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WOMEN LEFT BEHIND: GENDER DISPARITIES IN UTILIZATION OF GOVERNMENT HEALTH INSURANCE IN INDIA

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Women Left Behind: Gender Disparities in Utilization of Government Health Insurance in India

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ABSTRACT

We document large gender disparities within a government program that entitles 46 million poor individuals to free hospital care. We show that care is not free in practice and higher costs are associated with larger disparities. Lowering care costs increases female utilization but does not reduce gender disparities because marginal beneficiaries are as likely to be male as inframarginals. Long-term exposure to local female leaders reduces disparities by addressing factors lowering female care. In the presence of gender bias, subsidizing social services may fail to address gender inequalities without actions that specifically target females.

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1 Introduction

India consistently ranks among the five worst countries in the world for the health and survival of females (World Economic Forum, 2021). A substantial body of research has documented gender bias in the allocation of household resources, and of health inputs in particular, and shown that it results in worse female health outcomes. Heavily subsidizing health care has been a key policy response to address health inequalities. For decades, this largely entailed direct provision of health care through a large network of public health facilities. Since 2008, policy has increasingly shifted to financing the provision of care through publicly-funded health insurance programs. By the end of 2018, government health insurance covered the poorest 40% of the Indian population, or approximately 500 million people. Ensuring universal and equitable access to health care is an explicit goal of these programs. This paper shows evidence of substantial gender disparities in such programs and investigates why they persist.

We study the Bhamashah Swasthya Bima Yojana (BSBY), a government health insurance program that entitles 46 million poor individuals in Rajasthan, India, to free care at public and private hospitals. This is half the total population of the U.S. national Medicaid program (92 million).[1] We compile a dataset of insurance claims for all 4.2 million hospital visits under the program from its launch in late 2015 through late 2019. We geocode both hospital locations and patient addresses, which allows us to measure geographic proximity to hospitals and the distance traveled for every hospital visit. We also match patient residence locations to two rounds of the population census and to data on the gender of local political leaders (Sarpanches) across three elections between 2005 and 2015. To our knowledge, this is the first dataset of its type in India and allows us to study health care seeking under insurance with unusual granularity across time, geography, and type of care.

We first document large gender disparities on both the extensive and intensive margins of BSBY utilization. Females account for only 45% of all hospital visits, with the biggest gaps among children under 10 years (33%) and adults 50 years and older (43%) (Figure 1), and are particularly underrepresented in private and higher-value tertiary care. Differences in underlying health needs cannot account for the gap: across several health conditions, the female share of

[1]BSBY was a precursor to, and was later incorporated into, the national Pradhan Mantri Jan Arogya Yojana (PMJAY) program, the largest health insurance program in the world.

BSBY hospital visits is more than 10 percentage points (pp) lower than is expected based on local sex-specific illness prevalence estimates and the sex ratio in the population. Using male BSBY utilization as the benchmark, we estimate over 225,000 missing female hospital visits between 2017 and 2019 for nephrology, cardiology, and oncology services alone. Furthermore, the female shares of utilization and spending *decrease* over four years of BSBY implementation, even as total utilization increases substantially (Figure 2), indicating that program expansion alone is insufficient to address these gender gaps. As a result of these disparities, 57% of total public spending and 60% of non-childbirth spending on BSBY is on males. In comparison, 43% of annual Medicaid spending in the United States is on males.[2]

We propose a conceptual framework to explain why gender inequalities in care-seeking persist despite the substantial subsidy for hospital care and the likely impact of different types of policy interventions. First, gender-biased societal norms and practices lead to three classes of factors, or "wedges", that lower household demand for female care relative to males: 1) the economic return on investments in female health may be lower due to factors like patrilocality and low female labor force participation ("differential returns"); 2) households may value female health less ("biased preferences"); 3) the cost of seeking care for females may be higher than for males due to factors such as women's limited mobility, safety concerns, and domestic duties ("female-specific costs"). While the first two factors result in households being willing to allocate fewer resources to female health, the third dampens demand because it increases the cost of female care.

The first empirical implication of the framework is that, if BSBY is not costless, female utilization of BSBY will be lower than for males and care-seeking costs will be associated with larger gender disparities. We document that this is the case. Drawing on almost 20,000 surveys with BSBY patients, we first show that care is not free in practice: almost 40% of patients report unauthorized out-of-pocket (OOP) charges by hospitals. Using OOP charges for male care to calculate average charges by hospital and service, we show that the female share of BSBY visits decreases by about 3.5% with every additional 1,000 INR (∼$14) in OOP charges for a service. The female share of utilization also decreases by about 3.5% for every additional 10km in the

[2]Authors' calculations using the data available here: https://www.cms.gov/Research-Statistics-Data-and-Systems/Statistics-Trends-and-Reports/NationalHealthExpendData/Downloads/AgeandGenderTables.zip (last accessed on 2/6/2020).

distance to the nearest hospital, indicating that households are more likely to forego care for females as travel costs increase, and, conditional on seeking care, the distance traveled is 10% greater for males than females *within the same household*. Differences are also significant among children, suggesting that higher female-specific costs of travel for women cannot fully explain the gender gap.[3] These results show that BSBY does not fully offset care-seeking costs—even if BSBY can ensure that hospital care is free, households face travel and time costs—which results in gender disparities because households are willing to allocate fewer resources to female health. Female-specific barriers may further increase the household's cost of care-seeking for women, exacerbating the disparities.

Having shown that costs contribute to gender inequalities, a natural question is whether decreasing costs reduces gender inequality. We exploit an administrative reform in January 2018 that suddenly expanded the number of private hospitals allowed to participate in BSBY to test whether decreasing the cost of available care options near locations with previously limited access (effectively increasing the BSBY subsidy) helped close the gender gap. We conduct a difference-in-differences analysis, comparing changes in BSBY utilization in locations where the reform reduced the distance to the nearest private hospital to locations at a similar distance from the nearest hospital in 2017 but no reduction in 2018. Lowering the distance to the nearest subsidized private hospital by about two-thirds (20km) increases female BSBY visits by 17% and male visits by 19% and fails to change the gender gap over the next year (and remains substantial almost two years later). The second insight of our conceptual framework helps make sense of the somewhat counterintuitive finding that reducing care costs does not reduce gender inequality even though higher costs are associated with larger gender gaps. Increasing the BSBY subsidy induces some households to obtain care for females (in addition to males), thus increasing female utilization. It also induces some households to start obtaining care, but only for males; inducing them to bring women would require an even larger subsidy. The effect of lowering care costs on the gender gap in overall program usage depends, therefore, on the composition of households it induces to obtain care. More simply, increasing the BSBY subsidy increases female levels of utilization but may not reduce gender *disparities* because males benefit

[3]The cost to the household of distance may be higher for women than for men if, for example, women require an escort. However, this should not affect girls more than boys, as their care is arranged by an adult and need not depend on child gender.)

at least as much, proportionally, as females do. An important implication is that, although a large enough subsidy could reduce the gender gap, public spending would still be substantially male-skewed and subsidizing a large number of inframarginal males.

The third key insight of our framework is that directly targeting the factors that lower household demand for female care, such as gender bias and the specific care-seeking barriers women face, is an important complementary strategy for reducing gender disparities (and may be the only way to fully close them). In the final section of the paper we look at whether mandated political reservations for females in village elected councils (Gram Panchayats), a gender-targeted policy that has been shown to reduce bias in perceptions of and investments in females (Beaman et al., 2009, 2012; Chattopadhyay and Duflo, 2004), has an effect on gender disparities in BSBY utilization. Exploiting the randomized reservation of a third to half of GP leadership positions across three elections between 2005 and 2015, we find a 1.5-3% increase in the female share of BSBY visits among children and adults. However, there is no improvement among the elderly. Effects are not driven by reservation in 2015, but accumulate over ten or more years of exposure. We provide evidence that long-term changes in gender norms and maternal and child health investments that reduce women's care-seeking barriers, rather than direct assistance with BSBY, are the primary mechanisms, consistent with reservations directly shifting the factors that affect female demand. We also find suggestive evidence that females are more likely to be the marginal beneficiaries of cost reductions through empanelment in areas with long-term exposure to female leaders. These results add to the growing literature on the effects of female political reservations (see Hessami and da Fonseca (2020) for a review) and demonstrate that interventions that attempt to counteract gender bias by strengthening the position of women can have downstream, complementary effects on the extent to which females benefit from seemingly unrelated policies. However, while this illustrates the importance of targeting women, the effects on BSBY utilization are small, exclude the elderly, and take years to manifest. Other gender-targeted policies that specifically lower or offset female care costs, such as transport assistance or female-specific care subsidies, could potentially reduce gender gaps more quickly.

Our paper contributes to a large literature on gender inequality in healthcare in India. Gender differences in health outcomes are summarized most strikingly in the estimated 63 million missing women in India in 2018 (Government of India, 2019). Women who are alive have high rates of

under-nutrition and anemia, and female height has grown less rapidly than male height over the past decades of economic growth.[4] Gender discrimination in health-related inputs, including immunization, nutrition, breastfeeding, medical treatment, and health care expenditure, endures in India and contributes to worse female health outcomes.[5] Whereas much of this evidence comes from household surveys and focuses on early childhood primary care services, we provide large-scale state-level evidence using administrative insurance records for the full range of hospital care and across the age distribution.

Our finding of large gender disparities at older ages draws attention to the known but underemphasized fact that elderly women in India, particularly widows, are socio-economically disadvantaged and suffer substantial discrimination (Chen and Drèze, 1992; Jensen, 2007). Anderson and Ray (2010) and Datt et al. (2022) show that a large and growing share of missing females in India are 50 years or older, but remain agnostic about the factors driving this. Maharana and Ladusingh (2014) show large gender disparities in food and health expenditures among the elderly between 2000 and 2008. Calvi (2020) shows that older women are poorer than older men within the same household, reflecting their declining bargaining power, and links this to increased mortality, but does not identify the role of differential health care. Studies of hospital use find larger gender differences at older ages (Kapoor et al., 2019; Shaikh et al., 2018; Pandey et al., 2017). We provide large-scale evidence of intra-household gender differences in health care inputs among the elderly and show that they are resistant to public subsidies and female political representation. Government health programs, particularly at the village level, focus heavily on maternal and child health. Gender empowerment efforts that work to build female aspirations and agency typically also leave out the elderly. Ensuring social policy takes into account the specific circumstances of elderly women will become only more important as the Indian population ages.

Our main contribution is to show that a massive public subsidy is not reaching women as effectively as it is men, and that large gender disparities persist even when care is highly subsidized. Our results are consistent with raw gender differences observed in health insurance programs in

[4]See IIPS (2017), Deaton (2008).

[5]We do not attempt to summarize the vast literature, but Saikia and Bora (2016), Rajan and Morgan (2018), Khera et al. (2014), and Pande (2003) provide extensive summaries of the literature on differences spanning the last several decades.

other states (Kaur et al., 2020). Shaikh et al. (2018) show that, between 2008 and 2012 under a similarly designed government health insurance program in Andhra Pradesh, the female share of hospitalizations for "sex-neutral" conditions is 42% and the female share of program spending is 39%. By geocoding and linking our insurance claims data to other complementary datasets, we extend this work substantially, demonstrating that further increasing subsidies may not be sufficient to close gender gaps because male may continue to benefit as much as (or more than) females. This goes against the common assumption, implicit in much government policy in India, that expanding geographic access and reducing the cost of health care will automatically reduce inequalities (Reddy et al., 2011). We build on insights from studies that show that the relationship between increased household resources (Kanbur and Haddad, 1994) or subsidized social services (Oster, 2009) and intra-household inequality may be non-monotonic and that disadvantaged members may not necessarily benefit as much as others. More generally, we provide empirical support for the view that gender-neutral health and development policies are insufficient to address gender inequity (Duflo, 2012; Raj, 2011). The implications for policy are critical and generalize to services beyond healthcare: In the presence of deep societal gender biases, increasing access and reducing the costs of social services may help increase utilization among vulnerable populations, including women. However, ensuring that females benefit as much as males from social programs and addressing gender disparities in outcomes will require strategies directly targeting the costs and barriers faced by females in the short run, alongside longer term legal and social endeavors to strengthen the rights and bargaining power of females.

2 Gender Disparities in Utilization of Insured Care

2.1 The BSBY Insurance Program

The Bhamashah Swasthya Bima Yojana (BSBY) is a government health insurance program launched in December 2015 that entitles low-income households in Rajasthan to free secondary and tertiary care at public and empaneled private hospitals.[6] All public hospitals were automatically included in BSBY when the program was launched. Private hospitals that meet

[6]Primary care includes basic preventive and curative care delivered by doctors, clinics, and health centers. Secondary healthcare refers to basic hospital stays and uncomplicated child deliveries provided by community health centers and small hospitals. Tertiary healthcare refers to complex services, including in-patient intensive care and major surgeries, provided by the most specialized facilities.

basic eligibility criteria (formally registered, minimum bed capacity, and equipped and staffed to provide key services) must be officially "empaneled", or registered in BSBY and authorized to file claims. Broadly, BSBY covers the cheapest hospitals (public) and the bottom half of the quality/price distribution of private hospitals, excluding very low-quality and non-hospital health facilities and the very high-end hospitals. Of the 1,024 hospitals participating in BSBY in its first year, 466 (45%) were public; by late 2019, the total had increased to just over 1,400 hospitals, two-thirds of which were private.[7]

All members of households that meet state poverty criteria are eligible and automatically enrolled in BSBY. To verify eligibility at the point of care, households must simply present their Bhamashah Card, a biometrically-linked card that is issued to all households in Rajasthan (in the name of the female head of household) and provides access to a range of social programs. Households face no premium or co-pay and care is supposed to be entirely free. The program covers approximately 1,400 services. Hospitals are reimbursed at pre-specified rates for each service that cover all visit costs, including hospital fees, diagnostics, and medicines, so that patients pay nothing. Households are entitled to care worth up to 130,000 INR ($\sim$ \$1,900) per household per year (this increased to $\sim$\$4,700 two years into the program).[8] The program has a single, semi-governmental insurer. The verification of patients and the filing, review, and reimbursement of hospital claims is managed through a central government IT system that generates the administrative data we use. Program spending through October 2019 was approximately 26 billion INR (USD 375 million).

[7]The supply of public facilities is administratively determined and largely fixed over time. Public and private hospitals are not perfect substitutes. While the largest government hospitals and medical colleges based in big cities and district headquarters provide a wide range of services, including complex tertiary care, most public hospitals are relatively small secondary care facilities that largely focus on basic maternal and child health services and cannot handle complex cases or surgeries. "Ob-Gyn", "General Medicine" and "General Surgery" (which cover non-specific illness and basic procedures) account for over 80% of public hospital claims, while services like Cardiology, Urology, Nephrology, Orthopedics are typically provided by private hospitals.

[8]While limits on financial coverage under insurance are unusual in contexts like the U.S., all public and many private health insurance programs in India follow this design, in part to prevent egregious fraud. The annual limit does not bind or appear to affect the care-seeking decisions of most households: less than 1% of households come within 5% of their annual allowance); surveys show that households are mostly unaware of the limit; and there is no end-of-year bunching of hospital visits to suggest households anticipate and rush to exhaust their allowance.

