Welcome to the Current Issues and Immunization Net Conference Series. We're pleased today to present the next session of our Adult Immunization Seminar Series. The title of today's session is Immunizing Older Adults and those less than 65 years with chronic illnesses. My name is JoEllen Wolicki. I'm a nurse educator in the Immunization Services Division of the National Center for Immunization and Respiratory Diseases or NCIRD here at CDC and I'll be the moderator for today's session. To participate in today's program all you need is an internet connection. The learning objectives of today's session are one, describe an emerging immunization issue; two, list a recent immunization recommendation made by the Advisory Committee on Immunization Practices, or ACIP; three, locate resources relevant to current immunization practice; and four, implement disease detection and prevention healthcare services; for example, smoking cessation, weight reduction, diabetes screening, blood pressure screening, immunization services to prevent health problems and maintain health. Today's session is on immunizing older adults and those less than 65 years with chronic illnesses, and presenting will be Dr. Raymond Strikas. He is a medical officer in the Immunization Services Division of the National Center for Immunization and Respiratory Diseases here at CDC. A question and answer session will then follow.

Continuing education or CE credit is available only through the CDC ATSDR training and continuing education online system at http://www2a.cdc.gov/tceonline. The course number is WC261-051717. CE credit for the session will expire on June 19, 2017. In compliance with continuing education requirements, all presenters must disclose any financial or other associations with manufacturers of commercial products, suppliers of commercial services, or commercial supporters, as well as any use of unlabeled products or products under investigational use. CDC, our planners, content experts and their spouses/partners wish to disclose they have no financial interests or other relationships with the manufacturers of commercial products, suppliers of commercial services or commercial supporters. Planners have reviewed content to ensure there is no bias. Today's presentation will not include any discussion of unlabeled use of a product or a product under investigational use with the exception of Dr. Strikas' discussion of Zoster vaccine in a manner recommended by the Advisory Committee on Immunization Practices but not approved by the Food and Drug Administration. If you have a question during this presentation and it's related to content of this presentation, please type your question into the QA pod. I will select questions that we will address during the question and answer period which will follow the presentation. Now I'm happy to turn the program over to Dr. Strikas.
Thank you very much Ms. Wolicki and welcome to this program on immunizing older adults and those less than 65 years with chronic conditions. I’ll say again that I work for the federal government. I’m an employee with no financial interest or conflict with the manufacturer of any product named in the presentation. I will discuss, as Ms. Wolicki said, the off label use of Zoster vaccine which is not on this slide, but also off label use briefly of serogroup meningococcal ACWY and meningococcal B vaccines. I will cover the following topics: review the recommended adult immunization schedule for the United States for 2017, briefly review the burden of vaccine-preventable diseases in selected populations and the selected diseases are hepatitis B, Zoster, influenza, pneumococcal disease, pertussis, tetanus, meningococcal disease, and focus on older adults, that is those 65 years and older, adults with chronic illnesses without immunosuppression and immunosuppressed adults. We’ll talk very briefly about vaccine uptake or coverage in older adults and those chronically ill, vaccine effectiveness in these populations, and close the program with case studies, what vaccines are recommended for 3 different examples of persons in these groups. Some of the information I’ll present has been covered by Dr. Bridges and Kim in previous presentations in this adult webinar series but it’s important to keep that information in mind, so I will repeat some of it.

Here is the front page of the 2017 Harmonized Adult Immunization Schedule published annually by CDC and several partner organizations and these include the Advisory Committee on Immunization Practices, or ACIP, the American College of Physicians, the American Academy of Family Physicians, the American College of Obstetricians and Gynecologists, and the American College of Nurse Midwives. This is figure 1. These are the recommended vaccines by age group and while we will talk about persons who are chronically ill, as well as those 65 years and older as the primary foci of today’s presentation. All those persons should be immune to the diseases represented by the gold bars from influenza through varicella, and below varicella the recommendations vary by age and we will review those as appropriate. Most persons with chronic illness, beginning with the 2nd column in figure 2 of the adult schedule, that is immunocompromised persons, over the column on diabetes from diabetes type 2 from the far right should receive the same vaccines as healthy persons represented by the gold colored bars. Again, I will go over specific recommendations as we move through the presentation.

So let’s discuss several major vaccine-preventable disease and their burden. First, hepatitis B. This graph shows from 2003 through 2011 rates of acute hepatitis B declined among all age groups. Rates of acute hepatitis B increased slightly among the 30-39 year old age group in the yellow line from 2011 to 2013, and then decreased slightly into 2014. Rates for all other age groups decreased or stayed roughly the same among these age groups through 2014. In 2014 rates were highest for persons age 30 to 39 years, about 2 cases per 100,000 population, and the lowest rates were among children and adolescents less than 19 years or equal to 19 years, 0.02 cases per 100,000 population as designated
by the line with the circles at the bottom of the graph. Of the 2,791 case reports of acute hepatitis B received by CDC during 2014, a total of 38% or about 1,067 did not include a response, a yes or a no, to any of the questions about risk exposures and behaviors to enable assessment of their risk exposures or behaviors. Of the 1,724 case reports that had risk exposure or behavior information, 1,062 or about 62% of those indicated they had no risk exposure or behavior for acute hepatitis B, while 662 or about 38% indicated at least one risk exposure behavior for hepatitis B during the 6 weeks to 6 months prior to illness onset. The most commonly reported risks were injection drug use, having multiple sexual partners, and surgery.

