and is expected to constitute over 20% of the U.S. economy by 2025 (Keehan et al., 2016). The United States has the highest total healthcare spending, highest public healthcare spending per person, highest share of GDP spent on healthcare, but lowest public share of total health spending among comparable OECD countries (Lorenzoni, Belloni, & Sassi, 2014). As a result, out-of-pocket medical expenditures are an important component of American households' budgets (Murthy & Okunade, 2016). The benefits and burdens of this spending, however, are not spread evenly across the U.S. population

(Murthy & Okunade, 2016; Tarraf, Miranda, & González, 2012). Social disparities in medical spending burdens have important implications for broader social inequality, yet the relationship between medical spending, social status, and other dimensions of household budgets are not well-understood. High healthcare costs, particularly those associated with management of chronic conditions and responses to unexpected health catastrophe, can have disastrous consequences for long-term financial well-being. For example, high healthcare costs can lead to financial hardships that cause certain households to forgo other forms of care (Weaver, Rowland,

Bellizzi, & Aziz, 2010) or experience medical bankruptcy (Himmelstein, Thorne, Warren, & Woolhandler, 2009).

A wide body of research documents the social patterning of health status across age, such that health inequalities accumulate across the life course and disadvantaged households are at greater risk of experiencing catastrophic health events (Brown, 2018; Willson, Shuey, & Elder, 2007). These patterns would imply higher medical expenditures at middle and older ages and higher spending for disadvantaged social groups, net of income differences. Yet, not all medical spending is a result of poor health. High healthcare spending could be conceptualized as an investment aimed at maintaining or improving well-being. As such, we would expect high medical spending to be characteristic of relatively *advantaged* segments of the population. Some research on medical spending supports this. White households, for instance, have higher average medical spending than black households, net of socioeconomic differences (Charron-Chénier & Mueller, 2018). Other research finds that investments in leading-edge treatments and costly elective procedures could explain a significant portion of the socioeconomic gradient in health (Chang & Lauderdale, 2009; Glied & Lleras-Muney, 2008; Tehranifar et al., 2009).

In this study, we explore how high healthcare spending is patterned by age and social status. We expect that the population of high medical spenders in the United States represent mixture of both *health investors*, who use high medical spending as an investment in well-being, and *medical consumers*, who suffer high medical spending in response to illness. The relative proportion of health investors and medical consumers in a given population, we argue, varies as a function of social status and age. Research in health economics documents that medical expenditures represent an investment in future health, and access to medical spending is stratified according to relative social position (Grossman, 2017; Halliday, He, Ning, & Zhang, 2017; O'Donnell, Van Doorslaer, & Van Ourti, 2015). Rates of disablement, morbidity, and mortality increase with biological age (Taylor, 2010; Verbrugge & Jette, 1994). As a result, we expect a higher proportion of *health investors* among younger households, and a higher proportion of *medical consumers* among older households. This assumption implies a change in the determinants and consequences of high medical spending across the life course. At younger ages, the expected greater proportion of medical investors entails a positive association between socioeconomic status (SES) and medical spending. It also may entail minimal negative consequences of medical spending on household's ability to acquire other needed goods and services. In contrast, at older ages, the expected greater proportion of medical consumers implies a negative association between SES and medical spending. This also suggests that high medical spending may lead to a decrease in spending for other, nonmedical goods and services.

Background

High Medical Spending as Health Investment or Medical Consumption

Households can experience high medical spending for different reasons. At the population level, we expect high

medical spenders to be comprised of mixture of two broad groups with markedly different spending motivations. The first group, *health investors*, is comprised of relatively advantaged households engaging in preventive, elective, or leading edge procedures aimed at improving long-term health. Research in the field of health economics follows Grossman's human capital model of demand for health, which builds on Becker's earlier household production function model and theory of investment in human capital (Becker, 1993; Grossman, 2017). Social advantage comes with better access to medical technologies, and relatively advantaged groups are more likely to demand state-of-the art medical care (Chang & Lauderdale, 2009; Glied & Lleras-Muney, 2008; Tehranifar et al., 2009). This disparate access to health-promoting resources is a major mechanism driving population health disparities across a variety of disease outcomes (Brown, O'Rand, & Adkins, 2012). For example, as statins lowered the absolute risk for high cholesterol of those who could afford them, disadvantaged groups were placed at higher *relative* risk for cholesterol-related adverse health conditions (Chang & Lauderdale, 2009). Economically advantaged groups also have greater access to costly elective procedures linked to improved physical functioning, such as joint replacements (Agabiti et al., 2007; George, Hu, & Sloan, 2014; Ibrahim & Franklin, 2013).

