Influenza Epidemiology and Surveillance Update

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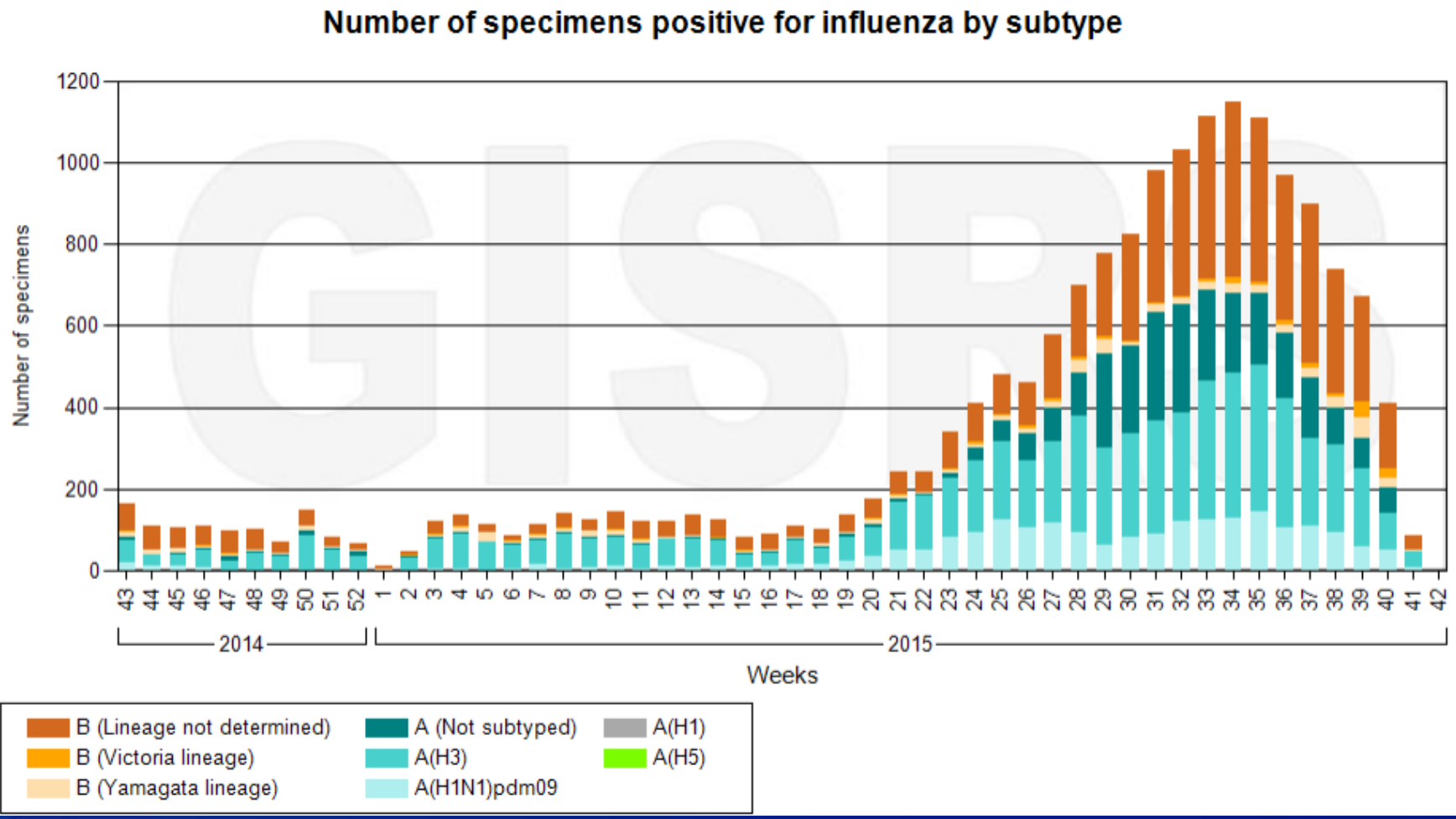
Advisory Committee on Immunization Practices
October 21, 2015

National Center for Immunization & Respiratory Diseases
Influenza Division, Epidemiology and Prevention Branch

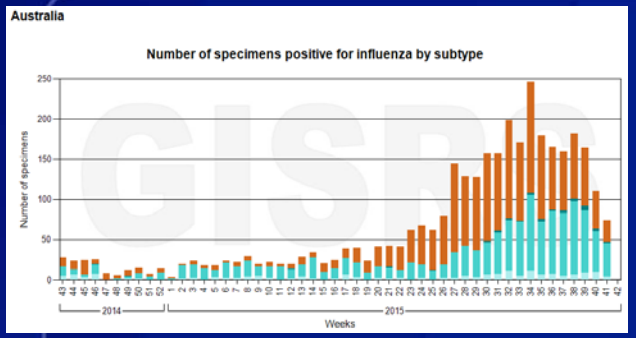
Outline

- International influenza activity update
- Recent U.S. influenza activity
- Southern Hemisphere vaccine recommendations

