Vaccination 101

Mary Conant-Cantor BSN, RN
Nurse Manager
Massachusetts Dept Of Public Health
Immunization Program

Presenter Disclosure Information
Mary Conant-Cantor BSN, RN

Consultant	No relevant conflicts of interest to declare or relevant conflict
Grant Research/Support	No relevant conflicts of interest to declare or relevant conflict
Speaker's Bureau	No relevant conflicts of interest to declare or relevant conflict
Major Stockholder	No relevant conflicts of interest to declare or relevant conflict
Other Financial or Material Interest	No relevant conflicts of interest to declare or relevant conflict
Off Label Use of Vaccines	Will be discussed, but in accordance with current ACIP recommendations

Outline

- Principles of vaccination
- Types of vaccines
- Screening prior to vaccination
- Contraindications and Precautions to vaccination
- Vaccine Information Statements (VIS)
- Vaccine administration documentation requirements
- Vaccine adverse events and medical error reporting

Principles of Vaccination

Active Immunity

- Protection produced by the person's own immune system
- Occurs due to natural exposure to antigen or by vaccination
- Usually permanent

Passive Immunity

- Protection transferred from another person or animal
- Temporary protection that wanes with time

Principles of Vaccination

Antigen

- A live or inactivated substance (e.g., protein, polysaccharide) capable of producing an immune response

Antibody

- Protein molecules (immuno-globulin) produced by B lymphocytes to help eliminate an antigen

Classification of Vaccines

- Live attenuated
  - viral
  - bacterial
- Inactivated

Your Opinion Counts!

A health care provider recommendation and offer is the single most important determinant of whether or not someone gets vaccinated.

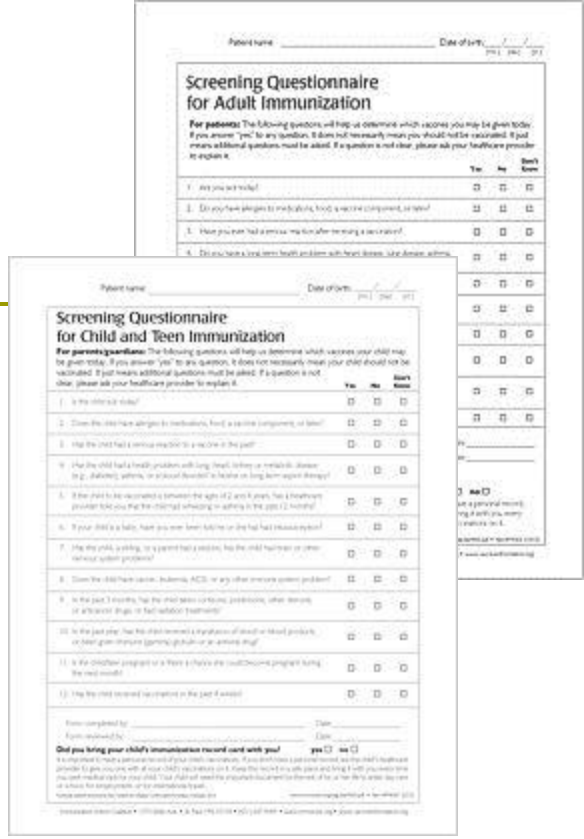
Screening Questions

- Is the child (or are you) sick today?
- Does the child have an allergy to any medications, food, or any vaccine?
- Has the child had a serious reaction to a vaccine in the past?
- Has the child had a seizure, brain or nerve problem?
- Does the child have cancer, leukemia, AIDS, or any other immune system problem?

Screening Questions, con't

- Has the child taken cortisone, prednisone, other steroids, or anticancer drugs, or had x-ray treatments in the past 3 months?
- Has the child received a transfusion of blood or blood products, or been given a medicine called immune (gamma) globulin in the past year?
- Is the child/teen pregnant or is there a chance she could become pregnant during the next month?
- Has the child received vaccinations in the past 4 weeks?

Screening Forms



- Available from:
  - Immunize.org
- Screening Forms
  - Adult Immunizations
  - Child and Teen Immunizations
  - TIV and LAIV Seasonal Influenza

www.immunize.org/handouts/screening-vaccines.asp

Contraindication and Precautions

- Contraindication
  - A condition in a recipient that greatly increases the chance of a serious adverse reaction
- Precaution
  - A condition in a recipient that might increase the chance or severity of an adverse reaction, or
  - Might compromise the ability of the vaccine to produce immunity

