Immunizing Vulnerable Children:
Special Patients and their Special Plans

ORANGE COUNTY IMMUNIZATION COALITION
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Marc Lerner, M.D.; Clinical Professor of Pediatrics

Objectives:

- Participants will be able to identify resources that can inform vaccine decisions in special populations
- Participants will utilize an audience response format to simulate and gain feedback on immunization decisions for children with chronic health conditions
- Participants will be able to identify the management of immunizations for children with immunologically compromised parent

The Three Components Defining a Chronic Condition:

- Diagnosis made on the basis of medical knowledge
- Not currently curable
- Duration
  - Has been present for at least the past year
  - Has been present for at least 3 months
  - Has occurred at least three times in the past year and will likely recur.

Underlying conditions	Effectiveness, %[a]	95% CI
Effectiveness confirmed		
Anatomic asplenia	77	14–95
COPD or asthma[b]	65	26–83
Congestive heart failure	69	17–88
Coronary vascular disease	73	23–90
Diabetes mellitus	84	50–95
Effectiveness not confirmed		
Alcoholism or cirrhosis	<0	−1093 to 61
Chronic renal failure	27	−152 to 78
Hodgkin's disease	11	−505 to 89
Immunoglobulin deficiency	59	−239 to 95
Leukemia	<0	−634 to 72
Multiple myeloma	<0	−550 to 78
Non-Hodgkin's lymphoma	64	−58 to 92
Sickle cell disease	11	−545 to 88

NOTE. COPD, chronic obstructive pulmonary disease.

[a] Vaccine effectiveness in indirect cohort analyses is calculated by comparing the proportion of invasive disease cases caused by serotypes included in the vaccine among vaccinated and unvaccinated people. No data are available for patients with HIV infection or who take immunosuppressive therapy. Adapted from [72].

[b] Asthma is no longer an Advisory Committee on Immunization Practices indication for pneumococcal polysaccharide vaccine.

From: Rethinking Recommendations for Use of Pneumococcal Vaccines in Adults
Clin Infect Dis. 2001;33(5):662-675. doi:10.1086/322676

Immunization Recommendations: 'The Footnotes'

- <15 months: MMR, Meningococcal ACWY
- 18 month – 18 years: MenACWY, MenB, Hep A, Hib, HPV, PCV13, PPSV23
- Adult: HPV-Male; PCV13, PPSV23, HepA, HepB, MenACWY, MenB, Hib

https://redbook.solutions.aap.org/SS/Immunization_Schedules.aspx

Figure 2. Recommended immunization schedule for adults aged 19 years or older by medical condition and other indications, United States, 2018

This figure should be reviewed with the accompanying footnotes. This figure and the footnotes describe indications for which vaccines, if not previously administered, should be administered unless noted otherwise.

Vaccine	Pregnancy[1-6]	Immuno-compromised (excluding HIV infection)[3-7,11]	HIV infection CD4+ count (cells/µL)[3-7,9-10]		Asplenia, complement deficiencies[7,10,11]	End-stage renal disease, on hemodialysis[7,9]	Heart or lung disease, alcoholism[7]	Chronic liver disease[7-9]	Diabetes[7,9]	Health care personnel[3,4,9]	Men who have sex with men[6,8,9]
			<200	≥200							
Influenza[1]	1 dose annually										
Tdap[2] or Td[2]	1 dose Tdap each pregnancy	1 dose Tdap, then Td booster every 10 yrs									
MMR[3]	contraindicated			1 or 2 doses depending on indication							
VAR[4]	contraindicated			2 doses							
RZV[5] (preferred)					2 doses RZV at age ≥50 yrs (preferred)						
or					or						
ZVL[5]	contraindicated				1 dose ZVL at age ≥60 yrs						
HPV–Female[6]		3 doses through age 26 yrs			2 or 3 doses through age 26 yrs						
HPV–Male[6]		3 doses through age 26 yrs			2 or 3 doses through age 21 yrs						2 or 3 doses through age 26 yrs
PCV13[7]		1 dose									
PPSV23[7]		1, 2, or 3 doses depending on indication									
HepA[8]	2 or 3 doses depending on vaccine										