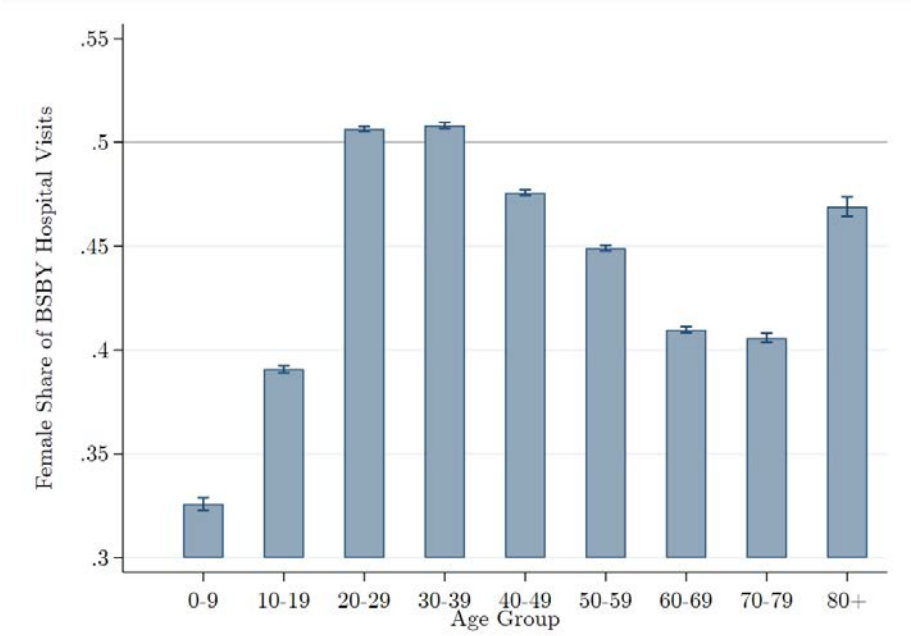
2.2 Insurance Claims Data

We obtained access to administrative data on the universe of insurance claims filed under the BSBY program from its launch through October 2019. These data include information on the 1) hospital: ID, name, sector (public/private), and address; 2) care provided: health service code (but no diagnostic or treatment details), medical specialty (e.g. Urology or Cardiology, reimbursement rate, claim filing date, and visit ID; and 3) patient: age, sex, residence address, and household ID. The unit of observation for most of our analysis is the hospital visit, which may include more than one claim if multiple services were provided (results are not sensitive to this choice). Our main analysis excludes visits in 2016 (the first year), when administrative data quality were lower; childbirths, which have no male counterpart; and neonatal claims, which typically include the parent's demographic details rather than the child's. Table A1 provides summary statistics from the compiled dataset on hospital visits. We study 3.21 million hospital visits by 1.97 million unique patients from 1.67 million households between January 2017 and October 2019. Just over half (55%) of all BSBY visits were to private hospitals, 15% were for long-term chronic (repeat) care, and 26% were for more complex tertiary care.

2.3 Large and Persistent Gender Gaps in BSBY Utilization

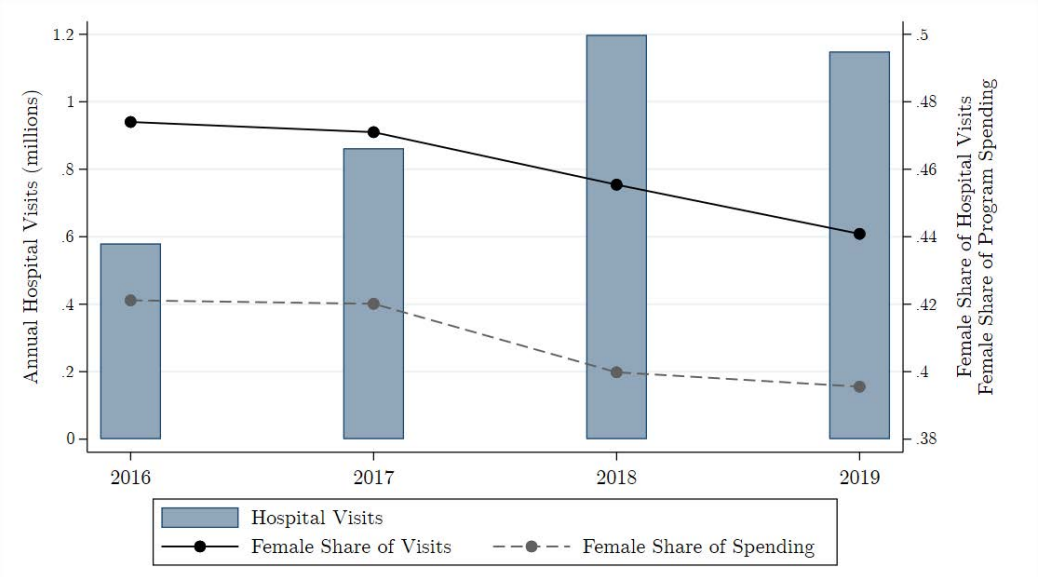
We observe striking gender disparities in both the quantity and type of care received under BSBY. Figure 1 plots the female share of all hospital visits (excluding childbirths and neonatal care) under BSBY in ten-year age bins. Females account for 45% of all visits, and this share is lowest among children under 10 years (33%) and adults 50 years and older (43%). Figure 2 shows that these gaps do not decrease as the program expands over time. Total annual visits grow from just under 600,000 visits in 2016, the first year of the program, to almost 1.2 million in the first 10 months of 2019 (recall our data ends in October 2019), reflecting increases in awareness of the program and the empanelment of additional hospitals. Over the same period the female share of hospital visits *decreases* from 47% to 44%. Figure A1 shows that the gender gaps are larger for private than public hospital care and for tertiary than secondary care. In other words, females are particularly underrepresented in more complex care and private facilities that are widely perceived to be higher quality and more expensive.

Figure 1: Female Share of BSBY Hospital Visits by Age Group



Notes: The figure presents the female share of total BSBY hospital visits within each age group using program administrative claims data. Claims data are restricted to the study sample: they exclude 2016, childbirth, and neonatal care claims (see Table A1 notes). Capped spikes represent 95% confidence intervals.

Figure 2: BSBY Utilization Over Time



Notes: The figure shows total annual hospital visits (bars), the female share of visits (solid line), and the female share of total program spending (dashed line) under BSBY using program administrative claims data from January 2016 (shortly after the launch of the program in December 2015) through October 2019 (when our access to the data ended). Childbirth and neonatal care visits are excluded. Program spending is the total value reimbursed to hospitals for insurance claims filed.

As a result of these differences in the likelihood and type of utilization, program spending is male-skewed: 57% of total BSBY reimbursements to hospitals and 60% of all non-childbirth reimbursements are for male patients (Figure 2). This is in contrast with the substantially higher spending on female healthcare observed in many other countries for which similar data are available. In the U.S. Medicaid program and in the Netherlands, Korea, and the Czech Republic, just under 45% of healthcare spending is on males.[9]

We rule out gender mismeasurement in the claims data as an explanation. Figure A2 shows that, in a sample of over 10,000 post-visit patient surveys, the patient's gender classification in the claims data was confirmed 97.1% of the time across a range of services.[10] Differences in enrollment are also unlikely to explain the gap, as all household members listed on the Bhamashah card, which is registered in the female head of household's name, are automatically enrolled in BSBY, and household surveys confirm that girls are no less likely than boys to be registered among children born after the household got its Bhamashah card.

2.4 Gender Gap Unexplained by Lower Illness Prevalence

To test whether the persistent gender gap in patient composition is driven by gender differences in the prevalence of health conditions, we obtain data on gender- and age-specific illness prevalence for India from the Global Burden of Disease Study (IHME, 2019), henceforth "GBD", the most comprehensive available estimates of illness and causes of death.[11] We combine this with Rajasthan's demographics from the 2011 Population Census to compute the estimated female share of total prevalence for a condition given the current population demographic structure (including population sex imbalances).[12] We conduct this exercise for 7 broad categories of health conditions that can be mapped from the medical specialties recorded in BSBY claims to GBD classifications and which together comprise 26% of total non-childbirth claims and 54% of claims for specialized services excluding general medicine and surgery.

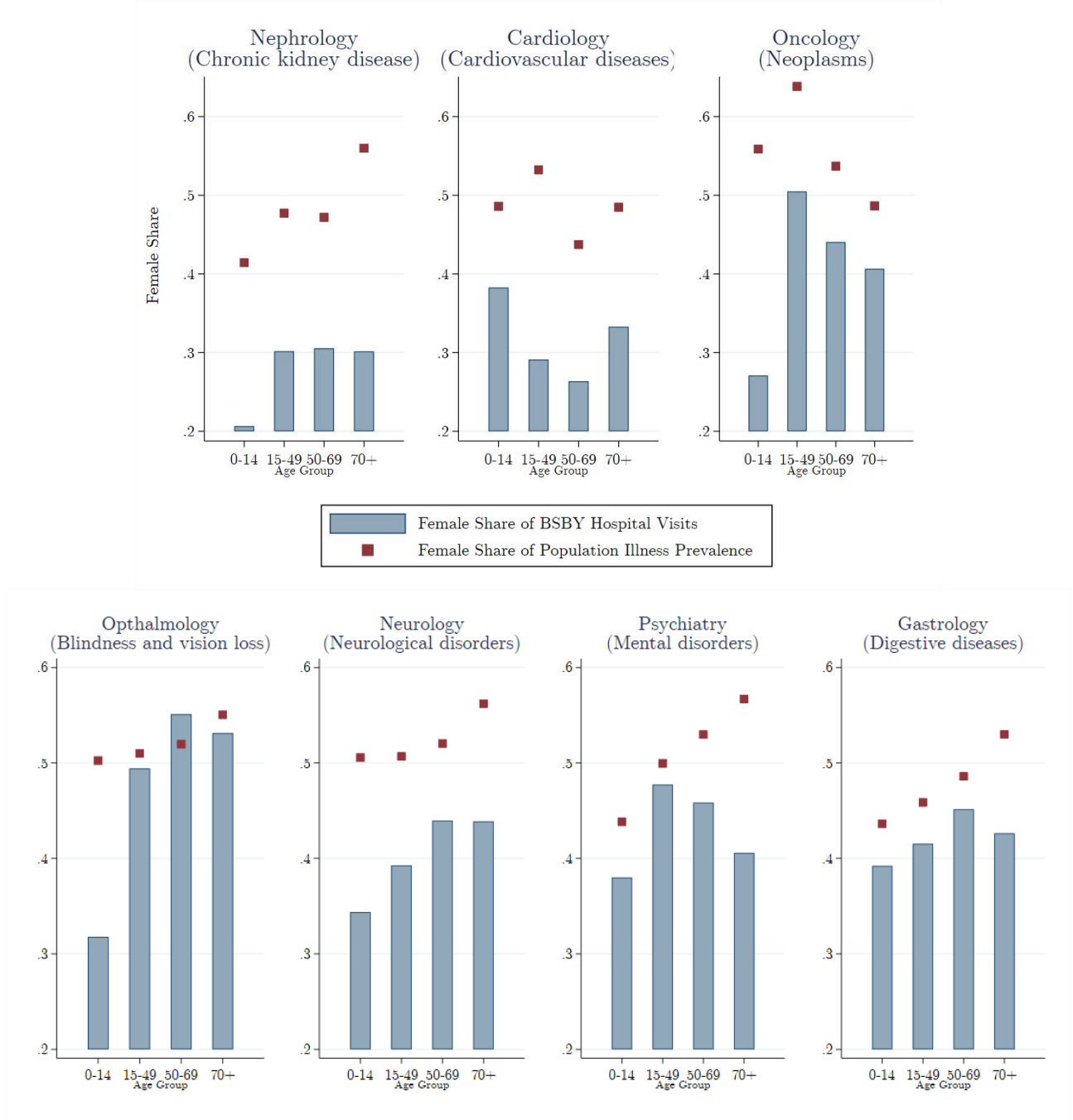
[9] See footnote 2 for Medicaid data. Data for the other countries was obtained from https://www.oecd.org/health/Expenditure-by-disease-age-and-gender-FOCUS-April2016.pdf

[10] Accounting most conservatively for errors in both data sources and using the highest of the female confirmation and lowest of the male confirmation rate ranges, the adjusted female share of claims among children aged 0-9 would increase from 33% to 0.33*(0.98)+0.67*(0.11) = 39.7%.

[11] GBD prevalence estimates are modeled if directly measured data are unavailable. For our analysis, we use the female:male ratios, rather than prevalence levels, which are less subject to modeling error.

[12] Females comprise 47% of the under-10 population, 50.5% of the 50 and older population, and 48% of the total population in Rajasthan per the 2011 Census.

Figure 3: Female Share of BSBY Hospital Visits Versus Illness Prevalence



Notes: The observed female share of BSBY hospital visits is based on program claims data in our study sample (January 2017-October 2019). The female share of illness for each condition is based on the age-sex specific estimates of illness prevalence from the Global Burden of Disease (GBD) 2019 estimates for India, combined with Rajasthan's age-sex specific population from the 2011 Population Census. We match GBD health conditions to BSBY care specialties as follows: Chronic kidney disease = Nephrology; Cardiovascular diseases = Cardiology; Neoplasms = Oncology; Blindness and vision loss = Opthamology; Neurological disorders = Neurology; Mental disorders = Psychiatry; Digestive diseases = Gastrology.

Figure 3 plots the female share of BSBY visits in bars and the estimated female share of prevalence in the population in squares for each medical specialty. The female share of hospital visits under BSBY is markedly below what would be expected based on GBD prevalence estimates for almost every age group and specialty we examine. For example, females account for 48% of people 15 years and older with chronic kidney disease in the population per GBD estimates, but only 30% of BSBY visits for chronic kidney disease by patients in the same age group. When we compare the condition-specific female share across all age groups in BSBY with that in the GBD (weighting each age group in the GBD by the age-group share of total BSBY visits for that condition among males), we find deficits of 4pp or more for 6 of the 7 specialties we study, and of 10pp or more for 4 of the 7 (Table A2). In other words, the gender disparities in utilization of BSBY are not because women are less sick. In fact, for many conditions and age groups, females have higher illness prevalence than men and should account for a greater share of BSBY visits. Although the BSBY population may be different from the GBD population, it is unlikely that selection can explain differences of this magnitude across several medical specialties.

For a rough estimate of what these gaps mean in absolute numbers, we use male BSBY utilization as a benchmark and calculate the number of "missing" female visits for each medical specialty: that is, the additional female visits we would observe if female utilization of BSBY, conditional on illness prevalence, was the same as for males. Table A2 shows that, while the numbers are small for low-prevalence conditions, we estimate over 230,000 missing female visits between 2017 and late 2019 for these 7 medical specialties, with nephrology, oncology, and cardiology accounting for most of them.[13] This is a ballpark estimate and does not account for uncertainty in the GBD estimates or differences in the underlying populations, but it indicates the very large number of women that are not receiving the critical, life-saving health services under BSBY to the same degree men do. Because we use male utilization and not illness prevalence as the benchmark, this is an estimate of gender *differences* in BSBY utilization and not the full extent to which women in BSBY are not receiving the care they should, which is likely to be far higher.

One limitation of our administrative data is that we only observe care received under the BSBY

[13] One may wonder if missing visits are explained by "missing women", where the sickest women that would need hospital care are already dead. Note that GBD prevalence estimates are for the current population, and thus already account for sex-specific premature mortality due to illness or other reasons. We also find large gender imbalances if we use GBD incidence (new annual cases) rather than prevalence estimates.

scheme. If women disproportionately receive unsubsidized care at non-BSBY hospitals, the low BSBY utilization we observe may not reflect lower overall hospital utilization. While we do not have data to rule it out, this scenario is highly unlikely. Firstly, BSBY includes all public hospitals, which are typically the cheapest hospitals; it excludes lower-level health facilities (primary care health centers and clinics), very low-quality hospitals, and very high-end hospitals. It is unlikely, in our context, that women are systematically getting high-end private hospital care outside BSBY; they could be getting very low-quality or non-hospital care instead of BSBY hospital care, which nevertheless reflects inequalities in hospital care. Furthermore, the 2018 National Sample Survey (NSS) shows that the statewide female (reported) hospitalization rate excluding childbirths was lower than for males and the female share of hospitalizations was 44% (compared to 45% in BSBY in the same year), with disparities among children and the elderly driving these gaps, just as in our BSBY data. Although the statewide NSS is not exactly comparable to the BSBY population, it strongly suggests that our analysis is not missing large numbers of women obtaining hospital care outside BSBY.[14]

3 Conceptual Framework

This section lays out a simple framework for analyzing gender differences in household health investments. We consider a utility-maximizing household with two members indexed by $i \in [m, f]$. The household chooses the levels of health investments x_m and x_f in each member. Investment in health weakly increases the household's present discounted lifetime earnings, based on the earnings function: $R_i(x_i) \equiv R(x_i, g_i)$. Earnings depend on the member's health investments well as their gender, g_i, because social norms and societal biases, such as patrilocality (girls leave the house at marriage, while boys support parents in old age) and low female labor force participation, may lower the return on investments in female health.

