

A large blue L-shaped graphic element is positioned on the left side of the slide, consisting of a vertical bar and a horizontal bar that meet at a right angle. A second, smaller blue L-shaped graphic element is positioned on the right side of the slide, also consisting of a vertical bar and a horizontal bar meeting at a right angle. The text "HISTORY OF VACCINES" is centered between these two graphic elements.

HISTORY OF VACCINES

Agenda

Smallpox

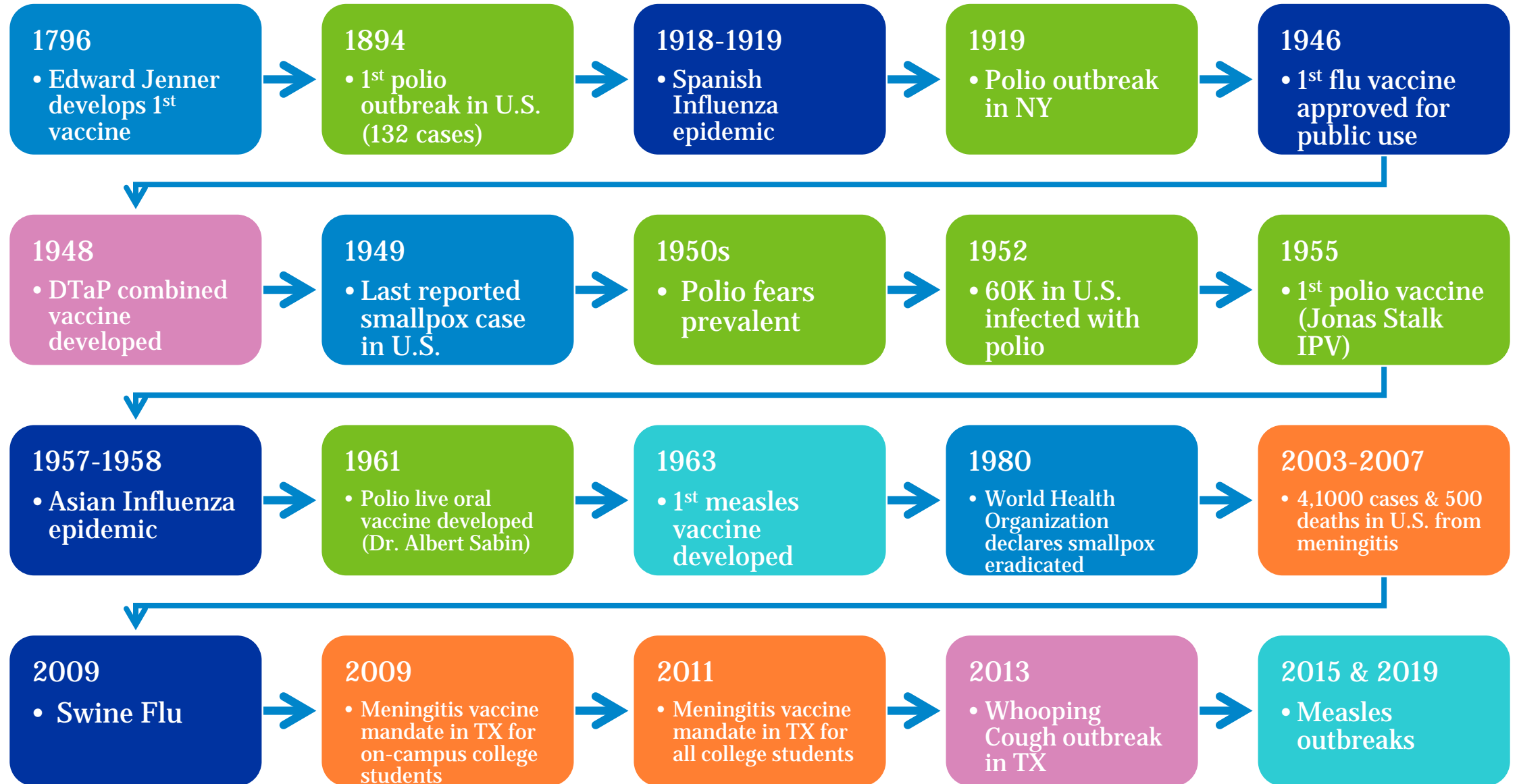
Polio

Measles

Influenza

Diphtheria, Tetanus, & Pertussis

Meningitis



Edward Jenner Develops 1st Vaccine

In 1700s, it was widely known that those who survived smallpox were immune to infection in the future. One of these survivors was **Edward Jenner**. A curious physician, stories of **dairymaids' immunity to smallpox** due to earlier infection from cowpox inspired Jenner. In 1796, Jenner took matter from dairymaid Sarah Nelms's cowpox lesions to **inoculate 8-year-old James Phipps**. Two months later, James was inoculated again, but this time with smallpox. Because of his earlier exposure to cowpox, James **did not develop the disease** and the first vaccination was born.



History of Smallpox

- Dates back to 3rd Century BCE
- Early prevention efforts
 - Variolation
- 3 out of 10 → death from smallpox
- George Washington conducts 1st mass army inoculation during peak of a war – 1777



