The Power of Daughters: How Physicians' Family Influences Female Patients' Health*

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Abstract

Can physicians' personal lives shape their clinical practice and performance? Using Danish administrative data and the quasi-random assignment of child gender, we find that female patients of male primary care physicians with more daughters experience significantly lower breast and gynecologic cancer mortality, driven by earlier detection and greater preventive effort. Exploring mechanisms, we find that these male physicians collaborate more with women and adhere more closely to women's health guidelines. Complementary survey data further shed light on channels such as trust, empathy, and communication. The results underscore how social experiences influence physician decision-making and high-stakes patient outcomes.

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1 Introduction

Physicians are a critical input to patient outcomes, yet much remains to be understood about what drives their behavior and decision-making. This gap is particularly concerning given persistent gender disparities in healthcare: compared to men, women are more likely to have their symptoms dismissed, receive less intensive treatment for similar conditions, and experience delayed diagnoses for diseases such as cancer (Hoffmann and Tarzian, 2001, Hernandez et al., 2007, Pietropaoli et al., 2010, Din et al., 2015, Westergaard et al., 2019, World Economic Forum, 2024). These disparities are often more pronounced when female patients are treated by male physicians (Cabral and Dillender, 2021, Champagne-Langabeer and Hedges, 2021). What shapes these disparities and the quality of care women receive, however, remains little understood.

This paper examines whether social experiences from physicians' personal lives affect their clinical practice and the health outcomes of their female patients. As professionals, physicians form judgments and habits through both formal training and life outside work. Experiences beyond the clinic—especially those that deepen their understanding of women's lives—may shape how they perceive symptoms, empathize with patients, and make clinical decisions. Such experiences, however, are difficult to study, because most aspects of physicians' private lives are unobserved, and one also needs plausibly exogenous variation in such experiences to establish causality.

In this paper, we assemble a unique dataset and provide novel evidence on one such personal dimension. Motivated by sociological work showing that fathering daughters makes men more likely to think and behave in a feminist manner (Warner, 1991, Warner and Steel, 1999), we study whether raising daughters, rather than sons, affects how male physicians care for female patients and the health outcomes of those patients. Past work on daughters' effects on fathers has largely centered on non-medical settings such as politics and business (Washington, 2008, Oswald and Powdthavee, 2010, Glynn and Sen, 2015, Cronqvist and Yu, 2017, Ronchi and Smith, 2024), focusing on fathers' behavioral responses rather than downstream impacts on final productivity, proxied in our study by women's outcomes. We focus on high-stakes health outcomes, particularly female cancer

mortality, a leading cause of death among women globally.[1] In addition, we examine intermediate outcomes related to women's healthcare delivery, including HPV vaccinations, contraceptive pill prescriptions, and preventive cancer screenings.[2] To our knowledge, this paper is the first to study how physicians' personal lives—particularly within their own households—shape their medical practice and women's health, highlighting how social experiences influence physician decision-making and high-stakes patient outcomes.

Studying the effects of daughters on their physician fathers requires extensive data linking both physician family and patient characteristics. We address this challenge using high-quality Danish administrative data, which cover the entire Danish population and provide detailed records of individual health and socioeconomic characteristics. Importantly, we are able to identify each individual's primary care physician (henceforth physician, also known as a family doctor or general practitioner) as well as the physician's family background, including the number and gender of the physician's children.[3] In addition, we use rich data, including those from a unique patient survey, to explore potential mechanisms.

Our empirical strategy builds on prior work and exploits the natural experiment of a child's gender to identify the effects of parenting daughters versus sons. Following Washington (2008), we regress patient health outcomes on the physician's number of daughters, while controlling for the physician's total number of children. The identifying assumption is that, conditional on total children, the number of daughters is essentially random. To support this assumption, we conduct balance tests and show that, conditional on the number of children, the number of daughters that a physician has is uncorrelated with a rich set of physician and patient socioeconomic characteristics. In addition, consistent with the idea that patients do not typically observe the gender composition of physicians'

[1] In 2022 alone, an estimated 670,000 women worldwide died from breast cancer, with 2.3 million new cases diagnosed, while about 680,000 women died from gynecologic cancers, with 1.47 million new cases (Bray et al., 2024).

[2] UK Department of Health and Social Care (2021) mentions several of these conditions and procedures among topics that women find difficult to discuss with their physicians and that should be included in a national strategy for Women's Health.

[3] We focus on physicians working as sole practitioners instead of those in group practices because the patient data allow us to identify each person's primary care *clinic* only. This means we could only identify each person's physician in sole-physician clinics, which are the most common type of clinic in Denmark.

children, we find no evidence of patient selection into or out of clinics based on the physician's number of daughters. Furthermore, we also test for and rule out the possibility that physicians engage in fertility stopping behavior based on child gender.

Our baseline analysis shows that while the number of daughters a male physician has does not significantly affect overall female mortality, it does matter for mortality from female-specific health conditions. Specifically, female patients under the care of male physicians with one additional daughter (compared to one additional son) experience 2.4% lower cancer mortality. This effect is driven by a 5.5% reduction in deaths from female-specific cancers, including a 4.8% decrease in breast cancer mortality and a 6.5% decrease in gynecologic cancer mortality, and is more pronounced among older women.[4] This relationship is robust across a range of specifications, including alternative measures of daughters, logit regressions, and analyses conducted at both the patient and clinic levels. In contrast, we find no comparable effects among female physicians or on male patient mortality, consistent with the view that daughters uniquely influence their physician fathers in matters of female health.

Exploring what might explain the baseline findings on reduced cancer mortality, we find that female patients cared for by male physicians with more daughters tend to be diagnosed earlier, before the cancer has progressed. In particular, these patients are more likely to receive mammography below age 50, prior to being covered under the universal national breast cancer screening program. They are also more likely to receive additional tests that may have led to earlier detection of cervical cancer or pre-cancerous cell changes. These findings suggest that male physicians with more daughters go the extra mile in testing for and preventing female cancers, contributing to earlier detection, reduced cancer progression, and ultimately fewer deaths.

A more challenging question is *how* daughters affect their physician fathers. Empirical evidence on the mechanisms behind daughters' influence on fathers remains scarce. Past

[4]To put these numbers into perspective, in 2016, 1,805 women aged 40 and above died from female-specific cancers in Denmark. A 5.5% reduction would mean approximately 100 fewer such deaths per year. In a meta-analysis of 11 randomized control trials across the UK, Sweden, Canada, and the US, Marmot et al. (2012) finds that women invited to regular breast cancer screenings on average experience a 20% relative risk reduction in breast cancer mortality. The 4.8% reduction in breast cancer mortality found in our study suggests that the effect of having a physician with one additional daughter amounts to about one-quarter of the effect of regular breast cancer screenings.

studies in economics and sociology argue that parenting daughters increases fathers' feminist sympathies (Warner and Steel, 1999, Washington, 2008, Borrell-Porta et al., 2019). In our context, this could translate into greater empathy and more positive attitudes toward women, ultimately improving the care male physicians provide to female patients. Alternatively, physicians may learn from their daughters and thus become more informed and knowledgeable about female-specific health issues. They may also develop stronger communication skills with women.[5] While disentangling these channels is inherently difficult, we present several pieces of evidence to explore the potential mechanisms.

First, we examine whether the effects of having daughters depend on the daughters' age. If physician learning or accumulated knowledge were the primary mechanism, we would expect to see stronger effects among physicians with older daughters, who have had more prolonged exposure to female-specific health concerns or experiences. However, we find no evidence that the effects vary with daughters' age, suggesting that learning or knowledge transfer is unlikely to be the primary channel at play.

Next, while our baseline analysis focuses on solo practitioners, we extend the analysis to male physicians in group practices to examine whether having daughters influences their choice of colleagues. We find that in group practices, male physicians with more daughters are more likely to team up with female physicians. While this pattern may reflect several factors, such as improved communication with women or greater comfort in mixed-gender settings, it is consistent with the idea that parenting daughters shapes physicians' attitudes toward women, as proxied by their gender preferences for colleagues.

Furthermore, we exploit two major exogenous shocks to health information over the past decade—a change in clinical guidelines on oral contraceptives and a surge of misinformation about the HPV vaccine—to test whether male physicians with more daughters respond differently than those with more sons. Using a difference-in-differences approach that exploits within-physician variation, we find that physicians with more daughters adhere more closely to women's health guidelines. Specifically, following revelations about potential side effects of newer oral contraceptives, they are more likely to revert to pre-

[5]Previous studies demonstrate a positive correlation between effective physician-patient communication and patient health (Stewart, 1995).

scribing older, safer versions. Amid the HPV vaccine misinformation surge, they are also more effective at maintaining vaccination rates among young female patients. Given the high-profile nature of both events, they have received extensive media coverage and are generally well known. We therefore think the behavioral differences are unlikely explained by physician knowledge; instead, we interpret them as being consistent with a higher level of care and concern for female patients, as well as stronger trust from those patients.

Finally, we draw on unique patient survey data linked to population registers to more directly examine patient experiences and physician-patient relationships. We find evidence that male physicians with daughters are perceived as more empathetic and enjoy greater trust among their female patients. In addition, female patients find these physicians' communication easier to understand, an effect not driven by higher frequency of contact. Consistent with our baseline results on male patients, we find that the gender composition of physicians' children has no effect on male patients' satisfaction with their physicians.

While we cannot entirely rule out physicians gaining health-relevant knowledge from daughters as a contributing mechanism, our findings suggest that a key mechanism lies in improvements in male physicians' empathy and attitudes toward women, which lead to greater care, stronger patient relationships, and improved outcomes for female patients.

Our work relates to several strands of literature. First, while physicians' beliefs and behaviors are crucial to patient outcomes (Epstein and Nicholson, 2009, Currie et al., 2016, Cutler et al., 2019, Simeonova et al., 2022, Currie and Zhang, 2023, Ginja et al., 2024), our understanding of what drives physician decision-making remains limited. A growing literature examines institutional and clinical determinants of physician behavior.[6] Recent work also highlights the benefits of physician–patient demographic match to patient outcomes (Greenwood et al., 2018, Alsan et al., 2019, Kristiansen and Sheng, 2022, Ye and Yi, 2023, Hill et al., 2023, Cabral and Dillender, 2024, Miyawaki et al., 2024).

Building on this literature, we study a previously unexplored dimension of influence: physicians' *personal* lives. We provide the first empirical evidence that physicians' per-

[6]These include legal and financial incentives (Currie and MacLeod, 2008, Clemens and Gottlieb, 2014, Einav et al., 2018), medical guidelines and heuristic rules (Meier et al., 2020, Singh, 2021), human capital and skill (Currie and MacLeod, 2020, Chan et al., 2022), teamwork (Chan, 2014), and physician–patient clinical relationships (Johnson et al., 2022).

sonal experiences outside the clinic—particularly within their own families—can shape clinical behavior and high-stakes patient outcomes. By linking physicians' private lives to professional practice, the paper broadens our understanding of how social experiences influence medical decision-making and provides new insights into the roots of gender disparities in healthcare. The findings underscore the need to look beyond institutional and clinical environments to more fully understand what shapes physician behavior and the quality of care. More broadly, our results suggest that male physicians' gender attitudes are malleable, pointing to the potential to improve care for women even in the absence of a physician–patient gender match.

This paper also contributes to the literature on gender inequalities in health (Case and Paxson, 2005, Goldin and Lleras-Muney, 2019, Awaworyi Churchill et al., 2020). While gender disparities in healthcare are well documented (Hoffmann and Tarzian, 2001, Hernandez et al., 2007, Chen et al., 2008, Pietropaoli et al., 2010, Pelletier et al., 2014), there remains little empirical evidence on the physician-level factors contributing to these disparities (Cabral and Dillender, 2024). Our results suggest that one key factor may be physicians' empathy and attitudes toward women. Moreover, our paper relates to research on women's health, particularly female cancers. While prior work documents the importance of cancer screening itself (e.g., Cutler, 2008, Bitler and Carpenter, 2016, Einav et al., 2020, Kowalski, 2023, Angrist and Hull, 2024), we highlight the critical yet understudied role of primary care physicians in facilitating timely screening and early detection, shedding new light on the determinants of preventive care for women.

Finally, our paper contributes to the literature examining children's impacts on parental beliefs and behaviors. Prior studies have examined how parenting daughters affects fathers' political preferences and corporate decisions (Washington, 2008, Oswald and Powdthavee, 2010, Dreber et al., 2024, Bennedsen et al., 2007, Cronqvist and Yu, 2017, Ronchi and Smith, 2024, Green et al., 2023).[7] It is, however, unclear whether such personal influences hold in settings supposedly ruled by science and objectivity, such as medicine. In addition, while past studies focused on changes in fathers' behavior, they

[7]See also evidence on how having daughters affects fathers' criminal behaviors (Dustmann and Landersø, 2021), gender norms (Warner and Steel, 1999, Borrell-Porta et al., 2019), and marriages and intrahousehold bargaining (Dahl and Moretti, 2008, Li and Wu, 2011, Kabátek and Ribar, 2020).

have rarely examined downstream effects on their performance. Our study, however, is able to measure effects on performance and productivity proxied by women's outcomes. We present the first empirical evidence on whether and how fathering daughters influences both healthcare providers' behavior and high-stakes patient outcomes, including mortality. We further leverage rich, novel data to investigate the mechanisms behind daughters' effects, which also remains little understood in the literature.

2 Institutional Background

2.1 Primary health care in Denmark

Denmark has a tax-funded universal public health insurance system that aims at ensuring egalitarian access to healthcare. In this structure, privately owned primary care clinics effectively serve as gatekeepers for secondary health care services offered by specialists in hospitals and private clinics. Self-employed primary care physicians provide publicly subsidized services to their patients free of charge and must therefore acquire a clinic authorization number to receive reimbursement from the national health insurance system.[8] The national health authorities thus control the number of clinic authorizations issued in an area. In 2010, Denmark has approximately 3,500 primary care physicians, each serving an average of 1,600 patients (OECD, 2017, Simonsen et al., 2021). These physicians work in about 2,200 clinics, around 1,300 of which are solo practices.

Each patient is registered with a primary care physician and is generally required to see only that physician for primary health care services, except during holiday periods. While patients can change their primary care physicians, the ease of doing so varies in practice based on local physician availability. Switching physicians typically costs about $30, though this fee is waived if the patient relocates to a different municipality or if their physician closes their clinic. In such cases, patients may choose from clinics accepting new patients within a 5–15 kilometer radius, depending on the urbanity of their area. The information available to the patient when choosing a clinic is the physician's name,

[8]Primary care clinics operate under a hybrid reimbursement framework that combines capitation and fee-for-service models.

age, and gender.[9] Over the past two decades, the primary care sector has seen a decline in the number of physicians, particularly outside major cities, further limiting options for changing physicians (Madsen et al., 2023).

The primary care physician plays a crucial role for patients affiliated with their clinic, serving as the primary link between patients and the healthcare system. They are responsible for initial diagnoses, treatments, prescriptions, chronic condition management, preventive care, and referrals to specialists.[10] The responsibilities of primary care physicians can vary widely and often require extensive communication and an ongoing relationship with patients (Heritage and Maynard, 2006). Often, a primary care physician serves as the family doctor, managing the health needs of multiple household members.

2.2 National screening programs

Having described the primary care sector, we now turn to screening programs for two leading cancers affecting women: breast and cervical cancer. Breast cancer is the most common, with 4,000–5,000 new cases reported annually in Denmark and a ten-year survival rate of 79% during 2001–2010 (NORDCAN, 2023a,b). Gynecologic cancers account for about 2,000 new cases each year, though only cervical cancer is routinely screened. Annually, there are roughly 350–400 new cervical cancer cases, along with 15,000 cases of precancerous cell changes, and about 6,000 women undergo cone biopsies. The five-year survival rate for cervical cancer rose from 67% in 2001–2010 to 74% in 2011–2020. A major development came around 2007, when national screening programs were fully rolled out for both cancers.