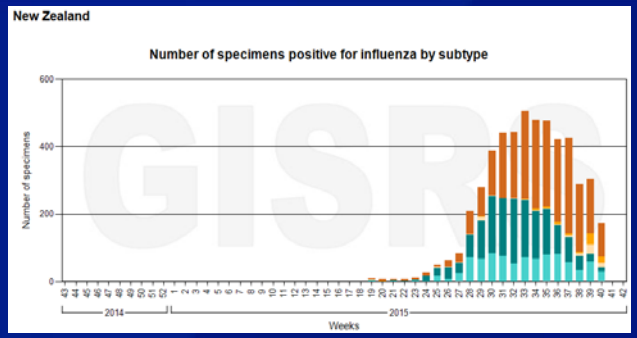
Southern hemisphere



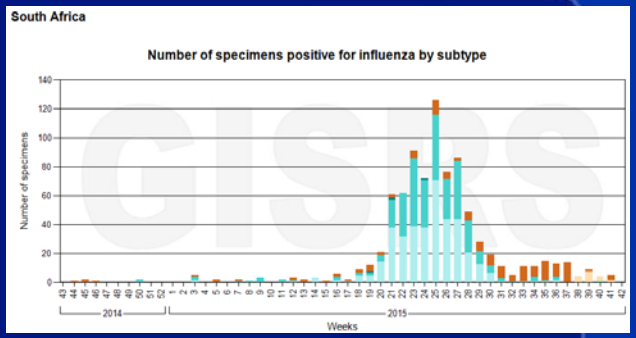
Australia



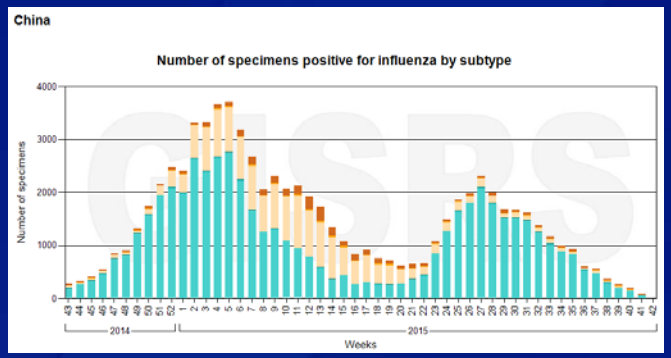
New Zealand



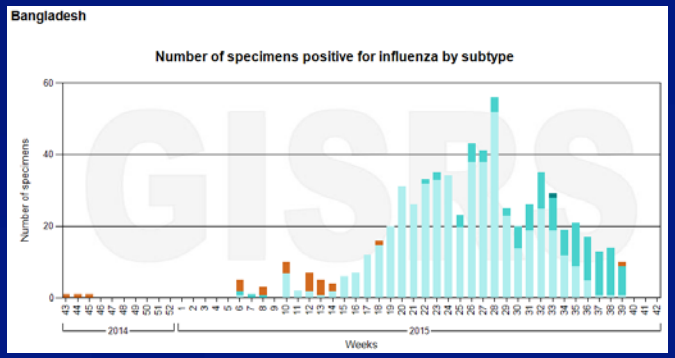
