CDC Influenza Division Summary & Technical Key Points
September 28, 2018

Summary Key Points

- *The 2018-2019 flu vaccine campaign kicked off this week with a press conference in Washington, DC. See: https://www.cdc.gov/flu/spotlights/press-conference-2018-19.htm*
- *To coincide with the event, CDC released unpublished preliminary estimates that more than 900,000 hospitalizations and more than 80,000 flu deaths occurred in the U.S. last season.*
- *As the United States heads into flu season, CDC recommends that everyone 6 months and older get vaccinated between now and the end of October.*
- *Annual flu vaccination is the best way to reduce the risk of influenza and its potentially serious complications.*
- *There are many benefits to vaccination, including reducing your risk of flu illness, doctor's visits, hospitalization and even death in children.*
- *For the upcoming 2018-2019 influenza season, there is updated flu vaccine and many vaccine options, including nasal spray vaccine.*
- *Manufacturers have projected that as many 163 million to 168 million doses of flu vaccine will be available in the United States this season; as of September 21, 2018, more than 90 million doses of flu vaccine had already been distributed.*
- *Visit www.cdc.gov/flu for more information*

Technical Key Points
In this document

CDC Estimates of Hospitalizations and Deaths during 2017-2018

- To coincide with the 2018-2019 flu vaccine campaign kick-off, CDC announced unpublished preliminary estimates of the number of flu hospitalizations and flu deaths last season.
- CDC estimates that there were more than 900,000 hospitalizations and more than 80,000 flu deaths last season.
- These numbers are record-breaking and show just how serious flu can be.
- Previously, the highest number of flu deaths estimated to have occurred in the United States since 2010 was 56,000.
- Previously the highest number of flu hospitalizations estimated to have occurred in the United States since 2010 was 710,000.

- These estimate are based on a model first published in PLoS one in 2013. (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3686813/)
- This model uses data from CDC influenza surveillance systems, including the Influenza Hospitalization Surveillance Network or "FluSurv-NET."
- To generate these preliminary estimates, CDC used multipliers of influenza testing practices and health-care seeking behavior observed during 2014-2015; a "high" severity season.
- Final data from FluSurv-NET for the 2017-18 season will be used to finalize these estimates, which will be published online during October.
- These preliminary numbers may change based on final FluSurv-NET data

Call to Action for 2018-2019

- We have updated flu vaccine and many vaccine options, including nasal spray vaccine. Get vaccinated!
- CDC recommends a yearly flu vaccine as the first and most important step in protecting against influenza and its potentially serious complications.
- Flu vaccines this season have been updated to match circulating viruses.
- There are many different flu vaccine options, including nasal spray flu vaccine.
  - Other options include high dose and adjuvanted vaccine for people 65 and older.
  - While there are many different flu viruses, flu vaccines protect against the 3 or 4 viruses that research suggests will be most common.
  - Get vaccinated by the end of October.

Flu Vaccine Benefits

- There are many benefits to flu vaccination.
  1. Flu vaccination can keep you from getting sick with flu.
  2. Flu vaccination can reduce your risk of flu-associated hospitalization.
  3. Flu vaccine can be life-saving in children.
  4. Vaccination helps protect women during and after pregnancy and can protect the baby from flu illness for several months after birth.
  5. Flu vaccination helps prevent serious medical events associated with some chronic conditions (heart and lung disease, diabetes).
  6. Vaccination can reduce the risk of heart attack in people with heart disease.
  7. Flu vaccination also has been shown in separate studies to be associated with reduced hospitalizations among people with diabetes and chronic lung disease.
  8. Flu vaccination prevents millions of flu illnesses and doctors' visits and tens of thousands of hospitalizations each season.
  9. Some people who get vaccinated do get sick, but vaccination has been shown to make illness less severe.
     - A 2017 study showed that flu vaccination reduced deaths, intensive care unit (ICU) admissions, ICU length of stay, and overall duration of hospitalization among hospitalized flu patients.
     - A 2018 study showed that among adults hospitalized with flu, vaccinated patients were 59 percent less likely to be admitted to the ICU than those who had not been vaccinated. Among adults in the ICU with flu, vaccinated patients on average spent 4 fewer days in the hospital than those who were not vaccinated.