Breast cancer screening In 1999, the Danish Parliament mandated mammography screening for all women aged 50–69. The program began in 2007, and by 2008, all regions had implemented it nationally (Christiansen et al., 2014). Eligible women receive a screening invitation every two years, with an 83% national participation rate among

[9] Most clinics now also list additional information on their websites, such as physician specialties.

[10] While primary care physicians receive no fee for writing prescriptions, they are responsible for around 85% of all outpatient prescriptions. Medication is provided free of charge while in hospital. Prescription drugs dispensed outside hospitals can be purchased in pharmacies and are highly subsidized, in particular for chronic conditions.

invitees (RRKP, 2023). Primary care physicians do not conduct the screenings, which are hospital-based and initiated through automatic electronic invitations. However, they can encourage participation and refer women outside the target age range—those under 50 or over 70—for specialized testing if clinical signs warrant it. The introduction of the national screening program made mammography more accessible and affordable, enabling physicians to refer patients not covered by the program for screening.

Cervical cancer screening Cervical cancer screening has been implemented in various forms in Denmark since the 1960s.[11] A national program was introduced in 2007, offering screenings every three years for women aged 23-49 and every five years for women aged 50-65.[12] The program primarily aims to detect precancerous changes, though it also helps identify asymptomatic cases of cervical cancer. The primary care physician typically performs cervical cancer screening using a Pap smear (or Pap test), and eligible women receive electronic invitations or reminders to schedule an appointment.[13] Severe abnormal findings are referred directly for colposcopy with biopsy. For women under 30 with minor abnormal findings, a strategy of periodic retesting is used. In contrast, women aged 30 and older with minor abnormalities undergo HPV testing as part of a triage process, with positive results usually leading to colposcopy (Lynge et al., 2018).

3 Data

3.1 Physician and patient samples

A key challenge in studying the impact of physicians' family composition on physician behavior and patient health is the lack of data measuring both physician family charac-

[11]Screening practices varied by county—some were systematic, while others targeted individuals with early symptoms or those at risk. There were also periods with no screening in certain counties.

[12]In 2017, the program was expanded to include older women above 69 years old in a one-time HPV screening test (Andersen et al., 2019). This group, initially excluded from the screening program, had the highest incidence and mortality rates for cervical cancer (Sundhedsstyrelsen, 2016).

[13]There are two types of Pap tests: one examines samples under a microscope, while the other tests for high-risk HPV viruses. Women over age 60 are generally recommended the former, while younger women receive the latter. The test procedure performed by the physician is the same for both types, with differences occurring only in the lab (Sundhedsstyrelsen, 2012). Screening is paused during pregnancy and resumes after birth.

teristics and patient outcomes. Our paper overcomes this challenge by using high-quality administrative data from the Danish population registers, which cover the entire Danish population. Specifically, we combine multiple nationwide registers and merge data on patients' demographics, socioeconomic variables, and health outcomes, including their mortality and healthcare utilization. In addition, the data allow us to form links between patients and their primary care physicians, as well as between physicians and their families. The resulting dataset provides a unique opportunity to study the influence of physicians' families on physician behavior and patient health outcomes.

A limitation of the data, however, is that we can only identify each person's primary care *clinic*. This means that in clinics with multiple physicians, we cannot observe which physician is directly responsible for each patient. To address this, our main analysis focuses on physicians working in solo practices, which make up the majority—about 60%—of all primary care clinics (Figure A.1). For each physician, we obtain from the population registers a rich set of their individual and family characteristics, including their gender, age, ethnicity, residential location, years of practice, marital status, as well as information on the number and gender composition of their children.

Our primary goal is to understand how having daughters influences physician fathers. We therefore focus our main analysis on male physicians and examine female physicians in supplementary analyses. To improve comparability, we make two additional sample restrictions. First, we focus on non-ethnic minority physicians (93.4% of the sample), who are more likely to share similar cultural values and gender norms, thus making them more comparable. Second, to remove outliers, we exclude the small share of clinic-years with unusually low patient volumes (fewer than 750 patients), which accounts for 4.4% of the sample.[14] While these restrictions improve sample comparability, we show in robustness checks that our results remain similar when we remove both restrictions. The final physician sample for our baseline analysis includes 1,142 unique male physicians during 2007-2016, representing 41% of all clinics during this period.

The final dataset for our baseline analysis comprises an annual panel of patients cared

[14]Low patient volumes may reflect physicians working part-time in certain years or clinics nearing closure. We set a threshold of 750 patients, which is about half the average patient load for a primary care physician (Table 1), but results are similar under alternative thresholds.

for by our sample of male physicians from 2007 to 2016.[15] While our primary focus is on female patients and their health outcomes, we also examine male patient outcomes in additional analyses. We will now discuss in more detail the variables used in our study.

3.2 Main outcome variables

Mortality outcomes Our primary outcome is female patient mortality, focusing on women over 40 given the rarity of deaths at younger ages. We examine both overall and cause-specific mortality, with particular attention to female-specific cancers, such as breast and gynecologic cancers, which are leading causes of death among women globally.[16]

Cancer diagnosis We investigate both the incidence of cancer and the age at initial diagnosis, separately for breast and gynecologic cancers. In addition, we examine the cancer stage at the time of the first diagnosis. We focus on the initial diagnosis because subsequent care and testing are often influenced by specialists at hospitals.

Cancer screening and diagnostic tests We use detailed data on all cancer screenings and diagnostic tests, which may occur at physician clinics, specialist facilities, or hospitals. For breast cancer, we focus on mammography—the primary diagnostic tool—broadly defined to include X-rays, CT scans, and MRIs of the thorax and breasts, conducted at public hospitals.[17] While national screening targets women aged 50–69, we also examine testing among women outside this range, where physician discretion plays a larger role. For gynecologic cancers, we track Pap tests for cervical cancer, performed by both physicians and specialists, as well as cone biopsies, which are often used to follow up on abnormal Pap results and detect cervical cancer or pre-cancerous cell changes.

Preventive measures and general healthcare utilization We assess each patient's interactions with their physician, including both the frequency of visits and the number

[15] As discussed in Section 2, this period follows the introduction of national screening programs for breast and cervical cancer, which have remained unchanged throughout.

[16] The ICD-10 codes used in our main analysis are listed in Appendix Table A.2.

[17] Although mammographies can be performed by specialists in private clinics, this is relatively uncommon (in less than 5 percent of recorded mammographies).

of services provided during each visit. In addition, we incorporate data on contacts with medical specialists, such as gynecologists, to examine physician referrals. For each patient, we also collect information on HPV vaccination and the use of oral contraceptives, which we use in subsequent investigations of potential mechanisms.

Patient-level survey data To further explore potential mechanisms, we combine the register data with unique survey data from 2019 that includes nearly 15,000 individuals representative of the Danish population (Gensowski et al., 2021, Gensowski and Gørtz, 2024). This dataset provides a rich set of measures, including individual health behaviors, expectations, and opinions about respondents' primary care physicians. It covers aspects such as patients' perceptions of their physician's empathy and communication skills, as well as their confidence in the physician's decisions and recommendations. Importantly, we are able to link survey and register data at the individual level.

Summary statistics Table 1 provides summary statistics for our baseline sample of male physicians and their patients at the clinic level. On average, the physicians are 58 years old. 95% of the physicians have at least one child, with an average of 2.4 children.[18] 26% of the physicians have no daughters, while most physicians have at least one daughter, with 7% having three or more daughters.[19] On average, about 45% of the patients at these clinics are female, consistent with previous studies suggesting that patients often prefer physicians of the same gender (Godager, 2012).[20] Having described our data, we now turn to our empirical strategy.

4 Empirical Strategy

Our baseline analysis examines whether male physicians' daughters influence the health outcomes of their female patients. A key concern is that the number of daughters may

[18] As a robustness check later in the paper, we exclude physicians with no children from our sample.

[19] Appendix Figure A.2 shows the distribution of children and daughters in our physician sample.

[20] Table A.1 compares our baseline sample of male physicians (column 5) to the full set of primary care physicians in Denmark (column 1). On average, the physicians and patients in our analysis sample are slightly older than those in the full sample. But the physicians are similar in terms of the number of children and daughters, and their patients have comparable levels of education and marital status.

Table 1: Summary Statistics of Baseline Physicians and Their Patients

	(1) Mean	(2) SD
Baseline male physician characteristics		
Age	57.70	7.03
Any child	0.950	0.217
Number of children	2.43	1.09
First born girl	0.495	0.500
Number of daughters	1.17	0.93
No daughter	0.260	0.439
One daughter	0.393	0.488
Two daughters	0.277	0.448
Three or more daughters	0.071	0.256
Patient characteristics, overall		
Number of patients	1,518	407.7
Share female patients	0.453	0.049
Female patient characteristics		
Age	46.16	3.68
Months of education	155.0	8.51
Married	0.429	0.086
Death (per 100 female patients)	2.122	14.41
Cancer death (per 100 female patients)	0.553	0.452
Female-specific cancer death (per 100 female patients)	0.138	3.714
Breast cancer death (per 100 female patients)	0.087	2.942
Gynecologic cancer death (per 100 female patients)	0.051	2.268
Pap smear (per 100 female patients)	19.05	39.27
Mammography (per 100 female patients)	27.45	58.36
Oral contraceptive pill (per 100 female patients)	25.87	43.79
Number of clinics	1,142	
Number of clinics × year	7,322	

Notes: The table presents summary statistics for the baseline sample of male physicians and their patients at the clinic level, averaged across 2007-2016. Column 1 shows the means, while column 2 reports the standard deviations. The statistics are computed based on all active practice years during 2007-2016.

be endogenous and potentially correlated with physician characteristics like age or total number of children, which could also affect patient outcomes. To address this concern, we use an empirical strategy pioneered by previous studies (Washington, 2008, Oswald and Powdthavee, 2010, Cronqvist and Yu, 2017, Dustmann and Landersø, 2021), exploiting the natural experiment of a child's gender to identify the causal effect of having daughters.

Specifically, we run the following regression for our baseline analysis:

$$Y_{ijt} = \alpha + \beta Girls_{jt} + C_{jt} + \phi_r + \delta_t + X_{ijt} + \epsilon_{ijt} \tag{1}$$

where Y_{ijt} is the health outcome of female patient i of primary care physician j in year t. The main explanatory variable of interest, $Girls_{jt}$, is physician j's number of daughters in year t.[21] We control for a set of fixed effects for the physician's total number of children, C_{jt}, to compare patients of physicians with the same number of children. We also include municipality and year fixed effects, ϕ_r and δ_t, to compare patients within the same municipality and control for any common shocks to women's health. X_{ijt} is a vector of controls for the physician's age and patient characteristics, including the patient's age dummies, months of education, and a dummy for being an ethnic minority. ϵ_{ijt} is the error term. Standard errors are corrected for clustering at the physician level.

The coefficient β estimates the impact of physicians having one additional daughter (compared to one additional son) on female patients' health outcomes. The identification assumption is that, conditional on the physician's total number of children, the number of daughters is not correlated with unobserved factors affecting female patients' health. To support this conditional exogeneity assumption, we present balance tests to assess the correlation between *Girls* and both physician and patient characteristics. Table 2 uses clinic-level data and shows that, conditional on total children, a physician's number of daughters is uncorrelated with a rich set of physician and patient characteristics, includ-

[21] Following Washington (2008) and Oswald and Powdthavee (2010), we measure the number of daughters as a continuous variable in the baseline. Nonetheless, we explore alternative measures, such as an indicator for having any daughter and categorical daughter counts, in robustness checks. In practice, the number of daughters is stable for most physicians, as few had a new birth during the study period. Thus, variation in daughters arises mainly across physicians, with some additional variation from doctor–patient reassignments. In robustness checks, we also verify the results when restricting to physicians with a fixed number of children and to patients who stay with the same physician throughout the period.

Table 2: Balance Tests

	(1) Physician age	(2) Physician experience	(3) Physician married	(4) ln(Patients)	(5) ln(Female patients)	(6) % Female patients	(7) % Fem. pat. age<18
Girls	-0.249	-0.040	0.013	-0.002	-0.003	-0.000	-0.000
	(0.277)	(0.189)	(0.013)	(0.009)	(0.011)	(0.002)	(0.000)
Observations	7,322	7,322	7,322	7,322	7,322	7,322	7,322
Mean of Dep. Var.	57.71	12.90	0.838	7.295	6.497	0.453	0.0466
Std.Dev. of Dep. Var.	7.031	5.192	0.369	0.247	0.298	0.0494	0.0153

	(8) % Fem. pat. age 18-64	(9) % Fem. pat. age> 65	(10) Fem. pat. age	(11) Fem. pat. education	(12) Fem. pat. ln(income)	(13) % Fem. pat. minority	(14) % Fem. pat. married
Girls	0.000	0.000	0.020	-0.192	-0.005	0.003	-0.003
	(0.001)	(0.001)	(0.106)	(0.282)	(0.003)	(0.002)	(0.002)
Observations	7,322	7,322	7,322	7,322	7,322	7,322	7,322
Mean of Dep. Var.	0.292	0.115	56.76	154.8	12.50	0.0927	0.536
Std.Dev. of Dep. Var.	0.0373	0.0367	3.127	9.842	0.141	0.0749	0.0944

Notes: The table shows the results of balance tests examining whether physicians with more daughters (compared to more sons) differ in terms of physician and patient characteristics. The sample consists of all male physicians in our baseline sample during 2007-2016. Each column shows the results from a separate OLS regression similar to equation (1), where each observation is a clinic-year. The outcome variables, measuring physician and patient characteristics, are listed at the top of each column. The explanatory variable is the number of daughters the physician has. Each regression controls for physician number of children fixed effects, year fixed effects, and municipality fixed effects. Standard errors, in parentheses, are corrected for clustering at the physician level. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

ing physician age, years of practice, marital status, total patient volume, and both the number and share of female patients (overall and by age group) (columns 1-9). We also find no systematic relationship with female patients' average age, education (in months), income, ethnicity, or marital status (columns 10-14).[22] To further assess balance, Table A.4 presents analogous tests at the individual patient level. Patient characteristics, including age, education, income, ethnicity, and marital status, are neither individually nor jointly significantly associated with their physician's number of daughters (joint p-value ≈ 0.6). Together, these results support the identification assumption of equation 1.

A potential threat to identification is that female patients might select physicians based on the gender composition of their children. We consider this scenario unlikely in practice, as the gender composition of a physician's children is typically not observable to patients.

[22]Table A.3 presents a similar balance table and again finds no difference when focusing on female patients above 40 years old, the sample for our baseline analysis.

The balance tests above also suggest that such selection is unlikely. Nonetheless, to further address this concern, we examine female patients who switched physicians during the study period and test whether these switches correlate with physicians' number of daughters. We exclude switches due to clinic closures to focus on clinic switches made more intentionally. Table A.5 shows that a physician's number of daughters does not predict patient entry or exit, supporting the view that female patients do not systematically select physicians based on the gender composition of the physicians' children.[23]

Another potential concern is fertility stopping behavior: physicians may continue having children until reaching a desired number of sons or daughters. If so, the number of daughters a physician has conditional on total children could reflect underlying gender preferences, potentially biasing our estimates. To test for this, we follow Washington (2008) and Cronqvist and Yu (2017), examining whether having a first-born daughter or having the first two children of the same gender predicts total fertility among physicians. As shown in Table A.6, we find no evidence of such patterns, providing further support for our identification strategy.

