VACCI-NATION
INOCULATION IN TI
C URY

Dr Sima alker

CONTENTS

VACCINATION

Vaccination:

- The healthy immune system is able to recognize invading bacteria and viruses and produce substances (antibodies) to destroy or disable them. Immunizations prepare the immune system to ward off a disease.
- To immunize against viral diseases, the virus used in the vaccine has been weakened or killed. To only immunize against bacterial diseases, it is generally possible to use a small portion of the dead bacteria to stimulate the formation of antibodies against the whole bacteria.
- In addition to the initial immunization process, it has been found that the effectiveness of immunizations can be improved by periodic repeat injections or "boosters."

CHANGING TERMINOLOGY

The terms inoculation, vaccination, and immunisation are often used synonymously to refer to artificial induction of immunity against various infectious diseases. This is visible if you look the words up in modern dictionaries, however, following on from the last lecture on smallpox there are some important historical and current differences.

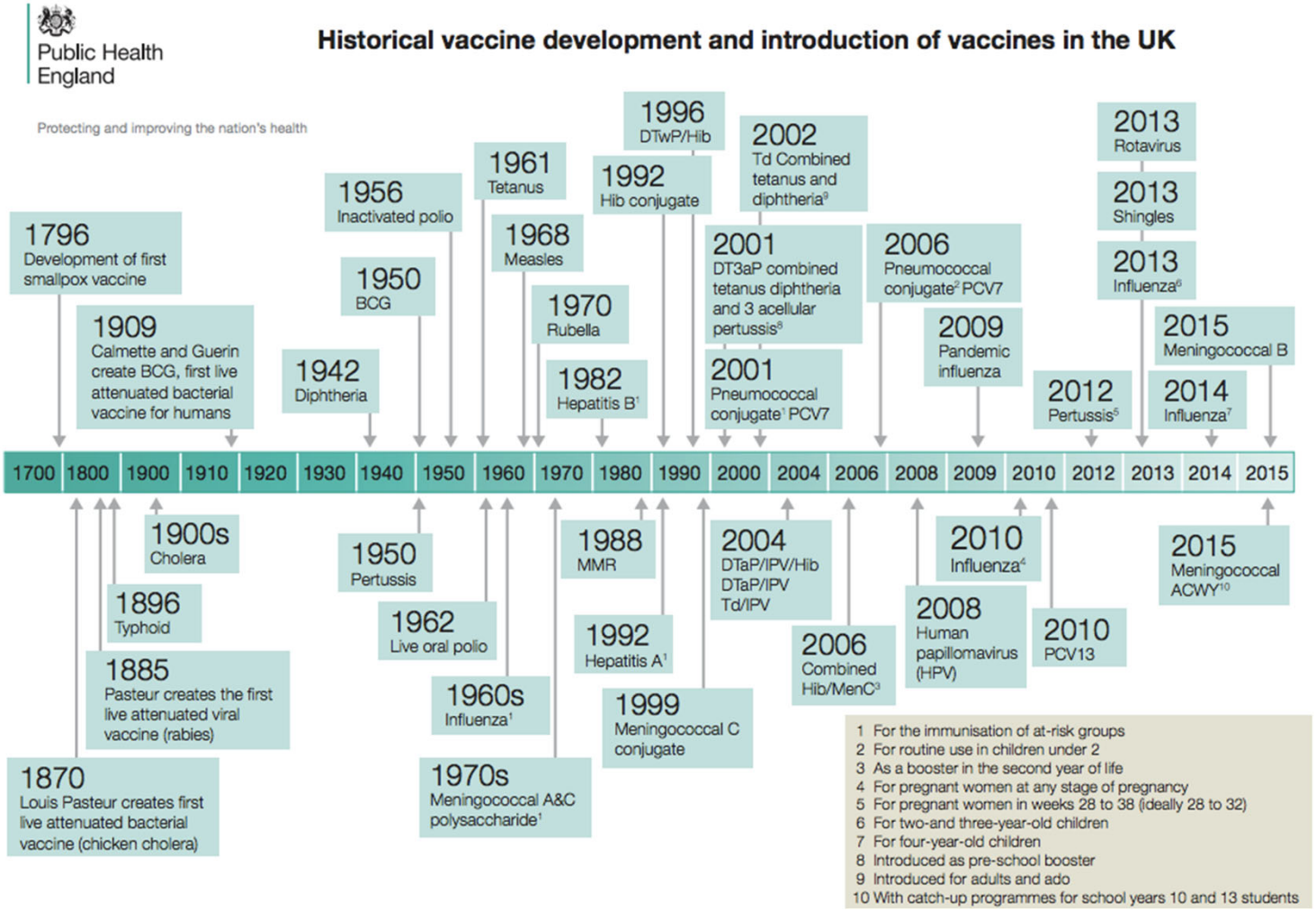
- Variolation – Pre Jenner's 1787 vaccine – Variolation (Variola meaning Smallpox) through deliberate transference of smallpox matter was the key form of inoculation.
- Vaccination – Coined by Pasteur in 1891 as cover all for all preventative injections designed to promote an immunity that were the current scientific obsession. Named Vax (Latin for Cow) in honour of Jenner's discovery.
- Immunisation – Synonymous term that has since evolved to include the use of an anti-toxin (containing a preformed antibody to promoting an immune reaction).
- Inoculation – Cover all term for all the above – practice of promoting an immunity through medical intervention.