10. More detailed information on flu vaccine benefits can be found at https://www.cdc.gov/flu/prevent/vaccine-benefits.htm.

Summary of CDC 2018-2019 Guidance

- CDC guidance for the 2018-2019 is published and available at:
- 'Prevention and Control of Seasonal Influenza with Vaccines: Recommendations of the Advisory Committee on Immunization Practices — United States, 2018–19 Influenza Season' has been published.
- CDC recommends annual influenza vaccination for everyone 6 months and older with any licensed, age-appropriate flu vaccine (IIV, RIV4, or LAIV4) with no preference expressed for any one vaccine over another.

What's New This Season

- Flu vaccines have been updated to better match circulating viruses [the B/Victoria component was changed and the influenza A(H3N2) component was updated].
- For the 2018-2019 season, the nasal spray flu vaccine (live attenuated influenza vaccine or "LAIV") is again a recommended option for influenza vaccination of persons for whom it is otherwise appropriate. The nasal spray is approved for use in non-pregnant individuals, 2 years through 49 years of age. There is a precaution against the use of LAIV for people with certain underlying medical conditions. All LAIV will be quadrivalent (four-component).
- Most regular-dose egg-based flu shots will be quadrivalent.
- All of the recombinant vaccine will be quadrivalent. (No trivalent recombinant vaccine will be available this season.)
- Cell-grown flu vaccine will be quadrivalent. For this vaccine, the influenza A(H3N2) and both influenza B reference viruses will be cell-derived, and the influenza A(H1N1) will be egg-derived. All these reference viruses will be grown in cells to produce the components of Flucelvax.
- No intradermal flu vaccine will be available.
- There were some changes in the age recommendation for two vaccines which are detailed in the 2018-2019 guidance.

Activity Update

- Flu season in the Southern Hemisphere is wrapping up and we are heading into our flu season. When it will start or how severe it will be is hard to predict, but flu can be very serious as we saw last season.
- The U.S. had record-breaking levels of influenza illness, hospitalization rates and deaths last season.
- Summer activity in U.S. has been low, but localized outbreaks have been reported to CDC, mostly caused by H1N1.
- Reported Southern Hemisphere flu activity has been relatively low and fairly mild, with H1N1 viruses predominating in most regions.
- Flu is unpredictable; sometimes Northern Hemisphere (U.S.) seasons are similar to what preceded in the Southern Hemisphere, but not always.

- It is not possible to predict what this flu season will be like. While flu spreads every year, the timing, severity, and length of the season varies from one season to another.
- We do know that flu season is coming and we will likely have co-circulation of H1N1, H3N2 and B flu viruses and that flu vaccines offer important protection against all of these. Take 3 (A three-pronged strategy to fight flu)

Flu Vaccine Coverage Estimates for 2017-2018

- 2018-2019 vaccine coverage data for pregnant women, children and health care providers is being released on 9/27/2018.
- Release of the flu vaccination adult coverage data is being delayed about 1 month as CDC performs additional analysis to address differences in last season's survey methodology.

Coverage in Children

- **CDC estimates from the 2017-2018 flu season suggest that flu vaccination decreased slightly among children.**
    - Flu vaccine coverage among children varied by age, is highest among the youngest children and decreases with increasing age:
        - 67.8% for children 6-4 years
        - 59.5% for children 5-12 years
        - 47.4% for children 13-17 years
        - This is consistent with past seasons.
    - Among children age 6 months through 17 years, flu vaccination coverage during the 2017-2018 flu season was an estimated 57.9%, which was 1.1 percentage points lower than the estimate for the 2016-17 season (59.0%).
    - The decrease in flu vaccine coverage for the 2017-18 season compared with the 2016-2017 season was driven by a drop in coverage among young children 6 months to 4 years of age, where coverage declined from an estimated 70% to 67.8% (2.2% decline in that age group).
    - The observed decrease may reflect true lower coverage or may be due to limitations of the telephone survey method.
    - There was large variability in flu coverage among children aged 6 months through 17 years from state to state, ranging from a low of 43.2% to a high of 76.2%.
    - Common reasons parents give for not having their child receive a flu vaccination include: the child is unlikely to get the flu or get very sick from the flu, the child is not in a high risk group, and concern about side effects from the vaccine.
    - Children younger than 5 years are at high risk of serious flu complications even if they are otherwise healthy just because of their age.
    - Of the pediatric deaths reported to CDC last season, more than one-third of these occurred among children between the ages of 6 months and 4 years (there were 180 reported pediatric-associated deaths last season).
    - Seeing a decline in coverage in this age group is concerning.