Mummy of Egyptian
Pharaoh Ramses V

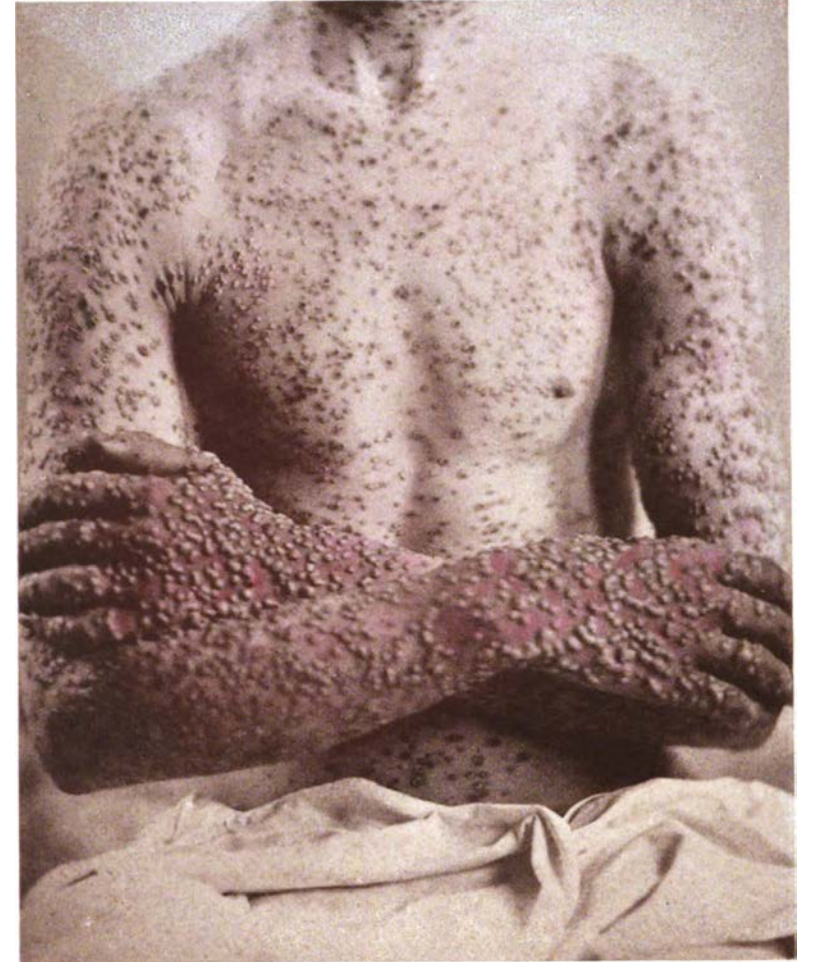
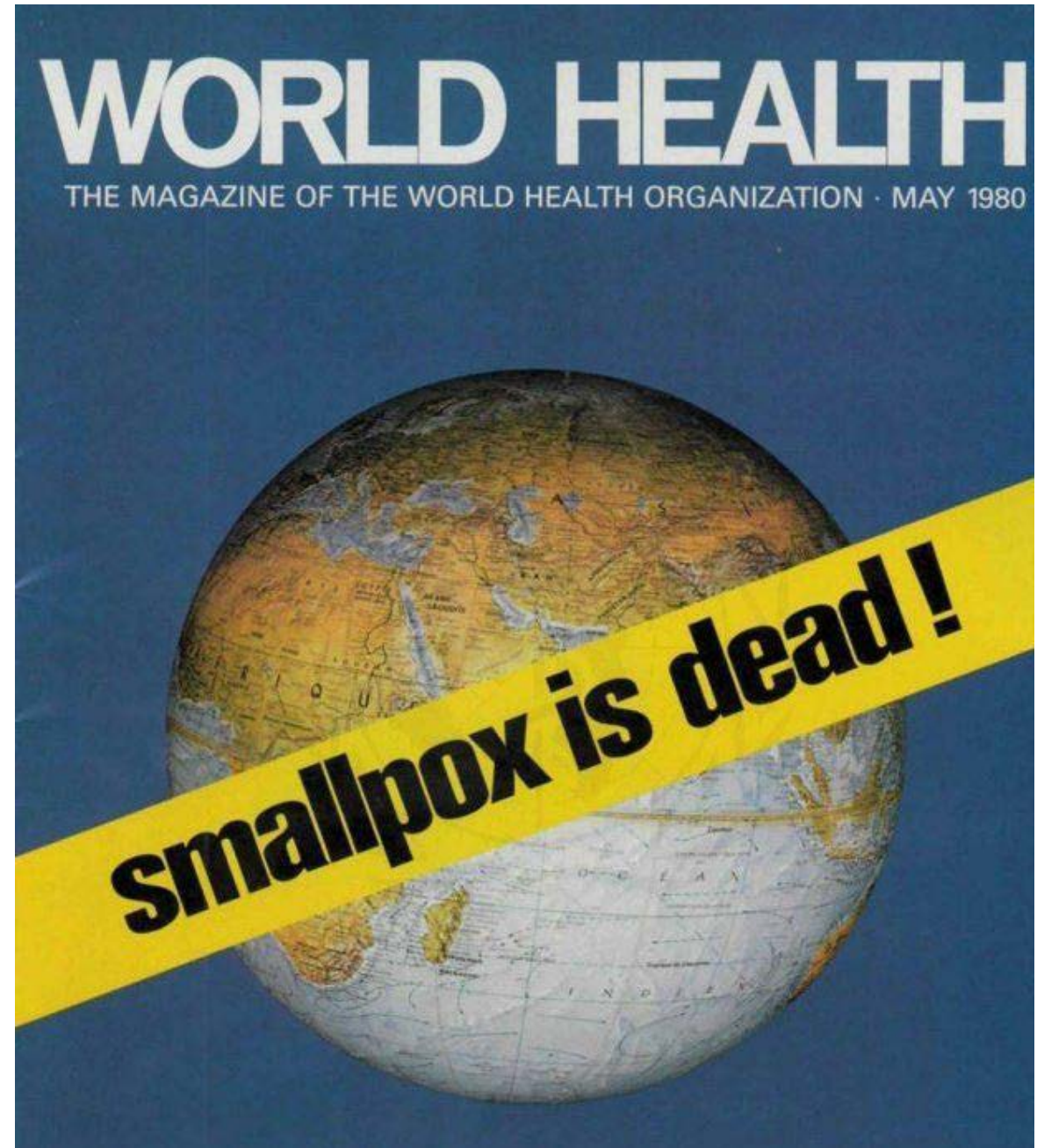


Image of Smallpox patient from GEORGE HENRY FOX,
PHOTOGRAPHIC ILLUSTRATIONS OF SKIN DISEASES 21 (2nd
ed. 1886).

Successful Eradication

- Edward Jenner develops a smallpox vaccine in 1796
- Last reported smallpox case in U.S. in 1949
- Vaccination campaigns in 1960s & 1970s
- World's last smallpox case occurs in 1977
- World Health Organization declares smallpox eradicated in 1980



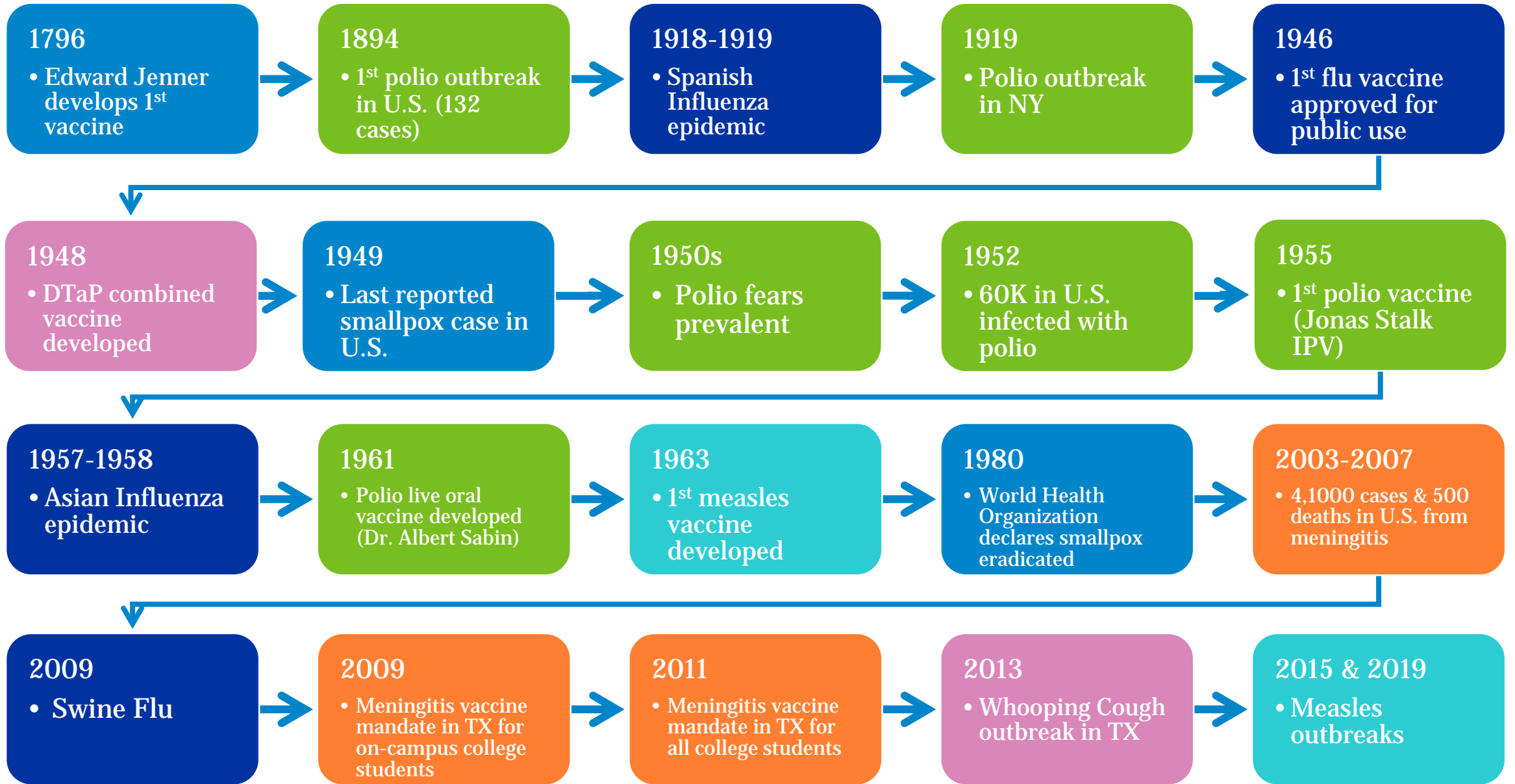
“

Future generations will know by history
only that the loathsome smallpox existed
and by you has been extirpated.

”

- U.S. President Thomas Jefferson in 1806

letter to Edward Jenner



An aerial black and white photograph showing a large crowd of people gathered around a building with a prominent dome. Several vintage cars from the mid-20th century are parked on the street. The scene suggests a significant public event, such as a mass vaccination campaign.