In contrast, *medical consumers* are relatively disadvantaged households who engage in medical spending as a response to acute health needs and/or to improve current or short-term utility. Research suggests that members of disadvantaged households are more likely to face health risks. For example, precarious employment conditions are linked to health risks (Benach & Muntaner, 2007). Social disadvantage is also associated with greater exposure to financial stressors, which are linked to adverse mental and physical health consequences (Price, Choi, & Vinokur, 2002). These groups experience higher risk for unforeseen health catastrophes caused by work-related injury and adverse health conditions arising from preventable conditions (Joynt, Gawande, Orav, & Jha, 2013; Saver, Wang, Dobie, Green, & Baldwin, 2014). Disadvantaged households often forego preventative care, and as a result experience higher risk for preventable hospitalizations, readmissions, and emergency surgeries, all of which are costly. These health disparities and avoidable medical treatments entail increased health spending burdens.

Taken together, these two pathways to high medical spending suggest that high medical spenders are either advantaged households engaging in health investment, or disadvantaged households responding to the need for higher medical consumption. The type of high medical spending in which a given household engages is likely influenced in part by its relative social position. At the population level, however, the relationship between social position and medical spending is not a straightforward one. Both advantaged and disadvantaged households engage in high medical spending, making the identification of causes and effects of medical spending difficult.

Changing Mixtures of High Medical Spenders Across Age

Identifying which spending strategy prevails for a given social group is important for formulating appropriate policy responses to high medical spending. Here, we propose that adopting a life course perspective provides a way to disentangle these issues. Risks of catastrophic illness and its associated effects on medical expenses increase dramatically with age and peak within the months immediately preceding death (Riley & Lubitz, 2010; Yang, Norton, & Stearns, 2003). Thus, we expect the risk of experiencing the need for medical consumption to increase substantially with age. This implies that the relative population mixture of health investors and responders changes significantly across the life course. For younger age groups, high medical spenders are comparatively more likely to be investment spenders. In contrast, greater risk of medical catastrophe leading to disability and death means that older households with high medical spending are more likely medical consumers. This expected shift in the relative mixture of health investors and medical consumers across age implies a change in the observed population-level association between SES and medical spending across age, and a population-level change in the observed consequences of high medical spending on access to other goods and services.

This age-patterning of medical expenditure is informed by recent insights from researchers in the field of health economics and is in line with Grossman's (2017) model of health investment. Halliday and colleagues (2017) examine three motives for health investment, finding that the "investment motive," defined by medical expenditures aimed at improving health to enable the allocation of more time to "productive or pleasurable activities" is dominant at younger ages. The mixture of motives in the population gradually shifts across age, such that for individuals in middle and later life the dominant motive becomes the "consumption"—the effort to derive utility from improved health (Halliday et al., 2017).

Among young adult households, we expect to find the highest proportion of health investors relative to medical consumers. For this group, we anticipate that high medical spending will be correlated with indicators of *higher* social status. In middle adulthood, we expect the mixture of investors to consumers to begin shifting in favor of the latter. For this group, we expect a *weakening or null* association between advantaged social status and high medical expenditures. Finally, for older households, health declines associated with biological aging processes lead us to expect a large relative portion of medical consumers. For consumers, high medical spending is a consequence of poor health. Given that health status is inversely correlated to SES, we expect the association between high medical expenditure and social status for these older households to be associated with indicators of *lower* social status.

Effects of High Medical Spending on Household Budgets

The impact of high medical expenditures on households' ability to acquire other important goods and services according to whether the high spending primarily reflects health investments or medical consumption. This argument can be understood in light of the life course perspective. Key elements of the life course approach include taking account of linked lives (e.g., life circumstances and transitions are shaped by and affect household members) and agency (Elder, Johnson, & Crosnoe, 2003). Households can deploy many strategies to match changing levels of resources and needs by adjusting both their expectations and their financial behavior. This concept is sometimes referred to as a *control cycle* (Elder, 1985). Because households must allocate spending across several categories of goods and services, high medical expenditure likely has spillover effects on household members' ability to purchase essentials like food, shelter, and transportation. These resource allocation decisions likely differ depending on the needs and available resources of households. Accordingly, we anticipate associations between high medical expenditure and other categories of spending to differ across health investors and medical consumers.