- Children 6 months through 8 years getting vaccinated for the first time, and those who have only previously gotten one dose of vaccine, should get two doses of vaccine this season.
- Other children need only one dose of flu vaccine this season.
- It's worth noting that nasal spray flu vaccine is again an option for children 2 and older this season.

2017-2018 Flu Vaccine Coverage Among Pregnant Women

- **CDC estimates that about half of pregnant women didn't get a flu shot last season, leaving themselves and their babies more vulnerable to serious flu complications.**
  - During the 2017-2018 influenza season, 49.1% of pregnant women received influenza vaccination before or during pregnancy.
  - A provider recommendation combined with an offer to administer a flu vaccine at the time of visit remains one of the best ways to increase flu vaccination among pregnant women.
  - Pregnant women who reported receiving a provider recommendation for and an offer of flu vaccination had higher vaccination coverage (63.8%) than pregnant women who reported receiving a recommendation but no offer (37.6%) or who reported receiving no recommendation (9.0%).
  - 66.6% of pregnant women reported receiving both a recommendation and offer and 19.0% received no provider recommendation or offer.
  - Previous studies haves shown a provider offer of vaccination was associated with higher vaccination coverage even among pregnant women with negative perceptions regarding the safety and efficacy of vaccination and pregnant women who were not concerned about flu infection.
  - The most commonly reported reason for not receiving influenza vaccination before or during pregnancy was belief that the vaccine is not effective (20.2%). The second most commonly reported reason for nonreceipt of was concern about safety risks to the baby.
  - Health care providers play a key role in increasing flu vaccination coverage among pregnant women.
  - CDC encourages doctors, nurses, midwifes, and other providers to give a clear direct flu vaccination recommendation at every visit.
  - Health care providers can take action to protect pregnant women from flu.
  - Systems supporting provider recommendations and offers, such as standing orders and provider reminder systems, can reduce missed opportunities for vaccination and improve vaccination coverage.
  - Health care providers who are not able to administer a flu vaccine at the time of the visit should still recommend flu vaccination and refer the pregnant patient to a place where vaccinations are provided.
  - Each provider's recommendation can be an important opportunity to improve vaccination coverage, especially where differences in coverage are seen among certain sub-groups based on education level and race/ethnicity.
  - Pregnant women are at high risk of serious complications from the flu.

- Vaccinating pregnant woman helps protect them from flu illness and hospitalization, and also has been shown to help protect the baby from flu infection for several months after birth, before the baby can be vaccinated.
- Vaccination reduces the risk of flu-associated acute respiratory infection in pregnant women by up to one-half.
- Getting vaccinated can also help protect a baby after birth from flu. (Mom passes antibodies onto the developing baby during her pregnancy.)
- Because pregnant women are at high risk of serious flu complications, they are recommended for influenza vaccination during any trimester of their pregnancy.
- Millions of flu vaccines have been given for decades, including to pregnant women, with a good safety record.

2017-2018 Flu Vaccine Coverage Among Health Care Professionals

- **While overall coverage among health care workers remains stable, many health care professionals (HCP) still are not getting vaccinated. 1 out of 3 assistants and aides and long term care workers did not get a flu shot last season.**

- The coverage rate for HCP was 78.4% for the 2017-18 season, which is similar to last year's rate of 78.6%, as well as similar to coverage from the previous four seasons.
- Coverage remained highest among physicians (96.1%), pharmacists (92.2%), nurses (90.5%), and nurse practitioners and physician assistants (87.8%) during the 2017-18 flu season.
- Coverage by occupation was lowest for assistants and aides (71.1%) and nonclinical personnel (72.8%).
    - Non-clinical personnel include administrative support staff or managers, and non-clinical support staff (food service workers, housekeeping staff, maintenance staff, janitors, laundry workers, etc.).
- Flu vaccination among health care personnel remained high overall for the last 4 seasons. However, 71% of assistants and aides were vaccinated, while coverage was over 90% for physicians, nurses, nurse practitioners, and pharmacists.