Smallpox

Edward Jenner's discovery in 1796 of the Smallpox Vaccine using Cowpox changed the face of preventative medicine by introducing a significantly safer form of inoculation than the commonly deadly variolation that had been in vogue for a century in Britain.

The mandatory requirement for the process established in 1853 yielded and anti-vaccination rhetoric that has continued for nearly two centuries

TRIALS AND TRIBULATIONS



TRIALS AND TRIBULATIONS

THE POLIO VACCINE AND CONTROVERSY

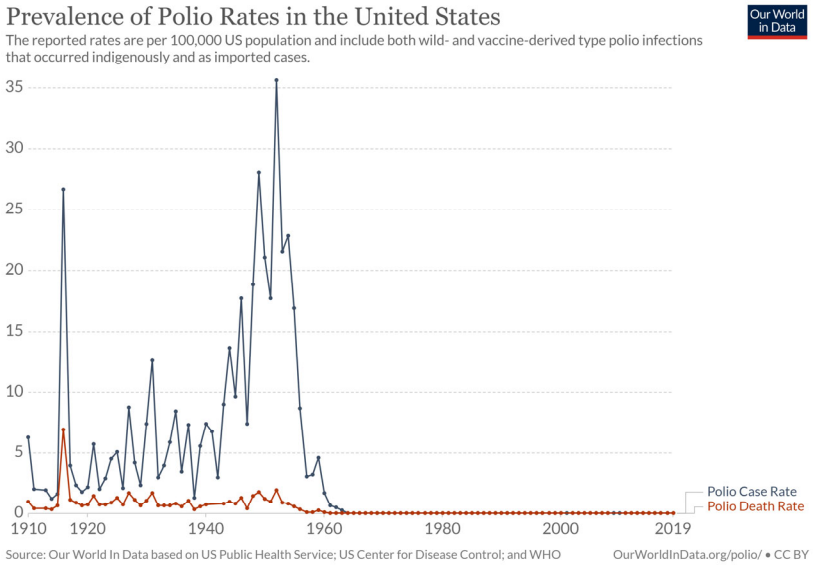
Jonas Salk

Rehabilitation of a children affected by polio.

- Inventor of the Polio vaccine Jonas Salk first began testing his compound in 1952 expanding it over the next two years, to become one of the largest clinical trials in medical history.
- Around two million children were given the vaccine during the test phase. Salk's efforts were supported and promoted by the National Foundation for Infantile Paralysis
- When the vaccine was approved for general use in 1955, Salk became a national hero. Honoured by President Dwight D. Eisenhower at the White House.

TRIALS AND TRIBULATIONS

THE POLIO VACCINE AND CONTROVERSY



https://ourworldindata.org/grapher/prevalence-of-polio-rates-in-the-united-states

The Cutter Incident:

- In April 1955 more than 200 000 children in five Western and mid-Western USA states received a polio vaccine in which the process of inactivating the live virus proved to be defective.

Within days there were reports of paralysis and within a month the first mass vaccination programme against polio had to be abandoned. Subsequent investigations revealed that the vaccine, manufactured by the California-based family firm of Cutter Laboratories, had caused 40000 cases of polio, leaving 200 children with varying degrees of paralysis and killing 10.

TRIALS AND TRIBULATIONS

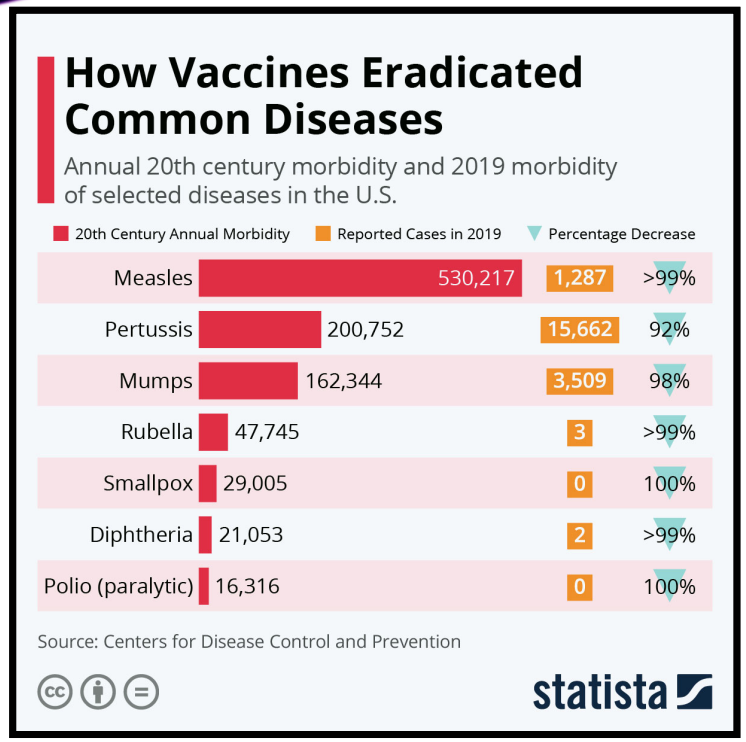
Immunization currently prevents 2-3 million deaths every year

Immunization prevents deaths every year in all age groups from diseases like diphtheria, tetanus, pertussis (whooping cough), influenza and measles. It is one of the most successful and cost-effective public health interventions

