

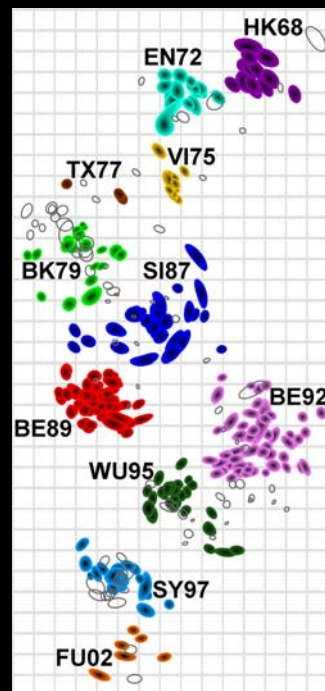
## The role of antigenic cartography in monitoring

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### Antigenic map Influenza A (H3N2) 1968-2004



Lapedes



de Jong



Osterhaus



Rimmelzwaan

Bestebroer

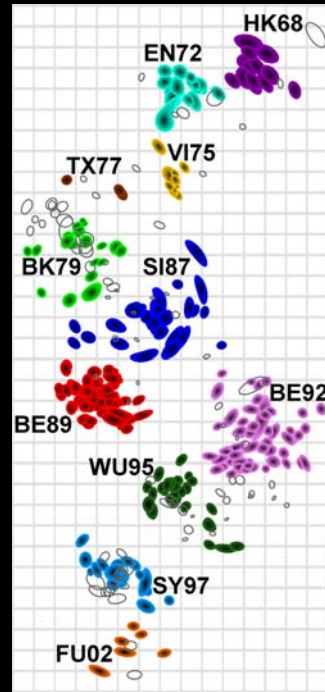
Fouchier

Smith et al *Science* 305, 371-376, 2004.

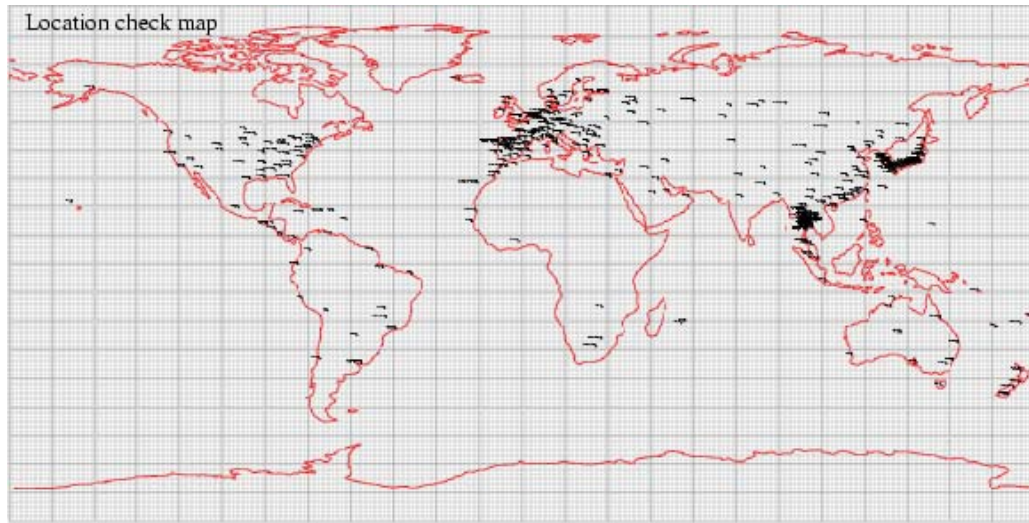
## Antigenic map Influenza A (H3N2) 1968-2004

- 2 Dimensional
- Clustered
- Chronologically ordered clusters
- Approximately equal cluster gaps
- Approximately equal timing between clusters
- Mostly linear
- Cluster transitions
- Predictable?

Smith, et al *Science* 305, 371-376, 2004.