The cost of the health input (a hospital visit) to the household, including hospital payments, travel, lodging, foregone wages etc. is c for males and $c + c_f$ for females. This allows for the

[14]The NSS is a series of household consumption and employment surveys that include additional modules on specific subjects in some rounds. NSS Round 75 (2018) included a health module that collected data on reported hospitalizations in the last year, the only available population-representative data on hospitalizations. However, NSS hospitalizations are not perfectly comparable to BSBY utilization because they are self-reported rather than observed from hospital records and cover the entire population rather than the specific set of BSBY-eligible services and households.

possibility that there may be additional female-specific care-seeking costs c_f, for example, if women need an escort or special transport provisions; if the opportunity cost of their time is higher because they are uniquely responsible for household work and childcare; if they prefer female doctors (which are relatively rare in India); if they are less informed about BSBY hence less able to obtain free care (Dupas and Jain, 2023); if they face additional discrimination at the hospital, etc.

The household's utility function is:

$$U(X, x_m, x_f) = \alpha X + \Big[R_m(x_m) + R_f(x_f)\Big] + \gamma(x_m)$$

where α is the weight put on consumption of non-health goods X (priced at 1) relative to the present discounted value of lifetime earnings, and γ represents the preference for investing more in the male than the female due to taste-based gender bias.

Total household income is I, and the budget constraint is: $X + c(x_m + x_f) + c_f x_{x_f} = I$.

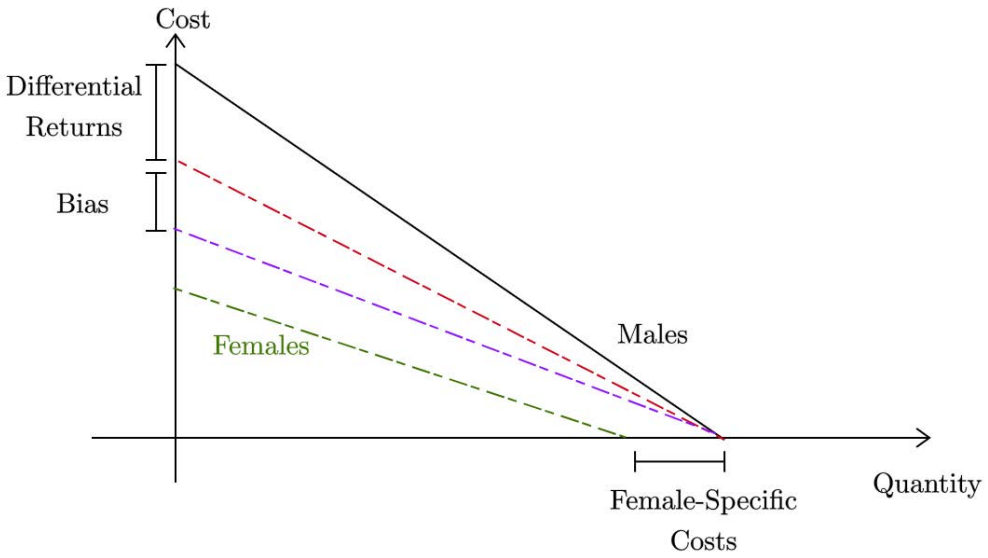
The first-order conditions yield the following result:

$$\frac{\partial R_f}{\partial x_f} = \frac{\partial R_m}{\partial x_m} + \gamma + \alpha c_f$$

We see that, first, if there are no female-specific costs of care ($c_f = 0$) and no preference for males ($\gamma = 0$), the household equalizes returns to investments across the two members ($\frac{\partial R_f}{\partial x_f} = \frac{\partial R_m}{\partial x_m}$). Thus, if the returns to health investments are lower for females, the household invests less in female health as long as the common cost of healthcare is strictly positive ($c > 0$), even absent biased preference or female-specific costs. Second, male preference ($\gamma > 0$) also reduces investments in female health as long as the common cost of care is positive ($c > 0$). Third, female-specific costs ($c_f > 0$) lower investments in females even if the common cost of care is zero ($c = 0$), there are no gender differences in returns to health investments ($R_f = R_m$), and no taste-based discrimination (γ=0). Note that the first two factors dampen demand for female care because households are willing to allocate fewer resources to female than male care, while the third dampens demand by increasing the cost to the household of female care.

Figure 4 illustrates how these three wedges can lower a household's demand for female relative

Figure 4: Sources of Gender Disparities in Demand for Care



Notes: The figure is illustrative. We draw one demand curve for males, and three potential demand curves for females: The red line shows the healthcare demand for females if the only wedge stems from differential returns to healthcare (the returns are lower for female). The purple line show healthcare demand for females when there is also a preference for males (bias). The green line shows healthcare demand for females when there are also female-specific costs in addition to the other two wedges. The y-axis reflects the total gender-neutral financial and non-financial costs of care-seeking ("common costs").

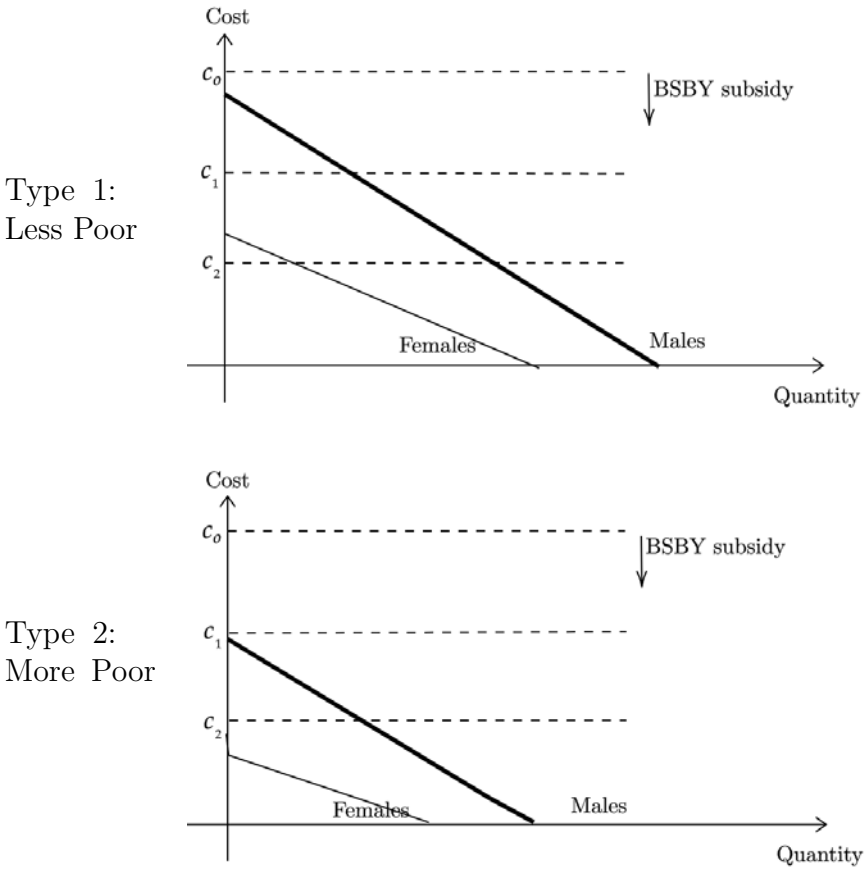
to male care. The horizontal distance between the curves for males and females is the gender difference in the quantity of care consumed by the household. As the figure shows, if any of the three wedges are present, a subsidy that lowers but does not eliminate care costs (i.e. $c > 0$) will not fully close the gender gap and, if $c_f > 0$, only negative prices (paying women to receive care) would achieve parity.[15] However, (sufficiently large) reductions in c can induce households to increase female usage and lower care inequality within the household.

This does not necessarily imply that reducing c will lower the *overall* program-level gender gap in care-seeking. We illustrate this in Figure 5. Assume, for illustration purposes, BSBY-eligible households within a village are heterogeneous in income, which affects their budget constraint and, therefore, their demand for care: there are less poor (Type 1) and more poor (Type 2) households. A small subsidy from c_0 to c_1 lowers the cost enough to induce Type 1 households to participate, but they seek BSBY care only for males. A larger subsidy that reduces the cost to c_2 reduces inequalities in these households, as they now also choose to use BSBY for females.

[15]Such conditional cash transfers are not uncommon—in India, the Janani Suraksha Yojana (JSY), in place in states with relatively lower socioeconomic levels, provides a cash incentive to all women who give birth at a formal healthcare institution.

However, this also induces Type 2 households to participate, but only for males. The somewhat counter-intuitive implication is that reducing c through subsidy expansions may not necessarily reduce gender inequality, as its impact depends on the relative share of each household type induced to participate. We use heterogeneity in income for illustration—but the insight is more general. Heterogeneity across households in the magnitude of the wedges (e.g., if some women face a great opportunity cost of time because no one else in the household can cook, or if the strength of gender norms vary across castes or communities) has the same implication that the impact of subsidy expansions on the gender gap will not be monotonic due to composition effects.

Figure 5: Potential Impacts of the BSBY subsidy



Notes: The figure presents the demand for male and female care separately for less poor (Type 1) and more poor (Type 2) households. The x- and y-axes are the same in both graphs. The demand curves in Type 2 are lower because the household has lower income, but all other factors that determine male and female demand are the same as in Type 1. The horizontal dashed lines represent the effect on each type of household of increasing the BSBY subsidy and thus lowering the common care cost from c_0 to c_1 and then further to c_2.

This framework generates three key insights:

1. In the presence of one or more of the three wedges, female utilization will be lower at, and positively associated with, positive care-seeking (common) costs.

2. Reducing costs may not reduce inequalities because marginal beneficiaries may be as likely to be male as inframarginals (or males may benefit at least as much, proportionally, as females). Substantially closing the gender gap is likely to require very large subsidies, but this will result in public spending being heavily male-skewed and subsidizing a large number of inframarginal males.

3. Directly targeting the three wedges lowering demand for female care, alongside subsidies, can reduce gender inequalities. In fact, achieving gender parity will require eliminating them or else offsetting them with female-specific subsidies.

Consistent with this framework, in section 4 we show that common care costs (unauthorized charges by hospitals and the distance to the nearest BSBY hospital, a proxy for travel costs that would arise even if care were free), are positively associated with gender gaps. In section 5 we study the effect of decreasing distance costs through hospital empanelment and find this increases female visits but does not reduce the gender gap because it increases male visits at least proportionally. Finally, section 6 looks at the impact of village-level female political representation, which has been shown to change gender attitudes, investments in female human capital, and female agency—factors determining all three wedges in our framework. We find that this reduces gender gaps in BSBY and show that this is due to shifts in the wedges lowering demand rather than a decrease in common care costs.

4 Care Costs and Gender Gaps

The implication of the gender differential in demand for care in our framework is that, if BSBY is not costless, female utilization of BSBY will be lower than for males and care-seeking costs within the program will be associated with larger gender disparities. This section provides evidence that BSBY is not free in practice and examines how female (relative to male) utilization changes with two types of care-seeking costs: hospital out-of-pocket (OOP) charges and distance to the nearest hospital.

4.1 Hospital Out-of-Pocket Charges

Although hospitals are not supposed to charge patients for services under BSBY, there is little oversight by the government to ensure they comply. To check and quantify the extent to which hospitals are charging patients for care against program rules, we conducted approximately 20,000 "audit" surveys with BSBY patients between June 2017 and July 2018. Using regularly updated claims data, we sampled a random subset of hospital visits every two weeks, and conducted phone surveys with patients within 3 weeks of the hospital visit to collect information on out-of-pocket (OOP) payments, services received, care quality, demographics, and socioeconomic status. The sample covered private hospital visits across 13 services and public hospital visits for childbirths and hemodialysis. Figure A3 shows that OOP charges are widespread: 37% of patients were charged for their care and average payments were about 1,600 INR (∼$25) at private hospitals, though this varies substantially by service, and 1,100 INR at public hospitals.[16] We find no evidence of differential hospital charges for males versus females, as shown in Table B1.

To examine the relationship between hospital charges and care-seeking for females relative to males, we calculate the mean OOP charge for each service at each hospital, using only surveys for male visits (to avoid endogeneity) and hospital-services with at least 10 male visits (to increase the reliability of estimates). Table 1 presents the results of regressions of a dummy for the visit being for a female patient on this hospital-service measure of OOP charges, with hospital district, service, age group, and month fixed effects. Overall, the female share of visits for a service decreases by 1.32pp (about 3.3% of the overall female share) with every 1,000 INR (∼$14) increase in the average charge for that service. This relationship is most pronounced among elderly patients (1.38pp, column 4), and is not found among children (column 2), where females are already heavily underrepresented (38% overall and 45% at hospitals with zero average charge).

[16] The OOP charges for childbirths ("deliveries") are particularly surprising, as childbirths at public hospitals are supposed to be free even without insurance and are additionally compensated under government conditional cash transfer programs. Hospitals charging for this service means that a key opportunity to inform women about free care under BSBY is lost.

Table 1: Out-of-Pocket (OOP) Charges and Female BSBY Utilization

	(1)	(2)	(3)	(4)
	Dependent Variable: Patient is Female			
	All	Under 15 years old	15-45 years old	46+ years old
Average charge ('000 INR)	-0.0132	0.0048	-0.0120	-0.0138
	(0.0010)	(0.0074)	(0.0018)	(0.0013)
	{0.0000}	{0.5151}	{0.0000}	{0.0000}
Age Group Fixed Effects	Yes	Yes	Yes	Yes
Month Fixed Effects	Yes	Yes	Yes	Yes
Hospital District Fixed Effects	Yes	Yes	Yes	Yes
Service Fixed Effects	Yes	Yes	Yes	Yes
Observations	368,897	17,345	175,441	176,110
Female share | OOP charges sub-sample	0.406	0.381	0.415	0.399
Female share | Average OOP charge=0	0.552	0.452	0.586	0.520

Notes: The unit of observation is a hospital visit. The table presents results from regressions of a dummy for whether a BSBY hospital visit is for a female on the average out-of-pocket (OOP) charge faced by males for the same type of care in the same facility. Regressions include hospital district, age group, service, and month fixed effects. Survey data on OOP charges were used to compute the hospital-specific average OOP charge paid by males for each service, for the 126 private hospital-service combinations with at least 10 completed audit surveys with male patients. The regression analysis is restricted to hospital visits in the BSBY claims data for these 126 private hospital-service combinations. The female share (with sampling weights) of visits overall for this sub-sample and at hospitals with zero average OOP charges are reported at the bottom of the table for reference (Table A1 reports the female share in the study sample overall). Monetary values are expressed in 1,000 INR. Standard errors in parentheses, p-values in curly brackets.

