I won’t spread flu to my patients or my family.

Even healthy people can get the flu, and it can be serious.

Everyone 6 months and older should get a flu vaccine. This means you.

This season, protect yourself—and those around you—by getting a flu vaccine.

For more information, visit: http://www.cdc.gov/flu

Thanks to Dr. David Stier for slides
Impact of Complicated Influenza

• **Death**
  – Mean 23,600 annual influenza-associated deaths in USA, mainly from cardiopulmonary complications
  – 90% are age 65+

• **Hospitalization**
  – >200,000 annually in USA
  – Mainly age 65+, age 0-4, those with chronic conditions

• **Costs during a severe season** - $12 billion

Influenza Strains Continually Evolve

- **Antigenic drift** = slow mutation over time
- **Antigenic shift** = sudden reassortment (pandemic)

- Yearly flu vaccine formulation changes adjust for antigenic drift in flu strains

- FDA reviews changes in circulating strains annually to determine new vaccine composition
Antigen Composition 2017-18

• Trivalent influenza vaccines
  – A/Michigan/45/2015 (H1N1)pdm09-like NEW
  – A/Hong Kong/4801/2014 (H3N2)-like
  – B/Brisbane/60/2008-like (Victoria lineage)

• Quadrivalent influenza vaccines
  – All of the above, plus
  – B/Phuket/3073/2013-like (Yamagata lineage)
2017-18 Influenza Recommendations

• Live Attenuated Influenza Vaccine (LAIV/FluMist) still not recommended
• Recombinant vaccine (RIV3; Flu Blok) is acceptable during pregnancy
ACIP: Don’t use LAIV this Season

- No significant effectiveness of LAIV against (H1N1)pdm09, during the influenza seasons 2013-14, 2014-15, and 2015-16

- Causes of low vaccine effectiveness not completely clear

- Not feasible to resolve issue for start of the 2017-18 season

- ACIP review of additional data expected Oct 2017 (today!)
# Flu Vaccine Formulations, 2017-18

<table>
<thead>
<tr>
<th>Formulation</th>
<th>Abbrev.</th>
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<tbody>
<tr>
<td><strong>Inactivated Influenza Vaccine, quadrivalent</strong></td>
<td></td>
</tr>
<tr>
<td>• MDV / SDV* / Prefilled syringes* / Intradermal*</td>
<td>IIV4</td>
</tr>
<tr>
<td><strong>Inactivated Influenza Vaccine, trivalent</strong></td>
<td></td>
</tr>
<tr>
<td>• MDV / Prefilled syringes*</td>
<td>IIV3</td>
</tr>
<tr>
<td><strong>Cell-culture based Inactivated Influenza Vaccine, quadrivalent</strong></td>
<td>ccIIV4</td>
</tr>
<tr>
<td>• Prefilled syringes</td>
<td></td>
</tr>
<tr>
<td><strong>Inactivated Influenza Vaccine, trivalent, high dose</strong></td>
<td>IIV3-HD</td>
</tr>
<tr>
<td>• Prefilled syringes</td>
<td></td>
</tr>
<tr>
<td><strong>Adjuvanted Inactivated Influenza vaccine, trivalent</strong></td>
<td>aIIV3</td>
</tr>
<tr>
<td>• Prefilled syringes</td>
<td></td>
</tr>
<tr>
<td><strong>Recombinant Influenza Vaccine, trivalent</strong></td>
<td></td>
</tr>
<tr>
<td>• SDV</td>
<td>RIV3</td>
</tr>
<tr>
<td><strong>Recombinant Influenza Vaccine, quadrivalent</strong></td>
<td></td>
</tr>
<tr>
<td>• Prefilled syringes</td>
<td>RIV4</td>
</tr>
</tbody>
</table>

* CA requires use of thimerosal-free preparation for pregnant women and children ages 6-35 months
Who Needs Vaccine?

• All persons age $\geq$ 6 months who do not have a contraindication

• But especially:
  – Persons at higher risk of complications
  – Household contacts of those persons
  – Health care workers (anyone with patient contact)

• And ... true contraindications are rare
Higher Risk for Influenza Complications

- Children < 5 yrs. (especially < 2 yrs.)
- Adults ≥ 65 yrs.
- Immunosuppression
- Pregnant women
- Residents of long term care facilities
- Chronic Disease
  - Asthma, COPD, CF, other chronic pulmonary
  - Cardiovascular (except HTN)
  - Sickle cell, other chronic hematologic
  - Diabetes, other chronic metabolic
  - Stroke, Spinal Cord Injury, other chronic CNS
CONTRAINDICATIONS
• Severe allergic reaction to any component of the vaccine (except egg) or to previous flu vaccination

