

Influenza Updates: Reductions in Burden of Disease

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Influenza vaccination recommendations over time

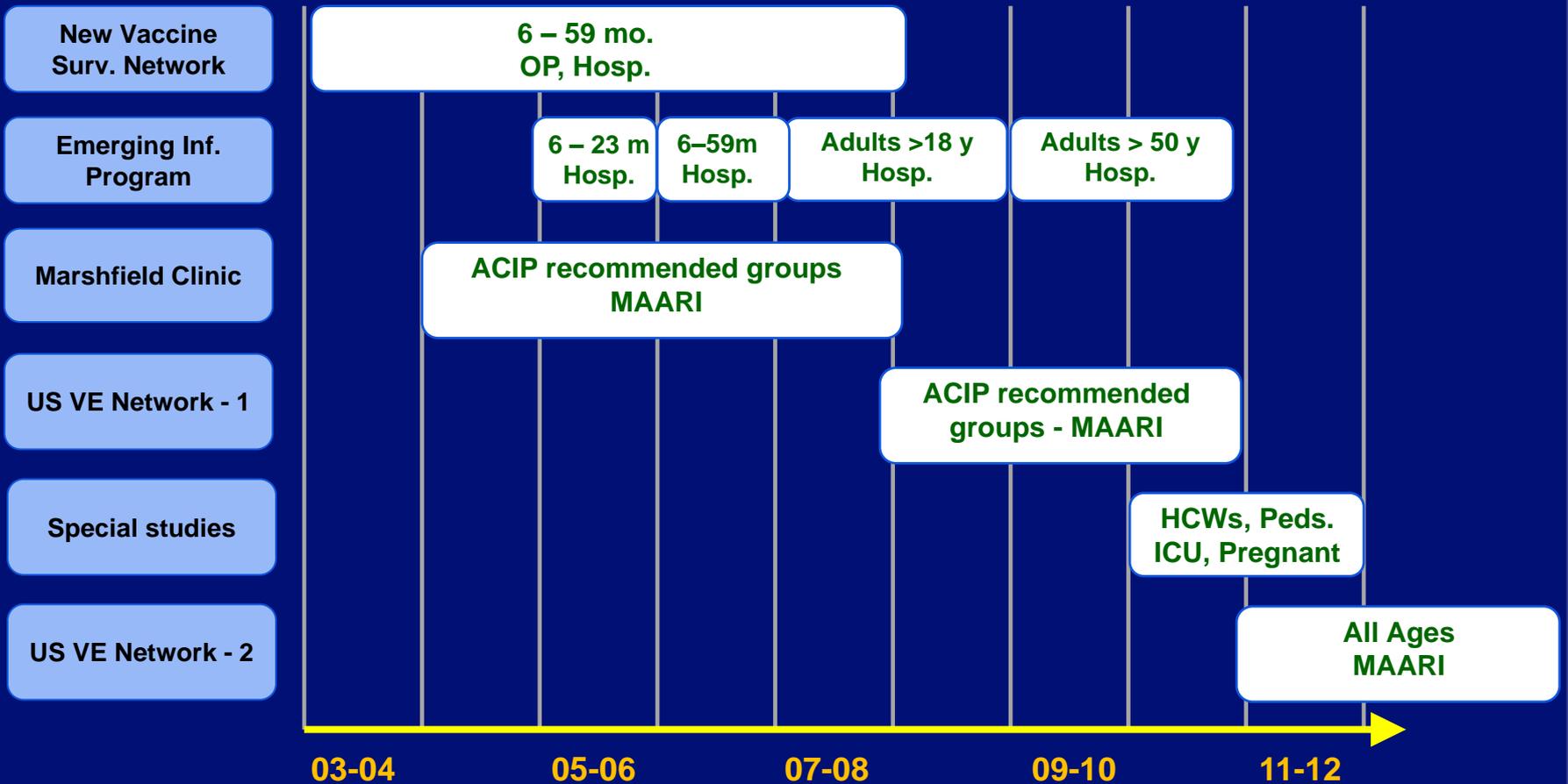
- Before 2000:**
- Persons aged 65 or older
 - Persons with high-risk chronic medical conditions
 - Pregnant women in the second or third trimester
 - Household contacts of the above
 - Health care workers
- 2000:**
- Adults 50 and older
- 2004:**
- Children aged 6—23 months
 - Household contact of children aged 0--23 months
 - Women who will be pregnant during influenza season
- 2006:**
- Children aged 6—59 months
 - Household contacts of children aged 0—59 months
- 2008:**
- All children aged 6 months—18 years
- 2010:**
- All persons > 6 months in the US

