Influenza Risk Assessment Tool (IRAT): H7N9: Emergence vs. Impact Risks
Vaccine Decision Framework

Current Status: Clinical 
Lots and Trials
- No H2H transmission
- Plateau/ low increase in human cases
- Limited geographic distribution
- Significant morbidity & mortality
- Manufacturing process TBD
- Safety and Effectiveness TBD
- Ex. H3N2

Small Stockpile
- No H2H transmission
- Current conditions or increasing incidence
- Expanding Geographic Spread
- Significant morbidity & mortality
- Defined/tenable manufacturing process
- Safety and Efficacy identified from CT
- Capable of EUA status
- Emerging antiviral resistance
- Ex. H5N1

Broader Stockpile 
Potential Limited Vaccination
- No/early H2H transmission
- Many case clusters, frequent health care workers infected
- Wide Regional or Multination Spread
- Significant increase in genetic and phenotypic indicators of human adaptation
- Significant morbidity & mortality
- Manufacturing process established
- Safety and Effectiveness acceptable
- Vaccine approved or EUA allowed

Large Scale Vaccination Campaign
- H2H Transmission
- High Population Attack Rates
- High rates of hospitalization and CFR
- Genetic-phenotypic markers for sustained transmission
- Global spread
- Can manufacture for full population based on dosing data
- Costs are affordable
- Vaccine is safe, effective
- Vaccine is approved or EUA allowed

Stop vaccine development

FOUO Procurement Sensitive
H7N9 Vaccine Development Timelines

April
- Vaccine Seed Development

May
- Clinical Investigational Lot Production

June
- IND Preparation, Review, and Submission
- Vaccine Potency Assay Preparation & Calibration

July
- Clinical Trials

Aug.
- Clinical Trial Results & Analysis

Sept
Pre-Pandemic H7N9 Vaccine Stockpile Factors

• Intended Use
  ― Entire Population
  ― Portion of Population
    • Public safety workers and/or other essential workers
    • Persons at high risk of adverse outcomes
    • Children
  ― Priming vaccine immunization

• Vaccine Types
  ― Live, attenuated
  ― Inactivated Split Virion or Subunit
    • Egg-based
    • Cell-based
  ― Recombinant
  ― H5N1 stockpile (inactivated only) vs. H7N9 stockpile (pending clinical results)
  ― Production capacities
Pre-Pandemic H7N9 Vaccine Stockpile Factors

• **Timing**
  - Optimization of vaccine production yields
  - Uninterrupted seasonal vaccine production campaign
  - Window of opportunity balanced with urgency
  - Budgetary considerations
  - Access to manufacturing lines and staff
  - Knowledge or lack thereof of dose requirements

• **Cost**
  - Unit cost per vaccine lot in contracts
  - Other factors
    • Number of vaccine lots ordered (volume discounts)
    • Production yield (Total amount of vaccine antigen per lot)
    • Dose requirement (Number of doses per vaccine lot)
  - Possible opportunity and carrying costs
  - Availability of funds
H7N9 Vaccine Production Campaigns: (-/+ ) Adjuvant

Maintain Seasonal Production - No Adjuvant

Maintain Seasonal Production - Adjuvant
H7N9 Vaccine Summary

• Risk assessment for H7N9 is similar to H5N1
  — Decision for H5N1: develop vaccine and stockpile bulk antigen

• HHS has already taken multiple steps in the vaccine development process: 1) vaccine seed strain development, 2) clinical lot manufacturing, 3) potency assay reagent preparation, and 4) clinical trial protocols in preparation
  — Clinical trials expected to start in August 2013

• Vaccine stockpiling decision under deliberation

• Decision to conduct a large scale vaccine manufacturing campaign depends on risk of emergence of sustained human-to-human transmission
Vaccine Lessons Learned

• 2009 H1N1
  — Need for new vaccine technology (Cell- & recombinant- based
    now FDA approved and available)
  — Need to shorten vax mfg. process from beginning to end.:
    • Expedited sterility/potency testing are used when possible
    • Optimization of Vaccine seeds employed

• 2013 H7N9
  — Streamline vaccine seed strain qualifying process & provide
guidance to manufacturers
  — Better coordination of HHS & USDA on biocontainment
    permitting
  — Recombinant-based vaccines moving faster than other
technologies in development