Influenza Risk Assessment Tool

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Influenza Risk Assessment Tool (IRAT)

- A global public health tool to prioritize pandemic preparedness activities
  - Evaluates risk from novel viruses currently circulating in animals, i.e. in pre-pandemic period

- Assess potential pandemic risk for:
  - Emergence of a novel influenza virus in humans
    - Human-to-human transmission
  - Public health impact
    - Severity

- The IRAT cannot predict the next pandemic strain
Why do we need the IRAT?
Multiple Emerging Novel Influenza A Viruses

- H9N2
- pH1N1
- H7N9
- H5N6
- H6N1
- H10N8
- H7N3
- H3N2v
- H7N7
- pH1N1
- H7N9
- H5N6
- H6N1
- H10N8
- H7N3
- H3N2v
- H7N7
- H5N1

1998-2014
2003
2009-14
2011-14
2012
2013-14
Increasing Novel Infections Demand Responses

- **H7N9**
  - >400 cases
  - ~30% CFR
  - Minimal mammalian adaptations
  - No population immunity

- **H3N2v**
  - >300 cases
  - Very low CFR
  - Significant human adaptation
  - Substantial population immunity

- Very different problems require very different solutions and investments

- Risk assessments are needed to assist decision-making:
  - Vaccine development, testing, manufacturing
  - Countermeasure procurement and preparedness planning
Benefits of the Influenza Risk Assessment Tool

- Objective, risk measure applied consistently with minimal bias
- Provides documentation to support decisions
- Builds on strong global influenza network for virus and genetic sequence sharing (WHO/GISRS)
- Identifies gaps in knowledge/data
  - Encourages sharing and input from both public health and animal health sectors
- Evaluated and reviewed regularly in an iterative process
  - Easily, rapidly updated with new information or data collection methods
- Effective communication method for policy makers
Influenza Risk Assessment Tool (IRAT)\textsuperscript{1,2}

- **Design** – A simple, additive, multi-attribute assessment tool
- **Process** –
  - Subject matter experts from different disciplines evaluate available evidence to provide a quantitative assessment to answer the following questions:
    - What is the likelihood that a virus will emerge?
    - What is the likely impact of that virus if it emerges?
  - Ten elements are scored as “Low”, “Moderate”, or “High”:
  - Scores are weighted to answer “emergence” and “impact” questions
  - Each reviewer provides a “confidence score” to address uncertainty
- **Implementation** –
  - IRAT has been used to evaluate H7N9, H5N1, H9N2, H3N2v to inform vaccine development and procurement decisions by USG.

\textsuperscript{1} Trock SC1, Burke SA, Cox NJ. Development of an influenza virologic risk assessment tool. Avian Dis. 2012 Dec;56(4 Suppl):1058-61.
Ten Elements Evaluated in IRAT In Three Groups

<table>
<thead>
<tr>
<th>Virus</th>
<th>Population</th>
<th>Ecology</th>
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</thead>
<tbody>
<tr>
<td>3. Transmission in Laboratory animals</td>
<td>7. Antigenic Relationship to Vaccine Candidates</td>
<td>10. Human Infections and Transmission</td>
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</table>
Each element is scored, weighted, and combined with all reviewer scores.

Data are provided to decision-makers on vaccine development.

Process revisited when more data.

So far, scores have changed:
- H3N2v lowered
- H7N9 rose slightly
IRAT and Pandemic Vaccine Priorities

- IRAT scores provided regularly to HHS/BARDA on a regular basis to guide pre-pandemic vaccines and stockpile decisions
  - One component of multi-faceted decision process
- Question:
  - Which additional vaccine antigens should be produced, stockpiled or selected for clinical trials to mitigate potential public health impact of emerging virus
- Assess 5 elements relevant to vaccine
  - Human infection; Antigenic relationship; Global distribution; infection in animals; genomic variation
  - Which H5N1 virus poses greatest risk to impact public health when considering vaccine development and vaccines available in SNS?
  - Which virus poses greatest risk to impact public health when considering vaccine development and available candidate vaccine viruses?
Questions?

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