South Africa



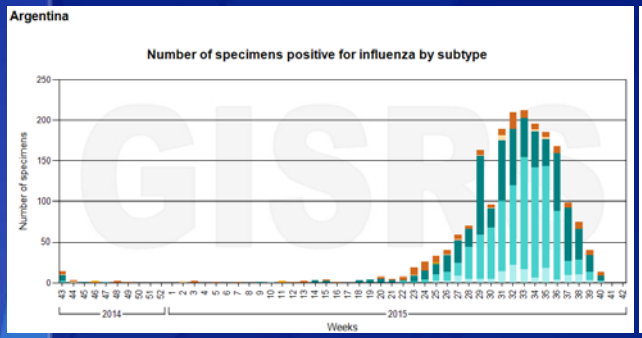
China



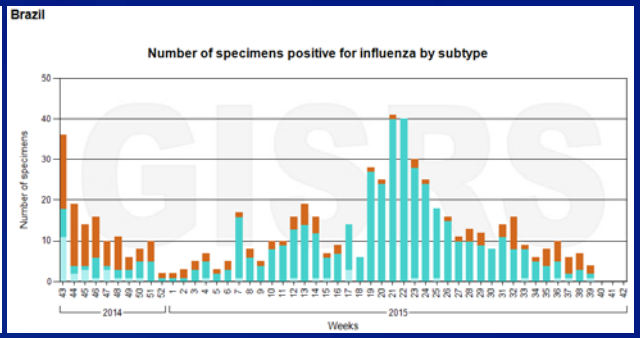
Bangladesh



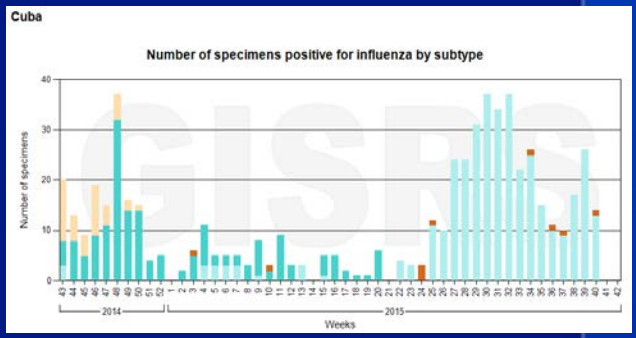
Argentina



Brazil