If we talk about zoster or shingles, this is a late complication of prior varicella vaccination. We are seeing about a million cases of zoster annually in the United States, or about 10 to 11 per 1,000 per year in persons 60 years of age or older. The lifetime risk for anyone in the United States is about 32% chance of acquiring zoster during your lifetime. Thoracic, cervical and ophthalmic involvement are most common and you see on the top right photo a thoracic zoster and the bottom right photo ophthalmic zoster which can jeopardize the eye and eyesight. There is also risk of severe prolonged pain or postherpetic neuralgia which increases with age. The rate of zoster disease increases strikingly with age as well, particularly at 50 years of age or older, as you see on the graph.

If we talk about streptococcus pneumoniae or pneumococcal disease, we have seen recently significant declines of invasive pneumococcal disease or IPD. Since pneumococcal conjugate vaccines were introduced in the United States, PCV7 or pneumococcal conjugate 7-valent vaccine in 2000 and PCV13 or the 13-valent in 2010 for children overall IPD cases dropped from 100 cases per 100,000 to 9 cases per 100,000 in 2015 from the baseline in 1998 among children. IPD causes by serotypes specific to PCV13 decreased from 91 cases per 100,000 in 1998 to 2 cases per 100,000 in 2015, and vaccine impact on carriage of streptococcus pneumoniae organisms likely related to the decrease and facilitated that occurring. For adults 65 years and older, they have the highest rates of IPD at present. Fifty-nine cases per 100,000 were the baseline we had in 1998 before conjugate vaccines were available. Presently it’s 23 cases per 100,000 in 2015, and again, we believe these reductions are mostly attributable to conjugate vaccination of children.

Now, many of our recommendations for use of pneumococcal vaccine are risk based. The first reason for risk-based recommendations, a very high incidence of IPD in adults with immunocompromising conditions which are depicted on this graph. As you look at the two high bars on the right, individuals with hematological cancer and HIV/AIDS have the highest risk for IPD, which are over 20 fold increase compared to that of healthy persons on the far left, that is a running 170 or more per 100,000 as compared to 8 per 100,000 for healthy persons. The second reason that risk-based recommendations are important is
these data demonstrate high rates of disease for immunocompetent persons which you see beginning with cardiovascular disease, diabetes, pulmonary disease, kidney disease, liver disease and chronic alcohol use and rates of 26 per 100,000 to 59 per 100,000 or 3 to 7 fold above the baseline of 8 per 100,000. Older persons have a rate of 23 per 100,000 so they, too, have an increased rate of disease and therefore we focus on them as well for pneumococcal vaccination.

Talking about influenza health impact, the influenza disease burden varies from year to year. There are millions of cases and an average of 226,000 hospitalizations annually with about 75% of those occurring among adults. Up to 56,000 deaths annually; 90% of those among adults; the majority of those, 71-85% occurring among adults 65 and older, and the majority of hospitalizations, 54% up to 70% also occur among adults 65 years and older. Direct medical costs in the U.S. to influenza average about $10.4 billion in an influenza season but they vary widely depending on the type of influenza and its severity, and if you add in loss of work and productivity costs and loss of life, the total cost of influenza to society averages $87 billion per year with a wide range.

Pertussis is a concern across the entire age spectrum, caused by Bordetella pertussis, the bacteria. This infection leads to respiratory tract inflammation and difficulty clearing pulmonary secretions. Twenty-one thousand cases reported in 2015, 22% of those in adults and as with most infectious diseases this is probably a significant underreport of actual cases. The most severe cases occur among infants. Complications among hospitalized infants notably death 1% among hospitalized infants. Apnea is seen in 61% requiring breathing assistance, pneumonia in 23%, seizures and encephalopathy are also described. Among adults, death is very, very uncommon but pneumonia can occur in 2% of them, weight loss in 33% from protracted coughing and inability to eat, urinary incontinence, syncope, and rib fractures from severe coughing are all described. I will remind you, as you are aware, pregnant women are recommended to get Tdap vaccine in the 3rd trimester of each pregnancy to protect their infants prior to 6 months of age before they receive 3 doses of DTAP vaccine because mother can pass on antibodies from a Tdap vaccine during pregnancy ideally in the 3rd trimester and protect those infants from these serious outcomes I just described.

These graphs demonstrate pertussis cases reported in the U.S. by year and age group back from the 1920’s and ‘30s and the smaller graph on the right from 1990 through 2015. The graph on the left indicates the high rates of pertussis reported to CDC which dropped after the introduction of wholesale pertussis vaccine or DTP in the late 1940’s. And you also see on the far right of that graph a modest resurgence of pertussis disease since about 2000. We know that since acellular pertussis vaccines were introduced in the 1990’s pertussis wanes after acellular pertussis vaccine within 5 years or so and it lasted longer with the holder wholesale vaccine. The graph on the right indicates this increase in pertussis has occurred in all age groups since the late 1990’s or about 2000 with
the highest rate in infants less than 1 year of age depicted by the purple line but less market increases in older children are seen, and very modest increases in persons 20 years of age or older in the blue line at the bottom of the graph.

