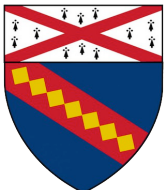




# Synthesizing Model-Based Findings and Field Observations to Consider the Role of Combined Intervention Strategies Against Ebola



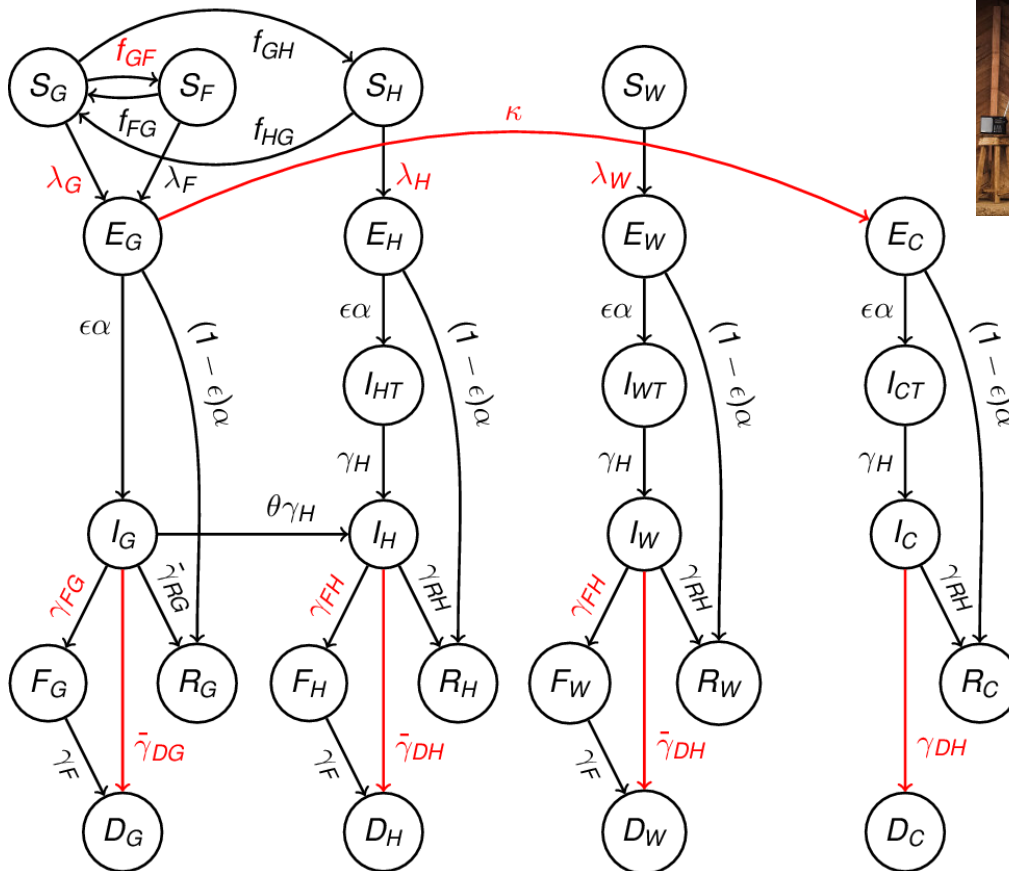
Center for Infectious Disease Modeling and Analysis  
Yale School of Public Health