For medical consumers, we anticipate that high medical expenditures will limit households' ability to spend on other major categories of goods and services. This financial impact of medical care for consumers can be understood as an important source of cross-domain cumulative advantage/disadvantage (Ferraro & Shippee, 2009). For health investors, in contrast, we anticipate that high medical spending does not come at the expenses of other essential expenditures. Indeed, we expect that high medical spending is likely part of a broader investment strategy aimed at increasing future well-being for oneself or one's kin network. As such, high medical spending for health investors should have little to no negative effect on other essential spending, and may actually be associated with higher spending levels on other household investments like housing and education. Given our expectations regarding the relative mixture of health investors and medical consumers across age groups, we expect the average impact of high medical spending on other types of household spending to be closest to that of health investors for younger households, and to most resemble that of medical consumers for older households.

Data and Methods

Data for this study were obtained from the January 2010 to March 2018 Consumer Expenditure Surveys (CE). The CE is a quarterly survey of household spending managed by the U.S. Census Bureau and the Bureau of Labor Statistics. It is administered on a rotating panel basis and samples approximately 7,000 households each quarter. Sampled households are re-interviewed every 3 months over a full

calendar year for a total of four interviews. Expenditure data for each household are updated at every wave, but background information is collected in the first interview only and carried forward. Data on households' financial status is collected in the same way and updated once in the final interview (National Research Council, 2013). For these variables, analyses rely on the latest available value. The data therefore present a hierarchical structure with expenditure data at the household-quarter level (level 1) nested in households (level 2). Household-quarters with missing values for any of the model variables were excluded from the analytic sample (3,880 households or 4.0% of observations).

The CE is an economic survey and does not collect information on respondent health. It does, however, provide a large sample of respondents and collects detailed information on both medical and nonmedical spending. A large sample is useful for stable identification of changes in population composition, and detailed expenditure data are necessary to examine the relationship between medical- and nonmedical spending. For this reason, the CE is the preferred data source for this study, especially relative to prominent alternatives that provide no information on nonmedical spending.

In order to (a) identify households with persistently high medical spending; (b) identify associations between SES and high medical spending across age groups; and (c) identify associations between high medical spending and spending on other essential nonmedical expenditures, we use three sets of analyses. These analyses are described subsequently.

Key Theoretical Variable: High Healthcare Spending

Our analyses rely on several key variables. These variables are used as dependent variables in some models and independent variables in others. Our first key variable measures whether an individual household has *high healthcare spending*, defined as persistently high medical spending relative to others of a similar age. To measure medical spending, we use the sum of all quarterly out-of-pocket expenditures on prescription drugs, medical services (e.g., doctors' visits), and medical equipment (e.g., eyeglasses). We categorize households as high medical spenders using a finite mixture growth model. This allows us to identify distinct clusters of household medical spending trajectories over the four quarters in which households are interviewed. Trajectory classes are then used as categorical variables in subsequent analyses. Models testing the association between SES and medical expenditures use latent trajectory membership as their dependent variable. Models examining the impact of medical spending on other nonmedical expenditures use trajectory memberships as their key independent variable. More details on these models are provided subsequently.

Dependent Variables: Nonmedical Spending

Models of nonmedical spending examine consumption bundles from the following five spending categories: food, housing, transportation, utilities, and education. On average, these categories represent approximately three quarters of households' total spending. Our choice of specific consumption bundles is intended to capture both essential and nonessential consumption within these broad spending types. Detailed descriptions for each variable are provided in Table 1. For food spending, we examine food prepared at home, eating out, and alcoholic beverages. For housing spending, we examine mortgage principal and interest, and spending on rent. For transportation spending, we examine new vehicle outlays and spending on fuel. Spending on utilities and education are not disaggregated.

Independent Variable: Educational Attainment

Our key independent variable for multinomial logit models (see Analytic Strategy section below) is educational attainment. Education is a core component of SES and, unlike income and wealth, it is typically achieved earlier in life and remains relatively constant (Lynch, 2003; Taylor, 2010). We operationalize education using a categorical variable measuring the educational attainment of the households' primary earner. The categories are *less than high school*, *high school graduate* (reference), and *college graduate* (including associate, bachelor, graduate, and professional degrees).