Contraindications & Precautions

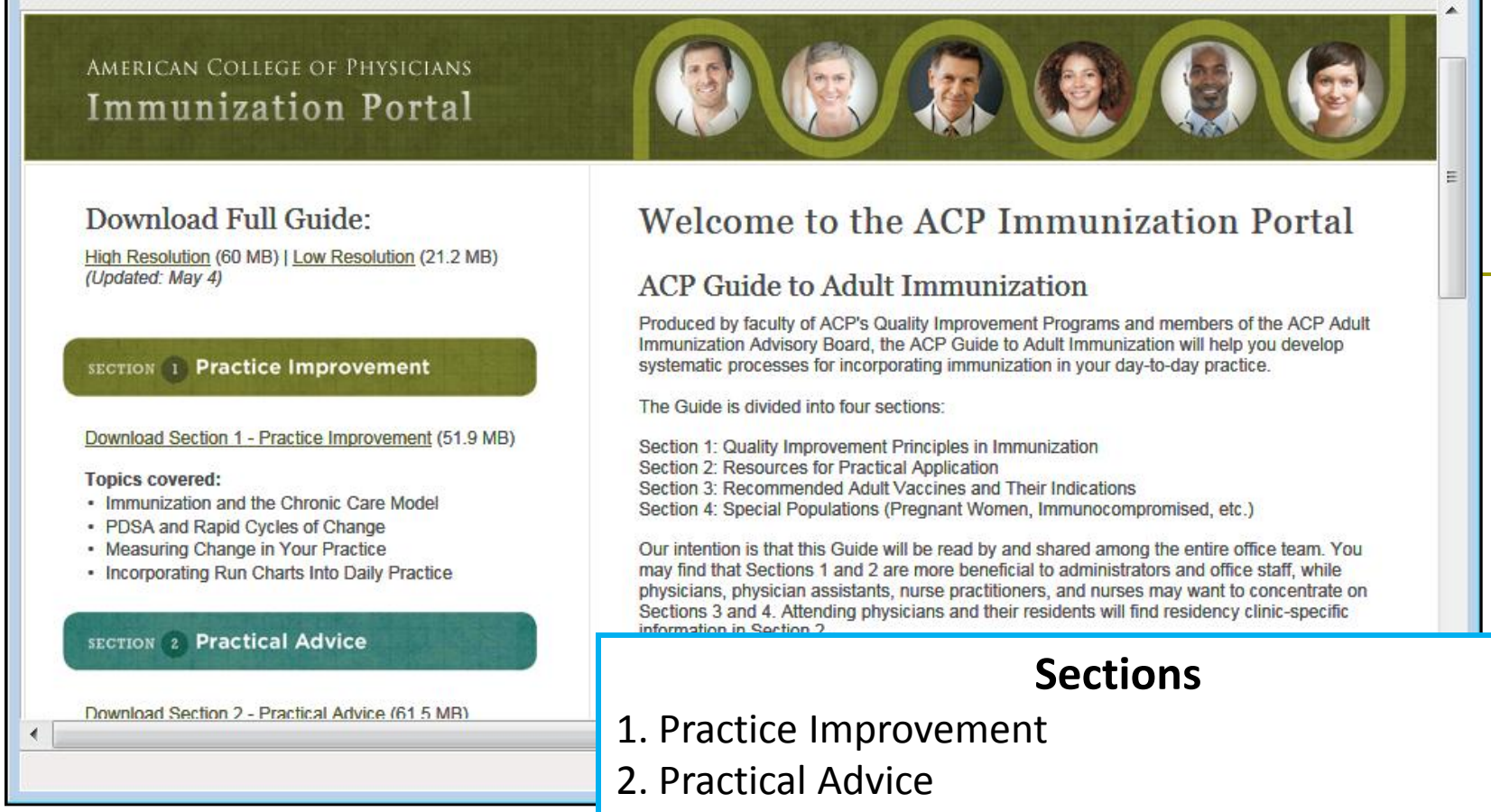
Summary Table published annually by CDC with US adult schedule in MMWR. (CDC. MMWR 2013; Vol.62, No.1.)

TABLE. Contraindications and precautions to commonly used vaccines in adults[1*†]

Vaccine	Contraindications	Precautions
Influenza, inactivated vaccine (IIV)	Severe allergic reaction (e.g., anaphylaxis) after previous dose of any influenza vaccine or to a vaccine component, including egg protein.	Moderate or severe acute illness with or without fever. History of Guillain-Barré Syndrome (GBS) within 6 weeks of previous influenza vaccination. Persons who experience only hives with exposure to eggs should receive IIV with additional safety precautions.[2]
Influenza, live attenuated (LAIV)[3]	Severe allergic reaction (e.g., anaphylaxis) after previous dose of any influenza vaccine or to a vaccine component, including egg protein. Conditions for which the Advisory Committee on Immunization Practices (ACIP) recommends against use, but which are not contraindications in vaccine package insert: immune suppression, certain chronic medical conditions such as asthma, diabetes, heart or kidney disease, and pregnancy.[4]	Moderate or severe acute illness with or without fever. History of GBS within 6 weeks of previous influenza vaccination. Receipt of specific antivirals (i.e., amantadine, rimantadine, zanamivir, or oseltamivir) 48 hours before vaccination. Avoid use of these antiviral drugs for 14 days after vaccination.
Tetanus, diphtheria, pertussis (Tdap); tetanus, diphtheria (Td)	Severe allergic reaction (e.g., anaphylaxis) after a previous dose or to a vaccine component. For pertussis-containing vaccines: encephalopathy (e.g., coma, decreased level of consciousness, or prolonged seizures) not attributable to another identifiable cause within 7 days of administration of a previous dose of Tdap or diphtheria and tetanus toxoids and pertussis (DTP) or diphtheria and tetanus toxoids and acellular pertussis (DTaP) vaccine.	Moderate or severe acute illness with or without fever. GBS within 6 weeks after a previous dose of tetanus toxoid–containing vaccine. History of arthus-type hypersensitivity reactions after a previous dose of tetanus or diphtheria toxoid–containing vaccine; defer vaccination until at least 10 years have elapsed since the last tetanus toxoid-containing vaccine. For pertussis-containing vaccines: progressive or unstable neurologic disorder, uncontrolled seizures, or progressive encephalopathy until a treatment regimen has been established and the condition has stabilized.
Varicella[2]	Severe allergic reaction (e.g., anaphylaxis) after a previous dose or to a vaccine component. Known severe immunodeficiency (e.g., from hematologic and solid tumors, receipt of chemotherapy, congenital immunodeficiency, or long-term immunosuppressive therapy[5] or patients with human immunodeficiency virus (HIV) infection who are severely immunocompromised). Pregnancy.	Recent (within 11 months) receipt of antibody-containing blood product (specific interval depends on product).[6,7] Moderate or severe acute illness with or without fever. Receipt of specific antivirals (i.e., acyclovir, famciclovir, or valacyclovir) 24 hours before vaccination; avoid use of these antiviral drugs for 14 days after vaccination.
Human papillomavirus (HPV)	Severe allergic reaction (e.g., anaphylaxis) after a previous dose or to a vaccine component.	Moderate or severe acute illness with or without fever. Pregnancy.
Zoster	Severe allergic reaction (e.g., anaphylaxis) to a vaccine component. Known severe immunodeficiency (e.g., from hematologic and solid tumors, receipt of chemotherapy, or long-term immunosuppressive therapy[5] or patients with HIV infection who are severely immunocompromised). Pregnancy.	Moderate or severe acute illness with or without fever. Receipt of specific antivirals (i.e., acyclovir, famciclovir, or valacyclovir) 24 hours before vaccination; avoid use of these antiviral drugs for 14 days after vaccination.
Measles, mumps, rubella (MMR)[3]	Severe allergic reaction (e.g., anaphylaxis) after a previous dose or to a vaccine component. Known severe immunodeficiency (e.g., from hematologic and solid tumors, receipt of chemotherapy, congenital immunodeficiency, or long-term immunosuppressive therapy[5] or patients with HIV infection who are severely immunocompromised). Pregnancy.	Moderate or severe acute illness with or without fever. Recent (within 11 months) receipt of antibody-containing blood product (specific interval depends on product).[6,7] History of thrombocytopenia or thrombocytopenic purpura. Need for tuberculin skin testing.[8]

