Hepatitis A-related questions:

Has hepatitis A vaccination recommendation been discussed for first responder and emergency personnel? I ask because one of the routes of hep A transmission is fecal-oral. A third of the 911 calls for the rural volunteer fire dept. where I live are lift assists. This creates a situation where personnel could come in contact with feces while assisting non-ambulatory patients. In San Diego there has been a hep A outbreak for the homeless population—especially those who are IV drug users.

We do not know whether first responders have an increased risk of hepatitis A because of their occupation; however, in studies in the U.S. the following occupational workers were not at increased risk of infection despite their potential exposure to the virus through fecal matter: wastewater workers exposed to sewage, childcare workers, health care workers. Read more in the current hepatitis A recommendations: https://www.cdc.gov/mmwr/PDF/rr/rr5507.pdf.

Should the hepatitis A catch-up recommendation for adults or non-vaccinated children also be applied to migration clinics?

Yes, this would be reasonable to do.

Influenza-related questions:

According to the vaccine efficacy data for influenza, responses are higher in those 6 months to 8 years of age who receive 2 doses of vaccine a month apart. Should we consider giving 2 doses of influenza vaccine to all ages?

It’s hard to know the reason why protective efficacy was better in the younger age group. However, the most likely reason is something called original antigenic sin. Once you’ve already been exposed to natural influenza virus or influenza vaccine, you are more likely to respond to antigens that you’ve seen before and less likely to respond to new antigens. In other words, if you were previously infected or vaccinated with the pandemic H1N1 virus (California/A/H1N1), you would be more likely to respond to that virus in a vaccine than to the H3N2 virus that is also in the vaccine. Young children are less likely to have this problem.

Do you think the effectiveness of the influenza vaccine would be improved if more of our herd were immunized?

Although herd immunity would make it less likely that someone who is vaccinated would be exposed to the influenza virus, it wouldn’t make the vaccine more effective for the individual.

What, if anything, can we take from the bad flu season that Australia is currently experiencing?

They are still working to figure out what is causing this year’s influenza season to be more severe in Australia; however, influenza is unpredictable. The U.S. vaccines are based on the information about influenza around the world each year, particularly the Southern Hemisphere, so we should try to get as many people immunized as possible before the season begins and see what happens.

Should we be concerned about the report of miscarriage in first-trimester women after receipt of flu vaccine?

The recent study published in Vaccine suggesting that influenza vaccine administered in the 2010-2011 and 2011-2012 seasons suggested an increased risk of miscarriage in women who were vaccinated in the first trimester. However, the numbers were very small. Only 17 women suffered this problem. In addition to the small numbers, there are other reasons to suspect that this is an anomalous finding. First, influenza vaccine does not replicate, is not accompanied by a powerful adjuvant, and does not cross the placental barrier. Second, antibodies generated by vaccination will not cross the
placental barrier until 32 weeks gestation (i.e., the third trimester). In other words, there is no biological reason to have suspected that this would be a problem. As a general rule, if something doesn't make biological sense then it probably isn't true. I suspect that this finding will not be reproduced with future studies.

**Varicella- and shingles-related questions:**

**Are there any studies from Japan on the incidence of zoster since they have been using varicella vaccine longer?**

Although the varicella vaccine was developed in Japan, use of the vaccine was voluntary until 2014, so immunization rates were low (about 40 percent), and a [2015 paper by Yukiko Takao in the Journal of Epidemiology](https://www.ncbi.nlm.nih.gov/pubmed/26295762) indicated the incidence of zoster in Japan was not known, so it is unlikely that we can learn anything from their experience.

**I am not familiar with endogenous and exogenous "boosting". Can you explain that concept in simple terms?**

Two ways that an existing immune response can get stronger, or be boosted, are described as exogenous and endogenous based on what causes the strengthening. Exogenous boosting is strengthening of the immune response from an external source, such as exposure to the virus circulating in the community. Endogenous boosting occurs when the immune system is strengthened due to viral reactivation and replication in dorsal root nerve cells in which the virus had previously been latent. In other words, in endogenous boosting, the virus reactivates but not to the extent of causing clinical disease. These reactivation events boost the immune system.

