Linked lives and health: registry-based study of how parents' health shocks change healthcare use of adult children*

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ABSTRACT

Past literature has shown that a health shock in one member of a married couple is likely to lead to changes in the lifestyle and health of the other. Based on the linked lives theoretical perspective, we anticipate that such changes may extend further beyond the dyad: to children. We advance the literature by leveraging the unique registry-linked survey data REGLINK-SHAREDK collected in Denmark that includes administrative data on healthcare use of adult children. We ask the following questions. Is a parental health shock associated with changes in non-urgent health care use among their adult children? Do the changes in healthcare use of adult children following a parent's health shock vary by the shock's severity? Is the association between parental health shock and adult child's health shock modified by geographic and/or emotional closeness? We outline the planned analytic steps we intend to complete before the EPC 2020 meeting.

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INTRODUCTION

A health shock changes our behavior in multiple domains. We are likely to become more mindful of our health behaviors (Keenan 2009), alter our retirement plans (McGeary 2009), and generally become more averse to risk taking (Decker and Schmitz 2016). But a health shock usually does not affect an individual alone. As the linked lives theoretical framework posits, our lives are reflected in the lives of our nearest others (Elder Jr 1995, Settersten 2005). The consequences of one member's health shock will reverberate through the fibers of a family network.

The emerging literature on family health shocks has primarily focused on the relationship between spousal health changes and behaviors. It has established that married heterosexual couples are responsive to each other's health shocks and may change their intentions or behaviors based on witnessing their partner struggle with health. For example, work by Margolis has shown that both men and women have increased odds of smoking cessation when they develop a new chronic condition, but women are also likely to change their smoking behavior when their partner falls ill (2013). Related work by McGeary shows that women become more likely to retire when their partner experiences a new health shock (2009). There is also evidence that spousal health is concordant—when one experiences a severe deterioration, the other is likely to report worsened mental and physical health as well (Valle et al. 2013).

Scholars have proposed several mechanisms that may account for the health and behavioral changes that follow a relative's health shock. A sudden health change in a family member is likely to increase the vigilance about one's own health. This may be because we have practiced similar health behaviors as this person (Margolis and Wright 2016, Margolis 2013) or because they are our blood relatives—we anticipate similar genetic risks (Diefenbach, Miller and Daly 1999). It could also be that our perception of risks changes not only in relation to our own state of health but also to that of others (Kokot 2017). Moreover, a health shock in a relative could have the very practical implications of a larger anticipated financial burden due to future health care needs (Fadlon and Nielsen 2015). We may become more motivated to preserve our health to be able to provide care in the long run and to keep working in order to accumulate financial resources that will make quality long-term care possible. Finally, a health shock in a relative is a stressful life event. In some cases, it may paradoxically lead to worsened health behaviors and health outcomes for those close to the afflicted (Lewis et al. 1989, Margolis 2013). Considerable room remains for testing these mechanisms, which are likely to be modified by other characteristics of the relevant family ties, such as emotional closeness and geographic proximity.

A major omission in this literature has been its lack of attention to multigenerational family ties, especially those between aging parents and adult children. As the normal and expected duration of the human life span has extended over the course of twentieth century, we have increasingly become members of intergenerational families and sometimes even households (Bengtson 2001). Older adults often assume active roles in childcare, assist in times of need, and may be important sources of social support for the wider family network (de Jong Gierveld 2009). We observe our parents over unprecedentedly long periods of aging and bear witness to their more-or-less-precipitous health declines. Because older adults are well integrated into modern families, the theoretical framework of linked lives leads us to anticipate that their health shocks will affect our health and wellbeing too. Similar to a spousal health shock, a parent's health change may provide motivation to change one's own lifestyle, become more conscious about regular healthcare use, and grow in awareness of the financial and emotional burden that can be associated with care provision. In this study, we advance the current literature in the linked lives framework and evaluate the relationship between parents' health shocks and their adult children's health care use.

We will use the Survey of Health, Aging, and Retirement in Europe (SHARE) with linked Danish national health register data (REGLINK-SHAREDK). This unique data source is exceptionally well suited to the examination of changes in healthcare use following a parent's health shock because it includes data on all health services accessed by Danish citizens, which we have been able to link into family networks. As our analysis proceeds, we intend to ask the following research questions. Is a parental health shock associated with changes in non-urgent health care use among their adult children? Do the changes in healthcare use of adult children following a parent's health shock vary by the shock's severity? Is the association between parental health shock and the adult child's health shock modified by geographic and/or emotional closeness? We have recently acquired the data needed for the outlined analysis and begun preliminary work. We therefore outline our intended plan of analysis but are unable to supply results at this stage. We are confident the analytic work will be complete by the time of the PAA 2020 meeting.