See footnotes on page 18.

http://www.cdc.gov/vaccines/schedules/downloads/child/mmwr-0-18yrs-catchup-schedule.pdf



American College of Physicians
Guide to Adult Immunizations

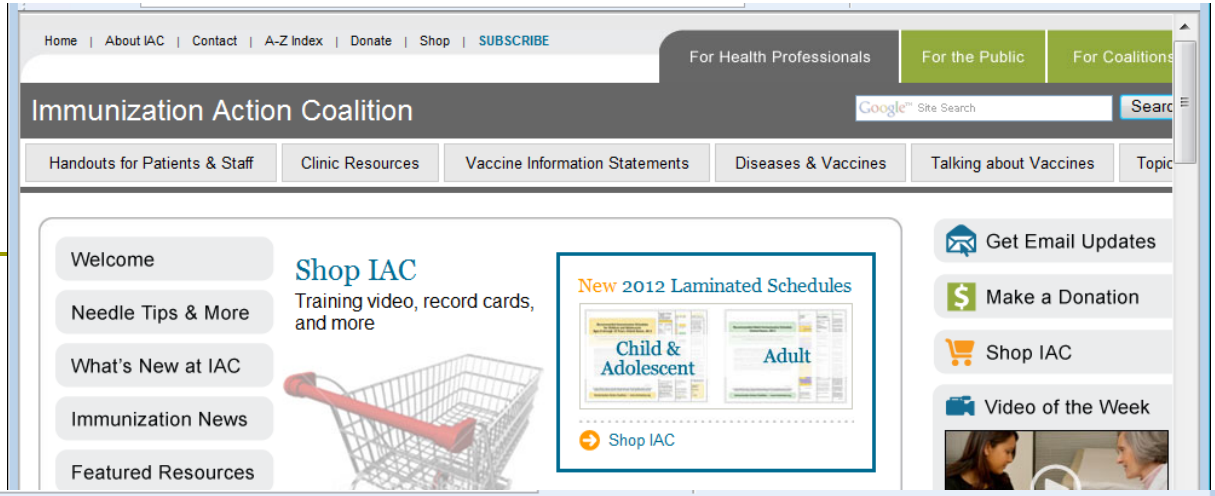
http://immunization.acponline.org/

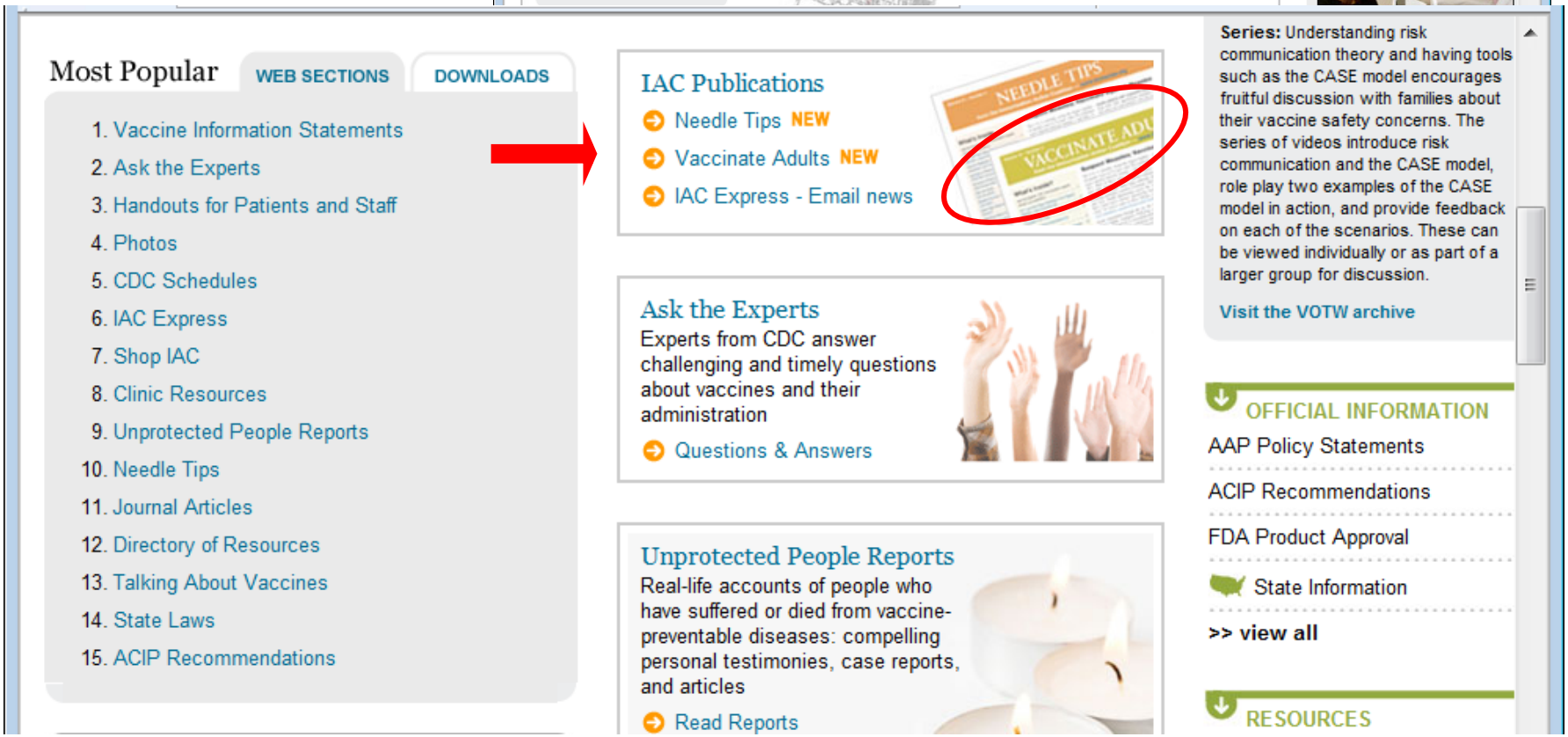
Sections

1. Practice Improvement
2. Practical Advice
3. Vaccines and Their Indications
4. Special Populations
   - Women who are Pregnant or Breastfeeding
   - Immunocompromised Persons
   - Patients with Anatomical or Functional Asplenia
   - Childhood Catch-up