While we also have data on female physicians and male patients, we keep them separate from the baseline analysis. Female physicians constitute a much smaller group, and as we show below, their number of daughters still tends to be correlated with several observable characteristics conditional on total children, weakening identification. Moreover, patients tend to sort to physicians of the same gender, which means that male and female physicians often have systematically different patient populations (Godager, 2012). Finally, the women's health outcomes we focus on are less relevant for male patients. For these reasons, and consistent with past work in other settings, we focus on male physicians and female patients in our baseline specification and report results for the other groups separately in additional analyses.

[23]This finding is consistent with recent evidence that patients are generally unable to identify high-quality physicians (Ginja et al., 2024).

5 Results

Having outlined our empirical strategy, we now present the main findings on how daughters influence physician fathers' behavior and the health outcomes of their female patients. Our baseline analysis focuses on mortality, particularly deaths from female cancers, before turning to other health outcomes and potential mechanisms.

5.1 Baseline results on mortality

We begin by examining the relationship between male physicians' number of daughters and the mortality outcomes of their female patients. Table 3 reports estimates for overall female mortality as well as cause-specific mortality. For ease of interpretation, the final row of the table presents effect sizes relative to the mean of each outcome. Column 1 shows no evidence that the gender composition of physicians' children affects overall female mortality. In contrast, column 2 shows that female patients cared for by male physicians with one additional daughter (compared to one additional son) experience a 0.013-percentage-point decrease in cancer mortality, or 2.4% relative to the mean. This effect is particularly pronounced for female-specific cancers, such as breast and gynecologic cancers, which are leading causes of death among women. As shown in column 3, mortality from these cancers declines by 5.5% relative to the mean. The estimate for other cancer deaths (column 4) is also negative and of meaningful magnitude, although it is not statistically significant at conventional levels. Overall, these results suggest that while a male physician's number of daughters may not affect overall female mortality, it does appear to matter for health issues and causes of death specific to women.

To further investigate the baseline results, we examine effects on female cancer mortality by cancer type and patient age in Table 4. Panel A shows that mortality declines are evident for both breast cancer (4.8%) and gynecologic cancer (6.5%). Panel B shows that these effects are more pronounced among women over age 60. Appendix Table A.8 further shows that the effects are larger for less educated patients, but similar in magnitude across ethnic majority and minority groups.

For completeness, Table A.7 presents the effect of physicians' number of daughters on

Table 3: Physicians' Number of Daughters and Female Patient Mortality

	Death by Cause			
	Any	Cancer	Female cancer	Other cancer
	(1)	(2)	(3)	(4)
Girls	-0.000031	-0.000131**	-0.000077***	-0.000053
	(0.000113)	(0.000053)	(0.000026)	(0.000045)
Observations	3,109,917	3,109,917	3,109,917	3,109,917
Mean of Dep. Var.	0.0173	0.00545	0.00141	0.00404
Std.Dev. of Dep. Var.	0.130	0.0736	0.0375	0.0634
Effect in %	-0.18	-2.40	-5.46	-1.31

Notes: This table presents the estimated effects of physician daughters on female patient mortality by cause. Each column shows the results from a separate OLS regression following equation (1), where each observation is a patient-year. The sample consists of all female patients above 40 years old under the care of the baseline male physicians during 2007-2016. The outcomes are binary variables that equal 1 if the patient dies in a given year from any cause (column 1), any type of cancer (column 2), female-specific cancers (i.e., breast or gynecologic) (column 3), or other types of cancer (column 4), and 0 otherwise. The explanatory variable is the number of daughters the physician has. Each regression controls for physicians' age, physician number of children fixed effects, patients' education in months, patient age dummies, an indicator for ethnic minority patients, municipality fixed effects, and year fixed effects. The estimated effects, measured as percentages relative to the mean of the outcome variables, are reported in the last row of the table. Standard errors, in parentheses, are corrected for clustering at the physician level. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table 4: Physicians' Number of Daughters and Cancer Deaths

	(1)	(2)	(3)
	Death from Female-Specific Cancers		
	Overall	Breast	Gynecologic
Panel A: Baseline sample			
Girls	-0.000077***	-0.000042**	-0.000035**
	(0.000026)	(0.000020)	(0.000016)
Observations	3,109,917	3,109,917	3,109,917
Mean of Dep. Var.	0.00141	0.000876	0.000535
Std.Dev. of Dep. Var.	0.0375	0.0296	0.0231
Effect %	-5.5	-4.8	-6.5
Panel B: Patients aged 60+			
Girls	-0.000151***	-0.000102***	-0.000049*
	(0.000047)	(0.000038)	(0.000029)
Observations	1,554,692	1,554,692	1,554,692
Mean of Dep. Var.	0.00237	0.00149	0.000884
Std.Dev. of Dep. Var.	0.0487	0.0386	0.0297
Effect %	-6.4	-6.9	-5.5

Notes: This table presents the estimated effects of physician daughters on female-specific cancer mortality. Each column shows the results from a separate OLS regression following equation (1), where each observation is a patient-year. For Panel A, the sample consists of all female patients above 40 years old under the care of the baseline male physicians during 2007-2016. For Panel B, the sample consists of female patients from Panel A who are above 60 years old. The outcomes are binary variables that equal 1 if the patient dies from any female-specific cancers (column 1), breast cancer (column 2), or gynecologic cancer (column 3) in the given year, and 0 otherwise. The explanatory variable is the number of daughters the physician has. Each regression controls for physicians' age, physician number of children fixed effects, patients' education in months, patient age dummies, an indicator for ethnic minority patients, municipality fixed effects, and year fixed effects. The estimated effects, measured as percentages relative to the mean of the outcome variables, are reported in the last row of each panel. Standard errors, in parentheses, are corrected for clustering at the physician level. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

all causes of mortality among female patients.[24] Overall, we find that the reduction in cancer deaths is not at the expense of increased mortality from other diseases.

5.2 Robustness checks

In the Appendix, we present a series of robustness checks across alternative samples and specifications. First, we show that the baseline estimate on female cancer mortality is highly similar with or without the controls (Table A.9). Next, we assess the sensitivity of our findings to physician sample restrictions. Table A.10 shows that the results are robust to including ethnic minority physicians (column 1), removing the minimum patient threshold (column 2), and lifting both restrictions (column 3). Our finding also holds when we extend the analysis sample to 2019 (column 4).[25] In addition, to address concerns that patient turnover or physician-switching might bias our estimates, we show that the results are highly similar when restricting to patients who remain with the same physician over time, indicating that the results are not driven by physician–patient reassignment (column 5). The results are also nearly identical when restricting to physicians whose number of children is constant during the study period (column 6). Finally, excluding the 5% of physicians without children does not alter our main results (Table A.11).

We also explore alternative ways to define treatment. Instead of a linear variable, we use categorical variables to measure the number of daughters (i.e., one, two, or three or more) and find consistent results (Table A.12). Specifically, the effects of having any number of daughters are sizable, although they are more pronounced for physicians with

[24]Specifically, mortality from non-cancer causes is generally unaffected by the number of daughters across disease categories, with the exception of a marginally significant increase in deaths from nervous system diseases at the 10% level. To contextualize this, cancer is the leading cause of death in Denmark and account for 30% of all deaths in 2019, whereas diseases of the nervous system (primarily Alzheimer's and Parkinson's) account for just 5%. In addition, cancer deaths occur earlier in life: nearly 30% before age 70, compared to 90% of nervous system deaths occurring after 70. One plausible interpretation is that as more women survive cancer, they live longer and may eventually develop diseases of the nervous system at an older age. Moreover, when we aggregate all non-cancer causes of death into a single category, the estimated effect is near zero (0.0000993; s.e. = 0.0000954; p-value = 0.298).

[25]As noted in section 2, we focus on 2007–2016 in our main analysis because female cancer screening guidelines were stable during this period. In 2017, Denmark expanded cervical cancer screenings to women over age 69 with a one-time HPV test (Andersen et al., 2019), largely reducing the role and discretion of primary care physicians in cervical cancer screenings.

two or more daughters.[26] Results are also robust to defining treatment as having any daughters, the share of daughters, or having a majority of daughters (Table A.13).[27]

To account for the prevalence of zeroes in the binary mortality outcome, we run logistic regressions as an alternative specification and find consistent results (Table A.14). We also find similar results when aggregating our data from the patient-year level to the clinic-year level to examine female cancer mortality *rates* (defined as deaths per thousand female patients), which further mitigates the presence of zero outcomes (Table A.15).

Moreover, compared to general mortality, studying cause-specific mortality can be complex due to competing risks of death. To address this, we investigate in Table A.16 all-cause mortality for women simultaneously using a multinomial logit model, with survival as the baseline category and four categories of mortality outcomes: breast cancer, gynecologic cancer, cardiovascular diseases, and all other causes. The results reinforce our baseline finding: women cared for by male physicians with more daughters are less likely to die from breast and gynecologic cancers, with no corresponding increase in mortality from other causes. Taken together, the robustness of the results across the battery of checks in this section further strengthens the causal interpretation of our baseline findings.

5.3 Female cancer diagnoses, testing, and prevention

Having established the baseline results and robustness checks, we now explore potential explanations for the reduction in female cancer mortality. Focusing on female patients with male physicians and using the same specification as equation 1, we examine: (1) the timing of cancer diagnoses (Table A.17); (2) use of screening and diagnostic tests linked to cancer prevention and early detection (Table A.18); (3) cancer stage at diagnosis (Table A.19); and (4) detection of pre-cancerous cervical cell changes (Table A.20). These results, presented in the Appendix, are discussed below.

[26] This finding aligns with Brenøe (2022), who shows that in families with more daughters (as opposed to mixed-sex children such as a daughter and a son), parents are less likely to engage in gender-specialized parenting where mothers disproportionately spend time with daughters and fathers with sons. As a result, fathers in households with more daughters would potentially spend more time with their daughters, which may amplify daughters' effects.

[27] The estimate for having a first-born daughter is negative but smaller and statistically insignificant. This is likely because 55.8% physicians with first-born sons in our sample have at least one daughter later, making a first-born daughter a noisier measure of exposure to daughters.

Breast cancer We begin by examining breast cancer diagnoses by patient age group in Panel A of Table A.17, where the outcome is an indicator equal to 1 if the patient receives a first-time breast cancer diagnosis that year. Column 1 of the panel shows no overall effect of physician daughters on the likelihood of diagnosis. However, the remaining columns suggest a clear shift in the timing of diagnosis: patients of male physicians with more daughters are more likely to be diagnosed earlier between ages 22 and 49 (column 2), an age group not yet covered by the national breast cancer screening program, and less likely to be diagnosed later in life (column 4).

What might explain the shift toward earlier diagnosis? One possibility is earlier testing. To explore this channel, we examine mammography use by age group. As shown in column 2 of Panel A, Table A.18, female patients of male physicians with more daughters are more likely to receive mammograms between ages 22 and 49. As noted earlier, women in this age group are not yet covered by the national breast cancer screening program, which targets only those aged 50 to 69, and thus are not expected to receive regular screenings.[28] While primary care physicians do not treat breast cancer, they can encourage timely participation in screenings and arrange mammograms for patients outside the national program. This earlier testing likely contributed to the lower mortality rates we observe. Consistent with this, we find that breast cancer patients with physicians who have more daughters are diagnosed at earlier stages, before the cancer spreads to surrounding tissue (Panel A, Table A.19).[29]

Together, the evidence suggests that male physicians with more daughters provide enhanced care for female patients, going even beyond national screening requirements and paying closer attention to women who might otherwise be overlooked. In doing so, they may contribute to earlier breast cancer detection and improved survival rates.

Gynecologic cancer Next, we turn to outcomes related to gynecologic cancer diagnosis and testing, which reveal a somewhat different pattern. First, we look at gynecologic

[28]We also find a positive effect for women over 70 (column 4), who are likewise not covered by the national program, though the effect is less precisely estimated possibly due to smaller sample sizes.

[29]This effect is driven by diagnoses between ages 50–70, suggesting that patients diagnosed earlier (before age 50) avoid more advanced-stage cancers that would otherwise emerge upon entering the screening program at 50.

cancer diagnoses by patient age groups. We find that female patients whose physicians have more daughters are less likely to ever be diagnosed with gynecologic cancer (column 1 of Panel B, Table A.17). Combined with the baseline finding of reduced gynecologic cancer mortality, the lower diagnosis rate likely reflects more successful cancer prevention.

What might lead to more successful prevention? We show that physicians with more daughters do not differ in their use of Pap tests, the primary tool for cervical cancer screening (Panel B, Table A.18). This is consistent with Pap tests being a routine part of Denmark's national cervical cancer screening program, which covers a wide age range (from 23 to 65 years old) and thus leaves little variation in test usage across physicians.[30]

We do, however, find suggestive evidence that male physicians with more daughters are more likely to refer female patients, particularly those aged 22–49, for a cone biopsy (Panel C, Table A.18). Cone biopsy, or conization, is a procedure used after an abnormal Pap test to diagnose cervical cancer or pre-cancerous cell changes.[31] The greater use of cone biopsy may contribute to earlier detection of gynecologic cancers or, more often, pre-cancerous changes that can be treated before cancer develops. Consistent with this, we find that physicians with more daughters are more likely to detect pre-cancerous cervical cell changes (Table A.20). Moreover, among patients diagnosed with gynecologic cancers, those cared for by physicians with more daughters tend to have cancers detected at earlier stages (Panel B, Table A.19). These findings suggest that male physicians with more daughters may be more diligent at screening and preventing gynecologic cancers.

Taken together, the evidence in this subsection suggests that male physicians with more daughters go the extra mile in testing and preventing female cancers, translating into earlier detection, reduced cancer progression, and lower mortality.

[30]Pap tests are generally not recommended for women over 65.

[31]A cone biopsy involves the removal of a cone-shaped piece of tissue from the cervix. It could be used for both diagnostic and therapeutic purposes: it can diagnose cervical cancer or pre-cancerous cell changes and, if necessary, treat abnormal cells by removing them. In contrast, Pap tests are used solely for screening purposes and cannot diagnose cancer or pre-cancerous changes.

5.4 Evidence from Male Patients and Female Physicians

Male patient mortality So far, we have focused on female patient outcomes. Appendix Table A.22 examines whether *male* patients' mortality varies with their physicians' number of daughters.[32] We find no significant differences in overall or cause-specific mortality, including male-specific cancers, among men cared for by male physicians with more versus fewer daughters. These results imply that having daughters does not broadly enhance male physicians' diagnostic or preventive skills, but rather improves care specifically in female health domains.

Female physicians Thus far, our analysis has focused on male physicians. It is natural to ask whether daughters exert a similar influence on *female* physicians. A challenge, however, is that female physicians comprise only about 30% of our solo practitioner sample, which limits sample size and identification. Appendix Table A.23 shows that, after conditioning on total children, female physicians and their patients still tend to differ on several observables like marital status, patient age, income, and minority share. Given these differences, we treat any estimates for female physicians as exploratory, offering a first look at whether daughters may shape practice patterns among women doctors.

Table A.24 shows the estimated effects of daughters among female physicians. Columns 1–3 report female cancer mortality (overall and by cause), while columns 4–5 present male patient mortality, including cancers of male reproductive organs. In each case, we find no significant effect from daughters among female physicians.[33] These results suggest that the beneficial impact of parenting daughters is confined to male physicians, perhaps by providing something unique to male physicians that female physicians already bring to their practice. This finding also aligns with previous research showing that daughters influence fathers' gender attitudes, but not those of mothers (Borrell-Porta et al., 2019, Ronchi and Smith, 2024). We next turn to exploring the potential mechanisms through which raising daughters shapes male physicians' clinical practices.