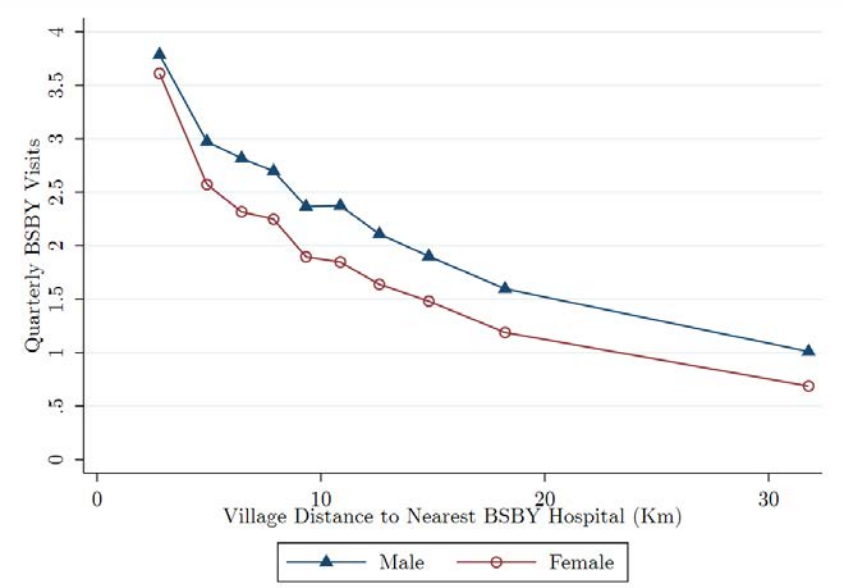
4.2 Distance to the Hospital

We conduct a similar analysis to examine the relationship between distance to health facilities, another measure of the cost of care-seeking, and gender disparities in BSBY usage. We geocode the exact location of 1,601 of the 1,639 hospitals that filed any claim in our dataset through the Google Maps API, and match patient addresses in the claims data to villages/towns in the 2011 Population Census and the corresponding GPS polygons (all residents of a census location are assigned the coordinates of the centroid of the polygon). Match accuracy is high: using patient surveys, we confirmed the matched residence locations in 98.2% of cases. This allows us to calculate the distance traveled in kilometers for a hospital visit, as well as each patient residence location's proximity to BSBY hospitals. Patient residence locations were successfully geocoded for 71% of all observations, or 2.29 million visits from 38,000 locations (Table A1).[17]

[17]There are no meaningful differences in patient age, sex, or whether the hospital was private across BSBY visits that were and were not geocoded, but visits for more complex tertiary services were slightly more likely to be geocoded (Table B2). We also link geocoded residences to other administrative data on public health facilities and poverty using the SHRUG data platform (Asher et al., 2021).

Figure 6 plots mean quarterly male and female visits from a location against that location's distance to the nearest BSBY hospital at the time. The differences are striking: the number of female visits is lower at every distance and decreases more rapidly.

Figure 6: Visit Counts by Gender and Distance to Nearest BSBY Hospital



Notes: The figure shows average quarterly male and female visits from a census location against the distance of the location to the nearest participating BSBY hospital. It uses administrative claims data for January 2017 to October 2019 collapased to the location-quarter level. Census-locations with zero BSBY visits are included.

Using administrative data collapsed to the location-quarter level, Table 2 shows that the female share of quarterly visits from a census location decreases in the location's distance to the nearest BSBY hospital at the time by 1.8pp (about 3.5%) with every 10km); this is robust to a rich set of location controls and district and quarter fixed effects; and it is significant in every age group, including children, among whom the female share is only 37.3% even when the nearest hospital is in the same location.[18]

[18] Controls include whether the location is urban, distance to the nearest town and administrative headquarters, totals and female shares of the scheduled caste, scheduled tribe, under-6, and overall populations, poverty rate, male and female literacy and labor force participation rates, irrigated share of land (for villages), a range of amenities (road, transport access, bank, electricity etc.), and public primary health facilities (not covered under BSBY).

Table 2: Distance to the Nearest BSBY Hospital and Female BSBY Utilization

	(1)	(2)	(3)	(4)	(5)
	Dependent Variable: Female Share of BSBY Visits				
	All	All	Under 15 years old	15-45 years old	46+ years old
Distance to nearest hospital(km/10)	-0.0176	-0.0190	-0.0108	-0.0256	-0.0134
	(0.0010)	(0.0011)	(0.0029)	(0.0015)	(0.0015)
	{<0.0001}	{<0.0001}	{0.0002}	{<0.0001}	{<0.0001}
District Fixed Effects	Yes	Yes	Yes	Yes	Yes
Quarter Fixed Effects	Yes	Yes	Yes	Yes	Yes
Population Female Share	Yes	Yes	Yes	Yes	Yes
Full Location Controls	No	Yes	Yes	Yes	Yes
Observations	324,039	324,039	88,044	253,468	242,140
Unique Locations	43,626	43,626	43,626	43,626	43,626
Female share | Hospital within vill/town	0.511	0.511	0.373	0.569	0.470

Notes: The unit of observation is a location-quarter. The table presents the relationship between the distance from a location to the nearest BSBY hospital and the female share of visits by age group. Using administrative data collapsed to the census location-quarter level, we regress the female share of quarterly BSBY hospital visits from a location on its distance (in tens of km) to the nearest public or private BSBY-empaneled hospital at the time. District and quarter fixed effects are included in all specifications; columns 2-5 include controls for whether the location is urban, distance to the nearest town and administrative headquarters, totals and female shares of the scheduled caste, scheduled tribe, under-6, and overall populations, poverty rate, male and female literacy and labor force participation rates, irrigated share of land (for villages), a range of amenities (road, transport access, bank, electricity etc.), and public primary health facilities (not covered under BSBY). Regressions are estimated on the unbalanced panel of location-quarters with non-zero BSBY visits, as female share is otherwise undefined. Regressions are unweighted to give each location equal importance. The female share of visits from locations that have a hospital within the location boundary (i.e. where the distance to the hospital is considered 0km) is reported at the bottom of the table for reference. Standard errors are in parentheses, p-values in curly brackets.

To address the possibility that other differences across locations besides distance explain the gender differentials we observe, in Table 3 we use visit-level data to show that there are systematic gender differences in the distance households travel for care—even within the same residence location and within the same household. Each cell corresponds to a separate regression with the variable in the left-hand column as the outcome and shows the coefficient on a dummy for whether a hospital visit was for a female patient. Controlling for month, patient age group, and residence location, females are 4.28pp more likely to get care at the hospital nearest their homes and households travel about 7.5km less for female care, almost 15% less than the male average of 54km (column 2). Strikingly, gender differences persist even when we include household, rather than location, fixed effects (column 3), but are smaller in magnitude (2.93pp and 5km). In column 4 we present the same specification as in column 1 but on the sub-sample included in column 3 (households that sought care for at least one male and one female due to the household fixed effects). The coefficients are similar to those in column 1, suggesting that these households are not substantially different from the full sample.

Table 3: Gender Differences in Distance Traveled for BSBY Care

	(1)	(2)	(3)	(4)
Dependent Variable	Coefficient on Female			
Distance to hospital visited (km)	-8.9087	-7.4339	-5.1155	-8.0815
	(0.0742)	(0.0701)	(0.1061)	(0.0909)
	{<0.001}	{<0.001}	{<0.001}	{<0.001}
Visited hospital nearest patient residence	0.0623	0.0428	0.0293	0.0732
	(0.0005)	(0.0005)	(0.0007)	(0.0007)
	{<0.001}	{<0.001}	{<0.001}	{<0.001}
Visited hospital in different district from residence	-0.07	-0.06	-0.04	-0.06
	(0.00)	(0.00)	(0.00)	(0.00)
	{<0.001}	{<0.001}	{<0.001}	{<0.001}
Age Group Fixed Effects	Yes	Yes	Yes	Yes
Month Fixed Effects	Yes	Yes	Yes	Yes
District Fixed Effects	Yes	No	No	Yes
Residence Location Fixed Effects	No	Yes	No	No
Household Fixed Effects	No	No	Yes	No
Household Fixed Effects Sample			Yes	Yes
Observations	2,262,729	2,261,194	1,415,801	1,415,801
Unique Locations	37,986	37,986	37,986	37,986
Distance to hospital visited (km) | Male	53.733	53.733	51.240	51.240
Visited hospital nearest patient residence | Male	0.838	0.838	0.819	0.819
Visited hospital in different district | Male	0.361	0.361	0.350	0.350

Notes: The unit of observation is a hospital visit. The table presents gender differences in the distance traveled for BSBY hospital visits. Each cell corresponds to a separate regression and shows the coefficient on a dummy for whether a BSBY hospital visit was for a female patient, in a fixed effects regression with the variable in the left-hand column as the outcome. All regressions include fixed effects for ten-year age bins and month. Column 1 includes patient residence district fixed effects; Column 2 includes patient residence census location fixed effects and Column 3 includes household fixed effects instead. Column repeats the regression from Column 1 but on the subsample from the household fixed effects regressions in Column 3 (i.e. households with at least one BSBY claim). Data are at the hospital-visit level and the sample is restricted to BSBY hospital visits where the patient residence location and the hospital location in the claims data were both successfully geocoded (see Table A1 notes on geocoded observations). Mean values of each of the outcomes for males are reported at the bottom of the table for comparison. Standard errors in parentheses, p-values in curly brackets.

In sum, 1) care-seeking within BSBY is not costless ($c > 0$ in our conceptual framework); and 2) the same cost—whether hospital charges or distance—is associated with lower BSBY utilization for females than males, consistent with households having lower demand for female care. It is likely that all three wedges in our framework—differential returns on female health inputs, female-specific care-seeking costs, and male preference—are contributing to lower demand. We do not attempt to disentangle them, as their implications for the effects of BSBY subsidies on gender gaps are broadly similar. However, it is highly unlikely that female-specific costs are the *only* factor driving gender differences. Factors such as limited mobility and agency, household duties, lower BSBY awareness, etc., should not affect *young girls* more than young boys, given

that children's care is arranged by an adult in the household and need not depend on the child's gender (i.e. men can equally take boys and girls to the hospital even if women cannot). Yet, we find the largest gaps in the likelihood of getting care among children under 10 years. This suggests that part of the gender gap in BSBY is due to households' willingness to allocate fewer resources to female than male health, either due to biased preferences or differential returns on these investments.

5 Impacts of Hospital Empanelment

Now that we have shown that care-seeking costs are positively associated with gender disparities, a question that follows is whether *decreasing* these costs reduces gender gaps in BSBY utilization. To examine this, we study the effect of the expansion of BSBY in 2018, which reduced the cost of available care options near locations with previously limited access.

In December 2017, the government relaxed eligibility requirements to allow smaller hospitals to participate and conducted a major empanelment drive to increase hospital access in under-served areas. The number of private hospitals in BSBY increased from under 600 in 2017 to almost 800 in early 2018.[19] Empanelment effectively reduces the distance costs for patients of going to private hospitals for locations that previously did not have one participating nearby. To study how this cost reduction affected care-seeking within BSBY, we compare changes in BSBY utilization in locations where the 2018 empanelment drive reduced the distance to the nearest private hospital to locations with no nearby empanelment. Because the supply of public facilities is largely fixed and most locations already have one nearby, the empanelment shock should be understood as a reduction in distance costs for heavily subsidized private care.[20]

We restrict the BSBY claims data to census locations where the closest participating private BSBY hospital is 25-50km in 2017 (approximately the 50th to 90th percentile) and compare locations that saw empanelment of a private hospital within 25km in 2018 Quarter 1 (treatment) with locations that did not see any closer empanelment by December 2018 (control).[21] We focus

[19] These are almost exclusively existing hospitals joining BSBY rather than new hospitals entering the market.

[20] Since most public health facilities (outside the major hospitals in the big cities) are small and focus on basic maternal and general health services, they are not simply cheaper substitutes for private hospitals, which typically provide the full range of services.

[21] We later show results are not sensitive to these distance choices. An alternative strategy would be to compare

on empanelments in the first quarter of 2018, as their timing was more likely to be driven by the sudden administrative change in eligibility criteria rather than factors that may be correlated with BSBY utilization. To increase the comparability of the treatment and control groups, we use entropy balancing to re-weight observations so that the two groups have similar distributions of a wide range of location characteristics from the census, including demographics, poverty, village amenities, and connectivity, as well as distance to nearest public BSBY hospital in 2017.[22] Using the balanced panel of location-quarters (including those with zero BSBY visits) for January 2017 to December 2018, we use a standard two-way fixed effects event study specification with Treatment x Quarter interaction dummies, 2017 Quarter 4 as the excluded reference group, quarter and location fixed effects, and errors clustered at the location level. We also report difference-in-differences (DID) estimates from similar regressions with a single Treatment x Post-empanelment dummy.[23]

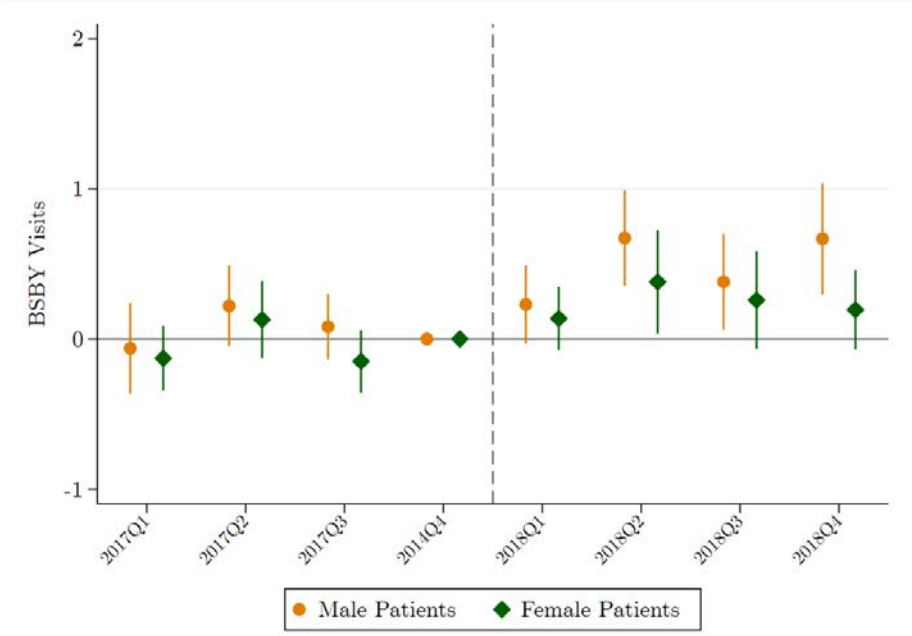
Figure 7 presents the event study results: visits in the treatment and control groups are on parallel trends in 2017 but diverge in 2018 Quarter 1 and continue to do so (for men) over the year. Table 4 reports the DID regression results. Empanelment reduces the distance to the closest private hospital in Treatment locations by about 20km, or almost two-thirds the average 2017 distance (but the distance to the closest hospital changes very little because most locations already have a nearby public hospital). On average over the year after empanelment, female quarterly BSBY visits increase by about 15.5% (0.28 visits, p-value=0.005) but male visits increase as well (0.43 visits or 19%, p-value<0.001). Since the female share is undefined for location-quarters with zero BSBY visits we do not report it as an outcome, but note that the female share of marginal visits induced by empanelment is only 39% $(0.279/(0.279+0.427))$ compared to 43% $(1.794/(1.794+2.344))$ of infra-marginal visits (see pre-empanelment mean row in Table 4), confirming that empanelment did not decrease the gender gap in BSBY utilization.

locations with a 2018 empanelment to those that already had a private hospital empaneled nearby. Results using this control group are qualitatively unchanged—there is no detectable impact of the empanelment on the female share of visits. Results available upon request.

[22] Entropy balancing is an increasingly popular method of achieving covariate balance with a binary treatment because it directly adjusts weights to balance the first or higher moments of covariate distributions, thus obviating the need to manually check balance and identify the right propensity score model (Hainmueller, 2012; Athey and Imbens, 2017). For recent applications see Basri et al. (2021) and Guriev et al. (2021).

[23] Because treatment roll-out is one-time, we need not be concerned with the issues in the recent literature around staggered roll-out designs when effects are heterogeneous (Roth et al., 2022).

Figure 7: Effect of Hospital Empanelment on BSBY Utilization



Notes: The figure presents an event study analysis of the effect of the empanelment (registration to participate in BSBY) of a private hospital near a location on BSBY utilization in that location. The analysis covers the period January 2017 to December 2018. The BSBY claims data are collapsed to generate a balanced location-quarter panel (including those with zero visits) and the sample is restricted to locations where the closest private BSBY hospital in 2017 is 25-50km away. The analysis compares locations that saw entry of a private hospital within 25km in the first quarter of 2018 (Treatment) with locations with no similar entry by December 2018 (Control), using an event study specification with Treatment x Quarter interaction dummies, 2017 Quarter 4 as the excluded reference group, quarter and location fixed effects, and errors clustered at the location level. The outcomes are quarterly male and female hospital visits. Regressions are unweighted so that each location receives equal importance. We use entropy balancing to reweigh observations so that the treatment and comparison groups have similar distributions of a wide range of location characteristics from the census, including demographics, poverty, village amenities, and connectivity. Table 4 reports the corresponding difference-in-differences estimates and Figure A4 presents the public-private hospital breakdown and long-run estimates through 2019 Quarter 3.