# Model to evaluate combinations of interventions that target different routes of transmission



Source: Boakai Fofana/  
allAfrica



Source: Associated  
Press

Source: WHO



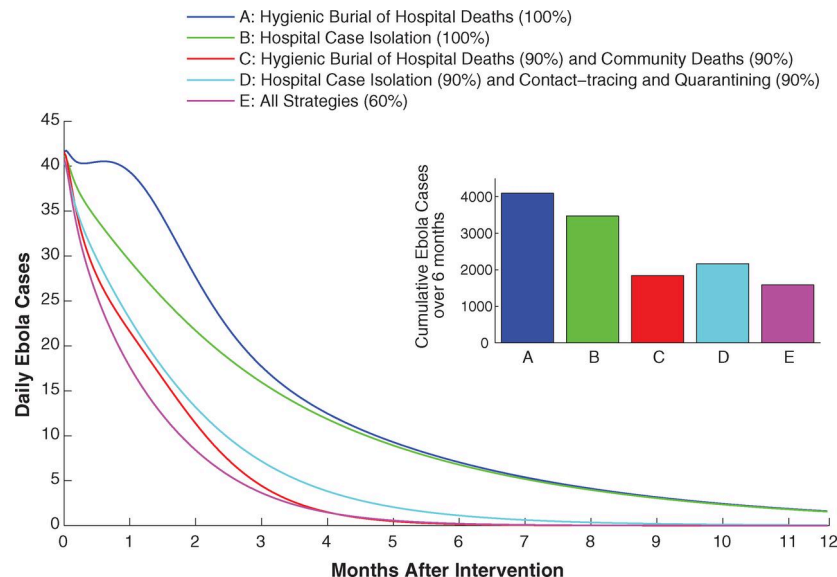
Source: CDC



Pandey et al. (2014) *Science*

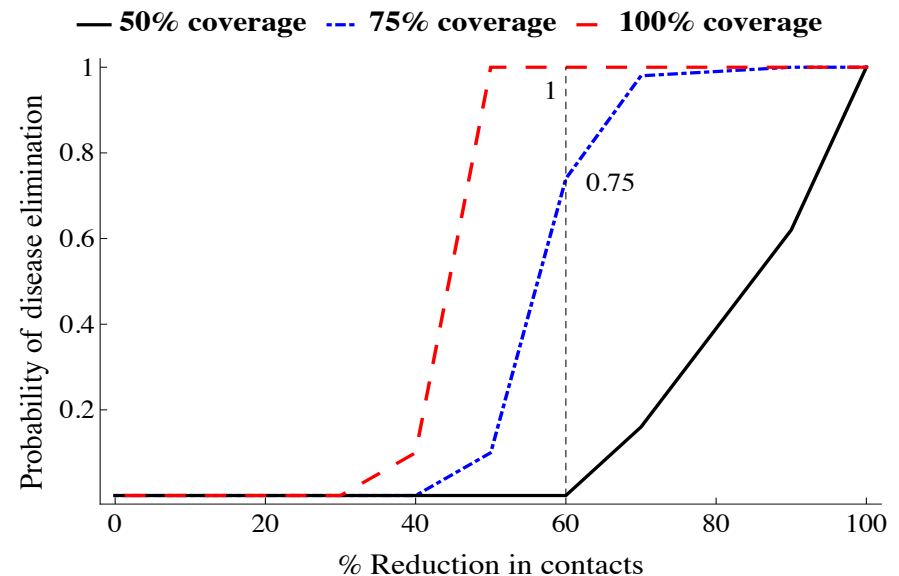
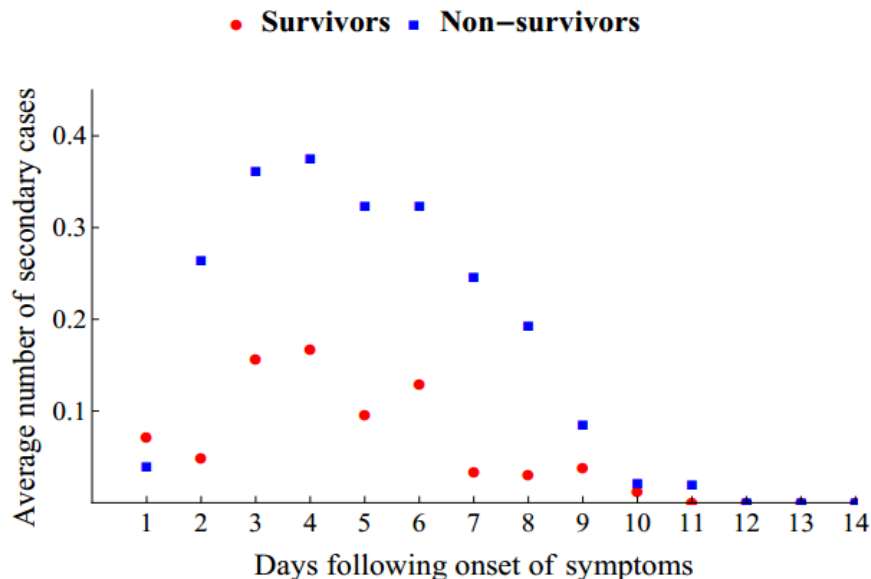
# No individual intervention could sufficiently reduce transmission over a six-month period.

- ❖ A combination of case isolation and hygienic burial practices could reduce transmission to an extent that disease elimination became a realistic goal
- ❖ Fortunately, these interventions were implemented and Liberia is on the verge of eliminating Ebola



# Non-survivors contribute more significantly to transmission

- ❖ Isolating 75% of the most critically ill on the first day of symptoms could both improve case fatality ratios and reduce transmission to others.

