

Epidemiology of Human Influenza

SD One Health Meeting

September 24, 2015

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Human Influenza: What is it?

What is influenza ?

- Contagious respiratory illness caused by influenza viruses that infect the nose, throat, and lungs. It can cause mild to severe illness, and at times can lead to death.

Signs and symptoms of influenza:

- Fever* or feeling feverish/chills.
- Cough.
- Sore throat.
- Runny or stuffy nose.
- Muscle or body aches.
- Headaches.
- Fatigue.
- Some (especially children) have vomiting and diarrhea.

Influenza: How bad is it?

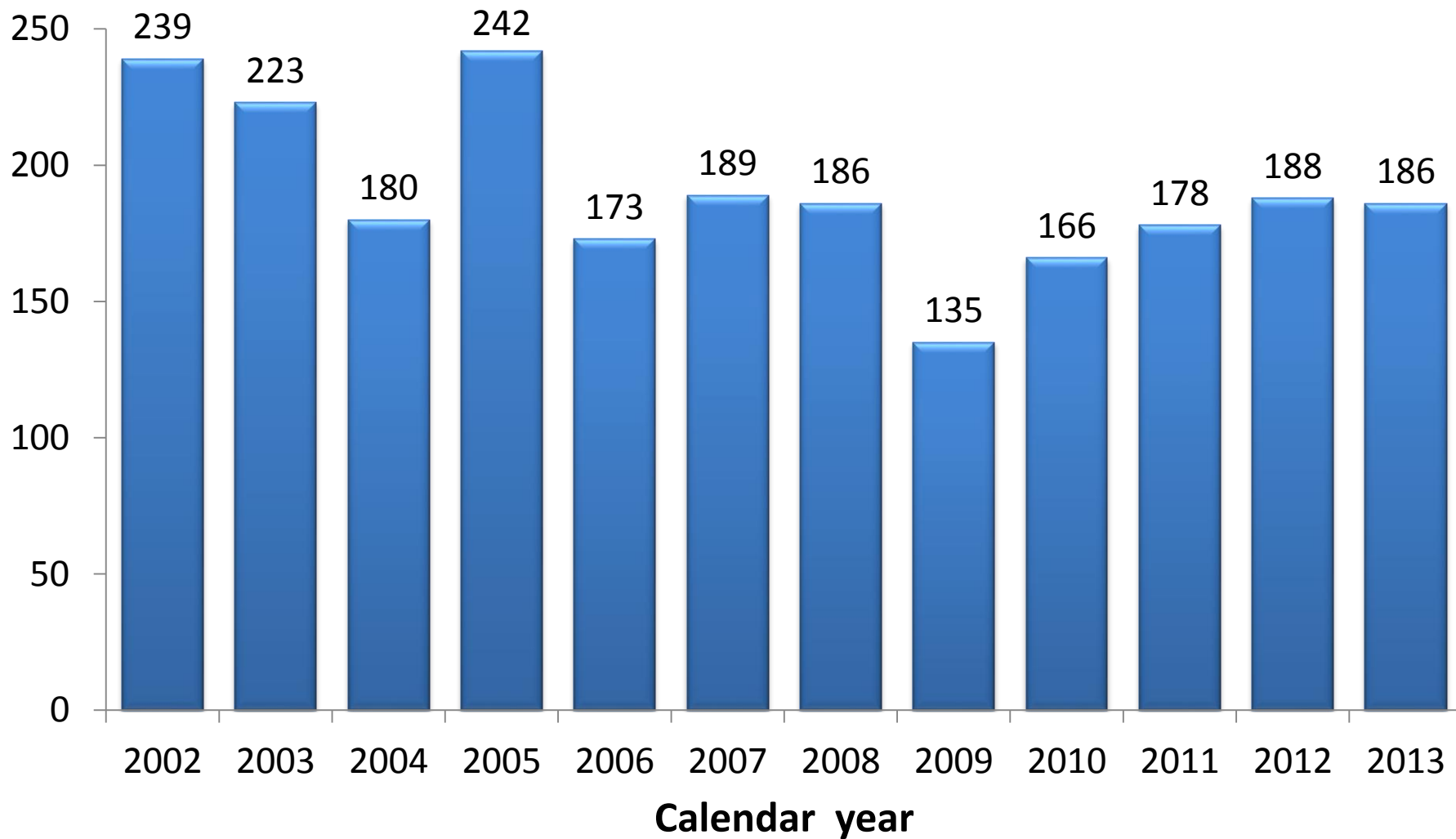
Uncomplicated influenza:

- Abrupt onset after an incubation of 1-2 days.
- Duration of symptoms: typically 3 days, but may last 4-8 days.

