



# Don't Hesitate – Vaccinate!

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## Abstract

Although the rates of childhood vaccination are still high in the United States, there has been an increase in vocal vaccine deniers. Regardless that the safety and efficacy of vaccines has been well established through evidence-based medicine, these individuals are relentless in their beliefs and are dismissive of scientific research. Subsequently, there have been several outbreaks of measles, a serious vaccine preventable disease. How should we as medical providers address this trend? This article provides an expert opinion by Dr. Paul A. Offit a renowned and highly respected pediatric infectious disease physician, to consider non-vaccination of healthy children as a form of neglect.

**Keywords** Vaccinate · Vaccine · Measles · Outbreaks

In order to better understand the connection between failure to vaccinate children and medical neglect, I conducted an interview with Dr. Paul A. Offit, the Director of the Vaccine Education Center and Professor of Pediatrics in the Division of Infectious Diseases at the Children's Hospital of Philadelphia (CHOP) in Philadelphia, PA. Since my interview with Dr. Paul Offit, the CDC has documented 5 outbreaks of measles, with 101 confirmed cases thus far in the United States for 2019. An outbreak is defined as 3 or more cases. These outbreaks have occurred in 3 counties in New York State and in Washington, and Texas. Of the available data regarding immunization status, the majority of people who developed measles were unvaccinated. In Rockland County, NY from 2018 to 2019 there were 135 confirmed cases of measles of which 81.5% were unimmunized. In Clark County, Washington there were 53 confirmed cases of measles of which 88.7% were unimmunized. Many of these outbreaks occur when individuals with measles travel from other countries into the US (<https://www.cdc.gov/measles/cases-outbreaks.html> accessed 2/13/2019). These

recent outbreaks highlight the importance of vaccination. Unfortunately, there are still many parents who chose not to vaccinate or chose to delay vaccinating their children due to non-evidence based falsehoods regarding vaccines. It is these cases of non-vaccinated healthy children that is considered by some as a form of neglect.

## Interview with Paul A. Offit, MD (March 12, 2020)

### What Makes an Effective Vaccine?

The purpose of a vaccine is to essentially induce the immunity that is typically the result of a natural infection without having to pay the price of the natural disease. An effective vaccine induces an immune response that protects the recipient from natural infection. For example, we have eliminated smallpox. Measles vaccine was introduced in the United States in 1963 and by 2000 measles was eliminated. Unfortunately, as parents' chose not to vaccinate their children there have been several recent measles outbreaks.

### What Is Herd Immunity and Why Is It So Important?

Herd immunity means that if you can immunize enough people in the population it will prevent a virus or bacteria from spreading within the population. The percentage of people that need to be immunized to induce herd immunity depends on

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which preventable disease is being targeted. Highly contagious viruses such as measles need a fairly high percentage of the population to be vaccinated to prevent spread within the community. Polio, which is less contagious, requires a lower percentage. The reason herd immunity is important because there are some individuals who cannot be vaccinated. These include individuals receiving chemotherapy for their cancers, individuals receiving immunosuppressive therapy for their chronic or rheumatologic diseases, or individuals who are too young to be vaccinated. According to the US Census Bureau the United States population in 2017 was 325.7 million. Approximately 500,000 individuals cannot be vaccinated. Herd immunity protects them by essentially putting a moat around them so these viruses or bacteria can't get in.

### **How Has Herd Immunity Been Impacted in the Last Decade by Failure to Vaccinate?**

Measles is the perfect example. Measles is highly contagious. It is so contagious that one does not have to have face-to-face contact with an infected individual. Simply being in the air space of an infected individual within 2 h can cause infection. Yet, despite that, measles was eliminated in the United States in 2000. However, there have been measles outbreaks in 2014, 2016, and 2017 because enough parents have chosen not to vaccinate their children that measles has reemerged.

### **What Is the Cost of a Measles Outbreak?**

When an individual is infected with measles, the natural immunity achieved is better than what is induced by vaccination. Measles vaccine induces approximately 1/3 of antibody levels that result from natural infection. Not all vaccines are 100% effective in preventing natural disease. Measles is approximately 95% effective. However, with diminished vaccine rates, this is equivalent to the allusion of a canary in the coalmine. As dangerous gases such as carbon monoxide were prevalent in a mine, the miners' caged canary would die before them. Measles outbreaks are a sign of erosion of herd immunity. A critical number of individuals are now choosing not to vaccinate their children, which not only affects their own child but the children whom they come into contact.

