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When the answer to vaccines is “No”

This comprehensive review provides point-by-point, data-supported responses to 13 common vaccine misconceptions and concerns your patients may have.

PRACTICE RECOMMENDATIONS

- › *Use a presumptive approach when discussing vaccines with patients/parents. (A)*
- › *Offer vaccines at every opportunity; provider recommendation is the most important factor in getting patients to vaccinate. (A)*
- › *Focus on the cancer prevention aspect of the human papillomavirus vaccine to improve rates of vaccine acceptance. (A)*

Strength of recommendation (SOR)

- (A)** Good-quality patient-oriented evidence
- (B)** Inconsistent or limited-quality patient-oriented evidence
- (C)** Consensus, usual practice, opinion, disease-oriented evidence, case series

We all know how challenging and time-consuming it can be to convince vaccine-hesitant patients that vaccinations are what is best for them and their children. Patients are bombarded with misinformation through the news and social media that seeds or “confirms” their doubts about vaccines. And for our part, we have only a few minutes during an office visit to refute all of the false claims that are a mere click or scroll away.

To better prepare for this challenge, this article details a practical approach to discussing vaccines with your patients. Using the patient-friendly language and evidence described here, you will be well positioned to refute 13 common vaccine misconceptions and overcome the barriers that stand in the way of these lifesaving interventions.