WHO 2020

https://www.who.int/news-room/facts-in-pictures/detail/immunization

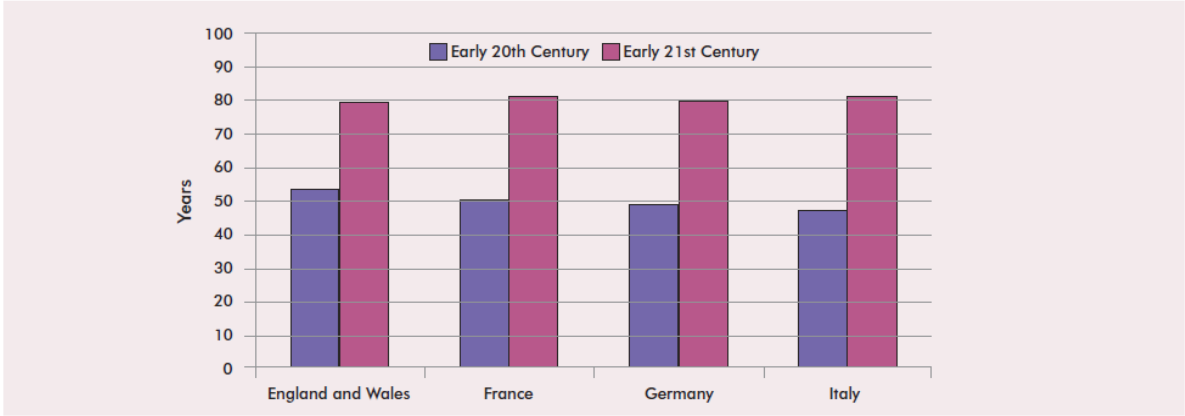
SUCCESS AND IMPROVEMENT



Selected Key Vaccines Developed 20th Century

- 1897 Anti-Typhoid
- 1888 Anti-Cholera
- 1914 Pertussis
- 1926 Diphtheria
- 1938 Tetanus
- 1955 Polio (OPV)
- 1963 Measles
- 1967 Mumps
- 1969 Rubella
- 1985 Hep B
- 1998 Rotovirus
- 2000 Hep A

Figure 2. Life expectancy at birth for selected European countries, early 20th and early 21st centuries



Notes: England and Wales data for the early 20th century are for 1910-11; France 1908-13; German Empire 1910-11; Italy 1910-12. All these data are taken from Vallin (see Sussex and Yuen, 2000). The borders of Germany and Italy in 1995 differ from those in the early 20th century. The data for the early 21st Century are taken from the UN's *World Population Prospects* (United Nations, 2009) and relate to 2005-2010.
Sources: Sussex and Yuen (2000); United Nations (2009)

SUCCESS AND IMPROVEMENT

Evidence sourced from L. Baillie and E. Hawe, "Causes of Death: A Study of a Century of Change in England and Wales", *OHE,* (2012), pp.4-12. Available at https://www.ohe.org/publications/causes-death-study-century-change-england-and-wales

Table 1. Share of total fall in standardised mortality rate* in each period attributable to each disease group, England and Wales

	1901-1971	1971-1997	1971-2007	1997-2007
Attributable to micro-organisms				
1. Airborne	39%	20%	20%	21%
2. Water- and food-borne diseases	16%	2%	0%	-2%
3. Other infections	12%	-1%	0%	0%
Total infections	**67%**	**21%**	**20%**	**19%**
Not attributable to micro-organisms	33%	79%	80%	81%

*Age-standardised mortality rate based on 1901 population structure
Sources: ONS (2008a); ONS (2011); Sussex and Yuen (2000)

Table 2. Airborne infections: Share of total fall in standardised* mortality rates from all causes, England and Wales

	1901-1971	1971-1997	1971-2007	1997-2007
Tuberculosis (respiratory)	11%	1%	1%	0%
Bronchitis, pneumonia, influenza	19%	19%	20%	21%
Whooping cough	3%	0%	0%	0%
Measles	2%	0%	0%	0%
Scarlet fever, diphtheria	4%	0%	0%	0%
Smallpox	0%	0%	0%	0%
Infections of ear, pharynx, larynx	1%	0%	0%	0%
Total	**39%**	**20%**	**20%**	**21%**

*Age-standardised mortality rate based on 1901 population structure
Sources: ONS (2008a); ONS (2011); Sussex and Yuen (2000)

Table 3. Water- and food-borne infections: Share of total fall in standardised* mortality rates from all causes, England and Wales