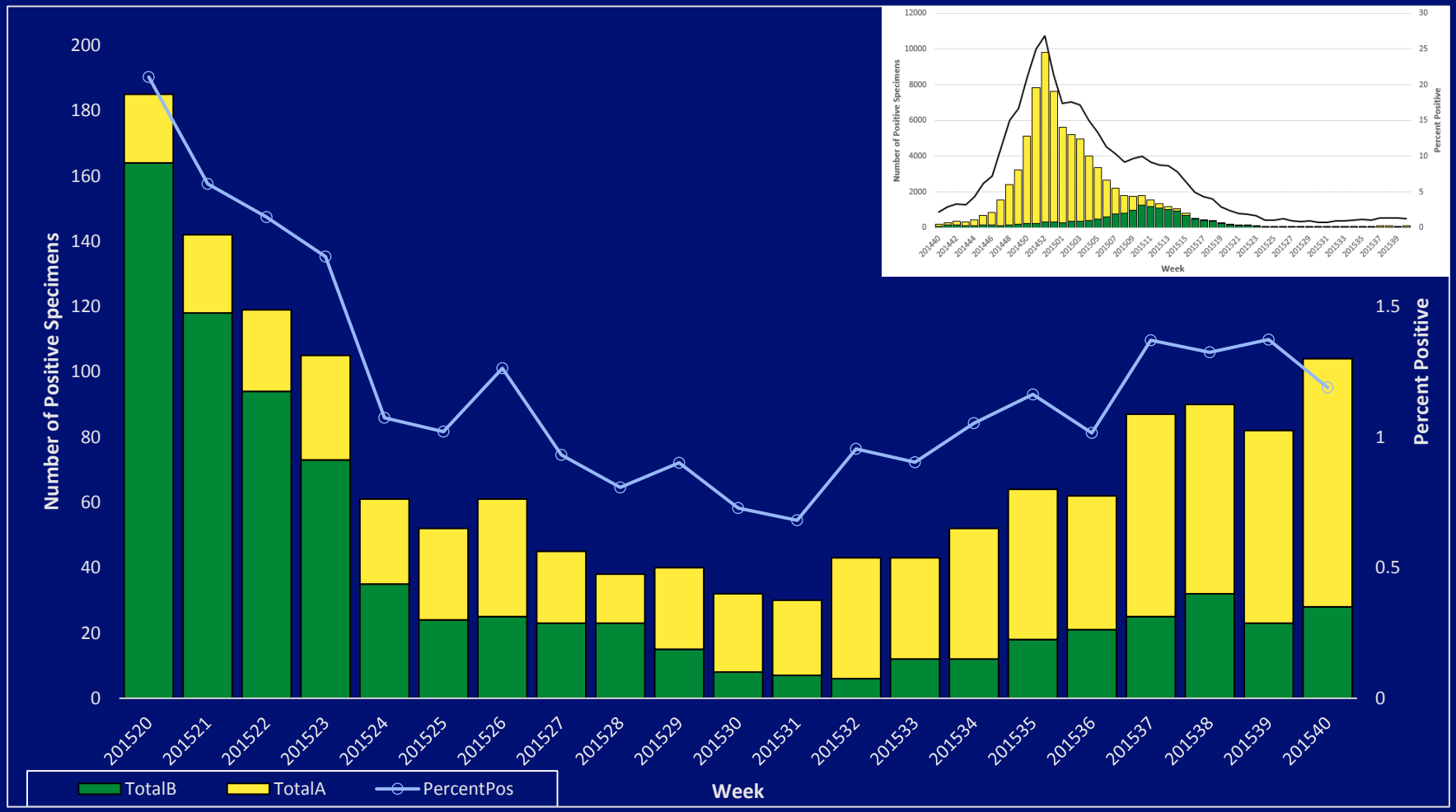


Cuba

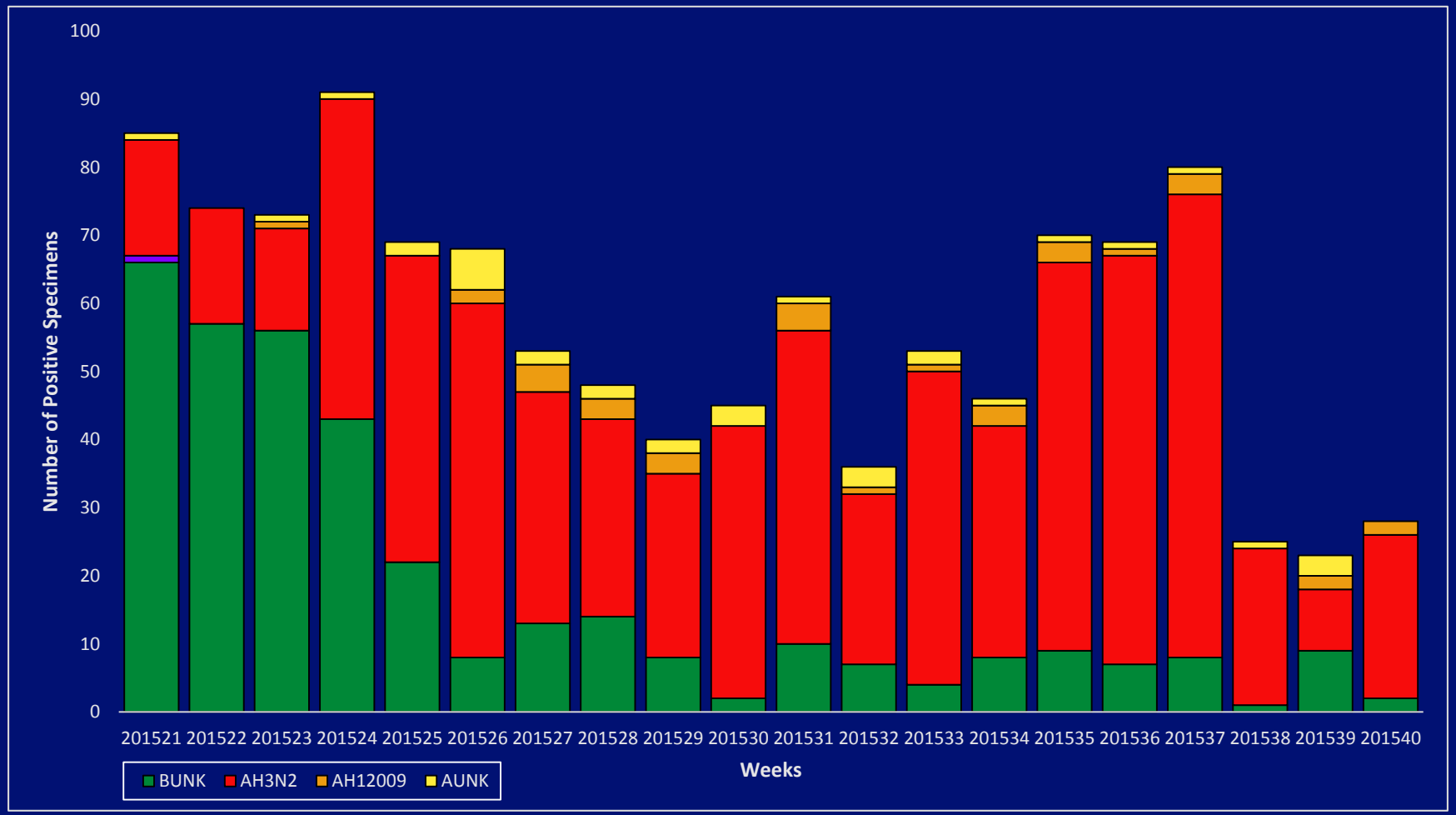


B (Lineage not determined)
B (Victoria lineage)
B (Yamagata lineage)
A (Not subtyped)
A(H3)
A(H1N1)pdm09
A(H1)
A(H5)

