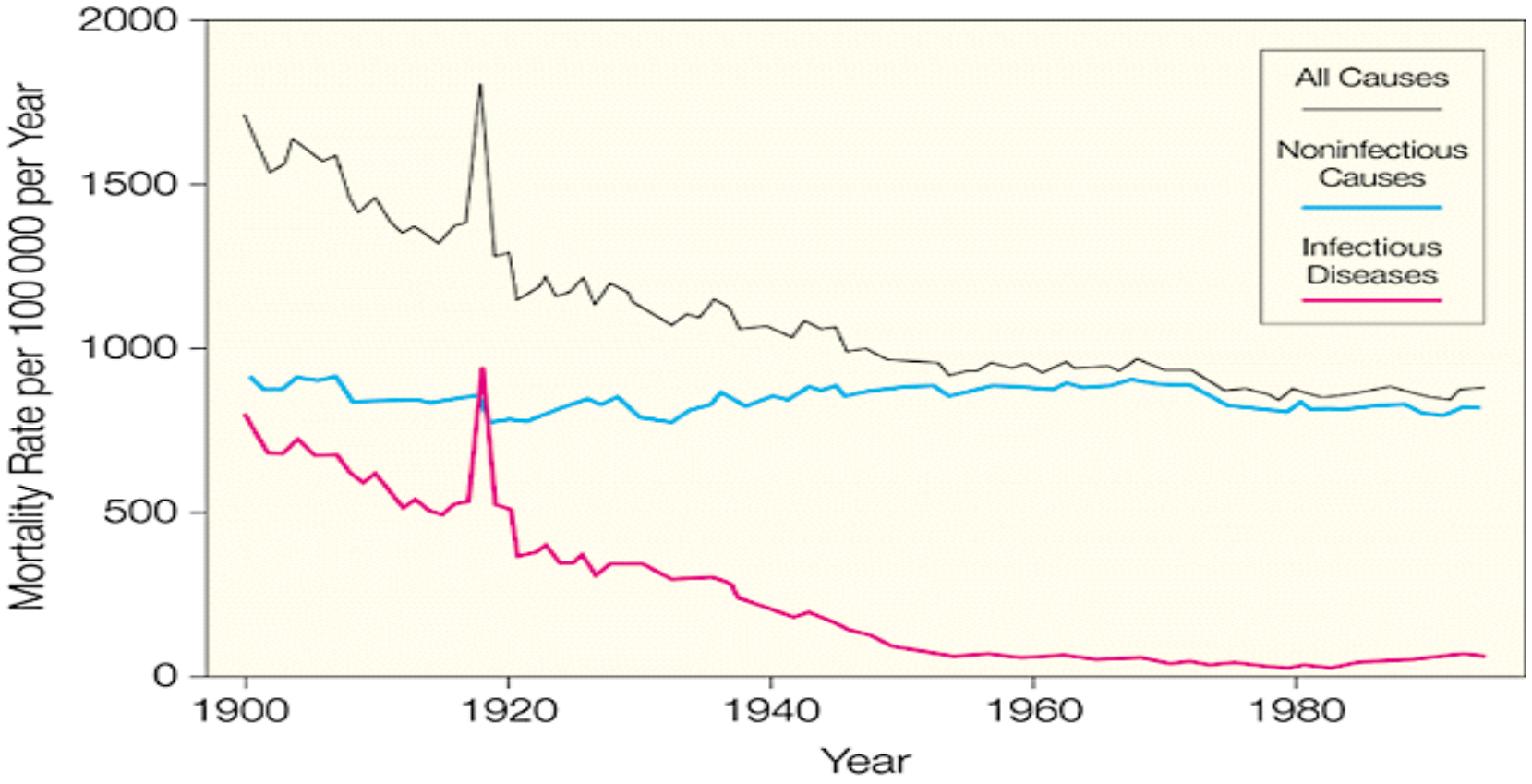
UWTASP
tele-antimicrobial stewardship program

September 15th, 2020

Agenda

- Intro to Vaccines
  Rupali Jain, PharmD
- Case Discussions
- Open Discussion
- COVID-19 corner

Crude Mortality Rates for All Causes in US, Infectious & Non-infectious Causes, 20th century



JAMA. 1999;281(1):61-66. doi:10.1001/jama.281.1.61

Top ten causes of death

	1900	1950	2010	2016
1	Pneumonia & **influenza**	Heart disease	Heart disease	Heart disease
2	Tuberculosis	Cancer	Cancer	Cancer
3	Diarrhea **& enteritis**	Stroke	Chronic lung disease	Chronic lung disease
4	Heart disease	Injuries	Stroke	Injuries
5	Stroke	Infant mortality	Injuries	Stroke
6	Kidney disease	Pneumonia **& influenza**	Alzheimer's disease	Alzheimer's disease
7	Injuries	Tuberculosis	Diabetes	Diabetes
8	Cancer	Artheriosclerosis	Kidney disease	Pneumonia **& influenza**
9	Senility	Kidney disease	Pneumonia **& influenza**	Kidney disease
10	Diphtheria	Diabetes	Suicide	Suicide

National Vital Statistics System, CDC/NCHS; Slide from Helen Chu

Ten Great Public Health Achievements United States, 2001 -2010

- **Vaccination**
- Prevention and Control of Infectious Diseases
- Tobacco Control
- Maternal and Infant Health
- Motor Vehicle Safety
- Cardiovascular Disease Prevention
- Occupational Safety
- Cancer Prevention
- Childhood Lead poisoning
- Public Health Preparedness and Response

MMWR May 20, 2011 / 60(19);619-623 Slide from Helen Chu

Audience Response

Do pharmacists provide immunizations at your site?