Tetanus disease is uncommon. Only about 233 cases reported in a recent 8-year period. It’s particularly uncommon in persons with 3 or more doses received of tetanus-containing vaccine outlined in the yellow box. However, persons 65 years or older have the highest rate of tetanus disease of all age groups or .23 per 100,000 persons outlined in the red box making up about 1/3 of all reported cases in this time period, and this emphasizes the need for an entirely preventable disease for you to assess and vaccinate as needed all adults, but particularly older adults for tetanus booster doses, Tdap if they’ve not received it, or TD as necessary.

Let’s talk about meningococcal disease incidences. This graph depicts 3 peaks in meningococcal disease incidences; that is before 1 year of age in adolescents, the bump there at 15 to 19, 20 to 24 in young adulthood, and in persons age 80 years and older. The incidents of serogroup C and Y which represent the majority of cases of meningococcal disease preventable by the conjugate vaccines are at historic lows. However a peak in disease incidences among adolescents, young adults 16 to 21 years of age has persisted which you see in the 2nd arrow on the graph, even after routine vaccination of adolescents was recommended in 2005. We compare the incidences of cases in 2000-2004 to 2005-2009 the estimated annual number of cases of serogroup C and Y meningococcal disease decreased 74% among persons age 11 to 14 years, but only 27% among persons age 15 through 18 years, so this modest risk persists. If we add in an evaluation of serogroup B which is in the dark line in this graph between 2005 and 2014, as well as serogroup C and Y in the lower light colored line and the gray line, we see the incidents of these serogroups in adolescents and young adults fall away from 2005 to 2014 after meningococcal conjugate vaccine was introduced. And while the incidences of all serogroups is low, serogroup B in black is the leading cause of meningococcal disease in this age group and indeed serogroup B has been documented to have caused 7 outbreaks on college campuses since 2009 resulting in 41 cases of disease and 3 deaths.

So how many people are at risk for meningococcal disease? There are several groups at increased risk and these include in the first row on this table persons with complement component deficiencies. Complement is a part of our immune system manifested by protein groups in our bloodstream, and people who lack one or more elements of the complement system are up to 10,000-fold more likely to experience meningococcal infection. In the second row persons who lose their spleens or whose spleens do not function well, such as persons with sickle cell disease, also have an increased risk for meningococcal infection as well as by other bacteria with capsules, notably streptococcus pneumoniae and Hemophilus influenzae. In the third row we see microbiologists who work with
Neisseria Meningitidis bacteria in their laboratories also have an increased risk of this disease and should be vaccinated. These three groups comprise an estimated 270,000 people in the U.S. at continuing high risk of meningococcal disease and, again, should be vaccinated with both types of meningococcal vaccines. At the bottom is the latest group to be added to this risk grouping and that is persons with HIV and/or AIDS. There are 1.2 million persons estimated to be infected with HIV in the U.S. and have an attack rate of meningococcal disease of 3.4 to 6.6 per 100,000. Primarily they seem to be affected with meningococcal types ACW and Y, not type B and hence the recommendation for HIV infected persons to only receive meningococcal ACWY vaccine at this time. The last group I want to mention meningococcal disease risk is persons involved in an outbreak. Over a 9-year period in 2008 to 2016, we estimate about 180,000 students were involved in 11 serogroup B outbreaks since 2008. Average is about 20,000 students per year but does not account for also at risk people who among the faculty, community members and staff at those universities, so the number actually at risk is somewhat higher.

So as demonstrated by the vaccines enclosed by the green line in figure 1 of the adult immunization schedule. Again, these are the vaccines all adults should receive: influenza vaccine annually, be up to date for TD Tdap, have received or are old enough depending on the disease to be immune to measles, mumps, rubella and varicella, and if 60 years or older, as enclosed in the blue line, receive zoster vaccine as you see on the graph. As outlined in the red line, all adults 65 years and older are at increased risk of invasive pneumococcal disease, as we discussed earlier, and likely pneumococcal pneumonia should receive both pneumococcal conjugate vaccine PCV13 followed in a year by pneumococcal polysaccharide vaccine PPSV23 unless the person has already received the latter at 65 years or older. About 60% of older adults report having received pneumococcal vaccine, likely PPSV23 because PCV13 has only been recommended for older adults since 2014. If an older adult has received PPSV23 at 65 years or older, then PCV13 is the only pneumococcal vaccine they need receive if they’ve not received it before. It’s only recommended once for adults and it should follow the PPSV23 dose by at least one year.