Controls

Our multinomial logit and hierarchical linear models (HLM) (see Analytic Strategy section below) control for several measures of economic resources. We control for (log) total household *spending* (a more accurate measure of economic resources than income for retired individuals), for the employment sector of the head of household (*private sector* [reference], *government*, *self-employed*, *not currently working*), and for whether the household *owns* its home.¹ We also adjust for the *number of people* in the household and the self-reported race of the primary earner (non-Hispanic *white* [reference], non-Hispanic *Black*, *Hispanic*, *Asian*, *other*). As a proxy for healthcare access, we use a dummy variable series for the type of health insurance held by household members: *uninsured* (reference), *Medicare*, *Medicaid*, or *private insurance*. These categories are not mutually exclusive. Finally, we include a set of covariates for the geographic context of the household. We control for region of the country

¹ In the third stage of our analysis (described below), we restrict the estimation sample to only those households that are at risk of incurring the modelled expenditure. Specifically, we restrict the sample to homeowners when estimating mortgage outlays, and restrict the sample to nonowners for estimates of rent expenditures.

Table 1. Spending Variable Definitions

Spending Category	Description
Medical	Prescription drugs, medical equipment (including convalescent care and eye glasses), and medical services (e.g., physician's services, dental care, eye exams, laboratory tests, ambulance costs)
Food	
Groceries	Food prepared at home, or prepared by the household on out-of-town trips
Eating out	Meals at restaurants and carry-out orders, food on out-of-town trips, catered affairs, school lunches
Alcohol	Beer, wine, and other alcohol consumed at home, restaurants, taverns, and on trips
Housing	
Mortgage	Principal and interest on mortgage, home equity loan, or line of credit, property taxes
Rent	Rent, tenant's insurance, maintenance and repair fees
Transportation	
New vehicles	Costs for new vehicle purchase, including down payment, principal and interest paid on loans
Gas	Gasoline, diesel fuel, alternative fuels, and motor oil
Utilities	Electricity, natural gas, heating fuels, telephone, water, and sewage for owned or rented properties
Education	Tuition, books, equipment, test preparation, and tutoring for educational daycare centers and nursery schools, elementary and high school, vocational or technical school, and university

(*Northeast* [reference], *Midwest*, *South*, *West*), *community population* (>4 million [reference], 1.2–4 million, 0.33–1.2 million, 125,000–330,000, <125,000), and *urban* (as opposed to rural) residence. Descriptive statistics for all control variables are reported in [Supplementary Table 1](#).

Age Groups

Testing our expectations requires obtaining unique estimates for young, middle aged, and older households. To do so, we classify households in three age groups based on the age of household's oldest member. To approximate young households, we use households whose oldest members is aged between 25 and 44. To approximate middle aged households, we use households whose oldest members is aged between 45 and 64. To approximate older households, we use households whose oldest members is aged 65 and older. In our analyses, these age groups are used to partition our sample into age group subsamples and to estimate interactions effects in regression models, as appropriate.

Analytic Strategy

We conduct our analysis in three stages. First, we estimate finite mixture models to identify latent trajectory classes of medical spending. We use latent classes from these models to classify high medical spenders and use this classification for the next two stages. Because we anticipate differences across high medical spenders across age groups, we estimate separate latent trajectories across the three age groups described earlier. We use Stata 15 with a group-based trajectory model plugin to estimate latent trajectories ([Jones & Nagin, 2013](#)). We select best fitting trajectories using Bayesian Information Criteria (BIC) values; favored solutions for all three age groups yield four medical spending trajectories.

In the second stage, we use multinomial logistic regression to identify how household characteristics are

associated with membership in the high medical spending latent class. These models take the form

$$\Pr(TRAJ = m|x_i) = \frac{\exp(\alpha + \beta_m x_i)}{\exp(\alpha + \beta_k x_i)}$$

where *TRAJ* is a dummy variable series for the latent trajectories of medical spending estimated during Stage 1, *m* indexes the *k* – 1 possible trajectory outcomes, *k* is the reference category, α is a constant, and β_m are coefficient estimates for outcome *m*. Results from the multinomial logit models are reported as relative risk ratios comparing households' risk of membership in the stable high spending category relative to risk of membership in the stable low spending category (see Results section). This model is estimated separately for each age group subsample, and tests our first theoretical expectation: that the association between SES (measured by education) and high medical spending (measured using our latent trajectory classification) is positive for younger households but negative for older households.