1. Yes
2. No

Intro to Vaccines

Outline

- Concept of Immunity reviewed
- Vaccine Types
- Vaccine Efficacy
- Vaccine Safety
- Resources

Immunity

PASSIVE	ACTIVE
-Transfer of antibody produced by one human or animal to another -Temporary protection that wanes over time -Transfer of antibody through placenta	-Infection with disease causing organism -Vaccination

Two types of vaccines

Live attenuated (weakened form of the organism)

- Viral or bacterial

Inactivated (non-live or fraction of the organism)

- Viral or bacterial
- Protein based (eg toxoid or subunit vaccines)
- Polysaccharide based (eg bacterial cell wall polysaccharide)

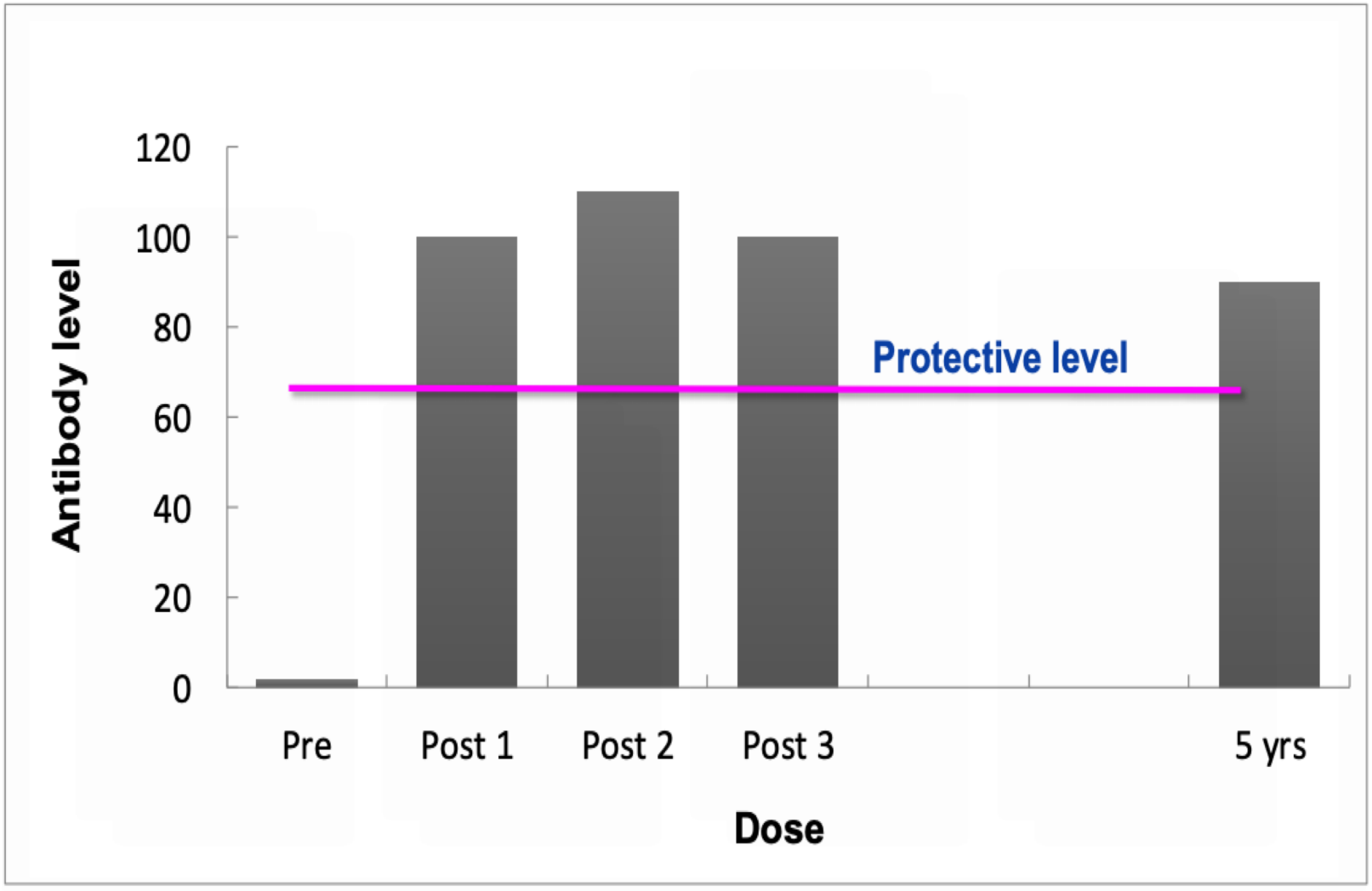
Live, attenuated vaccines

- Able to grow in the body but does not cause illness
- When it does cause disease, usually milder than natural disease
- Immune response identical to natural infection
- Usually produces immunity with one dose (except oral)

Examples

- Viral: MMR, rotavirus, intranasal flu vaccine, yellow fever
- Bacterial: oral typhoid, oral cholera, and BCG