PRECAUTIONS
• Egg allergy (often listed as contraindication, however see specific ACIP recommendations)
• Moderate or severe acute illness with or without fever
• Guillain-Barre syndrome within 6 weeks after a prior flu vaccine
Flu Vaccine and Pregnancy

- The majority of studies show an association between flu vaccination during pregnancy and improved birth outcomes
  - Preterm birth
  - Low birth weight
  - Stillbirth
- Maternal immunization also protects young infants from flu
- Recently published study showed an association between miscarriage and receipt of H1N1-containing flu vaccine in the first trimester
- The study had many limitations
- Does not allow/provide an estimate of potential increased risk of miscarriage after vaccination
- Bottom line: Pregnant women should discuss with OB providers. CDC still recommends flu vaccine during all trimesters of pregnancy.

Donohue, Kieke et al. Vaccine 2017;35(40):5314-5322
Strategies to increase flu vaccine immunogenicity for older adults (≥ 65)

• High-dose flu vaccine reduced flu illness by about 25% compared with standard-dose IIV
• Adjuvanted and recombinant flu vaccine also performed better than standard-dose IIV in preliminary studies
• Head-to-head comparison studies are pending
• In the meantime, no preferential recommendation by CDC
IIV4 vs. IIV3

Prevalence of Flu B - Yamagata
IIV4 v. IIV3

- Clinically, flu A and B are indistinguishable.
- Flu B linked to more severe disease in children.
- In some years flu B ~ 30% of illness.
- IIV4 decreases risk of B lineage vaccine mismatch.
- No randomized controlled trial data; modeling studies suggest IIV4 is cost-effective, especially in years with more Flu B.

Hepatitis A Update

Incidence of hepatitis A, by year
United States, 1984-2015

Reported Number of Cases

Year
Hepatitis A Outbreaks in California

- Mostly affecting homeless and drug-using patients
- San Diego: 507 cases; 19 deaths
  - Local public health emergency declared on 9/1/17
- Santa Cruz: 70 cases
- Los Angeles: 8 cases
- Public health departments statewide are “on alert” for related cases; vaccination efforts underway
Hepatitis A – Introduction

• “Hepatitis” = liver inflammation
  – Can be caused by viruses, drugs, or toxins
  – Clinical picture may be similar even if cause is different

• Hepatitis A caused by infection with Hepatitis A Virus (HAV)

• Unlike Hepatitis B and C, HAV infection is acute only; does not become chronic

• May be asymptomatic, especially children<6 yrs; may be life-threatening, especially for adults with existing liver disease (such as Hepatitis B/C infection)
Hepatitis A - Outcomes

• Most adults with HAV infection have nausea, vomiting, fatigue, stool/urine changes, jaundice. Most recover with no permanent liver damage.

• <1% have fulminant (extremely severe) disease that can result in liver failure and death/need for transplant

• Rarely fatal, overall case fatality rate (CFR) is 0.3%
  – Higher in pts w/coexisting liver disease, >50yrs
  – San Diego CFR 3.6%
Hepatitis A – Transmission and Incubation Period

• HAV infects GI tract, excreted in feces: mostly transmitted person-to-person or in contaminated food
  – poor hygiene/sanitation conditions, sexual practices contribute to spread

• Incubation period from infection to symptoms is 15-50 days, average 28 days

• Long incubation period makes outbreak investigation and tracking very challenging!
Hepatitis A - Risk groups

• Main groups at risk for HAV in US
  – Travelers to countries with high or intermediate HAV endemicity
  – Men who have sex with men (MSM)
  – Drug users (injection and non-injection)
  – Contacts of recent adoptees from HAV-endemic countries
  – Now... homeless (a CA-specific recommendation)
Global epidemiology of hepatitis A

[Map showing the global prevalence of Hepatitis A virus]

http://wwwn.cdc.gov/travel/yellowBookCh4-HepA.aspx
Public Health HAV Case Investigation

- Contact tracing; notification and education of contacts
- Post-exposure prophylaxis for contacts
- Restriction from food handling while infectious
Increase in HAV Cases in MSM in SF

- Cases noted beginning in August 2017
- 8 cases so far; unimmunized
- No clear chain of transmission or common exposure among cases
- Analysis of viral specimens shows strains related to MSM outbreaks elsewhere in the US and Europe, NOT related to homeless outbreaks
HAV Vaccination for Outbreak Control and Outbreak Prevention

• For outbreak prevention, SFDPH is actively working to immunize at-risk groups

• Approximately 3000 doses of vaccine given so far in SF (all groups)

• Vaccination of MSM in high volume clinics; primary care

• Vaccination of at-risk individuals in...
  – Jails
  – Syringe exchange programs
  – Behavioral health sites
  – Drug treatment facilities
  – Shelters
  – Soup kitchens
  – Street Medicine outreach