

Common Immunization Myths and Misconceptions

Talking Points and Resources for Busy Healthcare Professionals

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Background

Parents, patients, and healthcare professionals all have misconceptions about vaccinations.

- More patients and parents are questioning the safety and effectiveness of vaccines. Your responses to them require knowledge, tact, and time.
- Healthcare providers can miss opportunities to vaccinate by believing false contraindications and following unnecessary rules.

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Background (cont.)

This presentation will provide:

- information that addresses common concerns or misconceptions about vaccination. Concerns and misconceptions of patients, parents, and healthcare professionals will be reviewed.
- links to related evidence-based resources – some are intended as background information for healthcare professionals and others for patients/parents.

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Patient and Parent Myths



MYTH: MMR causes autism

- Many large, well-designed studies have found no link between MMR and autism.
- Autism usually becomes apparent around the same time MMR is given – no evidence of causality.
- Autism probably has multiple components, including genetics (e.g., one study found that if one identical twin had autism, the chance that the second twin had autism was greater than 90%, but with fraternal twins the chance was less than 10%.)

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MYTH: MMR causes autism (cont.)

- The 1998 study by Andrew Wakefield that started this concern was based on 12 children who were preselected for study.
- In 2004, 10 of the 13 authors of this study retracted the study's interpretation.

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MYTH: MMR causes autism (cont.)

- On 2/2/2010, the editors of *The Lancet* retracted the paper following the ruling of the U.K.'s General Medical Council that stated the primary author's conduct regarding his research was "dishonest" and "irresponsible" and that he had shown a "callous disregard" for the suffering of children involved in his studies. Wakefield was subsequently removed from the U.K medical register and is no longer licensed to practice medicine.
- In January 2011, the BMJ published a series of articles showing Wakefield's work was not just bad science, but deliberate fraud.



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References

- IAC's "MMR vaccine does not cause autism. Examine the evidence!" www.immunize.org/catg.d/p4026.pdf
- IAC's "Clear Answers & Smart Advice about Your Baby's Shots" by Ari Brown, MD, FAAP www.immunize.org/catg.d/p2068.pdf
- CDC's "Measles, Mumps, and Rubella (MMR) Vaccine Safety Studies" www.cdc.gov/vaccinesafety/vaccines/mmr/mmr-studies.html
- The Fraud Behind the MMR Scare (IAC web section) www.immunize.org/bmj-deer-mmr-wakefield
- IOM Report: "MMR Vaccine and Autism" www.nap.edu/read/10101/chapter/1



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References (cont.)

- IAC's "Evidence Shows Vaccine Unrelated to Autism" www.immunize.org/catg.d/p4028.pdf
- IAC's "Decisions in the Omnibus Autism Proceeding" www.immunize.org/catg.d/p4029.pdf
- VEC's "Vaccines and Autism: What you should know" www.chop.edu/export/download/pdfs/articles/vaccine-education-center/autism.pdf
- CDC's "Understanding MMR Vaccine Safety" www.cdc.gov/vaccines/hcp/conversations/downloads/vacsafe-mmr-color-office.pdf
- "Vaccines and Autism: A Tale of Shifting Hypotheses" by Paul Offit, MD and Jeffery Gerber, MD <http://cid.oxfordjournals.org/content/48/4/456.full>



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References (cont.)

- "Fitness to Practice Panel Hearing" report from the U.K's General Medical Council regarding Dr. Andrew Wakefield www.neurodiversity.com/wakefield_gmc_ruling.pdf
- *The Lancet* retraction [www.thelancet.com/journals/lancet/article/PIIS0140-6736\(97\)11096-0/abstract](http://www.thelancet.com/journals/lancet/article/PIIS0140-6736(97)11096-0/abstract)
- "How a zealot's word led us astray on autism" by Arthur Caplan, PhD www.msnbc.msn.com/id/35218819/ns/health-health_care
- AAP's "Vaccine Safety: Examine the Evidence" www.aap.org/en-us/Documents/immunization_vaccine_studies.pdf



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MYTH: Giving an infant multiple vaccines can overwhelm the immune system

- Babies begin being exposed to immunological challenges immediately at the time of birth. As babies pass through the birth canal and breathe, they are immediately colonized with trillions of bacteria, which means that they carry the bacteria in their bodies but aren't infected by them. Healthy babies constantly make antibodies against these bacteria and viruses.