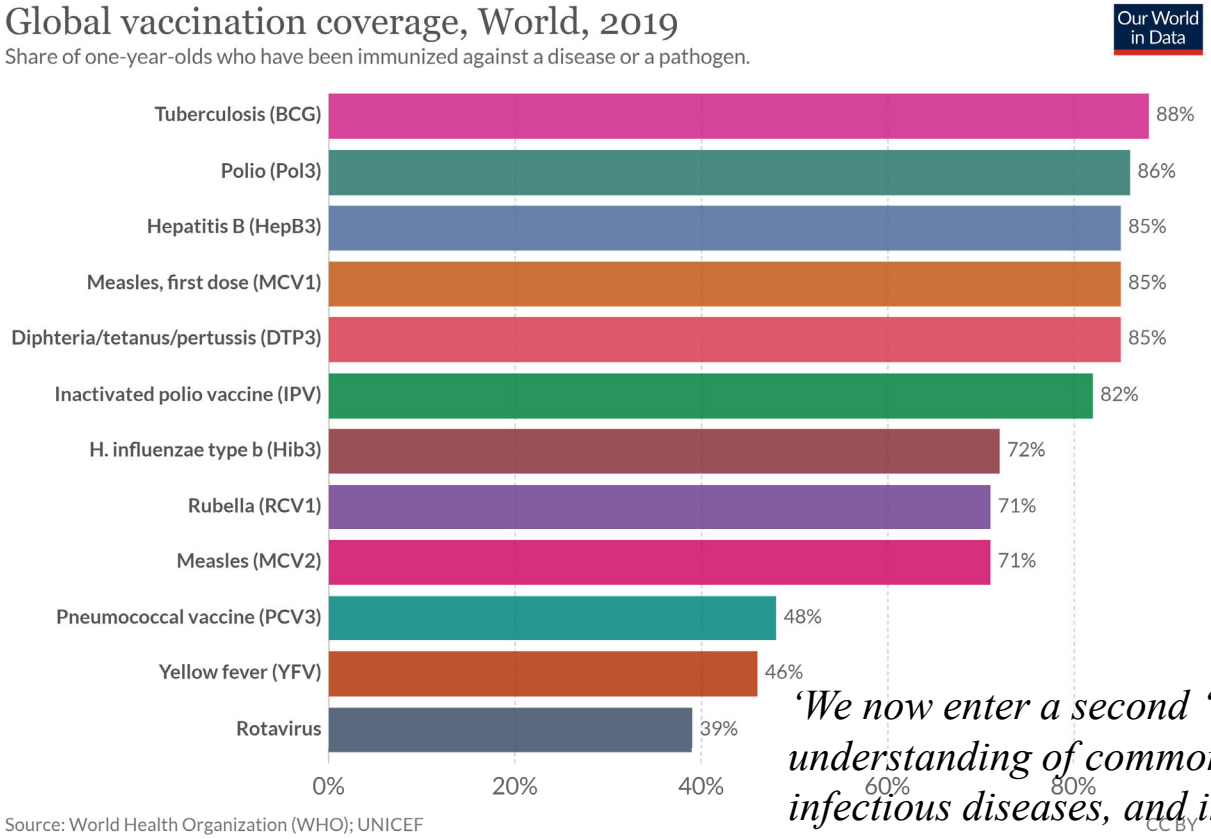
	1901-1971	1971-1997	1971-2007	1997-2007
Cholera, diarrhoea, dysentery	10%	2%	0%	-2%
Tuberculosis (non-respiratory)	4%	0%	0%	0%
Typhoid, typhus	1%	0%	0%	0%
Total	**15%**	**2%**	**0%**	**-2%**

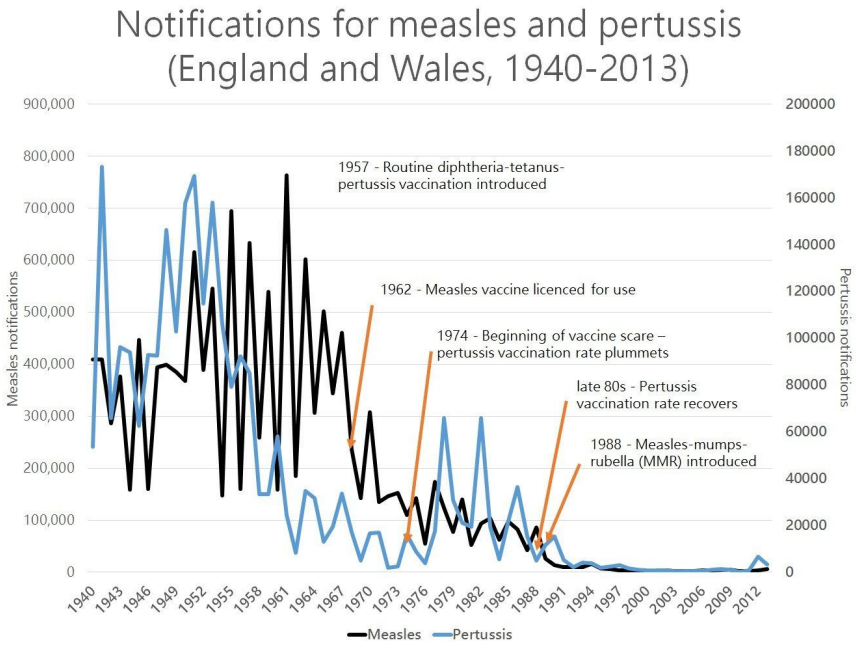
*Age-standardised mortality rate based on 1901 population structure
** In 1997 and 2007 figures relate to intestinal infectious diseases, which include cholera and dysentery. For 1901 and 1971, this group comprised deaths recorded as cholera, diarrhoea and dysentery.
Sources: ONS (2008a); ONS (2011); Sussex and Yuen (2000)

Table 4. Other infections: Share of total fall in standardised* mortality rates from all causes, England and Wales

	1901-1971	1971-1997	1971-2007	1997-2007
Convulsions, teething	6%	0%	0%	0%
Syphilis	1%	0%	0%	0%
Appendicitis, peritonitis	1%	0%	0%	0%
Puerperal fever	1%	0%	0%	0%
Other infections	4%	-1%	-1%	0%
Total	**12%**	**-1%**	**0%**	**0%**

*Age-standardised mortality rate based on 1901 population structure
Sources: ONS (2008a); ONS (2011); Sussex and Yuen (2000)