Polio Vaccine Developed

- 1955 Dr. Jonas Salk develops 1st polio vaccine
 - IPV = inactive polio vaccine
- 1961 Dr. Albert Sabin's oral vaccine becomes popular

Polio in the '50s

- By 1950s, polio one of most feared diseases
- In early 1950s, more than 15,000 cases a year
- 1952 peak – 52,876 reported cases
- “Iron lungs” commonly used to help infected patients breathe

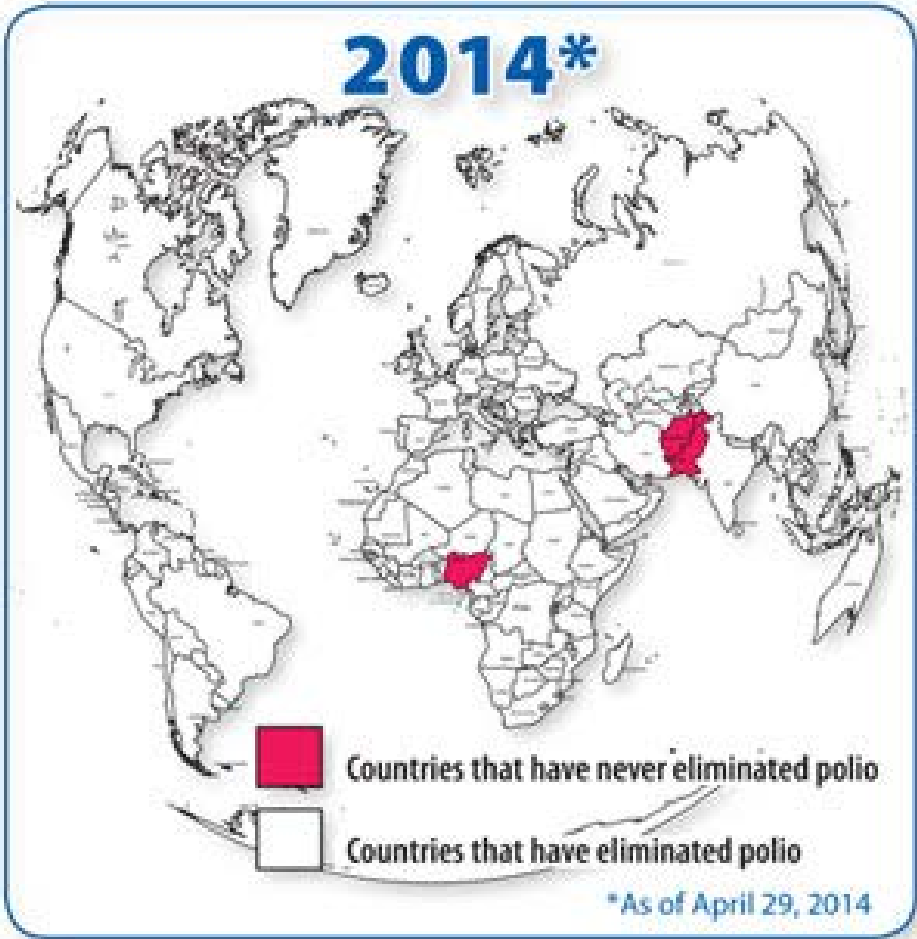


Impact of the Vaccine

Year	Polio Cases per Year
1950s	> 15,000 cases
POLIO VACCINE DEVELOPED	
1960s	< 100 cases
1970s	< 10 cases
Today	0 cases