- **Employers can take action to protect their staff from flu and reduce absences. Flu vaccination coverage was highest in settings with employer flu vaccination requirements or promotion of flu vaccination.**

- Coverage was highest among HCPs working in settings with flu vaccination requirements (94.8%).
    - 44.1% of surveyed HCP were required to be vaccinated, similar to recent seasons, but an increase from 35.5% in the 2013–14 season.
- Comprehensive, work-site intervention strategies that include education, promotion, and easy access to vaccination at no cost for multiple days can increase HCP vaccination coverage.
- In the absence of an employer requirement for vaccination, coverage was higher among HCP who had access to free, on-site vaccinations over multiple days (76.0%) than HCPs whose employers had no policies related to vaccination promotion (47.6%)

- **Coverage by occupational setting was highest for HCP working in hospitals (91.9%), and remained lowest among HCP in long-term care (LTC) settings (67.4%).**

  - Vaccination of HCP in LTC settings is extremely important because:
    - Many LTC residents are people 65 years and older who are at greater risk of serious complications from the flu.
    - Influenza vaccination among health care personnel in long-term care settings is especially important because influenza vaccine effectiveness, particularly against the most severe H3N2 influenza virus, can be lower among older adults.
    - Some studies have demonstrated health benefits to patients, including reduced flu-related complications and reduced risk of death, with vaccination of HCP in LTC settings.

CDC & AAP Influenza Vaccination Recommendations for Children

- CDC and the American Academy of Pediatrics both agree that a flu vaccine is the best way to prevent flu, and both recommend that children 6 months and older get an annual flu vaccine.
- LAIV is a vaccine option in the recommendations of both organizations for the 2018-2019 flu season.
- CDC has no preferential recommendation for one flu vaccine over another.
- The AAP recommends inactivated influenza vaccine (flu shot) as the primary choice for children. The nasal spray vaccine is recommended for children who would not otherwise receive an influenza vaccine (eg, refusal of a flu shot) and for whom it is appropriate.
- Clinicians should exercise their clinical discretion to ensure that as many people as possible are protected against influenza.

Waning Immunity & Optimal Timing of Vaccination

- Antibody levels increase after vaccination, but then gradually decline over time.
- The rate at which influenza vaccine effectiveness declines is the subject of ongoing studies.
- Some studies show sharp waning (for example, Kissling 2016 observed that VE declined to zero by four months post-vaccination) whereas others have found no appreciable waning until more than six months after vaccination (for example, Radin 2016).
- Two more recent studies on this topic looked at change in vaccine benefit with time since vaccination:
  - Ferdinands 2017 found about 7% absolute decline in VE per month after vaccination.
  - Ray 2018 found that the odds of influenza infection were twice as high among people who had been vaccinated for more than 22 weeks (5.1 mos) compared to people who had been vaccinated for less than six weeks.

- Some studies have shown that the waning may be more pronounced against H3N2- and influenza B-specific antibodies than H1N1-specific antibodies.
- The rate at which influenza antibodies decline is important to help determine the optimal timing of influenza vaccination.
- In recent years, vaccine has been available earlier than it had in the past, raising the question about when is "too early" to get vaccinated.
- ACIP/CDC currently recommends that "vaccination should be offered by the end of October." (Except for children who need 2 doses who should get vaccinated "as soon as possible after vaccine becomes available.")
- There currently is no specified time to start influenza vaccination (and thus no definition of "too early.")
- ACIP/CDC will continue to look at this issue as more information becomes available but the picture is not yet clear enough to support change in policy.

Take 3 Framework

1. **Take time to get a flu vaccine each year.**
    - While there are many different flu viruses, flu vaccines protect against the 3 or 4 viruses that research suggests will be most common. Three-component vaccines contain an H3N2, an H1N1 and a B virus. Four component vaccines have an additional B virus component. (See Vaccine Virus Selection for this season's vaccine composition.)
    - Flu vaccination can reduce flu illnesses, doctors' visits, and missed work and school due to flu, as well as prevent flu-related hospitalizations.
    - Flu vaccination also has been shown to significantly reduce a child's risk of dying from influenza.
    - Also, there are data to suggest that even if someone gets sick after vaccination, their illness may be milder.
    - Everyone 6 months of age and older should get a flu vaccine every year before flu activity begins in their community. CDC recommends getting vaccinated by the end of October. Learn more about vaccine timing.
    - For the 2018-2019 flu season, CDC and its Advisory Committee on Immunization Practices (ACIP) recommend annual influenza vaccination for everyone 6 months and older with any licensed, age-appropriate flu vaccine (inactivated, recombinant or nasal spray flu vaccines) with no preference expressed for any one vaccine over another. (See Types of Flu Vaccines).
    - Vaccination of high risk persons is especially important to decrease their risk of severe flu illness.
    - People at high risk of serious flu complications include young children, pregnant women, people with chronic health conditions like asthma, diabetes or heart and lung disease and people 65 years and older.