**This is anecdotal - I don't have data but I know that in colleges and universities, over the past 10 years or so there has been a significant increase in young, generally healthy 18- to 26- year olds getting Zoster. I am not sure if this is being reported. University Health Services have been attributing this to the high stress environment but perhaps the lack of exogenous boosting has played a role?**

Your observations haven't been noted in the seven studies that have examined the incidence of shingles in the U.S. population over the past few years.

**What do we know about those who received the varicella vaccine as children and their titer levels when they reach childbearing age?**

Studies looking 10 years after receipt of 2 doses show greater than 98% vaccine efficacy, so it is likely that significant protection remains into the period of childbearing.

**Is there evidence that people that receive two doses of varicella vaccine have decreased rates of shingles? If this cohort is still too young, when might we have more information?**

Because the second dose of varicella vaccine was recommended for 4-6 year old children only 12 years ago, it is still too early to tell whether the incidence of shingles (which peaks in people more than 60 years old) will have an effect.

**Is a booster dose of Zostavax be considered? I understand that immunity to shingles only lasts five years after receiving Zostavax.**

This question is timely because during the next ACIP meeting (in October 2017) the committee will be discussing the new shingles vaccine called Shingrix. The new vaccine is a subunit vaccine (glycoprotein E) that includes two adjuvants compared with the existing Zostavax which is a live viral vaccine (and, therefore, contains no adjuvants). Data from trials of Shingrix indicate that efficacy is better than that for Zostavax at over 90 percent. The one caveat is that given the nature of the adjuvants, local, and possibly even systemic, side effect rates may be greater. It will be interesting to see what comes of the ACIP discussion in October.

**Can adults who have had cerebral palsy get Varivax?**

Yes, if they have not had disease or previously been vaccinated, as with other adults.
Mumps-related questions:

What about possible contribution of U.S. unvaccinated cohort combined with unvaccinated travelers bringing mumps into U.S.?

Vaccine-preventable diseases are easily brought into the U.S. and certainly, can contribute to the spread of infections. (Indeed, the most recent circulating strain of mumps virus, which is genotype G, entered the United States from England.) However, U.S. coverage with MMR vaccine has been fairly consistent between 91 and 92 percent over the last several years, and the threshold of herd immunity for mumps is estimated to be 88-92 percent. So, while possible, it is less likely to provide an explanation.

Regardless of official recommendations, would parents do well to consider a third dose of MMR for their teens?

Yes, medically-speaking, parents could consider a third dose given the number of outbreaks in colleges; however, financially-speaking, it is uncertain whether insurance companies would cover the extra dose.

If a third dose of mumps vaccine is recommended, will individual mumps vaccine be an option instead of having to give MMR?

It would depend on whether the company would decide to make a single component vaccine available; however, if not, the booster dose of measles and rubella would be of value.

Meningococcal-related questions:

Do you anticipate that ACIP will eventually make a universal recommendation for serogroup B meningococcal vaccine instead of the current permissive recommendation?

Three aspects of the meningococcal B vaccine led to the permissive recommendation: low prevalence of disease (i.e., low number of annual deaths relative to the cost of routine immunization), durability of immunity following vaccination and strain coverage. Therefore, it is unclear whether the recommendation would be changed without some other change to the situation.

Can you comment on the possible protective effect of meningococcal B vaccine against gonorrhea and which meningococcal B vaccine was it?

Yes, a recent study from New Zealand showed that the meningococcal B vaccine called MeNZB was 31 percent effective against gonorrhea. MeNZB contains the outer membrane vesicle of meningococcus B. It is not available in the U.S. But, the Bexero vaccine in the U.S. also contains that protein, so it would be interesting to see if a similar result would be found. Since this has only been found in one study, additional studies will need to be conducted to confirm this result. A review of the study was presented in the July 2017 column that Dr. Offit wrote for the VEC’s monthly newsletter, Vaccine Update: http://www.chop.edu/news/journals-vaccine-designed-prevent-one-disease-also-prevented-another.