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MYTH: Giving an infant multiple vaccines can overwhelm the immune system (cont)

- Vaccines use only a tiny proportion of a baby's immune system's ability to respond; though children receive more vaccines than in the past, today's vaccines contain fewer antigens (e.g., sugars and proteins) than previous vaccines. Smallpox vaccine alone contained 200 proteins; the 14 currently recommended routine vaccines contain fewer than 150 immunologic components.



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References

- VEC's "Too Many Vaccines? What you should know"
<http://media.chop.edu/data/files/pdfs/vaccine-education-center-too-many-vaccines.pdf>
- FAQs about Multiple Vaccinations and the Immune System
www.cdc.gov/vaccinesafety/Vaccines/multiplevaccines.html
- "Vaccines and Autism: A Tale of Shifting Hypotheses" by Paul Offit, MD and Jeffery Gerber, MD
<http://cid.oxfordjournals.org/content/48/4/456.full>

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MYTH: It's better to space out vaccines using an alternative schedule

- Delaying vaccines increases the time children will be susceptible to diseases
 - In 2014, there were 665 cases of measles reported in the U.S. The majority of people who got measles were unvaccinated. Measles is still common in many parts of the world, including some countries in Europe, Asia, the Pacific, and Africa, and can easily be transported.
 - In 2014, 32,971 cases of pertussis were reported to CDC, and many more cases were undiagnosed.
- Requiring many extra appointments for vaccination increases the stress for the child and may lead to a fear of visits to the clinic.
- There is no evidence that spreading out the schedule decreases the risk of adverse reactions.

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References

- "The Problem With Dr. Bob's Alternative Vaccine Schedule" by Paul Offit, MD and Charlotte Moser
<http://pediatrics.aappublications.org/content/pediatrics/123/1/e164.full.pdf>
- AAP's "The Childhood Immunization Schedule: Why Is It Like That?"
www.aap.org/en-us/advocacy-and-policy/Documents/Vaccineschedule.pdf
- VEC's "Too Many Vaccines? What you should know"
<http://media.chop.edu/data/files/pdfs/vaccine-education-center-too-many-vaccines.pdf>
- IOM Report: "Multiple Immunizations and Immune Dysfunction"
www.nap.edu/read/10306/chapter/1
- "Parental Refusal of Pertussis Vaccination is Associated with an Increased Risk of Pertussis Infection in Children" Ganz et al
<http://pediatrics.aappublications.org/content/123/6/1445.abstract>

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MYTH: Natural infection is better than immunization

- Natural infection usually does not cause better immunity than vaccination.
- However, the price paid for natural disease can include:
 - paralysis
 - permanent brain damage
 - liver failure
 - liver cancer
 - deafness
 - blindness
 - loss of limbs
 - death

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References

- "Natural Infection vs. immunization" by Paul Offit, MD
www.chop.edu/centers-programs/vaccine-education-center/vaccine-safety/immune-system-and-health
- Photos of people with vaccine-preventable diseases
www.immunize.org/photos
- Real-life accounts of people who have suffered or died from vaccine-preventable diseases
www.immunize.org/reports

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MYTH: Thimerosal causes autism

- The form of mercury found in thimerosal is ethylmercury (EM), not methylmercury (MM). MM is the form that has been shown to damage the nervous system.
- Although no evidence of harm has ever been demonstrated, thimerosal was taken out of vaccines as a precaution, and "because it can be" (due to single dose vials).
- Since 2001, with the exception of a few influenza vaccine products, thimerosal has not been used as a preservative in any routinely recommended childhood vaccines.

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MYTH: Thimerosal causes autism (cont)

- Multiple studies have shown that thimerosal in vaccines does not cause autism when comparing children who received thimerosal-containing vaccines and those who received vaccines not containing thimerosal.
- Studies of three countries compared the incidence of autism before and after thimerosal was removed from vaccines (in 1992 in Europe and 2001 in the U.S.). There was no decrease in autism with the switch to thimerosal-free vaccines.

