

In Vaccines We Trust?

The Effects of the CIA's Vaccine Ruse on Immunization in Pakistan

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Trust in the medical sector and in medical products is a key determinant of the demand for health care. This is especially relevant for the use of vaccines. Because of herd immunity, it is difficult—if not impossible—to learn about the effectiveness of vaccines through one's own experience. Hence, events that discredit the effectiveness of vaccines or the reputation of the medical sector can have dramatic consequences on immunization rates. A commonly discussed example of such dynamics was the publication of an article in the medical journal *The Lancet* in 1998 that linked autism to the measles, mumps, and rubella vaccine. Media reports have associated this publication with the emergence of the anti-vaccine movement and with the recent rise in the number of unvaccinated children in several countries. The declines in vaccination rates have contributed to the reemergence of previously eradicated diseases in several countries.

These issues are even more relevant in developing countries, where citizens have lower levels of education and the low quality of remedial medicine can exacerbate the negative consequences of infections. In spite of the importance of these issues, we have only limited empirical evidence on how the disclosure of information damaging the reputation of vaccines impacts health outcomes.

In our work, we exploit a sequence of events that took place in the recent history of Pakistan and that severely affected the degree to which citizens trusted formal medicine and vaccines. As part of operations to capture Osama bin Laden in 2011, the CIA launched a fake vaccination campaign in the city of Abbottabad, Pakistan. The objective of this operation was to obtain DNA samples of children living in a compound in Abbottabad where bin Laden was suspected to hide. This would have allowed the CIA to obtain definitive proof that bin Laden was hiding there. In July



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2011, two months after the actual capture of bin Laden, the British newspaper *The Guardian* published an article reporting on the vaccine ruse and describing the collaboration of a Pakistani doctor with the CIA.

The disclosure of this information caused uproar in Pakistan. The Pakistani Taliban used this information to intensify their discrediting campaign against formal medicine and vaccines particularly. They issued several fatwas—religious edicts—in which they accused health workers of regularly conducting espionage activities for the United States and related polio vaccination campaigns to attempts to sterilize Muslim girls. While the Taliban’s campaign to discredit vaccinations can be traced back to the early 2000s, the disclosure of the vaccination ruse and the actual involvements of Pakistani doctors in espionage activities lent credibility to the Taliban’s arguments.

We estimate the impact of these events on immunization rates using household-level data from the Pakistan Social and Living Standards Measurement survey. We compare immunization rates of children born before and after the vaccine ruse was disclosed and across districts with different levels of support for Islamist political groups. Our underlying hypothesis is that, on average, parents in districts with higher support for political Islamist groups will be more likely to change their beliefs about vaccines according to the messages spread by the Taliban. As a measure of support for Islamist groups, we use district-level measures of electoral support for Muttahida Majlis-e-Amal, which was a coalition of Islamist parties that ran under a single banner in the 2008 general election.

Our estimates suggest that the disclosure of the vaccine ruse had substantial effects on vaccination rates: a one-standard-deviation increase in the support for Islamist groups leads to a 9–13 percent larger decline in the likelihood that children have received the first dose of several different vaccines. The results are highly statistically significant and robust to the inclusion of a host of controls, including district and month of birth. Furthermore, we document the absence of differential trends preceding the disclosure of the vaccination ruse.

These results are consistent with the hypothesis that the disclosure of the vaccine ruse damaged the reputation of vaccines and of formal medicine more generally. The increase in vaccine skepticism may have led some parents

to refuse to vaccinate their children. We provide additional evidence consistent with this channel. First, we show that other forms of health-seeking behavior also experienced important declines. In particular, parents were less likely to consult formal health workers when their children got sick. Second, we show that the effects are driven by children living in districts where a relatively larger fraction of the population does not trust or consume mainstream media. Individuals in these districts tend to rely more on religious leaders or word of mouth to get information on events in Pakistan. While we do not have a precise measure of the extent to which parents were exposed to Taliban propaganda, we construct a proxy computing the fraction of the population that get their news mainly from religious leaders and also express support for the Taliban. Our estimates indicate that vaccination rates experienced larger declines in regions where this share of the population is larger. Third, we show that the negative effect of the disclosure of the vaccine ruse on vaccination rates is larger for girls than for boys. This is consistent with parents believing the rumors spread by Islamist groups that suggested vaccination campaigns were intended to sterilize Muslim girls.

We also examine alternative explanations. In particular, we explore whether the supply of medical services changed in response to the disclosure of the vaccine ruse. We obtained administrative data on the number and scope of the vaccination drives that took place during the period of our study. We provide evidence that the number of vaccination campaigns and the number of children targeted during those campaigns did not differentially change across districts with different levels of support for Islamist groups. Furthermore, we show that the availability of health facilities did not experience differential changes. Finally, we show that our main results are fully robust to controlling for measures of supply of health services.

Our study makes several contributions to the related literature. First, we focus on a shock to the reputation of vaccines and examine immunization rates as the main outcome of interest. Given the inherent difficulties in inferring the effectiveness of vaccines through one’s own experience, shocks to the reputation of vaccines can be especially damaging. Second, we examine events that were detrimental to the reputation of vaccines in the context of the recent history of Pakistan. Hence, this illustrates that preserving the

reputation of vaccines and the health sector more generally is a current pressing issue for developing countries.

Our research is also related to the literature that examines the effect of persuasive communication on behavior. While much literature has documented the effect of advertising campaigns and media exposure on consumer and voting behavior, to the best of our knowledge, no study has documented the causal effect of propaganda campaigns against vaccines—or of information lending credibility to such campaigns—on immunization rates. Furthermore, the presence of an active political group trying to discredit the reputation of vaccines by means of spreading rumors and wrongful information connects our work with the recent literature on the effects of fake news and the consequences of conspiracy theories. A way of conceptualizing the natural experiment described in our work is as follows:

The disclosure of the vaccine ruse constituted a piece of information that lent credibility to a set of rumors and conspiracy theories related to vaccinations that were circulating in the Pakistani population. As a result, the diffusion of these rumors and misinformation increased. It is the combination of these two factors, we argue, that led to the discrediting of vaccines and to the effects that we estimate in our research.

NOTE

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