Special populations: HepB or HepA-HepB For Adults

- Chronic liver disease (e.g., hepatitis C infection, cirrhosis, fatty liver disease, alcoholic liver disease, autoimmune hepatitis, alanine aminotransferase [ALT] or aspartate aminotransferase [AST] level greater than twice the upper limit of normal)
- HIV infection
- Percutaneous or mucosal risk of exposure to blood (e.g., household contacts of hepatitis B surface antigen [HBsAg]-positive persons; adults younger than age 60 years with diabetes mellitus or aged 60 years or older with diabetes mellitus based on individual clinical decision; adults in predialysis care or receiving hemodialysis or peritoneal dialysis; recent or current injection drug users; health care and public safety workers at risk for exposure to blood or blood-contaminated body fluids)
- Sexual exposure risk (e.g., sex partners of HBsAg-positive persons; sexually active persons not in a mutually monogamous relationship; persons seeking evaluation or treatment for a sexually transmitted infection; and men who have sex with men [MSM])
- Receive care in settings where a high proportion of adults have risks for hepatitis B infection (e.g., facilities providing sexually transmitted disease treatment, drug-abuse treatment and prevention services, hemodialysis and end-stage renal disease programs, institutions for developmentally disabled persons, health care settings targeting services to injection drug users or MSM, HIV testing and treatment facilities, and correctional facilities)
- Travel to countries with high or intermediate hepatitis B endemicity

Special populations: HiB

- Administer Haemophilus influenzae type b vaccine (Hib) to adults with the following indications:
- Anatomical or functional asplenia (including sickle cell disease) or undergoing elective splenectomy: Administer 1 dose if not previously vaccinated (preferably at least 14 days before elective splenectomy)
- Hematopoietic stem cell transplant (HSCT): Administer 3-dose series with doses 4 weeks apart starting 6 to 12 months after successful transplant regardless of Hib vaccination history

https://redbook.solutions.aap.org/SS/Immunization_Schedules.aspx

Immunizing the Immunocompromised Patient

- General principles were established by the Infectious Disease Society of America (ISDA) in consultation with the AAP, CDC, and others.
- Separates conditions into those commonly creating high level and low level immunosuppression
- Subspecialists sharing patients with PCPs share responsibility for decisions for recommending appropriate vaccinations for the patient AND their family members

www.idsociety.org/Templates/Content.aspx?id+32212256011

Immunizing a Boy with Moderate Asthma

- Alex is a 7-year-old boy who recently presented for an annual exam. Recently he has been ill with cough and trouble breathing typical of his usual asthma exacerbation. His last episode began 4 days ago and was accompanied by a runny nose and a low-grade fever without any other symptoms. His mother treating him with nebulized albuterol every 4 hours, and he was placed on 20 mg of Prednisone BID by the physicians at the ED. He is now afebrile and breathing easily.
- Past Medical History:
  - Asthma since infancy, with multiple prior hospitalizations
  - Eczema and environmental allergies
- Family Hx: Multiple family members also have asthma
- Social history: He is in second grade but has missed at least 10 days of school this year due to his asthma.
- Current medications: prn albuterol, daily cromolyn.
- Immunizations: Up to date, except for influenza this year and missing one MMR

Which Immunizations Can You Provide Alex?

- POLLEVERYWHERE

Immunosuppression and Vaccine Timing

- Immunosuppressive steroid dose is considered to be 2 or more weeks of daily receipt of 20 mg prednisone or equivalent
- Vaccination should be deferred for at least 1 month after discontinuation of such therapy
- Providers should consult ACIP recommendations for complete information on the use of specific live vaccines among persons on immune-suppressing medications or with immune suppression because of other reasons.