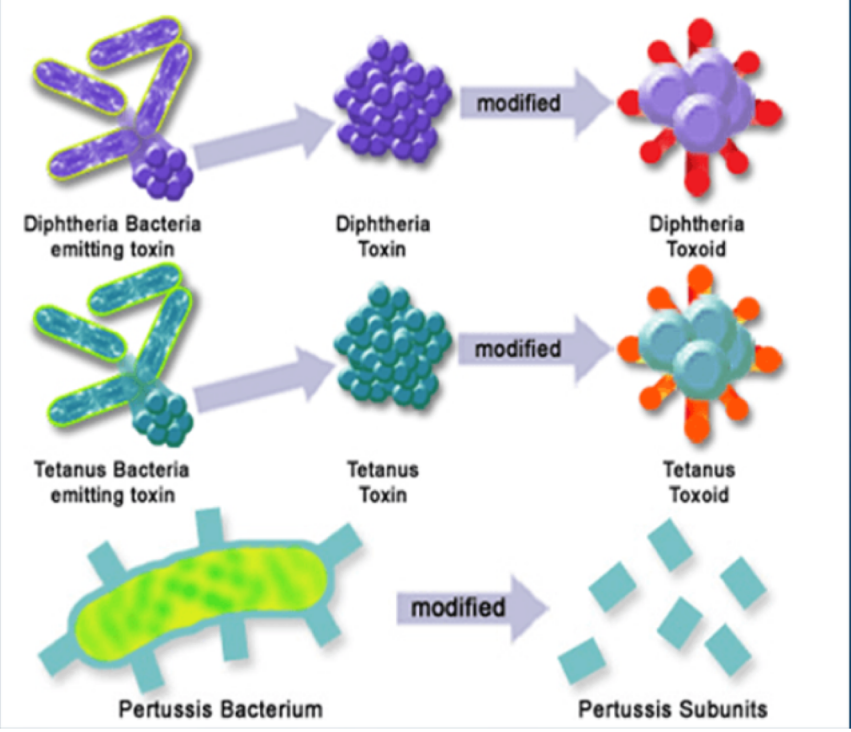
Individual Response to Live Vaccine



Inactivated vaccines

- Produced by growing bacteria or viruses in culture medium, then inactivating them with heat/chemicals
- Unable to grow in the body
- Composed of whole viruses or bacteria or fractions of either
  - Protein based
  - Polysaccharide based
- Require multiple doses:
  - 1st dose: primes the immune system
  - 2nd dose: protective immune response develops