[32]We conduct a balance test on male patients and find that their characteristics are largely balanced across physician daughter counts (Table A.21).

[33]Consistent with the null effects on female cancer deaths, we also find no effect on the age at first female cancer diagnosis among female physicians. Results are available upon request.

6 Mechanisms

We have shown that daughters shape male physicians' behavior and the health outcomes of their female patients. A key puzzle lies in the mechanism. Empirical evidence on *how* daughters influence their fathers remains scarce. Prior studies in sociology and economics argue that parenting daughters increases fathers' feminist sympathies (Warner and Steel, 1999, Washington, 2008, Borrell-Porta et al., 2019). In our setting, this could translate into greater empathy and more positive attitudes toward women, ultimately improving the care male physicians provide to female patients. In addition, physicians may learn from their daughters and thus become more informed and knowledgeable about female-specific health issues. Moreover, male physicians with daughters may develop stronger communication skills with women. While disentangling these channels is inherently challenging, we present several pieces of evidence to explore the potential mechanisms.

6.1 Knowledge and learning

First, we explore knowledge and learning from daughters as a potential channel. If knowledge transfer were the main driver, we would expect stronger effects among physicians with older daughters, who are more likely to have experienced female health issues and passed on relevant knowledge. To test this, we examine whether the baseline effects vary with daughters' age, focusing on the age of the oldest daughter. Specifically, we compare physicians with older daughters to those with only younger daughters. As shown in Table A.25, the effects are similar across both groups. Notably, the effects are present even among physicians whose oldest daughter is under 25 years old—an age group unlikely to have significant experiences with female cancers (column 2 of Table A.25). These findings suggest that knowledge transfer is unlikely to be the primary mechanism.

6.2 Empathy and attitudes towards women

Empathy and attitudes toward women could be another potential channel through which daughters influence their physician fathers. To explore this mechanism, we first examine male physicians' choice of partners in group practices, testing whether having

daughters affects their preference for working with a female colleague. We then exploit two major exogenous health information shocks to study whether male physicians with more daughters are more attentive and responsive to medical guidelines concerning women. Finally, we turn to unique patient survey data to more directly investigate how daughters affect patients' experiences and physician-patient relationships, providing further insight into how daughters shape physicians' behavior and interactions with patients.

6.2.1 Gender of partners in group practices

While our baseline analysis focuses on sole practitioners because we could identify their patients more clearly, others work in group practices with two or more physicians (Figure A.1). For male physicians in such clinics, their choice of partners in the clinic could be informative about their gender attitudes. We therefore test whether a male physician's number of daughters predicts the gender of his colleagues in group practices.

Column 1 of Table 5 focuses on duo-physician practices and shows that male physicians with one additional daughter (relative to a son) are 5 percentage points (or 8.5%) more likely to team up with a female colleague. Columns 2 and 3 show that this effect remains positive and meaningful when including larger clinics, though it is not statistically significant possibly due to limited variation, as nearly all larger clinics have at least one female physician.[34] While the evidence here could reflect various factors, such as improved communication with women or greater comfort in mixed-gender settings, it supports the view that having daughters may influence male physicians' attitudes toward women, as reflected in their greater propensity to collaborate with women in professional settings.

6.2.2 Reactions to female-specific medical guidelines

Next, we exploit two major exogenous health information shocks in Denmark over the past decade—a change in clinical guidelines on oral contraceptives and a surge of misinformation about the HPV vaccine—to test whether male physicians with more daughters respond differently. Greater attentiveness to women's health guidelines could also indicate

[34] As shown in column 3 of Table 5, 78% of clinics with two or more physicians have a female physician.

Table 5: Physicians' Number of Daughters and Gender of Partners in Group Practices

	(1)	(2)	(3)
	Having a Female Colleague, by Clinic Size		
	2 physicians	2-3 physicians	2+ physicians
Girls	0.050**	0.022	0.015
	(0.023)	(0.016)	(0.010)
Observations	3,940	7,193	11,439
Mean of Dep. Var.	0.586	0.684	0.776
Std.Dev. of Dep. Var.	0.493	0.465	0.417

Notes: This table presents the estimated effects of physician daughters on having a female colleague among male physicians in group practices. Each column shows the results from a separate OLS regression similar to equation (1), where each observation is a physician-year. The sample consists of male physicians working in group practices, including clinics with two physicians (column 1), two or three physicians (column 2), or two or more physicians (column 3). The outcome is a binary variable that equals 1 if the male physician has a female colleague in the clinic, and 0 otherwise. The explanatory variable is the number of daughters the physician has. Each regression controls for physicians' age, physician number of children fixed effects, municipality fixed effects, and year fixed effects. Standard errors, in parentheses, are corrected for clustering at the physician level. *** p <0.01, ** p <0.05, * p <0.1.

stronger care and concern for female patients. Notably, these analyses include physician fixed effects, allowing us to identify within-physician changes in behavior over time.

Prescription of oral contraceptives We begin with the case of contraceptive pills, which are widely used in Denmark: by age 20, 85% of women have been prescribed hormonal contraception. The type of oral contraceptive pills prescribed changed dramatically over this period (Appendix Figure A.4). From 1999 to 2011, third-generation contraceptive pills dominated the market, accounting for about 70% of prescriptions. However, between 2009 and 2011, new medical research linked third- and fourth-generation pills to a higher risk of venous thromboembolism (blood clots in the veins). In late 2011, Danish health authorities recommended second-generation pills as the first choice for oral contraception (Løkkegaard and Nielsen, 2014). Following this guidance, the use of second-generation pills rose sharply—from 20% in 2011 to 87% in 2018 (Figure A.4).[35]

We use a difference-in-differences approach to examine whether male physicians with

[35]Source: Authors' calculations based on medstat.dk.

more daughters are more likely to switch back to prescribing second-generation pills after the discovery of increased side effects associated with newer-generation pills. To conduct this analysis, we compile data on oral contraceptive prescriptions from the National Prescription Register. While we focus on women of reproductive age (13-55 years old), the results remain consistent with alternative age cutoffs.

We run the following event study specification to exploit within-physician variation:

$$Y_{ijt} = \alpha + \sum_{d=2008}^{2017} \beta_d \, Girls_j \times I_t^d + \sum_{d=2008}^{2017} C_j \times I_t^d + \gamma_j + \delta_t + X_{ijt} + \epsilon_{ijt}, \tag{2}$$

where Y_{ijt} is the outcome of interest, i.e., the use of the second-generation oral contraceptive pills for patient i of physician j in year t. The main explanatory variable is the interaction between physician j's number of daughters, $Girls_j$, and a vector of year dummies, I_t^d.[36] We also control for the interaction between physicians' number of children fixed effects, C_j, and the year dummies, allowing the effect of C_j to vary over time. In addition, we include physician and year fixed effects, γ_j and δ_t, to control for time-invariant physician characteristics and common temporal shocks. The baseline patient and physician time-varying controls, X_{ijt}, are also included. Standard errors are clustered at the physician level. The analysis is restricted to physicians who were practicing both before and after 2011 to focus on within-physician changes over time.

Figure 1 presents the event study estimates for second-generation pill prescriptions, with 2011 as the reference year. The results show that, conditional on having the same number of children, male physicians with more daughters are more likely to revert to prescribing the second-generation pill following the 2011 guideline change.[37]

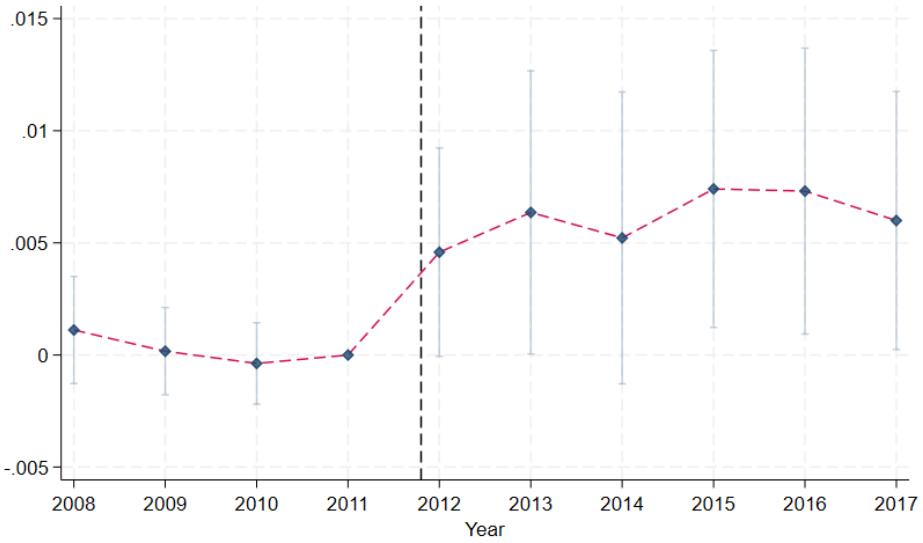
Given the extensive media coverage of the health risks associated with newer-generation pills and the widespread public awareness of the guideline change, it seems unlikely that the differential prescribing behavior is driven by differences in physician knowledge or information.[38] Rather, we interpret the findings as consistent with the idea that having

[36] In the analysis, we exclude the few physicians who had a new birth during the study period. The results, however, remain nearly identical when these physicians are included.

[37] Table A.26 shows that the number of physician daughters is not associated with an overall change in total oral contraceptive prescriptions post-2011.

[38] Major Danish media outlets reported extensively on the risks associated with newer-generation

Figure 1: Physicians' Number of Daughters and Prescription of 2nd-Generation Pills



Notes: The figure plots the event study estimates of the effects of physician daughters on the likelihood of female patients being prescribed second-generation oral contraceptive pills during 2008-2017. The estimates come from a single OLS regression following equation (2), with the year 2011 as the reference period. The sample consists of all female patients aged 13-55 under the care of the baseline male physicians. The outcome is a binary variable that equals 1 if the female patient in a given year is prescribed the second-generation pill, and 0 otherwise. The explanatory variables are the physician's number of daughters in 2011 interacted with year dummies. The regression controls for physician fixed effects, physician number of children fixed effects (measured in 2011) interacted with year dummies, physicians' age, patients' education in months, patient age fixed effects, an indicator for ethnic minority patients, municipality fixed effects, and year fixed effects. The vertical line marks the onset of the change in medical guidelines regarding oral contraceptives in late 2011. The dots are the estimated coefficients and the vertical lines represent the 95% confidence intervals.

daughters shapes male physicians' empathy and attitudes toward women, making them more attentive to female-specific medical information and needs.

HPV vaccination To further explore the mechanisms, we examine another female-specific health practice: HPV vaccinations. Since 2009, the Danish Childhood Vaccination Program has included vaccination against Human Papillomavirus (HPV) for girls aged 12 and older. The vaccinations are typically administered at primary care physicians' clinics.

Following an initial high uptake, HPV vaccination rates declined dramatically after negative media coverage during 2013-2015 linked the vaccine to serious side effects, which

contraceptive pills. For example, the national public service TV and radio broadcaster *Danish Radio*, the conservative newspaper *Berlingske*, and the left-wing newspaper *Politiken* all reported in late October 2011 with the same headline: "New oral contraceptive pills increase the risk of blood clots".

were later proven to be unfounded (Gørtz et al., 2020, Hansen et al., 2020). The sharpest decline occurred after 2014, as shown in Figure A.5.

Using the event study approach from equation 2 to exploit within-physician variation, we test whether male physicians' number of daughters affects the likelihood that their young female patients receive the HPV vaccine after the negative media coverage. Focusing on 13-year-old girls in each year and examining their vaccination status, Figure 2 presents the event study estimates, with 2014 as the reference year. The figure shows that, after the negative media coverage, girls under the care of male physicians with more daughters are more likely to receive the HPV vaccine.[39] We present similar evidence using a traditional difference-in-differences setup, interacting the number of daughters with a *Post* indicator for years after 2014 (Table A.27).

Given that the negative media stories were widely reported and attracted national attention, we believe the effects are unlikely due to differences in the information that male physicians have depending on whether they have daughters. Rather, it seems more plausible that male physicians with more daughters may be more effective at ensuring that their female patients adhere to important health guidelines, even amidst widespread misinformation. This could be partly due to their ability to more convincingly communicate the pros and cons of being vaccinated. These findings may also reflect the level of trust between patients and physicians. Patients with greater trust in their physicians are more likely to follow vaccination recommendations despite conflicting media narratives.

6.2.3 Evidence from patient survey data

Our analysis thus far has relied on administrative data. To further explore the mechanisms, we now leverage unique patient-level survey data that are linked to the administrative register data.[40] The survey provides a unique opportunity to examine the impact

[39]Similar to the contraceptive pill analysis, we exclude the few physicians who had a new birth during the study period, but the results are essentially the same when including them.

[40]The survey, conducted in summer 2019, invited a randomly selected representative sample of individuals aged 18–75 in Denmark (Gensowski et al., 2021, Gensowski and Gørtz, 2024). Respondents were contacted through a national secure messaging system linked to each citizen's social security number. The response rate was 33.7% including partial responses and 30% for complete responses. The anonymized survey data were merged with administrative registers by Statistics Denmark. Questions on physician satisfaction, which we use here, were sent to a randomly selected subsample of individuals aged 20–75.

Figure 2: Physicians' Number of Daughters and HPV Vaccination



Notes: This figure plots the event study estimates of the effects of physician daughters on the likelihood of female patients receiving HPV vaccinations by age 13 during 2011-2018. The estimates come from a single OLS regression similar to equation (2), with the year 2014 as the reference period. The sample in each year consists of all the 13-year-old girls under the care of the baseline male physicians. The outcome is a binary variable that equals 1 if the young female patient has received any HPV vaccination by age 13, and 0 otherwise. The explanatory variables are the physician's number of daughters in 2014 interacted with year dummies. The regression controls for physician fixed effects, physician number of children fixed effects (measured in 2014) interacted with year dummies, physicians' age, patients' education in months, patient age fixed effects, an indicator for ethnic minority patients, municipality fixed effects, and year fixed effects. The vertical dashed line marks the onset of negative media coverage of HPV vaccines. The dots are the estimated coefficients and the vertical lines represent the 95% confidence intervals.

of physician daughters on patient experiences and the physician-patient relationship.

From the survey, we analyze responses to all questions measuring patients' experiences at their primary care clinics, including their perceptions of collaboration, communication clarity, time spent, empathy, and trust in their primary care physician. The questions were worded as follows: 1) Collaboration: "The doctor and I made all treatment decisions together." 2) Communication clarity: "The doctor's explanations were easy to understand." 3) Time spent: "The doctor spent enough time during my consultation." 4) Empathy: "The doctor understood my needs and problems and took them seriously." 5) Trust: "I had confidence in my doctor's decisions and recommendations." Respondents

rated their agreement on a 5-point Likert scale, where 1 denotes "Do not agree" and 5 denotes "Completely agree."[41]

In this part of the analysis, to maximize statistical power and sample size, we use the full sample of female patients in clinics with at least one male physician, rather than restricting to solo male practitioners. The dataset thus includes female patients from both solo and group practices, where male and female physicians may be present. Because the sample and specification differ from our main analysis, these results should be interpreted as suggestive. Nonetheless, we believe they offer valuable complementary evidence.