During the last decade...

- **More people getting vaccinated with influenza vaccines**
- **Greater use of vaccines in persons at high risk of complications**
- **More awareness of the need for vaccination**
- **Some skepticism of the value of influenza vaccination**

Are influenza vaccines effective in preventing influenza-associated illnesses each year?

Measuring influenza vaccine effectiveness in the U.S.



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Are influenza vaccines effective in preventing influenza-associated illnesses each year?

Yes.

... but the effectiveness varies by season, population, and outcome measured

Communicating influenza VE

Key Points How Well Do Influenza (Flu) Vaccines Work?

- There are two types of flu vaccines: Trivalent inactivated vaccines ("flu shots"), which are given with a needle and contain inactivated (killed) virus that cannot cause influenza virus infection; and a live attenuated influenza vaccine ("nasal-spray flu vaccine"), which is sprayed into the nose and contains attenuated (weakened) virus (sometimes called LAIV).
- Influenza vaccines protect against infection and illness caused by influenza viruses. Flu vaccines will NOT protect against infection and illness caused by other viruses that can also cause influenza-like symptoms. There are many other viruses besides influenza that can result in influenza-like illness (ILI) that spread during the flu season.
- Researchers try to tell how well a vaccine works in order to continually assess and confirm the value of influenza vaccines as a public health intervention.
- Study results about how well a flu vaccine works can vary based on study design, outcome(s) measured, population studied and the season in which the vaccine was studied. These differences can make it difficult to compare one study's results with another's.
- How well the flu vaccine works (or its ability to prevent influenza illness) can range widely from season to season and also can vary depending on who is being vaccinated.
- While determining how well a flu vaccine works is challenging, in general, recent studies have supported the conclusion that influenza vaccination benefits public health, especially when the viruses in the vaccine and circulating viruses are well-matched. (See "Current Efforts to Study How Well Influenza Vaccines Work.")

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Impact of influenza vaccination program

- **Question:**

Are influenza vaccine programs effective in reducing influenza-associated health outcomes in the population?

- **Goal:**

Estimate the number of averted influenza-associated outcomes that result from influenza vaccination in the United States

Impact of influenza vaccination program

- **Advantages:**

- Consistent and systematic approach across seasons
- Uses data collected as core program activities (Influenza Division and Immunization Services Division)
- Estimates can be updated annually
- Illness/outcomes averted may be easier and more meaningful way to communicate value of vaccine