Panel A of Figure A4 confirms that these effects are driven by increases in private hospital visits. There is a small reduction in female visits at public hospitals in 2018 Quarter 2, though it is not significant, suggesting some households may have shifted female care from public to the newly participating private facilities. To examine whether effects change over the very long run, Panel B of Figure A4 presents results from a similar analysis, but where the control group is locations with no hospital entry through 2019 Quarter 3 (when our data end). Both male and female visits increase over time. The gender gap decreases but remains substantial almost two years after empanelment. Figure A5 shows that results are qualitatively similar if we use different control (25-35, 25-40, or 25-50km to nearest private hospital) and treatment (0/5-20/25km) groups (but female visits only increase when the distance reduction is substantial).

Table 4: Effect of Hospital Empanelment on BSBY Utilization

	(1)	(2)	(3)	(4)
	Distance to Nearest Private BSBY Hospital	Distance to Nearest BSBY Hospital	Male Visits	Female Visits
Treatment x Post-empanelment	-19.7901	-0.3677	0.4270	0.2791
	(0.2890)	(0.0555)	(0.1255)	(0.0996)
	{0.0000}	{0.0000}	{0.0007}	{0.0051}
Location Fixed Effects	Yes	Yes	Yes	Yes
Quarter Fixed Effects	Yes	Yes	Yes	Yes
Observations	94,929	94,929	94,929	94,929
Unique Locations	11,907	11,907	11,907	11,907
Treatment Locations	1,085	1,085	1,085	1,085
Pre-empanelment mean (Treated)	33.834	10.409	2.344	1.794
Pre-empanelment mean (Control)	33.651	10.405	2.133	1.948

Notes: The unit of observation is a location-quarter. The table presents results from a difference-in-differences analysis of the effect of the empanelment (registration to participate in BSBY) of a private hospital near a location on BSBY utilization in that location. See Figure 7 notes. We use a two-way fixed effects specification with a Treatment x Post-empanelment dummy and quarter and location fixed effects, and errors clustered at the location level. Column 1 reports the first stage, or the change in the distance (in km) to the nearest private BSBY hospital for Treatment locations compared to Control induced by empanelment; column 2 reports distance to the nearest hospital, including public facilities (see for discussion of this); columns 3 and 4 report quarterly male and female hospital visits from a location. Standard errors are in parentheses, p-values in curly brackets. Figure A4 presents the public-private hospital breakdown and long-run estimates through 2019 Quarter 3.

One concern, since we do not observe care outside BSBY, is that empanelment may be reducing the gender gap in overall hospital usage, even if not within BSBY, if it induces women who would otherwise forego hospital care to use BSBY, while for males it simply shifts their care from outside the program into it. However, if the increase in male BSBY visits were entirely from patients that were already visiting the newly empaneled hospital and now show up in our data, we should see a jump in the first quarter and no increase thereafter, but Figure A4 shows that visits continue to increase almost two years later. Furthermore, Panel A of Figure A4 suggests that some of the increase in female private hospital visits is a shift from public hospitals rather than new care. It remains possible that the gender gap reduced somewhat, but in 2019 females are only 44% of total marginal beneficiaries.

Overall, these results show that substantially lowering care costs increased female utilization but increased male utilization by as much or more and hence did not meaningfully reduce the gender gap. This seems counter-intuitive, given that in section 4 we find that care costs exacerbate the gap. However, it is consistent with the descriptive fact from Figure 2 that gender disparities widened, even as the program substantially expanded its reach over four years of implementation. Our conceptual framework helps reconcile these results: even if a subsidy expansion decreases gender inequality within some households by inducing them to obtain care for females in addition to males, it may not reduce overall gender inequality in BSBY usage if it induces more new households to participate for whom the marginal beneficiary is male. Thus, we may see increasing female levels of BSBY usage but no decrease in the gender gap.

6 Impacts of Female Political Reservations

Prior studies have found that female leaders are more likely to focus on health, particularly of females, and that long-term exposure to female political leaders can shift deep-seated perceptions of women and raise the aspirations of and investments in females.[24] This could affect all three wedges highlighted in our conceptual framework—biased preferences, differential returns on health investments, and female-specific care-seeking costs/barriers—and shift demand for female care closer to that of males. This section examines whether such exposure to village-level female political leaders reduces the gender gap in BSBY utilization.

6.1 The Panchayat System and Female Reservations

A Gram Panchayat (GP) is a village council covering 1 to 15 villages (1,000 to 10,000 population). It is comprised of 5 directly elected council members and is headed by a Sarpanch (also known as a Pradhan) elected directly by citizens or indirectly by other council members. In 1992, the 73rd Constitutional Amendment devolved local governance to GPs, including provision and

[24] Beaman et al. (2009) find that GP reservations changed voter perceptions of female leaders and increased the likelihood of running for and winning office; Beaman et al. (2012) find reservations shifted parental attitudes towards their daughters and girls' career aspirations and educational attainment; both studies find effects manifest only after two electoral terms. Chattopadhyay and Duflo (2004) show that female Sarpanches shift investments towards women voters' preferences. Bhalotra and Clots-Figueras (2014) and Bhalotra et al. (2023) show that state-level female politicians invest more in health infrastructure that lowers maternal and neonatal mortality.

maintenance of local public goods such as roads, irrigation, sanitation, and drinking water, oversight of government education and health services, and delivery of public benefits such as subsidized food. The amendment also required that one-third of all council member and Sarpanch seats be reserved for women in each five-year term, with reserved Sarpanch seats selected randomly with replacement from the list of GPs before each election. In Rajasthan, the share of reserved seats was increased to 50% in 2009 and a requirement that candidates have completed at least secondary education was introduced in 2014.

6.2 Gram Panchayat Reservations Data

We link data on the 2005, 2010, and 2015 GP elections and match these with BSBY patient residence locations using 2011 Population Census identifiers.[25] We successfully matched patient residence locations to complete reservations histories for 61.4% of all BSBY hospital visits in the study sample (about 2 million visits); of these, 12.3% were from locations that were never reserved, 51.9% reserved once, 31.2% reserved twice, and 4.7% reserved in all three elections (Table A1).[26] Compliance with the policy has been high and the reservations have been highly successful at increasing female leadership: of the 8,818 GPs in the matched sample, less than 10% of Sarpanches are female in unreserved GPs, while 92-100% are female in reserved GPs over the three elections (Table B3). We test whether female reservation status is orthogonal to characteristics among locations with complete reservation history in Table B4. We find some imbalance in scheduled caste share of population and availability of a banking facility, but the differences are small and, overall, the results suggest the randomization protocol was adhered to and that attrition due to incomplete matching is uncorrelated with reservation status. We control for all characteristics in Table B4 in our analysis of the effects of reservations.

[25] Electoral data were downloaded in March 2020 from the Rajasthan State Election Commission (http://sec.rajasthan.gov.in/StatisticsArchiveNew.aspx) and the list of GPs and villages was downloaded from from the Local Government Directory (https://lgdirectory.gov.in/). Electoral data for the 1995 and 2000 elections were unavailable.

[26] The matching process was limited by several factors: 1) because GPs only govern rural areas, BSBY patients residing in urban locations will (correctly) not be matched, but we cannot distinguish these "legitimate" unmatched urban locations from villages with "missing" matches because urban administrative status is not clearly identified; 2) because the GP lists do not include a unique numeric location identifier, we had to use "fuzzy" name matching; 3) because GPs and villages can split over time, new units that do not share the name with the parent unit may not be matched.

6.3 Long-term Exposure to Female Leaders Reduces Gender Gap

To examine the effect of female reservations on the gender gap in BSBY utilization, in Table 5, we regress a dummy for whether a hospital visit was for a female on a categorical measure of whether the patient's residence location was reserved 0, 1, 2 or 3 times between 2005 and 2015.

Table 5: Effect of Political Reservations on Female BSBY Utilization

	(1)	(2)	(3)	(4)
	Dependent Variable: Patient is Female			
	All Claims	Under 15 years old	15-45 years old	46+ years old
Number of times GP reserved	0.0031	0.0103	0.0089	-0.0044
	(0.0021)	(0.0029)	(0.0031)	(0.0028)
	{0.129}	{0.000}	{0.004}	{0.117}
Age Group Fixed Effects	Yes	Yes	Yes	Yes
Month Fixed Effects	Yes	Yes	Yes	Yes
Patient District Fixed Effects	Yes	Yes	Yes	Yes
Specialty Fixed Effects	Yes	Yes	Yes	Yes
Observations	1,969,980	149,553	970,391	850,036
Female share | Never reserved	0.492	0.326	0.549	0.445

Notes: The unit of observation is a hospital visit. The table presents regressions of a dummy for whether a BSBY hospital visit was for a female on a categorical measure of whether the patient resided in a location with a female-reserved Sarpanch seat zero, one, two, or three times between 2005 and 2015. The sample is restricted to BSBY hospital visits where the patient residence location is successfully matched to GP reservations history (see Table A1). Childbirth are additionally included in column 5 (included within the "general medicine" specialty). All regressions include location level controls for the 2001 and 2011 Population Census variables listed in Table B3, distances to district and sub-district headquarters in the 2011 Census, and distances to the nearest public and private BSBY hospitals. Age group fixed effects are in ten-year age bins. The female share of visits in locations with Sarpanch seats that were never reserved for a female between 2005 and the full 2015 effect size are reported at the bottom of the table for reference. Standard errors are clustered at the GP level in parentheses, p-values in curly brackets.

Each reserved election cycle increased the female share of hospital visits among children under 15 years old by 1.03pp (3.2%; p-value<0.001) and among women of childbearing age by 0.89pp (1.6%; p-value=0.004), while it reduced it among the elderly by 0.44pp, but this is not significant at conventional levels (1.0%; p-value=0.117).

Although the effect of reservations on absolute levels of male and female BSBY utilization at

the location-quarter level is imprecisely estimated, Table B5 suggests that the positive effect on the female share among children is driven by an increase in visits for girls with no change among boys.

Effects are not driven by being reserved in 2015 alone, but require long-term exposure. To distinguish the impact of current from historical and cumulative exposure, Table B6 separately reports the effect of being reserved in 2015, the number of prior reserved elections (up to 2), and the interaction of the two. The "Reserved 2015" coefficients are small and not significant.

6.4 Mechanisms for Reservations Effects

We find no evidence that reservations reduced the common cost of care-seeking under BSBY ("common costs" in our framework). First, reservations have no effect on the supply of nearby health facilities either within or outside BSBY that would indicate a reduction in distance costs (Table A3). Second, there is no change in awareness or care-seeking behavior among males, as we discuss below. Finally, the fact that results are not driven by reservation in 2015, when BSBY was launched and our study period begins, indicates that direct assistance with BSBY is not the primary channel for effects.

Reservations may, instead, work through channels that more slowly increase households' willingness to use BSBY for females and lower the care-seeking costs women face. For example, they may prioritize and invest more resources in village health activities that target women and encourage them to obtain formal care.[27] They may change women's own aspirations and self-efficacy through role model effects, which could enable them to overcome barriers such as limited mobility or bargaining power and more effectively obtain care for themselves and their children. Exposure to women in positions of power could also shift gender norms and households' perceptions of the value of investing in females. Although we do not attempt to isolate the various causal channels, we provide survey evidence that exposure to female leaders induces

[27] Sarpanches are supposed to monitor and support government-appointed village health workers, facilitate their contacts with residents (e.g. through village meetings and home visits), and coordinate local health spending and activities with them. There are three types of village health workers: Accredited Social Health Activists (ASHAs) reside in the village and are responsible for mobilizing children for immunizations, helping women use formal healthcare for childbirth, and connecting households to the health system. Auxiliary Nurse Midwives (ANMs) manage the public primary health centers and provide basic maternal and child health services. Anganwadi Workers (AWWs) run maternal and young child feeding programs.

changes consistent with shifts in one or more of the three wedges that lower demand for female care.

In Table A4, we use surveys with BSBY-eligible households to look at the effect of reservations on healthcare contacts, gender attitudes, and female empowerment.[28] First, we find that village health workers (ASHAs) are a key point of contact with the health system for women and that female leaders strengthen these interactions substantially. In unreserved areas, 32.9% of women but only 13.5% of men have talked to the ASHA in the last month. Exposure to each female-reserved GP election increases the likelihood of ASHA contact by 10.9pp for women (p-value=0.008) but has no effect for men (2.0pp, p-value=0.47). This does not translate into awareness gains: although women score 0.82 standard deviations lower than men on an index of awareness of BSBY coverage, we find no significant effect of reservations on awareness among females (but the coefficient is large and positive). We also do not find evidence of a significant shift in an index of "progressive' attitudes about women's societal position and opportunities, though the coefficients are positive (around 0.12sd for females). However, women in reserved villages report a substantial increase in an index of female agency that measures their involvement in decision-making and independence (0.219 standard deviation increase; p-value=0.0.086).[29]

Consistent with this, surveys with Sarpanches in office in 2015 also indicate that female leaders engaged more actively with their constituents and village health staff.[30] Table A5 shows that Sarpanches in female-reserved seats in 2015 were 8.4pp more likely to organize village meetings at least once a month compared to an unreserved mean of 35.5% (p-value=0.084). They were

[28] We sampled households with a BSBY-covered childbirth in 2017 (since childbirth is less prone to selection than other services, this is as close to a representative sample of BSBY-eligible households as we could get without enrollment data) and conducted phone surveys with them from November 2019 to January 2020. Surveys were randomly administered to either a male or female adult, permitting us to study responses by gender. Compliance with the gender assignment was high (83% and 97% among female- and male-assigned households respectively). We surveyed about 2,600 households, but could only match 838 to the GP reservations history. We report the interaction of respondent gender and the number of times their residence location was reserved.

[29] Splitting the index into its components indicates that the effect is driven by increases in women's involvement in health decisions, likelihood of having an independent source of earnings, and mobility within the same village/town. Interestingly, male reports of female agency do not increase (females were asked about themselves and males were asked about their spouses), which could reflect differences in reporting or changes in women's behaviors that are unobserved by men.

[30] We randomly sampled 1,332 GPs, stratifying by GP district and whether it was reserved for a female Sarpanch, and conducted phone surveys with the Sarpanch from the 2015-2020 term in November 2020 (after the 2020 GP elections; most Sarpanches were not re-elected). Due to incorrect phone numbers in the government directory, we only reached 561 Sarpanches (42%). We had to talk to a male proxy in about 15% of interviews for female-reserved seats (typically because the husband or another male relative refused permission).

also 7.8pp more likely to meet ASHAs at least weekly compared to an unreserved mean of 21.4% (p-value=0.059), which is consistent with household reports of greater ASHA contacts in Table A4. However, contacts with other types of village health workers did not increase and healthcare is not significantly more likely to be a top spending priority for female than male leaders (6.5pp over an unreserved mean of 23%; p-value=0.141). Finally, female Sarpanches are not better informed about BSBY than males (-0.15sd, p-value=0.202).

Taken together, our findings that the effects of reservations manifest after long-term exposure, are concentrated among children and women of child-bearing age, and include increases in women's agency and health worker contacts, suggest that their impacts on BSBY utilization work through longer-term changes in maternal and child health investments and gender dynamics, and not direct assistance with the program. These effects are consistent with shifts in the demand for female healthcare (potentially through changes in all three wedges in our conceptual framework), rather than gender-neutral reductions in BSBY care costs, being the primary explanation for the reduction in gender disparities in BSBY utilization in locations with female leaders. Although effects are modest (unsurprising, given that reservations were unrelated to BSBY and Sarpanches were not specifically tasked with spreading BSBY awareness), they demonstrate that interventions that target women and counteract the effects of societal gender biases can increase the extent to which women benefit from subsidies for social services such as healthcare.