   - Health Care Workers (HCWs)

Immunization Action Coalition

www.immunize.org

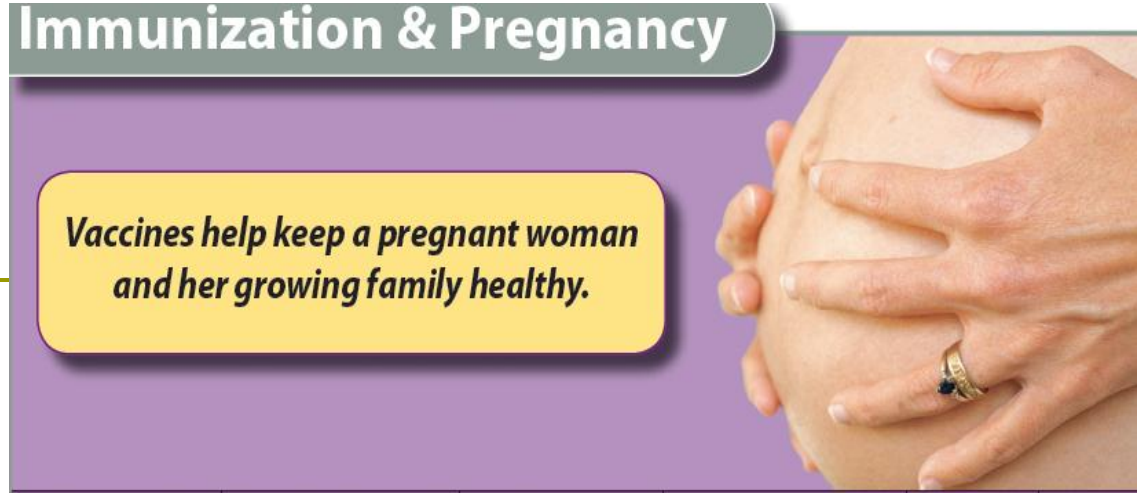




Vaccination of Pregnant Women

- Live vaccines should not be administered to women known to be pregnant
- In general inactivated vaccines may be administered to pregnant women for whom they are indicated
- HPV vaccine should be deferred during pregnancy

CDC Guidelines for Vaccinating Pregnant Women



- Guidelines for vaccination
- Travel and other vaccines
- Breast feeding and vaccination
- Prenatal screening