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References

- CDC's Vaccine Safety Concerns web page www.cdc.gov/vaccinesafety/concerns
- IAC's collection of thimerosal-related resources www.immunize.org/thimerosal
- Institute of Medicine reports on thimerosal www.nap.edu/books/030909237X/html and www.nap.edu/read/10208/chapter/1
- CDC's "Understanding Thimerosal, Mercury, and Vaccine Safety" www.cdc.gov/vaccines/hcp/patient-ed/conversations/downloads/vacsafe-thimerosal-color-office.pdf

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References (cont.)

- Vaccine Education Center's (VEC's) "Thimerosal: What you should know" <http://media.chop.edu/data/files/pdfs/vaccine-education-center-thimerosal.pdf>
- VEC's "Vaccines and Autism: What you should know" <http://media.chop.edu/data/files/pdfs/vaccine-education-center-autism.pdf>
- CDC's Studies on Thimerosal in Vaccines www.cdc.gov/vaccinesafety/pdf/cdcstudiesonvaccinesandautism.pdf
- "Vaccines and Autism: A Tale of Shifting Hypotheses" by Paul Offit, MD and Jeffery Gerber, MD <http://cid.oxfordjournals.org/content/48/4/456.full>

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MYTH: Ingredients in vaccines are harmful

Aluminum

- Aluminum is used in some vaccines as an adjuvant – an ingredient that improve the immune response. Adjuvants can allow for use of less antigen. They have been used for this purpose for more than 70 years.
- Aluminum is the most common metal found in nature. It is in the air and in food and drink. Infants get more aluminum through breast milk or formula than vaccines.
- Most of the aluminum taken into the body is quickly eliminated.

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MYTH: Ingredients in vaccines are harmful (cont.)

Formaldehyde

- Formaldehyde is used to detoxify diphtheria and tetanus toxins or to inactivate a virus.
- The tiny amount which may be left over from these steps in making vaccines is safe.
- Formaldehyde is also found in products like paper towels, mascara, and carpeting.
- Humans normally have formaldehyde in their blood streams at levels higher than is found in vaccines.

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MYTH: Ingredients in vaccines are harmful (cont.)

Miscellaneous

- Antibiotics are present in some vaccines to prevent bacterial contamination when the vaccine is made.
- Additives such as gelatin, albumin, sucrose, lactose, MSG, and glycine help the vaccine stay effective while being stored.
- Trying to make vaccines without adjuvants, additives, and preservatives is difficult – these ingredients keep vaccine safe and effective.

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References

- VEC's "Aluminum in Vaccines: What you should know"
<http://media.chop.edu/data/files/pdfs/vaccine-education-center-aluminum.pdf>
- VEC's "Vaccine Ingredients: What you should know"
<http://media.chop.edu/data/files/pdfs/vaccine-education-center-vaccine-ingredients.pdf>
- IAC's "Adjuvants and Ingredients" web section
www.immunize.org/concerns/adjuvants.asp
- AAP's "Questions and Answers about Vaccine Ingredients"
<https://www.healthychildren.org/English/safety-prevention/immunizations/Pages/Vaccine-Ingredients-Frequently-Asked-Questions.aspx>

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References (cont.)

- CDC's "Vaccine Excipient & Media Summary, by Excipient"
<https://cdc.gov/vaccines/pubs/pinkbook/downloads/appendices/B/excipient-table-2.pdf>
- CDC's "Ingredients of Vaccine – Fact Sheet"
www.cdc.gov/vaccines/vac-gen/additives.htm
- IAC's Package Inserts web section
www.immunize.org/fda

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MYTH: Disease rates have dropped due to factors other than vaccination

- Better living conditions (less crowded housing, better nutrition, etc.) have had an impact on disease rates. BUT, the only real decrease in a VPD has occurred after the introduction of a vaccine to prevent it.
- This is also true for newer vaccines like Hib (1987) and varicella (1995), which were introduced during times of modern hygiene.

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MYTH: Disease rates have dropped due to factors other than vaccination (cont.)