Pneumonia complications of influenza:

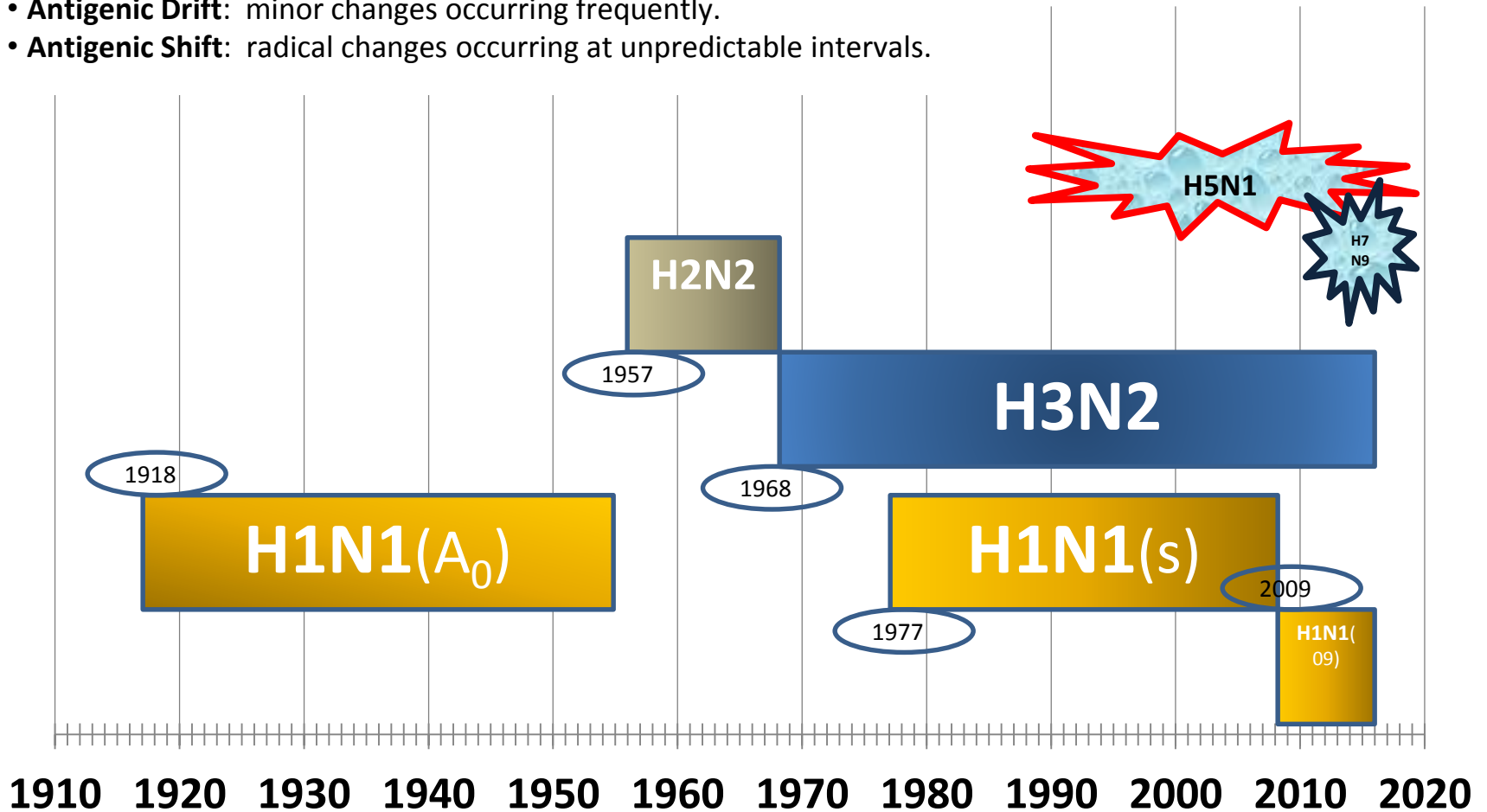
- Primary influenza viral pneumonia:
 - Risk factors: pregnancy, cardiovascular disease, young adult.
 - Relentless progression from classic 3-day influenza.
- Secondary bacterial pneumonia:
 - Risk factors: age >65 years, pulmonary disease.
 - Bacteriology: Pneumococcus, Staphylococcus, Haemophilus.

Influenza and pneumonia deaths, South Dakota 2002-2013 (J09-J18)



Human Influenza A virus subtypes circulating 1918 to present

- **Antigenic Drift:** minor changes occurring frequently.
- **Antigenic Shift:** radical changes occurring at unpredictable intervals.

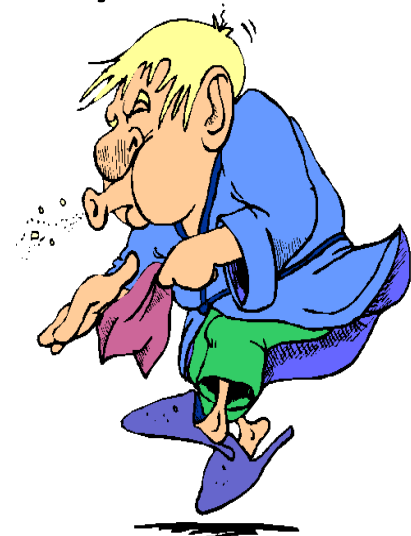


Other Influenza Viruses of Public Health Concern

- **Human Influenza B virus:**
 - B strains drift but do not shift
 - Victoria and Yamagata lineages currently circulating
- **Swine influenza virus:**
 - A(H3N2) variant (Brookings County, SD 2008).
 - A(H1N1) variant (Iowa Case Hospitalized in SF, SD, 2015)
- **Avian influenza viruses:**
 - A(H5N1) emerged in Hong Kong in 1997, ongoing
 - A(H7N9) emerged in China in 2013, ongoing

SD Influenza Surveillance: When? Where? What?