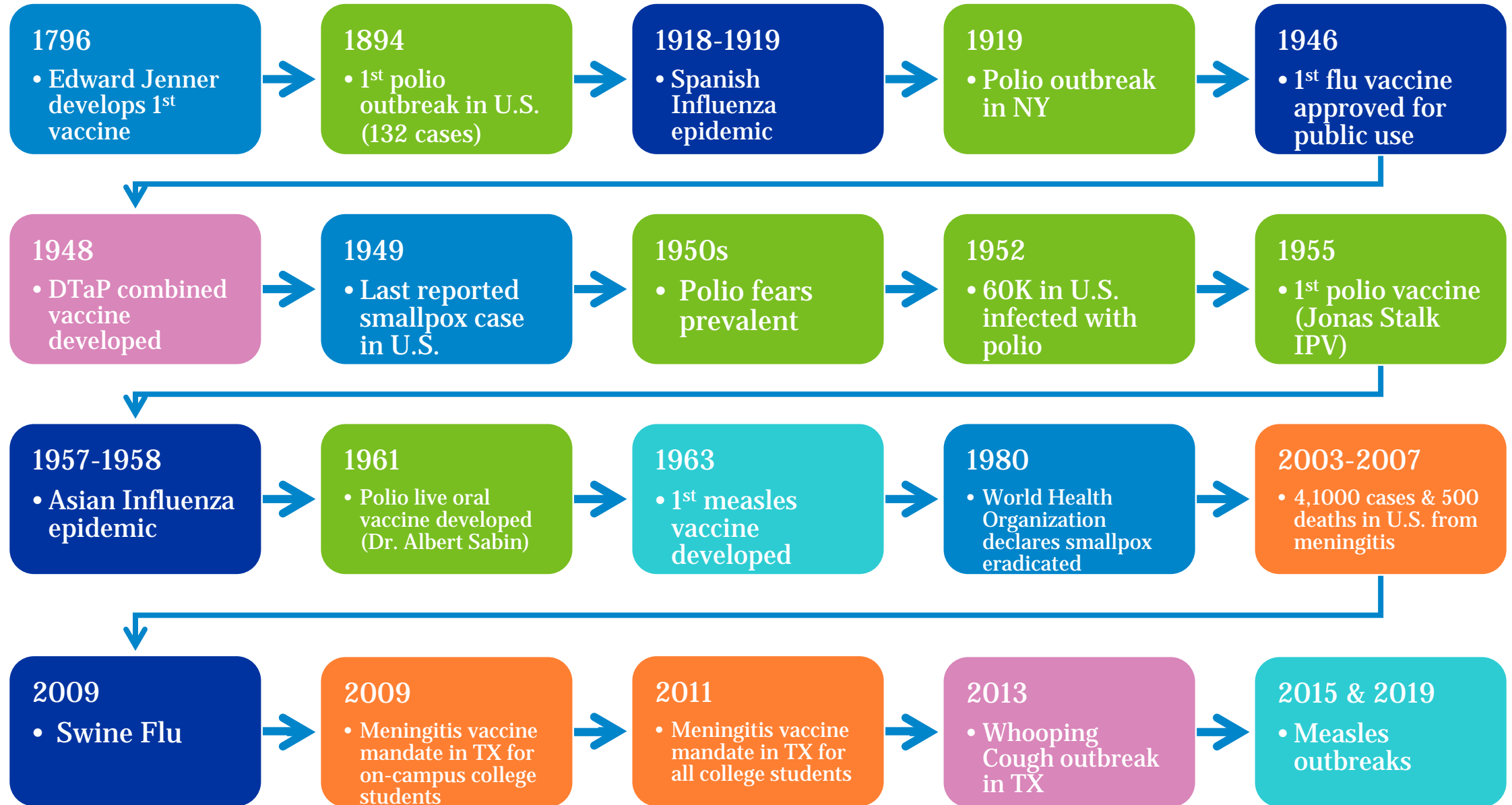


Polio Elimination



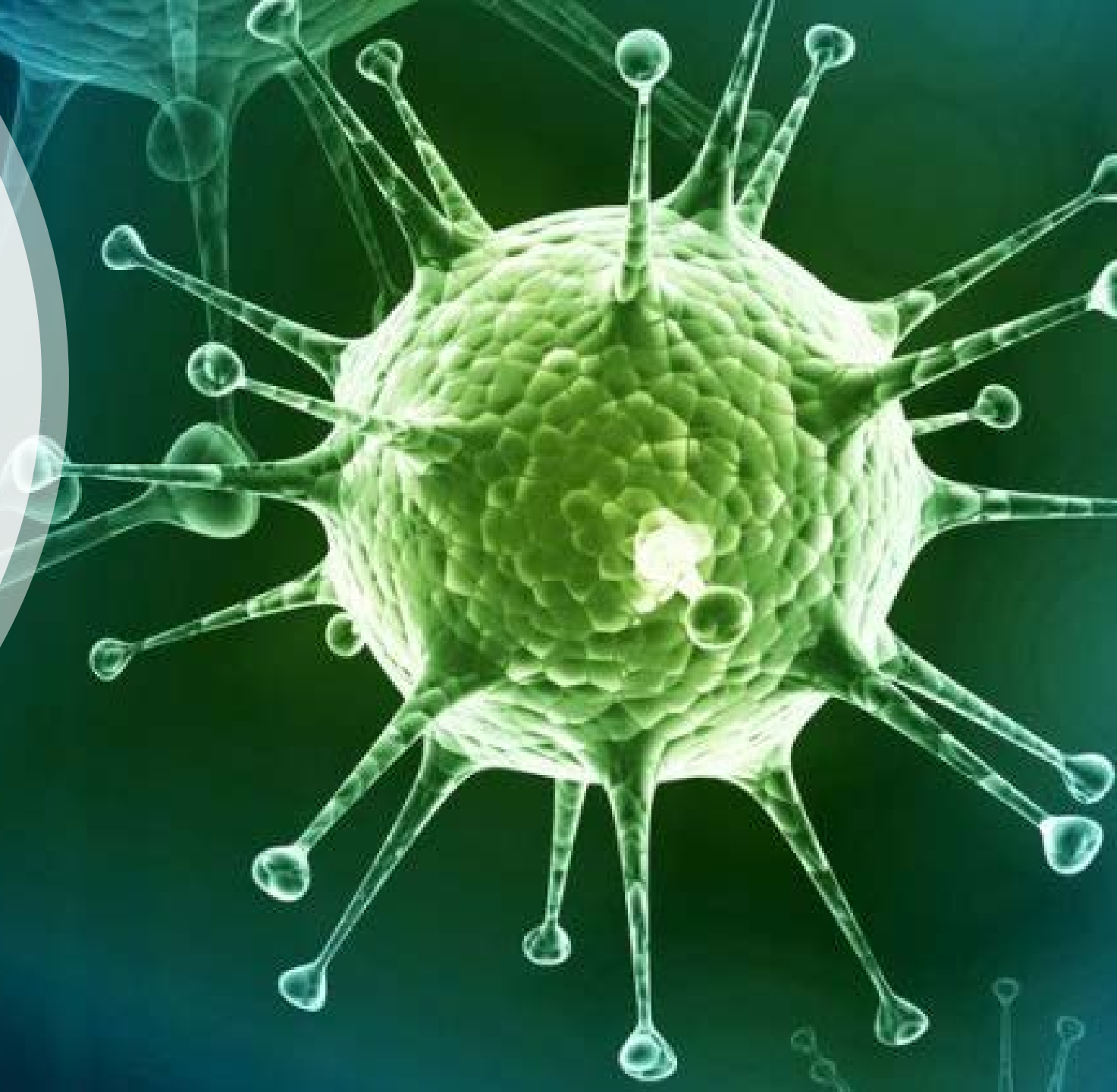
Polio Vaccinations (IPV & OPV)

- **IPV = inactive polio vaccine (Dr. Salk)**
- **OPV= oral polio vaccine (Dr. Sabin)**
- **U.S. uses only IPV since 2000**
 - **OPV still used in other countries**
- **CDC recommends 4 doses for children**
 - **2 months**
 - **4 months**
 - **6-18 months**
 - **4-6 years**



Flu Vaccine Developed

- Vaccine 1st developed & approved for military use in 1945
 - Imperative for military – 1 of 67 death rate during 1918-1919 pandemic
- Approved for public use in 1946
- Dr. Thomas Francis Jr. & Dr. Jonas Salk instrumental in development



The Flu – Major Outbreaks



1918–1919

Spanish Influenza epidemic

- 40 million died worldwide
- No treatment or vaccine



1957–1958

Asian Influenza epidemic

- 2 million killed worldwide
- 70,000 deaths in U.S.
- Vaccine developed once new strain identified



2009

Novel H1N1 (Swine Flu)

- Between 8,520 & 17,620 deaths in U.S.
- 18,449 deaths worldwide



2017-2018

A(H3N2) Prominent

- 171 pediatric deaths reported
- Diverse type & subtype
- Only 22% of children who died were vaccinated

Advantages of Vaccination

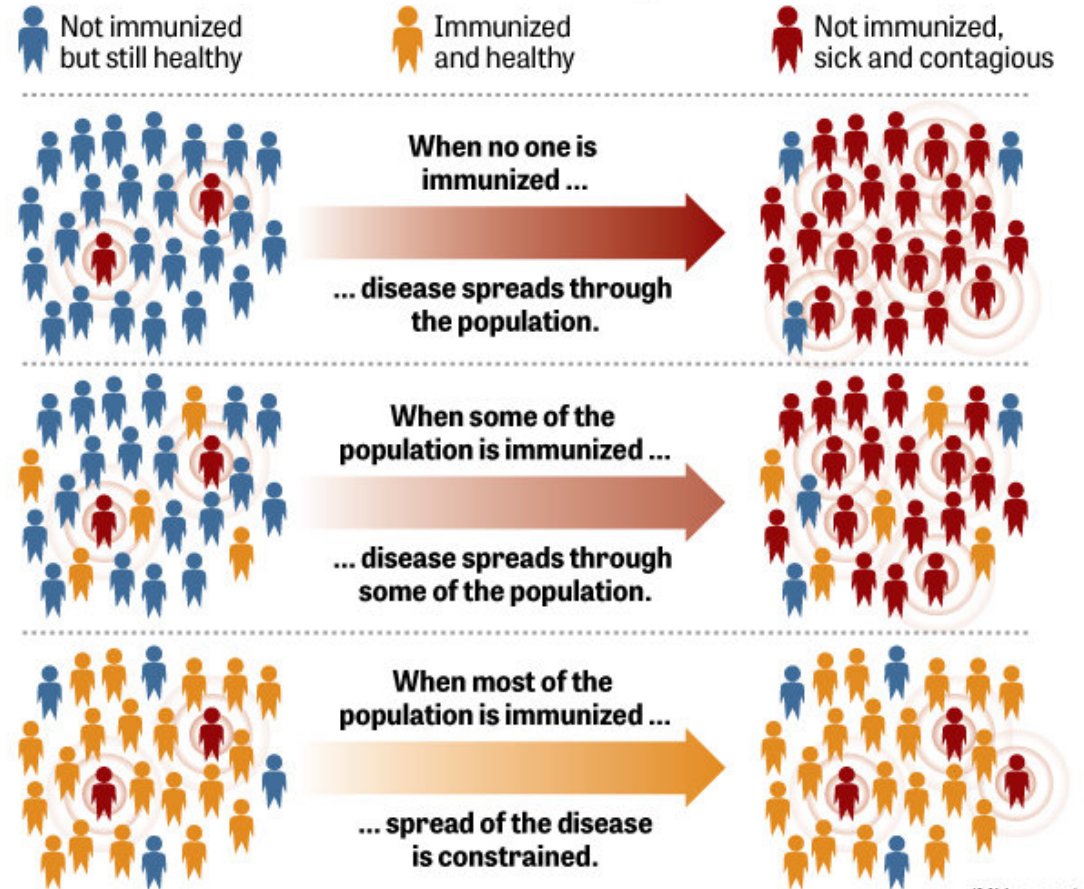
- Lowers risk of flu illness by 40-60%
- Milder illness or prevent sickness if flu contracted
- Significantly reduces child's risk of death if flu contracted
- Helps with chronic disease
 - Lowers rates of cardiac events for those with heart disease
 - Reduced hospitalization – diabetes & lung disease
- Protects people who cannot get vaccinated