Now let’s talk about adults less than 65 years who have a variety of chronic illnesses but without significant immunosuppression. Here is figure 2 of the adult schedule again. The conditions and the vaccines outlined in the green lines are those who are chronically ill persons, that is persons with HIV infection but who have a high T cell count relative to those with severe disease or AIDS, persons with heart or lung disease or chronic alcoholism, chronic liver disease or diabetes. These folks should receive the routinely recommended vaccines we discussed on figure 1 just before this one, plus HPV vaccine if they’re in the right age group, and also PPSV23 pneumococcal polysaccharide vaccine which is indicated specifically because of their chronic illness and their modestly increased risk for pneumococcal disease that we discussed earlier on that segment.
On this alteration of figure 2 of the adult immunization schedule for adults less than 65 years whose health conditions I’ve outlined in red, groups and vaccines indicated for them. These groups include persons with HIV infection but with CD4 T cell counts of less than 200/microliter, those with asplenia and persistent complement component deficiencies and kidney failure, or end stage renal failure who may be on dialysis but may not be. If not on dialysis but they are expected soon to be so or they are candidates for renal transplant, they fit into this category of kidney failure. They need the vaccines we identified for the non-immunosuppressed persons outlined in green previously; now I’ve outlined them and blocked them out in red, and you see for all HIV infected persons pneumococcal conjugate vaccine PCV13 is recommended as it is for asplenic persons, those with complement component deficiencies and chronic kidney failure. The last group of vaccines recommended for some patients in this category are meningococcal conjugate ACWY vaccines for all HIV infected persons that we mentioned earlier and for those with asplenia and complement component deficiencies in that line as outlined in red. Persons with asplenia and complement component deficiencies should also receive a meningococcal B vaccine series, and lastly if not previously vaccinated with Hib vaccine, persons with asplenia should receive one dose of any licensed Hib vaccine. Another group to mention briefly is persons who have had a hematopoetic stem cell transplant designated as post HSCT in the outlined red box in the bottom left hand side of the table should receive a Hib vaccine series after the transplant denoted in the outlined bottom red box at the bottom left of this figure.

I’ll go over in some more detail meningococcal vaccine recommendations for adults 19 years of age and older because they are varied and they can appear complex. Adults 19-21 years who are in a shared residence setting, be they in colleges or the military, are recommended to also receive meningococcal conjugate vaccine once; that is the ACWY vaccine. These are the recommendations for adults 19 years of age or older for meningococcal disease if they are travelers to a residence of countries where meningococcal disease is hyperendemic or epidemic, and that would include the meningitis belt in Northern Africa as well as people traveling to Saudi Arabia for the Hodge. Also people present during outbreaks caused by a vaccine serogroup and other people with prolonged exposure, and here we talk about the microbiologists I mentioned before. These folks should receive one dose of meningococcal ACWY vaccine and with a booster dose every 5 years if their risk continues as it may for microbiologists or for recurrent travelers, and MenACWY vaccine now is also recommended for those 56 years of age or older because the previous meningococcal polysaccharide vaccine Menimune or MPSV crossed out here is no longer available and all of the product that’s out there will expire by September 2017. And these folks if risk continues should also be boosted with meningococcal ACWY vaccine every 5 years.
Persons with, as I mentioned, persistent complement component deficiencies, HIV infection or functional anatomic asplenia, they need 2 doses of the conjugate vaccine 8 weeks apart and boost every 5 years, and the same is now true for people 56 years of age or older, 2 doses of the conjugate 8 weeks apart and boost every 5 years. So the age does not matter. All adults at risk should receive these vaccines as outlined on the slide.

Regarding meningococcal B vaccine, there is the permissive recommendation or category B recommendation for young adults through 23 years; that is beginning at age 16 but through 23 years who wish to be vaccinated weighing the benefits; it’s a rare disease but a very severe one versus risks which seem to be minimal. One would get either 2 doses of Bexsero 4 weeks apart or 2 doses of Trumenba on a 0 and 6 months schedule. For persons who have persistent complement component deficiencies, anatomic or functional asplenia including sickle cell disease, and people present during outbreaks caused by serogroup B, or microbiologists, they need 2 doses of Bexsero but here because of the increased risk. It’s not the 2-dose Trumenba series but the 3-dose Trumenba series originally licensed 0 months, 1-2 months later and 6 months later is the schedule in this setting for Trumenba.

Now I’m going to briefly touch on vaccination coverage. I’m going to skip over some of these slides in the interest of completing the program and have ample time for your questions. This data I’m going to summarize very rapidly was published in the MMWR surveillance summaries on May 5, 2017 and it’s a very brief summary of those data. These data come from the National Health Interview Survey which is an annual in-home survey of U.S. non-institutionalized civilians. Questions about receipt of recommended vaccines for adults were asked of one randomly selected adult within each family in the household. Data were weighted to produce national coverage estimates and the final sample in the 2015 NHIS, the response rate was about 55.2% and the total sample was 33,348 persons. And the final sample adult response rate for influenza vaccination coverage was about 58.9% in 2014, 55.2% in 2015, and the sample was slightly lower at 31,897 persons. This report summarizes the results of analysis in NHIS for influenza vaccine for the 2014-15 influenza season. Pneumococcal vaccine overall for both the 23-valent and the 13-valent vaccines for tetanus toxoid-containing vaccines, both TD and Tdap, hepatitis A, hepatitis B, herpes zoster or shingles and HPV vaccines. There were no questions in the NHIS in this sample to ascertain which pneumococcal vaccine was received. Comprehensive information on high risk conditions for hepatitis A or B was not collected in this sample. What was collected for hepatitis A was travel status and chronic liver disease, and for hepatitis B just travel status, chronic liver disease and diabetes. There were some increased risk conditions identified for pneumococcal disease and healthcare personnel were solicited to offer their employment, including those with and without direct patient care.
I’ll show you one sample of results for influenza vaccine coverage. Vaccine coverage for the 2014-2015 season was 45% for all adults 19 years and older, an increase of about 2 percentage points compared to the previous season in 2013-2014. Influenza vaccination coverage was 33% for those age 19 to 49; 49% for those age 50 to 64; and 74% for those age 65 years and older. Note that influenza vaccination coverage for those age 65 years and older was higher than the overall adult target for Healthy People 2020 of 70%. Influenza vaccination coverage for healthcare personnel labeled HCP was 69%, and among healthcare personnel coverage did not really increase from the previous season.