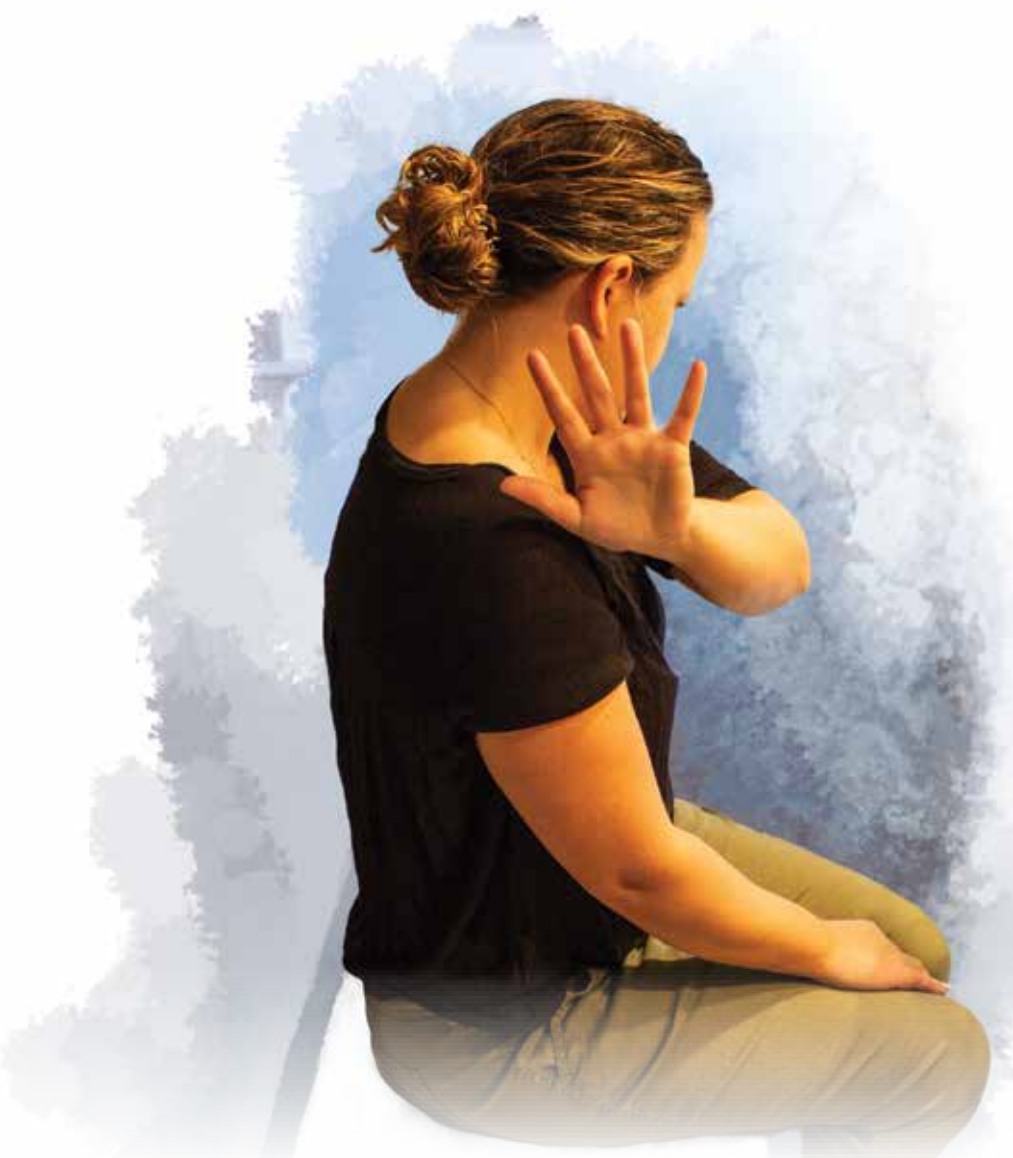
A few important baseline concepts

In discussing vaccination with our patients, it is important to keep the following in mind:

■ **Patients don’t refuse vaccinations** just to make our lives difficult. They truly are trying to make the best decisions they can for themselves and their families. Recognizing this can significantly reduce frustration levels.

■ **Time well spent.** While educating patients about the value of vaccines takes time, the return is worth it. The more consistently we offer vaccines, along with the reasons they are important, the more likely patients are to give vaccines a second thought. In fact, studies show that provider recommendation is the most important factor in patients’ decisions to vaccinate.¹

■ **Approach matters.** In all other aspects of medicine, we attempt to use a participatory approach, involving our patients in decisions regarding their health care. When discussing vaccines, however, a participatory approach (eg, “What do you want to do about vaccines today?”) can introduce doubt into patients’



Studies show that provider recommendation is the most important factor in patients' decisions to vaccinate.

minds. Studies show that a presumptive approach (eg, “Today we are going to provide the tetanus, human papillomavirus [HPV], and meningitis vaccines”) is a much more effective way to get patients to vaccinate.²

Barriers to counseling. Health care providers report a variety of barriers to effective vaccine counseling (limited time and resources, lack of confidence in addressing patients' concerns, etc).³ In addition, providers sometimes worry that strong encouragement of vaccination will create an adversarial relationship with vaccine-hesitant patients. Developing a good rapport and trusting relationship, as well as using motivational interviewing approaches, can help communicate the importance of vaccines, while leaving patients with the sense that you have heard them and respect their intentions. (See “Facilitate vaccine discussions using these 2 approaches,”⁴⁻⁷ page 350.)

IMAGE: © JOE GORMAN

If at first you don't succeed, try again because patients often have an experience that changes their mind. Perhaps a friend died of throat cancer or a family member developed a complication of the flu that required hospitalization. You never know when something will influence patients' choices.

Don't wait for scheduled well visits. Use every patient encounter as a means to catch patients up on missing vaccinations.

Common misconceptions and concerns and how to counter them

1. I've heard that vaccines can actually make you sick.

When patients raise this concern, start with an explanation of how vaccines work. Explain that our bodies protect us from foreign invaders (such as viruses and bacteria) by mounting an immune response when we are



INSTANT POLL

What percentage of your patients (including parents of patients) express reticence or concerns about vaccinations?

- 0%-10%
- 11%-20%
- 21%-30%
- 31%-40%
- > 40%

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Facilitate vaccine discussions using these 2 approaches⁴⁻⁷

C.A.S.E.

Corroborate

Acknowledge concerns and find some point on which you can agree.

Example: "It sounds like we both want to keep your child healthy and safe."

About me

Describe what you have done to build your expertise on the subject.

Example: "I have been practicing medicine for 15 years and have spent a great deal of time researching the data on vaccinations."

Science

Review the data and science behind vaccines.

Example: "Vaccines are more rigorously studied and safer than almost any other intervention we have in medicine."

