

# Does prenatal care increase access to child immunization? Gender bias among children in India

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## Abstract

Prenatal care appears to serve as a trigger in increasing the chances for access to subsequent health care services. Although several previous studies have investigated this connection, none have focused specifically on how parents' behavior differs before and after learning the gender of their babies. Investigating parents' behavioral changes after the child's birth provides a quasi-natural experiment with which to test the gender discrimination hypothesis. This issue was examined here, using a rich family health survey data set from India. We find evidence for the triggering effect of prenatal care on immunization only among rural boys, but we find no compelling evidence for this effect among other sub-samples. This finding suggests two things, which are not mutually exclusive. One is that the information spillover from prenatal care has a much larger impact in rural areas, where alternative sources of information are scarce, compared with urban areas. The other is that the sex of a child is a critical factor in producing different levels of health care behavior in rural areas, where sons are favored and more valued than in urban areas.

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## Introduction

Numerous studies have demonstrated that the use of health care services during pregnancy serves dual functions. Prenatal care directly reduces child morbidity and mortality. In addition, it increases the chances that the mother accesses subsequent health care services for her child, such as institutional delivery and immunization (Arnold, 1992; Butz, Funkhouser, Caleb, & Rosenstein, 1993; Hill & Upchurch, 1995; Kogan, Alexander, Jack, & Allen, 1998; Lee, 2005; Munshi & Lee, 2000;

Sugathan, Mishra, & Retherford, 2001). One possible interpretation for this finding is learning-by-doing (Lee & Mason, 2005). Women who participate in prenatal health care programs may receive counseling about the importance of subsequent programs, such as child immunization, and develop confidence in the value of these immunization programs. They may develop a familiarity with health care systems, increasing the likelihood that they will later rely on these systems to the benefit of their children.

One important issue, addressed in the analysis to be presented, is the effect of son preference on the link between prenatal care and subsequent health care. When there is gender discrimination, the effect of prenatal care on subsequent health care may

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differ based on the sex of the child. Investigating differences in parental behavior before and after the child's birth provides a quasi-natural experiment with which to test the gender discrimination hypothesis. In this study, we test whether the role of the effects of prenatal care differ with a child's sex and place of residence of the mother. If a mother's decision on whether to immunize her child is conditioned on the sex of the baby, there will be significant differences in this spillover effect of prenatal care. Although there is a substantial body of research focusing on gender bias in health care and mortality (Arnold, Choe, & Roy, 1998; Arnold, Kishor, & Roy, 2002; Basu, 1989; Das Gupta, 1987; Mishra, Roy, & Retherford, 2004; Pande, 2003; Retherford & Roy, 2003; Sudha & Rajan, 1999), little evidence exists on how parents' health care behavior changes after parents learn the gender of their babies. This study is expected to fill this gap in the existing literature.

One difficult problem that arises in estimation is in accounting for the influence of unobserved traits of women—tastes, attitudes, other unmeasured factors—that precondition their use of health services. Lee (2005) demonstrates that there is *complementarity* between health care behaviors. That is, it is likely that a mother who uses prenatal care may also engage in subsequent health care services, not because of the role of prenatal care in disseminating information on the following health care, but because of the mother's inherent attitudes, beliefs, motivations, or tastes. Since belief or motivation is individual specific, a woman who uses prenatal care may be more likely to vaccinate her children as well. Strobino, Keane, Holt, Hughart, and Guyer (1996) demonstrate that a woman's beliefs, regarding the risk and effectiveness of health care, affect the likelihood that she will have her children vaccinated. When the presence of this complementary behavior is ignored, the estimated effect of prenatal care on immunization may be biased, because the estimated coefficient not only reflects the effect of prenatal care on immunization, but it may also reflect the mother's consistent behavioral pattern regarding health care, which is not captured by measured variables. To address this issue, we estimate the model first ignoring the complementarity, then controlling for it, and compare the results. Probit and bivariate probit models are used, respectively, for estimation.

The paper is organized as follows. In the next section, data, variable selection, and estimation

techniques are discussed. Estimated results are followed by. The last section summarizes and discusses implications of the study.

## Data, variables, and estimation technique

### *Data and variables*

This study uses data from the 1992–1993 National Family Health Survey (NFHS) in India. The 1992–1993 NFHS is comprised of a representative sample of 89,777 ever-married women, aged 13–49, residing in 88,562 households. This analysis focuses on children born to these women in the 12–47 months preceding the survey, in both urban and rural India. Children born less than 12 months preceding the survey were not included, as internationally accepted guidelines specify that children should be fully immunized by the time they complete their first year of life. In total, 34,386 children, including 648 who died, fit into this category. The total number of households in the resulting sample is 27,922, and the maximum number of children born to a single mother during the sample period is three. An advantage of the NFHS is that the data set includes health information for the deceased children. Previous research has examined the determinants of immunization coverage using data only on living children, due to the lack of immunization information for children who died (e.g., Pebley, Goldman, & Rodriguez, 1996). The restriction of immunization estimates to living children has most likely resulted in an overestimate of immunization coverage, which does not arise when using the NFHS data set.

Due to the sampling design of the NFHS, certain categories and states of respondents were over-sampled. It is, therefore, necessary to use weights to restore the correct population proportions. All estimates, in this paper, make use of weighted numbers at the national level. Further, in generating the estimates used in this paper, we account for clustering problems.<sup>1</sup> Details of the sample design are provided in the report for the NFHS of India (IIPS, 1995).

<sup>1</sup>We assume that observations (children) are independent across mothers (clusters) but not necessarily independent within a same mother. If we ignore this, the reported standard errors will be smaller than their true values. The standard errors are thus corrected using the method by Huber (1967).

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