Finally, in the third stage of analysis, we model the relationship between high medical spending and nonmedical spending using HLM of the form

$$\ln(\text{spending}_{ij}) = \alpha + \beta_1 TRAJ_j + \beta_2 (AGE_j \times TRAJ_j) + \sum \gamma_k x_k + \mu_j + \varepsilon_{ij}$$

where *spending* represents different categories of quarterly nonmedical spending, *AGE* is a dummy variable series representing the age of the oldest household member (25 to 44, 45 and 64, and 65 and over), *TRAJ* is defined as previously, *x* represents control variables, α is a constant, β and γ are coefficient estimates, μ_j is a random intercept at the household level, and ε_{ij} is a random error at the household-quarter level.²

² The equations are not strictly independent and could reasonably be estimated as a system using Zellner's Seemingly-Unrelated Regressions Estimator (SUR) or multivariate regression. Given limitations to the estimator, this would require annualizing all spending data rather than relying on quarterly values to remove repeated observations over time (which is currently accounted

Figure 1. Latent trajectories of (Log) medical spending.

Spending models are estimated on the sample of households that is at risk of engaging in the modeled spending category. This means that only home owning households are included in the sample on which owned housing outlays are modeled and only nonhome owning households are included in the sample on which rent expenditures are modeled.

Results

Analysis I: Latent Classes of High Medical Expenditure

Within each age group, our finite mixture models identify four latent trajectory classes of respondents. Figure 1 shows predicted medical spending over four quarters for each latent trajectory within each age group. In each case, trajectory models identify a group with stable low medical spending, a group with stable high medical spending, a group transitioning from high to low spending, and a group transitioning from low to high spending. In subsequent analyses, we use membership in the stable high spending trajectory as our indicator of high medical spending. This trajectory class identifies households with

continuously elevated levels of medical spending across an entire survey year. Using this group to identify high medical spenders minimizes issues related to short-term consumption smoothing and classification changes.

As Figure 1 shows, the finite mixture models find similar latent spending trajectory for each age group. The proportion of households in each trajectory, however, varies substantially across age categories. Whereas 33.2% of younger households fall into the high stable medical spending category, this proportion increases to 52.5% for the middle aged group, and to 55.8% for older households. This steady increase in the share of the population in the stable high medical spending trajectory across age groups is consistent with increased health needs and increased frequency of catastrophic health events across the life course. Median annual healthcare spending for the high medical spenders is \$800 (younger age group), \$1,340 (middle age group), and \$1,427 (older age group).

Analysis II: Changing Associations of Education and High Medical Spending over Age

To examine what type of household is most likely to be found in the high spender group, we use multinomial logistic models that predict trajectory membership based on households' characteristics. We estimate separate models for each age group. Figure 2 reports estimated relative risk ratios from the models and shows how the probability of being a stable high spender relative to being a stable low spender varies across categories of educational attainment—our preferred measure of SES. Households with a high school diploma are used as the reference category (i.e., have a risk ratio set to 1). Results are consistent with our

for using random-intercept models). In our specific case—namely, a situation where the equations use the exact same regressors—the SUR estimator reduces to the OLS independent equation estimates (see Cameron and Trivedi 2010, p. 162–163), yielding identical coefficients and standard errors. The same is true of the multivariate regression estimates. We therefore estimate models using HLM, which accounts for repeated observations for the same households over time.

Figure 2. Estimated relative risk ratios of high healthcare spending. Note: Risk of high healthcare spending is shown relative to risk of low medical spending (predicted values shown are based on estimates from [Supplementary Table 2](#)). Models include all controls. Separate models for each age group. High school graduates are the reference category (not shown, relative risk ratio = 1).

expectations: education is associated with a greater risk of being a high medical spender for younger households, but a smaller risk for older households. Among younger households (25–44), the relative risk ratio of high medical spending is 0.87 ($p < 0.01$) for households where the primary earner has less than a high school education, but 1.32 ($p < 0.001$) where that earner has a college degree. This association is not significant at middle ages (45–64) and reverses at older ages (65 and over), such that households with a primary earner with less than a high school education have a relative risk ratio of being high medical spenders of 1.18 ($p < 0.01$), and college graduates have a relative risk ratio of 0.88 ($p < 0.01$; relative risk ratios for all model variables are reported in [Supplementary Table 2](#)).