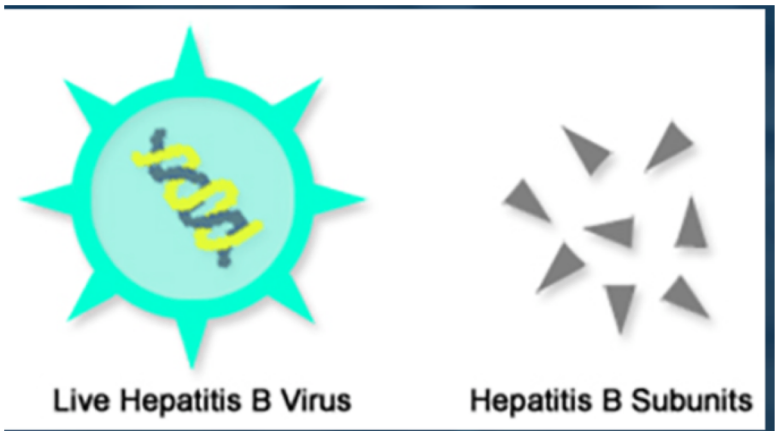
Examples

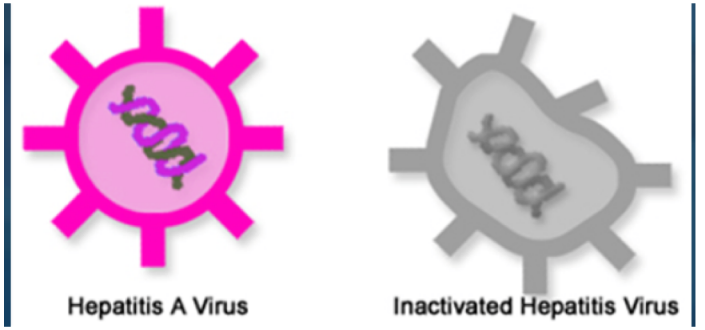


Whole-cell inactivated vaccine
rabies, and Japanese encephal

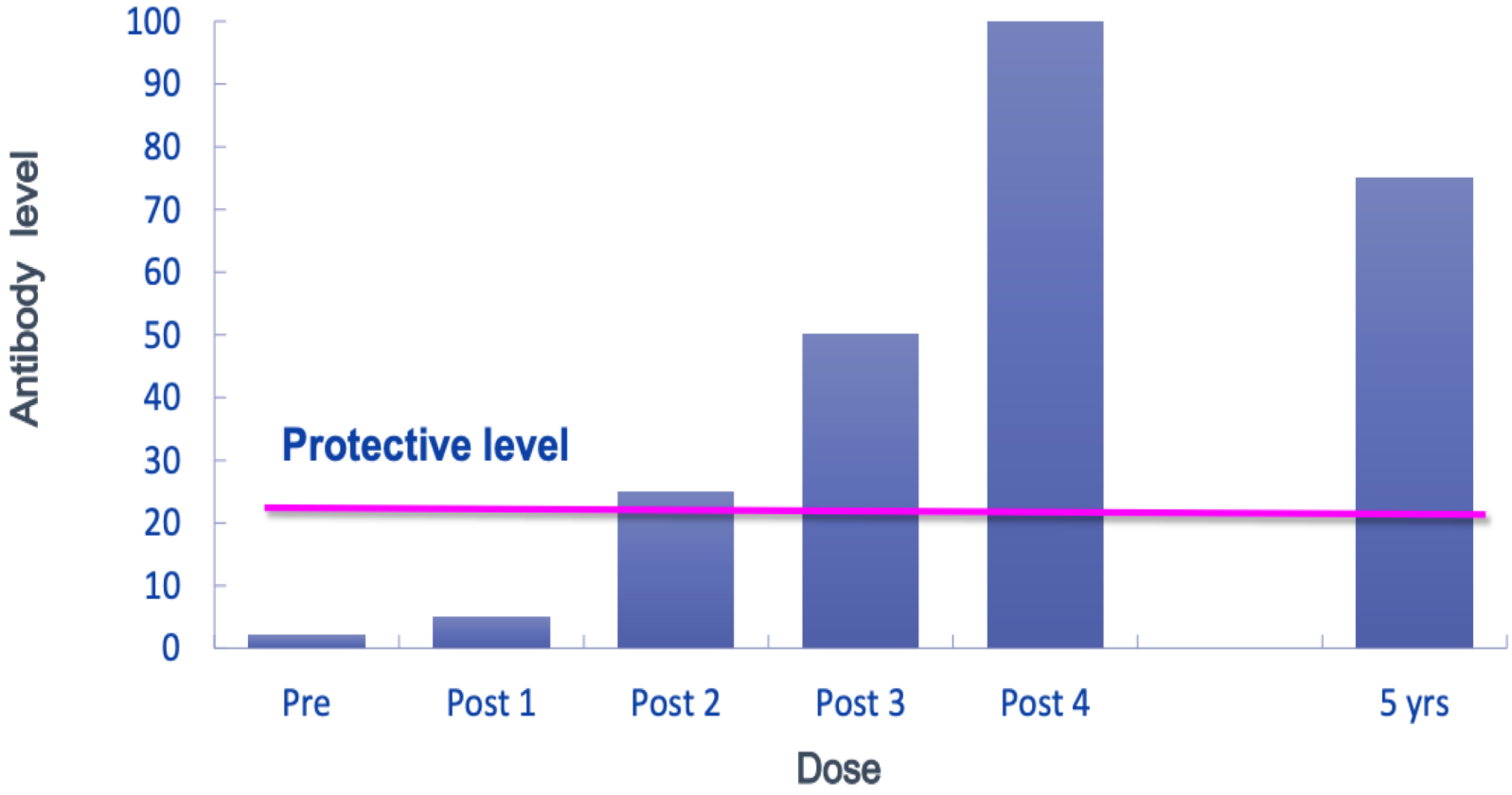
Subunit vaccines: hepatitis B,
pertussis

