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.

Vaccine hesitancy, reluctance or refusal to be vaccinated to have one's children vaccinated, is identified by the World Health Organization one of the top ten globaal health threats of 2019.Arguments against vaccination are contradicted by overwhelming scientific consensus about the safety and efficacy of vaccines.

Hesitancy results from public debates around the medical, ethical and legal issues related to vaccines. It has existed since the invention of vaccination, and pre-dates the coining of the terms "vaccine" and "vaccination" by nearly 80 years. The specific hypotheses raised by anti-vaccination advocates have been found to change over time.[7]hesitancy often results in disease outbreaks and deaths from vaccine-preventable diseases.

Bills for mandatory vaccination have been considered for legislation, including California Senate Bill 277Australia'sNo Jab No Pay, all of which have been strenuously opposed by anti-vaccination activists.[14][15][16]to mandatory vaccination be based on anti-vaccine sentiment, or concern that it violates civil liberties reduces public trust in vaccination.

Talking about vaccines

- **Effective, empathetic communication** is critical in responding to parents who are considering not vaccinating their children
  - ***Parents*** should be helped to feel comfortable voicing any concerns or questions they have about vaccination
  - ***Providers*** should be prepared to listen and respond effectively

"A successful discussion about vaccines involves a two-way conversation, with both parties sharing information and asking questions."

***Talking with Parents about Vaccines for Infants* (CDC)**

www.cdc.gov/vaccines/hcp/conversations/downloads/talk-infants-color-office.pdf

Ask questions

- Evaluate whether the child has a valid contraindication to a vaccine by asking about medical history, allergies, and previous experiences
- Assess the parent's reasons for wanting to delay or forgo vaccination in a non-confrontational manner
  - Have they had a bad experience?
    - Obtained troubling information?
    - Do they have a religious or personal belief that they think conflicts with vaccination?

CLINICAL REPORT Guidance for the Clinician in Rendering Pediatric Care

American Academy of Pediatrics

DEDICATED TO THE HEALTH OF ALL CHILDREN™

Countering Vaccine Hesitancy

Kathryn M. Edwards, MD, Jesse M. Hackell, MD, THE COMMITTEE ON INFECTIOUS DISEASES, THE COMMITTEE ON PRACTICE AND AMBULATORY MEDICINE

Immunizations have led to a significant decrease in rates of vaccine-preventable diseases and have made a significant impact on the health of children. However, some parents express concerns about vaccine safety and the necessity of vaccines. The concerns of parents range from hesitancy about some immunizations to refusal of all vaccines. This clinical report provides information about addressing parental concerns about vaccination.

INTRODUCTION

Immunizations have had an enormous impact on the health of children, and the prevention of disease by vaccination is one of the single greatest public health achievements of the last century. However, over the past decade acceptance of vaccines has been challenged by individuals and groups who question their benefit.[1] Increasing numbers of people are requesting alternative vaccination schedules[2,3] or postponing or declining vaccination.[4] In a national telephone survey of 1500 parents of children 6 to 23 months of age conducted in 2010 with a response rate of 46%, approximately 3% of respondents had refused all vaccines and 19.4% had refused or delayed at least 1 of the recommended childhood vaccines.[5] A study conducted in a metropolitan area of Oregon reported that rates of alternative immunization schedule usage have increased nearly fourfold in recent years,[3] and in some parts of the country the use of "personal belief exemptions" from vaccinations has grown to rates in excess of 5% of the school-aged population.[6]

The Periodic Survey of Fellows (PS#66) conducted by the American Academy of Pediatrics (AAP) in 2006 revealed that 75% of pediatricians surveyed had encountered parents who refused a vaccine,[7] and a follow-up survey in 2013 (PS#84) revealed that this figure had increased to 87% of pediatricians.[8] According to the survey, pediatricians stated that the proportion of parents who refused 1 or more vaccines increased from 9.1% to 16.7% during the 7-year interval between surveys.[7,8] Physicians stated that the most common reasons parents refused vaccines were that they believed that vaccines are unnecessary (which showed an increase over the 7-year span) and that they had concerns

abstract

FREE

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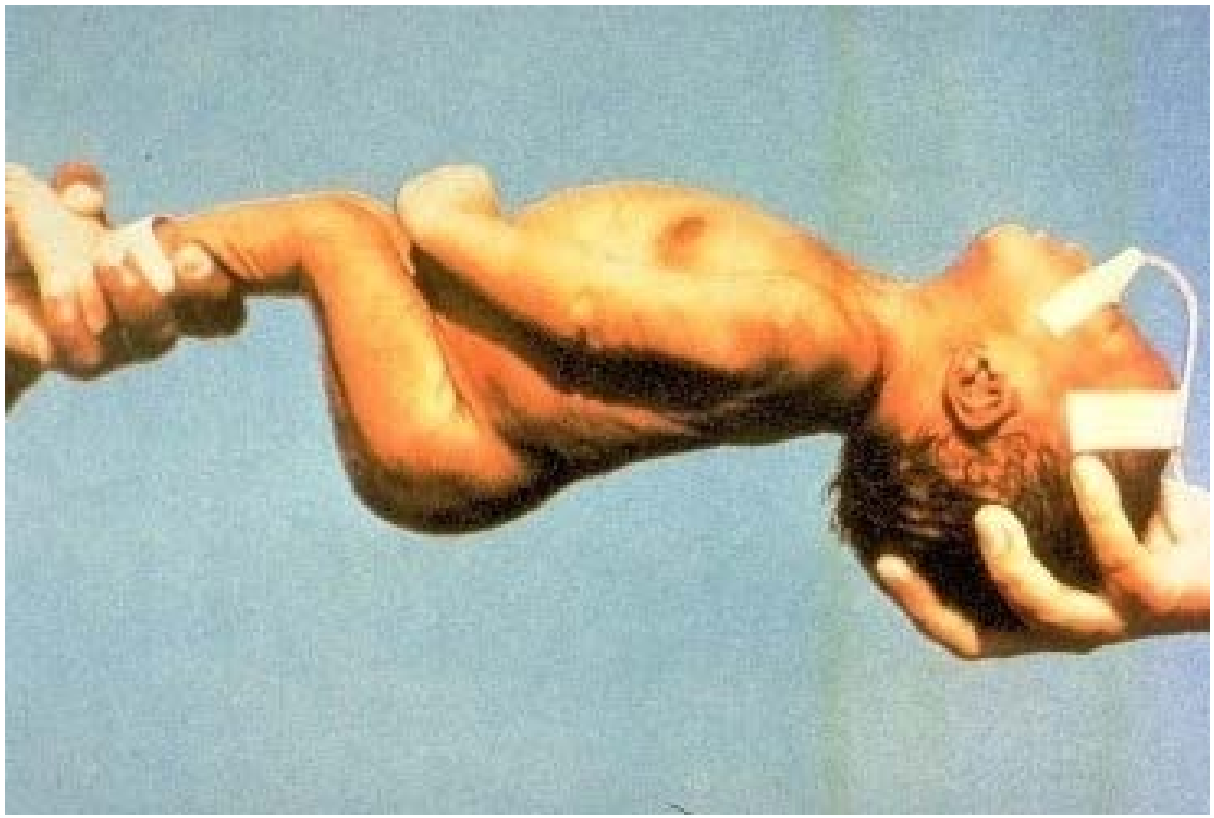
TABLE 1 Categorization of Parental Attitudes Toward Vaccines[12,14]

Immunization advocate	Parents agree that vaccines are necessary and safe. Parents have a strong relationship with their health care provider.
Go along to get along	Parents do not question vaccines, would like to vaccinate their children, but may lack a detailed knowledge of vaccines.
Cautious acceptor	Parents may have minor concerns about vaccines but ultimately vaccinate their children.
Fence-sitter	Parents have significant concerns about vaccines and tend to be knowledgeable about vaccines. Parents may vaccinate their child or may refuse or delay vaccines. Parents may have significant concerns about vaccines and may have a neutral relationship with their health care provider.
Refuser	Parents refuse all vaccines for their child. Their reasons for refusal may include distrust in the medical system, safety concerns, and religious beliefs.

Dialogue

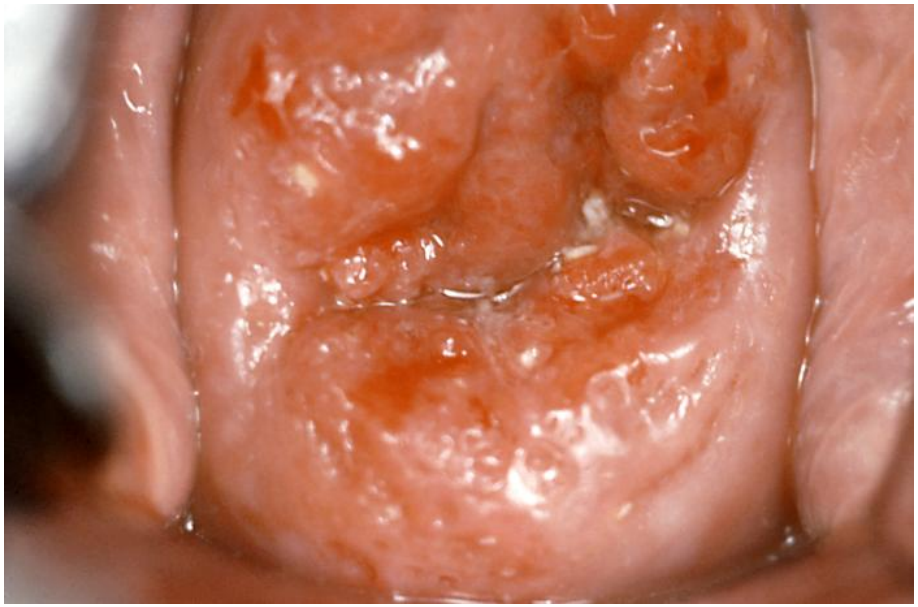
- If parents have safety concerns or misconceptions about vaccination, ask them to identify the source(s) of those concerns or beliefs
- Listen carefully, paraphrase to the parent what they have told you, and ask them if you have correctly interpreted what they have said
- Provide factual information in understandable language that addresses the specific concerns or misconceptions the parent has about vaccination



Tetanus: This baby has neonatal tetanus. His body is rigid. Infection can occur when the newly cut umbilical cord is exposed to dirt, as can occur in a developing country. Most newborns who get tetanus die. Neonatal tetanus can be prevented by hygienic delivery practices, and/or by immunizing mothers against tetanus.