If reservations are working through changes in broader health investments and gender dynamics, this could also explain why elderly females do not benefit from them. Village-level health activities overseen by Sarpanches and health workers largely focus on maternal and child health services, but not on the conditions that typically afflict the elderly. To the extent that reservations work by shifting aspirations or the returns on human capital investments in females, they are most likely to affect younger females rather than the elderly. Elderly women typically have low bargaining power within the household (Calvi, 2020); they may not be able to advocate for health care for themselves as effectively as elderly males and, if budget constrained households allocate more resources to younger females, this may come at the cost of care for elderly women.

7 Conclusion

Pro-male gender bias has been well-documented in India and shown to contribute to worse female health outcomes. Programs that increase geographic access to health facilities and subsidize health services have been the primary policy interventions to decrease inequalities in health, including by gender. Studying the universe of hospital visits under a health insurance program that entitles poor households in Rajasthan to free hospital care, we show that females benefit far less than males from these programs and large gender inequalities in usage persist despite massive program expansion over several years of implementation. We provide evidence that household demand for female healthcare is lower than for males, which contributes to inequalities because the program does not fully offset the costs of care-seeking. Reducing care-seeking costs by enrolling additional hospitals in more remote areas in the program increases both female and male usage of BSBY and doesn't close gaps meaningfully almost two years later. Female local political representation reduces the gender gap by shifting the demand for female care, but effects are small and require over a decade of exposure. Nevertheless, this demonstrates the potential for more directly targeting women to reduce gender inequality in health.

Gender-neutral policies that reduce the cost of accessing social benefits increase utilization among females, but may fail to reduce disparities in the presence of gender bias because males benefit as much or more than females. Ensuring social programs reach females and addressing gender disparities in outcomes will require strategies directly targeting the specific costs and barriers faced by females in the short run, coupled with longer term legal and social endeavors to strengthen their rights and bargaining power.

References

Anderson, Siwan and Debraj Ray, "Missing women: age and disease," *The Review of Economic Studies*, 2010, *77* (4), 1262–1300.

Asher, Sam, Tobias Lunt, Ryu Matsuura, and Paul Novosad, "Development Research at High Geographic Resolution: An Analysis of Night Lights, Firms, and Poverty in India using the SHRUG Open Data Platform," *World Bank Economic Review*, 2021.

Athey, Susan and Guido W Imbens, "The state of applied econometrics: Causality and policy evaluation," *Journal of Economic perspectives*, 2017, *31* (2), 3–32.

Basri, M Chatib, Mayara Felix, Rema Hanna, and Benjamin A Olken, "Tax administration versus tax rates: Evidence from corporate taxation in Indonesia," *American Economic Review*, 2021, *111* (12), 3827–71.

Beaman, Lori, Esther Duflo, Rohini Pande, and Petia Topalova, "Female Leadership Raises Aspirations and Educational Attainment for Girls: A Policy Experiment in India," *Science*, 2012, *335* (6068), 582–586.

_ , Raghabendra Chattopadhyay, Esther Duflo, Rohini Pande, and Petia Topalova, "Powerful Women: Does Exposure Reduce Bias?," *Quarterly Journal of Economics*, 2009, *124* (4), 1497–1540.

Bhalotra, Sonia and Irma Clots-Figueras, "Health and the Political Agency of Women," *American Economic Journal: Economic Policy*, 2014, *6* (2), 164–197.

_ , Damian Clarke, Joseph Flavian Gomes, and Atheendar Venkataramani, "Maternal mortality and women's political power," *Journal of the European Economic Association*, 2023.

Calvi, Rossella, "Why Are Older Women Missing in India? The Age Profile of Bargaining Power and Poverty," *Journal of Political Economy*, 2020, *128* (7), 2453–2501.

Chattopadhyay, Raghabendra and Esther Duflo, "Women as Policy Makers: Evidence from a Randomized Policy Experiment in India," *Econometrica*, 2004, *72* (5), 1409–43.

Chen, Marty and Jean Drèze, "Widows and health in rural north India," *Economic and Political weekly*, 1992, pp. WS81–WS92.

Datt, Gaurav, Cun Liu, and Russell Smyth, "Missing women in China and India over seven decades: an analysis of birth and mortality data from 1950 to 2020," *The Journal of Development Studies*, 2022, *58* (9), 1807–1830.

Deaton, Angus, "Height, health, and inequality: the distribution of adult heights in India," *American Economic Review*, 2008, *98* (2), 468–74.

Duflo, Esther, "Women empowerment and economic development," *Journal of Economic literature*, 2012, *50* (4), 1051–79.

Dupas, Pascaline and Radhika Jain, "Can beneficiary information improve hospital accountability? Experimental evidence from a public health insurance scheme in India," *Journal of Public Economics*, 2023, *220*, 104841.

Government of India, "Economic Survey 2018-2019," Technical Report, Ministry of Finance 2019. Available at https://www.indiabudget.gov.in/budget2019-20/economicsurvey/.

Guriev, Sergei, Nikita Melnikov, and Ekaterina Zhuravskaya, "3g internet and confidence in government," *The Quarterly Journal of Economics*, 2021, *136* (4), 2533–2613.

Hainmueller, Jens, "Entropy balancing for causal effects: A multivariate reweighting method to produce balanced samples in observational studies," *Political Analysis*, 2012, *20* (1), 25–46.

Hessami, Zohal and Mariana Lopes da Fonseca, "Female political representation and substantive effects on policies: A literature review," *European Journal of Political Economy*, 2020, *63*, 101896.

IHME, "Global Burden of Disease Study 2019 (GBD 2019) India Profile," 2019.

IIPS, "National Family Health Survey (NFHS-4), 2015–16," *International Institute for Population Sciences (IIPS), Mumbai, India*, 2017.

Jensen, Robert, "Caste, Culture, and the Status and Well-Being of Widows in India," in David A. Wise, ed., *Analyses in the Economics of Aging*, University of Chicago Press, 2007, chapter 11.

Kanbur, Ravi and Lawrence Haddad, "Are better off households more unequal or less unequal?," *Oxford Economic Papers*, 1994, *46* (3), 445–458.

Kapoor, Mudit, Deepak Agrawal, Shamika Ravi, Ambuj Roy, S V Subramanian, and Guleria Randeep, "Missing female patients: an observational analysis of sex ratio among outpatients in a referral tertiary care public hospital in India," *BMJ Open*, 2019.

Kaur, Sukhvinder, Nishant Jain, and Sanjay Kumar, "Addressing gender issues under Ayushman Bharat Pradhan Mantri Jan Arogya Yojana (AB PM-JAY) in India: implications for equity," Working Paper 005, National Health Authority 2020.

Khera, Rohan, Snigdha Jain, Rakesh Lodha, and Sivasubramanian Ramakrishnan, "Gender bias in child care and child health: global patterns," *Archives of disease in childhood*, 2014, *99* (4), 369–374.

Maharana, Barsharani and Laishram Ladusingh, "Gender disparity in health and food expenditure in India among elderly," *International Journal of Population Research*, 2014, *2014*.

Oster, Emily, "Does increased access increase equality? Gender and child health investments in India," *Journal of Development Economics*, 2009, *89*, 62–76.

Pande, Rohini, "Selective gender differences in childhood nutrition and immunization in rural India: the role of siblings," *Demography*, 2003, *40* (3), 395–418.

Pandey, Anamika, George B Ploubidis, Lynda Clarke, and Lalit Dandona, "Hospitalisation trends in India from serial cross-sectional nationwide surveys: 1995 to 2014," *BMJ open*, 2017, *7* (12).

Raj, Anita, "Comment: Gender equity and universal health coverage in India," *The Lancet*, 2011, *377* (9766), 618–619.

Rajan, Sowmya and S Philip Morgan, "Selective versus generalized gender bias in childhood health and nutrition: evidence from India," *Population and development review*, 2018, *44* (2), 231.

Reddy, K Srinath, Vikram Patel, Prabhat Jha, Vinod K Paul, AK Shiva Kumar, Lalit Dandona, Lancet India Group for Universal Healthcare et al., "Towards achievement of universal health care in India by 2020: a call to action," *The Lancet*, 2011, *377* (9767), 760–768.

Roth, Jonathan, Pedro HC Sant'Anna, Alyssa Bilinski, and John Poe, "What's trending in difference-in-differences? A synthesis of the recent econometrics literature," *arXiv preprint arXiv:2201.01194*, 2022.

Saikia, Nandita and Jayanta Kumar Bora, "Gender difference in health-care expenditure: evidence from India human development survey," *PloS one*, 2016, *11* (7), e0158332.

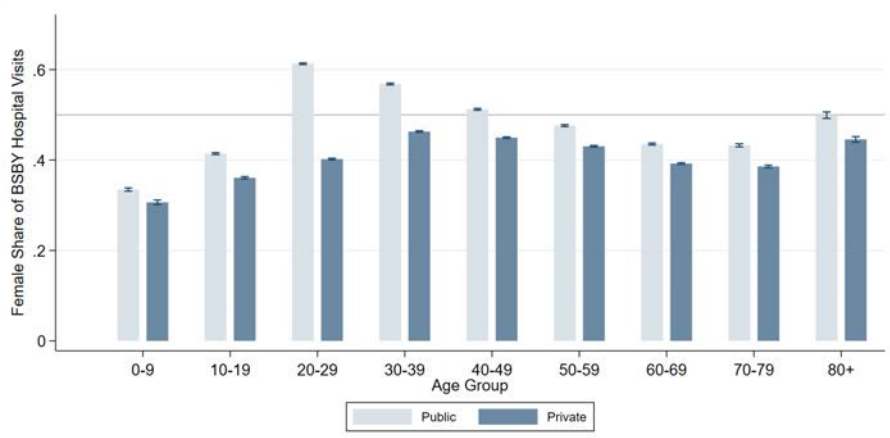
Shaikh, Maaz, Sanne A E Peters, Mark Woodward, Robyn Norton, and Vivekanand Jha, "Sex differences in utilization of hospital care in a state sponsored health insurance programme providing access to free services in South India," *BMJ Glob Health*, 2018, *3*, 2018–00085.

World Economic Forum, "Global Gender Gap Report 2021," Report, World Economic Forum 2021.

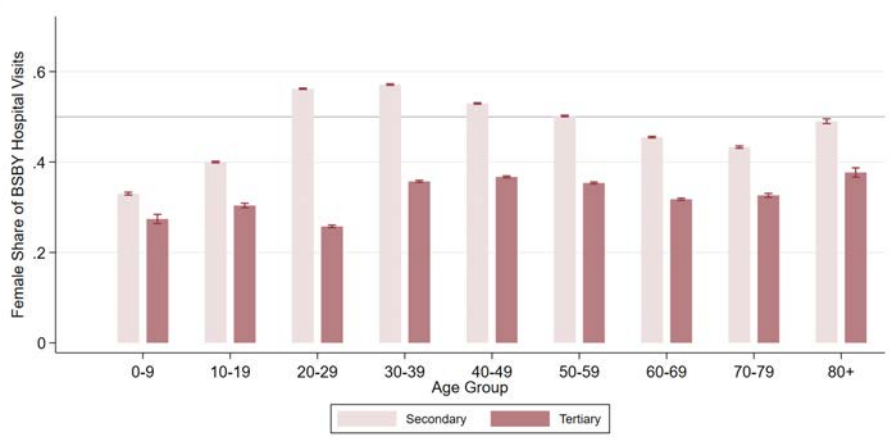
Appendix Figures and Tables

Figure A1: Gender Differences in Type of BSBY Care

(a) Female Share of Public and Private Care

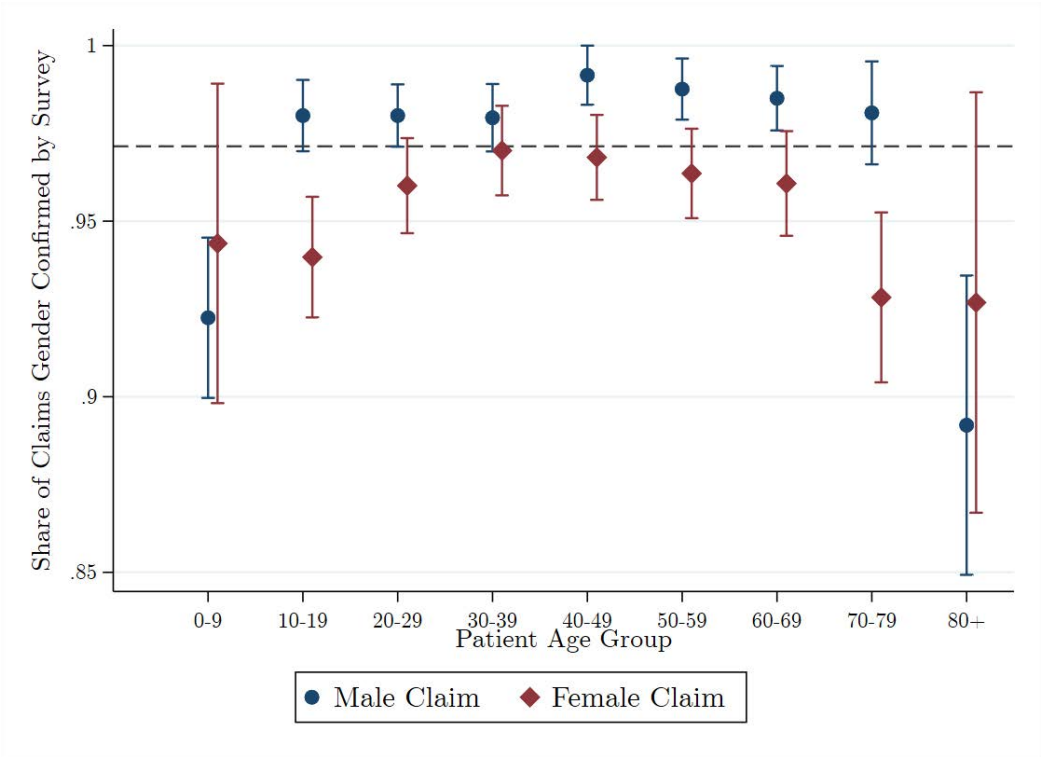


(b) Female Share of Secondary and Tertiary Care



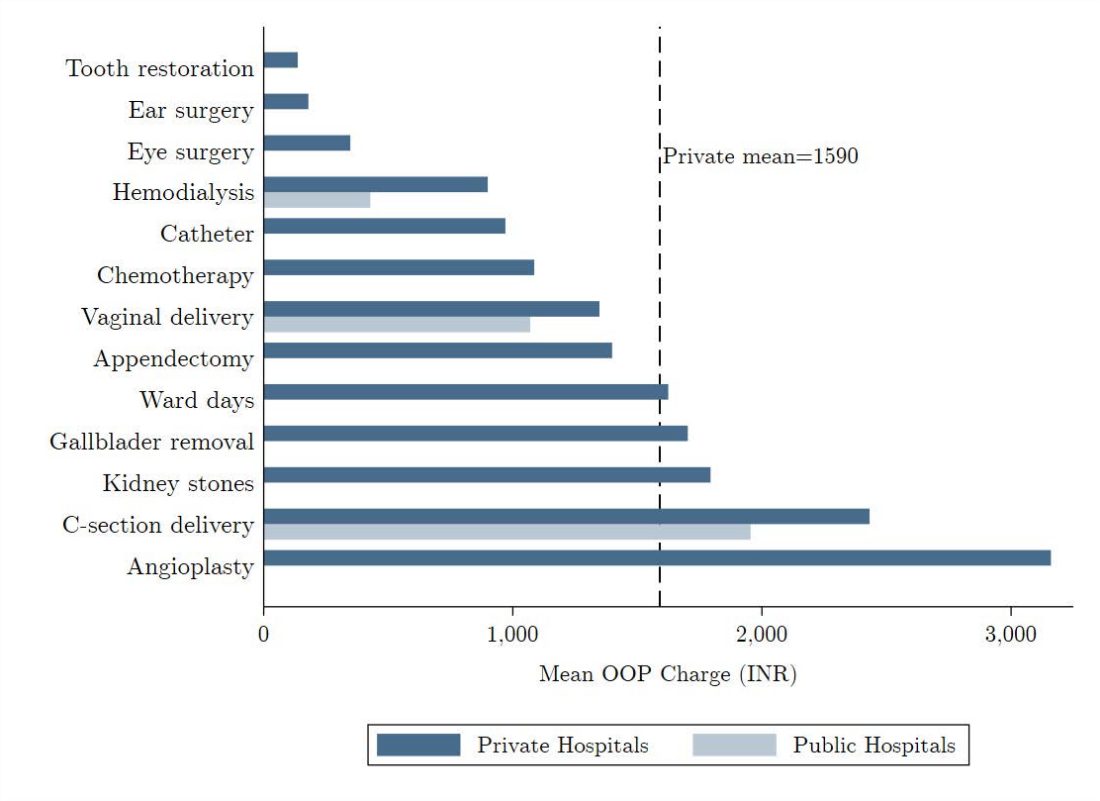
Notes: The figure presents the female share of total BSBY visits within each age group at public versus private hospitals in Panel A and for secondary versus tertiary care in Panel B, using program administrative claims data. Secondary care refers to basic hospital stays and uncomplicated minor surgeries provided at community health centers and small hospitals. Tertiary care refers to complex in-patient intensive care and major surgeries provided at large, specialized facilities. Claims data are restricted to the study sample: they exclude 2016, childbirth, and neonatal care claims (see Table A1 notes). Capped spikes represent 95% confidence intervals.