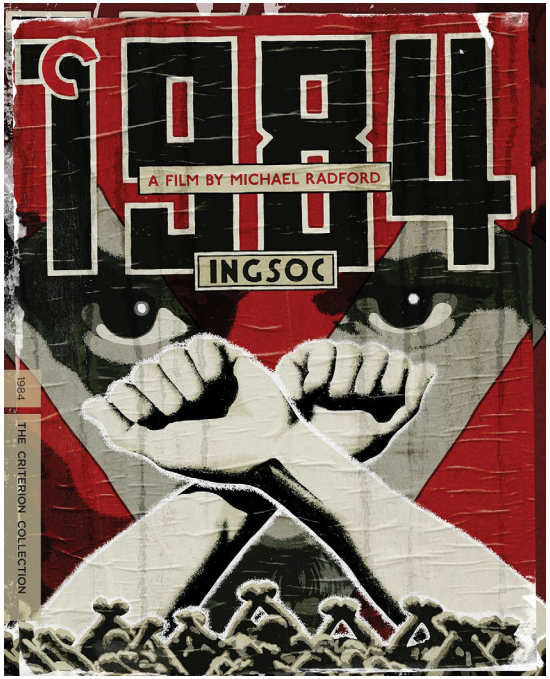


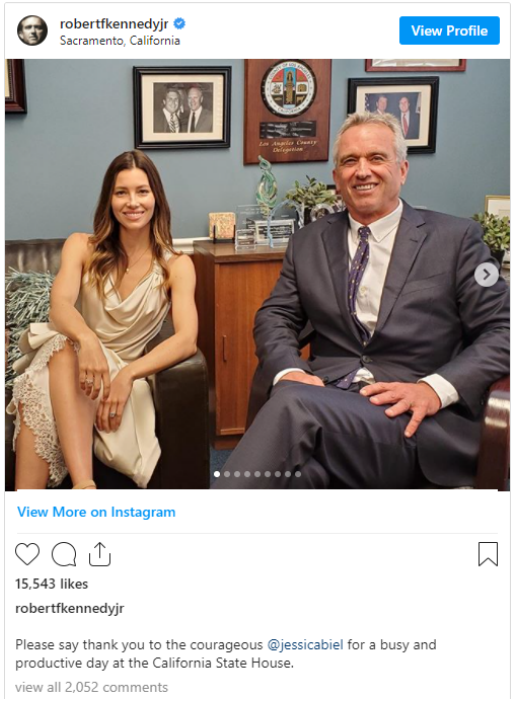
'We now enter a second 'golden age' of vaccinology in the enhanced understanding of common diseases, vaccine development against chronic non-infectious diseases, and in better integrating advances in biology, genomics, immunology, molecular biology, and virology.'

SUCCESS AND IMPROVEMENT

Poland G, Barrett A. The old and the new: successful vaccines of the 20th century and approaches to making vaccines for the important diseases of the 21st century. *Curr Opin Immunol.* 2009;21(3):305-307. doi:10.1016/j.coi.2009.05.014

Agency, Fear, Misinformation, or Vanity?



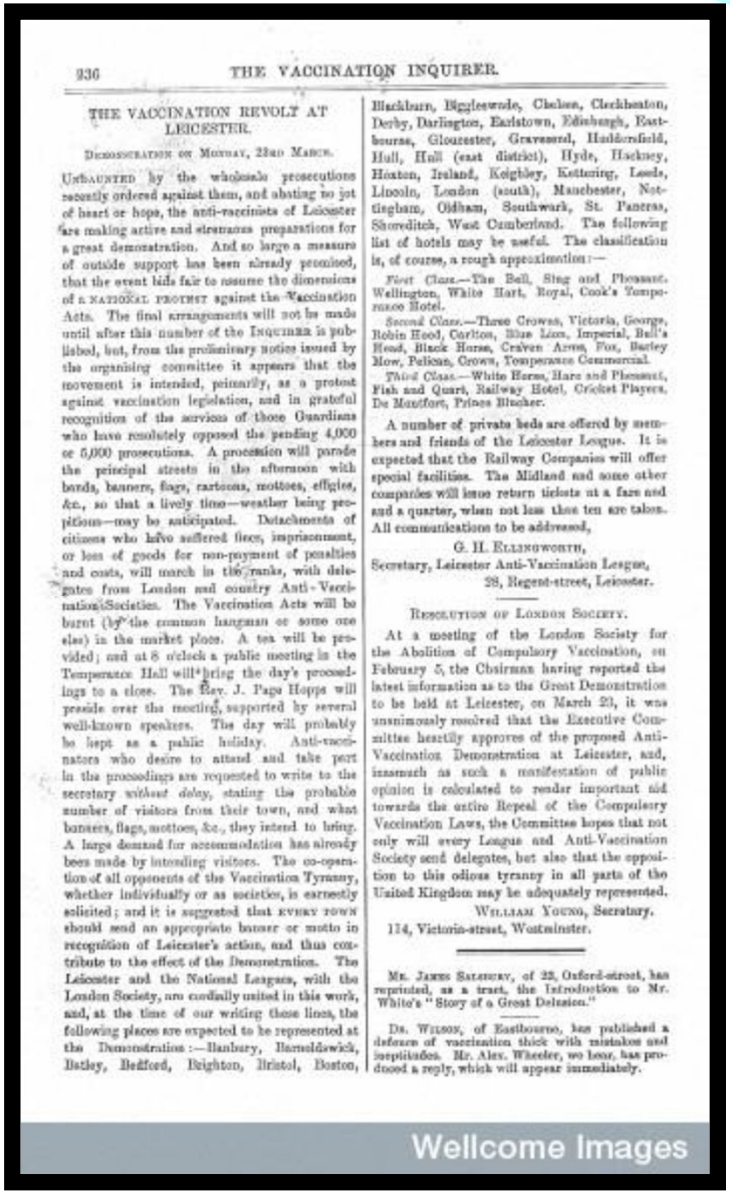


AN OLD FURY

Mandatory Vaccination in the UK in 1856 led to centuries of antivaccination campaigning