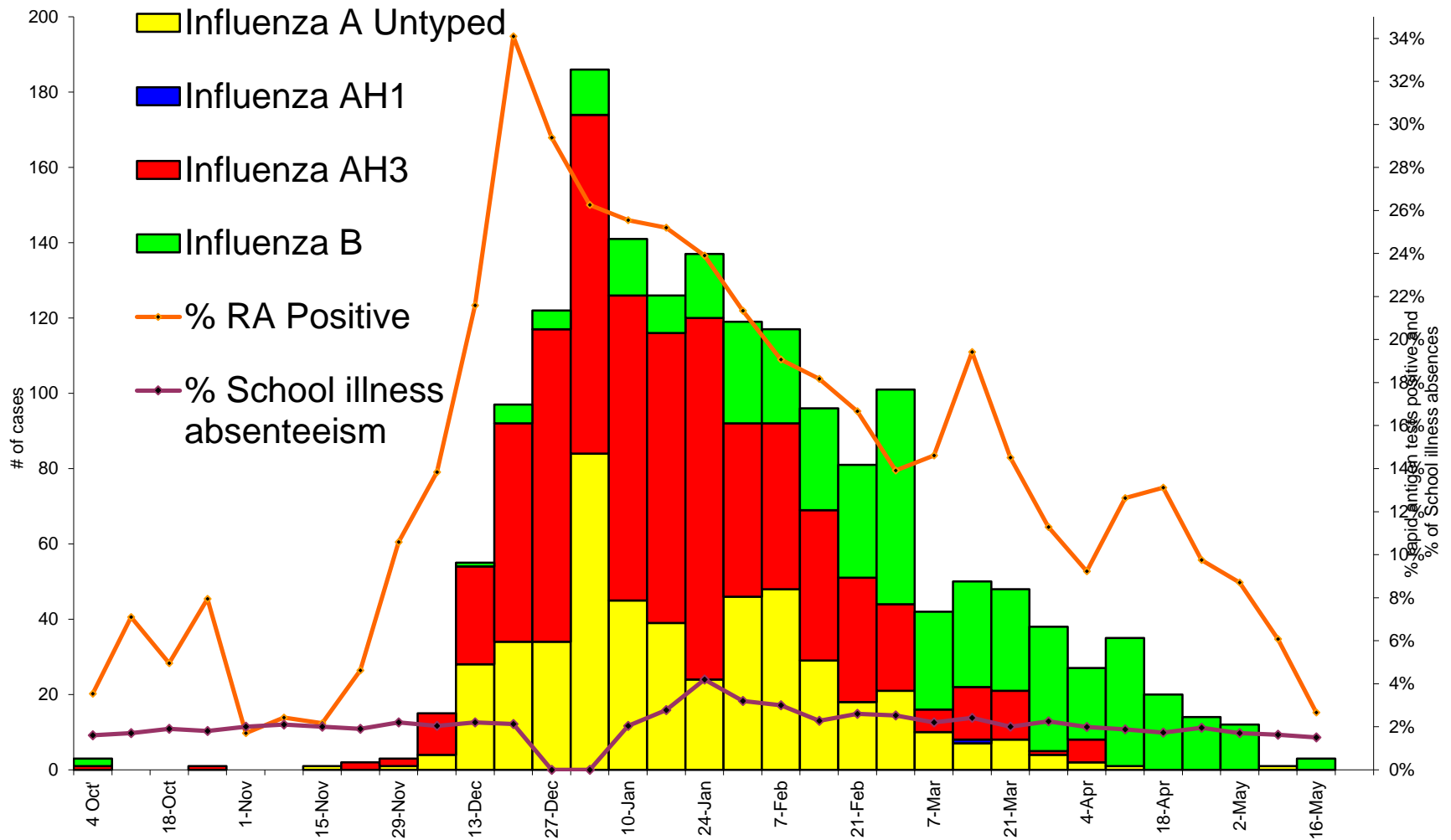
- Influenza surveillance conducted year round
- Enhanced surveillance October – May
 - ILI Net
 - Weekly aggregate Influenza Rapid Antigen reporting
 - Laboratory confirmed influenza (PCR, culture, DFA)
 - All Influenza-associated deaths
 - All Influenza-associated hospitalizations
 - School Illness Absentee Reporting
 - Outbreak reporting (schools, day-care, long term care facilities).