Explain/advise

Explain your recommendations, based on the science.

Example: "This is why I vaccinate my children, and this is why I recommend this vaccine for your child."

3As

Ask

Don't stop at a patient's first "No." Respectfully dig a bit deeper.

Example: "What questions do you have about the vaccines we are recommending today? Tell me what worries you about them."

Acknowledge

Acknowledge your patient's concerns.

Example: "You are obviously a very devoted parent, and I know that you are trying to make the best decision you can for your child. With everything we see on the news and social media, it's not always easy to know what to believe about vaccines."

Advise

Advise patients/parents of the facts about vaccines and provide a strong recommendation to vaccinate.

Example: "Depending on the year, influenza kills 12,000 to 56,000 people annually; the vast majority of those who die did not receive the flu vaccine.⁷ My family and I get the flu shot every year, and I strongly encourage you and your children to get this lifesaving vaccine."

invaders by the time we are exposed to an active infection.

■ **To use an analogy to war**, instead of being subjected to a surprise attack where we suffer large losses in the battle, vaccination prepares us with weapons (antibodies) to defend ourselves so that our bodies are now able to successfully fight off that attack.

Because the majority of vaccines are killed virus vaccines, they cannot cause the illness against which they are meant to protect. Triggering the immune system may make some recipients feel a little "under the weather" for a day or 2, but they do not make us "sick."

Live attenuated vaccines are similarly safe for those with a healthy immune system. We don't administer them, however, to people who have a weakened immune system (eg, pregnant women, newborns, people with acquired immunodeficiency virus, or patients receiving chemotherapy or other types of immunosuppression) because these patients could develop the illness that we are trying to protect against.

2. Don't vaccines cause autism? Aren't they toxic to the nervous system?

The largest setback to vaccination efforts in recent history was a 1998 study by Andrew Wakefield that suggested that vaccination (specifically the mercury [in the form of thimerosal] present in the measles, mumps, rubella [MMR] vaccine) was linked to the development of autism.⁸ This research was subsequently debunked,⁹ and the author of the 1998 study was stripped of his medical license for falsifying data. However, the damage to vaccination efforts had already been done.

■ **Aluminum.** Thimerosal is not the only agent that patients may find concerning. Some also worry about the aluminum content of vaccines. Aluminum works as an additive to boost the body's immune response to a vaccine. It is used only in killed virus vaccines—not in live attenuated ones. The Agency for Toxic Substances and Disease Registry monitors minimum risk levels (MRLs) of aluminum and other compounds in potentially hazardous substances. The amount of aluminum in vaccines is far below the MRL for aluminum, which is 1 mg/kg/d.¹⁰ (See "The

exposed to these proteins. Vaccinations work by exploiting this immune response; they expose the body to killed or weakened viral or bacterial proteins in a safe and controlled manner. In this way, our immune system will have already developed antibodies to these

facts about thimerosal and aluminum in vaccines,”¹¹⁻¹⁶ on page 359.)

3. I'm healthy. I never get sick. Why do I need vaccinations?

A good way to counter this comment is to respond: “Saying you don’t need vaccinations because you never get sick is like saying you don’t need to wear a seat belt because you’ve never been in a car accident.” Advise patients that we seek to vaccinate all members of a community—not just those who are sick or at high risk—to protect ourselves and to provide “herd immunity.” It’s important to explain that herd immunity is resistance to the spread of a contagious disease that results if a sufficiently high number of people (depending on the illness, typically 80%-95%) are immune to the disease, especially through vaccination.^{17,18} If vaccination levels fall, we see a rise in cases of vaccine-preventable illness (as was seen during the 2017 measles outbreak in a community in Minnesota).¹⁹

Even though many of us may not suffer severe consequences of an infection, we can still pass that infection to others. While the whooping cough that a healthy 35-year-old gets may cause only prolonged annoyance or time off from work, it can kill the baby that is sitting next to that adult on the plane or bus.

