

# Flu and Older Adults

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# Flu and Older Adults

**Risk factors** for infection in older adults include:

- comorbid illness,
- polypharmacy,
- functional status (physical, cognitive, sensory),
- place of residence,
- and individual variations in physiologic changes that **accompany age** (e.g., declining glomerular filtration rate, reduced gag/cough reflexes).

# Flu and Older Adults

## Comorbid Illness

- The **most important cofactor** for infection in older adult.
- chronic comorbid conditions (e.g., **diabetes mellitus, renal failure, chronic pulmonary disease, edema, immobility**).
- These comorbidities most often result in **reduced local innate immunity**.
- For example, **COPD** is associated with **impaired mucociliary clearance, alveolar macrophage dysfunction, and suppressed cough mechanism**, substantially increasing the risk for lower respiratory tract infection in older adults with COPD.

# Flu and Older Adults

## Comorbid Illness

- comorbid diseases in older adults with infection can also be **important predictors for worse outcomes—more important than age itself.**
- **declining immunity with advancing age** (immune senescence)
- **there is an underlying waning of immune responses that accompany old age even in the absence of comorbidity; this is called immune senescence.**
- **both innate and adaptive** responses are significantly dysregulated.
- **and physiologic changes that accompany age** (e.g., reduced stomach acid, gag/cough reflexes).

# Flu and Older Adults

- The decline in basal temperature and blunted response to pyrogens make it more likely that an older adult will have a body temperature within the “normal” range despite infection, and a normal temperature with significant infection often leads to delayed diagnosis and treatment.

# Flu and Older Adults

- **Cognitive impairment** may also contribute to the difficulty of diagnosing infection in older adults, with patients unable to communicate symptoms. This can lead to **overdiagnosis**, as well when colonization (e.g., asymptomatic bacteriuria) is often assumed to be the cause of nonspecific symptoms.

# Flu and Older Adults

- **Infection**, even serious life-threatening infection, frequently presents with **atypical features** in **older adults**.
- Serious infections may be signaled by seemingly trivial, nonspecific declines in function or mentation and underlying illness (e.g., congestive heart failure or diabetes mellitus) **may be exacerbated by infection**, leading older adult patients to **seek medical attention for symptoms related to comorbidity rather than infection**.

# Flu and Older Adults

- The most fundamental sign of infection, **fever, is absent in up to one-third of older adults with serious infection.** Several studies show that frail older adults have **lower mean baseline body temperatures** than the currently accepted normal of 98.6°F (37°C). Further, **temperature increases in response to pyrogens are diminished with advanced age.**