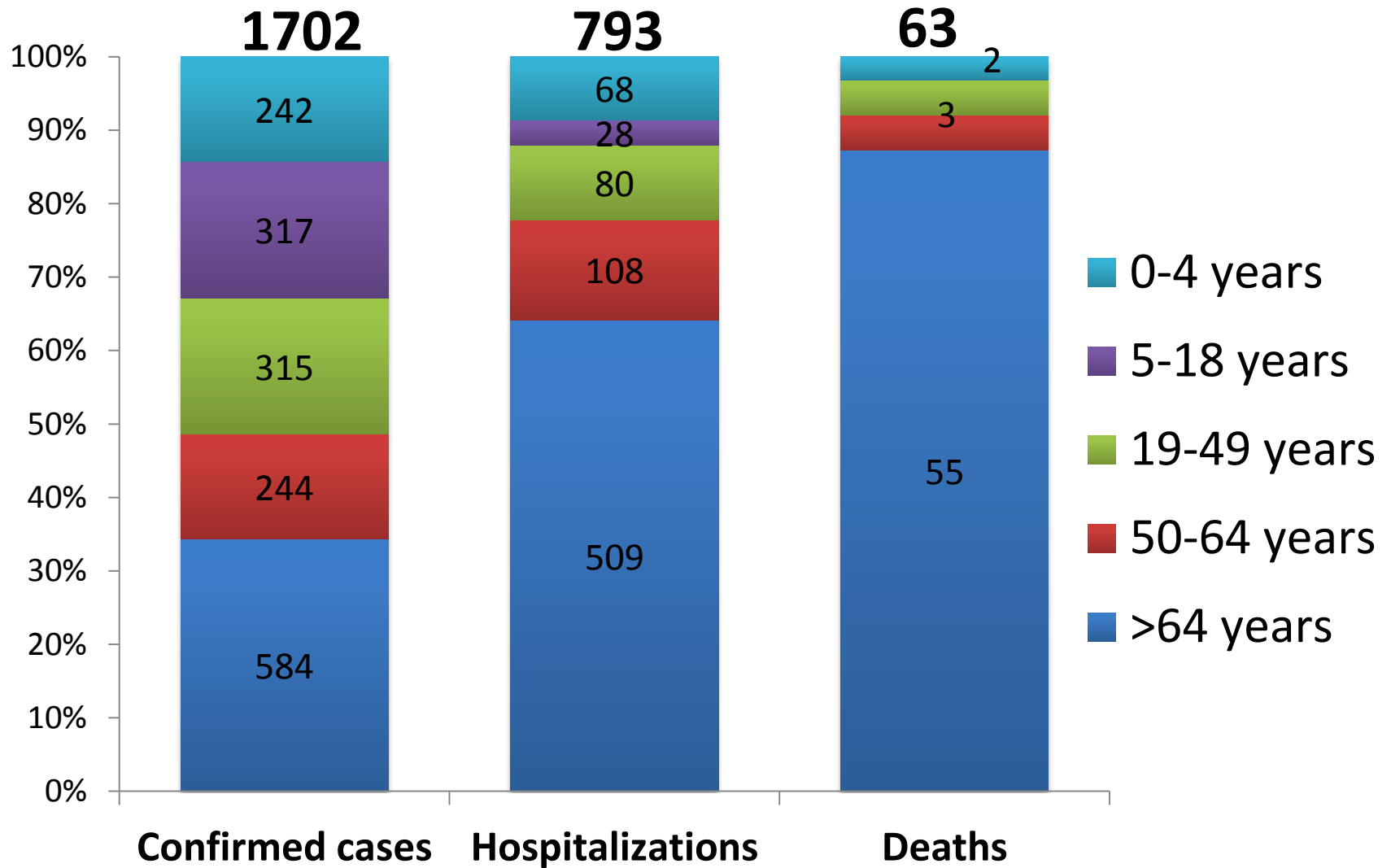
Confirmed, Hospitalizations & Deaths 2004-2015

Season	Dominate virus	Deaths	Hospitalizations	Confirmed cases (Culture,PCR, DFA)	Peak week
2004-2005	A(H3N2)	42	Not reportable	684	February 3rd week
2005-2006	A(H3N2)	11	Not reportable	636	March 2nd week
2006-2007	A(H1N1)	6	132	400	February 3rd week
2007-2008	A(H3N2)	22	361	684	February 4th week
2008-2009	A(H1N1)	4	134	525	March 1st week
2009-2010	A(H1N1) pandemic	24	431	2,303	October 2nd week
2010-2011	A(H3N2)	20	290	860	February 3rd week
2011-2012	A(H3N2)	17	164	505	March 3rd week
2012-2013	A(H3N2)	38	365	993	January 2nd week
2013-2014	A(H1N1)	14	239	659	January 1st week
2014-2015	A(H3N2)	63	793	1,703	January 1st week