Figure A2: Reliability of Gender Information in Claims Data



Notes: The figure presents the share of observations in each age group where the patient gender classified in the BSBY claims data was confirmed in post-visit patient surveys. Claims for a range of services were randomly sampled for post-visit surveys to collect data on patient spending and care details (see subsection 4.1); 10,489 of these were for non-childbirth claims and were used to confirm patient gender. Whiskers represent 95% confidence intervals. The grey dashed line represents the overall mean confirmation rate (97%). There are only 41 (37) surveys for female (male) patients 80+, and 71 (129) surveys for female (male) patients under 10, which is why confidence intervals for these groups are larger.

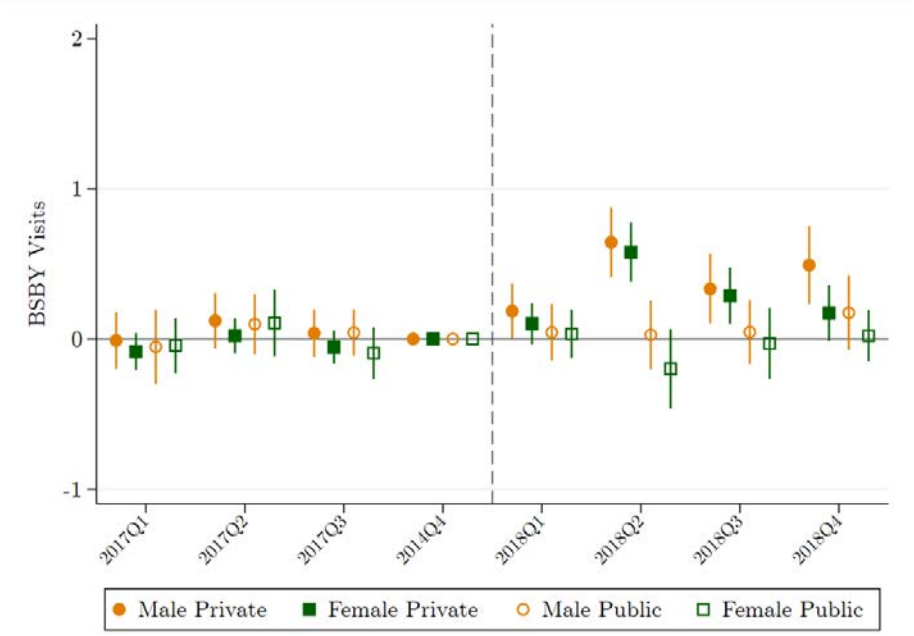
Figure A3: Out-of-Pocket Charges at BSBY Hospitals



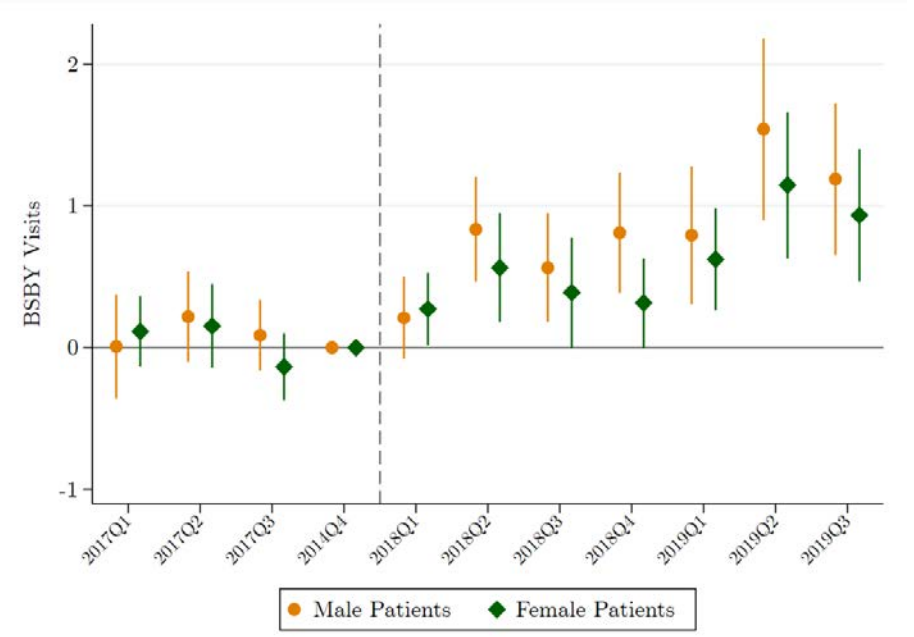
Notes: The figure shows average out-of-pocket (OOP) charges for BSBY hospital visits across a range of services from approximately 20,000 post-visit audit surveys conducted with BSBY patients (or their relatives) between July 2017 and July 2018. BSBY claims were stratified by service and hospital sector and randomly sampled for survey. The survey focused largely on patients visiting private hospitals, but deliveries and hemodialysis visits at public hospitals were also sampled. The vertical lines report the weighted means at public and private hospitals across all services shown. Monetary values are expressed in Indian Rupees (INR).

Figure A4: Effect of Hospital Empanelment: Additional Results

(a) Public and Private Visits

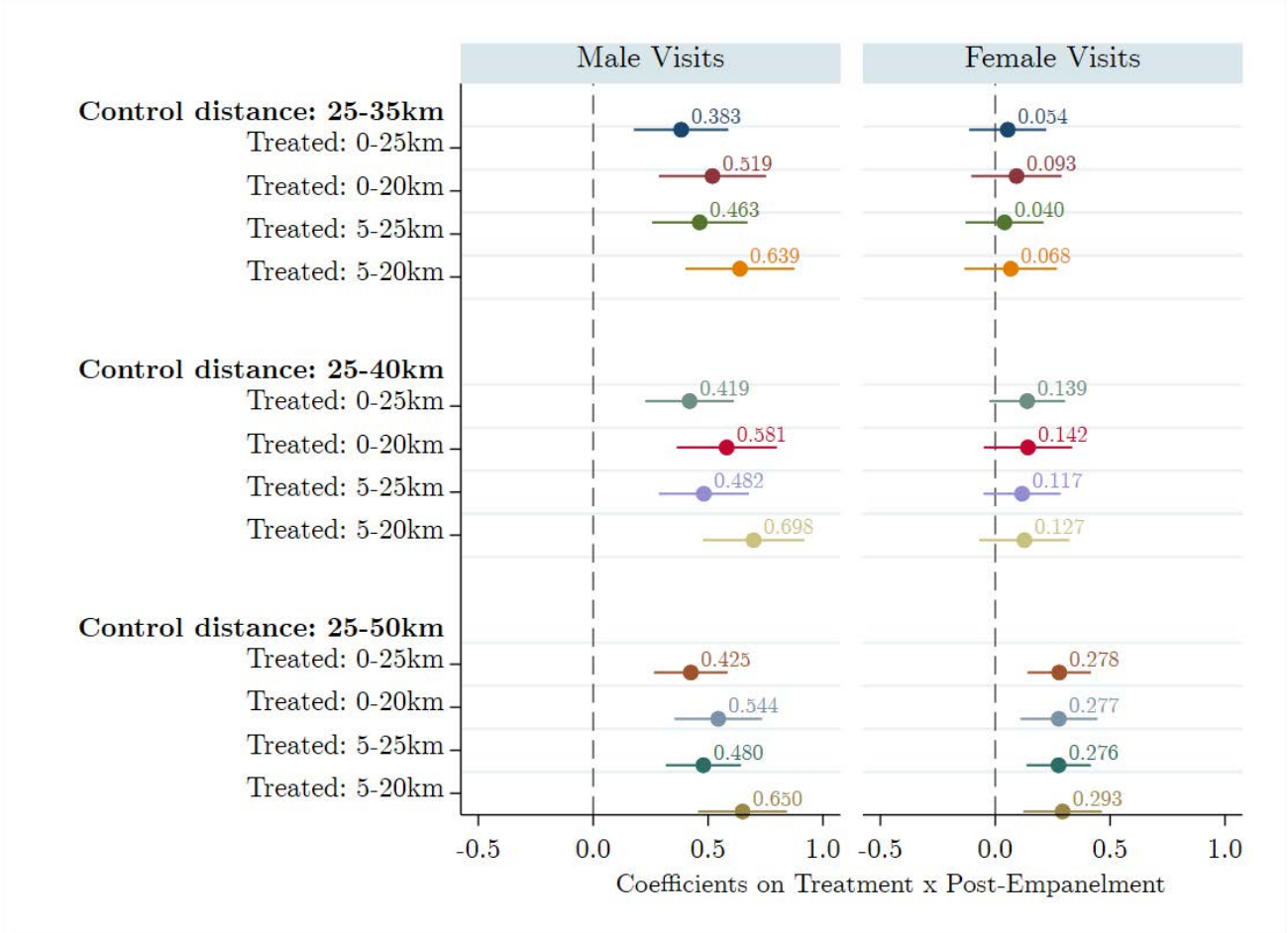


(b) Long-run Effects



Notes: The figure presents event study analyses of the effect of the empanelment of a private hospital near a location on BSBY utilization in that location, similar to Figure 7 except that: in Panel A, the outcomes are quarterly male and female BSBY visits split into those at public and at private hospitals; in Panel B, the control group is locations with no hospital entry through 2019 Quarter3 (when our data end) rather than through 2018 Quarter4. All other notes are as in Figure 7.

Figure A5: Effect of Hospital Empanelment: Robustness to Different Distance Bandwidths



Notes: The figure tests the sensitivity of the empanelment results to different definitions of the treatment and control groups. It reports coefficients from a series of DID regressions following the specification in Table 4 and where the control group (and the pre-empanelment treatment group) includes locations where the nearest private hospital in 2017 is 25-35km away, 25-40km away, and 25-50km away, and where the post-empanelment distance to the nearest private hospital in the treatment group is from 0km or 5km to 20km or 25km away. Our preferred comparison is of locations with the nearest private hospital 25-50km away to those with entry of a hospital 0-25km away. The outcomes are quarterly male and female BSBY visits. All other notes are as in Table 4. Standard errors are in parentheses, p-values in curly brackets.

Table A1: Descriptive Statistics on BSBY Hospital Visits

Panel A: Study Sample	
Full Sample	
Total hospital visits	4,161,487
Unique patients	2,518,184
Main Analysis Sample (Excluding 2016, childbirths, and neonatal visits)	
Hospital Visits	
Total hospital visits	3,209,675
Unique patients	1,973,878
Unique households	1,671,255
Unique BSBY hospitals	1,639
Observations Geocoded	
Patient residence geocoded (%)	71.2
Patient residence geocoded (#)	2,286,001
Patient residence geocoded and hospital geocoded (#)	2,262,729
Unique patient residence locations (village/town)	38,015
Observations with GP Reservations Information	
Patient residence merged with GP reservations (%)	61.4
Patient residence merged with GP reservations (#)	1,969,980
Never reserved (%)	12.3
Reserved once (%)	51.9
Reserved twice (%)	31.2
Reserved thrice (%)	4.7
Unique patient residence locations (village/town)	30,826
Panel B: Descriptive Statistics (Main Analysis Sample)	
Patient and Care Characteristics	
Female (%)	45.4
Age (years)	41.7
Chronic care (%)	15.0
Tertiary care (%)	26.4
Claims filed per hospital visit (#)	1.6
Claimed value per visit (INR)	8,757.4
Characteristics of Hospital Visited	
Private hospital (%)	54.7
Hospital nearest to patient's residence (%)	19.3
Hospital outside patient's district (%)	29.4
Distance traveled to hospital (km)	49.2
Observations (hospital visits)	3,209,675

Notes: The table presents descriptive statistics on the BSBY program administrative data. The Full Sample includes all available claims data—i.e. data on all BSBY visits between program launch in December 2015 and October 2019. The Main Analysis Sample excludes visits in 2016 (when the demographic and address data were of lower quality), for childbirth (since we focus on female-male comparisons), and for neonatal care (which record parent rather than child demographics). Patient residence locations from the claims data were 1) geocoded by linking them to the 2011 Population Census and 2) matched to Gram Panchayat (GP) female reservation status for the 2005, 2010, and 2015 elections (locations with data for all three rounds are considered matched). The locations of BSBY hospitals were also geocoded. Chronic is a dummy for care requiring repeat visits (vs one-time) and tertiary is complex, specialized care (vs secondary). Monetary values are expressed in Indian Rupees (INR) with a conversion rate of 70 INR= USD 1.

Table A2: Missing Female BSBY Visits

Specialty	(1) Female Share of BSBY Visits	(2) Female Share of GBD Illness Prevalence	(3) Missing Female BSBY Visits
Nephrology	0.30	0.48	147,319
Oncology	0.46	0.58	43,351
Cardiology	0.28	0.47	35,149
Neurology	0.41	0.52	9,502
Psychiatry	0.47	0.51	202
Gastrology	0.43	0.48	167
Opthalmology	0.53	0.52	-826

Notes: The table aggregates results from Figure 3 and presents the observed female share of BSBY hospital visits across all ages for a given medical specialty (column 1) and the female share of illness prevalence is based on India's 2019 Global Burden of Disease (GBD) sex-specific prevalence estimates and population sex ratio (column 2). Missing female visits are the additional female visits we would observe under BSBY between January 2017 and October 2019 (the study period) if, given observed male BSBY utilization levels, the female share of BSBY utilization was the same as the female share of illness prevalence in column 2 (instead of as in column 1). The analysis is restricted to the 7 medical specialties that could be matched from BSBY to the GBD, which account for 54% of all hospital visits under BSBY excluding general medicine/surgery. The calculation for each specialty and age group g is as follows:

$$Missing_g = (GBDFemaleShare_g * BSBYExpectedVisits_g) - BSBYFemaleVisits_g$$

$$= \left(GBDFemaleShare_g * \left(\frac{BSBYMaleVisits_g}{1 - GBDFemaleShare_g}\right)\right) - BSBYFemaleVisits_g$$

where $GBDFemaleShare_g$ is the female share of illness prevalence per the GBD, $BSBYExpectedTotalVisits_g$ is the total expected BSBY visits given the volume of observed male BSBY visits $BSBYMaleVisits_g$ and the prevalence-based expected male share $(1 - GBDFemaleShare_g)$, and $BSBYFemaleVisits_g$ is the volume of observed female BSBY visits.