4. Isn't it true that we see fewer serious illnesses because of improved hygiene and sanitation, rather than vaccines?

Our current US sanitation standards were established under the Safe Drinking Water Act of 1974.²⁰ While improvements in hygiene, sanitation, nutrition, and other public health measures have undoubtedly decreased the spread of disease and improved survival rates, there is no denying the significant drop in disease that occurs after the introduction of a vaccine for a particular illness or the increase in cases of that disease when vaccination rates drop off.

By the early 1990s, our current sanitation standards were already well established. Yet we didn’t see a significant decrease in the incidence of infections with *Haemophilus influenzae* type b (Hib) until after the conjugate Hib vaccines were introduced (dropping from about 20,000 cases/year to 1419 cases/year by 1993).²¹

In Britain, a drop in the rate of pertussis (whooping cough) vaccination in 1974 resulted in an epidemic of more than 100,000 cases and 36 deaths by 1978. There was no decrease in hygiene or sanitation standards to explain this rise.²¹

5. Vaccines are just another way for "big pharma" to make "big money."

Patients may benefit from knowing that in the earlier days of vaccines, pharmaceutical companies actually moved *away* from production of vaccines because they were not very profitable. These days, with worldwide distribution, drug companies are back in the swing of making vaccines and, as we would expect from all companies, are in business to make a profit.

That said, health care providers receive no payments from drug companies for offering vaccines or for offering one vaccine over another. The reason we recommend vaccination is because we know it is best for our patients’ health and the health of the community.

6. We don't see polio anymore. Why do I need the vaccine?

One of the factors contributing to the rise in antivaccine sentiment is that we rarely see vaccine-preventable illnesses (such as polio, measles, and mumps). But the absence of these illnesses is precisely due to prior years’ vaccination efforts.

Smallpox, a deadly and disfiguring disease that killed many millions of people and contributed to the downfall of the Roman, Aztec, and Incan empires, was eradicated from the planet in 1979, thanks to focused vaccination efforts by the World Health Organization. Vaccination works, but we have to keep at it.

While we no longer see as many of these vaccine-preventable illnesses in the United States, they are still present in other parts of the world. Our world is much smaller than it used to be. International travel is common, and illnesses can be reintroduced into a community with relative ease. We must remain vigilant.

7. I heard that vaccines are made from aborted fetal tissue.

There are 5 vaccines (varicella, rubella, hepatitis A, shingles, and rabies vaccines) that



Saying you don't need vaccinations because you never get sick is like saying you don't need to wear a seat belt because you've never been in a car accident.

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were originally made using aborted fetal tissue. In 1960, tissue from 2 fetuses aborted by maternal choice (and not for the purpose of vaccine production) was used to propagate cell lines that are still used in vaccine development today.

Human cells provide advantages for vaccine production that other cells do not. Some viruses do not grow well in animal cells. Animal cells can introduce contamination by bacteria and viruses that are not carried in human cell lines. Vaccine production can be hindered or halted, resulting in a vaccine shortage, if animal products used in development are threatened (eg, if an illness strikes egg-producing chickens; eggs are used to make the influenza vaccine).²²

Some patients, particularly those who are Catholic, may have concerns about these vaccines. The National Catholic Bioethics Center has prepared a statement regarding the use of these vaccines that may help settle any moral dilemmas.²³ It reads:

“The cell lines under consideration were begun using cells taken from one or more fetuses aborted almost 40 years ago. Since that time, the cell lines have grown independently. It is important to note that descendent cells are not the cells of the aborted child.”

“One is morally free to use the vaccine regardless of its historical association with abortion. The reason is that the risk to public health, if one chooses not to vaccinate, outweighs the legitimate concern about the origins of the vaccine. This is especially important for parents, who have a moral obligation to protect the life and health of their children and those around them.”

8. Vaccines aren't studied—or monitored—thoroughly enough.

Patients would benefit from knowing that vaccines are some of the *most* thoroughly studied products brought to market. They undergo rigorous testing and oversight, from both public and private organizations, for 10 to 15 years before being released for distribution. Post-licensure monitoring is ongoing, and the manufacturer may voluntarily participate in Phase IV trials to continue to test the safety and efficacy of a vaccine after release to market.