www.cdc.gov/vaccines/pubs/preg-guide.htm#prenatal

Immunizations and Pregnancy

Vaccine	Before pregnancy	During pregnancy	After pregnancy	Type of Vaccine
Hepatitis A	Yes, if indicated	Yes, if indicated	Yes, if indicated	Inactivated
Hepatitis B	Yes, if indicated	Yes, if indicated	Yes, if indicated	Inactivated
Human Papillomavirus (HPV)	Yes, if indicated, through 26 years of age	No, under study	Yes, if indicated, through 26 years of age	Inactivated
Influenza IIV	Yes	Yes	Yes	Inactivated
Influenza LAIV	Yes, if less than 50 years of age and healthy; avoid conception for 4 weeks	No	Yes, if less than 50 years of age and healthy; avoid conception for 4 weeks	Live
MMR	Yes, if indicated, avoid conception for 4 weeks	No	Yes, if indicated, give immediately postpartum if susceptible to rubella	Live
Meningococcal: • polysaccharide • conjugate	If indicated	If indicated	If indicated	Inactivated Inactivated
Pneumococcal Polysaccharide	If indicated	If indicated	If indicated	Inactivated
Tdap	Yes, if indicated	Yes, vaccinate during each pregnancy ideally between 27 and 36 weeks of gestation	Yes, immediately postpartum, if not received previously	Toxoid/ inactivated
Tetanus/Diphtheria Td	Yes, if indicated	Yes, if indicated, Tdap preferred	Yes, if indicated	Toxoid
Varicella	Yes, if indicated, avoid conception for 4 weeks	No	Yes, if indicated, give immediately postpartum if susceptible	Live

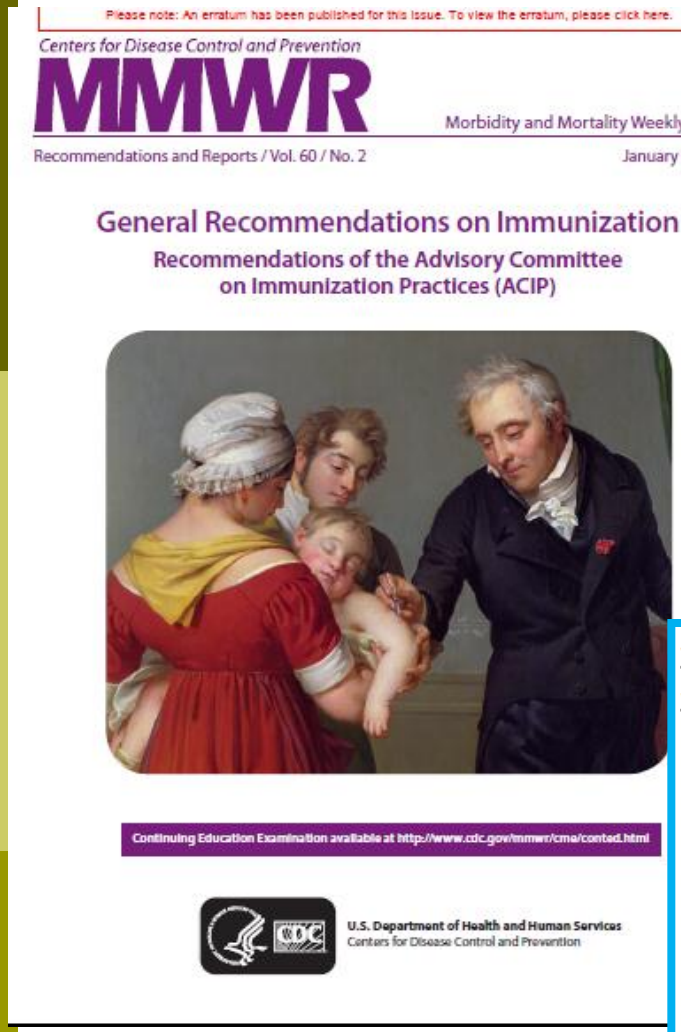
http://www.cdc.gov/vaccines/pubs/downloads/f_preg_chart.pdf

ACOG's Immunization Program

www.ImmunizationForWomen.org

Adult Immunization Conference 2013

ACIP General Recommendations



- Vaccine administration guidelines
- Contraindication and precautions
- Table 1 Recommended and Minimum Ages and Intervals Between Doses and its footnotes

http://www.cdc.gov/mmwr/pdf/rr/rr6002.pdf

TABLE 1. Recommended and minimum ages and intervals between vaccine doses*†

Vaccine and dose number	Recommended age for this dose	Minimum age for this dose	Recommended interval to next dose	Minimum interval to next dose
HepB-1§	Birth	Birth	1–4 months	4 weeks
HepB-2	1–2 months	4 weeks	2–17 months	8 weeks
HepB-3¶	6–18 months	24 weeks	—	—
DTaP-1§	2 months	6 weeks	2 months	4 weeks
DTaP-2	4 months	10 weeks	2 months	4 weeks
DTaP-3	6 months	14 weeks	6–12 months	6 months**,††
DTaP-4	15–18 months	12 months	3 years	6 months**
DTaP-5	4–6 years	4 years	—	—
Hib-1§,§§	2 months	6 weeks	2 months	4 weeks
Hib-2	4 months	10 weeks	2 months	4 weeks
Hib-3¶¶	6 months	14 weeks	6–9 months	8 weeks
Hib-4	12–15 months	12 months	—	—
IPV-1§	2 months	6 weeks	2 months	4 weeks
IPV-2	4 months	10 weeks	2–14 months	4 weeks
IPV-3	6–18 months	14 weeks	3–5 years	6 months
IPV-4***	4–6 years	4 years	—	—
PCV-1§§	2 months	6 weeks	8 weeks	4 weeks
PCV-2	4 months	10 weeks	8 weeks	4 weeks
PCV-3	6 months	14 weeks	6 months	8 weeks

http://www.cdc.gov/vaccines/pubs/pinkbook/downloads/appendices/A/age-interval-table.pdf