DATA AND MEASURES

Data

SHARE is an ongoing panel survey of European adults aged 50+ and their coresidential spouses that began in 2004 (Börsch-Supan, Hank and Jürges 2005). The study includes representative samples of adults from eleven European countries, including Denmark. Currently, it consists of seven waves: 2004 (W1), 2006/07 (W2), 2008/09

(W3), 2011 (W4), 2013 (W5), 2015 (W6), and 2018 (W7). Designed to provide a comprehensive, cross-national assessment of aging European adults' well-being and retirement activities, the survey includes extensive questions about respondents' current health, health histories, health care use, and other health behaviors. The REGLINK-SHAREDK project was undertaken by a consortium of Danish universities and institutions to link the Danish SHARE survey data to national register data. Through Statistics Denmark, Denmark maintains registers that provide extensive demographic information about the total population of Danish residents, including primary healthcare and hospital care registries. Denmark has had a universal, nationalized health care system since 1973, and access to hospitals and medical doctors is free for all residents (Olejaz et al. 2012, Vallgårda, Krasnik and Vrangbæk 2001). Although there are some socioeconomic inequalities, utilization of health care resources is high across the Danish population(Olejaz et al. 2012).

Register-recorded doctor's visits of an adult child

We investigate the change of the adult child register-recorded doctor visits in response to a parent's new chronic condition or disease. Register-recorded doctor visits come from the National Health Service register (NHS), which documents all health services provided by private general practitioners and specialists in Denmark (Olejaz et al. 2012). We limited doctor visits to those types that are fully covered by the national health care system, are not indicative of long-term therapeutic or non-medical visits, and that are likely to be included in respondents' answers to the self-reported medical doctor visits question just described. Thus, we included general practitioner visits, laboratory visits, and specialist visits, but not dentist, physiotherapist, chiropractor, optician, podiatrist, or psychologist visits. The number of visits was counted before and after the interview.

Parental diagnoses of new chronic conditions or diseases

We consider 10 different parental conditions or diseases: a) heart attack, b) cancer, c) stomach or duodenal ulcer, peptic ulcer, d) Parkinson disease, e) cataracts, f) high blood pressure or hypertension, g) high blood cholesterol, h) stroke, i) diabetes or high blood sugar, and j) chronic lung disease. These variables are used to construct a binary variable, which informs us if any new conditions or diseases appeared in a considered wave compared to previous one. Three comparisons are made between two consecutive waves: W1 vs. W2, W4 vs. W5, and W5 vs. W6. We omitted W3 as there is no information about chronic conditions or diseases. At the time of writing this abstract, the W7 was not linked with REGLINK-SHAREDK.

CONTROL VARIABLES

We include covariates for several other characteristics that are associated with individuals' use of physicians. Age, income, employment status, and civil status are based on register information. Information about respondents' age in years and gender come from the Danish Civil Registration System (Pedersen 2011). We use information about education level as was self-reported on the SHARE survey in 2006. Based on the International Standard Classification of Education (ISCED), we created three categories for education: low (ISCED levels 0-2; up to lower secondary education), middle (ISCED level 3; secondary education), and high (ISCED levels 4-5; post-secondary education). Disposable personal income data for 2004 and 2006 come from the Income Statistics Register (Baadsgaard and Quitzau 2011). This measure estimates income after taxes and interest expenses and was coded according to the tertiles of individuals' mean income over the three years leading up to the considered interview. The 3-year average was considered to avoid income reduction due to temporary unemployment or retirement. *Civil status* in 2004 and 2006 also comes from the DCRS. Employment status comes from the Integrated Database for Labour Market Research (Petersson, Baadsgaard and Thygesen 2011). Geographic closeness between parents and adult children is calculated based on registry address data. We use self-reported data reported by parents on how close they feel to their adult children to measure emotional closeness.

ANALYTIC STRATEGY

We plan to regress children's registered doctor visits per month in the year before and after the considered survey on a new parental disease variable and other covariates using a Generalized Linear Mixed (GLM) model, assuming a Poisson distribution. The basic model includes a dummy variable for time (before or after the parent's survey), variable coding presence or absence of the new disease in a parent, and a term interacting these two measures. The log of individual exposures will be set as an offset. This model will show whether there are differences in the rates of individuals' monthly registered doctor visits (1) in the year before and after the interview preceding the interview when the parental health deteriorated, (2) in the whole sample in the presence of new conditions and disease, as well as (3) whether the before and after rate differs by presence of the new parental disease. The basic model will then be extended by control variables.

