Evaluating the risk of spread of H5N1 highly pathogenic avian influenza in Kenya

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ILRI
RVC
DVS
Risk mapping

- Identify risk question
  - risk of spread of HPAI

- Identify risk factors
  - Proximity to roads
  - Proximity to navigable rivers
  - Poultry density
  - Proximity to markets (represented by cities with pop > 100,000)
  - Proximity to surface water and wetlands
  - Proximity to irrigated areas

- Weigh risk factors
  - from expert opinion

- Combine risk factor maps and weights to derive risk map
  - weighted linear combination
Average weights for risk factors associated with the spread of highly pathogenic avian influenza from expert opinion elicitation.

<table>
<thead>
<tr>
<th>Risk factor</th>
<th>Mean weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poultry density</td>
<td>0.2692</td>
</tr>
<tr>
<td>Proximity to markets</td>
<td>0.2400</td>
</tr>
<tr>
<td>Proximity to primary roads</td>
<td>0.1924</td>
</tr>
<tr>
<td>Proximity to water or wetlands</td>
<td>0.1375</td>
</tr>
<tr>
<td>Proximity to secondary roads</td>
<td>0.0879</td>
</tr>
<tr>
<td>Proximity to irrigated areas</td>
<td>0.0436</td>
</tr>
<tr>
<td>Proximity to navigable rivers</td>
<td>0.0294</td>
</tr>
</tbody>
</table>
Risk map for the spread of HPAI

Mombasa, Nairobi and Nyanza are high risk areas
A transport model for HPAI in Nigeria (and Kenya)

How far can a truck travel per day?

Grid cells: time to cross a grid cell
Bird flu in Nigeria (and Kenya)

Probability of causing a secondary outbreak from bird flue epidemics in Nigeria

Probability of causing a secondary outbreak from bird flue epidemics in Nigeria.
Bird flu in Nigeria (and Kenya)

When and where are outbreaks to be expected
Bird flu in Nigeria

Predictive modeling and historical outbreaks
...and Kenya

Risk of outbreak

Dead chickens
So that is (part of) what epidemiology can do
What can viral research do for us?
- Diagnostics
  - rapid detection is key to many disease mitigation measures
  - field test kits or laboratory facilities
- Identify pathways of disease spread by virus typing
  - we “speculate” on how the virus spreads, you can tell us

What’s going on now?
Rift Valley Fever Virus
Multi-national, multi-sector, multi-million
multi-model, multi-cool and multi-everything

Thank you for your attention!