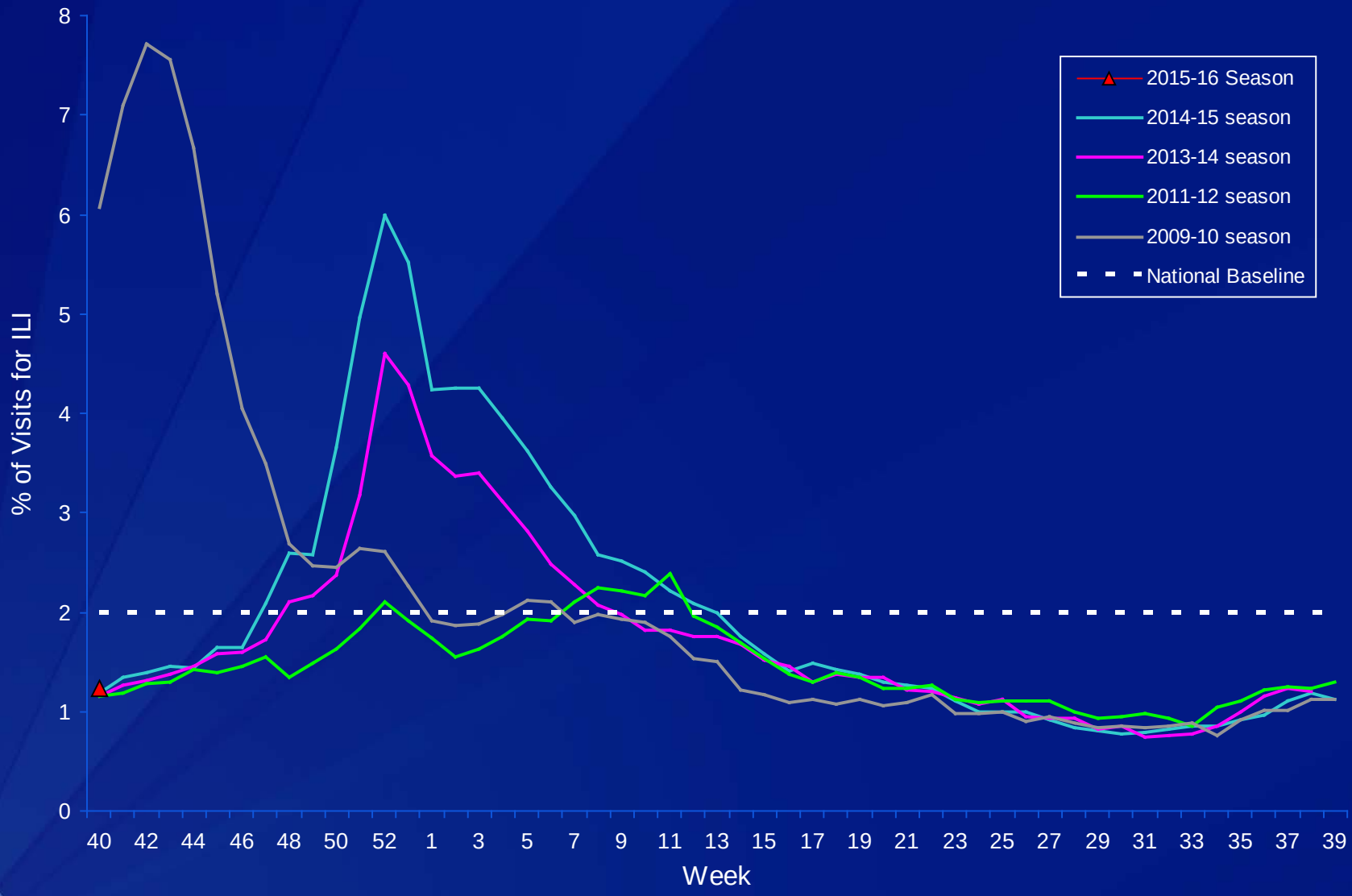
Influenza Positives, US Clinical Laboratories
May 24 – October 10, 2015