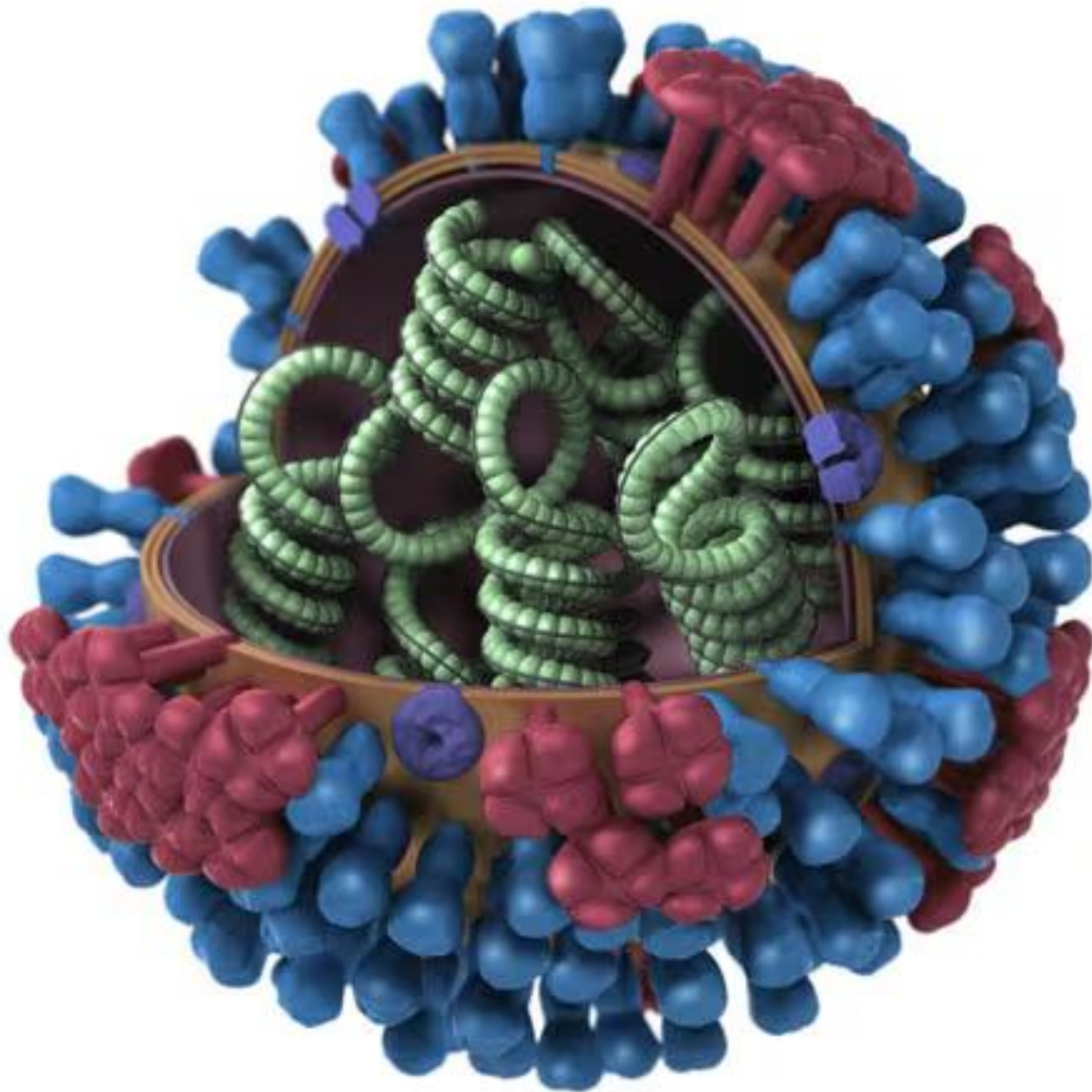


# Flu and Older Adults

- **Flu** can be serious for everyone—but for adults age 65 years and older, the risk of flu-related complications (including **pneumonia** ) and hospitalization is **higher**.
- Flu increases the risk of heart attack by 3-5 times and stroke by 2-3 times in the **first 2 weeks** of infection for **those 65+**. The risk remains elevated for several months.
- This all adds up to a **6-times higher risk of dying from flu** and related complications in age 65 years or older.
- Getting **an annual flu vaccine lowers** your risk of heart attack and stroke.

# Flu and Older Adults

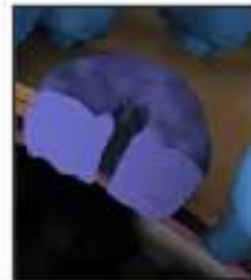
- There are **four types** of influenza viruses: **A, B, C, and D**. Influenza A and B viruses cause seasonal epidemics of disease in people (known as flu season) almost every winter.
- Influenza **A viruses** are the only influenza viruses known to **cause flu pandemics** (i.e., global epidemics of flu disease). A pandemic can occur when a new and different influenza A virus emerges that infects people, has the ability to spread efficiently among people, and against which people have little or no immunity.
- Influenza **C virus** infections generally cause **mild illness** and are not thought to cause human epidemics.
- Influenza D viruses primarily affect cattle with spillover to other animals but are not known to infect people to cause illness