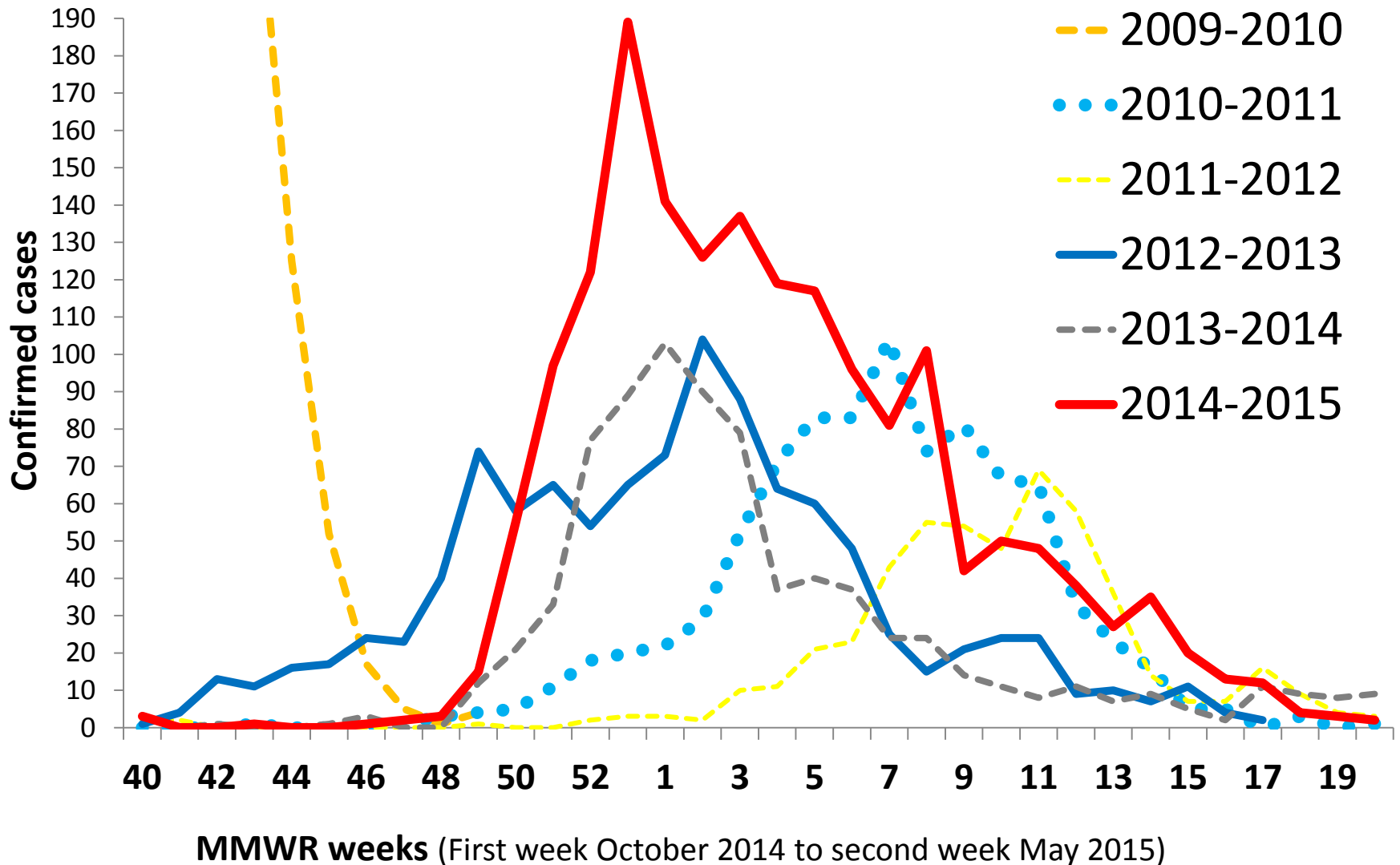
Influenza: ILI, confirmed cases, hospitalizations, school absenteeism and %+ rapid tests, South Dakota 2014-2015



Influenza cases, hospitalizations, and deaths by age group, South Dakota 2014-2015



Confirmed influenza cases, South Dakota 6 seasons 2009-2015



Antivirals

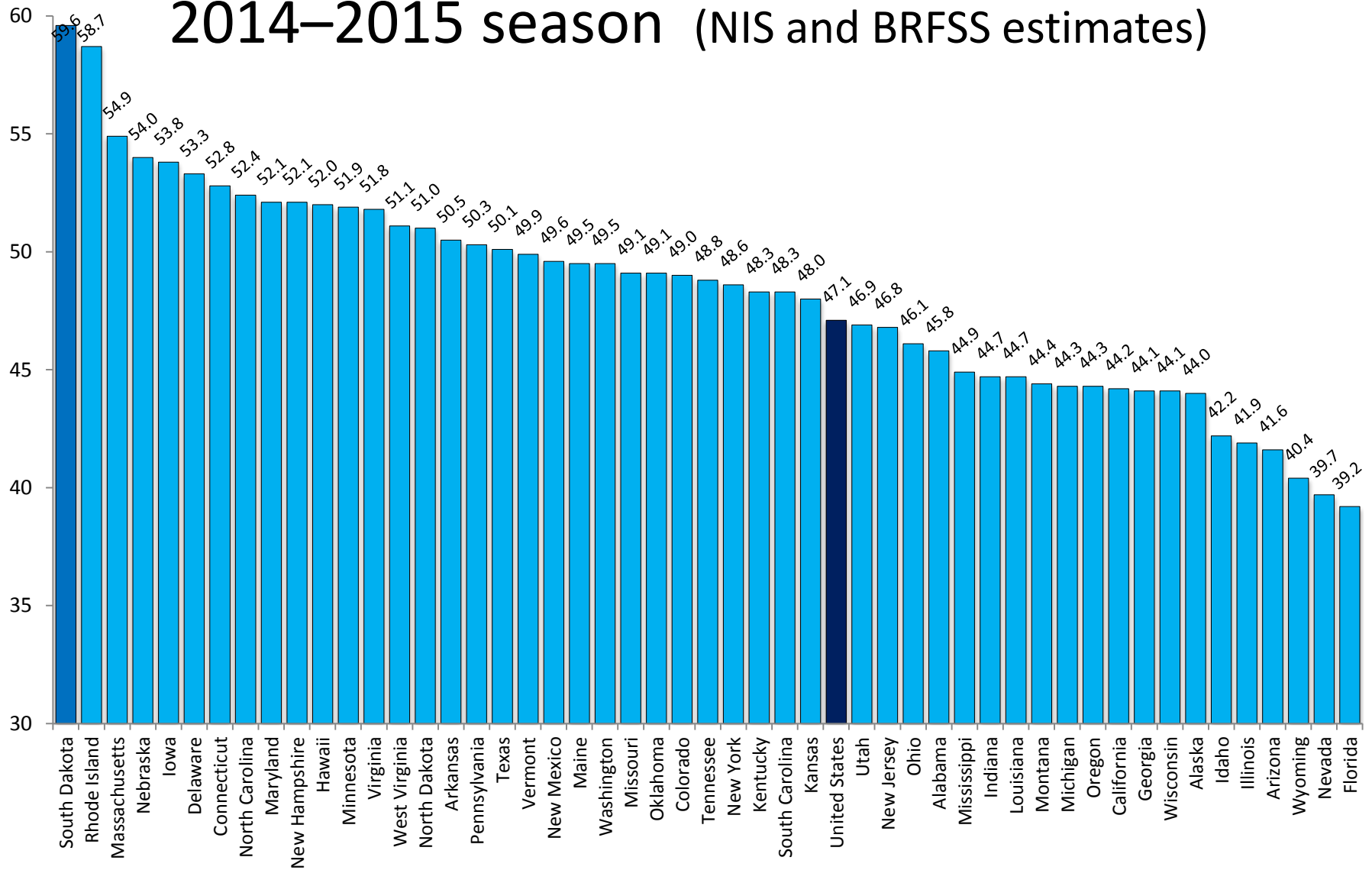
- There are 3 Antiviral medications approved for prevention and treatment of Influenza A & B in the United States (dosing is based on age, underlying health conditions, and weight of patient):
 - **Oseltamivir (Tamiflu)**: Used for treatment any age or chemoprophylaxis >3 months.
 - **Zanamivir (Relenza)**: Used for treatment >7 years or chemoprophylaxis > 5 years.
 - **Peramivir (Rapivab)**: Approved for use in U.S. Dec 2014 IV med used for treatment >18 years...not recommended for chemoprophylaxis.