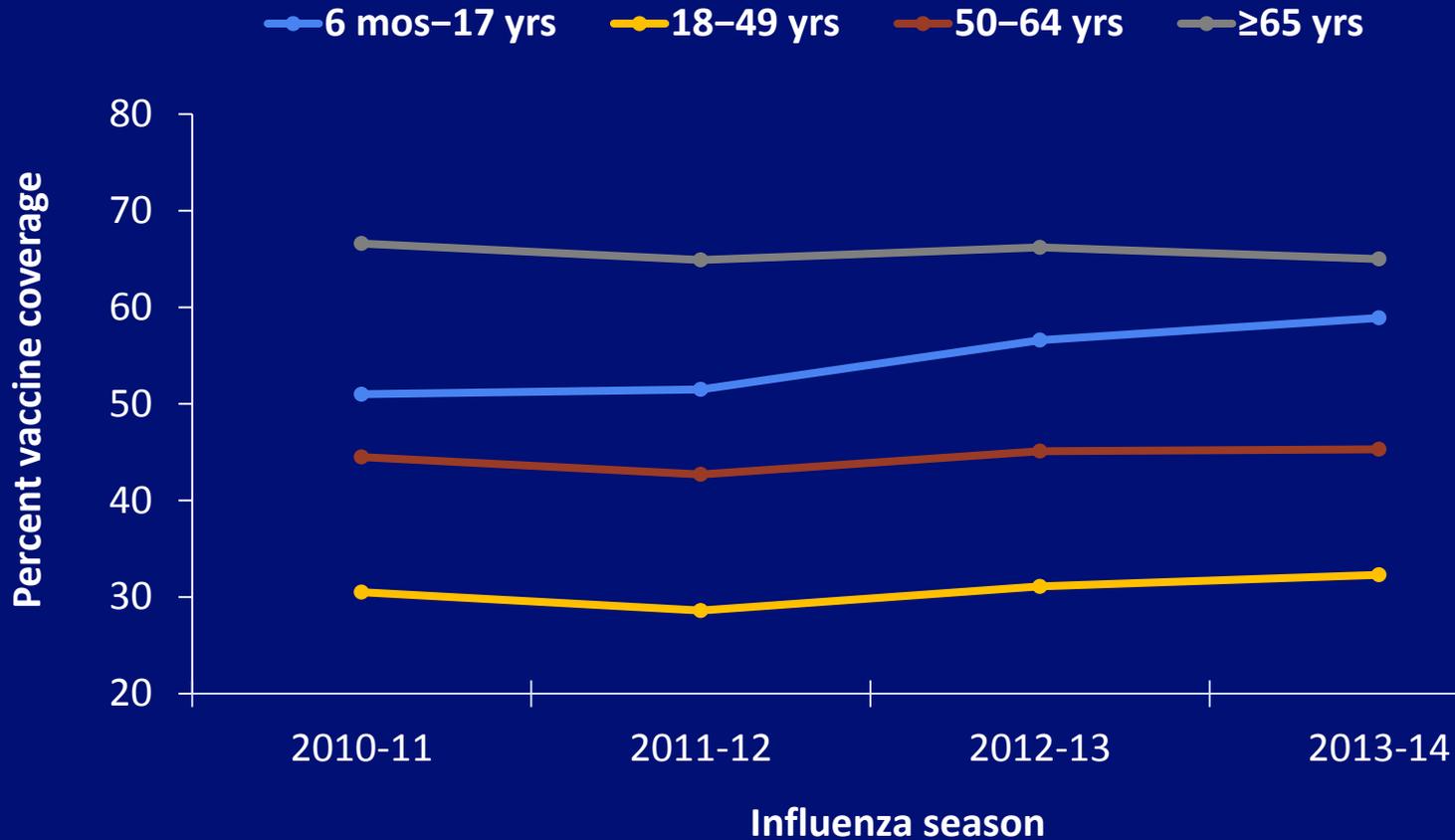
Impact of influenza vaccination program

- 1. Estimate observed annual burden of influenza-associated outcomes**
- 2. Estimate observed risk of influenza-associated outcomes among susceptible individuals**
 - Using data on annual vaccine coverage and vaccine effectiveness
- 3. Calculate expected burden of influenza-associated outcomes in population with no vaccination**
- 4. Calculate difference in outcomes attributable to vaccination program**

Burden of Disease

- **Since 2010-11, influenza has led annually to:**
 - 19 – 35 million cases of influenza respiratory disease
 - 3.4 – 15.2 million clinic visits
 - 110,000 – 592,000 hospitalizations
 - 5,300 – 39,000 deaths

