

In Vaccines We Trust? The Effects of the CIA's Vaccine Ruse on Immunization in Pakistan

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Vaccine Skepticism & Misconceptions on the Rise

- ▶ Vaccines behind some of the largest improvements in human wellbeing
- ▶ Vaccine skepticism is on the rise
- ▶ Fuelled by anti-vaccine movement and religious extremism (Afghanistan, Pakistan, Nigeria)
- ▶ Trust in health providers and vaccines is key for acceptance.

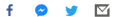


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Vaccines: Low trust in vaccination 'a global crisis'

By Michelle Roberts
BBC News

19 June 2019



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Measles outbreak across Europe

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Measles is spreading across Europe wherever immunisation coverage has dropped, the World Health Organization is warning.

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- ▶ Trust in health providers and vaccines is key for acceptance.
- ▶ How does **information discrediting health services** affect the **vaccination rates**?



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We Exploit the 2011 CIA Vaccine Ruse

- ▶ The CIA got intelligence suggesting Bin Laden was hiding in Pakistan
- ▶ The CIA organized a fake vaccination campaign to get DNA from kids in the compound
- ▶ They recruited a Pakistani physician, who conducted vaccinations in the area.
- ▶ Public disclosure: Jul 2011.
- ▶ The Pakistani Taliban used this information to discredit vaccines
→ Anti-Vaccine Propaganda

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CIA organised fake vaccination drive to get Osama bin Laden's family DNA

Senior Pakistani doctor who organised vaccine programme in Abbottabad arrested by ISI for working with US agents



📷 CIA organised fake vaccination programme in Abbottabad to try and find Osama bin Laden. Photograph: Md Nadeem/EPA

The CIA organised a fake vaccination programme in the town where it believed Osama bin Laden was hiding in an elaborate attempt to obtain DNA from the fugitive al-Qaida leader's family, a Guardian investigation has found.

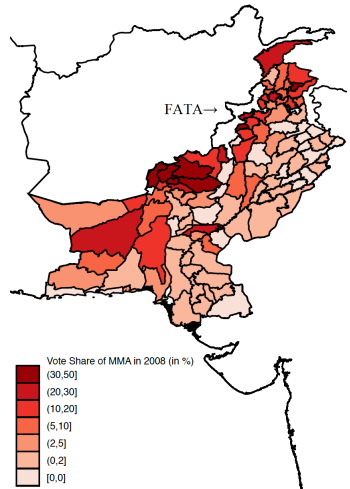
Paper In a Nutshell

- ▶ We implement a **DiD strategy**:
 - ▶ We compare children born **before & after** the disclosure.
 - ▶ Across regions with different levels of **Islamist support**.
- ▶ **Main Result:** Large **negative effect** on vaccination rates.
 - ▶ **12% to 20% decline** in vaccination rates per Standard Deviation in Islamist support.
 - ▶ Additional results suggest the channel is **lower demand & trust** in formal medicine

Background

Pakistan's Political & Administrative Background

- ▶ We focus on the 4 provinces of Pakistan (97% of the population)
- ▶ Measure of **ideological alignment to the Taliban**:
Vote share of MMA in 2008
- ▶ Alliance of Islamist, ultra-conservative parties with strong connections to the Taliban
- ▶ 3% of the votes and seats but substantial variation



Reactions to the CIA Vaccine Ruse in Pakistan

- ▶ **Anti-vaccine propaganda intensified** after 2011
 - ▶ *“Western conspiracy to sterilize Muslim girls”, “vaccines made of pig-fat”, “un-Islamic to take medicines before disease”*
- ▶ Leverage on the **CIA vaccine ruse** for **credibility**:
 - ▶ *“Polio agents could be also spies as we have found in the case of Dr. Shakil Afridi has surfaced.”*
(Published in a fatwa, cited in Roul 2014).
- ▶ Rumors spread through network of **radicalized mosques** and Islamist newspapers (Roul 2014).
- ▶ Extensive anecdotal evidence that **parents granted credibility** to these rumors and became skeptical of vaccines.

Vaccine Delivery in Pakistan

- ▶ Vaccines are administered by **Lady Health Workers**.
- ▶ Expanded Program in Immunization (EPI) organizes **coordinated vaccination drives**.
- ▶ Pakistan follows the official calendar recommended by WHO but not strictly enforced

Data

- ▶ **Pakistan Social and Living Standards Measurement:**
 - ▶ Rounds 2010 and 2012
 - ▶ 18,000 children in the sample < 2 years old
 - ▶ Outcome: indicator for having received 1st dose of vaccine X
 - = 1 if vaccine noted in the vaccine card
 - = 0 otherwise

▶ details

Difference-in-Differences Empirical Strategy

1. Regional variation:

- ▶ Districts with high support for the Taliban → parents more exposed and persuaded by the anti-vaccine propaganda