Now, I’m going to skip over the next several slides, again, in the interest of time. You can look at the slides online and you can also read the surveillance summary in the reference I gave you. I do want to stop and pause and say we have a continuing problem with racial and ethnic vaccination disparities that the NHIS pointed out. These have persisted for all 7 vaccines and indeed widened for pneumococcal vaccine and herpes zoster. Non-Hispanic blacks, Hispanic and non-Hispanic Asians had lower vaccination coverage than that of non-Hispanic whites for all the vaccines routinely recommended for adults. Some examples are listed on the slide. Also, non-Hispanic black healthcare personnel and Hispanic healthcare personnel had lower coverage than white healthcare personnel for influenza, Tdap and hepatitis B.

In conclusion, vaccination coverage estimates for only 1 of the 4 vaccines included in the Health People 2020 target for herpes zoster vaccination which was just over 30% in 2015, and the target is only 30%, relatively modest. It’s the only target that’s been met so far. Vaccination coverage estimates for the remaining 3 vaccines including in Healthy People 2020, influenza, pneumococcal vaccine and hepatitis B for healthcare personnel were all below the respective target levels of 70% for overall influenza vaccination for adults 19 years and older and did not reach the target of 90% for healthcare personnel for influenza vaccination or 90% for persons age 65 and older, and 60% for those 18 to 64 years, the latter for pneumococcal vaccines. And lastly, there’s a target of 90% for hepatitis B vaccine for healthcare personnel and, again, we’re short of that target as well. So there have been some improvements in coverage but coverage remains low for most vaccines routinely recommended for adults and racial and ethnic disparities remain. So much remains to be done. Their wider use of practice has shown to improve adult vaccination is needed including strategies such as assessment of patients’ vaccination needs by healthcare providers, routine recommendation offering of needed vaccines to adults, implementing reminder recall systems, use of standing order programs for vaccination, and assessment of practice level vaccination rates with feedback to staff members and other healthcare providers. Let me just acknowledge many colleagues at CDC from 6 divisions and 3 centers across the agency who analyzed and reported these data and my thanks go out to them for their hard work. Additional information on vaccination coverage and recommendations for
specific vaccines are listed on this slide and these are resources you should be aware of.

So let me move now to talking about vaccine effectiveness for selected vaccines relevant to these adult populations we’re discussing today. The impact of vaccine effectiveness of course varies by vaccine type, the disease outcome being measured in the age or health of the person vaccinated, and we’ll discuss some examples as I go through the next few slides. Please keep in mind many of these diseases are common and while vaccine effectiveness may be modest for some vaccines, influenza being the prototype there, when given to adults the impact of vaccination overall is high, or can be high, given the high number of cases that can be prevented. On this slide we talk about hepatitis B vaccine being about 90% effective for a 3-dose series for persons less than 40 years of age; although it’s low in persons with diabetes particularly as they age; 90% persons with diabetes less than 40 years of age but 80% effectiveness in diabetes if they’re up to 59 years of age, and 65% if they’re 60-69 years of age, and finally if 70 years or older and have diabetes, vaccine effectiveness of hepatitis B is estimated at less than 40%.

If we look at shingles vaccine, it’s only 51% effective preventing any case of shingles but more importantly it’s 66% effective in preventing postherpetic neuralgia, the severe neurologic pain that can be disabling and last a long time after shingles cases, and it is 80% effective against the most prolonged and extreme cases of postherpetic neuralgia but prior to the vaccine being available could be disabling for months or years.

Regarding pneumococcal vaccines, PCV13 or the pneumococcal conjugate vaccine is 45% effective against vaccine-type pneumococcal pneumonia and 75% effective against vaccine-type invasive pneumococcal disease, or IPD. These estimates are for adults 65 years and older. The vaccine has less effectiveness in immunocompromised adults. For IPD estimates range from 25% to 75% and no more than 13% against pneumococcal pneumonia in the few studies available of the conjugate vaccine. If we look at the polysaccharide vaccine, PPSV23, it’s estimated to be 74% effective against invasive pneumococcal disease or IPD for the serotypes in the vaccine, similar to the effectiveness for PCV13, but effectiveness has not been established for this vaccine for non-invasive pneumococcal pneumonia. In immunocompromised adults among IPD its effectiveness is relatively low, estimated only from 8% to 25%.