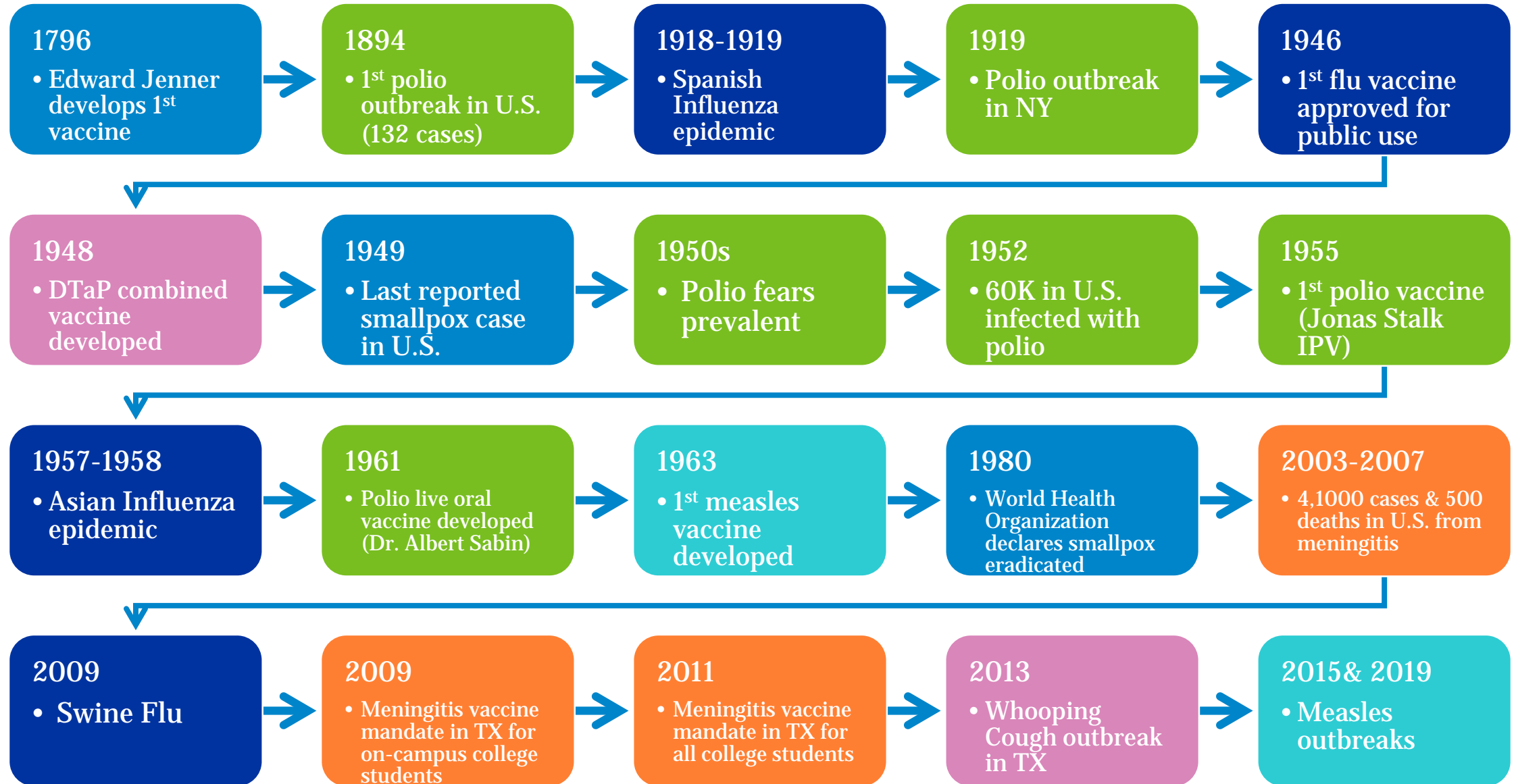
Need to Increase Flu Vaccination Rates

- Vaccination rates for adults just over 40%
 - Rates for children in high 50%
- Need herd immunity
 - Not enough people are vaccinated to create herd immunity
 - Protect those who can't be vaccinated

WHY DOES MY CHOICE MATTER TO OTHERS?

It matters because of the concept of "herd immunity." Here's how it works:





DTaP Vaccine Developed

- 1948: DTaP combined vaccine developed
- 1914: antitoxin/toxin diphtheria immunization
- 1924: tetanus toxoid for U.S. military in WWII created
- 1939: pertussis vaccine proved effective



DIPHTHERIA

- Thick coating in back of throat → breathing problems, heart failure, paralysis, even death
- Rare in U.S. (< 5)
- Still globally active → 4,190 cases worldwide in 2007
- Fatality rates highest for under 5 & over 40

TETANUS



- Kills 1 out of 10 infected
- Muscle tightening & stiffness throughout body
 - Tightening in head/neck → inability to swallow or breathe
- Only vaccine-preventable disease not spread through human contact
 - Contract through cuts, scratches, or wounds

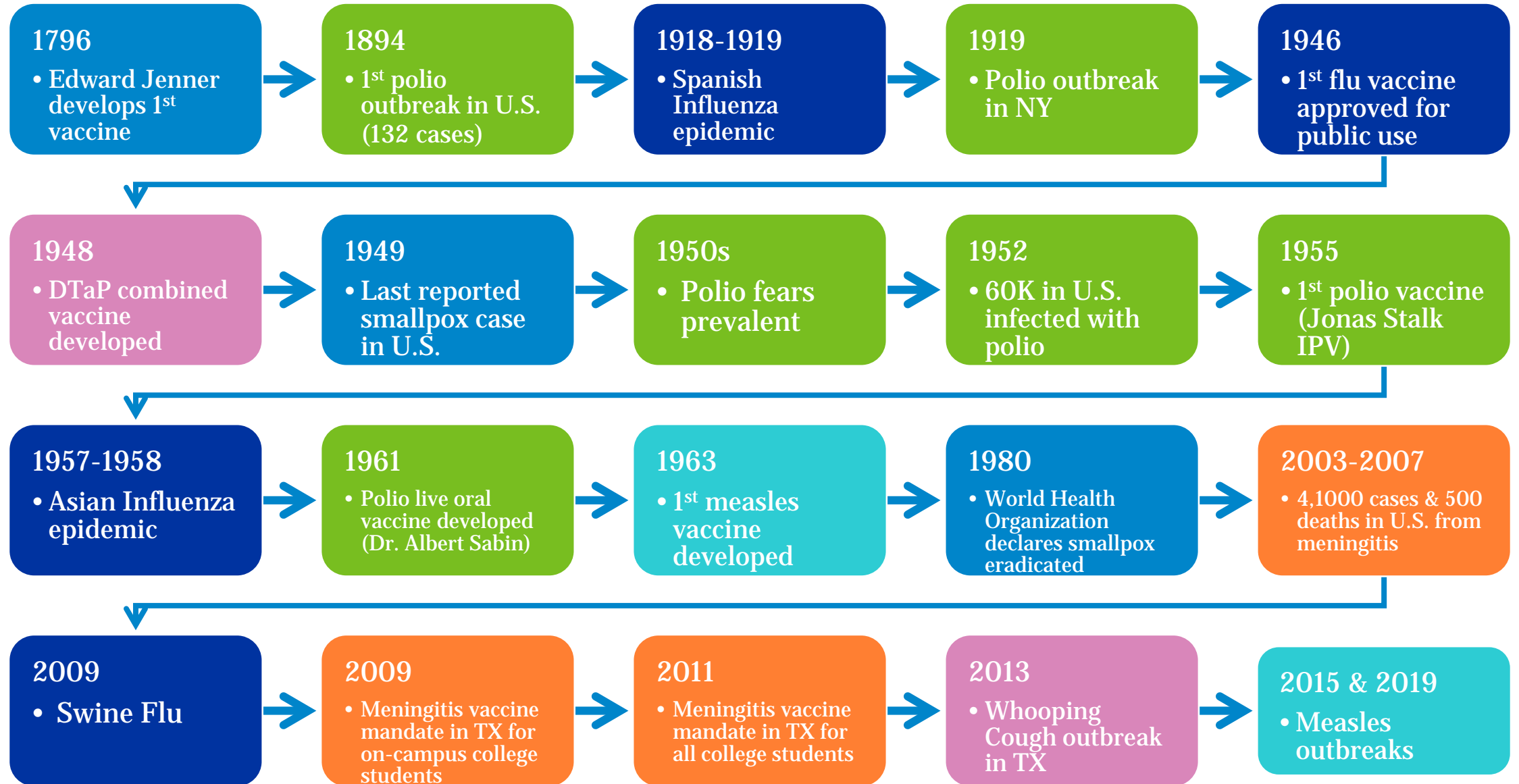
Whooping Cough (Pertussis)

- Intense coughing fits → trouble breathing, vomiting, sleeplessness
- TDaP during 3rd trimester