Vaccine Coverage



Vaccine Effectiveness

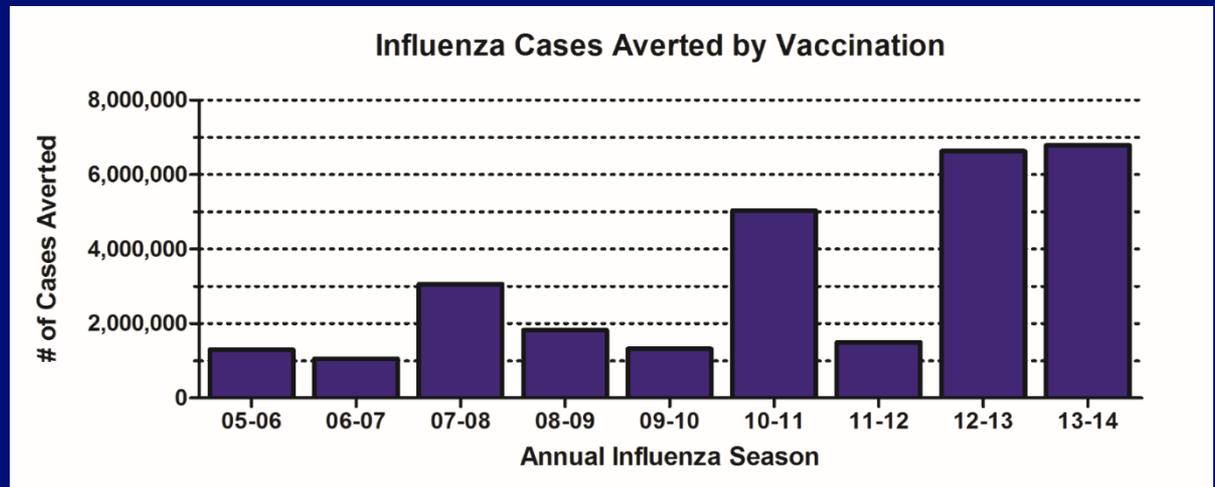
- **Varies by age group and season, 2010 – 2014*:**
 - 6 mos – 4 yrs: 47 – 68%
 - 5 – 19 yrs: 46 – 61%
 - 20 – 64 yrs: 50 – 52%
 - 65+ yrs: 32 – 39%



**US Flu VE network, annual estimates*

Disease Averted by Vaccination

- Since 2010-11, influenza vaccination has averted annually:
 - 1.6 – 7.2 million cases of influenza respiratory disease
 - 750,000 – 3.2 million clinic visits
 - 30,000 – 120,000 hospitalizations
 - 2,200 – 16,000 deaths



Communicating influenza vaccine impact

Morbidity and Mortality Weekly Report

Estimated Influenza Illnesses and Hospitalizations Averted by Influenza Vaccination — United States, 2012–13 Influenza Season

MMWR Morb Mortal Wkly Rep 2013;62:997–1000

Morbidity and Mortality Weekly Report

Estimated Influenza Illnesses and Hospitalizations Averted by Vaccination — United States, 2013–14 Influenza Season

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MMWR Morb Mortal Wkly Rep 2014; 63:1189–94

the **benefits** of **flu vaccination** 2013-2014

The estimated number of influenza-associated **illnesses prevented** by flu vaccination during the 2013-2014 season:

7.2 million



enough people to form
a line from **Maine to Oregon**

The estimated number of flu-associated **medical visits prevented** by vaccination during the 2013-2014 season:

3.1 million



more than the **population**
of the city of **Chicago**

The estimated number of flu **hospitalizations prevented** during the 2013-2014 season:

90,000



enough to fill Madison Square
Garden **more than 4 times**

get **vaccinated**

Conclusion

- **Substantial annual averted disease burden from the influenza vaccination program**
 - Varies by VE and annual disease burden
- **Program improvements will be made by**
 - increasing coverage in non-elderly persons
 - improving effectiveness of vaccines, especially in elderly persons

Conclusion

- **Annual estimates provide**
 - Comparison across seasons to examine impact of changes in burden, VE, and VC
 - Help identifying and prioritizing data needed to routinely evaluate program impact
- **Ongoing work to include indirect effects of vaccination**

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