Hemagglutinin



Neuraminidase



M2 Ion Channel



RNP

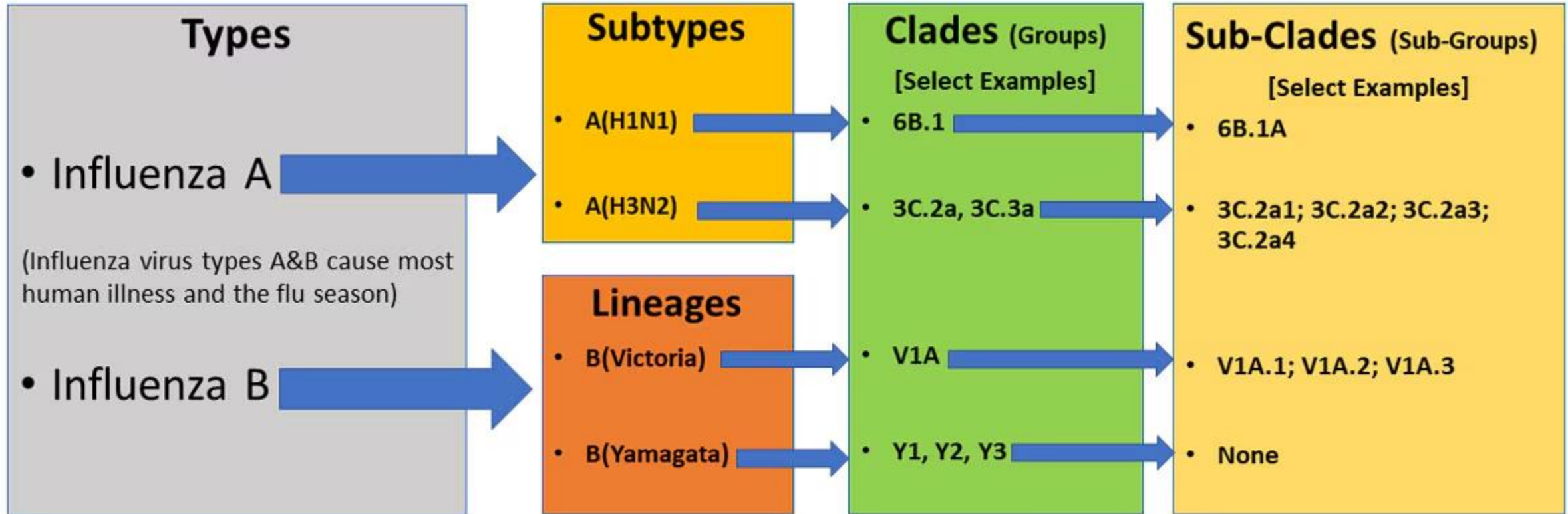
# Flu and Older Adults

- **Influenza A** viruses are divided into subtypes based on two proteins on the surface of the virus: **hemagglutinin (H)** and **neuraminidase (N)**. There are **18 different hemagglutinin** subtypes and **11 different neuraminidase** subtypes (H1 through H18 and N1 through N11, respectively). While more **than 130 influenza A subtype** combinations have been identified in nature, primarily from wild birds, there are potentially many more influenza A subtype combinations given the propensity for virus “reassortment.” **Reassortment** is a process by which influenza viruses swap gene segments. Reassortment can occur when two influenza viruses infect a host at the same time and swap genetic information

# Flu and Older Adults

- **Current subtypes of influenza A viruses** that routinely circulate in people include **A(H1N1) and A(H3N2)**. Influenza A virus subtypes and Influenza B virus lineages can be further broken down into different HA genetic “clades” and “sub-clades.” See the “Influenza Viruses” graphic below for a visual depiction of these classifications.

# Human Seasonal Influenza Viruses



# Flu and Older Adults

## Symptoms

- Flu can cause mild to severe illness, and at times can lead to death. Flu symptoms usually come on **suddenly**. People who have flu often feel some or all of these signs and symptoms:
- fever\* or feeling feverish/chills
- cough
- sore throat
- runny or stuffy nose
- muscle or body aches
- headaches
- fatigue (tiredness)
- some people may have vomiting and diarrhea, though this is more common in children than adults.