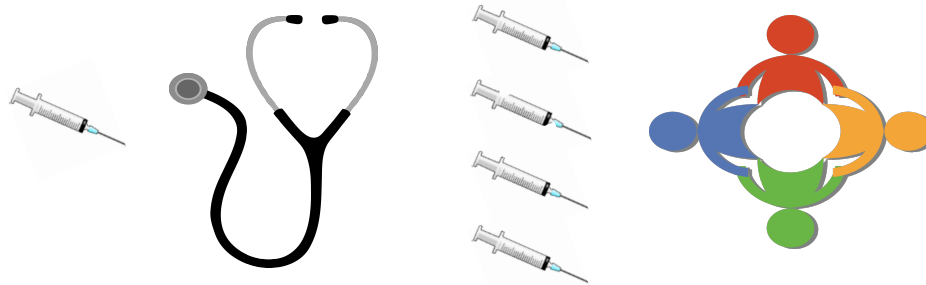


Yamin et al. (2015) *Annals of Internal Medicine*

Atkins et al. (2015) *British Medical Journal*

# Ring vaccination targets the contacts of an identified case.

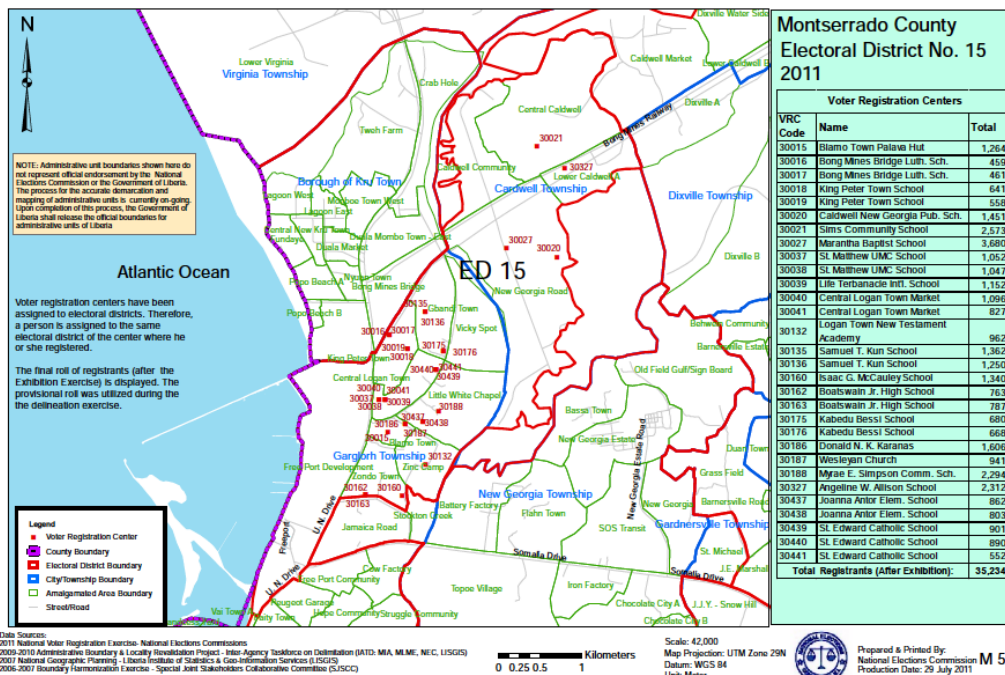
- ❖ Ring vaccination is particularly appropriate for clustered low-incidence diseases in the eradication phase.
- ❖ In settings like Liberia, ring vaccination can be incorporated relatively seamlessly into existing contact tracing efforts
- ❖ Both logistical and ethical constraints are significant considerations for evaluating vaccine trial design.
- ❖ Important to push forward with vaccine innovations



Galvani et al. (2014) *Annals of Internal Medicine*;  
Wells et al. (*PLoS NTD*); Bellan et al. (*Lancet ID*); Scarpino  
et al. (2014) *CID*