- Leicester 1885 100000 participants protested against mandatory vaccination
- Royal Commission in the 1890s and reported in 1896: Developed the conscience clause in 1898.
- Mandatory Vaccination repealed in 1906
- Vaccination widespread in 1914 -1918 within the military with rising concerns.
- Britain slow to adapt to modern vaccines unlike France, USA, or in Scandinavia.
- During WW2 British Ministry of Health started a national policy of immunisation against diphtheria. Fearing resistance, it made the procedure voluntary, but embarked on a massive advertising campaign. By the end of the war, rates of diphtheria had dropped significantly, boosting the profile of vaccination among the British medical community, government departments and the general public.
- NHS / Child Vaccination Scheme 1948 – introduced routine vaccinations for children
- Antivaccination groups / Vaccination scandals increased from 1940 onwards.

AN OLD FURY


936 THE VACCINATION INQUIRER.

THE VACCINATION REVOLT AT LEICESTER.

DEMONSTRATION ON MONDAY, 23RD MARCH.

UNDAUNTED by the wholesale prosecutions recently ordered against them, and abating no jot of heart or hope, the anti-vaccinists of Leicester are making active and strenuous preparations for a great demonstration. And so large a measure of outside support has been already promised, that the event bids fair to assume the dimensions of a NATIONAL PROTEST against the Vaccination Acts. The final arrangements will not be made until after this number of the INQUIRER is published, but, from the preliminary notice issued by the organising committee it appears that the movement is intended, primarily, as a protest against vaccination legislation, and in grateful recognition of the services of those Guardians who have resolutely opposed the pending 4,000 or 5,000 prosecutions. A procession will parade the principal streets in the afternoon with bands, banners, flags, cartoons, mottoes, effigies, &c., so that a lively time—weather being propitious—may be anticipated. Detachments of citizens who have suffered fines, imprisonment, or loss of goods for non-payment of penalties and costs, will march in the ranks, with delegates from London and country Anti-Vaccination Societies. The Vaccination Acts will be burnt (by the common hangman or some one else) in the market place. A tea will be provided; and at 8 o'clock a public meeting in the Temperance Hall will bring the day's proceedings to a close. The Rev. J. Page Hopps will preside over the meeting, supported by several well-known speakers. The day will probably be kept as a public holiday. Anti-vaccinators who desire to attend and take part in the proceedings are requested to write to the secretary *without delay*, stating the probable number of visitors from their town, and what banners, flags, mottoes, &c., they intend to bring. A large demand for accommodation has already been made by intending visitors. The co-operation of all opponents of the Vaccination Tyranny, whether individually or as societies, is earnestly solicited; and it is suggested that EVERY TOWN should send an appropriate banner or motto in recognition of Leicester's action, and thus contribute to the effect of the Demonstration. The Leicester and the National Leagues, with the London Society, are cordially united in this work, and, at the time of our writing these lines, the following places are expected to be represented at the Demonstration:—Banbury, Barnoldswick, Batley, Bedford, Brighton, Bristol, Boston, Blackburn, Biggleswade, Chelsea, Cleckheaton, Derby, Darlington, Earlstown, Edinburgh, Eastbourne, Gloucester, Gravesend, Huddersfield, Hull, Hull (east district), Hyde, Hackney, Hoxton, Ireland, Keighley, Kettering, Leeds, Lincoln, London (south), Manchester, Nottingham, Oldham, Southwark, St. Pancras, Shoreditch, West Cumberland. The following list of hotels may be useful. The classification is, of course, a rough approximation:—

First Class.—The Bell, Sing and Pheasant, Wellington, White Hart, Royal, Cook's Temperance Hotel.

Second Class.—Three Crowns, Victoria, George, Robin Hood, Carlton, Blue Lion, Imperial, Bull's Head, Black Horse, Craven Arms, Fox, Barley Mow, Pelican, Crown, Temperance Commercial.

Third Class.—White Horse, Hare and Pheasant, Fish and Quart, Railway Hotel, Cricket Players, De Montfort, Prince Blucher.

A number of private beds are offered by members and friends of the Leicester League. It is expected that the Railway Companies will offer special facilities. The Midland and some other companies will issue return tickets at a fare and a quarter, when not less than ten are taken. All communications to be addressed,

G. H. ELLISWORTH,
Secretary, Leicester Anti-Vaccination League,
28, Regent-street, Leicester.

RESOLUTION OF LONDON SOCIETY.

At a meeting of the London Society for the Abolition of Compulsory Vaccination, on February 5, the Chairman having reported the latest information as to the Great Demonstration to be held at Leicester, on March 23, it was unanimously resolved that the Executive Committee heartily approves of the proposed Anti-Vaccination Demonstration at Leicester, and, inasmuch as such a manifestation of public opinion is calculated to render important aid towards the entire Repeal of the Compulsory Vaccination Laws, the Committee hopes that not only will every League and Anti-Vaccination Society send delegates, but also that the opposition to this odious tyranny in all parts of the United Kingdom may be adequately represented.