Analysis III: Association of Nonmedical Expenditures with High Medical Spending

To examine associations between high medical spending and spending on other goods and services, we use HLM of 10 different spending bundles. Estimates from these models are not entirely consistent with expectations, but generally suggest that associations between nonmedical spending and high medical expenditures change across age

Figure 3. Estimated marginal effects of high medical spending on household expenditures. Note: Models include all controls. Estimates shown in light gray are not statistically significant at the $p < .05$ level. (Predicted values shown are based on estimates from [Supplementary Table 3](#)).

groups in predictable ways that suggest greater negative consequences at older ages.

Figure 3 shows predicted differences in spending between stable high medical spenders and stable low medical spenders for 10 categories of goods and services, by age group, and controlling for relevant household characteristics. We expected health investors, who should also engage in investment spending behaviors on education and housing, to make up the majority of the youngest households (25–44) engaged in high medical spending. For this group—and consistent with expectations—high medical expenditures are not associated with lower spending on any of the modeled spending categories. Models suggest that youngest households who own their home spend similar amounts on mortgage outlays as their same-age low medical-spending counterparts; youngest renting households spend more on rent relative to their same-age low medical-spending counterparts; and the youngest households spend similar amounts on education. Younger high medical spenders also have higher spending on alcohol and new vehicle outlays, arguably forms of nonessential spending indicative of disposable income. These households also spend more on several essential categories of goods and services, including groceries, fuel, and utilities. Models suggest that high medical spenders in the youngest age group spend as much on

eating out as nonmedical spender, which is not fully consistent with expectations.

For middle-age high healthcare spending households (45–64)—who we assume to be a more balanced mix of investors and medical consumers—we did not expect a consistent pattern of associations between high medical spending and other spending types. Results conform to this expectation, and reveal no clear pattern of association. We find that high medical spenders tend to spend less than low medical spenders on groceries and rent (consistent with a shifting of resources away from both essential and nonessential goods and services to support medical spending), but also tend to have higher educational spending, higher outlays on new vehicles, spend more on eating out, and spend more on alcohol (consistent with higher disposable income used for nonessentials and towards investment strategy supporting future household well-being). Like younger households, middle-aged high medical spenders also spend more on several essential categories like utilities and fuel.

For the oldest age-group (65 and older), [Figure 3](#) shows that high medical spenders spend less than low medical spenders on housing (both owned and rented), on education, and on new vehicle purchases. Amounts spent on groceries and alcohol are similar. Restricted spending in these three areas is consistent with high medical spending representing a response to medical need at the household level. Overall, these results are consistent with our expectations, and show that high medical spending for older households is generally associated with restrictions in certain nonmedical expenditures. More unexpectedly, spending on eating out and on two essential spending categories (gas and utilities) is higher for older medical spenders compared to older medical nonspenders. Overall, results from these analyses provide moderate evidence that high medical spending has an increasingly negative impact on household's ability to acquire other key goods and services across the life course. For younger households, high medical spending is associated with either stable or increased levels of spending on other goods and services. In contrast, models show that for older households, higher medical spending is associated with lower spending levels for at least two of the five investigated spending categories. If we assume that the population mix of investment spenders and medical consumers shifts across the life course towards increasing proportions of medical consumers, these spending patterns are consistent with our expectation of diametrically opposed consequences of high medical spending across types of medical spenders. Spending patterns for transportation and utilities, however, did not conform to these expectations.

Discussion

Households in the United States have high levels of medical expenditures compared with other OECD countries. Understanding how medical spending affects households'

ability to acquire other goods and services is a key element for understanding health disparities' broader impact on material inequality in the United States. The consequences of health spending on households' well-being are unclear, however, because prominent theories of health suggest that high medical spending can result from different and seemingly incompatible processes. In this study, we apply insights from life course research to reconcile apparently contradictory expectations from fundamental cause and cumulative disadvantage theories on the causes of high medical spending.

High medical spending can represent either a form of *health investment*, where higher status individuals spend more on medical care to maintain their health over time, or *medical consumption*, where individuals with lower relative social position spend more for medical care due to health need. Drawing on principles from the life course perspective, we reconcile these expectations by positing a population mixture of health investors and medical consumers. This mixture changes as the population ages, skewing toward medical consumers at older ages. As such, we assume that high medical spending is driven primarily by health investors at younger ages, and by medical consumers at older ages. With this approach, we present analyses that examine how the determinants and consequences of high medical spending vary across types of spenders.