We construct an outcome variable indicating whether the patient agrees with each statement (i.e., reports a value ≥ 3) and estimate the following regression:

$$Y_{ij} = \alpha + \beta_1 MalePhysicianGirls_j + X_{ij} + \epsilon_{ij} \tag{3}$$

where Y_{ij} is a binary variable equal to 1 if respondent i from primary care clinic j agrees with the statement, and 0 otherwise. The key explanatory variable, $MalePhysicianGirls_j$, measures the presence of daughters among male physicians in the clinic in two ways: (1) an indicator equal to 1 if any male physician has a daughter, and (2) the share of male physicians with at least one daughter.[42] The control variables X_{ij} include both patient and clinic characteristics. As in the baseline, we control for patient age fixed effects, ethnicity, and education level. At the clinic level, we control for the number of physicians fixed effects, the share of male physicians, average physician age, the share of ethnic majority physicians, municipality fixed effects, and fixed effects for the average number of children among physicians.[43] Standard errors are clustered at the clinic level.

Agreements to the five statements are strongly correlated, as seen from the correlation matrix in Table A.28. In addition to the five binary outcome variables indicating whether

[41] The response options were: 1 "Do not agree", 2 "Partly agree", 3 "Agree", 4 "Strongly agree", or 5 "Completely agree".

[42] While the "any male physician with a daughter" measure captures the presence of at least one male physician with a daughter, the share measure reflects the likelihood of having such a physician. As discussed earlier, when multiple physicians are present, we cannot observe the specific physician the patient saw; thus, we create a clinic-level summary measure.

[43] The average number of children is rounded to the nearest whole number, grouping clinics where physicians have four or more children with those where they have three on average.

the patient agrees with each statement, we create a composite measure derived from factor analysis, which captures the underlying dimension that explains the largest portion of variance among the five observed variables. This factor combines the original variables and reflects a common theme or construct that ties them together; in our context, we interpret this measure as overall satisfaction with the physician.[44]

The results in Table 6 suggest that female patients rate male physicians with daughters similarly in terms of collaboration and time spent (columns 2 and 4), but higher in empathy, trust, and overall satisfaction (columns 1, 5, and 6).[45] In contrast, consistent with the baseline null effect on male patient mortality, we find no effect on satisfaction—neither overall nor by specific dimension—among *male* patients (see Table A.30). These differing results suggest that the higher satisfaction among female patients is not driven by overall clinic quality. We interpret the survey results as suggestive evidence that male physicians with daughters (compared to those with only sons) provide a more satisfying experience for their female patients, marked by greater empathy, which manifests in higher levels of trust and confidence from their female patients.

6.3 Communication

Lastly, we consider communication as another channel. Male physicians who have parented daughters may be more skilled at communicating with women. Consistent with this view, column 3 of Table 6 shows that these physicians' communication is more easily understood by their female patients. This suggests that better communication could be part of the mechanisms underlying the baseline results. In comparison, we find no effect of a male physician's number of daughters on the likelihood or frequency of contact between physicians and their female patients (see Table A.31). Thus, while female patients may not receive more services on average, each visit tend to provide better care overall.

[44]The factor loading and unique variance from the factor used to measure overall satisfaction with the physician are shown in Table A.29.

[45]The estimate for empathy is more sensitive and not statistically significant at conventional levels when using the share of male physicians with a daughter as the explanatory variable (p-value = 0.12).

Table 6: Effects on Patient Experiences and Physician-Patient Relationships

	(1) Overall satisfaction	(2) Collaboration	(3) Communication clarity	(4) Time spent	(5) Empathy	(6) Trust
Panel A.						
Any male physician with a daughter	0.075**	0.020	0.024**	0.009	0.026*	0.026**
	(0.035)	(0.015)	(0.012)	(0.014)	(0.014)	(0.012)
Panel B.						
Share of male physicians with at least one daughter	0.065**	0.014	0.021*	0.008	0.020	0.026**
	(0.032)	(0.014)	(0.011)	(0.013)	(0.013)	(0.012)
Observations	8,011	8,051	8,053	8,056	8,052	8,060
Mean of Dep. Var.	-0.0687	0.764	0.869	0.779	0.819	0.821
Std.Dev. of Dep. Var.	0.977	0.425	0.338	0.415	0.385	0.383

Notes: This table presents the estimated effects of physician daughters on measures of patient experience and physician-patient relationships, based on patient survey data collected in 2019. Each column shows the results from a separate OLS regression following equation (3), where each observation is a patient. The sample consists of all female patients in the patient survey from a primary care clinic with at least one male physician. For columns 2-6, the outcome is a binary variable that equals 1 if the patient agrees with the given statement about their experience and relationship with the physician, and 0 otherwise. In column 1, the outcome is a composite measure that summarizes the patient's overall satisfaction with the physician, based on factor analysis that combines the five statements across columns 2-6. The explanatory variable in panel A is an indicator that equals 1 if any male physician in the clinic has a daughter, and 0 otherwise. The explanatory variable in panel B is the share of male physicians in the clinic with at least one daughter. Each regression controls for patients' education in months, patient age dummies, an indicator for ethnic minority patients, municipality fixed effects, fixed effects for the number of physicians in the clinic, physicians' average age, share of male physicians in the clinic, share of ethnic majority physicians in the clinic, and fixed effects for the average number of children among physicians, where the average number of children has been rounded to the nearest whole number. Standard errors, in parentheses, are corrected for clustering at the physician level. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

7 Conclusion

While physicians play a critical role in patient outcomes, much remains unknown about what drives their behavior and decision-making. In particular, causal evidence on what influences the quality of care provided to women, who continue to face systemic gender-based disparities in healthcare, remains scarce. Using rich and unique data, we examine whether fathering daughters influences physician behavior and patient outcomes.

We find that daughters influence physician fathers in important ways. Female patients cared for by male physicians with more daughters experience significantly lower breast and gynecologic cancer mortality, a result driven by earlier detection and greater preventive effort. Notably, male physicians with more daughters tend to go the extra mile for their female patients, paying closer attention to those who may be overlooked by the national screening program and providing more intensive preventive care.

Our evidence suggests that a key mechanism lies in improvements in male physicians' empathy and attitudes toward women. Male physicians with more daughters are more likely to collaborate with female colleagues, adhere more closely to women's health guidelines, and are rated higher by female patients in terms of empathy and communication, which ultimately translate into greater trust among those patients. These findings also suggest that physicians' gender attitudes are more malleable than previously understood.

Our paper provides the first causal evidence that physicians' personal experiences outside the clinic—particularly within their own families—can shape clinical practice. By linking physicians' private lives to professional practice, the paper broadens our understanding of how social experience influences clinical decision-making and performance, providing new insights into the roots of gender disparities in healthcare.

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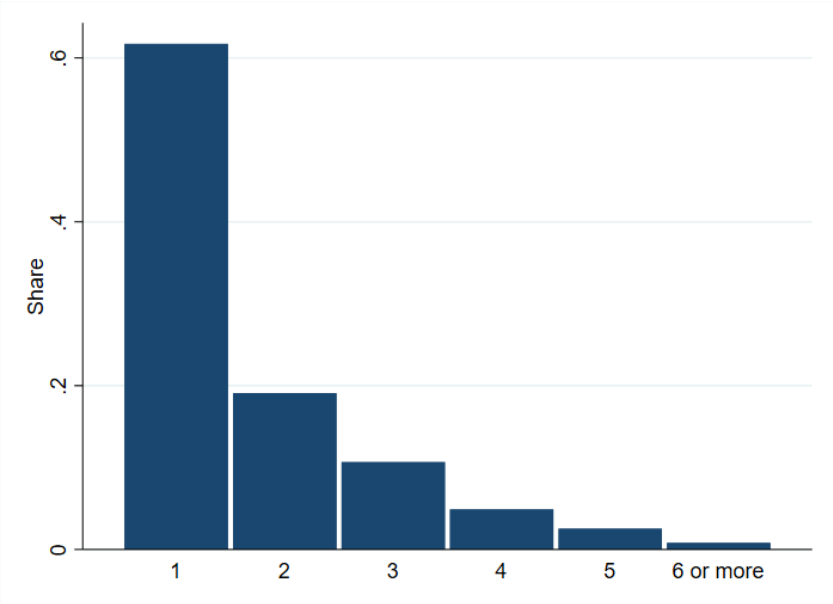
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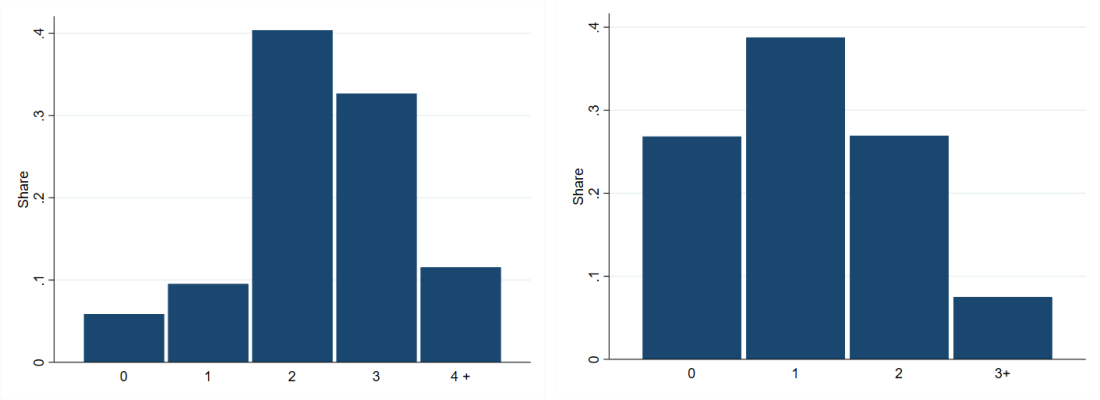
8 Online Appendix

Figure A.1: Share of Primary Care Clinics by Number of Physicians in the Clinic



Notes: The figure shows the distribution (%) of primary care clinics in Denmark by the number of physicians working in the clinic over the period 2007-2016.

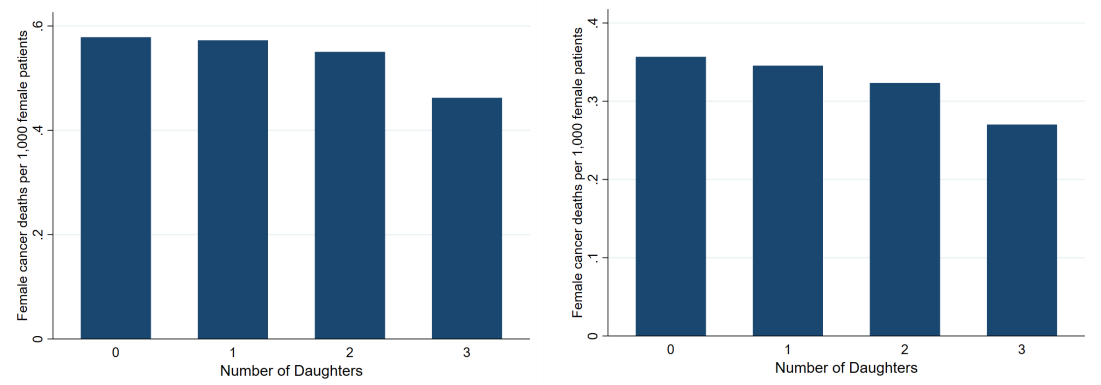
Figure A.2: Number of Children and Daughters Among Baseline Physicians



A: Number of children **B:** Number of daughters

Notes: The figures show the distribution (%) of male physicians in our baseline sample based on the number of children and daughters they have for the period 2007-2016.

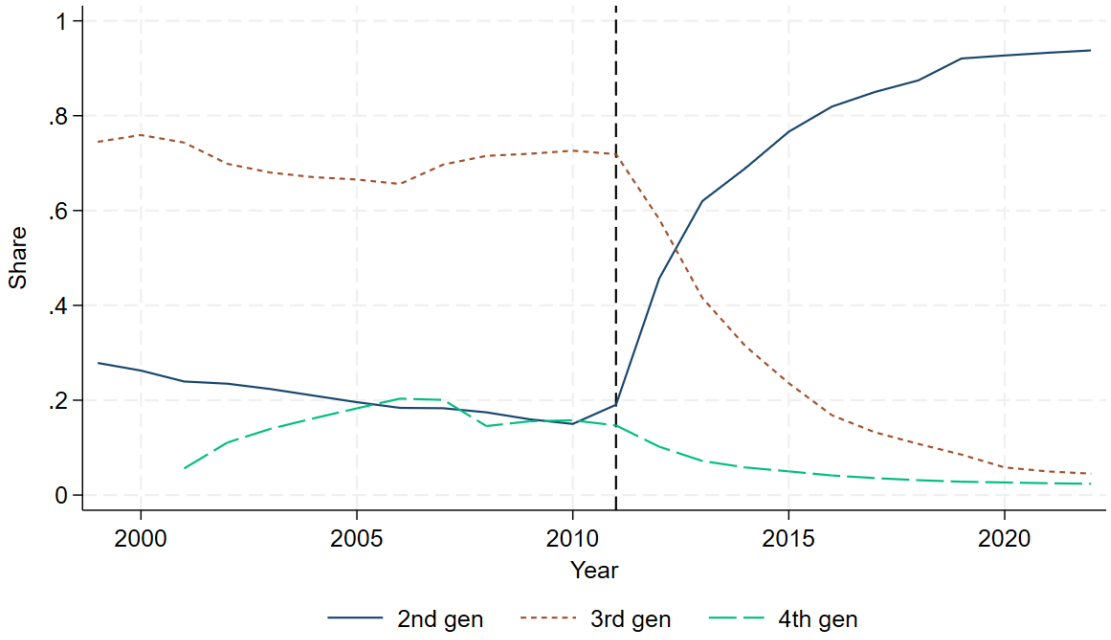
Figure A.3: Breast and Gynecologic Cancer Deaths by Physician Number of Daughters



A: Breast cancer **B:** Gynecologic cancer

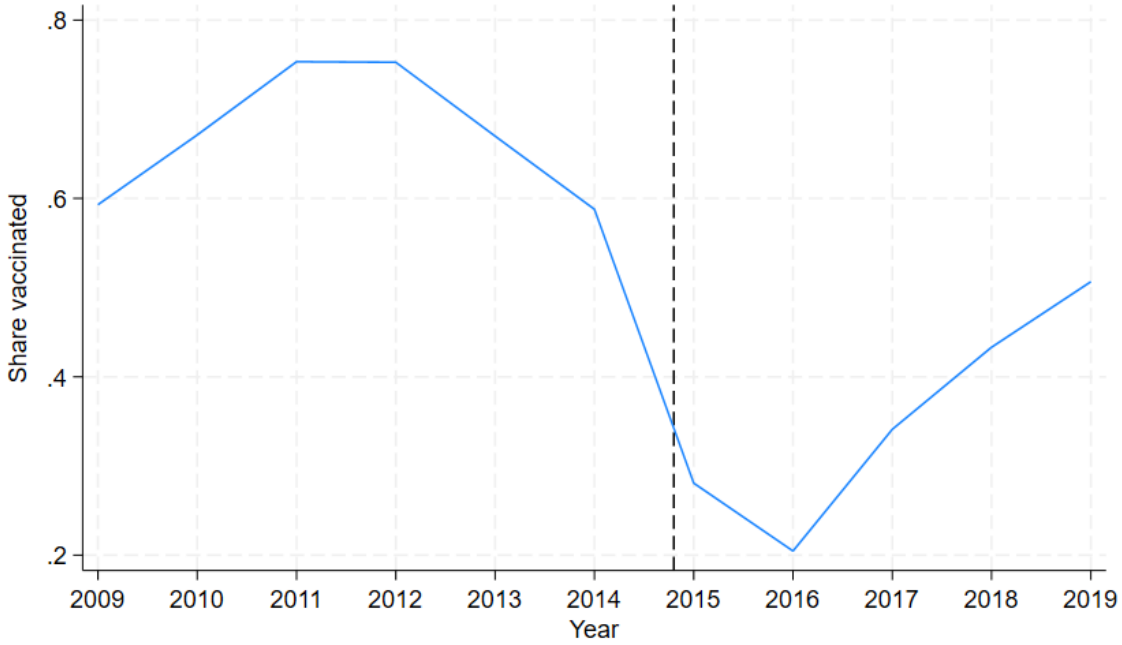
Notes: The figure shows the raw mortality rates of breast and gynecologic cancers among female patients of baseline male physicians, by the number of daughters the physician has. Mortality rates are calculated as the number of deaths from breast or gynecologic cancers per thousand female patients. The figures are based on raw data averaged across the years 2007-2016 without any controls.