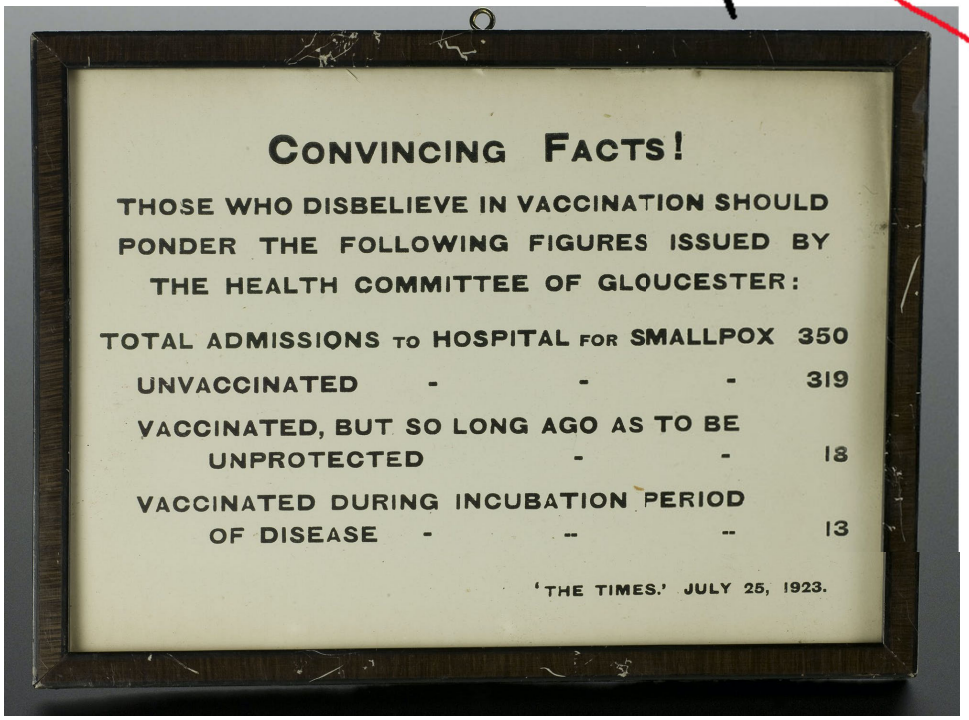
WILLIAM YOUNG, Secretary.
134, Victoria-street, Westminster.

MR. JAMES SALISBURY, of 22, Oxford-street, has reprinted, as a tract, the Introduction to Mr. White's "Story of a Great Delusion."

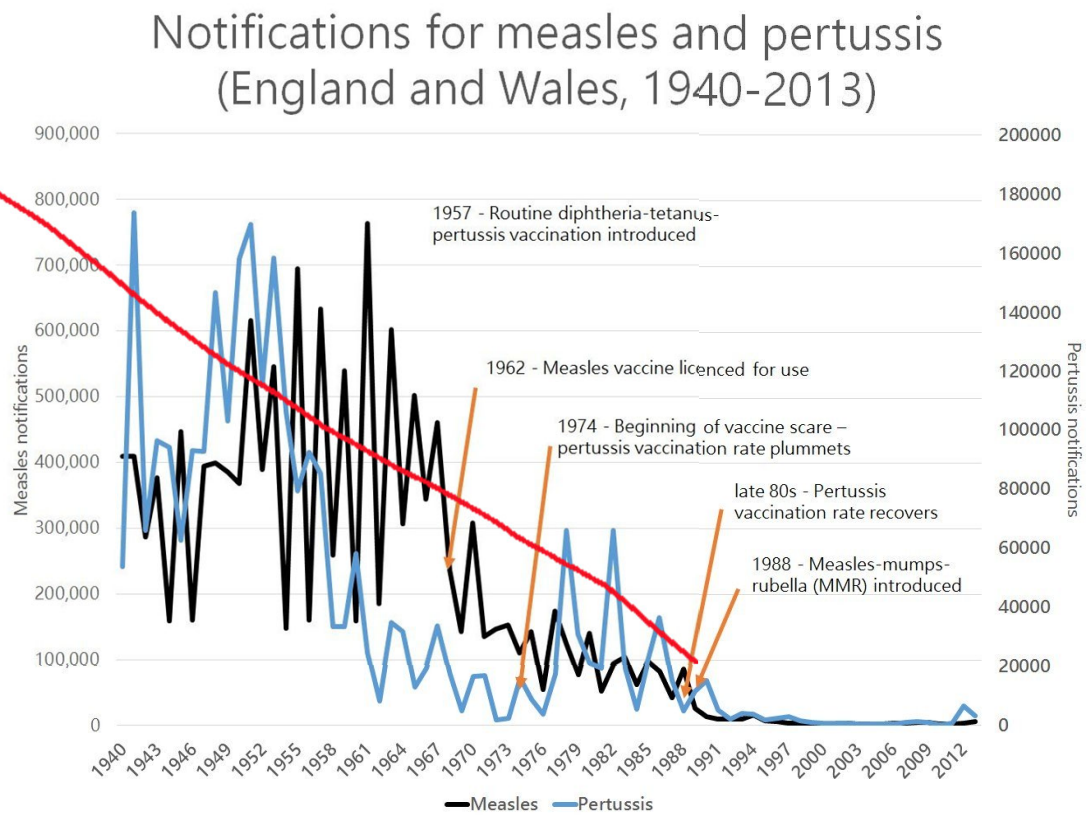
DR. WILSON, of Eastbourne, has published a defence of vaccination thick with mistakes and inepitudes. Mr. Alex. Wheeler, we hear, has produced a reply, which will appear immediately.

Anti-Vaccination– Rise and Decline 1900-2020

But the peak??