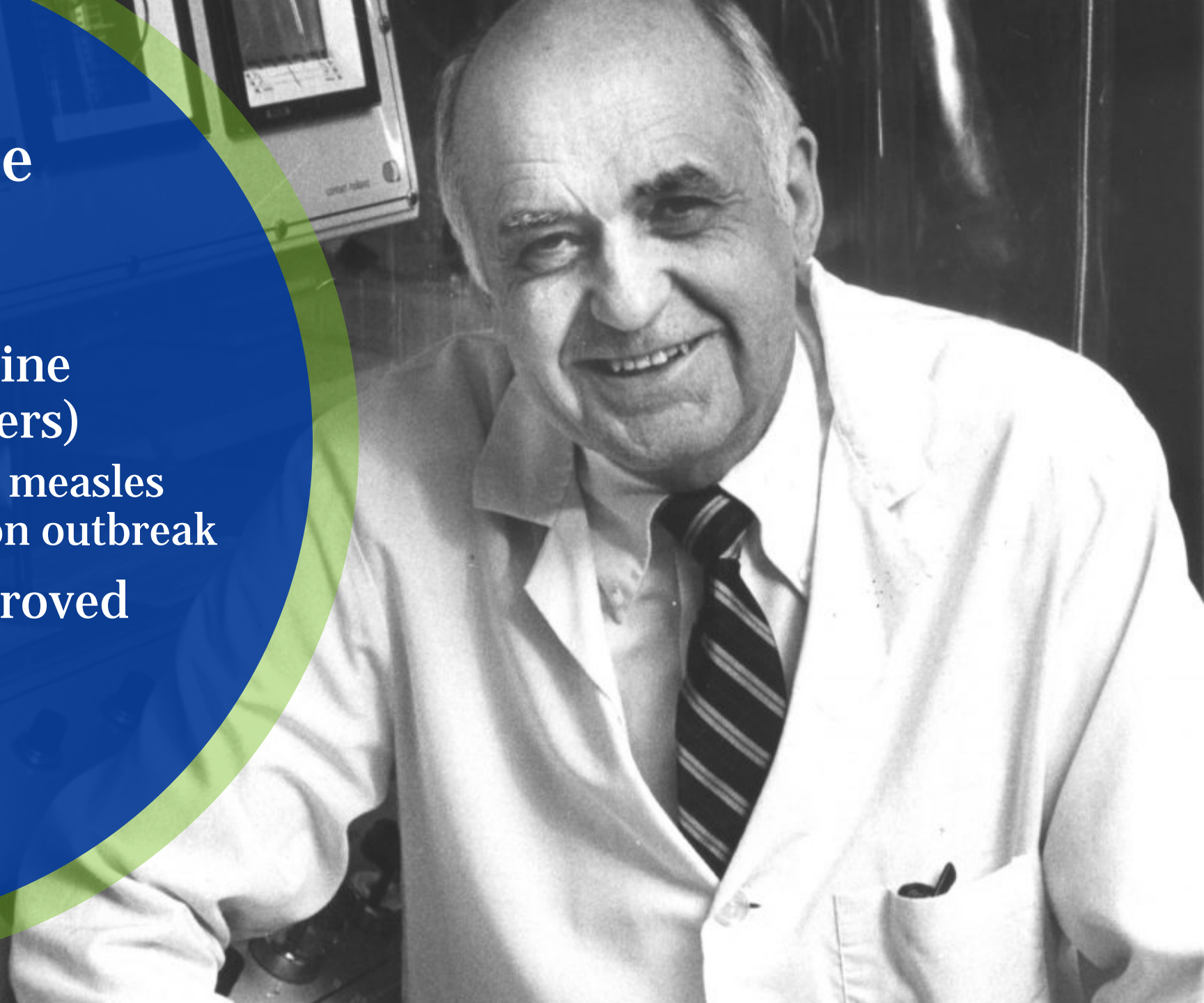
DTaP/TDaP

- DTaP vaccine for children
- TDaP for adults
- Combined vaccination (Diphtheria, Tetanus, and Pertussis)
 - Children: 5 vaccinations before age 6 (DTaP)
 - Adults: TDaP age 11 & TD booster every 10 years
 - TDaP during pregnancy
- Before vaccinations
 - 200,000 diphtheria cases
 - Hundreds of tetanus cases
 - 200,000 pertussis cases
- Post vaccinations
 - Diphtheria & tetanus - dropped 99%
 - Pertussis – dropped 80%



Measles Vaccine Development

- 1963: 1st measles vaccine developed (John Enders)
 - Created from isolated measles virus from 1954 Boston outbreak
- 1968: Hilleman's improved vaccine distributed



Measles Today



1 out of 10 suffer ear infections and many have permanent hearing loss



1 in 20 get pneumonia, which can be fatal in young children



1 of every 1000 develop encephalitis which can lead to deafness or intellectual disability



1-2 of every 1000 die

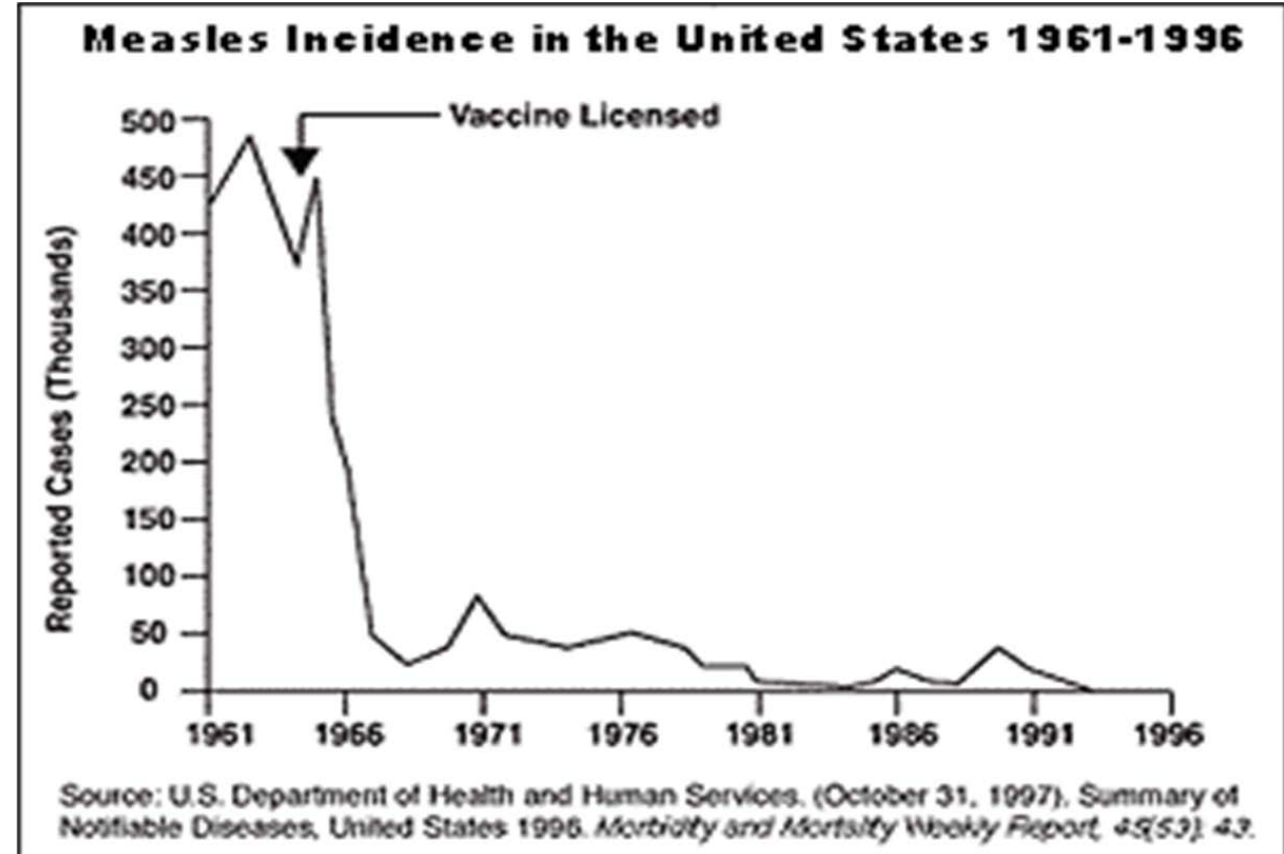
MMR Vaccine

- MMR = measles, mumps, & rubella (German measles)
- CDC recommends 2 doses for children
 - 12-15 months
 - 4-6 years
- Recommended for children under 12 months before travel
 - Disease uncommon in the U.S. – not uncommon in other locations
- MMR only recommended for adults in an outbreak environment