Photo courtesy of the Centers for Disease Control and Prevention (CDC)

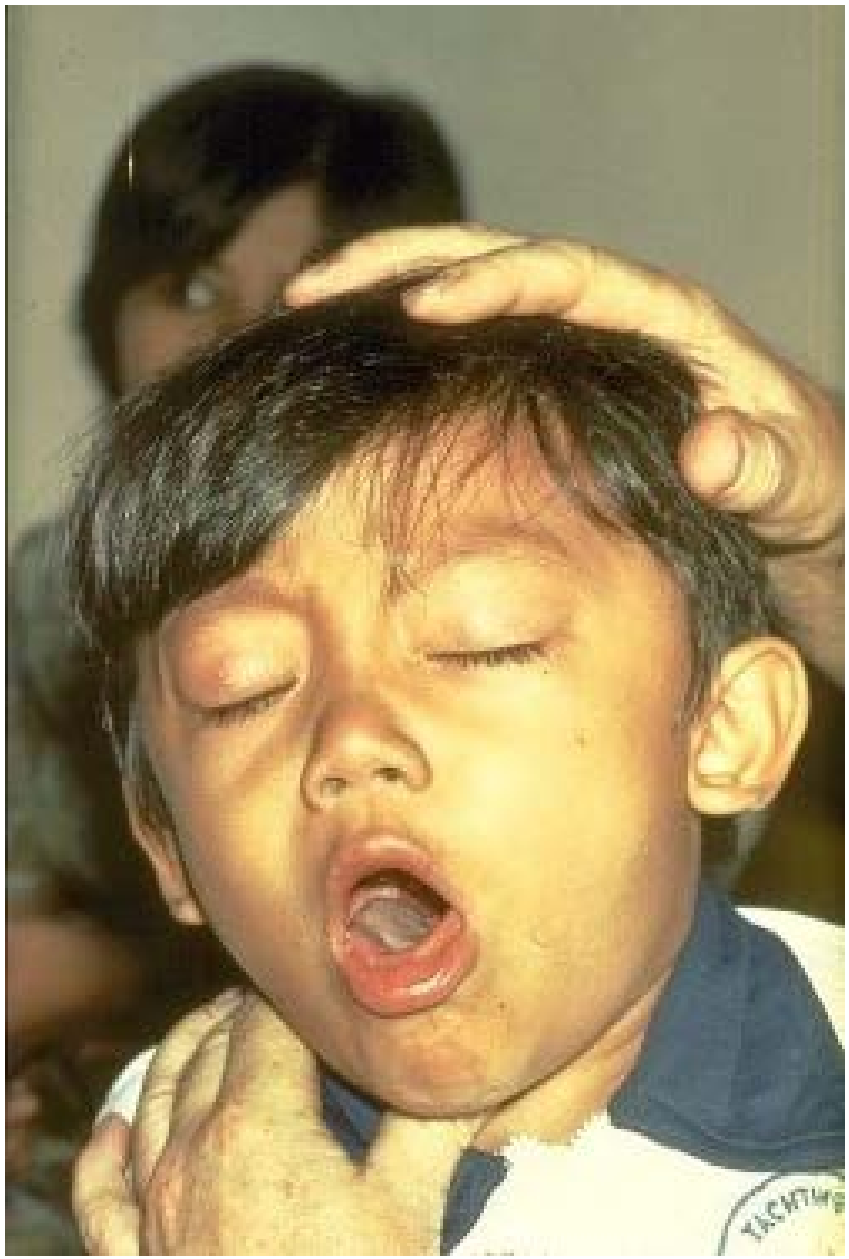
Human Papillomavirus (HPV): HPV is the most common sexually transmitted infection in the United States. Approximately 79 million American are infected with HPV. Most sexually-active men and women will get at least one type of HPV at some point in their lives.



Cervical cancer

Persistent infection with high-risk types of HPV is associated with almost all cervical cancers. An estimated 29,600 HPV-associated cancers occur annually in the U.S.

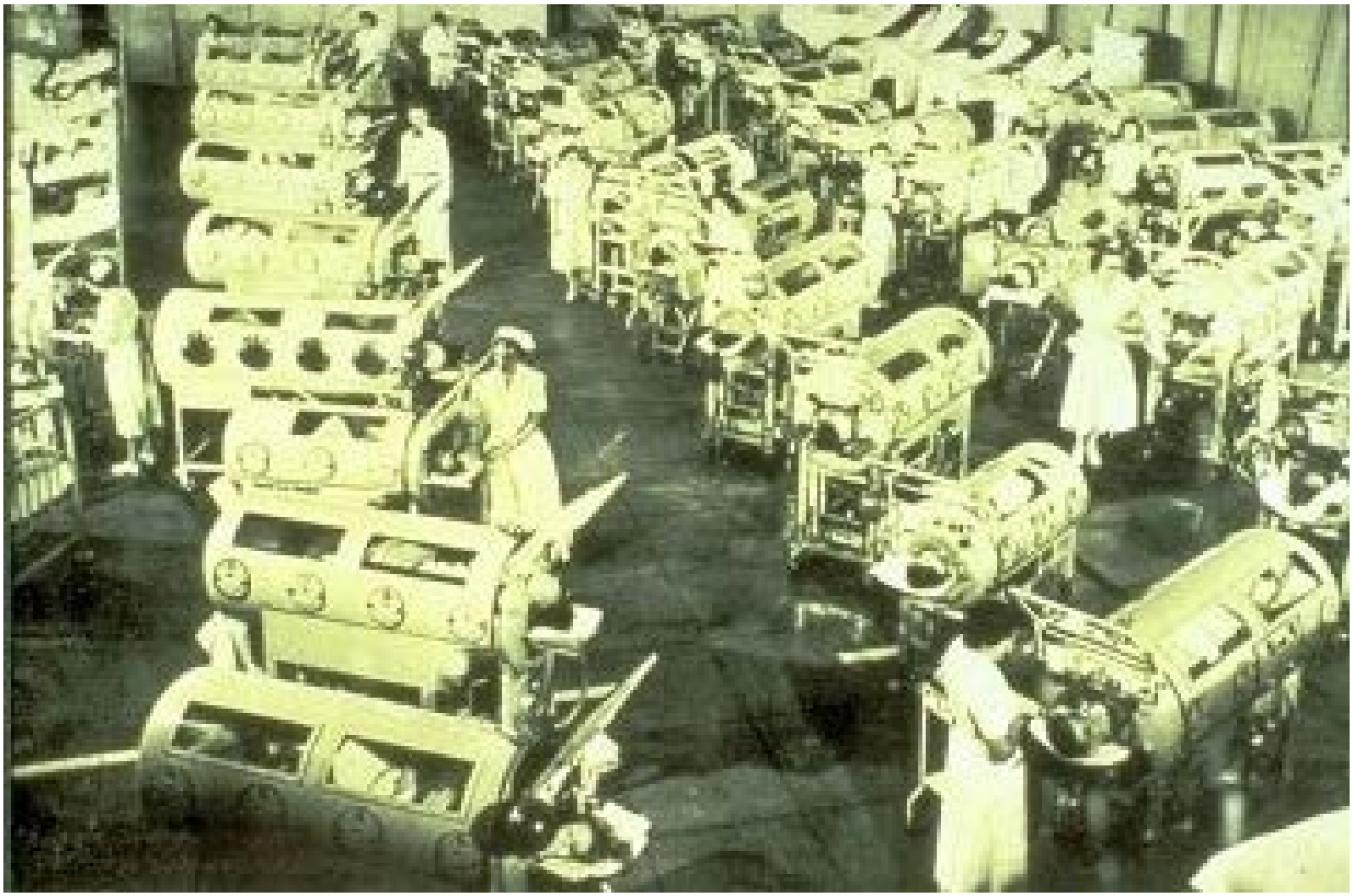
Photo courtesy of the Centers for Disease Control and Prevention (CDC)



Pertussis: This child has pertussis (whooping cough). He has severe coughing spasms, which are often followed by a “whooping” sound. It is difficult for him to stop coughing and catch his breath.

Babies are the most likely to die from pertussis and can have complications such as seizures and brain damage.

Photo courtesy of the Centers for Disease Control and Prevention (CDC)



Polio: This 1952 photo of a Los Angeles hospital respiratory ward shows polio victims in iron lungs — machines which were necessary to help victims breathe.

Photo courtesy of the Centers for Disease Control and Prevention (CDC)