Why use Antivirals

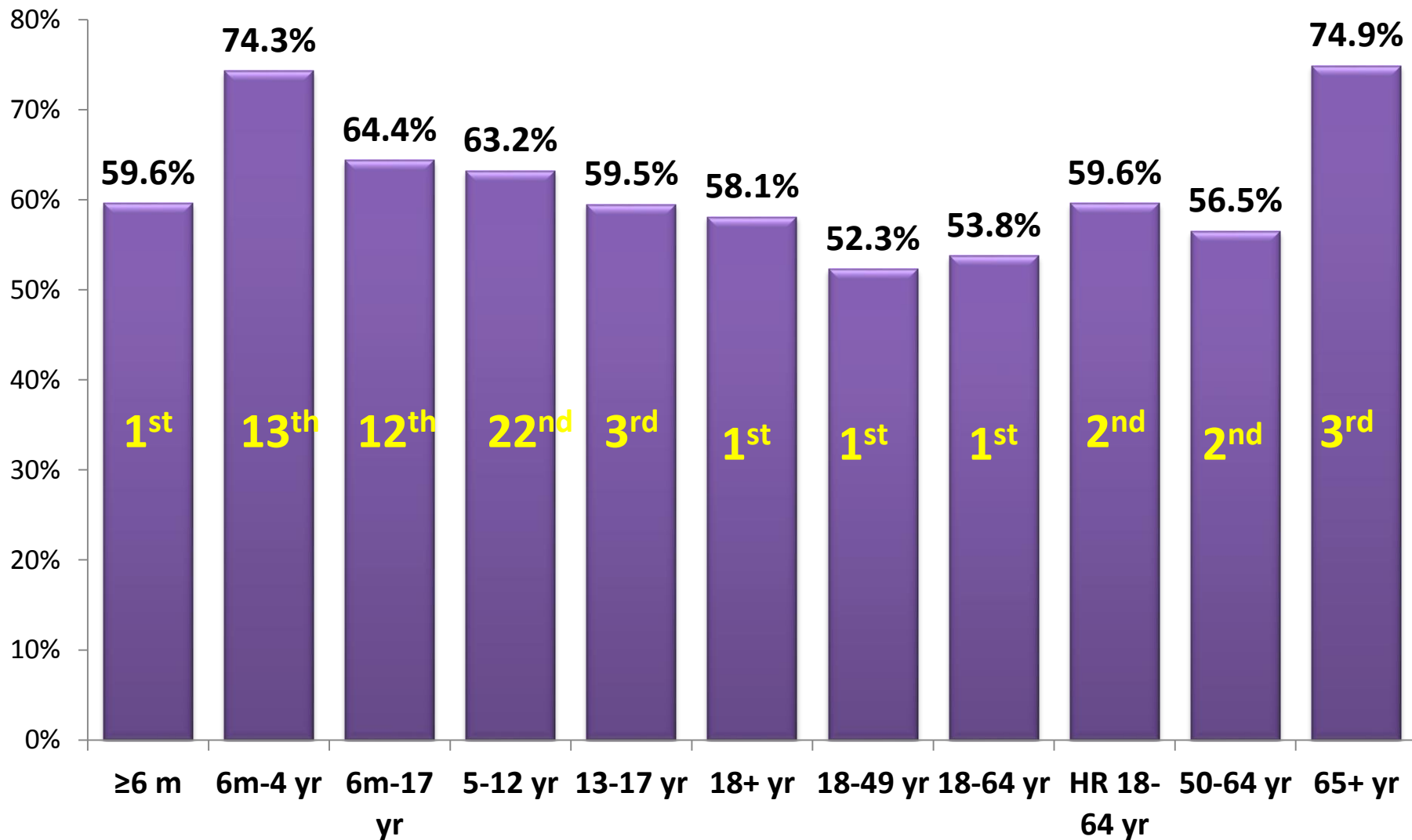
<http://www.cdc.gov/flu/professionals/antivirals/summary-clinicians.htm>

- Early treatment can shorten duration of symptoms and may reduce complications of influenza.
- Early treatment of hospitalized patients can reduce death
- Clinical benefit is greatest when antiviral treatment is administered early, especially within 48 hours of influenza illness onset.
- ***Influenza hospitalized patients antiviral treatment is warranted even if hospitalized after 48 hours of illness onset.***
- Decisions about starting antiviral treatment should not wait for laboratory confirmation of influenza.

