Vaccination Trends in India: From the 19th Century to the Present

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ABSTRACT

In 1803, a 3-year-old girl received what would be the first vaccination in India's history. The vaccine was for smallpox, which had taken the world by storm. Considering the administration of the vaccine a success, the British Raj opted to switch from variolation to vaccination. Vaccination types started with smallpox, then typhoid fever, and continued to grow along with the course of India's history until today with the emergence of the COVID-19 vaccination in its many forms. However, this sudden push to a new type of medicine could have been considered disruptive, taking people away from their traditional medicine and practices. As vaccines were considered Western medicine, the idea of them had mixed reviews amongst the population. Throughout the years, the production of vaccinations in India has improved a lot as India has recently quickly and efficiently rolled out vaccinations for the COVID-19 pandemic. Comparing and contrasting trends in vaccination statistics, developments, rules, and regulations from then and now can aid India and other countries in finding what worked and what didn't to adjust for future decisions in law-making and scientific research. Making changes based on historical analysis is one of the best ways to avoid making the same mistakes in the future and help avoid making new ones.
In this research project, we will explore vaccination trends in India starting from the first vaccines given in the 19th century to the current roll out of COVID-19 vaccines in today's pandemic.

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SMALLPOX

Smallpox was believed to have originated in India or Egypt thousands of years ago. It was often called the "Indian Plague", giving historians a reason to suspect that smallpox had a large prevalence in India. The first doses of the vaccine were given to a 3-year-old child, with the results being successful in 1803. Since the benefits of the vaccine were so apparent, some Indian states had already banned variolation by 1804. However, the general public's opinion on the vaccine were not as strong as the government's. People had to pay a fee for the smallpox vaccine, still believed that inoculation was superior, and that smallpox was the result of angry goddesses among other misconceptions. Additionally, those involved with variolations feared they might lose their jobs. Until 1850, the vaccine was still being imported from Great Britain. The increased demand led to a shortage and for India to act on their own. Animal lymph experiments began in 1832 and had successful results in 1880. In the later parts of the 19th century, the research shifted due to high amounts of vaccine supply towards vaccination preservation and transport techniques. With the National Smallpox Eradication Program launched in 1962, the last case of smallpox was reported in 1975 and India was declared smallpox free in 1977 (Lahariya, 2014).

TRENDS

When looking at factors that are driving vaccination, hesitance and resistance plays a role in whether or not citizens are likely to even get the vaccine.

When comparing multiple reasons for resistance of getting the vaccine, social media rumors ranked highest (90%)

Additionally, over 50% are resistant to get the vaccine in fear of the potential efficacy. (Umanakan et al., 2021)

Another study notes that the largest obstacle is hesitancy to potential benefits of the vaccine, due largely to mistrust (Chakraborty et al., 2021)

Figure 2. Health and Wellbeing

Figure 3. Vaccination

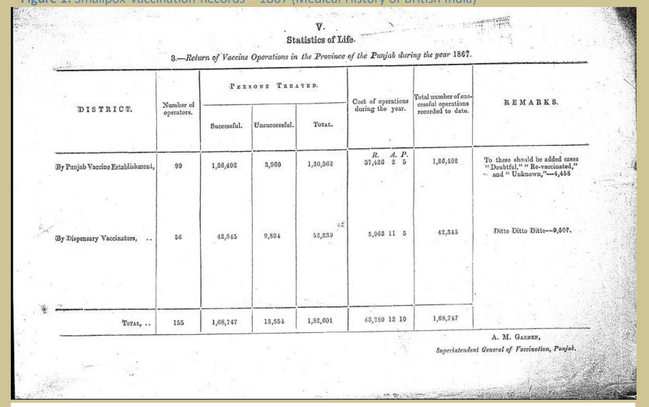
POLIO

In 1970, the Pasteur Institute of India (PII), introduced the trivalent polio vaccine. This time also encompassed the development of several vaccines.
After the World Health Assembly in 1988, a global goal to eradicate smallpox was put into action. Multiple polio vaccination programs were dispersed throughout Indian states. "Timeline of Polio Eradication Efforts"