immunization action coalition
IAC
immunize.org

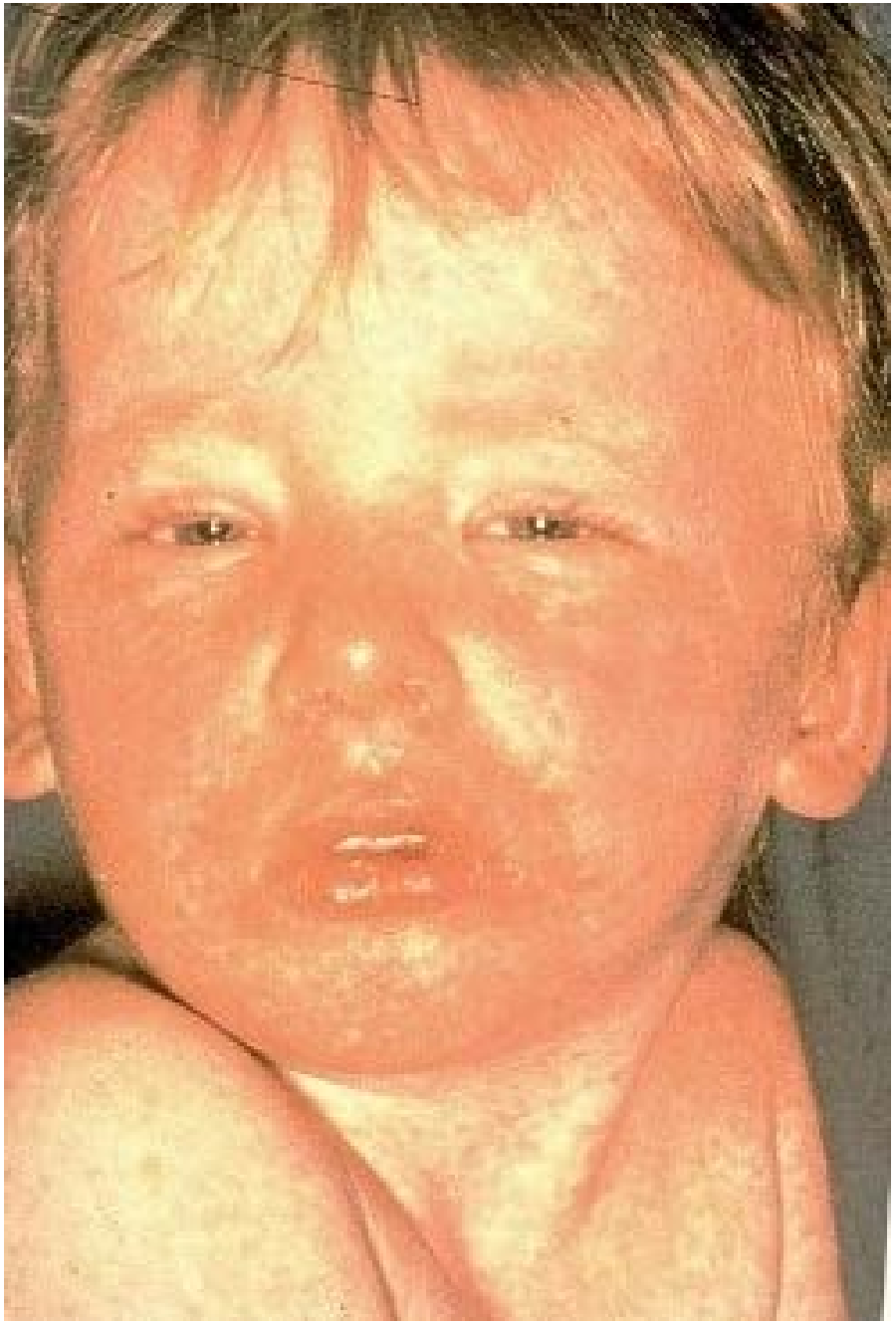


Photo courtesy of the Centers for Disease Control and Prevention (CDC)

Measles: This child has a severe measles rash. He has red eyes, a runny nose, and a fever.

Measles can cause pneumonia, seizures, brain damage, and even death. Death from measles occurs in 2 to 3 per 1,000 reported cases in the U.S.

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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%.)

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.

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.

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

MMR Vaccine Does Not Cause Autism

Examine the evidence!

There is no scientific evidence that MMR vaccine causes autism. The question about a possible link between MMR vaccine and autism has been extensively reviewed by independent groups of experts in the United States, including the National Academy of Sciences' Institute of Medicine (now renamed the National Academy of Medicine). These reviews have concluded that the available epidemiologic evidence does not support a causal link between MMR vaccine and autism.

The suggestion that MMR vaccine might lead to autism had its origins in gastroenterology research by Andrew Wakefield in the United Kingdom. In 1998, Wakefield and colleagues published an article in The Lancet *claiming that the measles vaccine virus in MMR caused inflammatory bowel disease, allowing harmful proteins to enter the bloodstream and damage the brain.*

The validity of this finding was later called into question when it could not be reproduced by other researchers. In addition, the findings were further discredited when an investigation found that Wakefield did not disclose he was being funded for his research by lawyers seeking evidence to use against vaccine manufacturers. As a result, Wakefield was permanently barred from practicing medicine in the United Kingdom and The Lancet *retracted the original article in 2010.*

RETRACTED: *Ileal-Lymphoid-Nodular Hyperplasia, Non-Specific Colitis, and Pervasive Developmental Disorder in Children*. Wakefield AJ et al. *Lancet* 1998; 351(9103):637-41. Subjects: 12 children with chronic enterocolitis and regressive developmental disorder.

"A Statement by the Editors of the Lancet," *Lancet* 2010; 363(9411):820-1, The editors fully retract this paper from the published record: www.thelancet.com/journals/lancet/article/PIIS0140673697110960/fulltext

The following list of articles published in peer-reviewed journals is provided so that parents and practitioners can themselves compare the balance of evidence about MMR vaccine and autism.

More than 25 articles refute a connection between MMR vaccine and the development of autism

1. ***Measles, Mumps, Rubella Vaccination and Autism – A Nationwide Cohort Study.*** Hviid A et al. *Ann Intern Med* 2019; 170(8):513–520. This nationwide cohort study included all 657,461 children born 1/1999–12/2010 in Denmark. With this many study participants, the researchers were able to look at vaccinated vs not vaccinated children, including 6,517 children with a diagnosis of autism.

   CONCLUSION: The findings strongly support that MMR vaccination does not increase the risk for autism, does not trigger autism in susceptible children, and is not associated with clustering of autism cases after vaccination.

   LINK: www.ncbi.nlm.nih.gov/pubmed/30831578

2. ***Early Exposure to the Combined Measles-Mumps-Rubella Vaccine and Thimerosal-containing Vaccines and Risk of Autism Spectrum Disorder.*** Uno Y et al. *Vaccine* 2015;33(21):2511-6. This case-control study investigated the relationship between the risk of Autism Spectrum Disorder (ASD) onset, and early exposure to MMR vaccine and thimerosal measured from vaccinations in the highly genetically homogenous Japanese population.

   CONCLUSION: No convincing evidence was found in this study that MMR vaccination and increasing thimerosal dose were associated with an increased risk of ASD onset.

   LINK: www.ncbi.nlm.nih.gov/pubmed/25562790

3. ***Autism Occurrence by MMR Vaccine Status among US Children with Older Siblings with and without Autism.*** Jain A et al. *JAMA* 2015;313(15):1534-40. The objective of this study was to investigate Autism Spectrum Disorder (ASD) occurrence by MMR vaccine status in a large sample of US children who have older siblings with and without ASD.

   CONCLUSION: In this large sample of privately insured children with older siblings, receipt of the MMR vaccine was not associated with increased risk of ASD, regardless of whether older siblings had ASD. These findings indicate no harmful association between MMR vaccine receipt and ASD even among children already at higher risk for ASD.

   LINK: www.ncbi.nlm.nih.gov/pubmed/25898051

4. ***Vaccines Are Not Associated with Autism: An Evidence-based Meta-analysis of Case-control and Cohort Studies.*** Taylor LE et al. *Vaccine* 2014;32(29):3623–9. A meta-analysis to summarize available evidence from five cohort studies involving 1,256,407 children and five case-control studies involving 9,920 children.

   CONCLUSION: Vaccination is not associated with the development of autism or autism spectrum disorder (ASD). Furthermore, the components of the vaccines (thimerosal or mercury) or multiple vaccines (MMR) are not associated with the development of autism or ASD.

   LINK: www.ncbi.nlm.nih.gov/pubmed/24814559

CONTINUED ON THE NEXT PAGE ▶

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IMMUNIZATION ACTION COALITION Saint Paul, Minnesota • 651-647-9009 • www.immunize.org • www.vaccineinformation.org

www.immunize.org/catg.d/p4026.pdf • Item #P4026 (5/19)

17. ***MMR Vaccination and Pervasive Developmental Disorders: A Case-Control Study.*** Smeeth L et al. *Lancet* 2004; 364(9438): 963-9. Subjects:1294 cases and 4469 controls.

CONCLUSION: Our findings suggest that MMR vaccination is not associated with an increased risk of pervasive developmental disorders.

LINK: www.ncbi.nlm.nih.gov/pubmed/15364187

18. ***Age at First Measles-Mumps-Rubella Vaccination in Children with Autism and School-Matched Control Subjects:*** A Population-Based Study in Metropolitan Atlanta. DeStefano F et al. *Pediatrics* 2004; 113(2): 259-66. Subjects: 624 children with autism and 1,824 controls.

CONCLUSIONS: Similar proportions of case and control children were vaccinated by the recommended age or shortly after (ie, before 18 months) and before the age by which atypical development is usually recognized in children with autism (ie, 24 months). Vaccination before 36 months was more common among case children than control children, especially among children 3 to 5 years of age, likely reflecting immunization requirements for enrollment in early intervention programs.

LINK: www.ncbi.nlm.nih.gov/pubmed/14754936

19. ***Prevalence of Autism and Parentally Reported Triggers in a North East London Population.*** Lingam R et al. *Arch Dis Child* 2003; 88(8):666-70. Subjects: 567 children with autistic spectrum disorder.

CONCLUSIONS: The prevalence of autism, which was apparently rising from 1979 to 1992, reached a plateau from 1992 to 1996 at a rate of some 2.6 per 1000 live births. This levelling off, together with the reducing age at diagnosis, suggests that the earlier recorded rise in prevalence was not a real increase but was likely due to factors such as increased recognition, a greater willingness on the part of educationalists and families to accept the diagnostic label, and better recording systems. The proportion of parents attributing their child's autism to MMR appears to have increased since August 1997.

LINK: www.ncbi.nlm.nih.gov/pubmed/12876158

20. ***A Population-Based Study of Measles, Mumps, and Rubella Vaccination and Autism.*** Madsen KM et al. *N Engl J Med* 2002; 347(19):1477-82. Subjects: All 537,303 children born 1/91–12/98 in Denmark.

CONCLUSIONS: This study provides strong evidence against the hypothesis that MMR vaccination causes autism.

LINK: www.ncbi.nlm.nih.gov/pubmed/12421889

21. ***Neurologic Disorders after Measles-Mumps-Rubella Vaccination.*** Makela A et al. *Pediatrics* 2002; 110:957-63. Subjects: 535,544 children vaccinated between November 1982 and June 1986 in Finland.

CONCLUSIONS: We did not identify any association between MMR vaccination and encephalitis, aseptic meningitis, or autism.

LINK: www.ncbi.nlm.nih.gov/pubmed/12415036

22. ***Relation of Childhood Gastrointestinal Disorders to Autism: Nested Case Control Study Using Data from the UK General Practice Research Database.*** Black C et al. *BMJ* 2002; 325:419-21. Subjects: 96 children diagnosed with autism and 449 controls.