http://www.immunize.org/catg.d/p3072a.pdf

Effect of Prednisone on Response to TIV in Asthmatic Children

- Prospective cohort study to assess the immunogenicity of TIV when given to children receiving a burst of prednisone
- Setting Outpatient pediatric clinic of a military medical center.
- Patients: Children aged 6 months to 18 years requiring the 1996 influenza virus vaccine were eligible for the study. N = 58
- The prednisone group included 21 children vaccinated at the beginning of a course of prednisone prescribed to treat an asthma exacerbation. 31 control subjects (84%) and 19 patients in the prednisone group (90%) completed the study.
- Interventions All study patients underwent immunization with the 1996-1997 TIV. The prednisone cohort received a burst of oral prednisone therapy (2 mg/kg per day for 5 days).
- Results: There were also no significant differences between groups in the mean changes in geometric titers to any of the 3 antigens.
- Conclusion: Prednisone bursts did not diminish the response of asthmatic children to the 1996 influenza virus vaccine, compared with controls. Children can be effectively vaccinated against influenza virus while they are receiving prednisone therapy bursts for asthmatic exacerbations.

https://jamanetwork.com/journals/jamapediatrics/fullarticle/190142

Which Immunizations Can You Provide Alex?

- Answer: D

MMR and TIV

Patients Should Not Get or Postpone Their MMR If He/She:

- Has any severe, life-threatening allergies. A person who has ever had a life-threatening allergic reaction after a dose of MMR vaccine, or has a severe allergy to any part of this vaccine, may be advised not to be vaccinated.
- Is pregnant, or thinks she might be pregnant. Pregnant women should wait to get MMR vaccine until after they are no longer pregnant. Women should avoid getting pregnant for at least 1 month after getting MMR vaccine.
- Has a weakened immune system due to disease (such as cancer or HIV/AIDS) or medical treatments (such as radiation, immunotherapy, steroids, or chemotherapy).
- Has a parent, brother, or sister with a history of immune system problems.
- Has ever had a condition that makes them bruise or bleed easily.
- Has recently had a blood transfusion or received other blood products. You might be advised to postpone MMR vaccination for 3 months or more.
- Has tuberculosis.
- Has gotten any other vaccines in the past 4 weeks. Live vaccines given too close together might not work as well.
- Is not feeling well. A mild illness, such as a cold, is usually not a reason to postpone a vaccination. Someone who is moderately or severely ill should probably wait.

https://www.cdc.gov/vaccines/vpd/should-not-vacc.html#mmr

Immunizing Julio:

- Julio, aged 5 years, 2 month is being seen for a routine WCC following treatment for Acute T cell Lymphocytic Leukemia

- PMH: Diagnosed with ALL at 3 years of age. He is in a good prognostic group and finished chemotherapy regiment last month and is being followed every 2 months by the oncologists. No other medical problems.
- Hospitalizations: Multiple for ALL therapy and complications (neutropenia x 2, Broviac catheter infection x 1, pneumonia x 1)
- Medications: None now. Allergies: Amoxicillin

- Family Hx: Siblings aged 18 months and 4 months of age both in good health. Paternal Uncle with HIV

- Social Hx: Lives with parents, 2 sibs. He started KG this year.
- PE: Normal vitals, Broviac scar and 2 CM liver below R costal margin

- Immunization history: Fully up to date through 26 months except no influenza vaccinations. No vaccinations since that time.

Immunization History

Age 0 months, 1 day
Hep B, dose 1

Age 2 months, 6 days
DTaP, dose1
IPV, dose1
PCV7, dose 1
Hib, dose 1
Hep B, dose 2

Age 4 months, 9 days
DTaP, dose 2
IPV, dose 2
PCV7, dose 2
Hib, dose 2

Age 6 months, 12 days
DTaP, dose 3
IPV, dose 3
PCV7, dose 3
Hib, dose 3
Hep B, dose 3

Age 12 months, 5 days
DTaP, dose 4
PCV7, dose 4
Hib, dose 4
MMR, dose 1
Varicella, dose 1
Hep A, dose 1

Age 26 months, 20 days
Hep A, dose 2

Julio

Age 5 years, 2 months

Polleverywhere:

- Text messaging for this presentation:

- Send the text MARCLERNER535 to the ‘phone number’ 37607 to join the session
- Once you have joined, send your text answers by texting appropriate answer: A; B; C; etc.

Immunizing Julio:

- Julio’s mom want him to get any vaccines that he missed but is concerned about safety. You recommend:

POLLEVERYWHERE

Immunizing Julio:

- Julio's mom want him to get any vaccines that he missed but is concerned about safety. You recommend:

ANSWER: D

It is safe for Julio to receive inactivated vaccinations now although they may not work well. He needs to wait 3 months after chemotherapy to receive any live virus vaccines.