According to the CDC, since 2000, the annual number of reported measles cases ranged from 37 people in 2004 to 667 in 2014. Complications, which are more common in children less than 5 years of age, include hospitalization (1 out of 4 cases), encephalitis (1 per 1000 cases), and death (1–2 per 1000 cases) (<https://www.cdc.gov/measles/downloads/measlesdataandstatsslide>).

Researchers at the CDC using the 2009 U.S. recommended immunization schedule for a hypothetical U.S. birth cohort of 4.2 million children, estimated cases of disease and deaths, the direct and societal costs associated with the infectious diseases compared to an effective immunization program.

Direct costs comprised inpatient visits, outpatient visits and outbreak control. Indirect costs consisted of loss of productivity and premature death. Vaccines were estimated to prevent nearly 42,000 deaths, 20 million cases of disease, and save \$14.7 billion (2014 U.S. dollars) in direct costs and \$75 billion (2014 U.S. dollars) in societal costs over the child's lifetime (Zhou et al. 2014). A measles outbreak in 2005 identified the source case as an unvaccinated teen in Indiana. The total cost of the outbreak was greater than \$200,000, the cost of containment was \$62,216. Another outbreak in 2008 when a measles infected traveler visited a hospital causing 13 additional cases, the cost to that hospital was approximately \$632,084 (\$695,993 in 2014 U.S.). Finally, in 2011, the cost incurred from public health entities due to 16 measles outbreaks involving 107 individuals incurred approximately 2.8–5.5 million dollars. (Moser et al. 2015).

### **There Is a Website “National Vaccine Information Center”, Which Would Appear to Provide Information Regarding Vaccines. However, It Is Deceptive. What Is the Anti-Vaccine Movement and Who Is Behind It?**

Fears of vaccination started with the very first vaccine, the smallpox vaccine. Edward Jenner introduced the smallpox vaccine in 1796. This vaccine was created by using cowpox to prevent a related human smallpox infection. Within a few years of vaccine use, there were individuals who feared that immunization with this vaccine would turn them into cows.

The modern-day anti-vaccine movement was born on April 19, 1982. Lea Thompson, a veteran newscaster for NBC, aired a special entitled “DPT: Vaccine Roulette.” Images of children suffering from seizure disorders or severe developmental delay were shown accompanied by interviews of their parents claiming the whooping cough vaccine harmed their normal child. Although there was no scientific basis, the claims scared people. The show was further segmented, aired on 20:20, and spun by local health reporters, creating even greater fear among parents. One of those parents, Barbara Loe Fisher soon formed a parent group, Dissatisfied Parents Together, which years later was changed to the National Vaccine Information Center. For some parents this website is the one stop shop for misinformation regarding vaccines. This website purports to provide information regarding vaccines when in fact, it disseminates wrong information, which continues to unnecessarily frighten parents.

### **Mississippi, West Virginia and California Are the Only States That Don't Allow Philosophical or Religious Exemption to Vaccination. Can You Comment?**

All 50 states have medical exemptions to vaccination. If a child has a medical contraindication to vaccination, then they should not be required to be vaccinated. Forty-seven states have religious exemptions and seventeen states have philosophical exemptions.

Religion exemption is “misnamed.” Religions teach individuals to care about their children, their family, and their community, and not to put any of them in harm’s way. The notion that people are able to do this and are also afforded the legal protections to not immunize in the name of God is offensive. Dr. Offit was involved in the measles epidemic in Philadelphia in 1991. In a 3-month period there were 1400 cases and 9 deaths. These cases were centered on 2 fundamentalist churches, Faith Tabernacle and First Century Gospel, which follow faith healing. Children are not vaccinated or brought for medical attention when they are sick. The only treatment is prayer. These children did not receive intravenous fluids for dehydration, which is a known consequence of measles, or oxygen supportive therapy for pneumonia and so those children died. In the name of God, these children were allowed to die. It was legal and no one in the religious or faith-based community stood up and said, “these are unchristian acts,” because they are.