- Vaccination also is important for health care workers, and other people who live with or care for high risk people to keep from spreading flu to them.
- Infants younger than 6 months are at high risk of serious flu illness, but are too young to be vaccinated. Studies have shown that flu vaccination of the mother during pregnancy can protect the baby after birth from flu infection for several months. People who live with or care for infants should be vaccinated.

2. **Take everyday preventive actions to stop the spread of germs.**
   - Try to avoid close contact with sick people.
   - While sick, limit contact with others as much as possible to keep from infecting them.
   - If you are sick with flu-like illness, CDC recommends that you stay home for at least 24 hours after your fever is gone except to get medical care or for other necessities. (Your fever should be gone for 24 hours without the use of a fever-reducing medicine.)
   - Cover your nose and mouth with a tissue when you cough or sneeze. After using a tissue, throw it in the trash and wash your hands.
   - Wash your hands often with soap and water. If soap and water are not available, use an alcohol-based hand rub.
   - Avoid touching your eyes, nose and mouth. Germs spread this way.
   - Clean and disinfect surfaces and objects that may be contaminated with germs like flu.

   - **Take antivirals to treat your flu if your doctor prescribes them.**
   - If you get sick with flu, antiviral drugs can be used to treat your illness.
   - Antiviral drugs are different from antibiotics. They are prescription medicines (pills, liquid or an inhaled powder) and are not available over-the-counter.
   - Antiviral drugs can make illness milder and shorten the time you are sick. They may also prevent serious flu complications.
   - CDC recommends prompt antiviral treatment of people who are severely ill and people who are at high risk of serious flu complications who develop flu symptoms.
   - For people with high-risk factors, treatment with an antiviral drug can mean the difference between having a milder illness versus a very serious illness that could result in a hospital stay.
   - Studies show that flu antiviral drugs work best for treatment when they are started within 48 hours of getting sick, but starting them later can still be helpful, especially if the sick person has a high-risk health condition or is very sick from flu. Follow your doctor's instructions for taking this drug.
     - Flu-like symptoms include fever, cough, sore throat, runny or stuffy nose, body aches, headache, chills and fatigue. Some people, especially children, may have vomiting and diarrhea. People may also be infected with flu and have respiratory symptoms without a fever.

3. **Take antiviral drugs for treatment if your doctor prescribes them.**
   - If you get sick with flu, antiviral drugs can be used to treat your illness.

- Antiviral drugs are prescription medicines (pills, liquid or an inhaled powder) and are not available over the counter.
- Antiviral drugs are different from antibiotics.
- Antiviral drugs can make illness milder and shorten the time you are sick. They may also prevent serious flu complications.
- CDC recommends prompt antiviral treatment of people who are severely ill and people who are at high risk of serious flu complications who develop flu symptoms.
- For people with high-risk factors, treatment with an antiviral drug can mean the difference between having a milder illness versus a very serious illness that could result in a hospital stay.
- Studies show that flu antiviral drugs work best for treatment when they are started within 48 hours of getting sick, but starting them later can still be helpful, especially if the sick person has a high-risk health condition or is very sick from flu. Follow your doctor's instructions for taking this drug.
- Influenza antiviral drugs are the only drugs approved to treat influenza infection.
- Three FDA-approved influenza antiviral drugs are recommended for use in the United States during the 2017-2018 influenza season: oseltamivir (Tamiflu® and generic formulations), zanamivir (Relenza®), and peramivir (Rapivab®).
- Antiviral drugs are not a substitute for getting a flu vaccine. The flu vaccine is the best way modern medicine currently has to reduce the risk of flu illness and it's potentially serious outcomes.