## Locations



GLOBAL  
HEALTH  
SECURITY

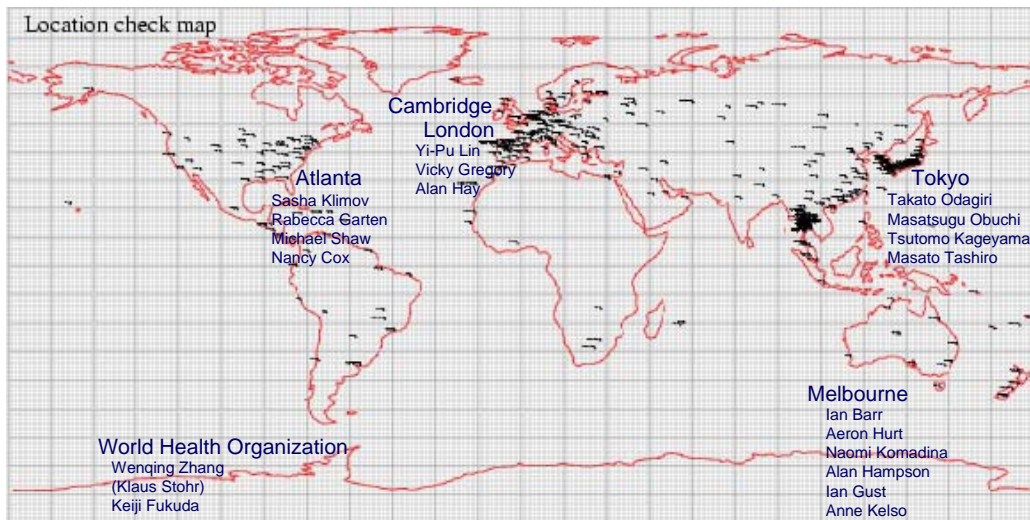
WHO Global Influenza Programme: Vaccine Recommendations



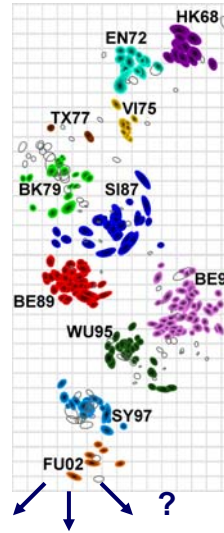
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## Locations



## Fujian-California cluster transition



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WHO Global Influenza Programme: Vaccine Recommendations



## Fujian-California cluster transition

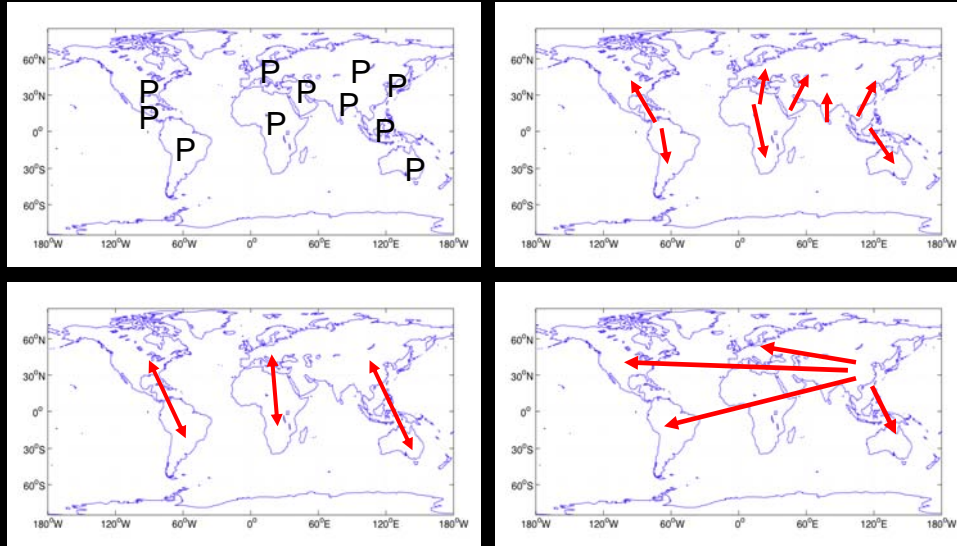


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WHO Global Influenza Programme: Vaccine Recommendations



## Global migration



## For seasonal H3N2 over the past 5 years



Russell *et al.* *Science*, 320, 340-346, 2008

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NIMR UK  
NIID Japan  
WHO CC Melbourne

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WHO Global Influenza Surveillance Network, >100 laboratories, 80 countries

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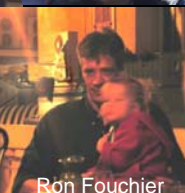
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Alan Lapedes

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Theo Bestebroer

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