Should Julio have Vaccines Re-administered?

- True or False?

Vaccines given to patients while they are receiving chemotherapy should be re-administered when the period of altered immunocompetence is over

POLLEVERYWHERE

Should Julio have Vaccines Re-administered?

Vaccines given to patients while they are receiving chemotherapy should be re-administered when the period of altered immunocompetence is over?

- True

Can Julio Return to School Now?

- Should Julio stay at home and limit visitors now or return to school?

POLLEVERYWHERE

Can Julio Return to School Now?

Correct Answer: E

Julio will be protected through herd immunity and may return to school.

Family and friends should strive to be fully immunized.

Immunizing Julio's Younger Brother

- This child's younger sibling did not get live virus vaccines. What is your advice for the sibling?

POLLEVERYWHERE

Immunizing Julio's Younger Brother

- This child's younger sibling did not get live virus vaccines. What is your advice for the sibling?

Correct answer: A

There was no need to hold vaccines for the sib.

Can This Parent Be Immunized?

- Patient: Sara, Age 43 years

- 3 months post op L Mastectomy F/U visit.
- No complaints, feels stronger
- Stage II breast CA removed three months ago, now undergoing radiation therapy.

- PMH:
  - Pregnancies: One NSVD at term 4 years ago.
  - Active lifestyle
- FHx positive for mother with breast CA.

- PE: V/S normal and recovering, healing incision. Otherwise normal

Can This Parent Be Immunized? (continued)

- Hx: Varicella at age 6

- Past vaccinations:
- DTP/OPV at ages 2,4,6, 15 months and 5 years
- MMR at 18 months

Vaccinating Sara Now

- POLLEVERYWHERE

Vaccinating Sara:

- What vaccines would you order for Sara based on her vaccination record?

ANSWER: B

TIV

Re: Tdap Wait 3 months after she finishes her Radiation Tx

Vaccinating a Parent after Cancer Treatment

(Should Sara have live attenuated vaccinations (MMR booster) and/or inactivated vaccinations (Tdap)?)

- Answer: It is ok for Sara to have her inactivated vaccines on the usual schedule

- Note: Immunization during radiation therapy should be avoided until 3 months after radiation therapy has been completed.

- Why: Concerns about reduced effectiveness of vaccine.

Catch Up Immunizations for Sara's Child

- When Sara's child was 4 he did not get his second MMR / varicella due to her illness. She asks her child's provider if he can get his live vaccines now.
- What advice would you give?

(POLLEVERYWHERE)

Answer: A

- It is recommended that family members be immunized with MMR/Varicella on schedule when there is an immunosuppressed household member

- The risk of transmission of vaccine strains is extremely low

General Recommendations for Persons with Altered Immunzations (CDC)

Which of the follow types of vaccines should be given to immunosuppressed individuals?

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- Cases developed through a cooperative agreement with the CDC, he AAP-CA Foundation, California Academy of Family Physicians, UCSD, Stanford University and expert consultants based at UCD and Los Angeles Children's Hospital

General Recommendations for Persons with Altered Immunity (CDC)

Which of the follow types of vaccines should be given to immunosuppressed individuals?

- Answer: E

TIV and polysaccharide vaccines

(PCV, PPV, MCV4, MPSV and Hib vaccine)

- Cases developed through a cooperative agreement with the CDC, he AAP-CA Foundation, California Academy of Family Physicians, UCSD, Stanford University and expert consultants based at UCD and Los Angeles Children's Hospital

Can a MMR Recipient Shed Virus to an Immunosuppressed Family Member?

- Since MMR is a live virus vaccination, a vaccine recipient could shed virus and infect another person. This is a concern for a household with an immunosuppressed individual.

- True

- False

POLLEVERYWHERE

Can a MMR Recipient Shed Virus to an Immunosuppressed Family Member?