The facts about thimerosal and aluminum in vaccines

Thimerosal

Ethyl-mercury was used (in the form of thimerosal) as a preservative to prevent bacterial and fungal contamination of vaccines. Since 2001, however, thimerosal has been removed from all US-licensed vaccines—except multidose vials of influenza vaccine—as a precautionary measure (and not for any reproducible evidence of harm). The multidose flu vial contains <0.01% thimerosal.¹¹

Ethyl-mercury is cleared from the body much more rapidly than methyl-mercury (the kind found in certain types of fish) and is less toxic.¹²

Since the removal of thimerosal from vaccines, the Centers for Disease Control and Prevention notes that the rates of autism have actually *increased*.¹³

Even Autism Speaks, the leading organization dedicated to advocacy for patients with autism and their families, denies a link between vaccines and autism.¹⁴

Aluminum

We are exposed to aluminum in products we use extensively every day, such as pots and pans, aluminum foil, seasonings, cereal, baby formula, paints, fuels, and antiperspirants.¹⁵

Infants are exposed to about 4.4 mg of aluminum in the vaccines typically administered in the first 6 months of life.¹⁶ However, infants typically ingest *more* than that during the first 6 months of life. Breast milk contains about 7 mg over 6 months; milk-based formulas contain about 38 mg over 6 months; and soy-based formulas contain about 117 mg over 6 months.¹⁶

■ **Monitoring adverse effects.** In addition, in 1990, the Centers for Disease Control and Prevention (CDC) and the US Food and Drug Administration established the Vaccine Adverse Events Reporting System (VAERS) to “detect possible signals of adverse events associated with vaccines.”²⁴ Most events reported are coincidental, but some common mild adverse events (like redness and swelling at the injection site) are often underreported.

Serious events are always thoroughly investigated and are often found unrelated. However, rare associations have been found. For example, an intestinal problem called intussusception, related to the original rotavirus vaccine, was discovered, and the vaccine causing it was removed from the market.²⁵ A new, safer rotavirus vaccine option is now available. Patients need to know that we do have an effective system of checks and balances in which we can place our trust.

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 In the United States, the 2013 annual cost of 4 major vaccine-preventable illnesses in adults ≥ 50 years was estimated at \$26.5 billion.

Influenza vaccine: Patient-friendly talking points

- Some people think that getting the flu is no big deal. While it is true that the flu takes a greater toll on the very young and very old, the chronically ill, and the immune compromised, even healthy people can become seriously ill or die. The Centers for Disease Control and Prevention estimates that the flu is responsible for 140,000 to 720,000 hospitalizations and 12,000 to 56,000 deaths in the United States every year.⁷ Of those who die from the flu, approximately 80% did *not* receive a flu shot.³⁶ Of children who died from the flu between 2004 and 2012, more than 40% had no risk factors for complications.³⁷
- The flu shot is a killed virus vaccine, so it can't give you the flu. People sometimes feel under the weather (achy, low-grade fever) after a vaccine, but this is considered normal and evidence that your body's immune system is "revving up."
- It takes 2 weeks before the vaccine becomes effective so a person can still get the flu during that time. This is why it is so important to get the vaccine earlier in the fall, before the flu season takes hold.
- The "stomach flu" is not the flu. The flu vaccine does not protect against the "stomach flu" or other flu-like illnesses.
- The flu vaccine is not perfect. It is an educated guess as to which strains will be circulating that year. (At its best, the flu vaccine is about 60% effective.³⁸) However, it makes the chance of getting the flu less likely and significantly decreases the odds of severe complications/death.
- Egg allergies are no longer a reason to avoid the flu vaccine. There is an egg-free vaccine called Flublok (for those ≥ 18 years of age). In 2016-17, the Advisory Committee on Immunization Practices changed the recommendations for flu vaccine in egg-allergic people. The recommendations say that if reactions are mild, or you can eat cooked eggs without a problem, you can receive a flu vaccine. If you have severe reactions, such as trouble breathing or recurrent vomiting, you can still receive the flu vaccine, but must be monitored by a health care provider who can recognize and respond to a severe allergic reaction.³⁹