Influenza Positives, US Public Health Laboratories
May 24 – October 10, 2015

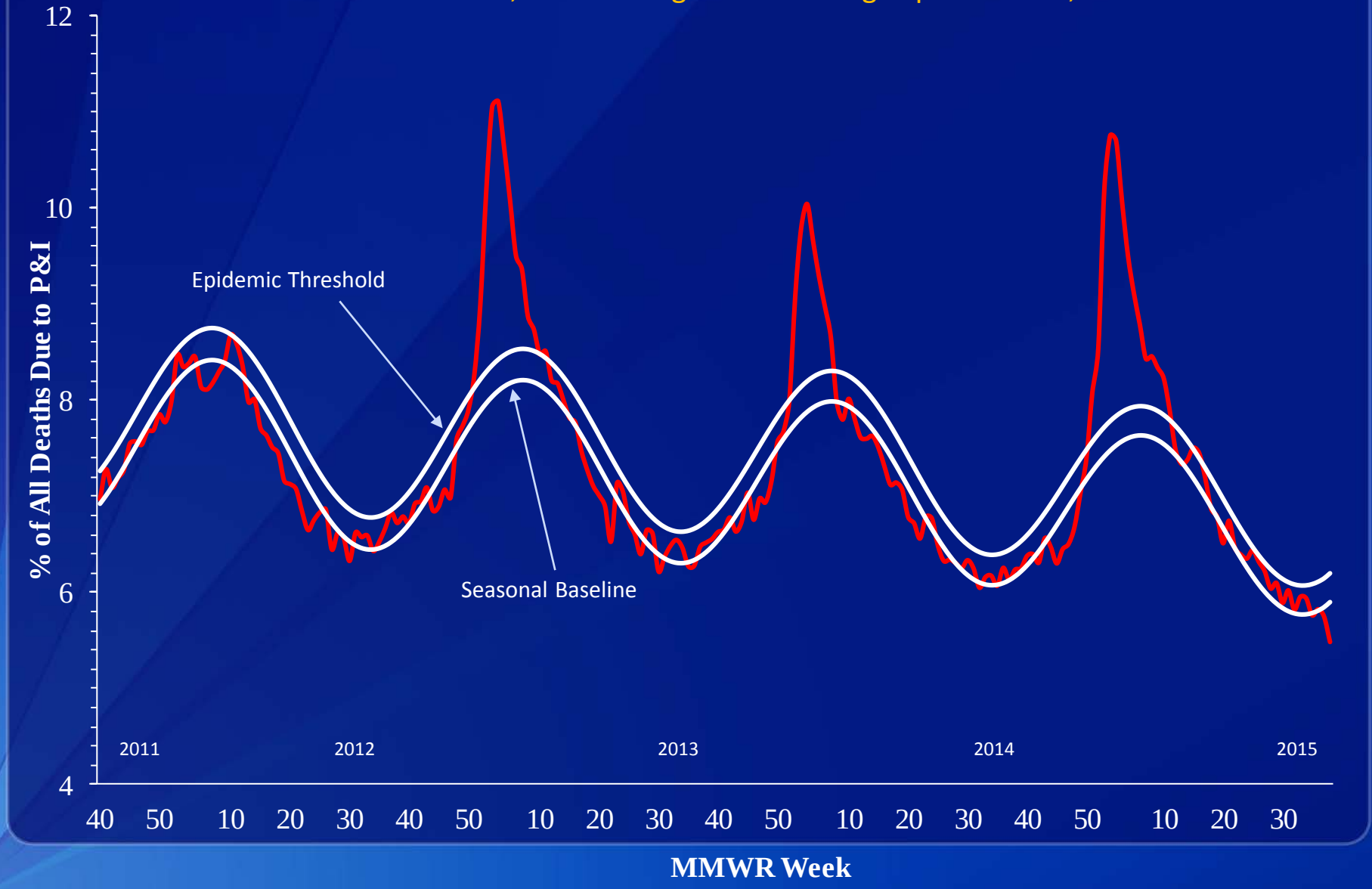


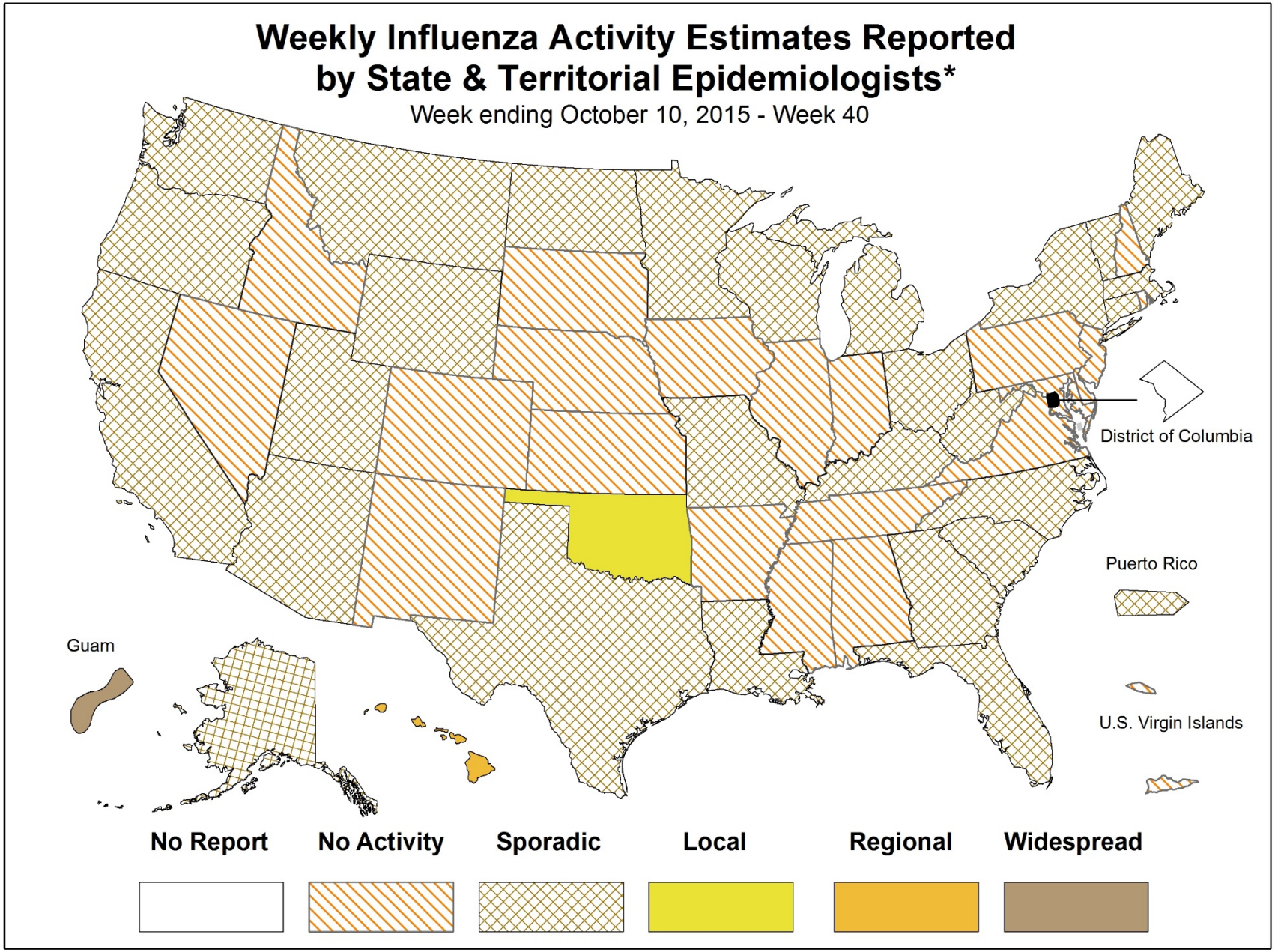
Percentage of Outpatient Visits for Influenza-like Illness (ILI)