Figure A.4: Use of Oral Contraceptive Pills by Generation of the Pill



Notes: The figure shows the proportion of oral contraceptive pills in use in Denmark by pill generation during 1999-2022. The dashed line indicates the year 2011, when greater side effects of the 3rd and 4th generation pills were discovered. The data include pills used by all women and are obtained from medstat.dk.

Figure A.5: HPV Vaccination Rates Among 12-Year-Old Girls



Notes: The figure shows the share of 12-year-old girls receiving the HPV vaccine in Denmark each year during 2009-2019. The dashed line marks the onset of negative media coverage.

Table A.1: Summary Statistics

	(1) All physicians	(2) All solo physicians	(3) Analysis sample	(4) Analysis sample: Female	(5) Analysis sample: Male (Baseline)
Physician characteristics					
Solo clinic	0.594	1.000	1.000	1.000	1.000
	(0.491)	(0.000)	(0.000)	(0.000)	(0.000)
Male	0.612	0.683	0.688	0.000	1.000
	(0.410)	(0.465)	(0.463)	(0.000)	(0.000)
Native	0.941	0.934	1.000	1.000	1.000
	(0.210)	(0.248)	(0.000)	(0.000)	(0.000)
Age	54.36	56.32	56.41	53.56	57.71
	(7.46)	(7.78)	(7.43)	(7.50)	(7.03)
Any child	0.961	0.936	0.941	0.921	0.950
	(0.194)	(0.245)	(0.235)	(0.270)	(0.217)
Number of children	2.36	2.33	2.35	2.16	2.43
	(0.94)	(1.10)	(1.09)	(1.06)	(1.09)
First born girl	0.492	0.492	0.503	0.520	0.495
	(0.500)	(0.500)	(0.500)	(0.500)	(0.500)
Number of daughters	1.14	1.134	1.15	1.01	1.17
	(0.80)	(0.92)	(0.91)	(0.88)	(0.93)
Patient characteristics					
Number of patients	2356.78	1439.25	1509.59	1490.53	1518.25
	(1561.37)	(488.22)	(398.45)	(376.55)	(407.74)
Share female patients	0.502	0.492	0.496	0.591	0.453
	(0.077)	(0.091)	(0.083)	(0.060)	(0.049)
Age	44.79	45.15	45.13	42.87	46.16
	(4.24)	(4.57)	(4.10)	(4.07)	(3.68)
Months of education	155.94	156.00	156.20	158.76	155.04
	(8.68)	(9.02)	(8.73)	(8.65)	(8.51)
Married	0.428	0.415	0.419	0.398	0.429
	(0.089)	(0.094)	(0.088)	(0.088)	(0.086)
Number of clinics	3,358	2,230	1,724	582	1,142
Number of clinics × year	20,244	12,015	10,647	3,325	7,322

Notes: The table provides summary statistics for various samples of physicians and their patients, averaged over the period 2007-2016. The physician characteristics were averaged across physician-years, and the patient characteristics were averaged across clinic-years. For each variable, both the mean and the standard deviation (in parentheses) are reported. Column 1 includes all primary care physicians in Denmark. Column 2 includes only solo physicians. Column 3 narrows the sample down to solo physicians from Column 2 who are ethnically Danish and have at least 750 patients. Column 4 includes only the female physicians from Column 3. Lastly, Column 5 consists of the male physicians from Column 3, forming the sample for our baseline analysis. All statistics are calculated based on active practice years between 2007 and 2016.

Table A.2: Cause of Death and ICD-10 Codes

Cause of Death	ICD-10
Cancer	C
Female specific cancers	C50 -C58
Malignant neoplasm of breast	C50
Malignant neoplasms of female genital organs	C51-C58
Vulva	C51
Vagina	C52
Uterus and cervix	C53-C55
Cervix uteri	C53
Corpus uteri	C54
Uterus, part unspecified	C55
Ovary	C56
Other and unspecified female genital organs	C57
Malignant neoplasms of male genital organs	C60-C63

Notes: This table shows the list of diseases considered in the mortality analysis along with their ICD-10 codes.

Table A.3: Balance Tests on Female Patients Aged 40 or Above

	(1) % Fem. pat. age > 40	(2) Fem. pat. age	(3) Fem. pat. education	(4) Fem. pat. ln(income)	(5) % Fem. pat. minority	(6) % Fem. pat. married
Girls	-0.000	0.048	-0.222	-0.005	0.002	-0.003
	(0.002)	(0.090)	(0.281)	(0.004)	(0.002)	(0.002)
Observations	7,322	7,322	7,322	7,322	7,322	7,322
Mean of Dep. Var.	0.292	61.07	151.4	12.47	0.0792	0.535
Std.Dev. of Dep. Var.	0.0549	2.482	10	0.150	0.0667	0.0960

Notes: The table shows the results of balance tests examining whether physicians with more daughters (compared to more sons) differ in terms of patient characteristics. The specification follows that in Table 2, except here female patient characteristics are measured using those above 40 years old, consistent with the sample for our baseline analysis. *** p <0.01, ** p <0.05, * p <0.1.

Table A.4: Balance Tests at the Patient Level

	(1)	(2)
	Physician number of daughters	
Patient age	0.000086	-0.000030
	(0.000274)	(0.000238)
Education	-0.000050	-0.000078
	(0.000103)	(0.000101)
Lives with partner	-0.008395	-0.008147
	(0.005228)	(0.005215)
Log income	-0.001150	-0.001701
	(0.002296)	(0.002364)
First-generation immigrant	0.003028	0.006673
	(0.012766)	(0.012598)
Descendant of immigrant	-0.012023	-0.005920
	(0.025728)	(0.021431)
Observations	3,100,818	4,086,802
Female patient sample	Aged 40+	Aged 22+
Mean of Dep. Var.	1.182	1.183
Std.Dev. of Dep. Var.	0.926	0.929
F-stat for joint significance	0.776	0.755
p-value for joint significance	0.589	0.606

Notes: The table shows the results of a balance test at the patient level, examining whether female patients' individual characteristics are correlated with their phyisicians' number of daughters, conditional on the physicians' total number of children. The sample consists of all female patients above 40 years old (column 1) and those above 22 years old (column 2) under the care of the baseline male physicians during 2007-2016. Each column shows the results from a separate OLS regression, where each observation is a patient-year. The outcome variable is the number of daughters that each patient's physician has. Individual patient characteristics include age, education (measured in months), a dummy for living with a partner, log income, a dummy for being a first-generation immigrant, and a dummy for being a descendant of immigrants. All regressions control for municipality fixed effects, year fixed effects, physician age, and physician number of children fixed effects. The F-statistic and p-value for the joint significance test of the listed variables are reported at the bottom of each column. Standard errors, in parentheses, are corrected for clustering at the physician level. *** p <0.01, ** p <0.05, * p <0.1.

Table A.5: Physicians' Number of Daughters and Female Patients' Selection Into or Out of the Clinics

	(1)	(2)	(3)	(4)
	Women aged 22+		Women aged 40+	
	Selecting out	Selecting in	Selecting out	Selecting in
Girls	0.00224	0.00352	0.00228	0.00289
	(0.00332)	(0.00245)	(0.00346)	(0.00250)
Observations	4,099,514	4,098,930	3,035,867	3,035,401

Notes: The table tests whether female patients select into or out of clinics based on the physicians' number of daughters. Each column shows the results from a separate OLS regression following equation (1), where each observation is a patient-year. The sample consists of all female patients above 22 years old (columns 1-2) or above 40 years old (columns 3-4) under the care of the baseline male physicians during 2007-2016. In columns 1 and 3, the outcome is a binary variable that equals 1 if the patient leaves for another clinic in the given year, and 0 otherwise. The explanatory variable is the number of daughters her original physician has. In columns 2 and 4, the outcome is a binary variable that equals 1 if the patient joins a new clinic from another clinic in the given year, and 0 otherwise. The explanatory variable is the number of daughters her new physician has. We exclude physician switches due to clinic closures. Each regression controls for physicians' age, physician number of children fixed effects, patients' education in months, patient age dummies, an indicator for ethnic minority patients, municipality fixed effects, and year fixed effects. Standard errors, in parentheses, are corrected for clustering at the physician level. *** p <0.01, ** p <0.05, * p <0.1.

Table A.6: Testing for Fertility Stopping Rules

	(1)	(2)
	Total Number of Children	
First-born girl	-0.089	
	(0.072)	
First and second child same gender		0.030
		(0.072)
Observations	808	719
Mean of Dep. Var.	2.530	2.719
Std.Dev. of Dep. Var.	0.986	0.876

Notes: The table presents the results from an exercise testing whether physicians follow fertility stopping rules. The sample consists of male physicians in our baseline sample. Each column shows the results from a separate OLS regression, where each observation is a physician. The outcome variable for each column is the total number of children the physician has. We measure total number of children in the last year observed, which is either 2016 or the year of clinic closure. In column 1, the explanatory variable is a dummy variable that equals 1 if the physician's first-born child is a girl, and 0 otherwise. The sample includes only baseline physicians with at least one child. In column 2, the explanatory variable is a dummy variable that equals 1 if the physician's first- and second-born children have the same gender, and 0 otherwise. The sample includes only baseline physicians with at least two children. Each regression controls for physician age and municipality fixed effects. *** p <0.01, ** p <0.05, * p <0.1.

Table A.7: Physicians' Number of Daughters and All Causes of Death (Categorized by First Letter of ICD Codes)

	(1) Small categories	(2) A	(3) C	(4) D	(5) E	(6) F	(7) G	(8) I	(9) J	(10) K	(11) N	(12) R	(13) W	(14) X
Girls	-0.000011	0.000002	-0.000131**	-0.000009	0.000016	-0.000023	0.000051*	0.000004	0.000001	0.000022	0.000009	0.000021	-0.000002	0.000018
	(0.000012)	(0.000012)	(0.000053)	(0.000009)	(0.000019)	(0.000029)	(0.000026)	(0.000057)	(0.000039)	(0.000021)	(0.000012)	(0.000051)	(0.000010)	(0.000011)
Observations	3,109,917	3,109,917	3,109,917	3,109,917	3,109,917	3,109,917	3,109,917	3,109,917	3,109,917	3,109,917	3,109,917	3,109,917	3,109,917	3,109,917
Mean of Dep. Var.	0.000289	0.000278	0.00527	0.000168	0.000550	0.000982	0.000690	0.00415	0.00211	0.000800	0.000223	0.000975	0.000165	0.000261
Std.Dev. of Dep. Var.	0.0170	0.0167	0.0724	0.0130	0.0234	0.0313	0.0263	0.0643	0.0459	0.0283	0.0149	0.0312	0.0129	0.0162

Notes: This table presents the estimated effects of physician daughters on female patient mortality by cause. Each column shows the results from a separate OLS regression following equation (1), where each observation is a patient-year. The sample consists of all female patients above 40 years old under the care of the baseline male physicians during 2007-2016. The outcomes are binary variables that equal 1 if the patient dies in a given year from that course. The types of death are categorized by the first letter in the ICD-cause of death. The first column is a category that consists of all rare causes with less than 1 percent of causes of deaths, including the ICD codes with the letters: B, H, L, M, O, P, Q, U, V, Y. The remaining categories are A: Infectious diseases, C: Cancers, D: Diseases of the blood, E: Endocrine, nutritional and metabolic diseases, F: Mental and behavioural disorders, G: Diseases of the nervous system, I: Diseases of the circulatory system, J: Diseases of the respiratory system, K: Diseases of the digestive system, N: Diseases of the genitourinary system, R: Symptoms, signs and abnormal clinical and laboratory findings, W: Accidents, X: Self-harm. The explanatory variable is the number of daughters the physician has. Each regression controls for physicians' age, physician number of children fixed effects, patients' education in months, patient age dummies, an indicator for ethnic minority patients, municipality fixed effects, and year fixed effects. Standard errors, in parentheses, are corrected for clustering at the physician level. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table A.8: Baseline Estimates by Patients' Educational Level and Ethnicity

	(1)	(2)	(3)	(4)
	Education		Ethnicity	
	Low	High	Majority	Minority
Girls	-0.000130***	-0.000045	-0.000080***	-0.000075
	(0.000048)	(0.000030)	(0.000026)	(0.000081)
Observations	1,235,853	1,873,788	2,915,782	194,135
Mean of Dep. Var.	0.00192	0.00107	0.00144	0.00100
Std.Dev. of Dep. Var.	0.0438	0.0327	0.0379	0.0317

Notes: This table presents the estimated effects of physician daughters on female-specific cancer mortality by patients' educational level and ethnicity. Each column shows the results from a separate OLS regression following equation (1), where each observation is a patient-year. The sample consists of all female patients above 40 years old under the care of the baseline male physicians during 2007-2016, which is then split by patients' educational level (low vs. high) in columns 1-2 and by patients' ethnicity (majority vs. minority) in columns 3-4. Low education is defined as having a high school degree or less, while high education includes any level of education above high school. The outcome is a binary variable that equals 1 if the patient dies from female-specific cancer (breast or gynecologic) in the given year, and 0 otherwise. The explanatory variable is the number of daughters the physician has. Each regression controls for physicians' age, physician number of children fixed effects, patients' education in months, patient age dummies, an indicator for ethnic minority patients, municipality fixed effects, and year fixed effects. Standard errors, in parentheses, are corrected for clustering at the physician level. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table A.9: Baseline Estimates with Controls Gradually Added

	(1)	(2)	(3)	(4)
	Death from Female-Specific Cancers			
Girls	-0.000062**	-0.000063**	-0.000064**	-0.000077***
	(0.000027)	(0.000027)	(0.000027)	(0.000026)
Observations	3,250,770	3,250,770	3,250,770	3,109,917
Mean of Dep. Var.	0.00145	0.00145	0.00145	0.00141
Std.Dev. of Dep. Var.	0.0381	0.0381	0.0381	0.0375
Year FE		X	X	X
Municipality FE		X	X	X
Physician controls			X	X
Patient controls				X

Notes: This table shows the baseline estimates on female-specific cancer mortality with control variables gradually added. Each column shows the results from a separate OLS regression and follows a similar sample and specification as in column 3 of Table 3. Column 1 includes only physician number of children fixed effects and no other controls. In column 2, we add year fixed effects and municipality fixed effects. In column 3 and 4, we further control for the physician and patient characteristics in the baseline specification. Standard errors, in parentheses, are corrected for clustering at the physician level. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table A.10: Baseline Estimates Using Different Samples

	(1) Include minority physicians	(2) Drop number of patient restriction	(3) (1) + (2)	(4) Extend years to 2007-2019	(5) Stayers	(6) No change in number of children
Girls	-0.000069***	-0.000070***	-0.000061**	-0.000064***	-0.000074**	-0.000077***
	(0.000025)	(0.000025)	(0.000025)	(0.000023)	(0.000032)	(0.000026)
Observations	3,255,357	3,143,721	3,292,520	3,703,780	2,556,963	3,076,267
Mean of Dep. Var.	0.00138	0.00142	0.00139	0.00138	0.00156	0.00141
Std.Dev. of Dep. Var.	0.0371	0.0377	0.0372	0.0371	0.0395	0.0375