Toxoids: diphtheria and tetanus

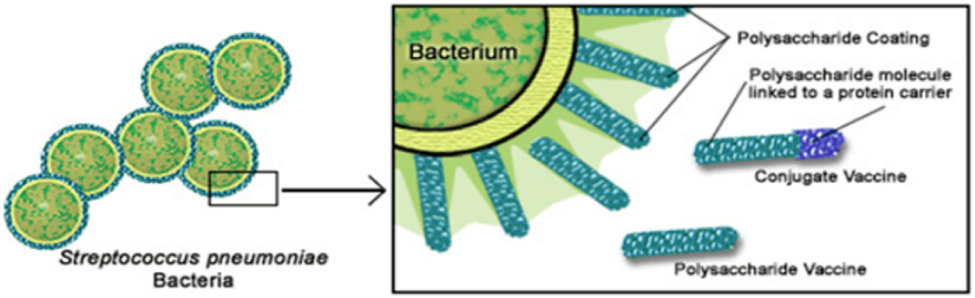


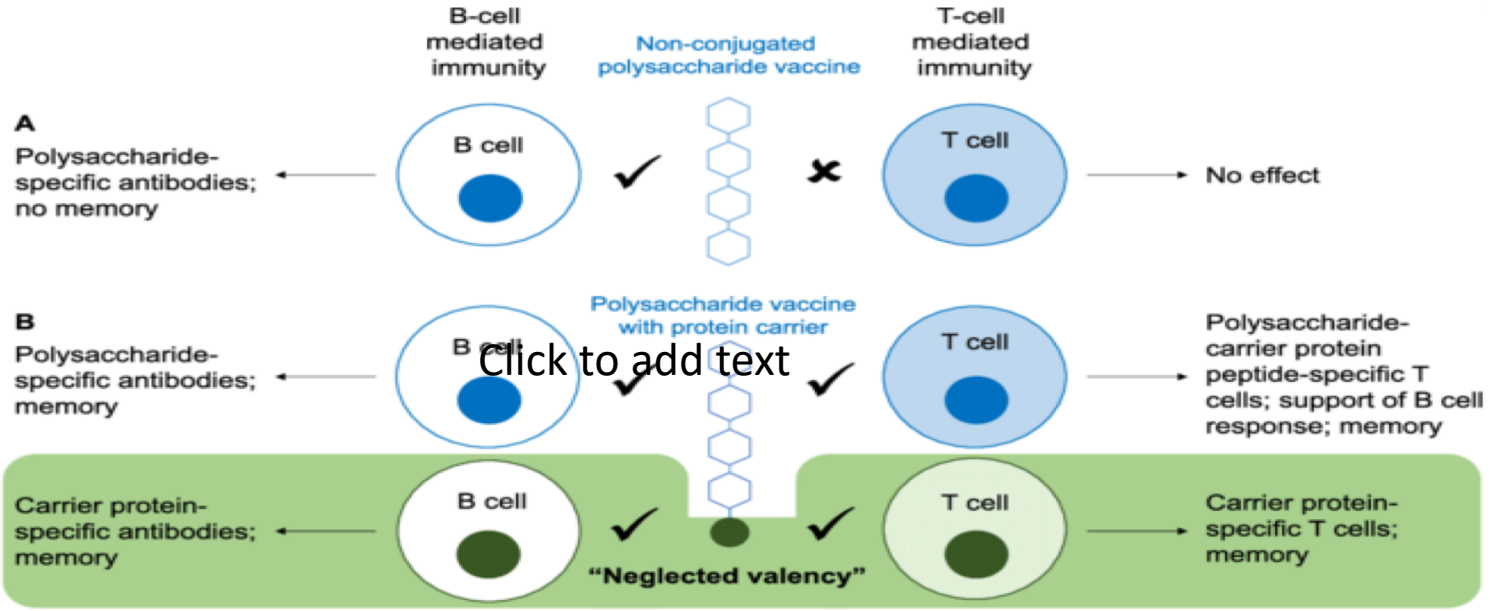


Individual Response to Inactivated Vaccine



Polysaccharide





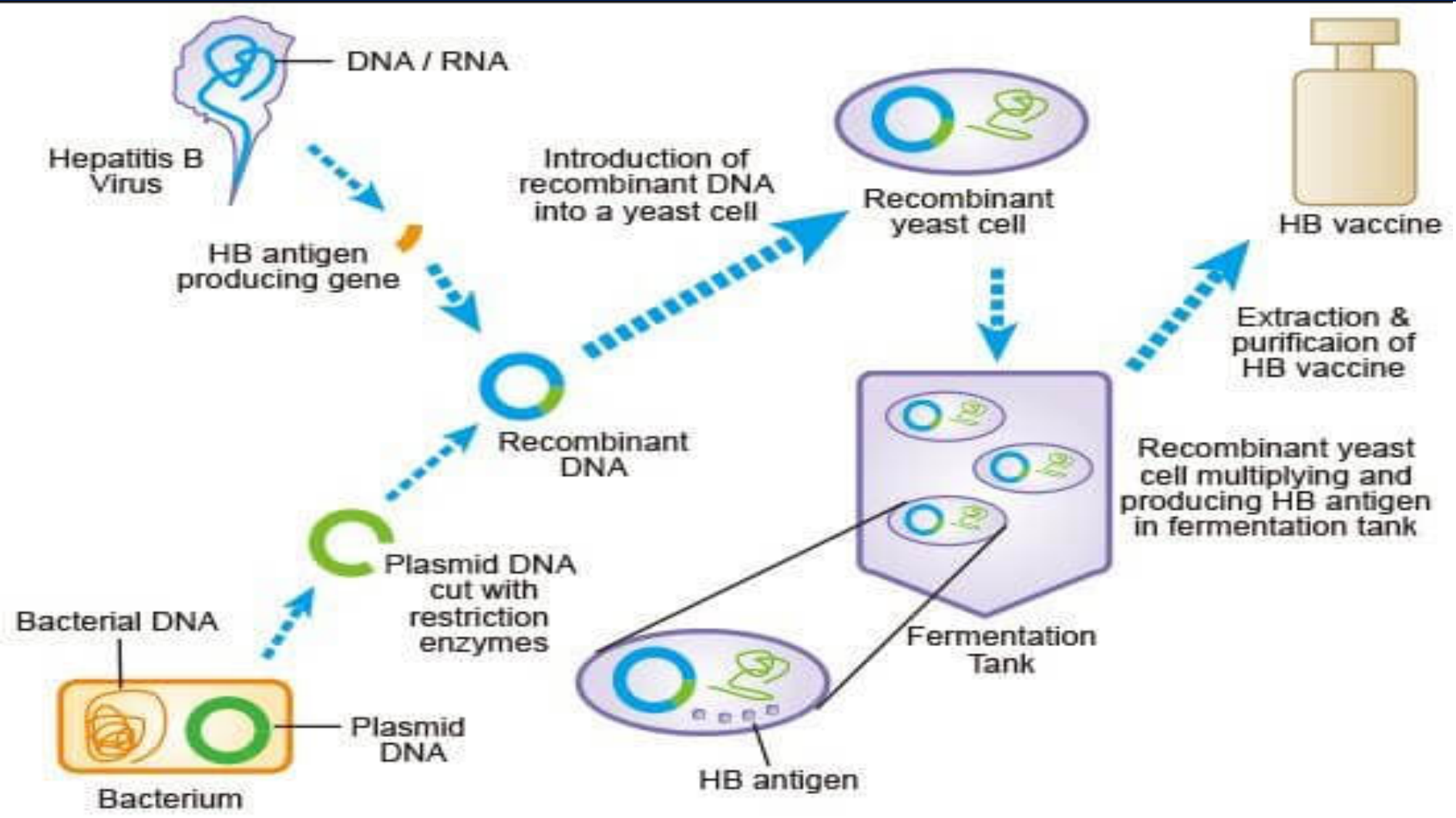
Click to add text

Examples:

