History of successful virus vaccines

1100s. **Variolation** technique developed in several countries, i.e. China
Inoculation dried scab material recovered from smallpox patients.

1798. Jenner published his work on **smallpox vaccine**.
Inoculation with a related virus, vaccinia or cowpox.

1885. Louis Pasteur and Emile Roux develop first **rabies vaccine**.
Weakened virus from desiccated brain tissue from infected rabbits.

1937. Max Theiler and Hugh Smith develop live attenuated **yellow fever vaccine**.
Attenuated strain 17D, licensed in 1953 in US.

1938. Jonas Salk and Thomas Francis develop **influenza vaccines**.
Inactivated influenza virus grown in eggs, licensed in 1945 in US.

1955. Jonas Salk **inactivated polio virus vaccine** is licensed.

1961. Albert Sabin **oral polio virus vaccine** is licensed.

1963. First live **measles virus vaccine** developed by John Enders is licensed.
Improved by Maurice Hilleman in 1968 (more attenuated).

1967. **Mumps live attenuated vaccine** is licensed.
Derived from a virus isolated by Maurice Hilleman from her daughter.

1969. Maurice Hilleman **live attenuated rubella virus vaccine** licensed.

1971. First use of the **MMR vaccine**.

1971. First tissue culture derived **TBE** vaccine is developed and commercialised.
Developed by the Institute of Virology, Vienna, and Baxter.

1977. Last case of naturally-acquired smallpox.
History of successful virus vaccines

1981. First hepatitis B viral vaccines were licensed. Developed by Merck by the Pasteur Institute.
1986. Recombinant hepatitis B vaccine was licensed. Using recombinant DNA technology, Merck scientists developed a hepatitis B surface antigen subunit vaccine.
1991. Last case of indigenous polio in the Western Hemisphere.
1995. Live varicella virus vaccine developed by Merck is licensed.
1995. Inactivated hepatitis A vaccine developed by SmithKline Beecham is licensed.
2003. First nasally administered influenza vaccine (by MedImmune) was licensed.
2006. Rotavirus vaccine, live, oral, pentavalent is licensed. Developed by Merck for use in infants ages 6 to 32 weeks.
2006. Shingles vaccine (herpes zoster) is licensed. Developed by Merck for use in people aged 60 years of age and older.
2006. FDA licensed the first vaccine developed by Merck to prevent cervical cancer, precancerous genital lesions, and genital warts due to human papillomavirus (HPV) types 6, 11, 16, and 18.
2019. First FDA-approved Ebola virus vaccine developed by Merck based on VSV vector.
2020. COVID-19 mRNA vaccines (Pfizer/BioNTech, Moderna) approved by FDA for emergency use.
As of December 2020, we have effective and safe COVID-19 vaccines

Now what?

Distribution of the vaccines needs to be accompanied by monitoring for infections, disease, and vaccine safety

Does SARS-CoV-2 changes under vaccine immune pressure? Do we need to update vaccines?

How long protection lasts? Do we need revaccinations?

Are there any groups where vaccines are not effective? Immunosuppressed?
A successful virus vaccine needs:

TO BE USED