- ANSWER:

- True

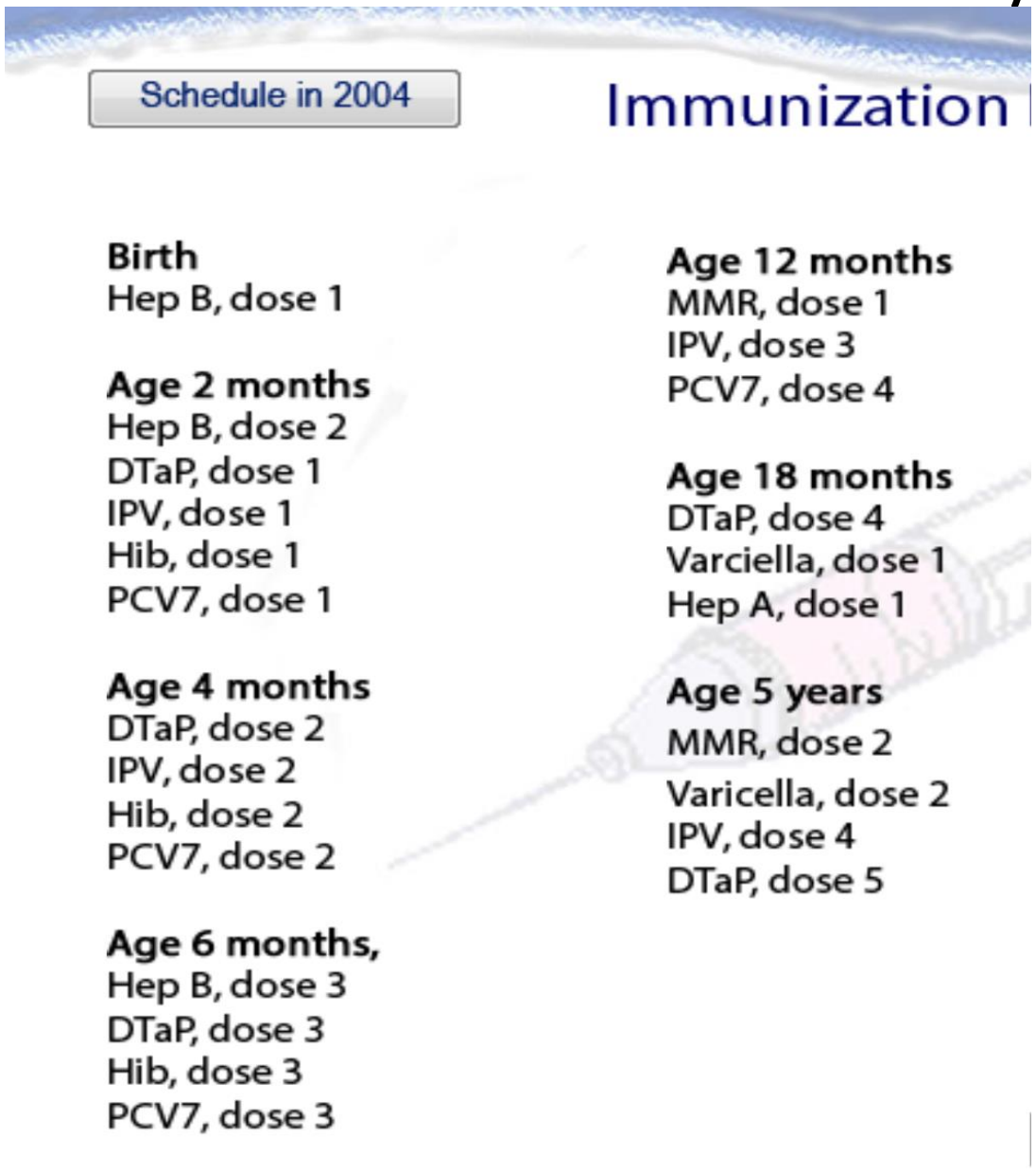
Immunizing Baby Girl Garcia

- Hepatitis B vaccination should be deferred for preterm infants and infants weighing less than 2000 g if the mother is documented to be hepatitis B surface antigen (HBsAg)-negative at the time of the infant's birth. Vaccination can commence at chronological age 1 month or at hospital discharge
- For infants born to women who are HBsAg-positive, hepatitis B immunoglobulin and hepatitis B vaccine should be administered within 12 hours of birth, regardless of weight

Should Nick Be Vaccinated?

