

# Candidate pandemic H1N1 vaccine viruses and vaccine potency reagents

- an update of the development and availability

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# Virus characterization

- Antigenic properties
  - Viruses from 28 countries in 5 of 6 WHO Regions analyzed in WHO CCs.
  - HI tests using post-infection ferret antisera, antigenically:
    - homogeneous
    - most closely related to A/California/7/2009(H1N1)v
    - distinct from currently circulating seasonal influenza viruses
    - similar to North American lineage triple-reassortant A(H1N1) swine influenza viruses
- Genetic properties
  - viruses from 31 countries in 5 of 6 WHO Regions analyzed so far closely related to A/california/7/2009(H1N1)v
- Viruses from severe cases no different – genetically and antigenically
- Antiviral susceptibility
  - All viruses tested so far except 3 since last week (from Japan, Denmark and HK) sensitive to Oseltamivir
  - All viruses tested so far, including the above 3 viruses, sensitive to Zanamivir
  - All viruses tested so far resistant to Adamantine (Amantadine and Rimantadine)



# Recommendation on virus for pandemic vaccine development

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- An A/California/7/2009-like virus
- The recommendation based on comprehensive analysis of available data from the WHO Global Influenza Surveillance Network and other sources
- WHO, with its Network and other partners, continuing monitoring the evolution of the virus, reviewing the recommendation. Will update whenever needed



# Available candidate pandemic H1N1 vaccine viruses

- Wild type vaccine viruses
  - A/California/4/2009
  - A/California/7/2009
  - A/Texas/5/2009
  - A/England/195/2009
  - A/New York/18/2009
- Candidate reassortant vaccine viruses
  - Classical reassortment
    - IVR-153
    - NYMC X-179 A
  - Reverse genetics
    - IDCDC-RG15
    - NIBRG-121
    - CBER-RG2
  - Characterization/safety testing of the above reassortants
    - Antigenic and genetic analysis completed
    - Ferret testing completed for the first 4.
    - For CBER-RG2, after consulting a vaccine safety expert group, no ferret safety testing needed for this reassortant.
- **All** above vaccine viruses are available from WHO CCs and ERLs
  - by 3<sup>rd</sup> Jul a total of 341 shipments made
  - <http://www.who.int/csr/disease/swineflu/guidance/vaccines/candidates/en/index.html>



# Candidate pandemic H1N1 vaccine viruses under development

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- Classical reassortment
  - A/New York/18/2009
    - New York Medical College
    - NIBSC
- Reverse genetics
  - A/New York/18/2009 and A/Texas/5/2009
    - CDC
  - A/Tennessee/1-560/2009 and A/Texas/SC06164/2009
    - St Jude Children's Research Hospital
  - A/England/195/2009
    - NIBSC
  - A/California/7/2009
    - NIID



# Growth property of available candidate pandemic vaccine viruses

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- Evaluation conducted jointly by ERLs and vaccine manufacturers
- Yield evaluation
  - Wild type vaccine viruses
    - A/California/7/2009 – similar to normal seasonal H1N1 component in Vero-cell
  - Reassortant vaccine viruses
    - Based on jointly evaluation conducted so far:
      - NYMC X-179A has highest yield - ~ 50% of seasonal H1N1 component
    - CBER-RG2, evaluated in CBER with initial result ~50% of seasonal H1N1 component
  - Manufacturers further optimizing the yield
- Growth is a viral property and the pandemic H1N1 is a new virus



# Vaccine potency reagents (1)

- General preparation process
  - Prepared independently by 4 ERLs (CBER/FDA, NIBSC, NIID and TGA)
  - Reference antigen – large amount of bulk antigen from manufacturers
    - Egg-based for testing of egg-based vaccines
    - Cell-based for testing of cell-based vaccines
  - Reference antiserum – from sheep by ERLs or for ERLs by local manufacturers
    - Small amount of purified HA
  - Distribution
    - Exchange among ERLs immediately for calibration
    - Once available, antigen and antisera distributed to requesting manufactures in parallel to the calibration among ERLs
    - Requests directly to originating ERLs
  
- First available pandemic vaccine reagents:
  - First available reference antigen
    - Egg-based (NYMC X-179A)
    - Prepared by CSL and labelled by TGA
    - 9000 vials to be filled and capped from Jul 8
    - Expected distribution Jul 10-15 to requesting manufactures
  - First available reference antiserum
    - A/california/7/2009
    - First lot prepared by NIBSC on Jun 24 – 2000 vials
    - Limited ongoing distribution: 50 vials per ERL; 30 vials per manufacturers upon request
    - Larger distribution from subsequent larger lots expected in 2-3 weeks



# Vaccine potency reagents (2)

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- Subsequent expected availability of pandemic vaccine reagents
  - Reference antigen
    - CBER – egg-based, 3<sup>rd</sup> week Jul
    - NIBSC – cell-based and egg-based, end Jul
    - NIID – egg-based, Aug-Sept
  - Reference antiserum
    - CBER – end of Jul, A/California/7
    - NIID and TGA – end Jul – early Aug, A/California/7
- Calibration of first available reagents
  - By collaborative study among 4 ERLs
  - Assigned value for reference antigen (egg-based) expected end of Jul