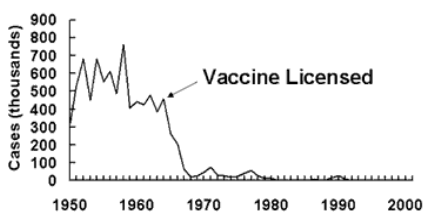
- When some developed countries (U.K., Sweden, Japan) stopped using DTP vaccine, their pertussis rates jumped dramatically.
- Several recent outbreaks of measles, pertussis, and varicella in the U.S. have been traced to pockets of unvaccinated children in states that allow personal belief exemptions. When vaccination rates go down, disease rates go up.

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Example: Measles

Measles—United States, 1950-2001

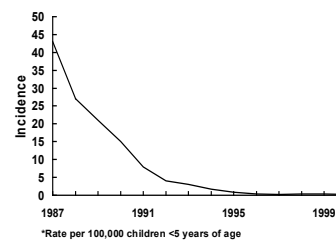


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Example: *Haemophilus influenzae* type b

Estimated Incidence* of Invasive Hib Disease, 1987-2000



*Rate per 100,000 children <5 years of age

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References

- HHS's "Vaccine Works"
www.vaccines.gov/basics/work/index.html
- CDC's "What Would Happen if We Stopped Vaccinations?"
www.cdc.gov/vaccines/vac-gen/whatifstop.htm
- IAC's "Personal belief exemptions for vaccination put people at risk. Examine the evidence for yourself."
www.immunize.org/catg.d/p2069.pdf

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MYTH: Mandatory vaccination violates civil rights

- Massachusetts enacted the first mandatory vaccination law in the U.S. in 1809.
- Vaccination laws have been found to be constitutional in U.S. courts. Seminal case was *Jacobson v. Massachusetts* in 1905.
- All states offer medical exemptions.
- Parents need to be aware that if they don't vaccinate their children, they are putting them, and their contacts, at risk of serious disease.
- Unvaccinated children often have to stay home from school or daycare during outbreaks.

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References

- IAC's "What if you don't immunize your child?"
www.immunize.org/catg.d/p4017.pdf
- IAC's "Decision to Not Vaccinate My Child" (*declination form*)
www.immunize.org/catg.d/p4059.pdf
- "Personal belief exemptions for vaccination put people at risk"
www.immunize.org/catg.d/p2069.pdf
- "Sample Vaccine Policy Statement"
www.immunize.org/catg.d/p2067.pdf
- IAC's Mandates and Exemptions web page
www.immunize.org/laws/exemptions.asp

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MYTH: Abortions are required to produce vaccines

- It's true that production of varicella, rubella, rabies, and hepatitis A vaccines involves growing viruses in human cell culture.
- Two human cell lines provide these cultures; they were developed from two legally aborted fetuses in the 1960s.
- The donor fetuses were not aborted for the purpose of obtaining these cells.
- The same cell lines have been used for more than 40 years – no new fetal tissue is required.

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References

- IAC's web page about ethical and religious objections to vaccination
www.immunize.org/concerns/religious.asp
- Why Were Fetal Cells Used to Make Certain Vaccines?
www.chop.edu/news/news-views-why-were-fetal-cells-used-make-certain-vaccines?utm_term=new+view&utm_content=vaccine+hesitancy&utm_campaign=vecupdatesApr2017

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MYTH: VAERS data prove that vaccines are dangerous

VAERS data cannot "prove" anything.

- Anyone can report anything...not proof of causality is required.
- Only reports of special interest (e.g., hospitalizations) are verified. When checked, many reports are not accurate.
- Reports include many non-serious reactions.
- The number of reported adverse events is influenced by publicity.
- VAERS is properly used to detect early warning signals and generate hypotheses.

