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Vaccine Hesitancy with a Focus on HPV

Announcer:

Welcome to CME on ReachMD. This activity, entitled "Vaccine Hesitancy with a Focus on HPV" is provided by Prova Education and is supported by an independent educational grant from Merck. Prior to beginning the activity, please be sure to review the faculty and commercial support disclosure statements as well as the Learning Objectives.

Dr. Caskey:

Let's start with a discussion about the term vaccine hesitancy. This is a term many people hear, and what it refers to is a delay in acceptance or refusal of vaccines, despite availability of vaccination services and an overall recommendation for a vaccine. Per the World Health Organization, vaccine hesitancy has been reported in over 90% of countries in the world. We often think of it commonly occurring in the US and other similar countries, but this is not unique to just the United States. Vaccine hesitancy is important because vaccination is one of our most cost-effective ways of avoiding disease. It is estimated that routine vaccination of children and adults currently prevents somewhere between 2-3 million deaths per year worldwide. In addition, up to another 1.5 million could be avoided if global coverage of vaccinations improved. Vaccine refusal has been associated with numerous outbreaks of many serious vaccine preventable diseases, including Hemophilus influenza B, often called HIB, varicella, or chicken pox, pneumococcal disease, measles, and pertussis. The list goes on and on.

Measles is one of the most contagious viruses that can be prevented by vaccines, and so we often see this disease pop up first when vaccination rates decrease. Routine childhood vaccination is recognized as one of the most cost-effective preventive interventions that we have in the US. A study published in 2014 estimated the cost and cost savings of childhood vaccination. The authors estimated that routine childhood vaccination prevents 20 million infections and prevents over 42,000 deaths. Providing universal vaccination to children does cost about \$7.5 billion, so it is costly. However, the direct and indirect savings from routine vaccination was estimated at over \$76 billion. So, this means for every dollar we spend on vaccination, we save \$10.00. This benefit/cost ratio of 10 to 1 is far superior to any other routine preventive measure, including things like mammography or colon cancer screening and so forth. Far more cost effective to universally vaccinate children and adolescents to prevent disease. We all care about vaccination rates across the globe, but we should particularly care about vaccination rates in our community. For most healthcare preventive strategies, such as perhaps cancer screening, if your neighbor opts to get a recommended screening, this likely has little direct impact on your health.

Vaccines are obviously very different. The term "herd immunity" is also a familiar term, and this is the resistance to spread of a contagious disease within a community that occurs if, and only if, a sufficiently high proportion of individuals are immune to that disease. Immunity typically is going to occur through vaccination. The level of vaccination needed to achieve herd immunity does vary by disease and vaccine but, on average, ranges from 80-95% of individuals need to be vaccinated to prevent spread. Herd immunity is important to protect those who are not fully immune. This could be individuals or infants who are too young to be fully vaccinated, but we also often forget about protecting those who are vaccinated but did not mount a full protection after vaccination. A small percentage of us will not develop robust antibodies after a vaccine and never be fully protected, though we may not know. So, herd immunity is important to protect those who cannot be vaccinated or who have been vaccinated but may not have full protection. Vaccine hesitancy can feel like it is coming from all directions. We hear about this in social media. We hear about this on the news. Perhaps families or parents who are on the fence. They don't know if vaccines are safe or really haven't thought about it before, and then they come across information

about safety concerns surrounding vaccines.

Many people believe vaccines are toxic, that it is a pharmaceutical conspiracy theory. The pharmaceutical companies want to make money off their children. I sometimes hear the concern that children's immune systems are too immature and can't handle that many vaccines at once or more than one vaccine at once, and so on and so forth. Everything's been reported, and as I'm sure many of you know, none of this has been supported by science and, in fact, there is incredible amounts of research to prove all of these theories false over the years. So, I'd like to now focus on HPV vaccination.

Human papilloma virus is now a commonly heard term, and as many may know, this is the most common sexually transmitted infection in the US and worldwide. In the US, we have over 6,000,000 new genital HPV infections every year, and many of those are among our adolescent and young-adult populations. What many don't know is that prevalence of genital HPV is not the same between males and females. And, in fact, males have a much higher lifetime prevalence of genital HPV compared to females. When we think about cancer risk, there are a number of cancers that have been associated with HPV infection. Most commonly, cervical cancers, and this is the cancers that were linked first to human papilloma virus, have had a lot of research behind it and were also the first cancers attributed to the importance of vaccination. And cervical cancer prevention is very important, we know. Over 99% of cervical cancers are caused by human papilloma virus but, in fact, many other cancers are also caused by HPV that are often not discussed. For example, as of today, over 70% of oral pharyngeal cancers have been associated with HPV type 16, and this is still an area of burgeoning research, and so we'll see as we learn more, that number could increase over time, but currently the vast majority of oral pharyngeal cancers are associated. In addition, most of the other anogenital cancers, including anal cancer, vaginal, vulvar, penile cancers, have been associated with HPV.