State Influenza vaccination percent coverage for 2014–2015 season (NIS and BRFSS estimates)



South Dakota rates and rank among states by age group, (NIS/BRFSS influenza vaccination), 2014-2015



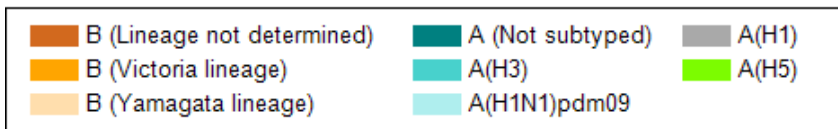
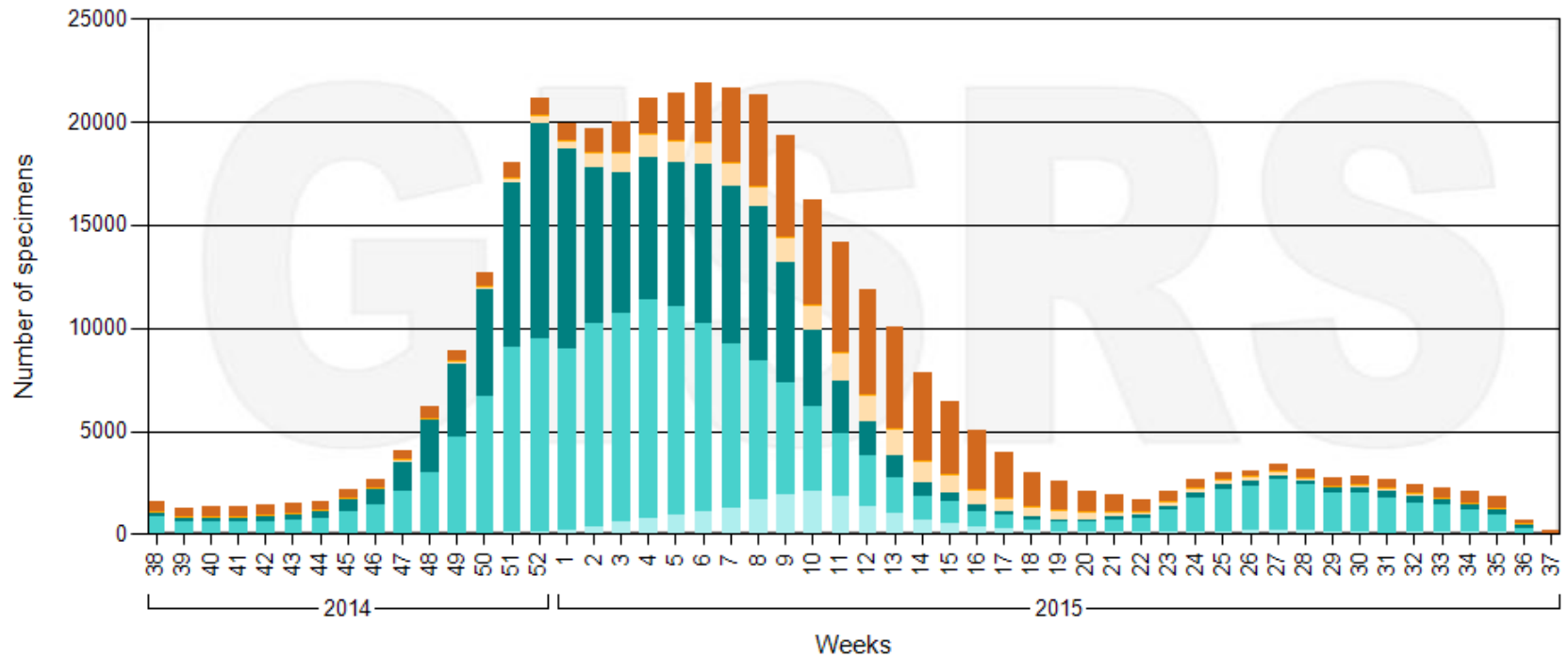
What can we expect this upcoming influenza season?



Global Influenza Surveillance and Response System (GISRS)

as of 17 Sep 2015

Number of specimens positive for influenza by subtype



Current influenza in Southern hemisphere (as of 7 Sep 15)

- **South Africa:** peak 27 June, influenza activity decreased, with influenza type B predominating in recent weeks.
- **South America temperate zone:** peak 22 Aug, ILI and SARI activity remained low and continued to decrease in general.
- **Australia:** peak 30 Aug, influenza activity increasing with predominantly B virus followed by A(H3N2) detections.



