Public hospitals reduce newborn mortality in rural north India

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Three-sentence summary

Births in public health facilities in north India have lower neonatal mortality than private facilities, but do public facilities causally reduce risk? In a district borders regression discontinuity design, being on the side of a district border with a higher district-level fraction of public facility birth increases delivery in public facilities, lowers neonatal mortality risk, and increases skin-to-skin contact. Fuzzy regression discontinuity analysis shows giving birth in public facilities is protective.

Background

In eight north Indian states, public health facility births have lower neonatal mortality (29 per thousand) than private health facility births (44 per thousand). This holds even though families that use public facilities are poorer. However, it's not clear what's causing that difference: selection or differences in treatment.

There is substantial heterogeneity in the fraction of births born in public facility across districts, which I exploit in a novel research design.

Why are district borders important?

At the border, facility choice sets and private costs are identical in expectation, and there are no empirical discontinuities in demographics. But the cost of public care varies: Local health care workers help families navigate their own district; conditional cash transfers are easier to redeem within own district; and non-emergency ambulances function within own district.

Why does care vary across facility types?

Private facilities vary widely in quality and are *de facto* largely unregulated. Private providers are incentivized to maximize profit, often by hiring unskilled nurses and by providing services that are desirable to attendants. Public facilities are incentivized to minimize effort and costs. The WHO recommends the low-cost intervention of immediate skin-to-skin contact at birth and early initiation of breastfeeding.

Empirical strategy: border regression discontinuity

- **Data.** DHS surveys of India, conducted 2014–2015 and 2019–2021, with village geographic data, household characteristics, and mothers' and children's health behavior and outcomes
- **Unit of analysis.** A birth to a rural family in the five years preceding the survey in Bihar, Chhattisgarh, Jharkhand, Madhya Pradesh, Odisha, Rajasthan, Uttarakhand, or Uttar Pradesh
- **Outcomes.** Public facility birth, neonatal mortality, and skin-to-skin contact
- **"Treatment."** Being in district with higher average fraction of public facility birth rather than neighboring district with lower
- **Running variable.** Distance to nearest district border

Results: Regression discontinuity plots

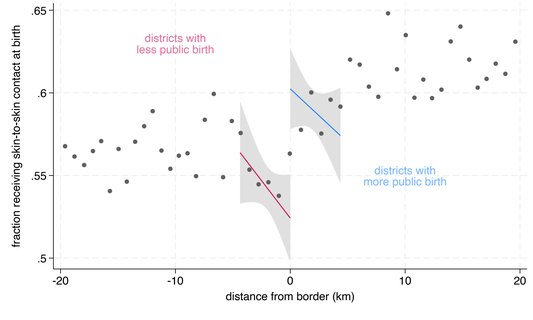

Figure 1. First-stage: Being on the side of a district border with more public facility birth increases **public facility birth**: 7.8 p.p. (1.8)

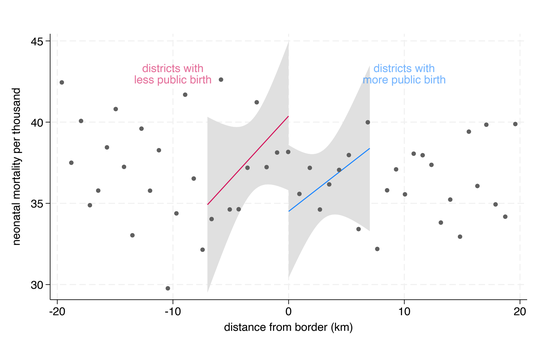

Figure 2. Outcome: Being on the side of a district border with more public facility birth decreases **neonatal mortality**: 5.9 per thousand (3.14)

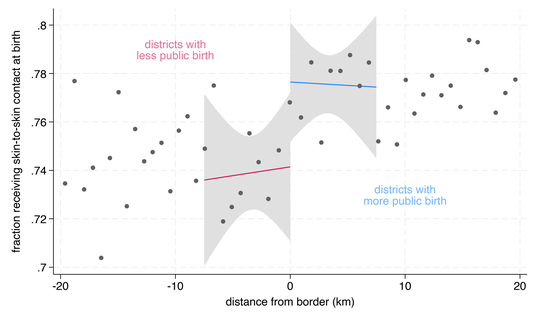

Figure 3. Mechanism: Being on the side of a district border with more public facility birth increases **skin-to-skin contact** (proxy for a bundle of care): 3.5 p.p. (2.0)

Continuity tests

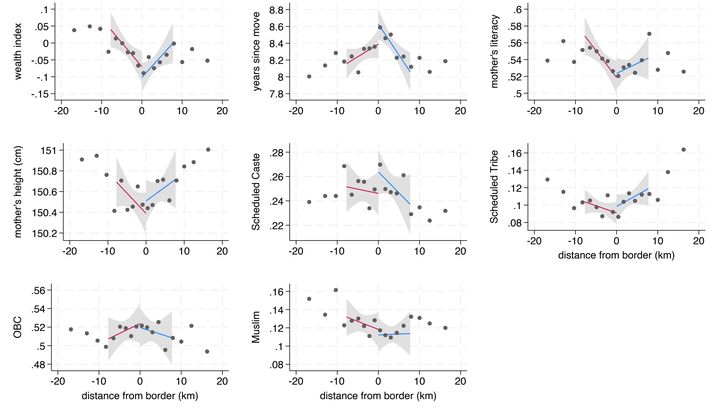

Figure 4. No discontinuities in demographic predictors of mortality

Results: Public birth reduces neonatal mortality

	Neonatal mortality		
	(1)	(2)	(3)
Panel a: Fuzzy RD, instrumenting public			
public birth	-82.9†	-89.4†	-96.1*
	(48.8)	(47.7)	(48.9)
Panel B: Fuzzy RD, instrumenting private			
private birth	146.984	157.876†	189.242†
	(89.977)	(86.734)	(100.407)
District pair FEs		Yes	Yes
Additional controls			Yes
Bandwidth	7.0	7.0	7.0
Observations	117753	117753	117753

References

[1] Diane Coffey, Nikhil Srivastav, Aditi Priya, Asmita Verma, Nathan Franz, Alok Kumar, and Dean Spears. Excess neonatal mortality among private facility births in rural parts of high-mortality states of india: Demographic analysis of a national survey. Manuscript submitted for publication.

[2] Rashmi Sharma. Organisation Through Neglect: Understanding Field Administration in India. Technical Report 2023-9, Centre For Policy Research, New Delhi, March 2023.

[3] Asmita Verma and John Cleland. Is newborn survival influenced by place of delivery? a comparison of home, public sector and private sector deliveries in india. *Journal of Biosocial Science*, pages 1–15, 2021.