PRELIMINARY DESCRIPTIVE TABLES

We show the descriptive characteristics of our sample, stratified into waves, in Tables 1 to 3. Across waves, we find that adult children whose parents did not develop any new conditions were on average younger, less often divorced or separated, and more often single. In Table 2, which refers to W4 to W5, we find that adult children who had high education were less likely to have a parent who developed a new condition. In contrast, adult children with low education were more likely. The patterns displayed in Table 3 were similar. In addition, in this wave, we find that parents who did not have any condition reported at baseline were more likely to develop a new one between waves.

[TABLES 1-3 ABOUT HERE]

HYPOTHESIS AND EXPECTED FINDINGS

Hypothesis 1)
Parental health shock is associated with increased healthcare use by the adult child.

Hypothesis 1a)
More severe health shocks are associated with larger increases in healthcare use by the adult child.

Hypothesis 1b)
First new health diagnoses are associated with larger increases in healthcare use by the adult child than subsequent diagnoses.

Hypothesis 2)
The effect of a parental health shock on an adult child's healthcare use will be stronger when the child is more emotionally connected to the parent.

Hypothesis 3)
The effect of a parental health shock on an adult child's healthcare use will be stronger when the child is more geographically proximate to the parent.

CONCLUSION

Building on the linked lives theoretical framework, this paper will use a unique registry-linked survey dataset to extend our understanding of how the health shocks of a parent influence the health care use of their children. The results of this study will contribute to the theoretical advancement of the literature on the life course, social demography, and medical sociology. Furthermore, it will be a useful contribution to the policy literature on individual fluctuations in health care use over the life course, as it will advance us toward understanding whether and how a shock in the health of a close family member predicts changes in health care use of other, seemingly unaffected individuals.

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Table 1. **W1 and W2 adult child characteristics.**		**Total**	**Parent has new condition**	**Parent no new condition**	
Sample size		1320	438	882	
Adult child characteristics at baseline					
Age (years)	Mean	35.44	36.97	34.68	*
	SD	8.34	7.99	8.42	
Female (%)		47.42	45.21	48.53	
Education (%)	High	28.48	26.94	29.25	
	Medium	50.23	49.32	50.68	
	Low	21.29	23.74	20.07	
Employed (%)		83.03	80.59	84.24	
Mean disposable personal income (%)	High	28.94	25.57	30.61	
	Medium	36.82	37.44	36.51	
	Low	34.24	36.99	32.88	
Civil status (%)	Divorced or Separated	6.14	8.45	4.99	*
	Partnered	42.8	44.52	41.95	
	Single	50.68	46.35	52.83	*
	Widowed	0.38	0.68	0.23	
Foreign-born (%)		0.76	0.46	0.91	
Parents no conditions (%)		43.64	40.64	45.12	*
Adult child physician visits					
Visits 12 months before W1 (visits per month)	Mean	0.32	0.32	0.31	
	SD	0.29	0.29	0.29	
Visits 12 months after W1 (visits per month)	Mean	0.33	0.34	0.33	
	SD	0.31	0.31	0.31	
Visits 24 months before W1 (visits per month)	Mean	0.31	0.31	0.31	
	SD	0.26	0.26	0.26	
Visits 24 months after W1 (visits per month)	Mean	0.33	0.34	0.33	
	SD	0.28	0.28	0.28	
Visits 36 months before W1 (visits per month)	Mean	0.31	0.31	0.31	
	SD	0.25	0.25	0.25	
Visits 36 months after W1 (visits per month)	Mean	0.33	0.34	0.33	
	SD	0.27	0.27	0.27	
No visits during 12 months before W1 (%)		15.68	15.3	15.87	
No visits during 12 months after W1 (%)		16.14	17.12	15.65	
No visits during 24 months before W1 (%)		6.29	6.62	6.12	
No visits during 24 months after W1 (%)		6.67	5.94	7.03	
No visits during 36 months before W1 (%)		3.79	3.2	4.08	