1988: World Health Assembly targets eradication by 2000
1996: National vaccination days in India for Polio
1997: National Polio Surveillance put into place by WHO and Indian government
2005: Monovalent Polio vaccine utilized
2010: Divalent Polio vaccine utilized, Last case in Mumbai detected
2012: India is removed from the list of Polio endemic countries

(Lahariya, 2014)

Figure 1. Smallpox Vaccination Records – 1867 (Medical History of British India)



V.
Statistics of Life.

8.—*Return of Vaccine Operations in the Province of the Punjab during the year 1867.*

DISTRICT.	Number of operators.	Persons Treated. Successful.	Unsuccessful.	Total.	Cost of operations during the year. R. A. P.	Total number of successful operations recorded to date.	REMARKS.
By Punjab Vaccine Establishment,	99	1,36,402	3,980	1,40,382	97,626 2 5	1,26,102	To these should be added cases "Doubtful," "Re-vaccinated," and "Unknown," —1,455
By Dispensary Vaccinators, ..	56	42,845	9,504	52,339	5,963 11 5	42,845	Ditto Ditto Ditto—9,507.
Total, ..	155	1,69,747	13,554	1,83,021	63,759 12 10	1,68,747	

A. M. Gaddis,
Superintendent General of Vaccination, Punjab.

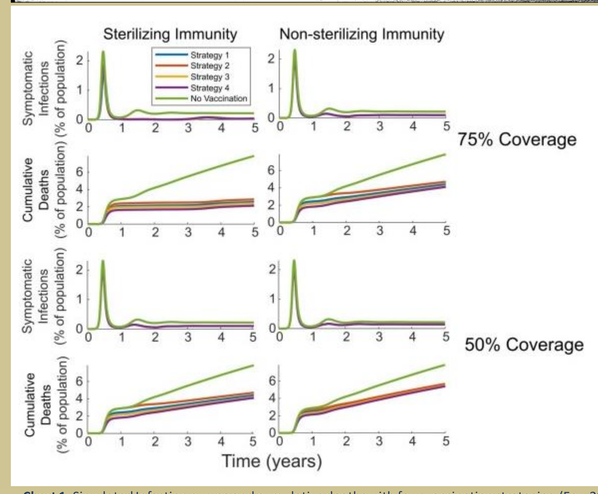


Chart 1. Simulated Infection curves and cumulative deaths with four vaccination strategies. (Foy, 2020)

COVID-19

Emerging in Wuhan, China, the COVID-19 outbreak was a wave of disease that has recently affected people all around the globe. While early epidemics were localized in Europe and North America, the disease moved to low- and middle-income countries rather quickly. The first confirmed COVID-19 case in India was documented on January 30, 2020 (Foy, 2020). With no type of treatment for the disease the world was put on lockdown and had one goal in mind: create vaccines. India rolled out multiple vaccines including the Oxford-AstraZeneca vaccine known as Covishield, Covaxin by Bharat Biotech, Corbevax by Biological E, Covovax by the Serum Institute of India, and the ZyCoV-D vaccine. As of February 7, 2022, India has given almost 1.7 billion doses of three previously approved vaccines (Covishield, Covaxin, and Sputnik V). 76% of eligible adults have been fully vaccinated, and more than 99% have received at least one dose (BBC, 2022). Chart 1 shows information from a mathematical research project regarding paths India could take with and without vaccines. Increased research with vaccines have allowed people the knowledge to make these predictions

CONCLUSIONS

Through various disease outbreaks in India, the trend over time has shown an increase in not only successful vaccinations, but also an increased acceptance of vaccinations. India has developed their labs and research dedicated to vaccines and the wellbeing of their population.

The research presented on this paper shows the capability of governments to adapt to illness outbreaks and implement vaccine programs.

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