Pneumonia and Influenza Mortality from the National Center for Health Statistics Mortality Surveillance System

Data as of October 15, 2015 through week ending September 26, 2015





* This map indicates geographic spread & does not measure the severity of influenza activity

Recommendation for 2016 Southern Hemisphere Influenza Vaccine

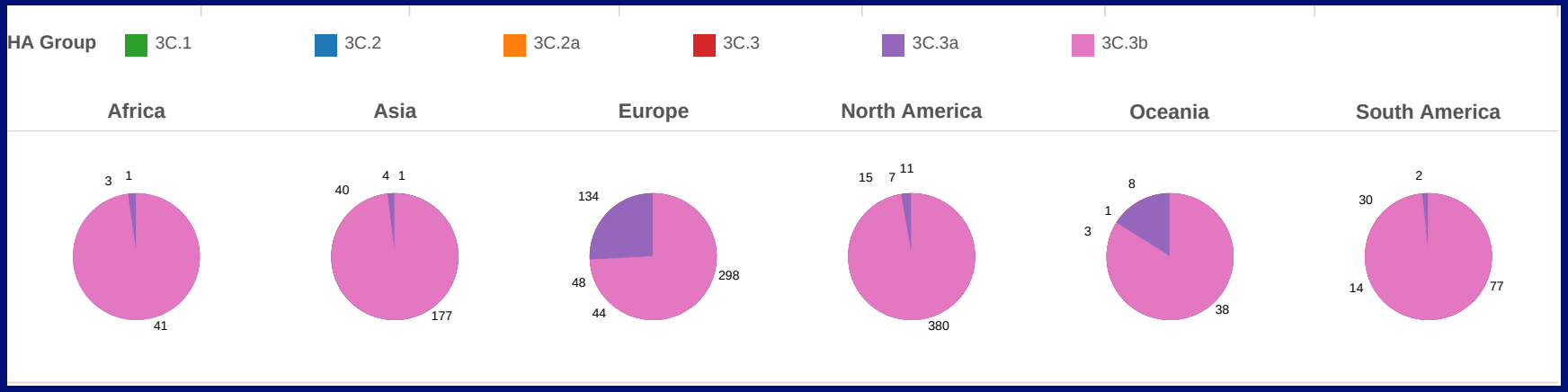
- **It is recommended that the following viruses be used for trivalent influenza vaccines in the 2016 Southern Hemisphere influenza season:**
  - an A/California/7/2009 (H1N1)pdm09-like virus;
  - an A/Hong Kong/4801/2014 (H3N2)-like virus; and
  - a B/Brisbane/60/2008-like virus.
- **For quadrivalent vaccines containing 2 B components:**
  - Above 3, plus
  - A B/Phuket/3073/2013-like virus

Southern Hemisphere Influenza Vaccine Virus Recommendations

- The Southern Hemisphere recommendation represents a update in the H3N2 component and a switch of influenza B virus lineage for the trivalent vaccine formulation
- These updates are NOT a result of significant antigenic drift
- Global laboratory data continues to indicate that most currently circulating viruses are antigenically similar to the vaccine viruses included in the 2015-16 U.S. vaccines