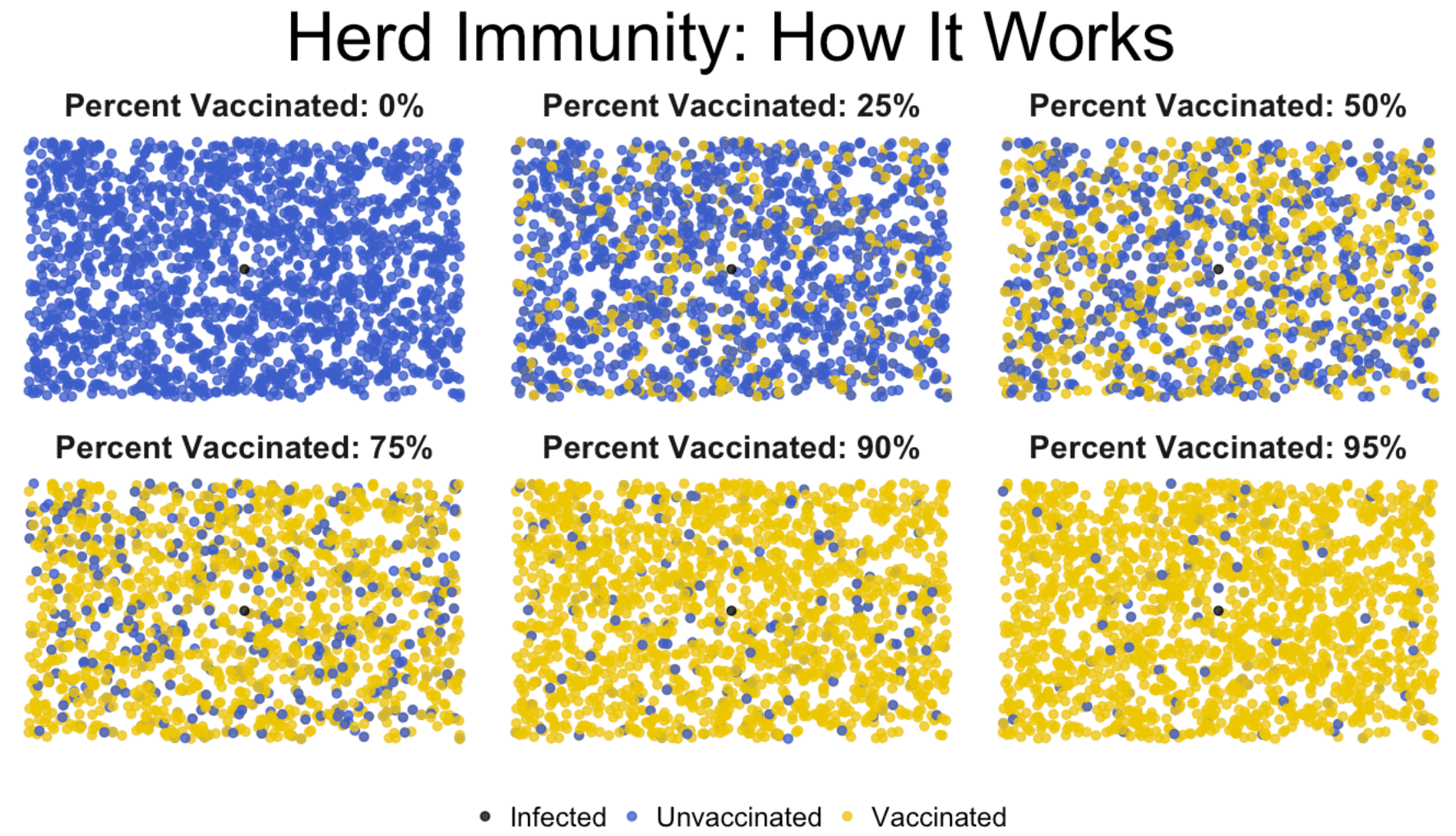
- Pure polysaccharide vaccines: pneumococcal (PPSV23) and typhoid
- Conjugate polysaccharide: haemophilus influenzae vaccine type b (Hib), pneumococcal (PCV 13) and meningococcal

May 2017 Vaccine 35(25)DOI: 10.1016/j.vaccine.2017.04.078

Recombinant Vaccines



it's not about you, it's about vulnerable people



Herd Immunity Thresholds

Herd Immunity Thresholds of vaccine-preventable diseases[6]

Disease	Transmission	Basic reproduction number	Herd Immunity Threshold
Measles	Airborne	12–18	92–95%
Pertussis	Airborne droplet	12–17	92–94%
Diphtheria	Saliva	6–7	83–86%
Rubella	Airborne droplet	6–7	83–86%
Smallpox	Airborne droplet	5–7	80–86%
Polio	Fecal-oral route	5–7	80–86%
Mumps	Airborne droplet	4–7	75–86%
SARS	Airborne droplet	2–5	50–80%
Ebola	Bodily fluids	1.5–2.5	33–60%
Influenza	Airborne droplet	1.5–1.8	33–44%

https://ourworldindata.org/vaccination

Vaccine Safety and Efficacy

Comparison of 20th Century Annual Morbidity and Current Morbidity: Vaccine-Preventable Diseases