Talking about influenza vaccine, effectiveness varies, as you know, annually based on antigenic match of the vaccine, the circulating virus or viruses, and also by age and health of the person being vaccinated. Vaccine effectiveness at best is 60-70% in younger adults, and only about 30% on average in adults 65 years and older against medically attended influenza illness when there’s a good match. Since 2007, vaccine effectiveness ranges widely in older persons from
near 0% to 59%. In the past influenza season, you see the estimates in the blue box at the bottom of the slide with estimates ranging from 19% in younger adults less than 50 years of age, perhaps because there was a small sample studied and there’s a wide range of conference(?) intervals you see there; 58% vaccine effectiveness in those 50-64 years, and 46% in those 65 and older. So approximately where we usually see these estimates for these populations.

Looking at influenza further for persons with chronic health conditions, the estimates are usually lower than similar age persons without the chronic health conditions. For example, an aggregate estimate for preventing laboratory-confirmed influenza, or LCI, is 48% in those with chronic illness versus 60% in those without such illnesses in preventing influenza-related hospitalization 36% for those with chronic illness versus 90% without, and 76% for adults with chronic lung disease preventing LCI in one study and 44% to 60% preventing cardiac events associated with influenza infection in persons with preexisting heart conditions. There are limited data for the effectiveness of influenza vaccine in immunocompromised persons and these are variable. The best estimate is for HIV infected adults without AIDS with an estimate of 75% effectiveness in preventing LCI.

So let us move to the end of the presentation. I’ve got three case studies for you to think about and opine and the first one is a 28-year-old woman who comes to your office in October to receive hepatitis A vaccine before a trip to New Zealand. Her medical history is unremarkable except for a splenectomy at age 13 following a bicycle crash and subsequent surgery. She doesn’t have an immunization record but fortunately your state’s immunization information system has her record and you find that she’s received 2 doses of MMR, 2 doses of varicella, 5 doses of DTAP, 4 doses of IPV, 4 doses of HibIB. She tells you she may have received pneumonia vaccine in the past but isn’t sure. So what vaccine or vaccines does this person need today? I’ll pause for 10-15 seconds and please think about it, maybe write down your answers and then we’ll review the needs and why they are in just a moment. Okay, so what does this person need? This person should be offered the following vaccines: hepatitis A, hepatitis B, influenza, TdapDAP, pneumococcal conjugate, meningococcal conjugate ACWY, and meningococcal B. Let’s talk about her indications for each of these vaccines that can be placed into 3 categories. Two travel-related vaccines, hepatitis A because hepatitis A outbreaks can occur throughout the world and sometimes in countries with low risk for hepatitis A including the U.S. You could acquire hepatitis A through contaminated food or water even in New Zealand so hepatitis vaccine is indicated. Hepatitis B, you can acquire hepatitis B through sexual contact, contaminated needles and blood products, so CDC recommends this vaccine if you inquire if the patient may have sex relations with a new partner, get a tattoo or piercing, or conceivably in an extended stay have any medical procedures. Hepatitis B vaccine would be recommended as well. Routinely recommended for all adults is TdapDAP-vaccine because she hasn’t had any tetanus, diphtheria or pertussis vaccines since her DTaPp as a child, so
TdapDAP should be given now and TdD booster dose is recommended every 10 years thereafter. And because she’s lost her spleen in surgery, you would recommend pneumococcal conjugate vaccine now followed in 8 weeks if she’s back in the country by pneumococcal polysaccharide vaccine; a 2nd dose of the polysaccharide vaccine 5 years later before 65 years of age, and a final 3rd dose of pneumococcal polysaccharide vaccine presently would be recommended once she reaches 65 years of age, and at least 5 years after the 2nd dose of that vaccine. She should receive meningococcal conjugate ACWY vaccine ideally 2 doses 8 weeks apart followed by booster doses every 5 years, and should receive a meningococcal B vaccine series, either a 2-dose series of Bexsero or the 3-dose series of Trumenba; booster doses are not yet recommended by ACIP or CDC. She did receive HibB vaccine as a child so we don’t recommend Hib vaccine though we do for asplenic adults if they have not received the vaccine as a child but this person has done so. And here another way of thinking about this is you look at figure 2 on our adult immunization schedule, the boxes in white, influenza vaccine, TdD Tdap, PCV13, hepatitis A, hepatitis B, mening-ACWY and mening-B are circled and outlined in white to make the point that these are the vaccines indicated for this person and you can discern that from looking at the schedule and thinking about the patient’s vaccine history.