A philosophical exemption to vaccination doesn’t make sense. The Greek word origin of “philo” is love and “sophos” is wisdom. Clearly, where’s the wisdom in not vaccinating a child, the antithesis of philosophical’s intended definition.

People also cite personal belief exemptions. These are personal beliefs akin to not believing in evolution or gravity. Vaccination efficacy is built on a mountain of evidence-based medicine. These anti-vaccinators just don’t want to vaccinate their children because they have been scared by sites such as the National Vaccine Information Center and they are not scared by the disease as they just don’t see it anymore. They use these euphemistically named pop off valves to convince themselves not to vaccinate.

Although one of the lowest ranked states for public health services, Mississippi has the highest vaccination rate in the United States and hasn’t had a measles outbreak in 2 decades. However, if you go to school in Mississippi whether private, parochial or public, a child must be vaccinated. If not, then the child has to be home schooled. A 1979 Mississippi Supreme Court Decision, *Brown v Stone*, declared that a religious exemption to vaccinate was unconstitutional as a child’s health and the public’s health were too important to allow for parents to opt out based on personal belief.

### **Do You Think Medicaid Recipients Should Be Allowed Philosophical or Religious Exemption?**

No. I don’t think Americans should be allowed philosophical or religious exemptions. If there is not a medical contraindication, then there is no good excuse not to vaccinate. If you chose not to immunize your child, a decision is being made that is based on bad information. Parents are scared that their child will develop autism, developmental delays, diabetes, multiple sclerosis, or attention deficit disorder. Which clearly are not caused by vaccination. There is no philosophical or religious exemption to car seats. Car seats save lives.

### **In the *Wrath of Khan*, Mr. Spock Stated, (Sallin and Meyer 1982, Track Title) “The Needs of the Many Outweigh the Needs of the Few, or the One.” Do You Agree?**

Yes. We chose to live in society, to benefit from society, and therefore we owe an obligation to society. It is not just about us. When you make a decision not to vaccinate your child, you are also making a decision for others. The anti-vaccinators state that if your child is vaccinated, then you shouldn’t have to worry about those of us who chose not to vaccinate our children. However, that’s not true as not all vaccines are 100% effective. The measles vaccine is 95% effective, meaning 1 in 20 children will not be protected from measles even if they received the scheduled 2-dose measles vaccine. They are, therefore, still vulnerable and at risk for acquiring measles. When you chose to cohabitate with others, you owe them protection.

### **Do You Consider Failure to Vaccinate Child Neglect?**

Yes, as failure to vaccinate puts a child unnecessarily in harm’s way. Due to disproven causation of autism and vaccination, parents of children with autism spectrum disorder and their younger siblings, who don’t have autism spectrum disorder, are not receiving vaccines. As a result these children are being exposed to needless harm. Unfortunately, every year at the Children’s Hospital of Philadelphia children die from vaccine preventable diseases, most typically from influenza, less commonly from pneumococcus or pertussis. Medicine has limits. Vaccination saves lives, so to choose not to vaccinate is unconscionable.

### **If a Parent or Other Member of the Household Is Immunocompromised What Is the Recommendation Regarding Live Vaccine Use in Children?**

The only vaccine that could not be administered in a home with an immunocompromised adult was the oral polio vaccine. All the other vaccines, MMR, varicella, and rotavirus

can be safely administered. If the person is immunocompromised then they cannot receive these live attenuated viral vaccines. Everyone in the household who is not immunocompromised should be vaccinated as it will protect the immunocompromised individual from infection.

### **What Is Your Opinion on Parental Refusal to Vaccinate Children with Severe Chronic Medical Conditions, for Which Serious Vaccine Preventable Infection Could Result in Death?**

An individual with a stable chronic illness can be appropriately vaccinated. For severe acute infections such as pneumonia or meningitis, vaccination is contraindicated. However, for diabetes, chronic lung, or chronic kidney disease these individuals are particularly vulnerable and should be vaccinated.

### **When Do Think Society Will Be Able to Say That Failure to Vaccinate Children Constitutes Neglect?**

I think the measles epidemics in 2014, 2015, and 2016 have scared people and with the mumps epidemic now people are getting scared. The response in California to eliminate philosophical exemption to vaccination was a hopeful sign. With the current administration, things have swung back the other way. People are more comfortable declaring their own facts, their own truths, and individual right and freedoms seems to “trump” the rights of others.