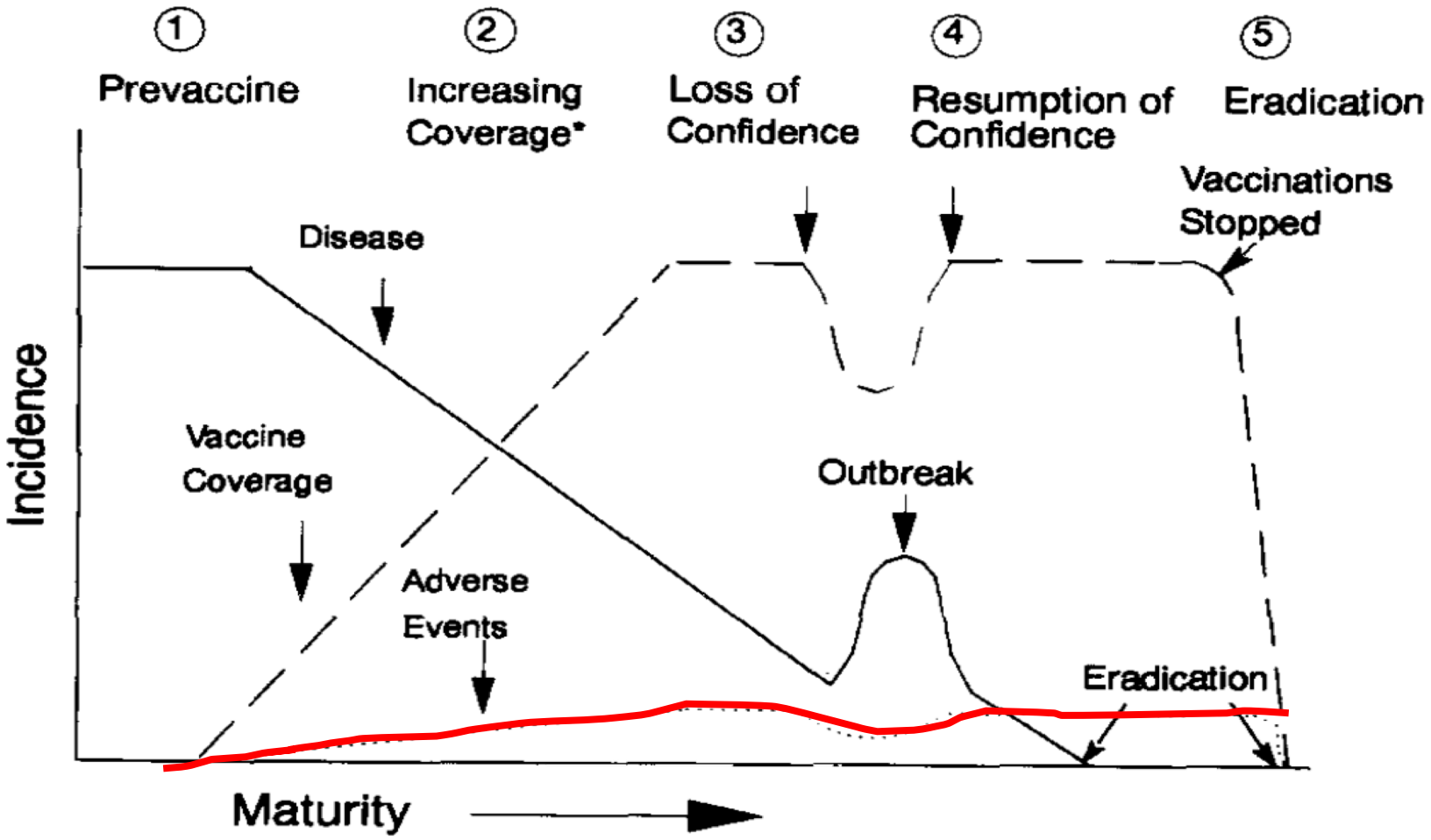
Disease	20th Century Annual Morbidity†	2017 Reported Cases ††	Percent Decrease
Smallpox	29,005	0	100%
Diphtheria	21,053	0	100%
Measles	530,217	122	> 99%
Mumps	162,344	5,629	97%
Pertussis	200,752	15,808	92%
Polio (paralytic)	16,316	0	100%
Rubella	47,745	9	> 99%
Congenital Rubella Syndrome	152	2	99%
Tetanus	580	31	95%
Haemophilus influenzae	20,000	22*	> 99%

† JAMA. 2007;298(18):2155-2163

†† CDC. *National Notifiable Diseases Surveillance System, Week 52, 2017 Weekly Tables of Infectious Disease Data.* Atlanta, GA. CDC Division of Health Informatics and Surveillance, 2018. Available at: www.cdc.gov/nndss/infectious-tables.html. Accessed on January 4, 2018.

* *Haemophilus influenzae* type b (Hib) < 5 years of age. An additional 11 cases of Hib are estimated to have occurred among the 237 notifications of Hi (< 5 years of age) with unknown serotype.

Stages of vaccine evolution



Chen RT Vaccine 1994 May;12(6):542-50.