So our 2nd case study is a 60-year-old adult, a retired aerospace engineer beginning a 2nd career as an aid in a children’s hospital. He has a history of psoriatic arthritis diagnosed 6 months ago. The arthritis is being treated with a dose of Etanercept, also known as Enbrel, twice a week. He reports having had severe varicella 22 years of age that was complicated by varicella pneumonia and required hospitalization. He also reports a current mumps outbreak in the community served by the hospital where he works and several children with mumps have recently been admitted to the hospital. His childhood vaccination record was lost in a fire several years ago but listed below are his only documented vaccine doses. He received influenza vaccine 1 dose a month ago, he completed his hepatitis B vaccine series 1 months ago, got a TD dose 1 year ago, and a dose of MMR vaccine 1 year ago at the outset of his work in the hospital. So what vaccine or vaccines can this person receive today? Again, I’m going to pause 10-15 seconds for you to think about this and we’ll come back and discuss it. Okay, ideally this patient should receive Tdap and pneumococcal conjugate vaccine today and absent his medical history, which we’ll come back to, a 2nd dose of MMR and zoster vaccine also would be indicated. He should also get pneumococcal polysaccharide vaccine 8 weeks after pneumococcal conjugate vaccine. These are all related to his Etanercept use and being immunosuppressed as a result. MMR is indicated and hepatitis B vaccine was given because he works in a healthcare facility and a second dose of MMR would be appropriate. He’s 60 years old, was born in 1957 just after the cutoff time when we would say he might be immune but we generally want to make sure healthcare personnel are immune to MMR by vaccination, not by age indication only. So Tdap is recommended because he’s only received TdD in the past. ACIP and CDC recommended revised mumps recommendations that
people be assured of having 2 doses of mumps vaccine, and we would ideally
want to do that but it’s a live virus vaccine. He’s taking Etanercept; we can’t give
him that vaccine. So what one can do is test for measles and mumps, IgG
antibody and you should also be testing his response to hepatitis B vaccine for
hepatitis B antibody to surface antigen which you could test now up to 2 months
after completing the vaccination series. If he does not have an adequate
antibody level, you would receive an additional dose of hepatitis B vaccine
followed by testing again 1-2 months later. Now, if you’re measles and mumps
IgG and anti-HPS are positive, then you can consider him immune to measles
and mumps. One dose of MMR offers immunity to rubella. We say you can
count that and not test for serology. If his measles or mumps titer is negative,
that 2nd dose of MMR would be recommended (recording goes blank). I’m told
we lost the connection so let me try to recap where we were with this patient. I
was saying that ideally one would want to give this patient Tdap pneumococcal
conjugate vaccine and you can do that because he is immunosuppressed while a
2nd dose of MMR is recommended and zoster vaccine are recommended; you
cannot give him these vaccines until he ceases the Etanercept
medication for his psoriatic arthritis for at least a month and that’s something
you’ll have to discuss with his physician. Also you need to think about
pneumococcal polysaccharide vaccine 8 weeks from now because of his
immunosuppression if that continues, and he needs a dose of TD to complete his
3-dose TD Tdap series 6 months after the Tdap dose.

The last case I want to discuss is Paul who is a 65-year-old retired accountant
who is an established patient in your practice. Has significant past medical
history or problems. He’s in your office, it’s November, for a checkup. He lives
with his daughter who is expecting her first child in a month. Paul wants to know
if he’s eligible for Tdap vaccine so his grandchild can be protected from
pertussis. He reports he had chickenpox as a child but his medical records lack
a diagnosis or verification of varicella disease. His vaccination record shows that
he received valid doses of smallpox, DTP and IPV in childhood and hepatitis B
and MMR as an adult. The state immunization registry shows recent vaccination
records below and those include Tdap 11 years ago, TD 2 doses about right after
apparently the Tdap dose, influenza vaccine a year ago, and TD dose one year
ago. So what vaccine or vaccines does Paul need today? Think about that for a
few seconds. So the vaccines recommended would be zoster vaccine,
pneumococcal conjugate vaccine and influenza vaccine. He would not receive
Tdap today. ACIP recommends that persons having close contact with an infant
younger than 12 months of age should receive a single dose of Tdap to protect
against pertussis if not previously vaccinated at least 2 weeks before beginning
close contact with the infant. But Paul has received Tdap even though it was 11
years ago; we do not have a recommendation for non-pregnant women to
receive Tdap more than once at this time. He received all childhood vaccines
that were appropriate at the time. Varicella vaccine did not exist at the time,
however, he reports having had chickenpox as a child and also he was born in
the U.S. prior to 1980 which considered evidence of immunity to varicella and
therefore one can presume he is immune to varicella and offer him zoster vaccine. Because he’s 65 years of age he needs pneumococcal conjugate vaccine now and you can bring him back in a year for pneumococcal polysaccharide vaccine. You do not want to give those vaccines on the same visit. And lastly, it’s influenza season. His last dose of influenza vaccine was a year ago so it’s important to vaccinate him against influenza and prevent complications. That’s our last case study. Let me run through some resources as we wrap up. There are some resources on our CDC website for staff education. We’ve got multiple education products available and CE is available for most of our products. The Pink Book is available published in 2015 and a supplement was published recently in 2017 including additional information on HPV, meningococcal disease and pneumococcal disease. If you’ve got questions, you can email us at NIPINFO@cdc.gov. You can also inquire CDC info at cdc.gov/cdcinfo. Our general website is cdc.gov/vaccines. We have a twitter handle for our center director that you see there. Influenza information at cdc.gov/flu and vaccine safety information is at the website at the bottom of the slide. There are additional resources. If you go to our CDC website, cdc.gov, and search for state immunization program, you’ll find their websites and there’s a host of partners whose websites are here who have valuable immunization information as well including our partners hosting this series, the Maryland Department of Health and Mental Hygiene. Let me thank you for attending and let me turn it back to Ms. Wolicki.