CONCLUSIONS: No evidence was found that children with autism were more likely than children without autism to have had defined gastrointestinal disorders at any time before their diagnosis of autism.

LINK: www.ncbi.nlm.nih.gov/pubmed/12193358

23. ***Measles, Mumps, and Rubella Vaccination and Bowel Problems or Developmental Regression in Children with Autism: Population Study.*** Taylor B et al. *BMJ* 2002; 324(7334):393-6. Subjects: 278 children with core autism and 195 with atypical autism.

CONCLUSIONS: These findings provide no support for an MMR associated "new variant" form of autism with developmental regression and bowel problems, and further evidence against involvement of MMR vaccine in the initiation of autism.

LINK: www.ncbi.nlm.nih.gov/pubmed/11850369

24. ***No Evidence for a New Variant of Measles-Mumps-Rubella-Induced Autism.*** Fombonne E et al. *Pediatrics* 2001;108(4):E58. Subjects: 262 autistic children (pre- and post-MMR samples).

CONCLUSIONS: No evidence was found to support a distinct syndrome of MMR-induced autism or of "autistic enterocolitis." These results add to the recent accumulation of large-scale epidemiologic studies that all failed to support an association between MMR and autism at population level. When combined, the current findings do not argue for changes in current immunization programs and recommendations.

LINK: www.ncbi.nlm.nih.gov/pubmed/11581466

25. ***Time Trends in Autism and in MMR Immunization Coverage in California.*** Dales L et al. *JAMA* 2001; 285(9):1183-5. Subjects: Children born in 1980-94 who were enrolled in California kindergartens (survey samples of 600–1,900 children each year).

CONCLUSIONS: These data do not suggest an association between MMR immunization among young children and an increase in autism occurrence.

LINK: www.ncbi.nlm.nih.gov/pubmed/11231748

26. ***Mumps, Measles, and Rubella Vaccine and the Incidence of Autism Recorded by General Practitioners: A Time Trend Analysis.*** Kaye JA et al. *BMJ* 2001; 322:460-63. Subjects: 305 children with autism.

CONCLUSIONS: Because the incidence of autism among 2 to 5 year olds increased markedly among boys born in each year separately from 1988 to 1993 while MMR vaccine coverage was over 95% for successive annual birth cohorts, the data provide evidence that no correlation exists between the prevalence of MMR vaccination and the rapid increase in the risk of autism over time. The explanation for the marked increase in risk of the diagnosis of autism in the past decade remains uncertain.

LINK: www.ncbi.nlm.nih.gov/pubmed/11222420

27. ***Autism and Measles, Mumps, and Rubella Vaccine: No Epidemiological Evidence for a Causal Association.*** Taylor B et al. *Lancet* 1999;353 (9169):2026-9. Subjects: 498 children with autism.

CONCLUSION: Our analyses do not support a causal association between MMR vaccine and autism. If such an association occurs, it is so rare that it could not be identified in this large regional sample.

LINK: www.ncbi.nlm.nih.gov/pubmed/10376617

5. ***Vaccines for Measles, Mumps and Rubella in Children.*** Demicheli V et al. *Cochrane Database Syst Rev*. 2012 Feb 15. Literature review of 5 randomized controlled trials, 1 controlled clinical trial, 27 cohort studies, 17 case-control studies, 5 time-series trials, 1 case cross-over trial, 2 ecological studies, 6 and self-controlled case series studies involving in all about 14,700,000 children and assessing effectiveness and safety of MMR vaccine (2004-2011).

   CONCLUSION: Exposure to the MMR vaccine was unlikely to be associated with autism, asthma, leukaemia, hay fever, type 1 diabetes, gait disturbance, Crohn's disease, demyelinating diseases, bacterial or viral infections.

   LINK: www.ncbi.nlm.nih.gov/pubmed/22336803

6. ***Immunization Safety Review: Adverse Effects of Vaccines: Evidence and Causality. Institute of Medicine. The National Academies Press:*** 2011. Consensus Report.

   CONCLUSION: Evidence favors rejection of five vaccine-adverse event relationships, including MMR vaccine and autism. Overall, the committee concludes that few health problems are caused by or clearly associated with vaccines.

   LINK: www.nationalacademies.org/hmd/reports/2011/Adverse-Effects-of-Vaccines-Evidence-and-Causality.aspx

7. ***Lack of Association Between Measles-Mumps-Rubella Vaccination and Autism in Children: A Case-Control Study.*** Mrozek-Budzyn D et al. *Pediatr Infect Dis J*. 2010;29(5):397-400. The 96 cases with childhood or atypical autism, aged 2 to 15, were included in the study group. Controls consisted of 192 children individually matched to cases by year of birth, sex, and general practitioners.

   CONCLUSION: The study provides evidence against the association of autism with either MMR or a single measles vaccine.

   LINK: www.ncbi.nlm.nih.gov/pubmed/19952979

8. ***Measles Vaccination and Antibody Response in Autism Spectrum Disorders.*** Baird G et al. *Arch Dis Child* 2008; 93(10):832-7. Subjects: 98 vaccinated children aged 10-12 years in the UK with autism spectrum disorder (ASD); two control groups of similar age: 52 children with special educational needs but no ASD and 90 children in the typically developing group.

   CONCLUSION: No association between measles vaccination and ASD was shown.

   LINK: www.ncbi.nlm.nih.gov/pubmed/18252754

9. ***Lack of Association between Measles Virus Vaccine and Autism with Enteropathy: A Case-Control Study.*** Hornig M et al. *PLoS ONE* 2008; 3(9):e3140. Subjects: 25 children with autism and GI disturbances and 13 children with GI disturbances alone (controls).

   CONCLUSION: This study provides strong evidence against association of autism with persistent MV RNA in the GI tract or MMR exposure.

   LINK: www.ncbi.nlm.nih.gov/pubmed/18769550

10. ***Immunizations and Autism: A Review of the Literature.*** Doja A, Roberts W. *Can J Neurol Sci*. 2006; 33(4):341-6. Literature review.

    CONCLUSION: Our literature review found very few studies supporting this theory, with the overwhelming majority showing no causal association between the Measles-Mumps-Rubella vaccine and autism.

    LINK: www.ncbi.nlm.nih.gov/pubmed/17168158

11. ***No Evidence of Persisting Measles Virus in Peripheral Blood Mononuclear Cells from Children with Autism Spectrum Disorder.*** D'Souza Y et al. *Pediatrics* 2006; 118(4):1664-75. Subjects: 54 children with autism spectrum disorder and 34 developmentally normal children

    CONCLUSION: There is no evidence of measles virus persistence in the peripheral blood mononuclear cells of children with autism spectrum disorder.

    LINK: www.ncbi.nlm.nih.gov/pubmed/17015560

12. ***MMR-Vaccine and Regression in Autism Spectrum Disorders: Negative Results Presented from Japan.*** Uchiyama T et al. *J Autism Dev Disord* 2007; 37(2):210-7. Subjects: 904 children with autism spectrum disorder. (Note: MMR was used in Japan only between 1989 and 1993.)

    CONCLUSIONS: During the period of MMR usage no significant difference was found in the incidence of regression between MMR-vaccinated children and non-vaccinated children. Among the proportion and incidence of regression across the three MMR-program-related periods (before, during and after MMR usage), no significant difference was found between those who had received MMR and those who had not. Moreover, the incidence of regression did not change significantly across the three periods.

    LINK: www.ncbi.nlm.nih.gov/pubmed/16865547

13. ***Pervasive Developmental Disorders in Montreal, Quebec, Canada: Prevalence and Links with Immunizations.*** Fombonne E et al. *Pediatrics*. 2006;118(1):e139-50. Subjects: 27,749 children born from 1987 to 1998 attending 55 schools.

    CONCLUSION: The findings ruled out an association between pervasive developmental disorder and either high levels of ethylmercury exposure comparable with those experienced in the United States in the 1990s or 1- or 2-dose measles-mumps-rubella vaccinations.

    LINK: www.ncbi.nlm.nih.gov/pubmed/16818529

14. ***Is There a 'Regressive Phenotype' of Autism Spectrum Disorder Associated with the Measles-Mumps-Rubella Vaccine? A CPEA Study.*** Richler J, Luyster R, Risi S, et al. *J Autism Dev Disord*. 2006 Apr;36(3):299-316. A multi-site study of 351 children with Autism Spectrum Disorders (ASD) and 31 typically developing children used caregiver interviews to describe the children's early acquisition and loss of social-communication milestones.

    CONCLUSION: There was no evidence that onset of autistic symptoms or of regression was related to measles-mumps-rubella vaccination.

    LINK: www.ncbi.nlm.nih.gov/m/pubmed/16729252

15. ***Relationship between MMR Vaccine and Autism.*** Klein KC, Diehl EB. *Ann Pharmacother*. 2004; 38(7-8):1297-300. Literature review of 10 studies.

    CONCLUSION: Based upon the current literature, it appears that there is no relationship between MMR vaccination and the development of autism.

    LINK: www.ncbi.nlm.nih.gov/pubmed/15173555

16. ***Immunization Safety Review: Vaccines and Autism.*** Institute of Medicine. *The National Academies Press:* 2004. Consensus report.

    CONCLUSION: The committee concludes that the body of epidemiological evidence favors rejection of a causal relationship between the MMR vaccine and autism.

    LINK: www.nap.edu/openbook.php?isbn=030909237X

CONTINUED ON THE NEXT PAGE ▶

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- *The Lancet* retraction 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

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.

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.

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

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.

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" Gianz et al http://pediatrics.aappublications.org/content/123/6/1445.abstract

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

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

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.

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.

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 thimersal
  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

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

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.

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.

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.