- CC: Seen for Middle School Physical
- PMH: Febrile Seizures, mild LD
- Medications: None
- Allergy: Amoxicillin
- Growth and Development: Delayed reading proficiency
- Family Hx: Ovarian CA for maternal aunt
- Social Hx: Lives with 9 YO sister and parents

Nick's Immunization History:



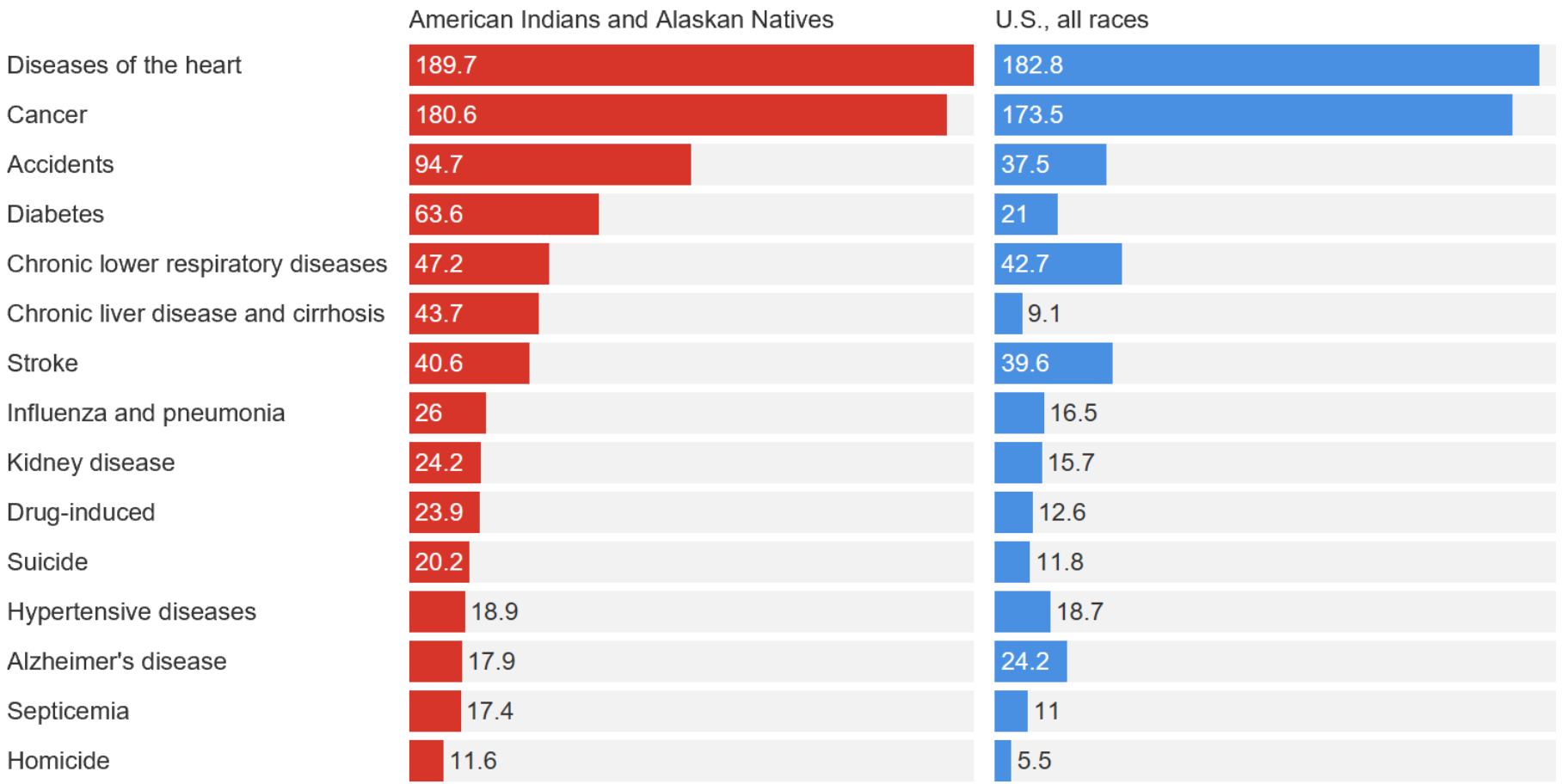
- Seizures
- Metabolic disorders
- Premies
- Autism
- Autoimmune disorders
- Genetics
- Adolescent self determination
- Native
- Health personnel
- Teens / pharmacy
- Chronic diseases