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## Period of Contagiousness

- You may be able to spread flu to someone else before you know you are sick, as well as when you are sick with symptoms.
- People with flu are **most contagious during the first three days of their illness.**
- Some otherwise healthy adults may be able to infect others beginning **one day before symptoms develop and up to five to seven days after becoming sick.**
- Some people, including young children and people with weakened immune systems, may be contagious for longer periods of time.



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## Onset of Symptoms

- The time from when a person is exposed and infected with influenza virus to when symptoms **begin is about two days** but can range from about one to four days.

# Flu and Older Adults

## People at risk

- Anyone can get flu (including healthy people), and serious problems related to flu can happen at any age, but some people are at higher risk of developing serious flu-related complications if they get sick. This includes **people 65 years and older**, people of any age with certain **chronic medical conditions (such as asthma, diabetes, or heart disease)**, people with a body mass index (BMI) of 40 kg/m<sup>2</sup> or higher, **pregnant** people, and children younger than five years.

# Flu and Older Adults

## Treatment of Flu

- If you get sick with flu, flu antiviral drugs may be a treatment option.
- Antiviral drugs can **make illness milder and shorten the time** you are sick. They might also **prevent some flu complications**, like pneumonia.
- Flu antiviral drugs **work best when started early**, ideally within two days after your flu symptoms begin.

# Flu and Older Adults

- CDC recommends prompt treatment for people who have flu or suspected flu and who are at **increased risk of serious flu complications**, such as **pregnant people, people with asthma and chronic lung disease, diabetes (including gestational diabetes), or heart disease.**

# Flu and Older Adults

## Who should take antiviral drugs

- It's very important that flu antiviral drugs are started as soon as possible to treat patients who are:
  - **hospitalized** with flu,
  - people who are very sick with flu but who do not need to be hospitalized

# Flu and Older Adults

## **When to seek medical care**

- Fever over 102°F for more than 3 days
- Symptoms that last over 10 days and get worse instead of better
- Shortness of breath
- Confusion or disorientation
- Severe or persistent vomiting
- Pain/pressure in your chest

# Flu and Older Adults

## Who should take antiviral drugs

- people who are at increased **risk of serious flu complications** based **on their age or underlying health conditions**, if they develop flu symptoms. For example, people with asthma and chronic lung disease, diabetes, or heart disease are at higher risk, as well as pregnant people.
- Although patients with mild illness who are not at higher risk for flu complications may also be treated with antiviral drugs, **most do not need to be.**

# Flu and Older Adults

- **Recommended antiviral drugs for this flu season**
- There are four FDA-approved antiviral drugs recommended by CDC to treat flu this season.
- **oseltamivir** phosphate (available as a generic version or under the trade name Tamiflu<sup>®</sup>),
- **zanamivir** (trade name Relenza<sup>®</sup>),
- **peramivir** (trade name Rapivab<sup>®</sup>), and
- **baloxavir** marboxil (trade name Xofluza<sup>®</sup>).



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## Oseltamivir

- Generic oseltamivir and Tamiflu® are available as a pill or liquid suspension (6mg/ml 1) and are FDA approved for early treatment of flu in people 14 days and older.



# Flu and Older Adults

Creatinine Clearance	Treatment Dose	Chemoprophylaxis Dose
>60 ml/min	75 mg bid	75 mg daily
31-60 ml/min	30 mg bid	30 mg daily
11-30 ml/min	30 mg daily	30 mg every other day
≤10 ml/min, not on dialysis	Tamiflu not recommended.	Tamiflu not recommended.
ESRD on hemodialysis (CrCl 10 ml/min or less)	30 mg after every hemodialysis cycle Treatment duration not to exceed 5 days.	30 mg after alternate hemodialysis cycles

# Flu and Older Adults



## CKD

**Creatinine clearance**

**- Cockcroft- Gault formula**

**(140-age) x body mass (kg)**

**Serum creatinine concentration x 72**

**Female x coefficient 0.85**

# Flu and Older Adults

## XOFLUZA (BALOXAVIR)

- Only indicated for **treatment of uncomplicated** influenza A or B virus infection.
- **Not recommended** by the CDC for outpatients **with complicated or progressive illness or hospitalized patients** because of the lack of information on use of this antiviral for these groups to date.