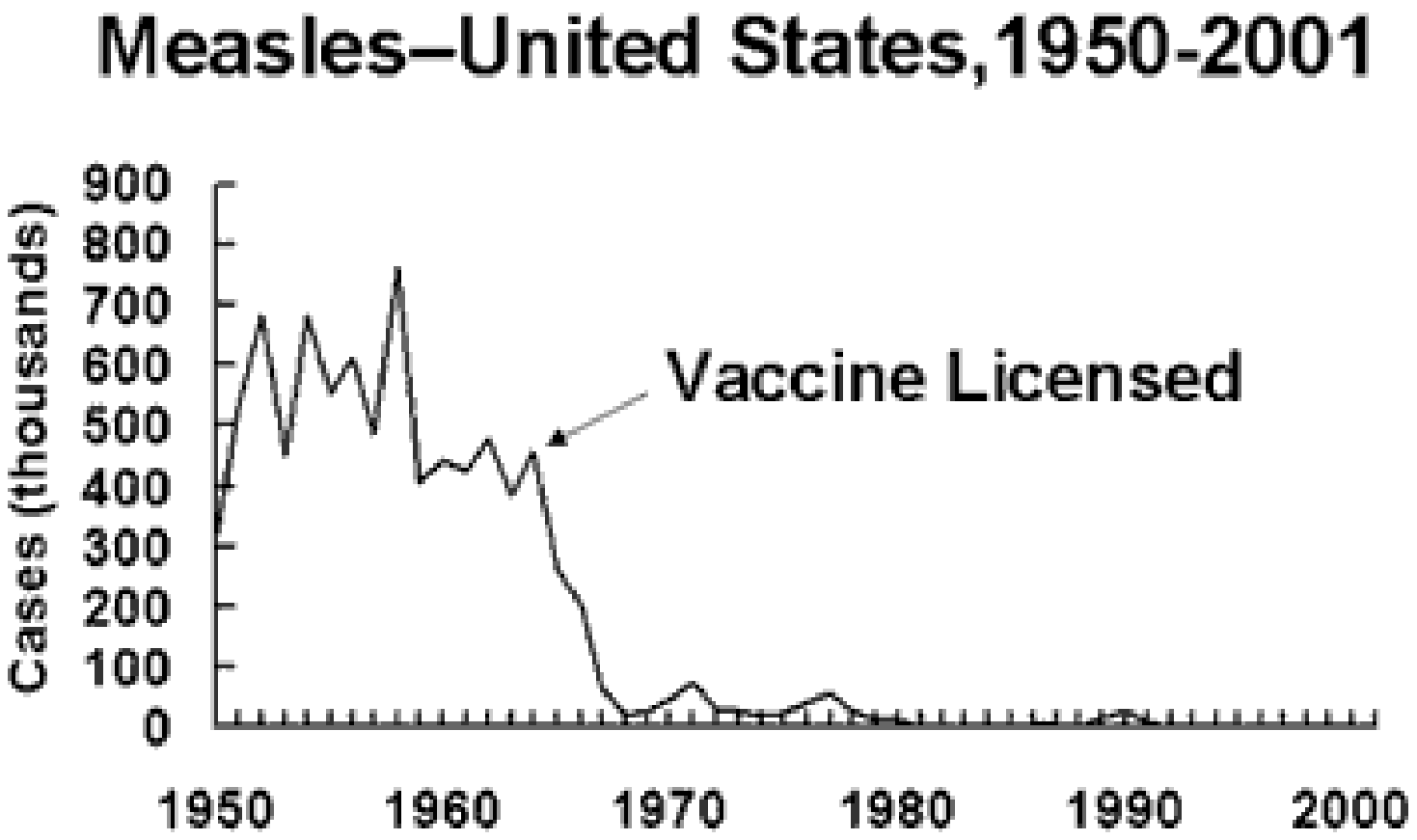
References

- 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

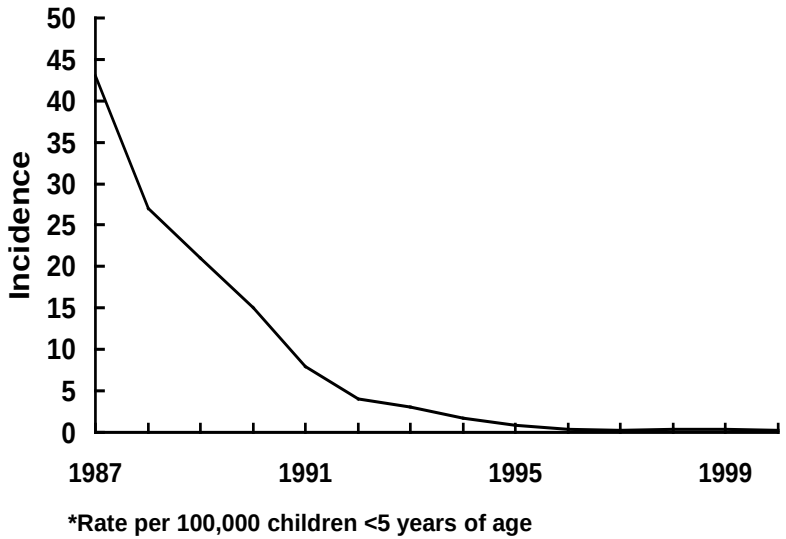
References (cont.)

- 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

Example: Measles



Example: *Haemophilus influenzae* type b



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

Vaccines Work!

CDC statistics demonstrate dramatic declines in vaccine-preventable diseases when compared with the pre-vaccine era

DISEASE	PRE-VACCINE ERA ESTIMATED ANNUAL MORBIDITY[1]	MOST RECENT REPORTS OR ESTIMATES OF U.S. CASES	PERCENT DECREASE
Diphtheria	21,053	1[2]	>99%
H. influenzae (invasive, <5 years of age)	20,000	33[2,3]	>99%
Hepatitis A	117,333	4,000[4]	97%
Hepatitis B (acute)	66,232	20,900[4]	68%
Measles	530,217	273[2]	>99%
Meningococcal disease	2,886[5]	340[2]	88%
Mumps	162,344	2,251[2]	99%
Pertussis	200,752	13,439[2]	93%
Pneumococcal disease (invasive, <5 years of age)	16,069	1,700[6]	89%
Polio (paralytic)	16,316	0[2]	100%
Rotavirus (hospitalizations, <3 years of age)	62,500[7]	30,625[8]	51%
Rubella	47,745	5[2]	>99%
Congenital Rubella Syndrome	152	0[2]	100%
Smallpox	29,005	0[2]	100%
Tetanus	580	20[2]	97%
Varicella	4,085,120	102,128[9]	98%

1. CDC. *JAMA* November 14, 2007; 298(18):2155–63.
2. CDC. National Notifiable Diseases Surveillance System, Week 52 (Provisional Data), Weekly Tables of Infectious Disease Data, Atlanta, GA. CDC Division of Health Informatics and Surveillance, 2019. Available at www.cdc.gov/nndss/infectious-tables.html. Accessed January 4, 2019.
3. An additional 11 cases of Hib are estimated to have occurred among the 221 notifications of Hib (<5 years) with unknown serotype.
4. CDC. Viral Hepatitis Surveillance – United States, 2016.
5. CDC. *MMWR* October 6, 1995; 43(53):1–98.
6. CDC. Active Bacterial Core Surveillance, 2016 data (unpublished).
7. CDC. *MMWR*, February 6, 2009; 58(RR-2):1–25.
8. CDC. New Vaccine Surveillance Network, 2017 data (unpublished); U.S. rotavirus disease now has a biennial pattern.
9. CDC. Varicella Program, 2017 data (unpublished).

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www.immunize.org/catg.d/p4037.pdf • Item #P4037 (4/19)

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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

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.

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-wer-fetal-cells-used-make-certain-vaccines?utm_term=new+view&utm_content=vaccine+hesitancy&utm_campaign=vecupdatesApr2017

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.

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

Don’t drug companies make big profits from pushing vaccines?

- Vaccines are not high-profit products. Vaccine sales are dwarfed by prescription sales.
- Costs for research, development, and compliance with standards are high, with no guarantee that a vaccine will be licensed.
- If vaccines were highly profitable, why would only a few companies produce almost all of the U.S. childhood vaccines today, when there used to be 25 companies producing vaccines?
- Vaccine manufacturing is a public service.

Isn’t it my right not to vaccinate my child?

- 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.

References

- *The Vaccine Enterprise* (*Health Affairs*, May 2005, Supplement)
  http://content.healthaffairs.org/content/24/3.toc
- *Big Pharma Vaccine Profits—The Real Conspiracy*
  (The Skeptical Raptor's Blog)
  www.skepticalraptor.com/skepticalraptorblog.php/big-pharma-supports-antivaccine-movement-conspirac-vaccines-maybe-not
- *Drug versus vaccine investment: a modelled comparison of economic incentives*
  www.ncbi.nlm.nih.gov/pmc/articles/PMC3846654

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

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

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.

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

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

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

Examining the impact of HPV vaccination

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A recent meta-analysis, published in *The Lancet*, examined how human papillomavirus (HPV) vaccination programs have impacted rates of HPV-related diagnoses in the little more than 10 years since vaccination was implemented. Sixty million individuals were included in the review and the 8 years of post-vaccination follow-up data indicate that vaccination has had a substantial impact on reducing HPV infection, CIN2+, and anogenital warts.

For the systematic review, the authors searched MEDLINE and Embase for studies published between February 1, 2014 and October 11, 2018. Eligible studies compared the frequency (prevalence or incidence) of at least one HPV-related endpoint, including genital HPV infection, anogenital wart diagnoses or cervical intraepithelial neoplasia grade 2+ (CIN2+), between pre-vaccination and post-vaccination periods. The studies also had to use the same population sources and recruitment methods before and after vaccination. All analyses were stratified by sex, age, and years since vaccine introduction.

The authors identified 1702 articles that were potentially eligible. Sixty-five articles from 14 high-income countries were included in the final review (23 for HPV infection, 29 for anogenital warts and 13 for CIN2+).

Five to 8 years of vaccination, prevalence of HPV 16 and 18 decreased significantly by 83% (relative risk [RR] 0.17; 95% CI 0.11—0.25) among girls between ages 13 and 19. Among women aged 20 to 24, prevalence decreased by 66% (RR 0.34; 95% CI 0.23—0.49). Although not as significant as HPV 16 and 18, prevalence of HPV 31, 33, and 45 decreased significantly by 54% (RR 0.46; 95% CI 0.33—0.66) among girls aged 13 to 19. Among women aged 20 to 24, the decrease was not significant.