Vaccine Safety

Vaccine Event Reporting System

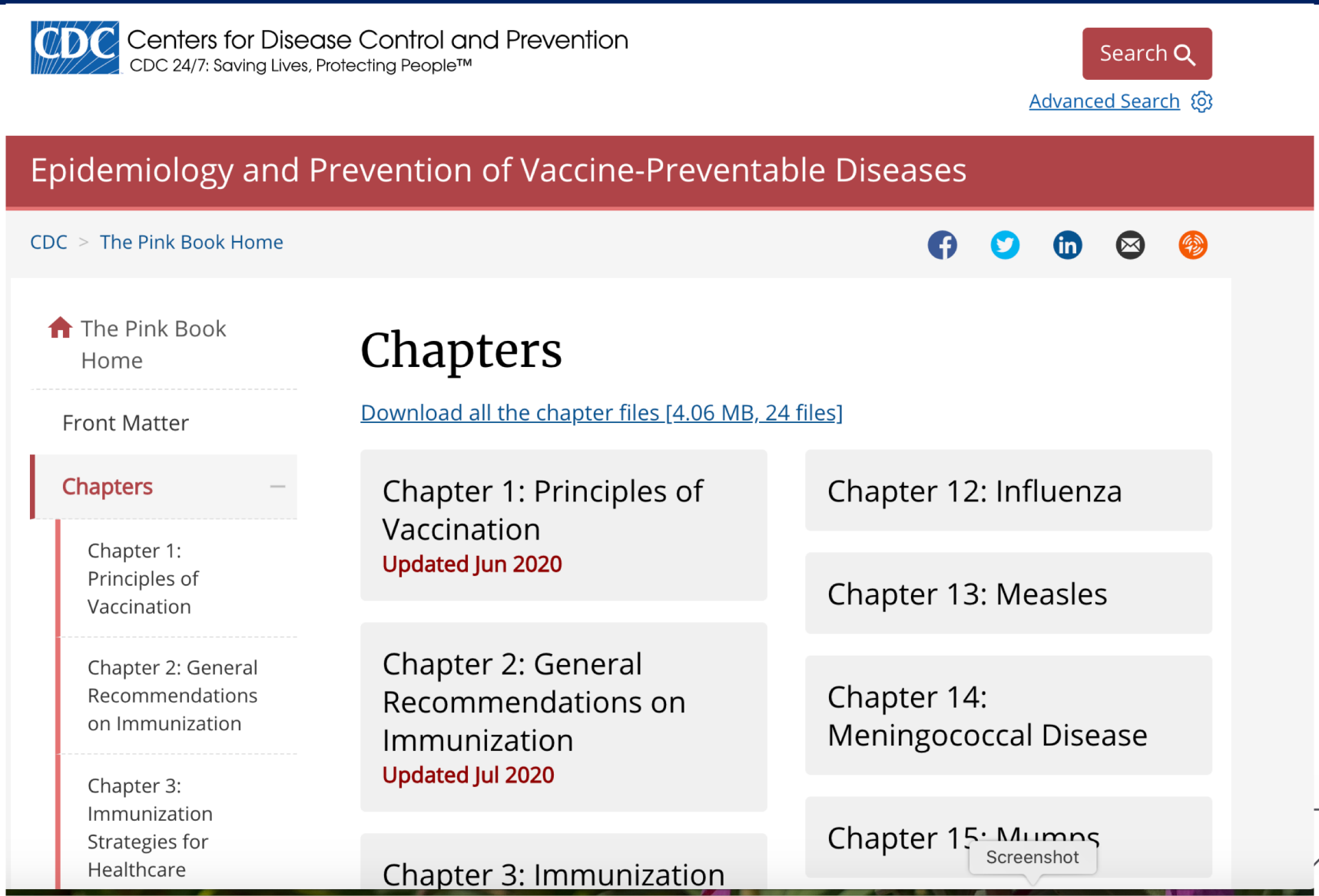
- National early warning system to detect safety problems with US vaccines
- Healthcare providers are **required by law** to report to VAERS:
- Any adverse event listed in the VAERS Table of Reportable Events Following Vaccination that occurs within the specified time period after vaccinations
- An adverse event listed by the vaccine manufacturer as a contraindication to further doses of the vaccine

Audience Response

Have you ever submitted a VAERS report?

1. Yes
2. No
3. Never knew it existed

Pink Book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CDC 24/7: Saving Lives, Protecting People™
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CDC > The Pink Book Home
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Front Matter
Chapters
Chapter 1: Principles of Vaccination
Chapter 2: General Recommendations on Immunization
Chapter 3: Immunization Strategies for Healthcare
Chapters
Download all the chapter files [4.06 MB, 24 files]
Chapter 1: Principles of Vaccination
Updated Jun 2020
Chapter 2: General Recommendations on Immunization
Updated Jul 2020
Chapter 3: Immunization
Chapter 12: Influenza
Chapter 13: Measles
Chapter 14: Meningococcal Disease
Chapter 15: Mumps
Screenshot

Resources

- https://www.historyofvaccines.org/content/types-vaccines
- CDC Vaccines and Immunizations:
  - https://www.cdc.gov/vaccines/index.html
- Immunize.org
  - Nice FAQ's documents to help answer those tough questions
- Pink Book
  - Pink Book Webinars: https://www2.cdc.gov/vaccines/ed/pinkbook/2020/pb1.asp

Immunization by Pharmacists

- https://naspa.us/resource/covid-19-vaccines/

Press release:

- https://www.hhs.gov/about/news/2020/09/09/trump-administration-takes-action-to-expand-access-to-covid-19-vaccines.html

- Contact Board of pharmacy for details

COVID-19 c

- https://www.uwtasp.org/

Table 1. Treatment options based on patient population with COVID-19

Outpatient	Consider clinical trial enrollment. For available clinical trials, visit the ITHS website: https://www.iths.org/iths-covid-19-research-resources/current-covid-19-research/
COVID-19 positive hospitalized patient without radiographic evidence of COVID-19 pneumonia and not requiring supplemental oxygen	Recommend against use of Remdesivir use link to request https://redcap.link/remdesivirEUA_UW Recommend against use of Dexamethasone due to concern for harm.
Lower Respiratory Tract infection (LRTI), defined as SpO2 < 94% or requiring supplemental oxygen but not mechanically ventilated	Recommend IV Remdesivir; use link to request https://redcap.link/remdesivirEUA_UW Recommend Dexamethasone 6mg daily for up to 10 days; discontinue at discharge. Consider clinical trial enrollment. UWMC/NWH/HMC: Ruxolitinib (RUX-COVID) actucovidstudies@uw.edu; study pager 206-314-8777 or after hours page through operator "ACTU COVID Studies" The NIH and IDSA Guidelines do not recommend for or against Convalescent Plasma. If desired, convalescent plasma (CP) is available thru transfusion services: use COVID-19 Convalescent Plasma orderset in ORCA To order at Northwest, use transfusion medicine orderset in Soarian.
LRTI with mechanical ventilation	Recommend Dexamethasone 6mg daily for up to 10 days; discontinue at discharge. Consider IV Remdesivir; Use link to request: https://redcap.link/remdesivirEUA_UW The NIH and IDSA Guidelines do not recommend for or against Convalescent Plasma. If desired, convalescent plasma (CP) is available thru transfusion services: use COVID-19 Convalescent Plasma orderset in ORCA To order at Northwest, use transfusion medicine orderset in Soarian.
Pregnant patients with LRTI	Recommend IV Remdesivir:_https://redcap.link/remdesivirEUA_UW Consider dexamethasone: Contact Maternal-Fetal Medicine to consider whether dexamethasone is appropriate and whether dose adjustment is indicated for fetal lung maturity.