Thank you Dr. Strickas. Before addressing some of the questions that we received, I’d like to share again some continuing education information. The course number is WC266-051717. CE for this session will expire on June 19, 2017. The instructions for applying for CE credit are available on your screen in the resource pod, and you’ll notice too that the slides from today’s presentation are also located there. So Dr. Strickas, we’ve gotten a number of questions, the first one being do we know yet if the risk of zoster for persons who were vaccinated with varicella vaccine is greater or is it less than those with a previous chickenpox infection?

The data present for—particularly this is relevant to children and young adults—the rate or incidents of zoster or shingles in people who receive varicella vaccine compared to the rate of zoster in people of a similar age who had wild chickenpox or varicella disease, data continues to show that the rate of zoster in people who were vaccinated is lower than it is in people who had natural chickenpox disease. So while it can occur, it does not seem to be as frequent as it is in people who had natural chickenpox disease.

Thank you. We have another question about meningococcal conjugate vaccine or Men-ACWY. This person has a local surgeon who recommends Men-ACWY vaccine for adults with cochlear implants. She knows that it’s recommended for children but is there any evidence to recommend this vaccine for adults?
I’m not aware of any data that people with cochlear implants have an increased risk of meningococcal disease or meningitis. It’s been demonstrated now back 20 years, they have an increased risk of pneumococcal infections and pneumococcal meningitis which is why we aggressively seek those people out and vaccinate them with pneumococcal conjugate vaccine and the polysaccharide vaccine. However, again, the epidemiology data that I’m familiar with does not indicate a risk so given meningococcal vaccines are very safe, there’s no obvious harm done to give meningococcal vaccine to people with cochlear implants but it’s not clear that it’s going to be beneficial if they do not have an increased risk of disease.

Thank you. We have a question that’s related to travel. Should a person going to Haiti from the U.S. for 6 months be given TD vaccine if they received Tdap in 2010? The concern here is that they will be doing activities that could result in injury.

I think the thing to do there is to assess their overall tetanus diphtheria status and if they completed a series in childhood of DTAP vaccine, they’ve gotten Tdap once and they’ve gotten TD boosters every 10 years regularly, there is no reason to re-vaccinate the person less than 10 years after the last dose. If you don’t have records or you’re concerned their TD or Tdap series is incomplete, then giving a dose of TD is appropriate. It really boils down to what records you have of their prior vaccination status and then making a judgment based on recommendations for adults.

Thank you. We’ve got a lot of questions about Tdap today. This person wants to know if there’s evidence that immunity to pertussis wanes after 5 years, why not administer Tdap every 10 years?

That’s an important question. It’s one that CDC and our Advisory Committee on Immunization Practices have wrestled with for the last 3 or 4 years since it’s become evident that acellular pertussis vaccine, whether we’re talking about DTAP or Tdap, have limited duration of protection 3 to 5 years after the last dose. And the challenges we have are would one get into a cycle of then recommending Tdap every 5 years. We don’t know how much additional protection that would offer; would it prevent pertussis outbreaks. That’s uncertain. Also the highest risk for serious pertussis is in infants and the best way to protect the infants is to vaccinate the mother before she delivers in the third trimester which I had mentioned and which will be a focus of the discussion in next week’s webinar. Suffice it to say that there is good evidence, preliminary evidence, that Tdap late in pregnancy will protect the infant for the first 6 months of life and those infants are the population at highest risk of serious outcomes, death and hospitalization related to pertussis and our present emphasis is on assuring that all pregnant women, as many as possible, receive Tdap vaccine late in pregnancy where the most severe disease is. There is certainly a lot of
concern and attention to see can we think of better policies and/or are better pertussis vaccines perhaps going to be available soon. At present it’s not clear when that might occur and so it’s a fair question and I can say it’s something the ACIP revisits regularly, so stay tuned and we'll see if that evolves but at present we don’t have a recommendation for Tdap in any population other than pregnant women more than once and we’ll have to see where it goes from there.

And one last question we have here that pertains to Zost\textaeervax. Why would Zost\textaeervax be given to a patient on Enbrel since it’s a live attenuated vaccine and this patient is immune-suppressed?

I’m sorry, I may have gone over that case study too quickly. The patient is eligible for zoster vaccine by virtue of his age but he has a contraindication because he's on Enbrel. He should not receive zoster vaccine unless and until he stops the Enbrel, the Etanercept, for at least a month and then is no longer immuno-suppressed and can then receive zoster vaccine after being off the drug for a period of time and resume the drug 14 days or a month later depending on his physician’s preference. So one should not give zoster vaccine to people who are significantly immunosuppressed as the patient we discussed is—but if he stopped his medication, you could give it. So let me make that clear and I apologize if it wasn’t.

(Recording goes blank for the last 3.19 minutes).