Anogenital wart diagnoses significantly decreased among girls and women aged 15 to 19, 20 to 24, and 25 to 29 in the first 4 years following implementation. Diagnoses 5 to 8 years after implementation also decreased by 67% (RR 0.33; 95% CI 0.24—0.46) among girls aged 15 to 19, by 54% (RR 0.46; 95% CI 0.36—0.60) among women aged 20 to 24, and by 31% (RR 0.69; 95% CI 0.47—0.98) among women aged 25 to 29.

At 5 to 9 years after implementation of vaccination, rates of CIN2+ decreased significantly by 51% (RR 0.49; 95% CI 0.42—0.58) among girls aged 15 to 19 and among women aged 20 to 24, this number decreased by 31% (RR 0.69; 95% CI 0.57—0.84). Among mostly unvaccinated women, CIN2+ significantly increased in women between ages 25 to 29 and 30 to 39, respectively (19% [RR 1.19, 95% CI 1.06—1.32] and 23% [RR 1.23; 95% CI 1.13—1.34].

The authors believe the results of the meta-analysis reinforce the recently revised position of the World Health Organization to recommend HPV vaccination to multiple age cohorts of girls with the hope that cervical cancer can be eliminated if proper population-level vaccination coverage can be achieved.

Personal belief exemptions for vaccination put people at risk. Examine the evidence for yourself.

Enforcement of mandatory immunization requirements for children entering childcare facilities and schools has resulted in high immunization coverage levels. While all states and the District of Columbia allow exemptions from the requirements for medical reasons, all but three offer exemptions to accommodate religious beliefs, and 18 states allow exemptions based on parents' personal beliefs. Several recent outbreaks of measles, pertussis, and varicella (chickenpox) have been traced to pockets of unvaccinated children in states that allow personal belief exemptions. To understand the impact of vaccine refusal, examine the evidence for yourself.

1. ***Association between vaccine refusal and vaccine-preventable diseases in the United States: a review of measles and pertussis.*** Phadke VK, Bednaraczyk RA, Salmon DA, Omer SB. *JAMA* 2016; 315(11): 1149-1158.

   SUMMARY: A review of 18 published reports of U.S. measles outbreaks from January 2000 through November 2015 and 32 published pertussis outbreaks from January 1977 through November 2015 to assess disease risk in the context of vaccine delay or exemption.

   KEY FINDINGS: The researchers found that more than half of the measles cases (56.8%) occurred in children whose parents refused measles vaccination. In the pertussis studies, many of the cases (24%–45%) in the five largest statewide pertussis outbreaks occurred in unvaccinated or undervaccinated populations. In addition, both the measles and the pertussis outbreaks occurred not only among unvaccinated individuals but also among vaccinated individuals in geographic locations with a high prevalence of vaccine exemptions.

   LINK: http://jama.jamanetwork.com/article.aspx?articleid=2503179

2. ***Measles – United States, January 4–April 2, 2015.*** CDC. *Morbidity and Mortality Weekly Report* (*MMWR*), April 17, 2015; 64(14):373–6.

   SUMMARY: To update surveillance data on current measles outbreaks, CDC analyzed cases reported during January 4–April 2, 2015. A total of 159 cases were reported during this period; over 80% of the cases occurred among persons who were unvaccinated or had unknown vaccination status.

   KEY FINDINGS: A total of 111 of the 159 cases were associated with an outbreak that originated in late December 2014 in Disney theme parks in Orange County, California. Cases associated with this outbreak were reported from seven U.S. states, Mexico, and Canada. Other smaller outbreaks without a link to the Disney outbreak occurred in Illinois (15 cases), Nevada (9), and Washington (5). The majority of the 159 cases were either unvaccinated (71 [45%]) or had unknown vaccination status (60 [38%]); 28 (18%) had received measles vaccine.

   LINK: www.cdc.gov/mmwr/preview/mmwrhtml/mm6414a1.htm

3. ***Outbreak of pertussis in a school and religious community averse to health care and vaccinations – Columbia County, Florida, 2013.*** CDC. *MMWR*, August 1, 2014; 63(30):655.

   SUMMARY: Health department staff in a Florida county investigated a report of an unvaccinated student who had lab-confirmed pertussis. The 316 students in the affected school were part of a larger community that was averse to health care and vaccinations. For example, only five (15%) of 34 students in kindergarten and one (5%) of 22 students in seventh grade were fully vaccinated; of those who were not fully vaccinated, 84% had religious exemptions.

   KEY FINDINGS: Despite the availability of free vaccine through the local health department, very few persons from the community took advantage of the offer. At the conclusion of the outbreak, the investigation found a total of 109 cases in the community, including 94 students and one teacher in the affected school and 14 household contacts of the initial case.

   LINK: www.cdc.gov/mmwr/preview/mmwrhtml/mm6330a3.htm

4. ***Religious exemptions for immunization and risk of pertussis in New York state, 2000–2011.*** Imdad A, Tserenpuntsag B, Blog DS, Halsey NA, Easton DE, Shaw J. *Pediatrics* 2013;132(1):37-43.

   SUMMARY: Researchers reviewed reported religious vaccination exemptions to the NYS Department of Health from 2000 through 2011. Changes in exemptions were assessed against incidence rates of childhood pertussis.

   KEY FINDINGS: Counties with higher exemption rates had higher rates of reported pertussis among exempted and vaccinated children when compared with counties having low exemption rates.

   LINK: http://pediatrics.aappublications.org/content/pediatrics/132/1/37.full.pdf

5. ***An outbreak of measles in an undervaccinated community.*** Gahr P, DeVries AS, Wallace G, et al. *Pediatrics.* July 2014; 134(1): e220–e228.

   SUMMARY: In March 2011, measles was confirmed in a Minnesota child without travel abroad. An investigation was initiated to determine the source, prevent transmission, and examine measles-mumps-rubella (MMR) vaccine coverage in the affected community.

   KEY FINDINGS: Twenty-one measles cases were identified. The median age was 12 months (range, 4 months to 51 years) and 14 (67%) were hospitalized (range of stay, 2–7 days). The source was a 30-month-old U.S.-born child of Somali descent infected while visiting Kenya. Measles spread in several settings, and over 3000 individuals were exposed. Sixteen case-patients were unvaccinated; 9 of the 16 were age-eligible: 7 of the 9 had safety concerns and 6 were of Somali descent. MMR vaccine coverage among Somali children declined significantly from 2004 through 2010 starting at 91.1% in 2004 and reaching 54.0% in 2010

CONTINUED ON THE NEXT PAGE ▶

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(P < 0.001). This was the largest measles outbreak in Minnesota in 20 years, and aggressive response likely prevented additional transmission. Measles outbreaks can occur if undervaccinated subpopulations exist. Misunderstandings about vaccine safety must be effectively addressed.

LINK: http://pediatrics.aappublications.org/content/134/1/e220.abstract

6. ***Measles – United States, January 1-May 23, 2014.*** CDC. *MMWR*, June 6, 2014; 63(22):496-9.

SUMMARY: To update national measles data in the United States, CDC evaluated cases reported by states from January 1 through May 23, 2014. A total of 288 confirmed measles cases have been reported to CDC, surpassing the highest reported yearly total of measles cases since elimination (220 cases reported in 2011). Fifteen outbreaks accounted for 79% of cases reported, including the largest outbreak reported in the United States since elimination (138 cases and ongoing).

KEY FINDINGS: The large number of cases this year emphasizes the need for health-care providers to have a heightened awareness of the potential for measles in their communities and the importance of vaccination to prevent measles. Most of the 288 measles cases reported this year have been in persons who were unvaccinated (200 [69%]) or who had an unknown vaccination status (58 [20%]); 30 (10%) were in persons who were vaccinated. Among the 195 U.S. residents who had measles and were unvaccinated, 165 (85%) declined vaccination because of religious, philosophical, or personal objections, 11 (6%) were missed opportunities for vaccination, and 10 (5%) were too young to receive vaccination.

LINK: www.ncbi.nlm.nih.gov/pubmed/24898167

7. ***Communication and mass vaccination strategies after pertussis outbreak in rural Amish communities-Illinois, 2009-2010.*** Medina-Marino A, Reynolds D, Finley C, Hays S, Jones J, Soyemi K. *J Rural Health*. 2013 Fall;29(4):413-9. doi: 10.1111/jrh.12019. Epub 2013 Mar 25.

SUMMARY: During January 2010, 2 infants from an Amish community in east-central Illinois were hospitalized with pertussis. The local health department (LDH) intervened to control disease transmission, identify contributing factors, and determine best communications methods to improve vaccination coverage.

KEY FINDINGS: Forty-seven cases were identified, with onsets during December 2009–March 2010. Median age was 7 (interquartile range 1–12) years. Nineteen (40%) patients were male; 39 (83%) were aged <18 years; 37 (79%) had not received any pertussis-containing vaccine. Presenting symptoms did not differ substantially between vaccinated and unvaccinated patients. Duration of cough was longer among unvaccinated than vaccinated patients (32 vs. 15.5 days, P=0.002). Compared with vaccinated patients, proportionately more unvaccinated patients reported secondary household transmission (30% vs. 72%; P=0.012). Through enhanced vaccination campaigns, 251 (~10%) Amish community members were administered 254 pertussis-containing vaccines. Targeted health communication and outreach resulted in a successful vaccine campaign and long-running monthly vaccination clinic. Amish do not universally reject vaccines, and their practices regarding vaccination are not static.

LINK: www.ncbi.nlm.nih.gov/pubmed/24088215

8. ***Nonmedical vaccine exemptions and pertussis in California, 2010. Pediatrics*** 2013; 132(4):624-630.

SUMMARY: Researchers analyzed nonmedical exemptions (NMEs) for children entering kindergarten from 2005 through 2010 and pertussis cases with onset in 2010 in California to determine if NMEs increased in that period, if children obtaining NMEs clustered spatially, if pertussis cases clustered spatially and temporally, and if there was statistically significant overlap between clusters of NMEs and cases.

KEY FINDINGS: Previous studies have shown that nonmedical exemptions (NMEs) to immunization cluster geographically and contribute to outbreaks of vaccine-preventable diseases such as pertussis. The 2010 pertussis resurgence in California has been widely attributed to waning immunity from acellular pertussis vaccines. This study provides evidence of spatial and temporal clustering of NMEs and clustering of pertussis cases and suggests that geographic areas with high NME rates were also associated with high rates of pertussis in California in 2010.