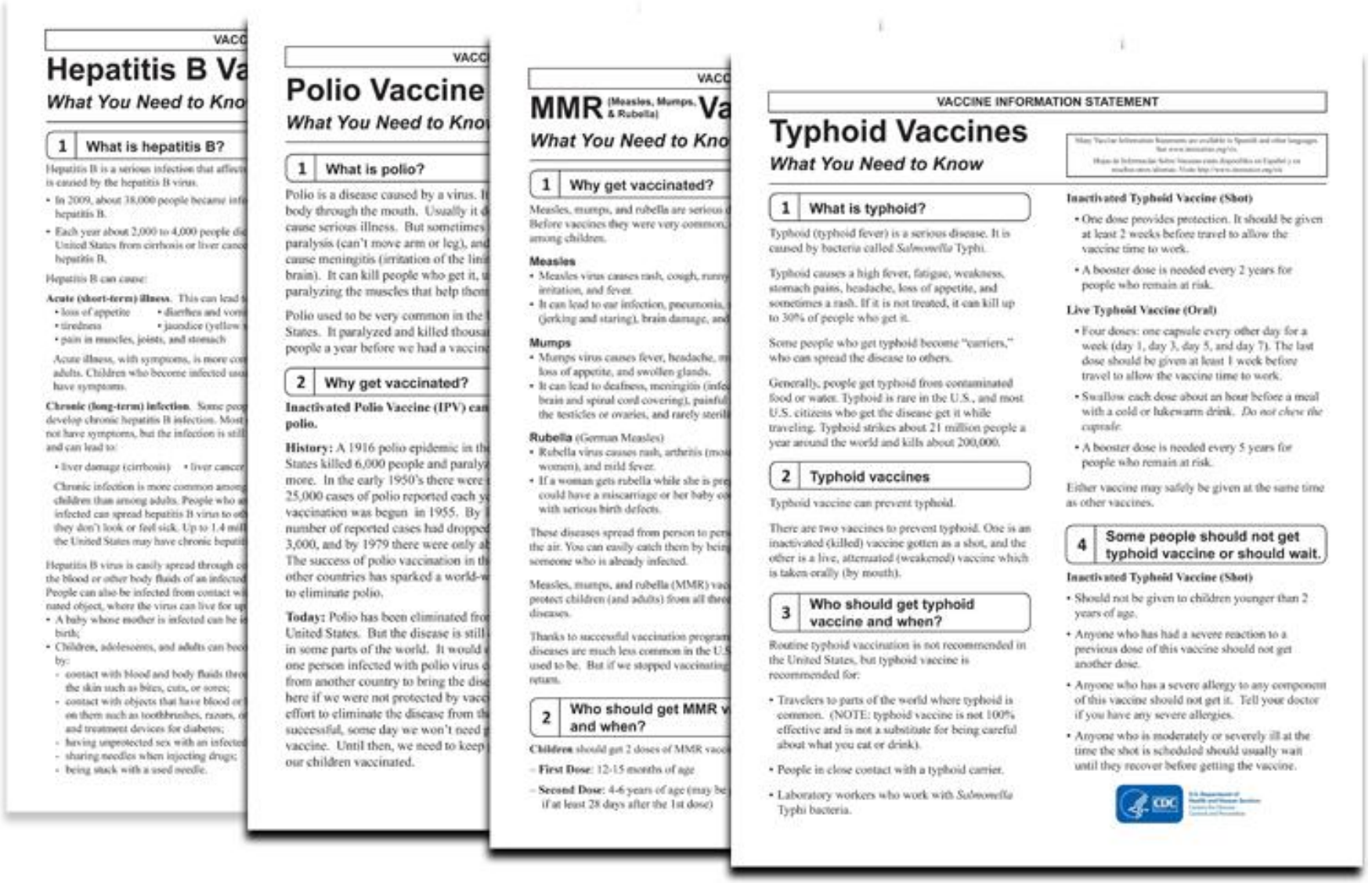
Vaccine Information Statements (VISs)

- VISs requirements
  - benefits
  - risks
  - injury compensation program
- Healthcare provider requirements
  - give VISs before vaccine is administered
  - offer a copy of the VISs to take away
  - applies to every dose of a vaccine series not just the first dose

VISs Webpage

- www.cdc.gov/vaccines/pubs/vis
- downloadable PDF files
- links to RTF files
- links to translations
- link to one-page instruction sheet with essential VISs information titled "Mandatory Instructions for the Use of Vaccine Information Statements"

VISs Updated Format



VACC

Hepatitis B Va

What You Need to Kno

1 What is hepatitis B?

Hepatitis B is a serious infection that affect
is caused by the hepatitis B virus.

- In 2009, about 38,000 people became infe
hepatitis B.
- Each year about 2,000 to 4,000 people die
United States from cirrhosis or liver cance
hepatitis B.

Hepatitis B can cause:

Acute (short-term) illness. This can lead t
- loss of appetite
- diarrhea and vom
- tiredness
- jaundice (yellow
- pain in muscles, joints, and stomach

Acute illness, with symptoms, is more com
adults. Children who become infected usu
have symptoms.

Chronic (long-term) infection. Some peop
develop chronic hepatitis B infection. Most
not have symptoms, but the infection is still
and can lead to:

- liver damage (cirrhosis)
- liver cancer

Chronic infection is more common among
children than among adults. People who a
infected can spread hepatitis B virus to ot
they don't look or feel sick. Up to 1.4 mill
the United States may have chronic hepati

Hepatitis B virus is easily spread through co
the blood or other body fluids of an infected
People can also be infected from contact wi
rated object, where the virus can live for up
- A baby whose mother is infected can be i
birth;
- Children, adolescents, and adults can beco
by:
  - contact with blood and body fluids thro
the skin such as bites, cuts, or sores;
  - contact with objects that have blood or
on them such as toothbrushes, razors, o
and treatment devices for diabetes;
  - having unprotected sex with an infecte
  - sharing needles when injecting drugs;
  - being stuck with a used needle.