I want to take a minute to talk about oropharyngeal because I feel this is a cancer many individuals don't know is associated with human papilloma virus, and/or don't know the magnitude. And, again, similar to the difference in genital infections, men are more likely to have HPV in the oropharynx, compared to women. They have a much higher infection rate. So, the incidence of HPV oropharyngeal cancers have been increasing, and it's been increasing disproportionately among males, over twice as common among males than females, and it's also been increasing among younger males – individuals under the age of 50. A few years ago, the incidence of HPV-related oropharyngeal cancers in men exceeded the incidence of cervical cancers in the US. And so that means currently there are more men in the US with HPV-related disease compared to women. And I can assure you, this is not something most parents understand when thinking about HPV vaccination for their adolescents, and many young adults don't understand. So, clinical outcomes.

This is important. Does the vaccine work? And some of the best data we have is from Australia. In Australia, in early 2006 through 2008, the entire continent made a strong effort to vaccinate first females, and then males were caught up shortly thereafter. And within two years after the first HPV vaccine was FDA-approved, they had over 80% of their adolescent females vaccinated. It was really quite remarkable. They used schools to vaccinate and really took it outside the traditional healthcare system, which was wildly successful. Because of their early high vaccination rates, they have had more time to accrue data compared to other countries. Some of their most impressive data is the trends in high-grade cervical lesions before and after vaccination. And what's remarkable is that for women 20 years of age or younger, so those that were in the age group that were vaccinated in 2006 through 2008, they have seen over 65% decline in high-grade cervical lesions. Over 65%. The 20-24-year old's, who may or may not have gotten vaccinated based on their age, they've seen a 44% decrease. And even the 25-29-year old's who were not vaccinated, have had a decline. And so, what's really remarkable about that is it suggests herd immunity. That by strong vaccination efforts for those adolescents, it also provided protection to those individuals who were outside the age range at the time and were not vaccinated. They've seen similar trends in genital warts and so forth.

In the US, though we have not reached the same vaccination rates as Australia, we have already seen a 30% decline in cervical cancer among our 15-24-year old's, and this is comparing data from 2003 to 2006 versus 2011 to 2014, so a 30% decline. Now, cancer takes time, and so really some of the most robust outcomes for cancer prevention in the US are likely to come in the next 5-10 years, but the great news is despite our lower vaccination rates, we are already seeing a marked decrease in disease. HPV vaccination is universally recommended for both males and females. The target age rate for vaccination is 11-12 years of age. One can start as early as 9. And just as a refresher, for those adolescents who start before their 15th birthday, the recommendation is two doses at least six months apart. For those that start on or after, it is three doses at two and six months apart. As you may have heard, in October 2018, the FDA did expand indications to both men and women 27-45 years of age, and so this is now an age group that can be considered for vaccination if they were not vaccinated at younger ages. So, how are we doing in the US? Well, sadly, we have much lower vaccination rates than many other countries. I think it's important to compare HPV vaccination rates against the other routinely recommended adolescent vaccines, such as tetanus, diphtheria, acellular pertussis (Tdap) and meningococcus, or the meningitis vaccine. For Tdap vaccination, we have nearly 90% of males and females, and about 85% across the country who have received meningitis vaccines. And so, there's an important take-home from this. First, it is not an issue of access. These vaccinations, meningitis and Tdap, are

recommended at the same age-range, 11-12, and if you look across the country nationally, adolescents are getting those vaccines. They are receiving them. They are not getting all the recommended vaccines. This is where we need to think about how are we recommending this vaccine? Are we encouraging all recommended vaccines or are we treating HPV differently? This also tells me that school mandates work. Much of the country requires Tdap and meningococcus for matriculation into 6th grade and/or 9th grade, and certainly into college as well. And so, that mandate works. Adolescents are more likely to get the school-mandated vaccines than the HPV vaccine.

The World Health Organization puts out its Top 10 Threats to Global Health every year, and in 2019, vaccine hesitancy was the first time ever to reach that list, and so it's very important to think about that in the context of all vaccines, but also HPV vaccine, and this was a threat to global health, not just in the US.

There are a lot of barriers to HPV vaccination. Sometimes it's fear around sexual activity or sexual behavior. And there's been numerous research studies now looking at comparing populations that have been vaccinated against HPV versus those who have not, and they've looked at early, mid, and late adolescence up through college, and all the studies have shown that there's no difference in age of sexual debut, number of sexual partners, risk of chlamydia or risk of pregnancy comparing those vaccinated against those not.

So, I propose that we simply normalized this vaccine. I focus a lot on normalizing. Treat the HPV vaccine the same as all other universally recommended vaccines. If I am asked about HPV vaccine, if I'm asked about if it's important, if it's needed, can we wait, I focus the conversation on why we have the vaccine. It is because HPV can cause lethal cancer. The more we normalize all vaccines, the more likely we are to be successful with vaccination.

Thank you.

Announcer:

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