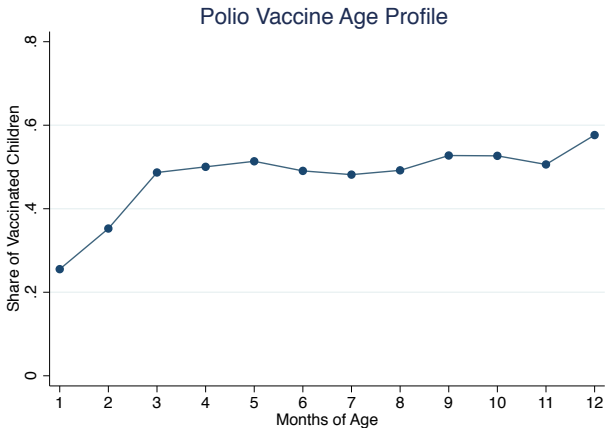
▶ Discussion

2. Cohort variation:

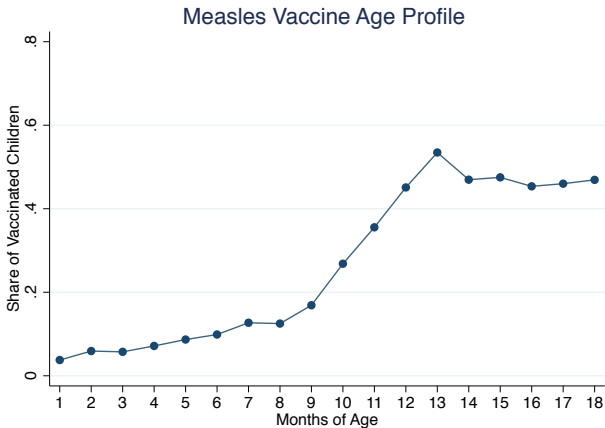
- ▶ Fully exposed cohorts → born after July 2011 (disclosure)
- ▶ Not exposed cohorts → born “much earlier” than July 2011
- ▶ Partially exposed cohorts → born shortly before July 2011
 - ▶ Early months in their life under the new information scenario

→ Next, we examine the **age profiles** to distinguish partially from not-exposed cohorts.

Age Profile of Vaccines (Pre-Treatment)



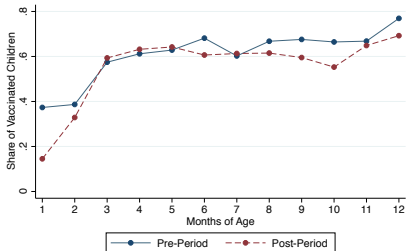
Age Profile of Vaccines (Pre-Treatment)



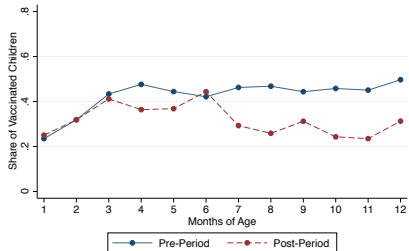
Age Profiles. Before & After. By Islamist Support

Polio Vaccine

Low Islamist Support



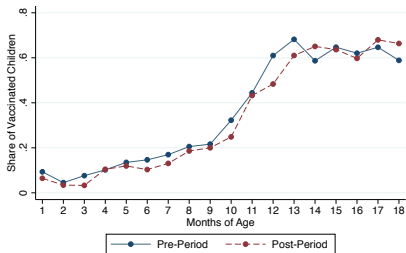
High Islamist Support



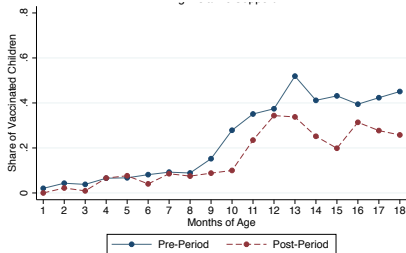
Age Profiles. Before & After. By Islamist Support

Measles Vaccine

Low Islamist Support



High Islamist Support



Empirical Strategy

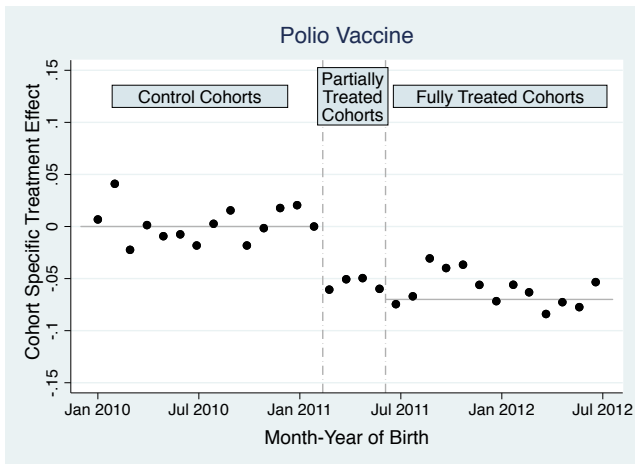
- ▶ Flexible Regression Framework

$$Y_{ikaj} = \sum_k \beta_k D_k I_j + \gamma_k + \gamma_j + \gamma_a + \delta c_i + \epsilon_{ikaj}$$