Notes: This table presents the estimated effects of physician daughters on female-specific cancer mortality when using different analysis samples. Each column shows the results from a separate OLS regression following equation (1), where each observation is a patient-year. The outcome is a binary variable that equals 1 if the patient dies from female-specific cancer (breast or gynecologic) in the given year, and 0 otherwise. The explanatory variable is the number of daughters the physician has. In Column 1, we drop the restriction that physicians must be Danish. Column 2 drops the requirement for physicians to have at least 750 patients. Column 3 removes both restrictions from columns 1-2. In column 4, we extend the baseline sample to the year 2019. In column 5, we restrict the sample to patients who stayed with the same physician throughout the study period. In column 6, we restrict the analysis to physicians who had the same number of children throughout the study period. Each regression controls for physicians' age, physician number of children fixed effects, patients' education in months, patient age dummies, an indicator for ethnic minority patients, municipality fixed effects, and year fixed effects. Standard errors, in parentheses, are corrected for clustering at the physician level. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table A.11: Baseline Estimates for Only Physicians with Children

	(1)	(2)	(3)
	Death from Female-Specific Cancers		
	Overall	Breast	Gynecologic
Girls	-0.000074***	-0.000043**	-0.000031*
	(0.000026)	(0.000020)	(0.000016)
Observations	2,955,522	2,955,522	2,955,522
Mean of Dep. Var.	0.00137	0.000847	0.000526
Std.Dev. of Dep. Var.	0.0370	0.0291	0.0229

Notes: This table presents the estimated effects of physician daughters on female-specific cancer mortality, after removing physicians without any child. Each column shows the results from a separate OLS regression following equation (1), where each observation is a patient-year. The table follows the same specification as Table 4, except that here the sample includes only patients whose physicians have at least one child. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table A.12: Baseline Estimates Using Dummy Variables for Number of Daughters

	(1)	(2)	(3)
	Death from Female-Specific Cancers		
	Overall	Breast	Gynecologic
One daughter	-0.000062	-0.000044	-0.000018
	(0.000060)	(0.000047)	(0.000038)
Two daughters	-0.000163**	-0.000093*	-0.000070*
	(0.000064)	(0.000051)	(0.000041)
Three or more daughters	-0.000214**	-0.000109	-0.000105*
	(0.000097)	(0.000076)	(0.000057)
Observations	3,109,917	3,109,917	3,109,917

Notes: This table presents the estimated effects of physician daughters on female-specific cancer mortality, when using dummy variables to measure number of daughters. Each column shows the results from a separate OLS regression following equation (1), where each observation is a patient-year. The sample consists of all female patients above 40 years old under the care of the baseline male physicians during 2007-2016. The outcomes are binary variables that equal 1 if the patient dies from any female-specific cancers (column 1), breast cancer (column 2), or gynecologic cancer (column 3) in the given year, and 0 otherwise. The explanatory variable is the number of daughters the physician has, measured as dummy variables instead of a continuous variable. Each regression controls for physicians' age, physician number of children fixed effects, patients' education in months, patient age dummies, an indicator for ethnic minority patients, municipality fixed effects, and year fixed effects. Standard errors, in parentheses, are corrected for clustering at the physician level. *** p <0.01, ** p <0.05, * p <0.1.

Table A.13: Baseline Estimates Using Alternative Treatment Variables

	(1)	(2)	(3)	(4)	(5)
	Treatment Defined as				
	Any daughter	Share of daughters	Most daughters	Only daughters	First-born daughter
Treatment	-0.000104*	-0.000150**	-0.000085*	-0.000088	-0.000027
	(0.000056)	(0.000063)	(0.000044)	(0.000055)	(0.000044)
Observations	3,109,917	3,109,917	3,109,917	3,109,917	3,109,917
Mean of Dep. Var.	0.00141	0.00141	0.00134	0.00132	0.00134
Std.Dev. of Dep. Var.	0.0375	0.0375	0.0366	0.0363	0.0366
Mean of treatment var.	0.743	0.464	0.354	0.236	0.467

Notes: This table presents the estimated effects of physician daughters on female-specific cancer mortality, when using alternatively defined treatment variables. Each column shows the results from a separate OLS regression following equation (1), where each observation is a patient-year. The sample consists of all female patients above 40 years old under the care of the baseline male physicians during 2007-2016. The outcome is a binary variable that equals 1 if the patient dies from female-specific cancer (breast or gynecologic) in the given year, and 0 otherwise. The regression uses different treatment variables specified in the column headers to measure physician daughters, including having any daughters (column 1), the share of daughters among all children (column 2), having most daughters (column 3), having only daughters (column 4), and having a first-born daughter (column 5). Each regression controls for physicians' age, physician number of children fixed effects, patients' education in months, patient age dummies, an indicator for ethnic minority patients, municipality fixed effects, and year fixed effects. Standard errors, in parentheses, are corrected for clustering at the physician level. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table A.14: Baseline Estimates Using Logit Regressions

	(1)	(2)	(3)
	Death from Female-Specific Cancers		
	Overall	Breast	Gynecologic
Girls	-0.0606***	-0.0539**	-0.0731**
	(0.0198)	(0.0249)	(0.0324)
Observations	3,109,152	3,100,560	3,094,341
Mean of Dep. Var.	0.00141	0.000878	0.000537
Std.Dev. of Dep. Var.	0.0375	0.0296	0.0232
Marginal effects	-0.000051	-0.000027	-0.000023

Notes: This table presents the estimated effects of physician daughters on female-specific cancer mortality using a logit function. Each column shows the results from a separate logit regression following equation (1), where each observation is a patient-year. The sample consists of all female patients above 40 years old under the care of the baseline male physicians during 2007-2016. The outcomes are binary variables that equal 1 if the patient dies from any female-specific cancers (column 1), breast cancer (column 2), or gynecologic cancer (column 3) in the given year, and 0 otherwise. The explanatory variable is the number of daughters the physician has. Each regression controls for physicians' age, physician number of children fixed effects, patients' education in months, patient age dummies, an indicator for ethnic minority patients, municipality fixed effects, and year fixed effects. The marginal effects, estimated at the average of the covariates, are reported in the last row of the table. Standard errors, in parentheses, are corrected for clustering at the physician level. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table A.15: Effects on Female-Specific Cancer Deaths at the Clinic Level

	(1)	(2)	(3)	(4)
		Death Rate		
	Any death	Overall	Breast	Gynecologic
Girls	-0.0150*	-0.0471***	-0.0281**	-0.0190*
	(0.00818)	(0.0181)	(0.0141)	(0.0109)
Observations	7,322	7,322	7,322	7,322
Mean of Dep. Var.	0.456	0.947	0.593	0.354
Std.Dev. of Dep. Var.	0.498	1.241	0.992	0.756

Notes: This table presents the estimated effects of physician daughters on female-specific cancer mortality, with baseline patient data aggregated to the clinic-year level. Each column shows the results from a separate OLS regression, where each observation is a clinic-year. The sample consists of all male physicians in our baseline sample during 2007-2016. In column 1, the outcome is a binary variable that equals 1 if the clinic has any female patient dying from breast or gynecologic cancer in the given year, and 0 otherwise. For columns 2-4, the outcomes are the number of deaths per 1,000 female patients in the given year from any female-specific cancers (column 2), breast cancer (column 3), or gynecologic cancer (column 4). Each regression controls for physicians' age, physician number of children fixed effects, patients' average education in months, average patient age, share of ethnic minority patients, municipality fixed effects, and year fixed effects. Standard errors, in parentheses, are corrected for clustering at the physician level. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table A.16: Estimates from Multinominal Logit Regression

	(1) Multinominal logit	(2) Marginal effect
Survival	-	0.00003
		(0.00006)
Breast cancer mortality	-0.04510*	-0.00003*
	(0.02611)	(0.00001)
Gynecologic cancer mortality	-0.08062***	-0.00003***
	(0.03074)	(0.00001)
Cardiovascular mortality	0.00209	0.00000
	(0.01479)	(0.00001)
Other causes of mortality	0.00515	0.00003
	(0.00999)	(0.00005)
Observations	3,109,917	3,109,917

Notes: This table presents the estimated effects of physician daughters on female-specific cancer mortality using a multinominal logit regression, where each observation is a patient-year. The sample consists of all female patients above 40 years old under the care of the baseline male physicians during 2007-2016. The outcomes consist of five categories: survival (baseline), death from breast cancer, death from gynecologic cancer, death from cardiovascular diseases, and death from other causes. The explanatory variable is the number of daughters the physician has. Each regression controls for physicians' age, physician number of children fixed effects, patients' education in months, patient age, an indicator for ethnic minority patients, and year fixed effects. Column 1 reports odds ratios relative to survival (the baseline category), while column 2 presents marginal effects estimated at the mean of the covariates. Standard errors, in parentheses, are corrected for clustering at the physician level. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table A.17: Physicians' Number of Daughters and Female Cancer Diagnoses by Age

	(1)	(2)	(3)	(4)
	Diagnosed for the First Time			
	Ages 22+	Ages 22-49	Ages 50-70	Ages 71+
Panel A: Breast cancer				
Girls	-0.000010	0.000093***	-0.000032	-0.000278**
	(0.000051)	(0.000036)	(0.000093)	(0.000129)
Observations	4,099,989	1,781,576	1,574,246	744,167
Mean of Dep. Var.	0.00438	0.00127	0.00663	0.00715
Std.Dev. of Dep. Var.	0.0661	0.0356	0.0812	0.0843
Panel B: Gynecologic cancer				
Girls	-0.000045**	-0.000013	-0.000090**	-0.000048
	(0.000021)	(0.000020)	(0.000037)	(0.000065)
Observations	4,099,989	1,781,576	1,574,246	744,167
Mean of Dep. Var.	0.00104	0.000415	0.00134	0.00192
Std.Dev. of Dep. Var.	0.0322	0.0204	0.0366	0.0438

Notes: This table presents the estimated effects of physician daughters on female cancer diagnoses by age. Each column shows the results from a separate OLS regression following equation (1), where each observation is a patient-year. The sample consists of female patients above 22 years old under the care of the baseline male physicians during 2007-2016 and is divided into different age groups for each column, as specified at the top of each column. The outcomes in each panel are binary variables that equal 1 if the patient is diagnosed with breast cancer (Panel A) or gynecologic cancer (Panel B) for the first time in the given year, and 0 otherwise. The explanatory variable is the number of daughters the physician has. Each regression controls for physicians' age, physician number of children fixed effects, patients' education in months, patient age dummies, an indicator for ethnic minority patients, municipality fixed effects, and year fixed effects. Standard errors, in parentheses, are corrected for clustering at the physician level. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table A.18: Physicians' Number of Daughters and Female Cancer Testing by Age

	(1)	(2)	(3)	(4)
	Receiving the Screening or Diagnostic Test			
	Ages 22+	Ages 22-49	Ages 50-70	Ages 71+
Panel A: Mammography				
Girls	0.000464	0.001399**	-0.000944	0.001623
	(0.000856)	(0.000553)	(0.001568)	(0.001342)
Observations	4,099,989	1,701,884	1,653,938	744,167
Mean of Dep. Var.	0.221	0.0604	0.393	0.208
Std.Dev. of Dep. Var.	0.415	0.238	0.488	0.406
Panel B: Pap smear				
Girls	-0.000591	-0.000597	-0.000940	0.000094
	(0.001001)	(0.001355)	(0.001070)	(0.000853)
Observations	4,099,989	1,781,576	1,230,777	1,087,636
Mean of Dep. Var.	0.193	0.290	0.173	0.0543
Std.Dev. of Dep. Var.	0.394	0.454	0.378	0.227
Panel C: Cone biopsy				
Girls	0.000051	0.000125*	-0.000038	0.000036
	(0.000038)	(0.000072)	(0.000045)	(0.000039)
Observations	4,099,989	1,781,576	1,230,777	1,087,636
Mean of Dep. Var.	0.00233	0.00381	0.00153	0.000846
Std.Dev. of Dep. Var.	0.0482	0.0616	0.0391	0.0291

Notes: This table presents the estimated effects of physician daughters on female cancer screening and diagnostic tests by age. Each column shows the results from a separate OLS regression following equation (1), where each observation is a patient-year. The sample consists of female patients above 22 years old under the care of the baseline male physicians during 2007-2016 and is divided into different age groups for each column, as specified at the top of each column. The outcomes in each panel are binary variables that equal 1 if the patient receives a mammogram (Panel A), Pap test (Panel B), or cone biopsy (Panel C) in the given year, and 0 otherwise. The explanatory variable is the number of daughters the physician has. Each regression controls for physicians' age, physician number of children fixed effects, patients' education in months, patient age dummies, an indicator for ethnic minority patients, municipality fixed effects, and year fixed effects. Standard errors, in parentheses, are corrected for clustering at the physician level. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table A.19: Physicians' Number of Daughters and Female Cancer Stage at Diagnosis

	(1)	(2)	(3)	(4)
	Cancer Has Spread to Surrounding Tissue			
	Ages 22+	Ages 22-49	Ages 50-70	Ages 71+
Panel A: Breast cancer				
Girls	-0.00983**	-0.00356	-0.0137**	-0.00279
	(0.00477)	(0.01164)	(0.0060)	(0.00842)
Observations	17,430	2,256	10,165	5,009
Mean of Dep. Var.	0.757	0.797	0.771	0.710
Std.Dev. of Dep. Var.	0.429	0.402	0.420	0.454
Panel B: Gynecologic cancer				
Girls	-0.00568*	-0.00309	-0.00516	-0.0204*
	(0.00295)	(0.00230)	(0.00927)	(0.0110)
Observations	21,833	14,690	4,219	2,924
Mean of Dep. Var.	0.186	0.0457	0.325	0.688
Std.Dev. of Dep. Var.	0.389	0.209	0.469	0.463

Notes: This table presents the estimated effects of physician daughters on female cancer stage upon diagnosis. Each column shows the results from a separate OLS regression following equation (1), where each observation is a patient-year. The sample includes all female patients under the care of the baseline male physicians who are diagnosed with breast cancer (Panel A) or gynecologic cancer (Panel B) for the first time during 2007-2016. The outcomes in each panel are binary variables that equal 1 if the patient's cancer tumor has spread to surrounding tissue, and 0 otherwise. The explanatory variable is the number of daughters the physician has. Each regression controls for physicians' age, physician number of children fixed effects, patients' education in months, patient age dummies, an indicator for ethnic minority patients, municipality fixed effects, and year fixed effects. Standard errors, in parentheses, are corrected for clustering at the physician level. *** p <0.01, ** p <0.05, * p <0.1.

Table A.20: Physicians' Number of Daughters and Detection of Cervical Cell Changes

	(1)	(2)	(3)	(4)
	Pre-Cancerous Cervical Cell Changes Detected			
	Ages 22+	Ages 22-49	Ages 50-70	Ages 71+
Girls	0.00488*	0.00218	0.00835	0.0117
	(0.00282)	(0.00214)	(0.00884)	(0.0119)
Observations	21,833	14,690	4,219	2,924
Mean of Dep. Var.	0.840	0.959	0.721	0.417
Std.Dev. of Dep. Var.	0.366	0.198	0.449	0.493

Notes: This table presents the estimated effects of physician daughters on the detection of pre-cancerous cervical cell changes. Each column shows the results from a separate OLS regression following equation (1), where each observation is a patient-year. The sample includes all female patients under the care of the baseline male physicians who are diagnosed with gynecologic cancer or pre-cancerous cervical cell changes for the first time during 2007-2016. The outcomes in each panel are binary variables that equal 1 if the patient is diagnosed with cervical cell changes, and 0 otherwise. The explanatory variable is the number of daughters the physician has. Each regression controls for physicians' age, physician number of children fixed effects, patients' education in months, patient age dummies, an indicator for ethnic minority patients, municipality fixed effects, and year fixed effects. Standard errors, in parentheses, are corrected for clustering at the physician level. *** p <0.01, ** p <0.05, * p <0.1.