# Flu and Older Adults



# Flu and Older Adults

- There are no available data on the use of baloxavir for treatment of influenza more than 2 days after illness onset.
- Adults weighing 80 kg or more: 80 mg by mouth as a single dose given within 48 hours of symptom onset.
- Adults weighing 40-79 kg: 40 mg by mouth as a single dose given within 48 hours of symptom onset.

# Flu and Older Adults

- Treatment of acute, uncomplicated influenza caused by influenza A or B viruses **in adults and adolescents  $\geq 12$  years of age** who have been symptomatic for  $\leq 48$  hours, including those who are otherwise healthy and those who are at high risk for influenza-related complications.

# Flu and Older Adults



## **RAPIVAB (PERAMIVIR) 200 mg per 20 mL (10 mg/mL)**

- **IV antiviral** indicated **for treatment only**.
- Can be used as a treatment option for patients who cannot absorb orally or enterally administered oseltamivir.
- **For uncomplicated influenza infection: 600 mg IV as a single dose.**



# Flu and Older Adults

- Renally dosed:
  - CrCl 30 to 49 mL/minute: 200 mg IV as single dose.
  - CrCl 10 to 29 mL/minute: 100 mg IV as single dose.
- Limitation: **efficacy based on clinical trials in which the main virus was influenza A.** A limited number of patients infected with influenza B were enrolled. **Efficacy not established in those with serious infection requiring hospitalization.**



# Flu and Older Adults

## RELENZA (ZANAMIVIR): INHALED ANTIVIRAL

Not recommended in those with underlying respiratory disease (i.e. asthma, COPD, etc.). Use with caution in any patient with high-risk underlying medical conditions (e.g., geriatric patients, severe metabolic disease, lung or cardiac disease); safety and efficacy have not been established in these patients.

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Usual Adult Dose for Influenza  
10 mg via oral inhalation twice a day for 5 days



# Flu and Older Adults

## Antiviral Drug Options

- For **hospitalized** patients with suspected or confirmed influenza, initiation of antiviral treatment with oral or enterically administered **oseltamivir** is recommended as soon as possible.
- For **outpatients with complications or progressive disease** and suspected or confirmed influenza (e.g., pneumonia, or exacerbation of underlying chronic medical conditions), initiation of antiviral treatment with oral **oseltamivir** is recommended as soon as possible.

# Flu and Older Adults

- For **outpatients** with suspected or confirmed **uncomplicated** influenza, [oral oseltamivir, inhaled zanamivir, intravenous peramivir, or oral baloxavir](#) may be used for treatment, depending upon approved age groups and contraindications.

# Flu and Older Adults

## Self-care measures

- **Rest** as much as possible.
- **Drink** plenty of non-alcoholic fluids.
- **Use saline nose drops to loosen mucus.**
- Use **Ibuprofen (Advil®)** or **Acetaminophen (Tylenol®)** to reduce **fever/discomfort** according to package instructions. Do NOT take aspirin.

# Flu and Older Adults

## Self-care measures

- Use **nasal decongestant** (Oxymetazoline) for short-term relief of nasal congestion (do not use for more than 3 days).
- **Gargle** with warm salt water and use throat sprays/lozenges (containing Benzocaine) for throat pain.

# Flu and Older Adults

## Preventing spread to others

- Getting **the flu vaccine annually** is the best prevention.
- If already sick, **stay home** and away from others (no classes, sports, group meetings, etc.).
- Wait for temperature to become less than 100°F (without medication) for more than 24-hours before resuming classes, etc.
- **Wash hands frequently.**
- Contain coughs and sneezes using the crook of your elbow.
- Don't share cups or other personal items.