VACC

Polio Vaccine

What You Need to Kno

1 What is polio?

Polio is a disease caused by a virus. It
body through the mouth. Usually it d
cause serious illness. But sometimes
paralysis (can't move arm or leg), and
cause meningitis (irritation of the lini
brain). It can kill people who get it, u
paralyzing the muscles that help them

Polio used to be very common in the
States. It paralyzed and killed thousa
people a year before we had a vaccin

2 Why get vaccinated?

Inactivated Polio Vaccine (IPV) can
polio.

History: A 1916 polio epidemic in th
States killed 6,000 people and paraly
more. In the early 1950's there were
25,000 cases of polio reported each y
vaccination was begun in 1955. By
number of reported cases had dropped
3,000, and by 1979 there were only a
The success of polio vaccination in th
other countries has sparked a world-w
to eliminate polio.

Today: Polio has been eliminated fro
United States. But the disease is still
in some parts of the world. It would
one person infected with polio virus
from another country to bring the dis
here if we were not protected by vacc
effort to eliminate the disease from th
successful, some day we won't need
vaccine. Until then, we need to keep
our children vaccinated.

VACC

MMR (Measles, Mumps, & Rubella) **Va**

What You Need to Kno

1 Why get vaccinated?

Measles, mumps, and rubella are serious
Before vaccines they were very common,
among children.

Measles
- Measles virus causes rash, cough, runny
irritation, and fever.
- It can lead to ear infection, pneumonia,
(jerking and staring), brain damage, and

Mumps
- Mumps virus causes fever, headache,
loss of appetite, and swollen glands.
- It can lead to deafness, meningitis (infe
brain and spinal cord covering), painful
the testicles or ovaries, and rarely steril

Rubella (German Measles)
- Rubella virus causes rash, arthritis (mos
women), and mild fever.
- If a woman gets rubella while she is pre
could have a miscarriage or her baby co
with serious birth defects.

These diseases spread from person to pers
the air. You can easily catch them by being
someone who is already infected.

Measles, mumps, and rubella (MMR) vac
protect children (and adults) from all three
diseases.

Thanks to successful vaccination program
diseases are much less common in the U.S
used to be. But if we stopped vaccinating
return.

2 Who should get MMR v and when?

Children should get 2 doses of MMR vacc
- **First Dose**: 12-15 months of age
- **Second Dose**: 4-6 years of age (may be
if at least 28 days after the 1st dose)

VACCINE INFORMATION STATEMENT

Typhoid Vaccines

What You Need to Know

1 What is typhoid?

Typhoid (typhoid fever) is a serious disease. It is caused by bacteria called *Salmonella* Typhi.

Typhoid causes a high fever, fatigue, weakness, stomach pains, headache, loss of appetite, and sometimes a rash. If it is not treated, it can kill up to 30% of people who get it.

Some people who get typhoid become "carriers," who can spread the disease to others.

Generally, people get typhoid from contaminated food or water. Typhoid is rare in the U.S., and most U.S. citizens who get the disease get it while traveling. Typhoid strikes about 21 million people a year around the world and kills about 200,000.

2 Typhoid vaccines

Typhoid vaccine can prevent typhoid.

There are two vaccines to prevent typhoid. One is an inactivated (killed) vaccine gotten as a shot, and the other is a live, attenuated (weakened) vaccine which is taken orally (by mouth).

3 Who should get typhoid vaccine and when?

Routine typhoid vaccination is not recommended in the United States, but typhoid vaccine is recommended for:

- Travelers to parts of the world where typhoid is common. (NOTE: typhoid vaccine is not 100% effective and is not a substitute for being careful about what you eat or drink).
- People in close contact with a typhoid carrier.
- Laboratory workers who work with *Salmonella* Typhi bacteria.

Inactivated Typhoid Vaccine (Shot)
- One dose provides protection. It should be given at least 2 weeks before travel to allow the vaccine time to work.
- A booster dose is needed every 2 years for people who remain at risk.

Live Typhoid Vaccine (Oral)
- Four doses: one capsule every other day for a week (day 1, day 3, day 5, and day 7). The last dose should be given at least 1 week before travel to allow the vaccine time to work.
- Swallow each dose about an hour before a meal with a cold or lukewarm drink. *Do not chew the capsule.*
- A booster dose is needed every 5 years for people who remain at risk.

Either vaccine may safely be given at the same time as other vaccines.

4 Some people should not get typhoid vaccine or should wait.

Inactivated Typhoid Vaccine (Shot)
- Should not be given to children younger than 2 years of age.
- Anyone who has had a severe reaction to a previous dose of this vaccine should not get another dose.
- Anyone who has a severe allergy to any component of this vaccine should not get it. Tell your doctor if you have any severe allergies.
- Anyone who is moderately or severely ill at the time the shot is scheduled should usually wait until they recover before getting the vaccine.

CDC

VIS Updates – E-mail

- Almost 100,000 subscribers *

* As of August 2012

Healthcare Provider Requirements

- Record in medical record or permanent office log
  - date vaccine was administered
  - vaccine manufacturer
  - lot number
  - name, address and title of person administering vaccine
  - VIS edition date
  - date VIS was provided
- MDPH also recommends the vaccine type, dose, site and route of administration be documented

Vaccine Administration Record

Vaccine Administration Record

Record No. / Insurance No.: _____

Patient Name: _____

Address: _____

Birth Date: _____ Male _____ Female _____

Clinic Name and Address:	
Name(s) of Vaccine Administrator(s):	Initials
Use Reverse Side for Additional Names and Initials	

Vaccine administrator: Make sure to give the parent or legal representative the most recent copy of the Vaccine Information Statement (VIS) which explains risks and benefits of vaccine for **each** dose of vaccine given.