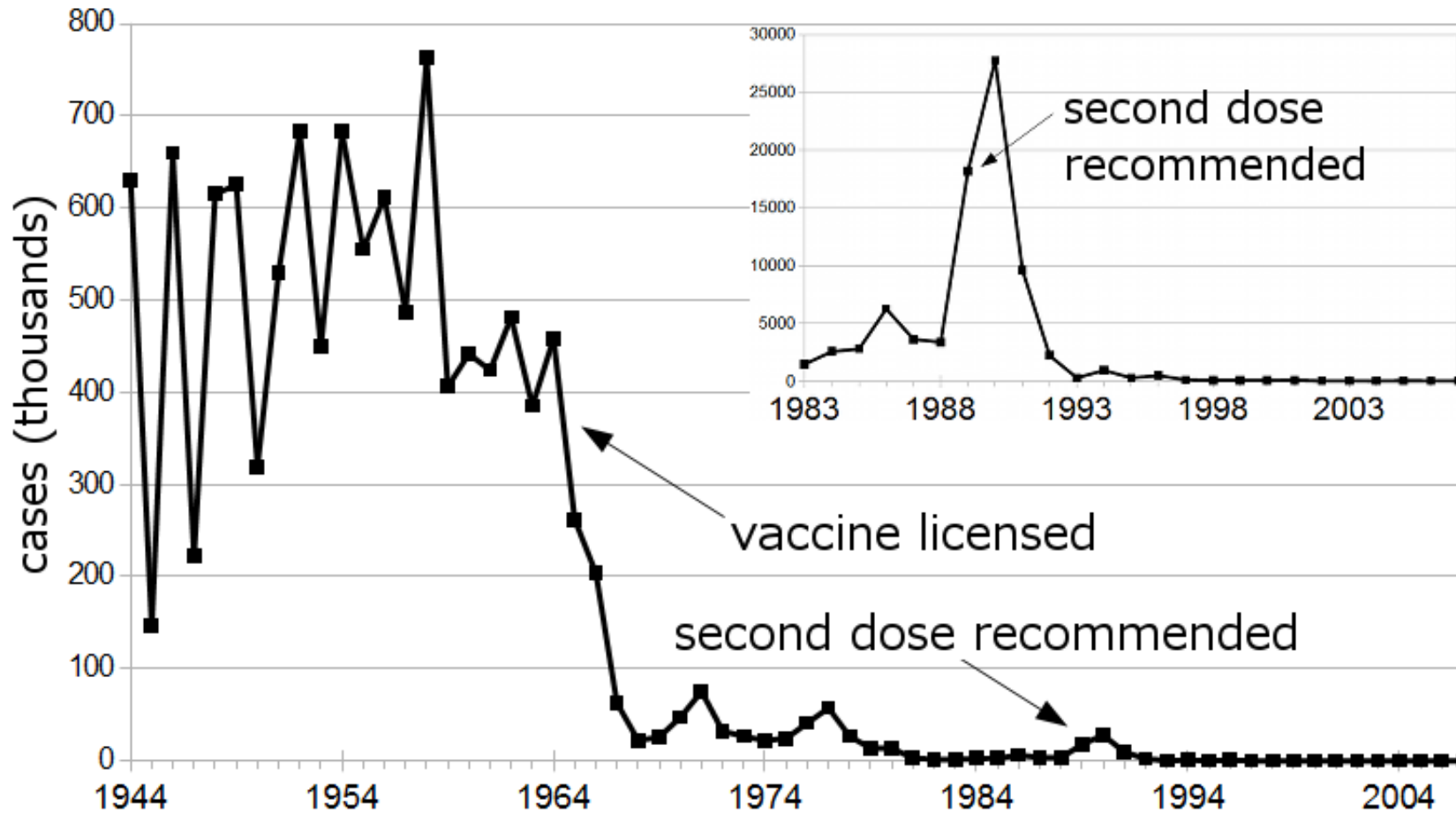
Importance of Staying Vaccinated

- In 1963 the 1st measles vaccine was developed
- Before vaccine:
 - More than 500,000 cases reported annually
 - 48,000 hospitalizations
 - 4,000 cases of encephalitis
 - 450-500 deaths
- 1966 National Measles Campaign