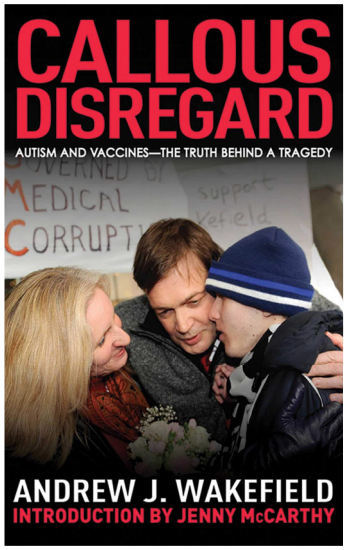


Accessible from https://wellcomecollection.org/articles/WsT4Ex8AAHruGfXd



AN OLD FURY

Not just fake news and misinformation – Anti-vaccination Arguments



Science –

'Overwhelming medical evidence shows that negative side effects are rare and minor' claimed an article in Scientific American, yet, studies do exist. Andrew Wakefield et al 2011 discredited study promoted a new vitriol and concern about the MMR inoculation forcing changes in Government Policy and new Global Questions on Vaccination.

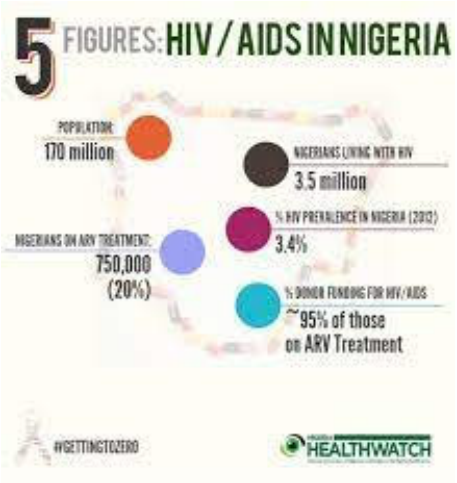
Rao TS, Andrade C. The MMR vaccine and autism: Sensation, refutation, retraction, and fraud. *Indian J Psychiatry*. 2011;53(2):95-96. doi:10.4103/0019-5545.82529

Agency / Government Control

An old argument but a mainstay of the anti-vaccination argument. Agency and freedom from government compulsion are amongst the oldest arguments against vaccination. This also often pulls in other factors such as Gender, Religion, and Social Conformity. The argument tends to be simple at it's core – 'I should not be forced to put something in my body if I do not want to'. Its an old and often compelling argument

Safety / Human Experimentation –

In 2000 in Nigeria, further use of an untested HIV vaccine was banned until investigations on its claimed efficacy are completed. Developed by controversial surgeon Jeremiah Abalaka, the Nigerian's Vice-President noted that the vaccine has killed more than it has cured. Ahmad, K., Public protests as Nigeria bans use of untested HIV vaccine *The Lancet* (2000) DOI:https://doi.org/10.1016/S0140-6736(05)74166-0



Price: $19.99

Fit Type: Men

Men | Women

Color: Black

Size:

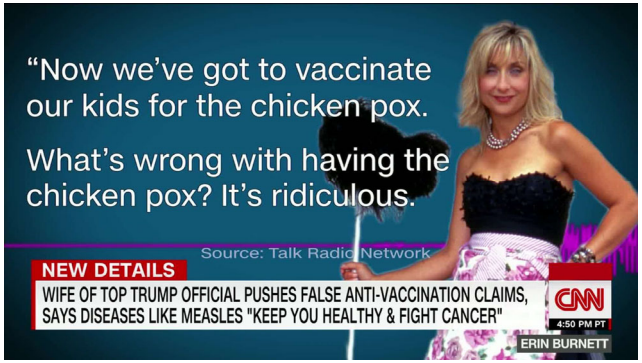
Select

- Solid colors: 100% Cotton; Heather Gr 50% Polyester
- Imported
- Machine wash cold with like colors, dry
- Lightweight, Classic fit, Double-needle

AN OLD FURY

…31 million people follow anti-vaccine groups on Facebook, with 17 million people subscribing to similar accounts on YouTube. The CCDH calculated that the anti-vaccine movement could realise US$1 billion in annual revenues for social media firms. As much as $989 million could accrue to Facebook and Instagram alone, largely from advertising targeting the 38·7 million followers of anti-vaccine accounts. Huge sums indeed, but it is worth noting that, in 2019, [Facebook generated revenue of $70·7 billion](#).

T. Burki, 'The online anti-vaccine movement in the age of COVID-19', *The Lancet, (2020),* *https://www.thelancet.com/journals/landig/article/PIIS2589-7500(20)30227-2/fulltext#articleInformation*



AN OLD FURY

CONCLUSION

Trials

- Throughout the 19th and 20th century vaccination was increasingly considered as the solution to medical crisis experienced globally.
- This enthusiasm, emboldened and enabled by scientific progress allowed for incredible advances but also terrible mistakes which damaged faith in the practice.

Success

- The eradication of a killer disease and the apparent control of so many more is a difficult achievement to argue against in the case of inoculation (although it happens)
- The statistics from numerous reputable sources illustrate how Vaccination has saved and improved the lives of millions annually.

Fury

- Old habits die hard as many of the same arguments from the 19th century continue up to today – Agency, Freedom, Fear, and Disinformation all collaborate to promote anti-vaccination messages.
- Economics is also a significant if difficult to recognise element in that there has always been money to be made from sensationalism and resistance.

For more information check:

- The Padlet Board https://padlet.com/simonwalker2018/vax
- Myplace for the Lectures and Seminars
- The core readings in the handbook and Myplace