Table A3: Effect of Political Reservations on Location-Level Health Facility Supply

	(1) Has public health center	(2) Has public hospital	(3) Distance to public BSBY hospital	(4) Distance to private BSBY hospital
Nbr of times reserved	0.0034	-0.0003	-0.1004	0.0720
	(0.0021)	(0.0009)	(0.0970)	(0.2165)
	{0.116}	{0.722}	{0.301}	{0.740}
Location-level Controls	Yes	Yes	Yes	Yes
District Fixed Effects	Yes	Yes	Yes	Yes
Observations	35,033	35,033	34,994	35,041
Mean	0.099	0.009	12.565	23.576
Mean | Never reserved	0.094	0.013	12.829	22.448

Notes: Regressions are at the village/town location level. Data on 2020 health facilities was obtained in March 2021 from the PMGSY Rural Facilites Dataset (http://omms.nic.in/Home/PMGSYRuralDataset/). The sample is restricted to locations successfully matched to GP reservations history (see Table A1). All regressions include location level controls for the 2001 and 2011 Population Census variables listed in Table B4, and for the distances to district and sub-district headquarters in the 2011 Census. Columns 3 and 4: Distances are expressed in kilometers. Mean values of each of the outcomes in locations with Sarpanch seats that were never reserved for a female between 2005 and 2015 are reported at the bottom of the table for comparison. Standard errors are clustered at the GP level in parentheses, p-values in curly brackets.

Table A4: Effect of Political Reservations on Household Awareness and Attitudes

	(1)	(2)	(3)	(4)
	Talked with ASHA in Last Month	BSBY Awareness Index	Gender Attitudes Index	Female Agency Index
Female respondent	0.199	-0.825	-0.093	-0.620
	(0.115)	(0.460)	(0.368)	(0.361)
	{0.085}	{0.073}	{0.801}	{0.086}
Female X Number times reserved	0.109	0.142	0.123	0.219
	(0.041)	(0.142)	(0.136)	(0.125)
	{0.008}	{0.317}	{0.366}	{0.081}
Male X Number times reserved	0.020	-0.157	0.072	-0.130
	(0.029)	(0.131)	(0.103)	(0.100)
	{0.474}	{0.229}	{0.485}	{0.193}
Strata Fixed Effects	Yes	Yes	Yes	Yes
Claim Type Fixed Effects	Yes	Yes	Yes	Yes
Surveyor Fixed Effects	Yes	Yes	Yes	Yes
District Fixed Effects	Yes	Yes	Yes	Yes
Observations	833	833	808	820
Mean | Male resp, never reserved	0.135	-0.000	0.000	-0.000

Notes: The unit of observation is a surveyed individual. The table presents the effect of reservations on the attitudes and awareness of residents using data from phone surveys conducted between November 2018 and January 2020 with a sample of households who had given birth at a BSBY facility between January and May 2017. Standard errors clustered at the GP level in parentheses, p-values in curly brackets. Mean values of each of the outcomes for male patients in locations with Sarpanch seats that were never reserved for a female between 2005 and 2015 are reported at the bottom of the table for comparison. All specifications include sampling weights and controls for whether the patient is of scheduled tribe, whether the household was randomly assigned to have a female respondent, as well as age, education, and assets bins. "Claim Type" refers to whether the household had no child visit, only male child visit(s), or at least one female child visit in the BSBY claim data subsequent to the childbirth. ASHAs are village-level government health workers that are responsible for immunizations, pregnant woman care, and basic health activities. All indices have been normalized over the male respondent group in never reserved locations. The BSBY awareness index combines dummies for whether the respondent is aware that BSBY covers hospital, doctor, tests, medicines, and not transport costs. The gender attitudes index combines dummies for "progressive" views (either agree or disagree, depending on the statement) on four statements: "A woman's most important role is being a good homemaker", "A man should have the final word about decisions in the home", "If there is not enough money for all the children in a family to go to school, the boys should get to go instead of the girls", "A woman should be able to travel outside her village alone". The female agency index combines dummies for whether the woman was in involved in major purchase decisions and in health care decisions for children in the household; whether she traveled to shops within the same village alone, another village alone, and another village with someone else in the last year (for urban residents we asked about the same urban neighborhood); and whether she has any source of her own earnings and owns her own mobile phone. Females were asked about their own agency and males about their spouses.

Table A5: Differences in Sarpanch Priorities by Reservation Status

	(1)	(2)	(3)	(4)	(5)	(6)
	Resp was Female Sarpanch	Organized Monthly Village Meetings	Met Weekly with ASHAs	Met Weekly with All VHWs	Health among Top 3 Spending Items	Knowledge of BSBY Coverage Index
Female-reserved 2015	0.836	0.084	0.078	0.037	0.065	-0.145
	(0.020)	(0.049)	(0.041)	(0.033)	(0.044)	(0.113)
	{0.000}	{0.084}	{0.059}	{0.250}	{0.141}	{0.202}
District Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Surveyor Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	547	527	546	546	527	512
Mean | Never reserved	0.014	0.355	0.214	0.124	0.230	0.004

Notes: The unit of observation is a surveyed Sarpanch. The table presents differences in Sarpanch priorities and actions by Gram Panchayat female reservation status using data from phone surveys conducted between November 2020 and January 2021 with Sarpanches from the 2015 election cycle. All regressions include controls for whether the survey respondent is the Sarpanch or a proxy, and whether the Sarpanch seat was caste-reserved (separately from female-reserved). ASHAs are village-level government health workers that are responsible for immunizations, pregnant woman care, and basic health activities. VHWs are village health workers, including ASHAs, Anganwadi workers (who manage child feeding programs), and ANMs (nurses that deliver immunizations and staff public health centers). Health spending includes spending on health care and maternal and child nutrition services. Knowledge of BSBY Coverage is an index of dummies for correct identification of the types of costs and conditions BSBY covers, standardized over the group that was unreserved in 2015. Standard errors in parentheses, p-values in curly brackets. Mean values of each of the outcomes in locations with Sarpanch seats that were never reserved for a female in 2015 are reported at the bottom of the table for comparison.

Online Appendix

Table B1: Gender Differences in Out-of-Pocket (OOP) Charges

	(1)	(2)
	Any Charge	Amount Charged
Female	0.012	25.458
	(0.009)	(81.624)
	{0.185}	{0.755}
Month Fixed Effects	Yes	Yes
Hospital Fixed Effects	Yes	Yes
Service Fixed Effects	Yes	Yes
Observations	9,845	9,844
Mean | Male	0.28	1222.11

Notes: The unit of observation is a hospital visit for which a patient exit survey was conducted. The table presents results from regressions of a dummy for whether the hospital charged the patient (column 1) or the amount charged (column 2) on a dummy for the patient being female. Regressions include month, hospital, and service fixed effects. Data come from the post-visit patient audit surveys (see Figure A3 notes). The analysis is restricted to private hospital visits and excludes childbirths. Mean values of each of the outcomes for males are reported at the bottom of the table for comparison. Monetary values are expressed in INR.

Table B2: Characteristics of Observations Matched to Locations

	Sample Mean	Patient residence location merged with PC11 Location Coordinates		GP Reservation History	
		Coeff	SE	Coeff	SE
Female	0.45	0.0029	(0.0006)	0.0046	(0.0006)
Age	41.68	0.6457	(0.0232)	0.1114	(0.0218)
Private Hospital	0.55	-0.0145	(0.0006)	-0.0274	(0.0006)
Tertiary Care	0.26	0.0947	(0.0006)	0.0627	(0.0005)
Merged with PC11 village	0.71				
Merged with GP reservation history	0.61				
Observations	3209675	3209675		3209675	

Notes: The table presents results from t-tests comparing characteristics of BSBY hospital visits for which the patients' residence locations were matched to 1) 2011 Population Census village/town locations and are geocoded and included in the analyses of distance and empanelment to those that were not and 2) Gram Panchayat (GP) locations and have full 2005-2015 electoral histories and included in the reservations analyses to those that were not. The Sample Mean is the mean across all matched and unmatched observations. Claims data are restricted to the study sample: they exclude 2016, childbirth, and neonatal care claims (see Table A1 notes).

Table B3: Descriptive Statistics on Gram Panchayats Matched to BSBY Visits

	Mean
GP Reservation Status	
Number of times GP reserved	1.3
GP never reserved (%)	11.6
GP reserved once (%)	52.1
GP reserved twice (%)	31.8
GP reserved thrice (%)	4.6
Reservation and Compliance	
2005: Reserved for female (%)	33.6
2005: Filled by female (%)	36.4
2005: Filled by female (reserved) (%)	99.9
2005: Filled by female (unreserved) (%)	4.3
2010: Reserved for female (%)	47.8
2010: Filled by female (%)	52.9
2010: Filled by female (reserved) (%)	100.0
2010: Filled by female (unreserved) (%)	9.7
2015: Reserved for female (%)	47.8
2015: Filled by female (%)	46.9
2015: Filled by female (reserved) (%)	92.3
2015: Filled by female (unreserved) (%)	5.3
Observations	8,818

Notes: The table presents statistics on Gram Panchayats (GPs) included in the study—that is, the GPs for the patient residence locations in the BSBY claims data that were successfully geocoded and matched to GP reservation histories for the 2005, 2010 and 2015 election cycles (see Table A1 for statistics on BSBY visits to GP reservation histories). Per national rules, 33% of all GPs are required to have seats reserved for a female Sarpanch. In 2009, Rajasthan increased this to 50%, which explains the higher reserved shares in the 2010 and 2015 elections. In 2014, Rajasthan introduced minimum education requirements for Sarpanches, which may explain the slightly lower adherence to reservation randomization in the 2015 election.

Table B4: Patient Residence Location Characteristics by Reservation Status

	Mean if Never Reserved (SD)	Coefficient (SE) on: Reserved 2015	Coefficient (SE) on: Nbr Times Reserved
2001 Population Census Characteristics			
Population ('000)	1.425	-0.0761	-0.0423
	(4.124)	(0.0601)	(0.0301)
Share female population	0.481	0.0001	0.0003
	(0.027)	(0.0003)	(0.0002)
Share female under-6 population	0.476	0.0001	0.0007
	(0.058)	(0.0007)	(0.0005)
Share SC population	0.179	0.0012	0.0035
	(0.172)	(0.0023)	(0.0016)
Share ST population	0.162	-0.0010	-0.0033
	(0.275)	(0.0040)	(0.0027)
Share with bus service	0.467	-0.0002	0.0062
	(0.499)	(0.0068)	(0.0046)
Share with banking facility	0.079	-0.0045	-0.0046
	(0.269)	(0.0035)	(0.0024)
Share with paved road	0.576	0.0054	-0.0007
	(0.494)	(0.0071)	(0.0048)
Share with primary health center	0.246	0.0012	-0.0015
	(0.431)	(0.0054)	(0.0036)
Share with hospital	0.004	-0.0003	0.0001
	(0.065)	(0.0009)	(0.0006)
Share urban	0.001	-0.0004	-0.0003
	(0.029)	(0.0005)	(0.0002)
2011 Population Census Characteristics			
Population ('000)	1.373	-0.0091	-0.0154
	(1.647)	(0.0187)	(0.0129)
Share female population	0.482	-0.0002	0.0000
	(0.025)	(0.0003)	(0.0002)
Share female under-6 population	0.471	-0.0005	-0.0007
	(0.064)	(0.0008)	(0.0005)
Share SC population	0.185	0.0016	0.0036
	(0.180)	(0.0023)	(0.0016)
Share ST population	0.168	-0.0016	-0.0027
	(0.283)	(0.0041)	(0.0028)
Number of Locations			30,826

Notes: The table examines balance in the characteristics of BSBY patient residence locations in the study sample by their GP reservation status to assess whether the randomization protocol was adhered to. The unit of observation is a patient residence location. The table presents coefficients from regressions of 2001 and 2011 Population Census characteristics on a dummy for whether the location was reserved for a female Sarpanch in 2015 and a categorical measure of the number of times it was reserved over the 2005, 2010, and 2015 GP elections. The sample is restricted to patient residence locations in the BSBY claims data that were successfully matched to the 2011 Population Census and have complete political reservation histories (see Table A1 notes). SC and ST stand for Scheduled Caste and Scheduled Tribes. Standard deviations are in parentheses in column 1 and standard errors are in parentheses in columns 2 and 3.

Table B5: Effects of Political Reservations on Location-Level Care Volume

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Dependent Variable: Number of BSBY Visits							
	Under 15		15 to 45 years old		46+ years old		15 to 45 years old, including deliveries	
	Females	Males	Females	Males	Females	Males	Females	Males
Number of times GP reserved	0.025	-0.009	0.007	-0.020	-0.013	0.013	0.008	-0.019
	(0.017)	(0.013)	(0.013)	(0.014)	(0.011)	(0.011)	(0.011)	(0.014)
	{0.125}	{0.493}	{0.604}	{0.153}	{0.256}	{0.265}	{0.499}	{0.164}
Location-level Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
District Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	254,322	254,322	254,322	254,322	254,322	254,322	261,420	261,420
Unique Locations	30,472	30,472	30,472	30,472	30,472	30,472	30,403	30,403
Mean | Never reserved	0.130	0.130	1.267	1.267	1.009	1.009	1.689	1.689

Notes: The unit of observation is a location-quarter. The table presents the effect of exposure to Gram Panchayat (GP) reservations on the volume of male and female visits. Estimates are from poisson regressions of the number of BSBY hospital visits from a location in a quarter on a categorical measure of whether the location had a female-reserved Sarpanch seat in zero, one, two, or three of the Gram Panchayat election terms between 2005 and 2015. The sample is a balanced panel of census locations in Rajasthan, including those with zero BSBY claims, that were successfully matched to GP reservations history (whereas Table A1 only reports locations with BSBY claims). The number of observations varies between columns 1-6 and 7-8 because the latter includes locations with childbirth visits; a small set of locations had no non-childbirth BSBY visits in any quarter, but at least one childbirth visit, and drop out of the regressions in columns 1-6. All regressions include quarter fixed effects, location level controls for the 2001 and 2011 Population Census variables listed in Table B4, distances to district and sub-district headquarters in the 2011 Census, and distances to the nearest public and private BSBY hospitals (which may vary within location across quarters due to empanelment). Standard errors are clustered at the GP level and in parentheses, p-values are in curly brackets.

Table B6: Effects of Political Reservations: Contemporary vs. Historical Reservations

	(1)	(2)	(3)
	Dependent Variable: Patient is Female		
	All Claims	Under 15 years old	15-45 years old
Reserved 2015	-0.0025	0.0048	-0.0078
	(0.0063)	(0.0070)	(0.0063)
	{0.689}	{0.494}	{0.216}
Reserved 2015 x Nbr Prior Reservations	0.0121	0.0041	-0.0023
	(0.0065)	(0.0068)	(0.0062)
	{0.063}	{0.548}	{0.712}
Nbr prior reservations	0.0061	0.0074	-0.0011
	(0.0041)	(0.0046)	(0.0044)
	{0.142}	{0.106}	{0.805}
Age Group Fixed Effects	Yes	Yes	Yes
Month Fixed Effects	Yes	Yes	Yes
Patient District Fixed Effects	Yes	Yes	Yes
Specialty Fixed Effects	Yes	Yes	Yes
Observations	149,553	970,391	850,036
Female share | Never reserved	0.326	0.549	0.445
Average 2015 Reservation Effect	0.010	0.009	-0.010
Average 2015 Reservation P-value	0.044	0.073	0.023

Notes: The unit of observation is a hospital visit. The table presents regressions of a binary measure for whether a BSBY hospital visit was for a female on a binary measure of whether the patient resided in a location with a female-reserved Sarpanch seat in 2015 (Reserved 2015), a categorical measure of whether it was reserved zero, one or two times between 2005 and 2015 (Nbr prior reservations), and the interaction of the two. The sample is restricted to BSBY hospital visits where the patient residence location is successfully matched to GP reservations history (see Table A1). All regressions include location level controls for the 2001 and 2011 Population Census variables listed in Table B4, distances to district and sub-district headquarters in the 2011 Census, and distances to the nearest public and private BSBY hospitals. Age group fixed effects are in ten-year age bins. The female share of visits in locations with Sarpanch seats that were never reserved for a female between 2005 and 2015 is reported at the bottom of the table for comparison. Standard errors are clustered at the GP level in parentheses, p-values in curly brackets.