LINK: http://pediatrics.aappublications.org/content/early/2013/09/24/peds.2013-0878

9. ***Measles – United States, January 1–August 24, 2013.*** CDC. *MMWR* 2013; 62(36):741–3.

SUMMARY: CDC evaluated cases reported by 16 states during January 1-August 24, 2013. A total of 159 cases of measles were reported during this period.

KEY FINDINGS: Unvaccinated people place themselves and others in their communities at risk for measles and other vaccine preventable diseases. Measles is a highly contagious viral disease that is preventable by vaccination. In the United States, measles elimination (i.e. absence of year round transmission) was declared in 2000. However, measles continues to be imported into the United States from countries where measles is still common. During January 1–August 24, 2013, 159 measles cases, including 8 outbreaks were reported to CDC. An outbreak in New York City is the largest outbreak reported in the United States since 1996 (58 cases). Most cases were import-associated [157 (99 percent)] and in persons who were unvaccinated [131 (82 percent)] or had unknown vaccination status [15 (9 percent)]. Among U.S. residents who were unvaccinated, 92 (79 percent) have philosophical objection to vaccination. High vaccine coverage is important to prevent spread of measles following importation.

LINK: www.cdc.gov/mmwr/preview/mmwrhtml/mm6236a2.htm

10. ***Measles – United States, January–May 20, 2011.*** CDC. *MMWR* 2011; 60(20):666–8.

SUMMARY: During the first 19 weeks of 2011, 118 cases of measles were reported, the highest number reported for this period since 1996.

KEY FINDINGS: Unvaccinated persons accounted for 105 (89%) of the 118 cases. Among the 45 U.S. residents aged 12 months–19 years who acquired measles, 38 (87%) were unvaccinated, including 24 whose parents claimed a religious or personal exemption and eight who missed opportunities for vaccination. Among the 42 U.S. residents aged >20 years who acquired measles, 35 (83%) were unvaccinated, including six who declined

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vaccination because of philosophical objections to vaccination. Of the 33 U.S. residents who were vaccine-eligible and had traveled abroad, 30 were unvaccinated and one had received only 1 of the 2 recommended doses.

LINK: www.cdc.gov/mmwr/preview/mmwrhtml/mm6020a7.htm

11. ***Measles in the United States during the postelimination era.*** Parker Fiebelkorn A, Redd SB, Gallagher K, et al. *J Infect Dis* 2010; 202(10):1520–28.

SUMMARY: A descriptive analysis of all cases of measles reported in the United States during 2001–2008.

KEY FINDINGS: A total of 557 confirmed cases of measles and 38 outbreaks were reported during 2001–2008. Of these outbreaks, the 3 largest occurred primarily among personal belief exemptors (defined as persons who were vaccine eligible, according to recommendations of the Advisory Committee on Immunization Practices or the World Health Organization, but remained unvaccinated because of personal or parental beliefs). During 2004–2008, a total of 68% of reported measles cases were among unvaccinated U.S. residents, who were age-eligible for vaccination but who claimed a personal belief exemption to state immunization requirements.

LINK: www.ncbi.nlm.nih.gov/pubmed/20929352

12. ***Measles outbreak in a highly vaccinated population, San Diego, 2008: role of the intentionally undervaccinated.*** Sugerman DE, Barskey AE, Delea MG, et al. *Pediatrics* 2010;125(4):747–55.

SUMMARY: Researchers mapped vaccination-refusal rates by school and school district, analyzed measles-transmission patterns, and conducted discussions and surveys to examine beliefs of parents who decline vaccination for their children.

KEY FINDINGS: An intentionally unvaccinated 7-year-old child who was unknowingly infected with measles returned from Switzerland, resulting in 11 additional measles cases and in known measles exposure of more than 800 people. In San Diego, high personal belief exemption (PBE) rates were found in 10 schools (range, 42%–100%); schools and districts with high refusal rates were clustered geographically. Across all surveyed kindergartens, higher PBE rates correlated strongly with lower measles vaccination rates.

LINK: www.ncbi.nlm.nih.gov/pubmed/20308208

13. ***Parental refusal of varicella vaccination and the associated risk of varicella infection in children.*** Glanz JM, McClure DL, Magid DJ, Daley MF, France EK, Hambidge SJ. *Archives of Pediatrics & Adolescent Medicine* 2010; 164(1):66–70.

SUMMARY: A case-control study of 133 physician-diagnosed cases of varicella among Kaiser Permanente Colorado members between 1998 and 2008; each case was matched with 4 randomly selected controls (i.e., people who did not have varicella disease).

KEY FINDINGS: Compared with children of vaccine-accepting parents, children of vaccine-refusing parents had a 9-fold higher risk of varicella illness. Overall, 5% of varicella cases in the study population were attributed to vaccine refusal.

LINK: www.ncbi.nlm.nih.gov/pubmed/20048244

14. ***Parental refusal of pertussis vaccination is associated with an increased risk of pertussis infection in children.*** Glanz JM, McClure DL, Magid DJ, et al. *Pediatrics* 2009;123(6):1446–51.

SUMMARY: A case-control study of 156 physician-diagnosed cases of pertussis among Kaiser Permanente Colorado members between 1996 and 2007; each case was matched with 4 randomly selected controls (n=595).

KEY FINDINGS: Vaccine refusers had a 23-fold higher risk for pertussis when compared with vaccine acceptors, and 11% of pertussis cases in the entire study population were attributed to vaccine refusal.

LINK: www.ncbi.nlm.nih.gov/pubmed/19482753

15. ***Invasive Haemophilus influenzae type b disease in five young children – Minnesota, 2008.*** CDC. *Morbidity and Mortality Weekly Report* (*MMWR*) 2009;58(03):58–60.

SUMMARY: In 2008, during routine surveillance conducted by public health workers in Minnesota for invasive *H. influenzae* type b (Hib) disease, five children ages 5 months to 3 years were reported with invasive Hib disease; one child died.

KEY FINDINGS: Three of the five children with invasive Hib disease had not been vaccinated. One of the children was too young to complete the primary series of Hib vaccine, and another child, who had completed the primary series, was found to have an immune disorder that impairs response to vaccination.

LINK: www.cdc.gov/mmwr/preview/mmwrhtml/mm5803a4.htm

16. ***Geographic clustering of nonmedical exemptions to school immunization requirements and associations with geographic clustering of pertussis.*** Omer SB, Enger KS, Moulton LH, Halsey NA, Stokley S, Salmon DA. *Am J Epidemiol* 2008;168:1389–96.

SUMMARY: Researchers evaluated the geographic clustering of personal belief exemptions in Michigan (1991–2004: N=4,495 schools) and measured the geographic overlap between exemption clusters and clusters of reported pertussis cases (1993–2004: N=1,109 cases among people18 years and younger).

KEY FINDINGS: Researchers reported significant overlap between clusters of exemptions and clusters of pertussis cases. In addition, exemption rates appear to be increasing in Michigan, and nonmedical exemptions tend to be geographically clustered.

LINK: www.ncbi.nlm.nih.gov/pubmed/18922998

17. ***Measles outbreak associated with a church congregation: a study of immunization attitudes of congregation members.*** Kennedy AM, Gust DA. *Public Health Reports* 2008; 123(2):126–34.

SUMMARY: Researchers conducted a focus group and interviews with church leaders and families following a measles outbreak among church members in Indiana.

KEY FINDINGS: Vaccine refusal was attributed to a combination of personal religious beliefs and safety concerns among a subgroup of church members. Among interviewees from outbreak households, none had received MMR vaccine prior to the outbreak. Four of the six outbreak households reported that they would consider some or all recommended vaccines in the future.

LINK: www.ncbi.nlm.nih.gov/pubmed/18457065

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- 54 of 99 evaluable schools in our three counties have >5% students whose parents claimed non-medical exemption for all and any vaccine. 27 of the schools had 12% for greater (up to 60%) non-medical exemption students.
- 67% of all students in Deschutes County are at schools with >5% of students whose parents who claimed non-medical exemptions, compared with only 4% in Jefferson and Crook Counties.
- All but two of the faith-based schools are in the >5% non-medical exemption schools.
- All of the schools on the west side of Bend are >5% non-medical exemption schools.
- The schools with the greatest risk of measles, mumps, rubella, pertussis, hepatitis B or C, tetanus and diptheria are in westside Bend and sectarian schools.

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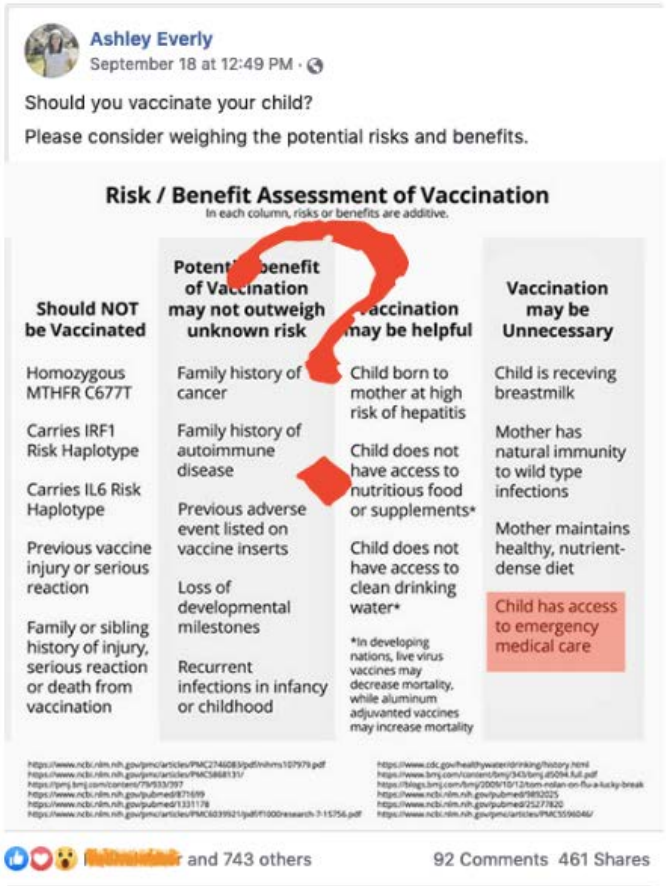
Risks and Benefits of Vaccines – Anti-Vax Edition

Anti-vax folks like to say that they are doing their research, even collecting that research into handy binders. And they like to think that they are looking at both the risks and benefits of vaccines when they make their decision to skip or delay their child's vaccines.