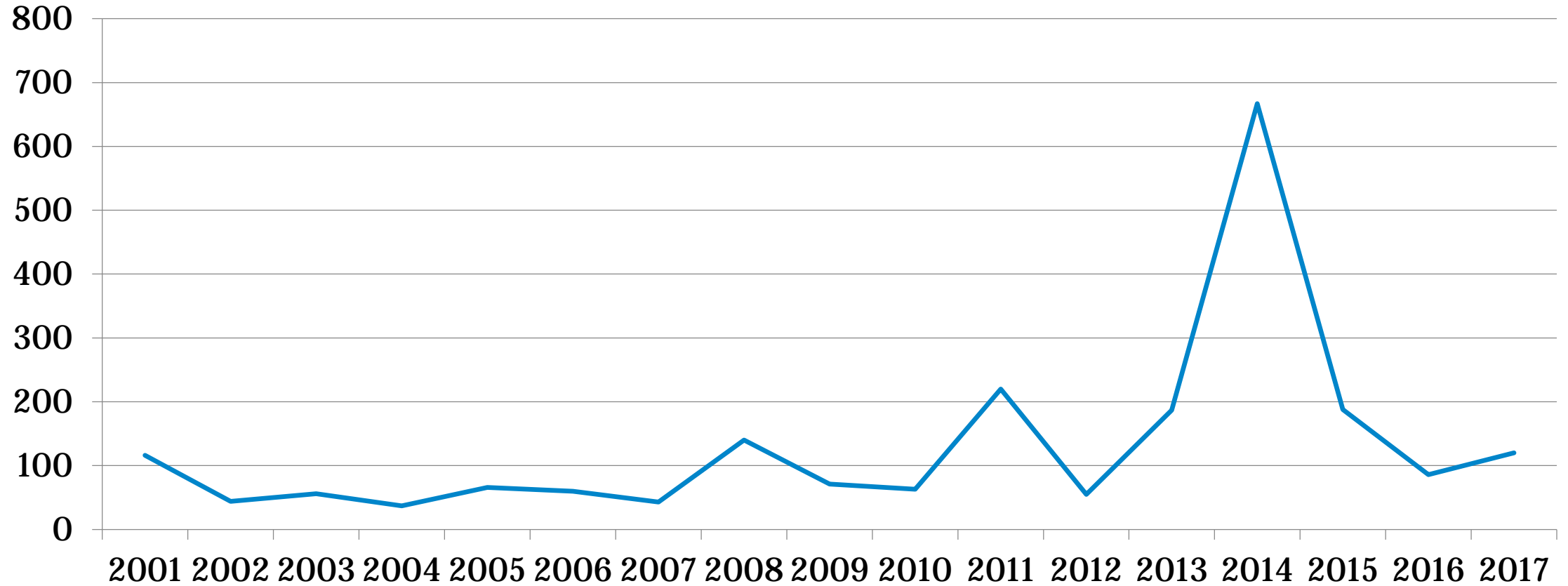


The Measles Story

Measles cases in the United States, 1944-2007



Measles Cases in the U.S. since 2000



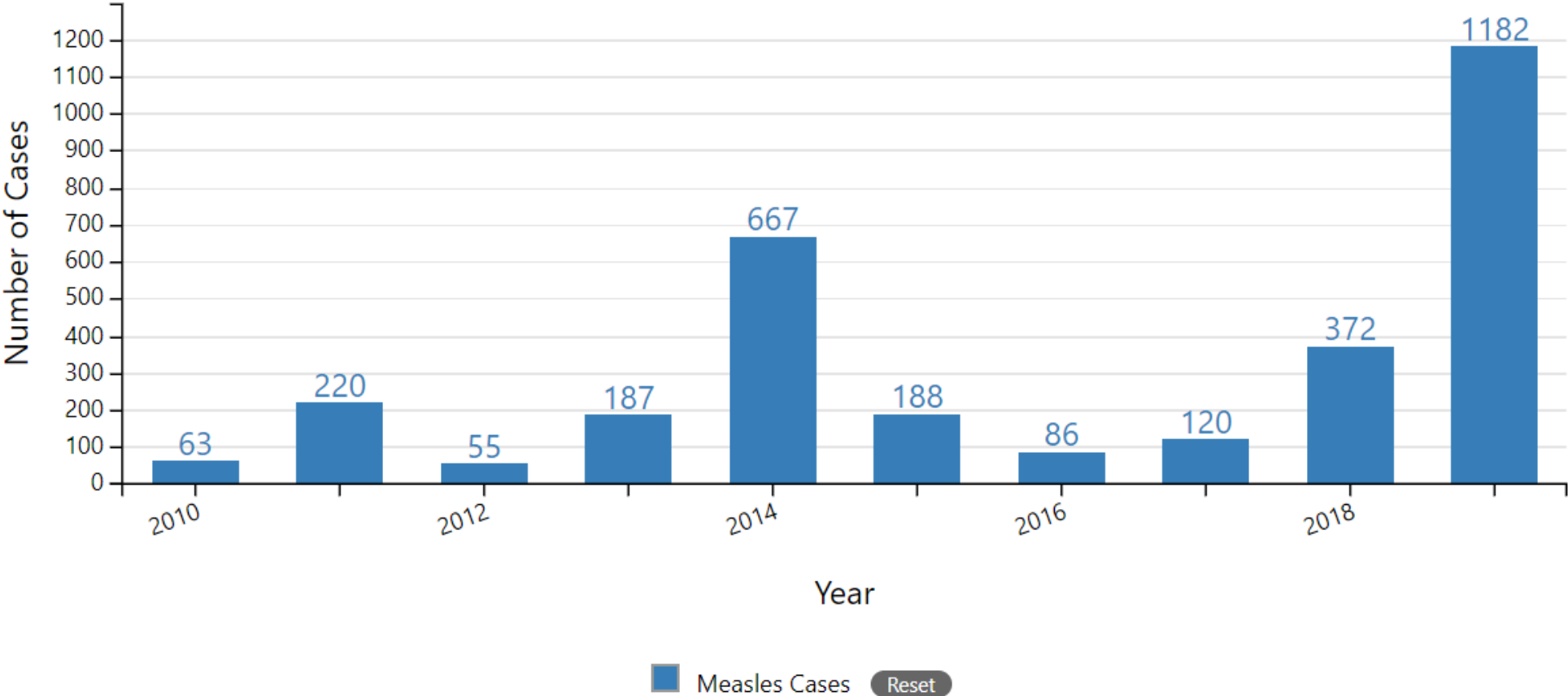
Measles in Disneyland

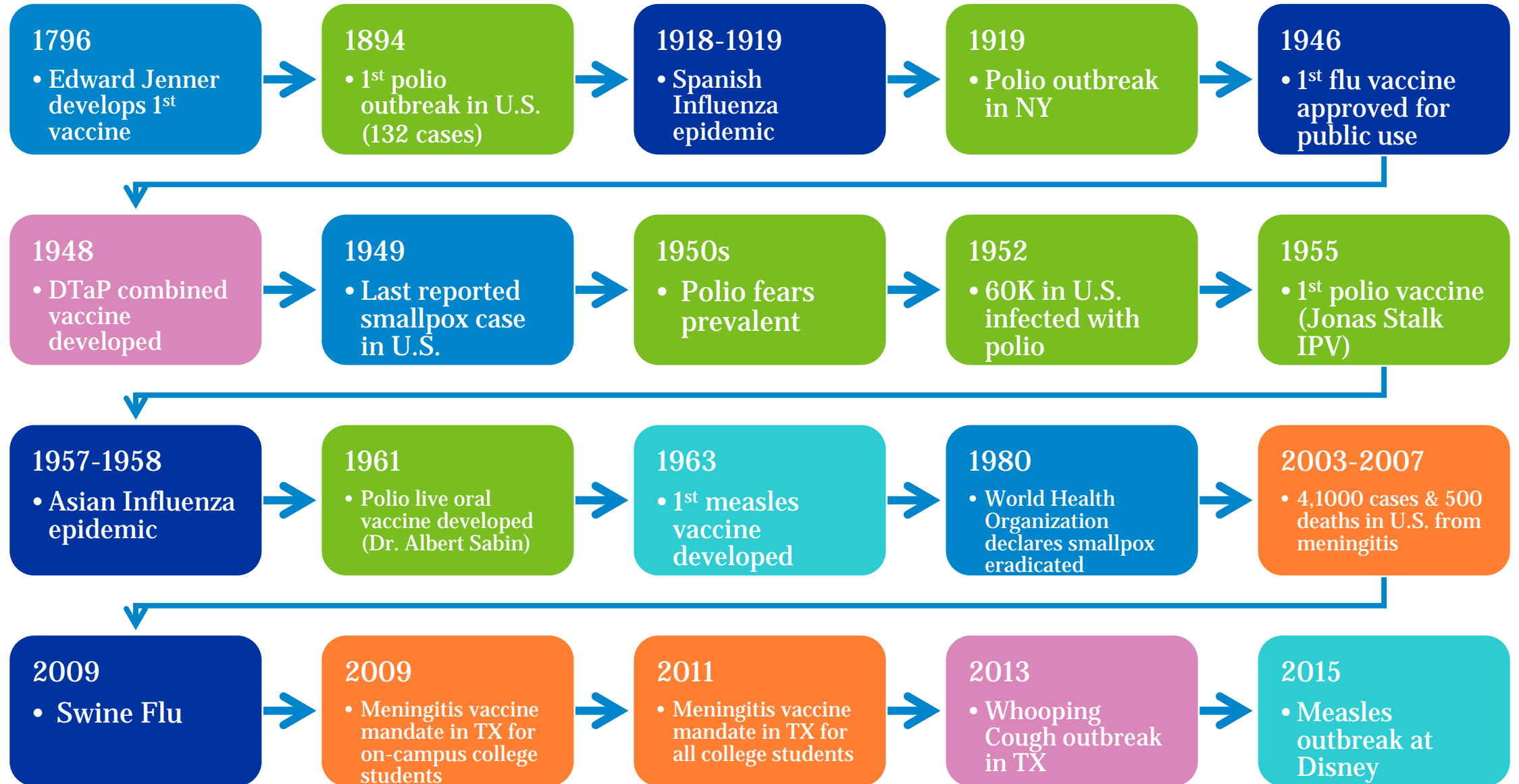
- January 5th, 2015: potential measles case
 - 11-year-old unvaccinated child hospitalized with rash following trip to Disneyland
 - 4 more potential cases reported in CA; 2 cases reported in Utah
- 125 measles cases between December 28th & February 8th
- 88% of CA patients infected were **unvaccinated**



Number of Measles Cases Reported by Year

2010-2019**(as of August 8, 2019)





Meningitis

- Vaccinations effective for 4 out of 5 common bacterial types
 - Those 4 types cause 70% of infections in the U.S.
- Increased promotion & use of meningitis vaccine has lowered outbreak frequency
 - 1 year period (1992-1993) – 8 identifiable outbreaks
 - Past 11 years – only 13 outbreaks total
- 2 types of vaccines
 - Meningococcal conjugate vaccine
 - Vaccinate at age 11-12 (+ booster at age 16)
 - Serogroup B meningococcal vaccine
 - Vaccinate if in 16-23 age group

Meningitis

- 1,000 - 2,600 cases each year (CDC)
- 1 out of 10 cases result in death
- Continuing health problems in 11-19% of survivors
 - Loss of limbs and hearing, blindness, nervous system problems, learning disability, kidney failure, seizures, strokes
- Can be contained by antibiotic – with extreme early action
 - Death and health problems still possible
- Infection progresses quickly (death can result in 24 hours)
 - Initial symptoms mimic typical flu



Meningitis – TX Legislation

- College students at greater risk
 - Close living conditions, sharing food/drinks, etc.
- 2009: Jamie Schanbaum Law (SB 1107) – all students living on college campus must have meningitis vaccine
 - Jamie Schanbaum – lost fingers and lower legs due to bacterial meningitis
 - 19-year-old UT student
- 2011: Nicolis Williams Law (HB 1816) – expands earlier law to include all college students (off-campus as well)
 - Nicolis Williams passed away due to bacterial meningitis
 - 20-year-old A&M student
 - TX 1st state to include all students in mandate



Thank You