Table A.21: Balance Tests on Baseline Physicians' Male Patient Characteristics

	(1) % Male patients	(2) % Male pat. age<18	(3) % Male pat. age 18-64	(4) % Male pat. age> 65	(5) Male pat. age	(6) % Male pat. education	(7) % Male pat. ln(income)	(8) Male pat. minority	(9) % Male pat. married
Girls	0.000	-0.000	0.001	-0.001	-0.054	-0.255	-0.006	0.003	-0.004*
	(0.002)	(0.000)	(0.002)	(0.001)	(0.095)	(0.229)	(0.004)	(0.002)	(0.002)
Observations	7,322	7,322	7,322	7,322	7,322	7,322	7,322	7,322	7,322
Mean of Dep. Var.	57.71	0.0517	0.397	0.0990	53.49	162.7	12.77	0.0927	0.573
Std.Dev. of Dep. Var.	7.031	0.0166	0.0733	0.0335	3.448	9.739	0.205	0.0777	0.104

Notes: The table shows the results of balance tests examining whether physicians with more daughters (compared to more sons) differ in terms of their male patient characteristics. The sample consists of all male physicians in our baseline sample during 2007-2016. Each column shows the results from a separate OLS regression similar to equation (1), where each observation is a clinic-year. The outcome variables, measuring male patient characteristics, are listed at the top of each column. The explanatory variable is the number of daughters the physician has. Each regression controls for physician number of children fixed effects, year fixed effects, and municipality fixed effects. Standard errors, in parentheses, are corrected for clustering at the physician level. *** p <0.01, ** p <0.05, * p <0.1.

Table A.22: Physicians' Number of Daughters and Male Patient Mortality

	Death by Cause			
	Any	Cancer	Male-specific cancer	CV
	(1)	(2)	(3)	(4)
Girls	0.000182	0.000069	-0.000006	-0.000024
	(0.000122)	(0.000059)	(0.000018)	(0.000060)
Observations	3,219,989	3,219,989	3,219,989	3,219,989
Mean of Dep. Var.	0.0181	0.00576	0.000811	0.00478
Std.Dev. of Dep. Var.	0.133	0.0757	0.0285	0.0690

Notes: This table presents the estimated effects of physician daughters on male patient mortality by cause. Each column shows the results from a separate OLS regression following equation (1), where each observation is a patient-year. The sample consists of all male patients above 40 years old under the care of the baseline male physicians during 2007-2016. The outcomes are binary variables that equal 1 if the patient dies in a given year from any cause (column 1), any type of cancer (column 2), male-specific cancers (i.e., male reproductive organs) (column 3), or cardiovascular diseases (column 4), and 0 otherwise. The explanatory variable is the number of daughters the physician has. Each regression controls for physicians' age, physician number of children fixed effects, patients' education in months, patient age dummies, an indicator for ethnic minority patients, municipality fixed effects, and year fixed effects. Standard errors, in parentheses, are corrected for clustering at the physician level. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table A.23: Balance Tests for Female Physicians

	(1) Physician age	(2) Physician experience	(3) Physician married	(4) ln(Patients)	(5) ln(Female patients)	(6) % Female patients	(7) % Fem. pat. age<18
Girls	0.261	-0.083	0.078**	-0.008	0.003	0.007**	0.001
	(0.465)	(0.351)	(0.030)	(0.012)	(0.012)	(0.003)	(0.001)
Observations	3,325	3,325	3,325	3,325	3,325	3,325	3,325
Mean of Dep. Var.	53.56	10.65	0.661	7.283	6.752	0.591	0.0593
Std.Dev. of Dep. Var.	7.499	6.136	0.473	0.213	0.230	0.0598	0.0201

	(8) % Fem. pat. age 18-64	(9) % Fem. pat. age> 65	(10) Fem. pat. age	(11) Fem. pat. education	(12) Fem. pat. ln(income)	(13) % Fem. pat. minority	(14) % Fem. pat. married
Girls	0.007*	-0.001	-0.080	-0.605	-0.011*	0.008*	-0.003
	(0.004)	(0.002)	(0.235)	(0.478)	(0.006)	(0.004)	(0.003)
Observations	3,325	3,325	3,325	3,325	3,325	3,325	3,325
Mean of Dep. Var.	0.426	0.105	53.39	163.5	12.60	0.124	0.517
Std.Dev. of Dep. Var.	0.0785	0.0385	3.807	10.74	0.146	0.0847	0.0998

Notes: The table shows the results of balance tests examining whether female physicians with more daughters (compared to more sons) differ in terms of physician and patient characteristics. The sample consists of all female physicians in our analysis sample (i.e., Danish solo physicians with at least 750 patients) during 2007-2016. Each column shows the results from a separate OLS regression similar to equation (1), where each observation is a clinic-year. The outcome variables, measuring physician and patient characteristics, are listed at the top of each column. The explanatory variable is the number of daughters the physician has. Each regression controls for physician number of children fixed effects, year fixed effects, and municipality fixed effects. Standard errors, in parentheses, are corrected for clustering at the physician level. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table A.24: Female Physicians' Number of Daughters and Patient Mortality

	Female Mortality			Male Mortality	
	Female cancer	Breast	Gynecologic	Overall	Male-specific cancer
	(1)	(2)	(3)	(4)	(5)
Girls	0.000033	0.000022	0.000010	0.000078	0.000036
	(0.000034)	(0.000029)	(0.000022)	(0.000218)	(0.000039)
Observations	1,498,169	1,498,169	1,498,169	1,056,577	1,056,577
Mean of Dep. Var.	0.00109	0.000661	0.000429	0.0165	0.000762
Std.Dev. of Dep. Var.	0.0330	0.0257	0.0207	0.127	0.0276

Notes: This table presents the estimated effects of physician daughters on patient mortality by cause among female physicians. Each column shows the results from a separate OLS regression following equation (1), where each observation is a patient-year. The sample consists of patients above 40 years old under the care of the female physicians in our analysis sample (i.e., Danish solo physicians with at least 750 patients) during 2007-2016. The sample is divided by gender across the columns, with columns 1-3 for female patients and columns 4-5 for male patients. For columns 1-3, the outcomes are binary variables that equal 1 if the female patient dies in a given year from any female-specific cancer (breast or gynecologic) (column 1), breast cancer (column 2), gynecologic cancer (3), and 0 otherwise. For columns 4-5, the outcomes are binary variables that equal 1 if the male patient dies in a given year from any cause (column 4) or male-specific cancer (i.e., cancers of the male reproductive organs) (column 5), and 0 otherwise. The explanatory variable is the number of daughters the physician has. Each regression controls for physicians' age, physician number of children fixed effects, patients' education in months, patient age dummies, an indicator for ethnic minority patients, municipality fixed effects, and year fixed effects. Standard errors, in parentheses, are corrected for clustering at the physician level. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table A.25: Baseline Estimates Based on the Age of the Oldest Daughter

	(1)	(2)	(3)
	Age Range of the Physician's Oldest Daughter		
	≤11	≥26	≥40
Girls	-0.000077***	-0.000089**	-0.000081***
	(0.000026)	(0.000036)	(0.000026)
Age range	-0.000411*	0.000067	0.000372
	(0.000224)	(0.000093)	(0.000277)
Girls × Age range	0.000168	-0.000007	-0.000063
	(0.000147)	(0.000054)	(0.000138)
Observations	3,109,917	3,109,917	3,109,917
Mean of Dep. Var.	0.00132	0.00135	0.00131
Std.Dev. of Dep. Var.	0.0364	0.0367	0.0362

Notes: This table presents the estimated effects of physician daughters on female-specific cancer mortality by the age of the physician's oldest daughter. Each column shows the results from a separate OLS regression following equation (1), where each observation is a patient-year. The sample consists of all female patients above 40 years old under the care of the baseline male physicians during 2007-2016. The outcome is a binary variable equal to 1 if the patient dies from any female-specific cancers (breast or gynecologic) in the given year, and 0 otherwise. The explanatory variables include the number of daughters the physician has as well as its interaction with an indicator for the age range of the physician's oldest daughter, as specified in the column headers. Each regression controls for physicians' age, physician number of children fixed effects, patients' education in months, patient age dummies, an indicator for ethnic minority patients, municipality fixed effects, and year fixed effects. Standard errors, in parentheses, are corrected for clustering at the physician level. *** p <0.01, ** p <0.05, * p <0.1.

Table A.26: Physicians' Number of Daughters and Oral Contraceptive Pill Prescription

	(1)	(2)	(3)	(4)
	Ages 13-55		Ages 20-55	
	Any	2nd generation	Any	2nd generation
Girls × Post	-0.0004	0.0055*	-0.0007	0.0046*
	(0.001)	(0.003)	(0.001)	(0.002)
Observations	1,698,692	1,698,692	1,465,704	1,465,704
Mean of Dep. Var.	0.270	0.0468	0.235	0.0435
Std.Dev. of Dep. Var.	0.444	0.211	0.424	0.204

Notes: This table presents the estimated effects of physician daughters on the likelihood of female patients being prescribed any or the second-generation oral contraceptive pills during 2008-2017. The estimates in each column come from a single OLS regression similar to equation (2), where the dummy variable *Post* indicate years from 2012 onwards. The sample consists of all female patients aged 13-55 (columns 1-2) and those aged 20-55 (columns 3-4) under the care of the baseline male physicians. The outcome is a binary variable that equals 1 if the female patient in a given year is prescribed any oral contraceptive pill (columns 1 and 3) or the second-generation pill (columns 2 and 4), and 0 otherwise. The explanatory variables are the physician's number of daughters in 2011 interacted with the *Post* dummy for years after 2011. The regression controls for physician fixed effects, physician number of children fixed effects (measured in 2011) interacted with year dummies, physicians' age, patients' education in months, patient age fixed effects, an indicator for ethnic minority patients, municipality fixed effects, and year fixed effects. Standard errors are clustered at the physician level. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table A.27: Physicians' Number of Daughters and HPV Vaccinations

	(1)	(2)
	HPV Vaccination by Age 13	
	Any	Number
Girls × Post	0.019**	0.024
	(0.009)	(0.020)
Observations	21,677	20,629
Mean of Dep. Var.	0.680	1.319
Std.Dev. of Dep. Var.	0.467	1.114

Notes: This table presents the estimated effects of physician daughters on young female patients' HPV vaccinations during 2011-2018. The estimates in each column come from a single OLS regression similar to equation (2), where the dummy variable *Post* indicate years from 2015 onwards. The sample consists of all the 13-year-old girls under the care of the baseline male physicians in each year. In column 1, the outcome is a binary variable that equals 1 if the female patient has received any HPV vaccination by age 13, and 0 otherwise. In column 2, the outcome is the total number of HPV vaccinations the female patient has received by age 13. The explanatory variable is the physician's number of daughters in 2014 interacted with the *Post* dummy for years after 2014. The regression controls for physician fixed effects, physician number of children fixed effects (measured in 2014) interacted with year dummies, physicians' age, patients' education in months, patient age fixed effects, an indicator for ethnic minority patients, municipality fixed effects, and year fixed effects. Standard errors, in parentheses, are corrected for clustering at the physician level. *** p <0.01, ** p <0.05, * p <0.1.

Table A.28: Correlation Matrix of the Agreement Variables

	(1)	(2)	(3)	(4)	(5)
(1) Collaboration	1.000				
(2) Communication clarity	0.434*	1.000			
(3) Time spent	0.377*	0.455*	1.000		
(4) Empathy	0.447*	0.508*	0.588*	1.000	
(5) Trust	0.451*	0.507*	0.522*	0.700*	1.000

Notes: The table shows the correlation matrix between the survey items used to measure physician satisfaction. The correlation is based on all people responding to the survey, which is 20,906 individuals. $*$ shows significance at the 5 percent level.

Table A.29: Factor Loadings and Uniqueness of the Agreement Variables

	Factor1	Uniqueness
(1) Collaboration	0.572	0.673
(2) Communication clarity	0.646	0.583
(3) Time spent	0.673	0.548
(4) Empathy	0.809	0.345
(5) Trust	0.783	0.387

Notes: The table shows the factor loading pattern matrix and unique variance from the different survey items used to create the composite measure of overall physician satisfaction. The values are based on all people responding to the survey, which is 20,906 individuals.

Table A.30: Effects on Patient Experiences and Physician-Patient Relationships – Male Patients

	(1) Overall satisfaction	(2) Collaboration	(3) Communication clarity	(4) Time spent	(5) Empathy	(6) Trust
Panel A.						
Any male physicians with a daughter	-0.007	-0.007	0.004	0.015	-0.003	-0.012
	(0.031)	(0.016)	(0.012)	(0.016)	(0.013)	(0.012)
Panel B.						
Share of male physicians with at least one daughter	-0.009	-0.001	-0.000	0.017	-0.006	-0.013
	(0.030)	(0.015)	(0.011)	(0.015)	(0.012)	(0.012)
Observations	6,791	6,829	6,826	6,829	6,833	6,829
Mean of Dep. Var.	0.0612	0.780	0.897	0.808	0.864	0.880
Std.Dev. of Dep. Var.	0.845	0.414	0.305	0.394	0.343	0.325

Notes: This table presents the estimated effects of physician daughters on measures of patient experience and physician-patient relationships, based on patient survey data collected in 2019. Each column shows the results from a separate OLS regression following equation (3), where each observation is a patient. The sample consists of all male patients in the patient survey from a primary care clinic with at least one male physician. For column 2-6, the outcome is a binary variable that equals 1 if the patient agrees with the given statement about their experience and relationship with the physician, and 0 otherwise. In column 1, the outcome is a composite measure that summarizes the patient's overall satisfaction with the physician, based on factor analysis that combines the five statements across columns 2-6. The explanatory variable in panel A is an indicator that equals 1 if any male physician in the clinic has a daughter, and 0 otherwise. The explanatory variable in panel B is the share of male physicians in the clinic with at least one daughter. Each regression controls for patients' education in months, patient age dummies, an indicator for ethnic minority patients, municipality fixed effects, fixed effects for the number of physicians in the clinic, physicians' average age, share of male physicians in the clinic, share of ethnic majority physicians in the clinic, and fixed effects for the average number of children among physicians, where the average number of children has been rounded to the nearest whole number. Standard errors, in parentheses, are corrected for clustering at the physician level. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table A.31: Physicians' Number of Daughters and Patients' Healthcare Utilization

	(1) Any contact	(2) Number of visits	(3) Services per visit
Girls	-0.000029	0.0268	-0.00979
	(0.000746)	(0.0449)	(0.00905)
Observations	3,841,524	3,841,524	3,841,524
Mean of Dep. Var.	0.919	7.025	1.597
Std.Dev. of Dep. Var.	0.272	6.150	0.884

Notes: This table presents the estimated effects of physician daughters on female patients' health care utilization. Each column shows the results from a separate OLS regression following equation (1), where each observation is a patient-year. The sample consists of all female patients above 22 years old under the care of the baseline male physicians during 2007-2016. The outcomes are a binary variable that equals 1 if the patient has any contact with her physician in the given year (column 1), the total number of times she visited the physician in the year (column 2), and the average number of services the physician provided per visit (column 3). The explanatory variable is the number of daughters the physician has. Each regression controls for physicians' age, physician number of children fixed effects, patients' education in months, patient age dummies, an indicator for ethnic minority patients, municipality fixed effects, and year fixed effects. Standard errors, in parentheses, are corrected for clustering at the physician level. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.