- Page 72

American Indians and Alaskan Natives

Deaths per 100,000 people

American Indians and Alaskan Natives are at greater risk than the general U.S. population of dying from cancer, accidents, diabetes, homicide or suicide.



Data for U.S. population as of 2009. Data for American Indians and Alaskan Natives as of 2008-2010.

Chart: The Conversation, CC-BY-ND • Source: Indian Health Service

Immunizing American Indians/Alaska Natives

- In 2016, American Indian/Alaska Native children received the recommended doses of vaccines for measles, mumps, rubella, Hib, polio, and chicken pox at the same rate as non-Hispanic White children.
- American Indian/Alaska Native adults aged 18 years and over 10 percent less likely as their non-Hispanic white counterparts to have received the influenza (flu) shot in the past 12 months.
- American Indian/Alaska Native adolescent females were 10 percent more likely to receive an HPV vaccine in 2017, as compared to non-Hispanic whites.

Who Should NOT Get Vaccinated with these Vaccines?

- Adenovirus
- Anthrax
- Cholera
- DTaP
- Hep B
- Hib
- HPV
- Influenza
- JE Ixiaro
- MMR
- MMRV
- Meningococcal
- Serogroup B Meningococcal (MenB)
- PCV13
- PPSV23
- Polio
- Rabies
- Rotavirus
- Smallpox
- Td
- Tdap
- Typhoid
- Varicella (chickenpox)
- Yellow Fever
- Live Zoster (Shingles) Vaccine, ZVL
- Recombinant Zoster (Shingles) Vaccine, RZV

https://www.cdc.gov/vaccines/vpd/should-not-vacc.html

Contraindications to Varicella Vaccination

- Severe allergic reaction (e.g., anaphylaxis) after a previous dose or to a vaccine component
- Severe immunodeficiency (e.g., hematologic and solid tumors, chemotherapy, congenital immunodeficiency or long-term immunosuppressive therapy)
- Persons with HIV infection who are severely immunocompromised
- Family history of congenital or hereditary immunodeficiency in first-degree relatives (e.g., parents and siblings), unless the immune competence of the potential vaccine recipient has been substantiated clinically or verified by a laboratory test
- Pregnancy
- Family history of congenital or hereditary immunodeficiency in first-degree relatives (e.g., parents and siblings), unless the immune competence of the potential vaccine recipient has been substantiated clinically or verified by a laboratory test

www.cdc.gov/vaccines/hcp/acip-recs/general-recs/index.html

Vaccinating Children with HIV

- HIV-infected children 5 years of age or younger should receive measles vaccine if CDT+ T-lymphocyte percentages are greater than or equal to 15% for greater than or equal to 6 months.
- HIV-infected children older than 5 years must have CD4+ percentages greater than or equal to 15 and CD4+ T-lymphocyte counts greater than or equal to 200 lymphocytes/cubic mm for 6 months or longer.
- In cases where only counts or only percentages are available for children older than 5 years, use the data that are available
- In cases where percentages are not available for children 5 years of younger, use counts based on the age-specific counts at the time the counts were measured (see HIVinfected children younger than 8 years may receive varicella vaccine if CD4+ T-lymphocyte percentages are 15% or greater.
- HIV-infected children 8 years or older may receive varicella vaccine if CD4+ T-lymphocyte count is greater than 200 cells/cubic mm

www.cdc.gov/vaccines/hcp/acip-recs/index.html

Resources:

- General Recommendations on Immunization: Recommendations of the Advisory Committee on Immunization Practices (ACIP)

https://www.cdc.gov/mmwr/preview/mmwrhtml/rr6002a1.htm?s_cid=rr6002a1_e