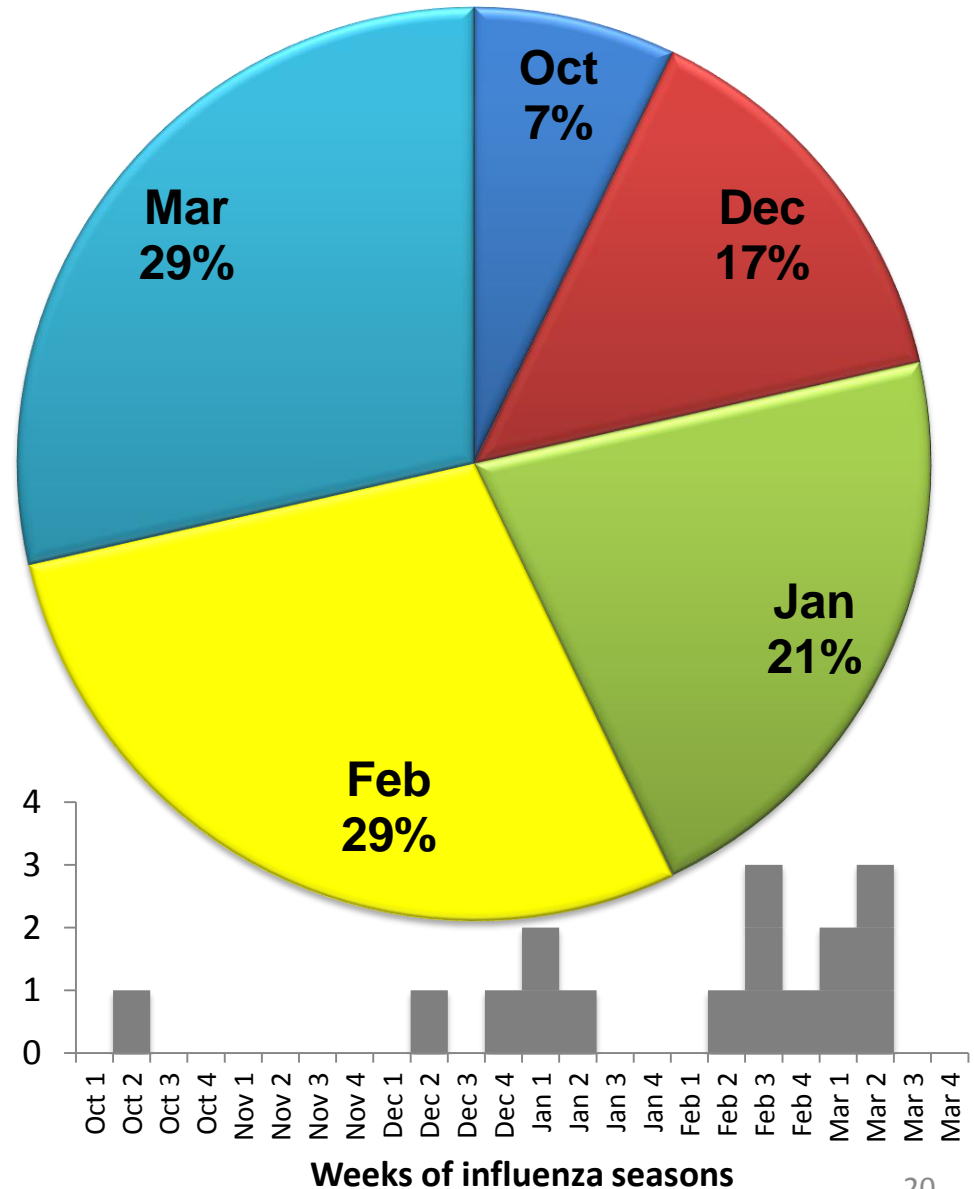
Best Prevention?

- 1. Get Vaccinated**
- 2. All persons aged 6 months and older should be vaccinated annually, with rare exception**
- 3. When to Vaccinate?**

Influenza peaks, South Dakota, 1999-2015

Flu Season: peak week

- 1999-2000: December 4th week.
- 2000-2001: February 2nd week.
- 2001-2002: March 2nd week.
- 2002-2003: March 1st week.
- 2003-2004: December 2nd week.
- 2004-2005: February 3rd week.
- 2005-2006: March 2nd week.
- 2006-2007: February 3rd week.
- 2007-2008: February 4th week.
- 2008-2009: March 1st week.
- 2009-2010: October 2nd week.
- 2010-2011: February 3rd week.
- 2011-2012: March 2nd week.
- 2012-2013: January 2nd week.
- 2013-2014: January 1st week.
- **2014-2015: January 1st week.**



Influenza vaccination 2015-2016 season

- **Trivalent influenza vaccines** will contain:
 - A/California/7/2009 (H1N1)-like virus
 - A/Switzerland/9715293/2013 (H3N2)-like virus **New****
 - B/Phuket/3073/2013-like (Yamagata lineage) virus. **New****
(same lineage as B Massachusetts as we saw in SD last season)
- **Quadrivalent influenza vaccines** will also contain:
 - B/Brisbane/60/2008-like (Victoria lineage) virus (which is the same Victoria lineage virus recommended for quadrivalent formulations in 2013–14 and 2014–15). We did see this virus in SD last season as well.

Currently, 6 influenza vaccine manufacturers are projecting that as many as 171-179 million doses of influenza vaccine will be available for use in the United States during the 2015-2016 influenza season..

Questions???

