A brief history of vaccination

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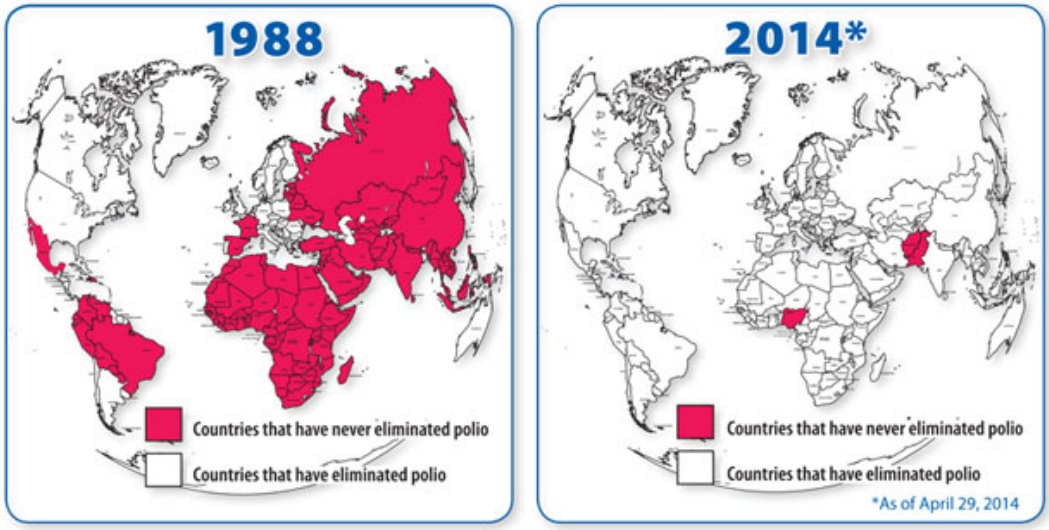
The practice of immunisation dates back hundreds of years. Buddhist monks drank snake venom to confer immunity to snake bite and variolation (smearing of a skin tear with cowpox to confer immunity to smallpox) was practiced in 17th century China. Edward Jenner is considered the founder of vaccinology in the West in 1796, after he inoculated a 13 year-old-boy with vaccinia virus (cowpox), and demonstrated immunity to smallpox. In 1798, the first smallpox vaccine was developed. Over the 18th and 19th centuries, systematic implementation of mass smallpox immunisation culminated in its global eradication in 1979.

Louis Pasteur's experiments spearheaded the development of live attenuated cholera vaccine and inactivated anthrax vaccine in humans (1897 and 1904, respectively). Plague vaccine was also invented in the late 19th Century. Between 1890 and 1950, bacterial vaccine development proliferated, including the Bacillis-Calmette-Guerin (BCG) vaccination, which is still in use today.

In 1923, Alexander Glenny perfected a method to inactivate tetanus toxin with formaldehyde. The same method was used to develop a vaccine against diphtheria in 1926. Pertussis vaccine development took considerably longer, with a whole cell vaccine first licensed for use in the US in 1948.

Viral tissue culture methods developed from 1950-1985, and led to the advent of the Salk (inactivated) polio vaccine and the Sabin (live attenuated oral) polio vaccine. Mass polio immunisation has now eradicated the disease from many regions around the world



Progess of polio elimination 1988 and 2014
Image:CDC

Attenuated strains of measles, mumps and rubella were developed for inclusion in vaccines. Measles is currently the next possible target for elimination via vaccination.

Despite the evidence of health gains from immunisation programmes there has always been resistance to vaccines in some groups. The late 1970s and 1980s marked a period of increasing litigation and decreased profitability for vaccine manufacture, which led to a decline in the number of companies producing vaccines. The decline was arrested in part by the implementation of the National Vaccine Injury Compensation programme in the US in 1986. The legacy of this era lives on to the present day in supply crises and continued media efforts by a growing vociferous anti-vaccination lobby.

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The past two decades have seen the application of molecular genetics and its increased insights into immunology, microbiology and genomics applied to vaccinology. Current successes include the development of recombinant hepatitis B vaccines, the less reactogenic acellular pertussis vaccine, and new techniques for seasonal influenza vaccine manufacture.

Molecular genetics sets the scene for a bright future for vaccinology, including the development of new vaccine delivery systems (e.g. DNA vaccines, viral vectors, plant vaccines and topical formulations), new adjuvants, the development of more effective tuberculosis vaccines, and vaccines against cytomegalovirus (CMV), herpes simplex virus (HSV), respiratory syncytial virus (RSV), staphylococcal disease, streptococcal disease, pandemic influenza, shigella, HIV and schistosomiasis among others. Therapeutic vaccines may also soon be available for allergies, autoimmune diseases and addictions.

(http://www.historyofvaccines.org/)

View timelines of the history of vaccine preventable disease discoveries and epidemics and vaccine development since the 11th century; participate in activities to learn how vaccines are made and how they work; and access immunisation resources suitable for parents and/or health professionals on *The History of Vaccines* website developed by The College of Physicians of Philadelphia.

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