Title: How Do Informed Consumers Consume Healthcare? Evidence From Medicare
Priority Area: Behavior Change in Health

I. Background

A unique feature of healthcare markets is that patients are less uninformed about the value of services than the providers who recommend it. This asymmetric information is thought to contribute to many inefficiencies, including overuse and underuse of specific services and poor choices of health plans and providers. We build a unique dataset to test this hypothesis by evaluating the healthcare used by elderly Medicare patients who were former medical professionals (doctors and nurses) compared to socioeconomically matched controls (lawyers). Because medical professionals are more informed, these results inform the degree to which patient knowledge drives various inefficiencies in medical care and the degree to which patient education efforts are likely to modify behavior.

This approach has been validated in prior work, but in narrower settings. For example, Bronnenberg et al. (2015) show that pharmacists are less likely to use branded over the counter medications, suggesting that brand premia do not reflect quality premia. Johnson and Rehavi (2016) find physician-mothers have lower rates of c-section in Texas and California, implying physician-induced demand for c-sections. Swedish evidence suggests physicians and their close relatives are less likely to be adherent to medications but having physicians in the family improves other health investments (Finkelstein et al., 2021; Chen et al., 2021). Finally, research in the Military Health System has found limited differences between physicians and others in high- and low-value care use (Frakes et al., 2021).

Relative to prior work, our study will be the most comprehensive assessment to date of the role of patient expertise, or lack thereof, in healthcare decision making in the US. First, by focusing on Medicare patients, we will have access to a broader sample than in prior work. Second, we will be able to focus on services relevant to the elderly, including end-of-life care and chemotherapy. Third, we will be able to study how informed consumers shop differently for providers and health plans. Finally, our setting is more generalizable to U.S. healthcare markets at large in terms of provider payment and organization and variation by geography.

II. Methods

We have already linked Medicare Fee-for-Service Claims (1999-2017) to data on patient occupations for physicians, nurses, lawyers, and their spouses. We first collected directories for physicians (CMS UPIN directory), nurses (19 State Nursing Boards), and lawyers (Martindale-Hubbell[1]). We then linked occupational directories to data from Infutor, a firm which creates a historical directory of 200M+ individuals in the U.S. over the last 30 years, compiled from sources including phone books, voter files, and property deeds. Infutor provides the following key fields: Social Security Number (SSN), name, birth month and year, and addresses, which have been used in prior studies (Bernstein et al., 2019; Diamond et al., 2019). We also identified likely spouses via shared addresses and last names, opposite gender, and age. We then provided CMS the SSNs in Infutor and CMS returned the beneficiary IDs associated with each SSN. This identified 374,037 individuals in physician households (physicians and their spouses), 476,065 individuals in lawyer households, and 1,174,049 individuals in nurse households in Medicare. The sample varies by year; for illustration, sample characteristics from 2017 are presented in Table 1.

[1] Martindale-Hubbell offers the single most comprehensive legal directory nationally. Our comparisons to public reports and select state bar association directories suggest 80-90% coverage of lawyers born between 1910-1955.

Table 1. Sample characteristics (2017)

	Household type			All Medicare
	Nurse	Lawyer	Physician	Beneficiaries
Age (Mean)	71.0	73.0	72.5	70.4
Male	44.2%	51.8%	52.7%	45.7%
White	88.0%	91.4%	80.2%	79.5%
Urban	79.3%	90.4%	89.9%	80.4%
Zip Code Avg. Income (Mean)	88,466	123,458	121,589	86,562
Mortality	2.9%	2.5%	2.3%	3.7%
Sample (N)	**882,886**	**368,840**	**300,609**	**61,405,844**

Note: Zip code average income derived from ACS 2019 5-year estimates; sample is the count of individuals.

We will compare healthcare decision-making across households because spouses likely share resources and medical knowledge (Chen et al., 2021). In preliminary work, we find similar utilization patterns within households, validating this approach. Our primary comparison will be between physician and lawyer households, which are comparable in SES. We find these groups have similar rates of key health events (e.g., strokes) after adjusting for comorbidities, suggesting limited omitted variable bias. Secondarily, nurses may provide insight on intermediate levels of healthcare expertise and are more comparable in SES to the general public, as seen in Table 1.

Outcomes will include use of key services (e.g., emergency visits, hospital care, chemotherapy), high value (e.g., drug adherence, palliative care), low value (e.g., unnecessary diagnostics, opioid use) care, provider choice (e.g., hospital quality, specialist use, travel time), and MA and Part D plan choice. We will also investigate heterogeneity across provider groups and payment policies. This will reveal whether patients' lack of expertise has different impacts depending on provider incentives. Finally, we will test whether geographic variations in use also exist for former medical professionals. This will inform whether these variations are related to different physician beliefs as suggested in prior work (Cutler et al., 2019).

To illustrate our approach, we have compared the number of emergency department (ED) visits across groups (Table 2). We find physician households use ~15% fewer ED visits than lawyer households, and nurse households use ~6% fewer ED visits than the general population.[2] This may be because medical expertise improves patients' ability to avoid inappropriate visits. We will test this theory by testing whether differences are smaller for the most appropriate uses.

Table 2. Models predicting emergency department visit use each year

	Probability of an ED visit		Number of ED visits	
	Coefficient	Std. Error	Coefficient	Std. Error
Nurse Households	-0.00918***	(0.000208)	-0.0584***	(0.00161)
Physician Households	-0.0258***	(0.000293)	-0.209***	(0.00223)
Lawyer Households	-0.00431***	(0.000282)	-0.0510***	(0.00287)
Mean across sample	.291		.756	
Model	Ordinary Least Squares		Negative Binomial	

*$p < .05$
** $p < .01$
*** $p < .001$

Standard error clustered at beneficiary level.

Note: Model estimated on beneficiary-years meeting enrollment criteria. Controls include age, race, sex, Part D, dual, disability, market, urban, zip avg. income, year, and comorbidities. Omitted category includes all other beneficiaries.

III. Planned Use for Pilot Funding

So far, we have used $74,000 from Harvard University to procure the data, which is housed at the NBER. NBER pilot funding would support research assistance costs to complete additional analysis for an R01 proposal.

[2] Percentages derived from the negative binomial coefficients (Table 2). The coefficient β reflects a (1-e^{β}) percent change in the outcome associated with a 1 unit increase in the covariate. The difference in ED visits between nurses and the general public is (1-$e^{-0.0584}$) = -6% and between physicians and lawyers is ($e^{-0.209}/e^{-0.051}$)- 1= -15%

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