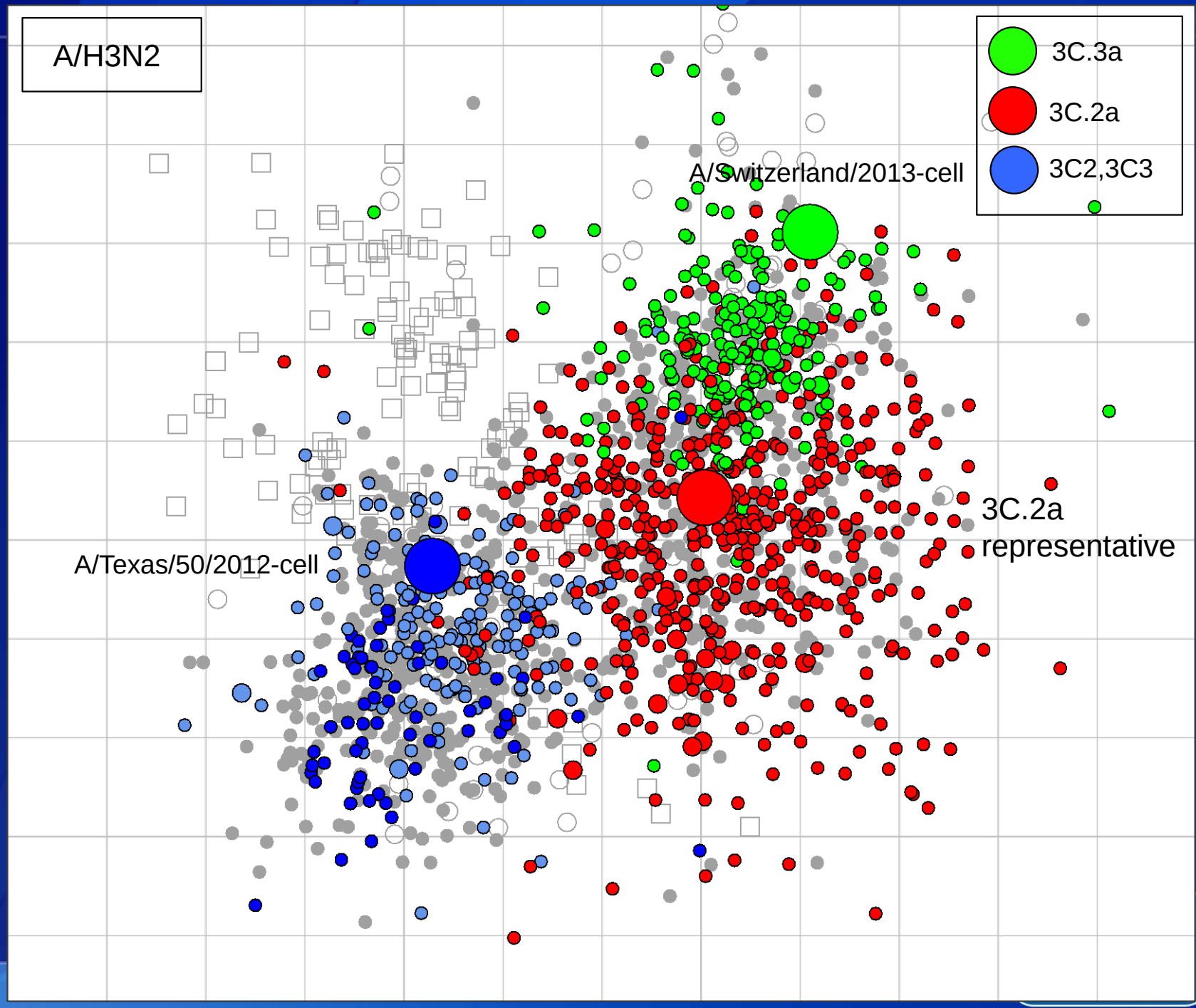
Geographic Distribution of A(H3N2) HA Genetic Groups --Collected Since Feb 1, 2015

- **Recent H3N2 viruses can be divided into multiple genetic groups**
  - A/Switzerland/9715293/13 belongs to the 3C.3a group
    - 2015-16 US vaccine H3 component
  - A/Hong Kong/4801/14 belongs to the 3C.2a group
    - Recommend 2016 Southern Hemisphere H3 component



Problems with Antigenic Characterization of H3N2 Viruses

- **Antigenic characterization of A(H3N2) viruses remains technically difficult**
- **Many 3C.2a viruses had low or undetectable hemagglutination activity or could not be recovered in cell culture**
  - This required the use of modified HI and virus neutralization assays for analysis
- **Egg propagation can introduce changes in the viruses that may affect antigenicity**


A/H3N2
3C.3a
3C.2a
3C2,3C3
A/Switzerland/2013-cell
3C.2a
representative
A/Texas/50/2012-cell

Influenza A(H3N2) Viruses

- Genetic subgroup 3C.2a viruses are predominating globally
- Antigenic characterization using reference ferret antisera indicate that 3C.3a and 3C.2a viruses are overall antigenically similar but are distinguishable in some cases
- A suitable candidate vaccine virus for 3C.2a genetic subgroup viruses was not available in February
- 3C.2a candidate vaccine viruses are now available

Influenza B Viruses

- The influenza B viruses recommended for quadrivalent influenza vaccines did not change
- The influenza B lineage recommended for trivalent influenza vaccines switched from a B/Yamagata lineage to the B/Victoria lineage
- B/Victoria and B/Yamagata lineage viruses continue to co-circulate, with B/Yamagata viruses predominating in many countries but the proportion of B/Victoria viruses increased in Australia and New Zealand from June 2015

Summary

- Influenza A(H1N1)pdm09, A(H3N2), and both lineages of influenza B viruses continue to circulate worldwide
- Activity in the United States and other Northern Hemisphere countries remains low at this time
- Recommended viruses for the 2016 Southern Hemisphere vaccine differ from the current Northern Hemisphere viruses but changes represent minor updates and are NOT due to significant antigenic drift

Summary

- Global laboratory data continue to indicate that most currently circulating viruses are antigenically similar to the vaccine viruses included in the 2015-16 U.S. vaccines
- This suggests that vaccination with Northern Hemisphere influenza vaccine should offer protection against the majority of circulating viruses analyzed to date and may offer significantly more protection compared to last season's vaccine