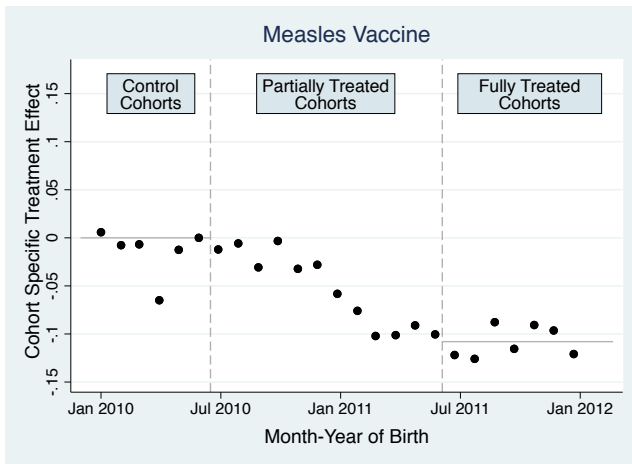
- ▶ $Y_{ikaj} = 1$ if child i got the 1st dose of the vaccine
- ▶ D_k dummy for month of birth k
- ▶ I_j Islamist Parties (MMA) 2008 vote share in district j (in standard deviations) [▶ details](#)
- ▶ $\gamma_k, \gamma_j, \gamma_a$: monthly cohort FE, district FE, monthly age FE
- ▶ c_i covariates (month-of-interview & rural indicator)

We plot $\hat{\beta}_k$ coefficient: treatment effect for each cohort

Cohort-Specific Treatment Effects



Cohort-Specific Treatment Effects



▶ With CI

▶ Longer Pre-Trend

▶ Full Immunization

▶ Medium-Run

Effects of Disclosure of Vaccination Ruse

	Dependent Variables:			
	Polio (1)	DPT (2)	Measles (3)	All Vaccines (4)
Panel A. 1st Dose of Each Vaccine				
<i>Mean Dep. Var.</i>	0.420	0.453	0.279	0.250
Post × Islamist Support	-0.060*** (0.020)	-0.056*** (0.018)	-0.055*** (0.016)	-0.058*** (0.016)
Observations	16,654	16,654	12,479	12,479
R-squared	0.262	0.241	0.253	0.259
Number of Clusters	109	109	109	109
Panel B. All Doses of Each Vaccine				
<i>Mean Dep. Var.</i>	0.381	0.419	0.279	0.264
Post × Islamist Support	-0.064*** (0.019)	-0.061*** (0.018)	-0.055*** (0.016)	-0.050*** (0.015)
Observations	11,205	11,205	12,479	11,205
R-squared	0.277	0.247	0.253	0.272
Number of Clusters	109	109	109	109

Mechanism

- ▶ Our proposed mechanism: ↓ **in demand & trust in vaccines**
 - ▶ CIA ruse lent credibility to the Taliban's conspiracy theories
 - ▶ The Taliban intensified their anti-vaccine propaganda
 - ▶ Parents in regions with higher support for Islamist groups, more exposed to these messages or more persuaded by them. [▶ extra](#)
 - ▶ Higher parental vaccine hesitancy.
- ▶ Main **alternative channel**: changes in **supply** of vaccines
 - ▶ Since mid-2012, the Taliban attacked polio vaccine workers.
 - ▶ We collected administrative data on vaccination drives.
 - ▶ No differential change in frequency of campaigns or in number of targeted children. [▶ details](#)
 - ▶ Results robust to controlling for supply of vaccines [▶ details](#)

Evidence Consistent with Demand Channel

1. Lower **Health Seeking** Behavior

- ▶ Less likely to consult medical worker when child gets sick

▶ details

2. Lower **Trust** in public sector workers

- ▶ Trust measures from South Asia Barometer

▶ details

3. **Larger negative effect for girls**

- ▶ Some Taliban's rumors argued that vaccines aimed at sterilizing Muslim girls

▶ details

▶ Robustness

▶ Unbundling Demand

Taking Stock & Further Research (I)

- ▶ The disclosure of the CIA's vaccine ruse lead to a substantial decline in immunization rates
- ▶ Additional evidence supportive of decline in demand & trust channel
- ▶ We estimate persuasion rates of 31-42%.
Della Vigna and Gentzkow (2010) rates [0.7% - 29.7%]
- ▶ First quantification of the negative effects of using health services as covert for espionage

Taking Stock & Further Research (II)

- ▶ Can trust be regained? How?
 - ▶ Papers finding persistent effects of mistrust: Alsan and Wanamaker (2017), Lowes and Montero (2018)
 - ▶ Others find trust can be regained Andrabi and Das (2017), Acemoglu, Cheema, Khwaja, Robinson (2018)
 - ▶ Medium-Run Effects
- ▶ Broader implication of the CIA vaccine ruse: making vaccines vulnerable to future conspiracy theories.

Many thanks!