9. People can become paralyzed or stop breathing after receiving a vaccination. Why run those risks?

One of the most feared reactions to vaccination is Guillain-Barré syndrome (GBS), which can cause paralysis. The CDC estimates the risk for GBS associated with the flu vaccine, for example, to be 1 to 2 cases per 1 million people vaccinated.²⁶ Another potential concern is the rate of anaphylaxis following vaccination. However, in a 2016 study in the *Journal of Allergy and Clinical Immunology*, the rate of anaphylaxis for all vaccines combined was only 1.31 per 1 million vaccines.²⁷

The risk of developing severe complications from an illness is much greater than that of developing complications from the vac-

cine meant to protect a person against that illness. In the United States, the population-based risk for influenza-related hospitalization in children, for example, is as high as 150 in 100,000 with as many as 125 deaths annually.²⁶

10. Isn't vaccination a personal choice? How does my health/illness impact the community?

Patients may not realize that most viruses are contagious from 1 to 2 days before symptoms appear, which means we can spread an illness before we even know we have it. Protecting oneself also protects those around us.

■ **Economic concerns.** There's also the economic impact of these illnesses to consider. This includes the personal cost of being

Human papillomavirus vaccine: Patient-friendly talking points

- Human papillomavirus (HPV) causes genital warts and cancer of the cervix, vagina, vulva, anus, rectum, penis, and oropharynx.
- The HPV vaccine is a cancer prevention vaccine. The 9-valent vaccine is active against 2 genital wart-causing strains and 7 cancer-causing strains of HPV.
- HPV is highly prevalent; 79 million Americans are currently infected, nearly 14 million people become newly infected each year, and nearly all of us will be exposed at some point in our sexual lives.⁴⁰
- There are often no outward signs of infection, so it is a difficult infection to avoid.
- It takes no high-risk sexual activity to be exposed to the HPV virus.
- The HPV vaccine is recommended for both boys and girls usually around age 11 to 12 years (but as early as 9 years and as late as 26 years is acceptable). If the first vaccine is administered before 15 years of age, only 2 injections are needed 6 to 12 months apart. If the first vaccine is administered after 15 years of age, 3 injections are needed at 0, 2 months, and 6 months.⁴¹
- Completing the series before sexual activity begins is the best way to protect our children because the vaccine is a preventive measure, not a treatment.
- The HPV vaccine is highly effective with >90% efficacy against high-risk cancer-causing strains.⁴²
- The HPV vaccine offers long-term protection. The vaccine has been on the market since 2006, and immunity has not yet diminished. Further monitoring is ongoing.⁴³
- The HPV vaccine is covered under the Vaccines For Children program until age 19 years. Then it is up to individual insurance plans to cover it.
- The HPV vaccine does not cause infertility.⁴⁴ HPV infection, on the other hand, can lead to fertility problems if, for example, treatment for cervical precancer or cancer requires partial removal of the cervix or a hysterectomy.
- The HPV vaccine does not cause autoimmune diseases.^{45,46} Studies show no difference between vaccinated and unvaccinated groups in rates of autoimmune diseases such as systemic lupus erythematosus, rheumatoid arthritis, type 1 diabetes mellitus, multiple sclerosis, Hashimoto's thyroiditis, Graves' disease, and others.
- The HPV vaccine does not encourage earlier sexual activity. There was no earlier incidence of outcomes related to sexual activity (pregnancy, sexually transmitted infection testing or diagnosis, or contraceptive counseling) in vaccinated vs unvaccinated patients studied.⁴⁷



While the whooping cough that a healthy 35-year-old gets may be a prolonged annoyance or prompt some time off from work, it can kill the baby sitting next to that adult on the plane or bus.

out of school or work for an extended period and the cost of a patient's care, which can become astronomical if hospitalization is required and which can become the country's problem if a person lacks sufficient health insurance coverage.

A study looking at the cost of 4 major

adult vaccine-preventable illnesses (influenza, pneumococcal disease, shingles, and whooping cough) in the United States in 2013 estimated the annual cost for these illnesses in adults ≥ 50 years to be \$26.5 billion.²⁸ And that doesn't include the cost of childhood vaccine-preventable diseases.