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References

- Vaccine Adverse Events Reporting Systems (VAERS)
www.vaers.hhs.gov
- CDC's Vaccine Safety Monitoring web page
www.cdc.gov/vaccinesafety/Vaccine_Monitoring/Index.html
- CDC's "Ensuring the Safety of Vaccines in the United States"
www.cdc.gov/vaccines/hcp/patient-ed/conversations/downloads/vacsafe-ensuring-color-office.pdf
- CDC's "Understanding the Vaccine Adverse Event Reporting System (VAERS)"
www.cdc.gov/vaccines/hcp/patient-ed/conversations/downloads/vacsafe-vaers-color-office.pdf
- WHO's "Causality assessment of adverse events following immunization"
www.who.int/vaccine_safety/causality/en

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Good resources FOR PROVIDERS talking to parents and patients

- IAC's Talking about Vaccines web section
www.immunize.org/talking-about-vaccines
- IAC's Responding to Parents web section
www.immunize.org/talking-about-vaccines/responding-to-parents.asp
- CDC's Provider Resources for Vaccine Conversations with Parents web section
www.cdc.gov/vaccines/hcp/conversations
- Vaccine Education Center
www.chop.edu/centers-programs/vaccine-education-center
- AAP's immunization website
www.aap.org/immunization
- National Adult and Influenza Immunization Summit
www.izsummitpartners.org

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Good resources FOR PARENTS

- IAC's handouts for communicating with parents
www.immunize.org/handouts/discussing-vaccines-parents.asp
- IAC's website for the public
www.vaccineinformation.org
- CDC's fact sheets on vaccine-preventable diseases for parents
www.cdc.gov/vaccines/hcp/conversations/prevent-diseases/index.html
- CDC's "Parents Guide to Childhood Immunization"
www.cdc.gov/vaccines/pubs/parents-guide
- Vaccine Education Center's handouts for parents and patients
www.chop.edu/centers-programs/vaccine-education-center/resources/vaccine-and-vaccine-safety-related-qa-sheets
- Every Child By Two's websites
www.ecbt.org and www.vaccinateyourfamily.org

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Good resources FOR ADULT PATIENTS

- IAC's handouts related to adult immunization
www.immunize.org/handouts/adult-vaccination.asp
- IAC's website for the public
www.vaccineinformation.org
- VEC's handouts on hepatitis A, meningococcal, HPV, influenza, shingles, and Tdap
www.chop.edu/center-programs/vaccine-education-center/resources/vaccine-and-vaccine-safety-related-qa-sheets
- VEC's "Vaccines and Adults" booklet
<http://media.chop.edu/data/files/pdfs/vaccine-education-center-vaccines-adults.pdf>
- National Foundation for Infectious Diseases
www.adultvaccination.org
- CDC's Vaccine Information for Adults web section
www.cdc.gov/vaccines/adults

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Don't worry about every possible question

- Be able to recommend good websites and handouts for patients/parents.
- Be aware of major vaccine-critical groups and individuals and become familiar with their websites. For example, the name National Vaccine Information Center sounds official and positive about vaccines, but it is not.
- Be ready to answer the most common questions – many concerns haven't changed in over 200 years!
- Remember, it's acceptable to say you'll look into a question and get back to the patient with more information.
- It's worth your time – people respect the opinion of their healthcare providers.

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Provider Myths



Background

- Vaccination contraindications and precautions are complicated, and the many vaccines and their recommendations can cause confusion that leads to misconceptions.
- Providers who are concerned about vaccinating properly frequently err on the side of caution.
- Unfortunately, misconceptions can lead to missed opportunities to vaccinate.

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Provider Myths

MYTH

Vaccines can't be given to people who are sick.

FACT

Mild acute illness with or without fever is not a contraindication to vaccination. Neither is antibiotic treatment, recent exposure to an infectious disease, or convalescing from an illness.

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Provider Myths

MYTH

Providers need to check vital signs before vaccinating.

FACT

ACIP does not recommend routinely checking temperature or other vital signs before vaccination. Mild illness is not a reason to withhold vaccination, and requiring extra steps can be a barrier to immunization.

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Provider Myths

MYTH

There is a limit to the number of vaccines that can be given at the same visit.

FACT

No upper limit has been established regarding the number of vaccines that can be administered in one visit. ACIP recommends administration of all recommended vaccines at the same visit.

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Provider Myths

MYTH

Figuring out which vaccine can be given at a single visit is complicated.

FACT

- Almost all* routine vaccines can be given simultaneously (at the same visit, not in the same syringe).
- If two live virus vaccines are *not* given at the same visit, then they need to be separated by at least 4 weeks.
- Inactivated vaccines can be given at the same time, or any time before or after, another inactivated or live vaccine.