When anti-vax folks look at the risks and benefits of vaccines, they see lots of risks and few benefits.

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Guide to Contraindications and Precautions to Commonly Used Vaccines[1,*]

Vaccine	Contraindications[1]	Precautions[1]
Hepatitis B (HepB)	• Severe allergic reaction (e.g., anaphylaxis) after a previous dose or to a vaccine component • Hypersensitivity to yeast	• Moderate or severe acute illness with or without fever • Infant weighing less than 2000 grams (4 lbs, 6.4 oz)[2]
Rotavirus (RV5 [RotaTeq], RV1 [Rotarix])	• Severe allergic reaction (e.g., anaphylaxis) after a previous dose or to a vaccine component • Severe combined immunodeficiency (SCID) • History of intussusception	• Moderate or severe acute illness with or without fever • Altered immunocompetence other than SCID • Chronic gastrointestinal disease[3] • Spina bifida or bladder exstrophy[3]
Diphtheria, tetanus, pertussis (DTaP) **Tetanus, diphtheria, pertussis (Tdap)** **Tetanus, diphtheria (DT, 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, prolonged seizures) not attributable to another identifiable cause within 7 days of administration of a previous dose of DTP or DTaP (for DTaP); or of previous dose of DTP, DTaP, or Tdap (for Tdap)	• Moderate or severe acute illness with or without fever • Guillain-Barré syndrome (GBS) within 6 weeks after a previous dose of tetanus toxoid-containing vaccine • History of Arthus-type hypersensitivity reactions after a previous dose of diphtheria- or tetanus toxoid-containing vaccine; defer vaccination until at least 10 years have elapsed since the last tetanus toxoid-containing vaccine • For DTaP and Tdap only: Progressive or unstable neurologic disorder (including infantile spasms for DTaP), uncontrolled seizures, or progressive encephalopathy; defer until a treatment regimen has been established and the condition has stabilized
***Haemophilus influenzae* type b (Hib)**	• Severe allergic reaction (e.g., anaphylaxis) after a previous dose or to a vaccine component • Age younger than 6 weeks	• Moderate or severe acute illness with or without fever
Inactivated poliovirus vaccine (IPV)	• 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
Hepatitis A (HepA)	• Severe allergic reaction (e.g., anaphylaxis) after a previous dose or to a vaccine component	• Moderate or severe acute illness with or without fever
Measles, mumps, rubella (MMR)[4]	• 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[5]), or persons with human immunodeficiency virus [HIV] infection who are severely immunocompromised[6] • 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	• Moderate or severe acute illness with or without fever • Recent (within 11 months) receipt of antibody-containing blood product (specific interval depends on product)[7] • History of thrombocytopenia or thrombocytopenic purpura • Need for tuberculin skin testing[8] or interferon gamma release assay (IGRA) testing • For MMRV only: Family or personal history of seizures
Varicella (Var)[4]	• 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[5]), or persons with HIV infection who are severely immunocompromised[6] • 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	• Moderate or severe acute illness with or without fever • Recent (within 11 months) receipt of antibody-containing blood product (specific interval depends on product)[7] • 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. • Use of aspirin or aspirin-containing products • For MMRV only: Family or personal history of seizures
Pneumococcal (PCV13 or PPSV23)	• Severe allergic reaction (e.g., anaphylaxis) after a previous dose or to a vaccine component (including, for PCV13, to any vaccine containing diphtheria toxoid)	• Moderate or severe acute illness with or without fever
Human papillomavirus (HPV)[9]	• Severe allergic reaction (e.g., anaphylaxis) after a previous dose or to a vaccine component	• Moderate or severe acute illness with or without fever

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Technical content reviewed by the Centers for Disease Control and Prevention

Saint Paul, Minnesota • 651-647-9009 • www.immunize.org • www.vaccineinformation.org

www.immunize.org/catg.d/p3072a.pdf • Item #P3072a (7/15/19)

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Vaccine	Contraindications[1]	Precautions[1]
Influenza, inactivated injectable (IIV)[10]	• Severe allergic reaction (e.g., anaphylaxis) to any component of the vaccine (except egg) or to a previous dose of influenza vaccine[10]	• Moderate or severe acute illness with or without fever • History of GBS within 6 weeks of previous influenza vaccination • Egg allergy other than hives (e.g., angioedema, respiratory distress, lightheadedness, or recurrent emesis); or required epinephrine or another emergency medical intervention (IIV may be administered in an inpatient or outpatient medical setting, under the supervision of a healthcare provider who is able to recognize and manage severe allergic conditions)[10]
Influenza, recombinant (RIV)[10]	• Severe allergic reaction (e.g., anaphylaxis) to any component of the vaccine (except egg) or to a previous dose of influenza vaccine[10]	• Moderate or severe acute illness with or without fever • History of GBS within 6 weeks of previous influenza vaccination
Influenza, live attenuated (LAIV)[4,5,10,11]	• Severe allergic reaction (e.g., anaphylaxis) to any component of the vaccine (except egg) or to a previous dose of influenza vaccine • Concomitant use of aspirin or salicylate-containing therapy in children or adolescents • Children age 2 through 4 years who have a diagnosis of asthma or had wheezing with the past 12 months, per healthcare provider statement • Children and adults who are immunocompromised due to any cause (including immunosuppression caused by medications or by HIV infection) • Close contacts and caregivers of severely immunosuppressed persons who required a protected environment) • Pregnancy • Receipt of influenza antivirals (amantadine, rimantadine, zanamivir, oseltamivir or peramivir) within the previous 48 hours; avoid use of these antiviral drugs for 14 days after vaccination	• Moderate or severe acute illness with or without fever • GBS within 6 weeks of previous influenza vaccination • Asthma in persons age 5 years and older • Other chronic medical conditions (e.g., other chronic lung diseases, chronic cardiovascular disease [excluding isolated hypertension], diabetes, chronic renal or hepatic disease, hematologic disease, neurologic disease, and metabolic disorders)
Meningococcal (MenACWY; MenB)	• Severe allergic reaction (e.g., anaphylaxis) after a previous dose or to a vaccine component	• Moderate or severe acute illness with or without fever
Recombinant zoster vaccine (RZV) **Zoster vaccine live (ZVL)[4]**	• Severe allergic reaction (e.g., anaphylaxis) after a previous dose or to a vaccine component • For ZVL only: Severe immunodeficiency (e.g., from hematologic and solid tumors, receipt of chemotherapy, or long-term immunosuppression therapy[7]), or persons with HIV infection who are severely immunocompromised • For ZVL only: Pregnancy	• Moderate or severe acute illness with or without fever • For ZVL only: 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 • For RZV only: Pregnancy and lactation

FOOTNOTES

1. The Advisory Committee on Immunization Practices (ACIP) recommendations and package inserts for vaccines provide information on contraindications and precautions related to vaccines. Contraindications are conditions that increase chances of a serious adverse reaction in vaccine recipients and the vaccine should not be administered when a contraindication is present. Precautions should be reviewed for potential risks and benefits for vaccine recipient. For a person with a severe allergy to latex (e.g., anaphylaxis), vaccines supplied in vials or syringes that contain natural rubber latex should not be administered unless the benefit of vaccination clearly outweighs the risk for a potential allergic reaction. For latex allergies other than anaphylaxis, vaccines supplied in vials or syringes that contain dry, natural rubber or natural rubber latex may be administered. Whether and when to administer DTaP to children with proven or suspected underlying neurologic disorders should be decided on a case-by-case basis.
2. 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.
3. For details, see CDC. "Prevention of Rotavirus Gastroenteritis among Infants and Children: Recommendations of the Advisory Committee on Immunization Practices. (ACIP)" *MMWR* 2009; 58(No. RR–2), available at www.cdc.gov/mmwr/pdf/rr/rr5802.pdf.
4. Age-appropriate parenteral vaccines (LAIV, MMR, Var, or ZVL) can be administered on the same day. If not administered on the same day, these live vaccines should be separated by at least 28 days.
5. 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.
6. 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 www.cdc.gov/mmwr/pdf/rr/rr6204.pdf, page 23, for details). HIV-infected 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.
7. Vaccine should be deferred for the appropriate interval if replacement immune globulin products are being administered (see "Table 3-5. Recommended Intervals Between Administration of Antibody-Containing Products and Measles- or Varicella-Containing Vaccine, by Product and Indication for Vaccination" found in "Best Practices Guidance of the Advisory Committee on Immunization Practices (ACIP)," available at www.cdc.gov/vaccines/hcp/acip-recs/general-recs/index.html.)
8. Measles vaccination might suppress tuberculin reactivity temporarily. Measles-containing vaccine may be administered on the same day as tuberculin skin testing or interferon gamma release assay (IGRA), or should be postponed for at least 4 weeks after the vaccination.
9. HPV vaccine is not recommended for use in pregnant women. If a woman is found to be pregnant after initiating the vaccination series, the remainder of the series should be delayed until completion of pregnancy. Pregnancy testing is not needed before vaccination.
10. For additional information on use of influenza vaccines among persons with egg allergy, see CDC. "Prevention and Control of Seasonal Influenza with Vaccines: Recommendations of the Advisory Committee on Immunization Practices (ACIP) – United States, . . ." Access links to influenza vaccine recommendations at www.cdc.gov/vaccines/hcp/acip-recs/vacc-specific/flu.html.
11. LAIV is not recommended for people with functional or anatomic asplenia, complement component deficiency, cochlear implant, or CSF leak.

* Adapted from "Table 4-1. Contraindications and Precautions to Commonly Used Vaccines" found in: CDC. "Best Practices Guidance of the Advisory Committee on Immunization Practices (ACIP)" available at www.cdc.gov/vaccines/hcp/acip-recs/general-recs/index.html.

Additional Resources

- Boostoregon.org
- ImmunizeOR.org
- Immunize.org
- Vaxxopedia