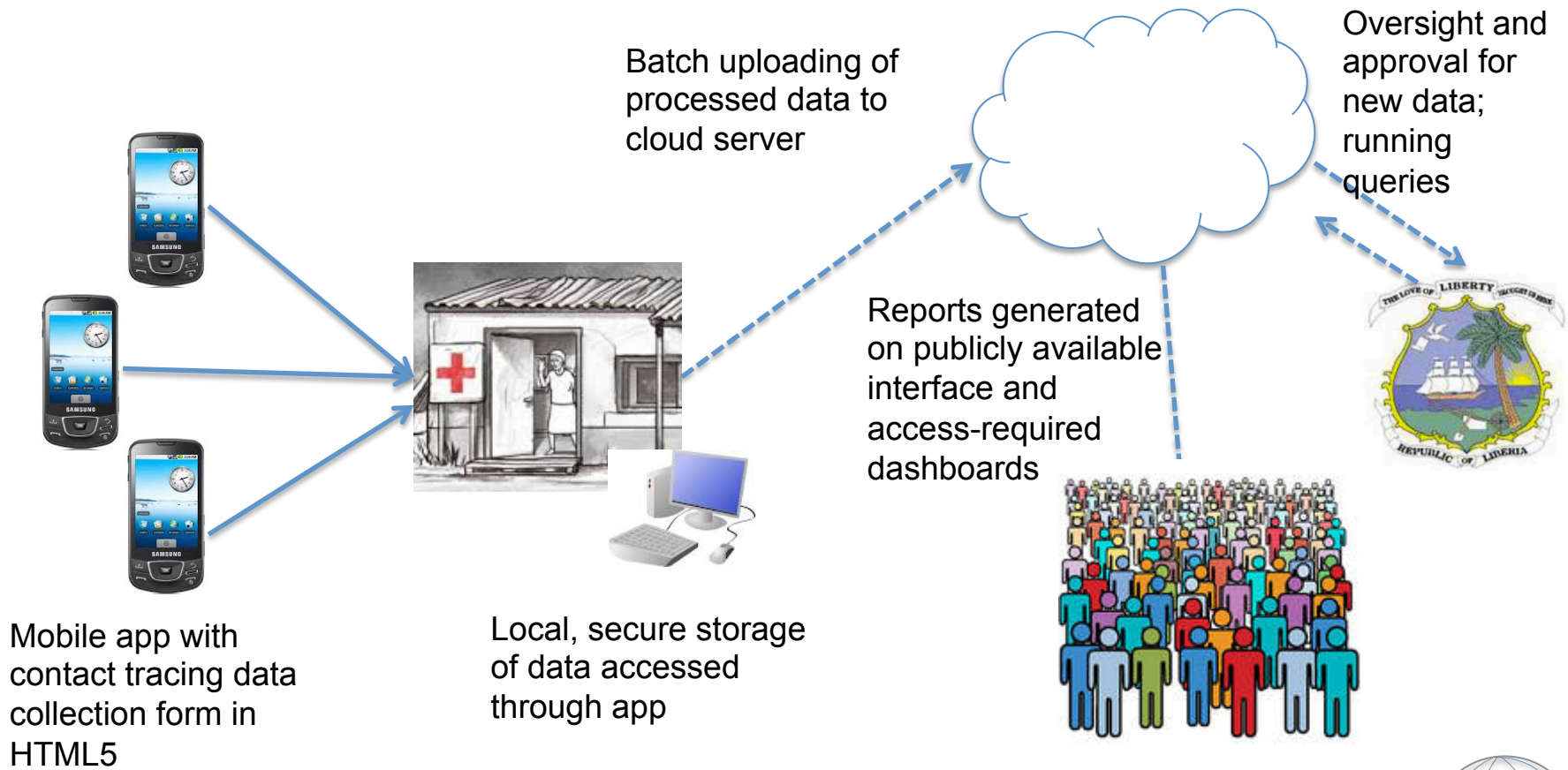
# Intervention implementation depends on active surveillance and rapid response.

- ❖ Community-based case finding efforts were organized into 17 districts.
- ❖ CIDMA was asked by MoHSW to develop a system for improving the collection of information by the community workers.



Source: NY Times

CIDMA developed a mobile phone app to make the data accessible to decision makers in real time through a cloud-based storage system and dashboard.



# Informing models with field experience allows for improved realism and relevance to policy makers and implementers.

- ❖ Our on-the-ground experience was very informative for us in helping to strike an appropriate balance between epidemiological realism and mathematical tractability.



Source: Heidi Vogt/Wall Street

# Thank you

- ❖ Multi-scale Modeling Consortium, MIDAS, NSF RAPID.
- ❖ Collaborators at Yale (Martial Ndeffo Mbah, Abhishek Pandey, Laura Skrip, Dan Yamin, Jeff Townsend, Chad Wells, Katie Atkins) Liberian Ministry of Health (Mosoka Fallah, Tolbert Nyenswah), UT Austin (L. Meyers, S. Bellan)