No visits during 36 months after W1 (%)		4.02	3.88	4.08

Table 2. W4 and W5 adult child characteristics.		**Total**	**Has new condition**	**No new condition**	
Sample size		2183	655	1528	
Adult child characteristics at baseline					
Age (years)	Mean	36.56	39.88	35.14	*
	SD	10.22	9.76	10.08	
Female (%)		48.97	50.69	48.23	
Education (%)	High	35.46	39.24	33.84	*
	Medium	45.17	41.07	46.92	*
	Low	19.38	19.69	19.24	
Employed (%)		82.55	84.43	81.74	
Mean disposable personal income (%)	High	32.16	36.34	30.37	*
	Medium	38.02	38.63	37.76	
	Low	29.82	25.04	31.87	*
Civil status (%)	Divorced or Separated	6.83	10.53	5.24	*
	Partnered	43.47	49.92	40.71	*
	Single	49.24	39.24	53.53	*
	Widowed	0.46	0.31	0.52	
Foreign-born (%)		1.15	0.92	1.24	
Parents no conditions (%)		45.99	36.18	50.2	
Adult child physician visits					
Visits 12 months before W1 (visits per month)	Mean	0.35	0.36	0.34	
	SD	0.3	0.28	0.31	
Visits 12 months after W1 (visits per month)	Mean	0.36	0.36	0.35	
	SD	0.32	0.3	0.32	
Visits 24 months before W1 (visits per month)	Mean	0.35	0.36	0.34	
	SD	0.28	0.26	0.28	
Visits 24 months after W1 (visits per month)	Mean	0.35	0.36	0.35	
	SD	0.28	0.28	0.29	
Visits 36 months before W1 (visits per month)	Mean	0.34	0.35	0.34	
	SD	0.26	0.24	0.27	
Visits 36 months after W1 (visits per month)	Mean	0.35	0.36	0.35	
	SD	0.27	0.26	0.27	
No visits during 12 months before W1 (%)		12.73	11.3	13.35	
No visits during 12 months after W1 (%)		13.7	12.06	14.4	
No visits during 24 months before W1 (%)		5.04	4.58	5.24	
No visits during 24 months after W1 (%)		5.73	4.27	6.35	
No visits during 36 months before W1 (%)		3.21	2.75	3.4	

No visits during 36 months after W1 (%)		3.16	2.44	3.47	

Table 3. **W5 and W6 adult child characteristics.**		**Total**	**Has new condition**	**No new condition**	
Sample size		3968	1193	2775	
Adult child characteristics at baseline					
Age (years)	Mean	37.16	40.41	35.77	*
	SD	10.47	9.95	10.38	
Female (%)		49.62	48.2	50.23	
Education (%)	High	37.02	36.46	37.26	
	Medium	45.06	46.02	44.65	
	Low	17.92	17.52	18.09	
Employed (%)		80.39	82.9	79.32	*
Mean disposable personal income (%)	High	31.35	34.79	29.87	*
	Medium	37.07	36.13	37.48	
	Low	31.58	29.09	32.65	*
Civil status (%)	Divorced or Separated	7.03	9.22	6.09	*
	Partnered	43.27	50.88	40	*
	Single	49.42	39.65	53.62	*
	Widowed	0.28	0.25	0.29	
Foreign-born (%)		1.81	2.26	1.62	
No parental conditions at baseline (%)	Mean	42.99	32.69	47.42	*
Adult child physician visits					
Visits 12 months before W5 (visits per month)	SD	0.35	0.36	0.34	
	Mean	0.31	0.32	0.31	
Visits 12 months after W5 (visits per month)	SD	0.34	0.35	0.34	
	Mean	0.31	0.32	0.3	
Visits 24 months before W5 (visits per month)	SD	0.35	0.36	0.34	
	Mean	0.28	0.29	0.28	
Visits 24 months after W5 (visits per month)	SD	0.35	0.36	0.34	
	Mean	0.27	0.28	0.27	
Visits 36 months before W5 (visits per month)	SD	0.35	0.36	0.34	
		0.27	0.28	0.26	
Visits 36 months after W5 (visits per month)	Mean	0.35	0.36	0.34	
	SD	0.27	0.28	0.26	
No visits during 12 months before W5 (%)		14.97	15.34	14.81	
No visits during 12 months after W5 (%)		15.15	14.25	15.53	
No visits during 24 months before W5 (%)		5.92	6.37	5.73	
No visits during 24 months after W5 (%)		6.28	5.53	6.59	
No visits during 36 months before W5 (%)		3.33	4.11	2.99	
No visits during 36 months after W5 (%)		4.94	4.78	5.01	