First, we find that correlations between SES and medical spending indicate that high medical spending is associated with social advantage among younger households, but with social disadvantage among older households. Associations between education (as a measure of SES) and medical spending show that net of other household characteristics, college educated households are most likely to be high medical spenders when they are young (*age 25–44*), but least likely when they are old (*65 and older*). The opposite holds for households with less than a high school diploma. This supports the assumption that the relative mixture of investment spenders and medical consumers changes markedly across the life course.

Second, we find that high medical spending is associated with lower levels of spending on owned and rented housing, education, and new vehicles at older ages, but not at younger ages. In contrast, we find that younger households with high medical expenditures spend similar or greater amounts on *all* examined expenses relative to their same-age, low-medical spending counterparts. Lower spending levels at older ages (*65 and up*) for high medical spenders is consistent with cross-domain accumulating disadvantage ([Ferraro & Shippee, 2009](#)). Older households' spending on medical care, in other words, appears to be financed through reduced investment in family members' mobility and reduced consumption of some essential goods and services. Younger households do not experience these constraints; higher medical expenditure for these households is not associated with restricted spending in any of the categories of our model.

Despite these advances, this study leaves several important questions unaddressed due to data limitations. First, our data do not directly measure health events, and we are therefore unable to use changes in health status to help distinguish between health investors and medical consumers. Longitudinal measures of health status and medical care usage, in combination with measures of household expenses such as those we use in the present study, could provide a more direct test of our hypotheses. Additionally, measures of net worth, lifetime earnings, and longer-term spending and budget behavior would provide additional clarity on how the relationships observed in the current study unfold over longer periods of time to contribute to widening inequalities as individuals age. For example, while joint replacements may represent an investment in future health among younger adults, relatively disadvantaged groups may have less access to medical expenditures for joint replacement procedures until later in life when motives for health expenditure may outweigh other material concerns. Joint replacement among some older adults is the result of a fall and broken hip. For others, it is the result of an elective procedure aimed at allowing them to continue to derive pleasure from participating in recreational sports. Both of these groups were considered medical consumers for the purpose of our analyses. However, the adverse budgetary consequences of medical consumption may be more marked among relatively disadvantaged households who have access to fewer resources and engage in medical spending for survival. Our analyses grouped together households engaging in medical expenditure because of a *consumption* motive with those who engage in expenditure because of a *survival* motive. Future research should continue to build on the insights of recent research to disentangle the composition of this complex group (Halliday et al., 2017).

Future studies should also investigate how life course patterns of healthcare spending relate to the intergenerational reproduction of inequality. For example, we observe the strongest association between high healthcare spending and education spending among households age 45–64. Future research might explore whether this higher education spending represents processes conferring material advantages on other household members directly (e.g., education spending on college students) or, alternately, is characterized by processes less directly beneficial to other household members (i.e., student loan payments).

These findings have significant implications for future research on medical expenditures. First, we find that the association between social advantage and high medical expenditure is conditional on age. As such, studies on the impact and effect of high medical spending should account for age in an interactive (rather than additive) way, and may otherwise find null or reduced associations where real effects exist. Second, medical expenditure considered on its own does not stand as an unambiguous marker of disadvantage. Under some circumstances, high medical expenditure may represent household advantage. The focus of the

present study was on understanding the households that were consistently high medical spenders among their age group across four quarters. Future research should assess the implications of our findings by investigating the causal effects of high medical spending on nonmedical spending over longer periods. Future researchers should also investigate the extent to which the factors we identified also correspond with the patterning of shorter-term high medical spending behaviors across age groups. Third, consistent with the life course principle of linked lives, we demonstrate that household expenditure data provide a fruitful empirical basis to study both cross-domain accumulating disadvantage and the impact of poor health on entire households.

Supplementary Material

Supplementary data are available at The Gerontologist online.

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Authors' Contributions

C. W. Mueller planned the study, wrote the paper, and made revisions, with the assistance of R. Charron-Chénier, B. J. Bartlett, and T. H. Brown. R. Charron-Chénier performed statistical analyses, prepared tables, and produced figures.

Conflict of Interest

The authors declare no conflicts of interest.

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