*next slide

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Provider Myths (cont.)

There are two exceptions to these general rules:

- 1) If both PCV13 and PPSV23 are indicated, these vaccines should not be given at the same visit. For adults age 19–64 who are receiving both vaccines due to a high-risk condition, the PCV13 should be given first followed by PPSV23 at least 8 weeks later. If PPSV23 has already been given, wait 8 weeks (for a child) or 1 year (for an adult age 19 years or older) before giving PCV13 to avoid interference between the 2 vaccines. For adults age 65 and older who are receiving both PCV13 and PPSV23 as part of the routine recommendation, PCV13 should be given first and PPSV23 a year later. This will ensure that Medicare will cover both.
- 2) A person with anatomic or functional asplenia should receive both pneumococcal conjugate vaccine (PCV13) and meningococcal conjugate vaccines (MenACWY). If *Menactra* brand MenACWY is used, the person should first receive all recommended doses of PCV13, then *Menactra* at least 4 weeks later. *Menveo* brand MenACWY can be given at the same time or at any time before or after PCV13.

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Provider Myths

MYTH

Vaccines can't be given to women who are breastfeeding.

FACT

All vaccines can be given to women who are breastfeeding (yes, even live vaccines!), with the exception of smallpox vaccine.

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Provider Myths

MYTH

Live virus vaccines (live zoster, varicella, MMR, and LAIV) should not be given to contacts of pregnant women or to contacts of immunocompromised people.

FACT

False. The only concern would be in the rare instance when a person develops a varicella-like rash after receiving varicella or live zoster vaccine. Then the vaccinee should avoid close contact with the unvaccinated infant or immunocompromised person until the rash resolves.

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Provider Myths

MYTH

Pregnant women should never get vaccines.

FACT

Although pregnant women should not receive LIVE vaccines, influenza and Tdap are recommended during pregnancy. Other inactivated vaccines may or may not be administered, depending on the mother's risk factors and vaccination status. HPV vaccine has not been sufficiently studied, so it should not be administered during pregnancy at this time.

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Provider Myths

MYTH

Pregnant women and infants need to get thimerosal-free influenza vaccines.

FACT

There is no scientific evidence that thimerosal in vaccines, including influenza vaccines, is a cause of adverse events, unless the patient has a systemic allergy to thimerosal. However, there are a few states that have banned the use of influenza vaccines containing thimerosal when given to people of certain age groups.

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Provider Myths

MYTH

Tdap can't be administered if a person has received Td in the last 5 years.

FACT

There is no "minimum interval" one needs to wait between receiving Td and Tdap.

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Background Resources for Providers

- IAC's ACIP Recommendations web section
www.immunize.org/acip
- IAC's *Ask the Experts* web section
www.immunize.org/askexperts
- IAC's Vaccine Information Statement (VIS) web section
www.immunize.org/vis
- IAC's educational materials web section
www.immunize.org/handouts
- IAC's "Summary of Recommendations for Adult Immunization"
www.immunize.org/catg.d/p2011.pdf
- IAC's "Summary of Recommendations for Child/Teen Immunization"
www.immunize.org/catg.d/p2010.pdf

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Background Resources for Providers

- ACIP's "General Best Practice Guidelines for Immunization"
www.cdc.gov/vaccines/hcp/acip-recs/general-recs/downloads/general-recs.pdf
- CDC's "Pink Book" (*Epidemiology and Prevention of Vaccine-Preventable Diseases*)
www.cdc.gov/vaccines/pubs/pinkbook/index.html
- CDC's "Contraindications and Precautions"
www.cdc.gov/vaccines/hcp/acip-recs/general-recs/contraindications.htm
- NVAC's "Standard for Adult Immunization Practice"
www.cdc.gov/vaccines/hcp/adults/for-practice/standards/index.html



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Questions

- Write the CDC experts at nipinfo@cdc.gov
- Write IAC at admin@immunize.org
- Read archived *Ask the Experts Q&As* at www.immunize.org/askexperts
- Subscribe to *IAC Express* for weekly updates on vaccine recommendations, licensures, and resources at www.immunize.org/subscribe



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