In 2015 California Senate Bill 277 eliminated personal exemptions for vaccination. Rhett Krawitt, then age 7 who could not be vaccinated as he was being treated for leukemia spoke to lawmakers in April 2015. In his you tube video Rhett thanks people who came to “Sacramento to pass laws so everybody will get vaccinated. Vaccines save lives. Soon we will say gone with the measles. My name is Rhett and I give a damn.” Perhaps a massive fatal outbreak of a preventable disease that was caused by low vaccination rates may sway society.

### **Can You Comment Regarding Parental Concerns That the HPV Vaccine Encourages Promiscuity?**

HPV vaccine was licensed for use in June of 2006. The Advisory Committee on Immunization Practices recommended that all US girls aged 11 to 12 receive HPV vaccine with catch-up vaccination recommended through age 26, and administration permitted for as young as 9 years. Focus on the Family a group that believes in abstinence only and prohibits sex education in school were a prominent voice against this vaccine. As a result, a retrospective study of girls age 11 through 12 enrolled in Kaiser Permanent Georgia was conducted to address their fears that this vaccine would encourage

sexual activity. The cohort included 1398 girls of which 493 received the HPV vaccine and 905 who were not vaccinated and had been followed for 3 years. They assessed sexual activity-related outcomes such as testing for or being pregnant, testing for or diagnosed with a sexually transmitted infection, or requesting contraceptive counseling. HPV vaccination was not associated with increased sexual activity-related outcome rates (Bednarczyk et al. 2012).

### **How Has the Vaccine Craze Regarding Links to Autism Impeded the Scientific Field from Conducting Research?**

This has not impacted vaccine research. Research is still being done, it’s just hard to make safe and effective vaccines and harder to make the claims that the vaccines are safe and effective and to combat misconceptions. Some of the autistic associations have been great, for example the Autism Science Foundation in New York for which Alison Singer is the current President co-founder. This organization has done everything they can to make sure that the correct information about vaccines is disseminated. Studies have shown that vaccines do not cause autism. Immunization rates for children with autism spectrum disorder are certainly less as reported by a recent JAMA Pediatrics paper. Despite having science on your side, people are still willing to deny the science.

### **What Are your Thoughts on Physicians Who Recommend a Delayed Vaccination Schedule for Children? Should They Be Sanctioned by Professional Organizations?**

To choose to delay vaccines as recommend by Dr. Robert Sears, the creator of the alternative vaccine schedule, just increases the period of time that a child will be susceptible to vaccine preventable diseases with no benefit. Providers who promote schedules that are not consistent with the CDC or AAP immunization schedule should be taken to task by their professional society or licensing boards. As these providers are acting in a manner that puts children at needless risk, they should be held accountable by justifying their unorthodox practices to their licensing board. Sanctioning a provider or removing their license should not be based solely on an adverse egregious event, it should be in a forward looking or preventative manner.

### **What Do You Do if You Reside in a Community with a Low Vaccination Rate?**

Dr. Offit recommends moving to a different community as it places an individual at greater risk of acquiring a vaccine preventable disease. There was an outbreak of measles in the

Netherlands in 1999–2000. Unvaccinated individuals were 224 times more likely to acquire measles than vaccinated individuals. However, an individual was less likely to acquire measles if they were unvaccinated and living in a highly vaccinated community than if the individual was vaccinated living in a highly unvaccinated community. This occurs as vaccines are not 100% effective and because an individual is much more likely to be exposed to the virus in an under vaccinated community. (Van den Hof et al. 2002).

## Conclusion

The interview with Paul A. Offit, MD brought to light the clash between science and public health vs anecdotal and anti-science communities. As COVID-19 has since emerged as a major pathogen, the mitigation strategies and failure of some to personally distance or wear masks have become points of contention. Should an effective vaccine be developed, similar arguments are likely to be made regarding its use. In the meantime, as vaccination rates fall because parents are not bringing children in for their shots for fear of COVID-19, outbreaks of diseases such as measles may occur.

## Compliance with Ethical Standards

**Conflict of Interest** On behalf of all authors, the corresponding author states that there is no conflict of interest.

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