Vaccine	Type of Vaccine*	Date Given mo/day/yr	Dose	Route (PO, SC, IM, ID, IN)	Site (RA,LA, RT, LT)	Vaccine		Vaccine Information Statement		Vaccine Admin Initials
						lot #	mfr.	Date on VIS	Date Given	
Hepatitis B (e.g., HepB, HepB-Hib, DTaP-HepB-IPV, HepA-HepB)				IM						
				IM						
				IM						
				IM						
Diphtheria, Tetanus, Pertussis (e.g., DTP, DTaP, DT, DTaP-Hib, DTaP-HepB-IPV, Td, Tdap)				IM						
				IM						
				IM						
				IM						
				IM						
				IM						
Haemophilus influenzae (e.g., Hib, DTaP-Hib)				IM						
Polio (e.g., IPV, DTaP-IPV)				IM						
Pneumococcal Conjugate (PCV7)				IM						
Hepatitis A (HepA, HepA-HepB)				IM						
Rotavirus				IM						
				IM						
				IM						
Measles, Mumps, Rubella (MMR)				SC						
Varicella (Var, MMRV)				SC						
☐ Check if 1) physician										
Meningococcal Conjugate (MCV4) or Polysaccharide (MPSV4)				IM•SC						
				IM•SC						
Influenza Inactivated (Intramuscular) or Live (Intranasal)				IM•IN						
				IM•IN						
				IM•IN						
Pneumococcal Polysaccharide (PPV23)				IM•SC						
				IM•SC						
Human Papillomavirus (HPV)				IM						
				IM						
				IM						
Other										

* Record the generic abbreviation for the type of vaccine given (e.g., DTaP), not the trade name. For combination vaccines, indicate the type (e.g.,DTaP-Hib) and all other information for each individual antigen (e.g., in the DTP and Hib sections) comprising the combination.

Vaccine Administration Record — Massachusetts Department of Public Health 06-06

Vaccine	Type of Vaccine*	Date Given mo/day/yr	Dose	Route (PO, SC, IM, ID, IN)	Site (RA,LA, RT, LT)	Vaccine		Vaccine Information Statement		Vaccine Admin Initials
						lot #	mfr.	Date on VIS	Date Given	
Hepatitis B (e.g., HepB, HepB-Hib, DTaP-HepB-IPV, HepA-HepB)				IM						
				IM						
				IM						
				IM						
Diphtheria, Tetanus, Pertussis (e.g., DTP, DTaP, DT, DTaP-Hib, DTaP-HepB-IPV, Td, Tdap)				IM						
				IM						
				IM						
				IM						

on Conference 2013

Adverse Event Classification

- Vaccine-induced
- Vaccine-potentiated
- Programmatic error
- Coincidental

Vaccine Adverse Reactions

- Adverse reaction
  - extraneous effect *caused by vaccine*
  - side effect

- Adverse event
  - *any* event following vaccination
  - may be true adverse reaction
  - may be only coincidental

Vaccine Adverse Reactions

- Systemic
  - fever, malaise, headache
  - nonspecific
  - may be unrelated to vaccine

Vaccine Adverse Event Reporting System (VAERS)

- National reporting system
- Jointly administered by CDC and FDA
- Passive (depends on healthcare providers and others to report)
- Receives about 28,000 reports per year

Vaccine Adverse Event Reporting System (VAERS)

- Detects
  - new or rare events
  - increases in rates of known side effects
  - patient risk factors
- Additional studies required to confirm VAERS signals
- Not all reports of adverse events are causally related to vaccine

www.vaers.hhs.gov

Vaccine Safety Datalink (VSD)

- Involves partnerships with 10 large managed care organizations
- Links vaccination and health records
- Allows for planned immunization safety studies
- Allows for investigations of hypotheses that arise from review of medical literature, reports to VAERS changes in immunization schedules, or the introduction of new vaccines

Vaccine Injury Compensation Program (VICP)

- Established by National Childhood Vaccine Injury Act (1986)
- "No fault" program
- Covers all routinely recommended childhood vaccines
- Vaccine Injury Table

www.hrsa.gov/vaccinecompensation

Institute of Safe Medication Practices (ISMP)

- What to report?
  - Errors in the prescribing, transcribing, dispensing, administering, and monitoring of medications;
  - Wrong drug, wrong strength, or wrong dose errors;
  - Wrong patient errors;
  - Confusion over look-alike/sound-alike drugs or similar packaging;
  - Wrong route of administration errors;
  - Calculation or preparation errors; and
  - Misuse of medical equipment.
- Report all medical errors online to ISMP at:

  www.ismp.org

Tips to Increase Immunization Rates

- Incorporate measures to improve vaccination rates
  - strongly recommend vaccine
  - reminder/recall
  - standing orders/vaccine only visits
  - speak from personal experience
  - provide information in foreign languages
  - avoid “missed opportunities”

Model Standing Orders


Standing Orders for Administering Varicella Vaccine to Children & Teens

- Adult and Childhood Vaccines
  - Recommended use
  - Contraindications and precautions
- Emergency Orders
- Immunize Action Coalition and MA Department of Public Health

IAC
http://www.immunize.org/handouts/screening-vaccines.asp

MDPH
http://mass.gov/dph/imm

Questions?