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➤ In 2016, only 60.4% of boys and girls were current on their first HPV vaccination and only 43.3% were up to date with the full series.

Countering 3 concerns about childhood vaccinations

1. I can't afford vaccines for my child.

The Vaccines for Children program is a federally-funded program that covers the cost of all vaccines for children younger than 19 years of age who are Medicaid-eligible, American Indian, Alaskan Native, uninsured, or underinsured.²⁹ Although there may be a small administration fee charged by the provider's office, the vaccine is free.

2. Don't all of the vaccines recommended for children overwhelm their immune systems?

Children are exposed to so many more proteins on a daily basis (by crawling around on the floor, putting their hands in their mouths, attending school or day care, etc) than they are ever exposed to in a series of vaccines.³⁰ Exposure to these proteins in their environment and to those in vaccines only serves to boost their immunity and keep them healthier in the long run.

And thanks to advances in vaccine production, the immunologic load in vaccines is far less than it used to be. The 14 vaccines given today contain <200 bacterial and viral proteins or polysaccharides, compared with the >3000 of these immunologic components in the 7 vaccines administered in 1980.³¹

3. Why don't we adhere to Dr. Sears' vaccine schedule?

There are multiple ways in which Dr. Robert Sears' book, *The Vaccine Book: Making the Right Decision for your Child*, published in 2007, misrepresents vaccine science and leads patients astray in making decisions regarding vaccinations.³² Most important to note is that Dr. Sears' Alternative Vaccine Schedule, which seeks to make it so that children do not receive more than 2 vaccinations per office visit, would require visits to a health care provider at 2, 3, 4, 5, 6, 7, 9, 12, 15, 18, and 21 months, and at 2, 2.5, 3, 3.5, 4, 5, and 6 years of age. This significantly increases the number of office visits and needle sticks, and raises the age at which vaccines are given, increasing the risk of illness outbreaks and decreasing the likelihood that parents would return to the office to complete the full series.

Acceptance of influenza and HPV vaccines remains a challenge

We are significantly less successful at getting parents and patients to agree to influenza and HPV vaccines than to the other vaccines we offer. The influenza vaccine success rate in 2016 was 59% in children and 43.3% in adults.³³ Compared to the Tdap vaccine (88%) and the meningococcal vaccine (82%), which are offered at the same age as the HPV vaccine, success rates for HPV vaccine are significantly lower. In 2016, only 60.4% of boys and girls were current on their first HPV injection and only 43.3% were up to date with the full series.³⁴

Newness of vaccines a factor?

Perhaps it is because the recommendations for these 2 vaccines are relatively new, and people don't yet grasp the seriousness and scope of the diseases. Until 2010, the flu shot was recommended only for the very young, the elderly, and the medically high risk.

Similarly, the HPV vaccine was originally introduced for girls in 2006 and wasn't recommended for boys until 2011.

■ **A sensitive subject.** Discussion of a vaccine related to a child's sexual health makes some parents uncomfortable. Studies show that focusing on the cancer prevention aspects of the vaccine, rather than on sexual transmission of HPV, results in greater vaccine acceptance.³⁵

However, if discussion of sexual transmission is unavoidable, remind parents to consider their own adolescence and whether they chose to share everything with their parents. Point out that there were probably things they did that they later looked back on and thought, "What was I thinking?" Their children, no matter how wonderful and levelheaded they are, will be no different. And, as much as parents don't want to think about it, some kids will suffer unwanted sexual contact. Shouldn't parents protect their children as best as they can?

■ **A teen's right to choose?** Some states have passed a Mature Minor Doctrine, which provides for mature, unemancipated teens to make their own medical decisions regarding such issues as sexuality, mental health, and drug and alcohol use without their par-

ents' consent. In these states, teens may elect to receive the HPV vaccine without parental permission. (Check your state's laws for specifics, and see the 2 boxes with patient-friendly talking points for influenza vaccine^{7,36-39} [page 360] and human papillomavirus vaccine⁴⁰⁻⁴⁷ [page 361].) **JFP**

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