HARVARD T.H. CHAN SCHOOL OF PUBLIC HEALTH

# Integrating information for better decisions at the earliest stages of outbreaks

Marc Lipsitch

Preventing Patient Zero

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CENTER *for* COMMUNICABLE DISEASE DYNAMICS

# Design surveillance for detection, but recognize that other systems needed for other purposes


A portfolio of specialized instruments, designed for different purposes

- Detection
- Individual assessment/treatment
- Characterizing severity, countermeasure effects
- Burden

Lipsitch … Grad *Frontiers in Public Health* 2024

# Early days of (possible) pandemics: immense uncertainty

- Is it a real threat?


- Is it severe?

July 2009: 3000x uncertainty about the case-fatality ratio for new pandemic flu strain

(truth turned out to be on the low end)

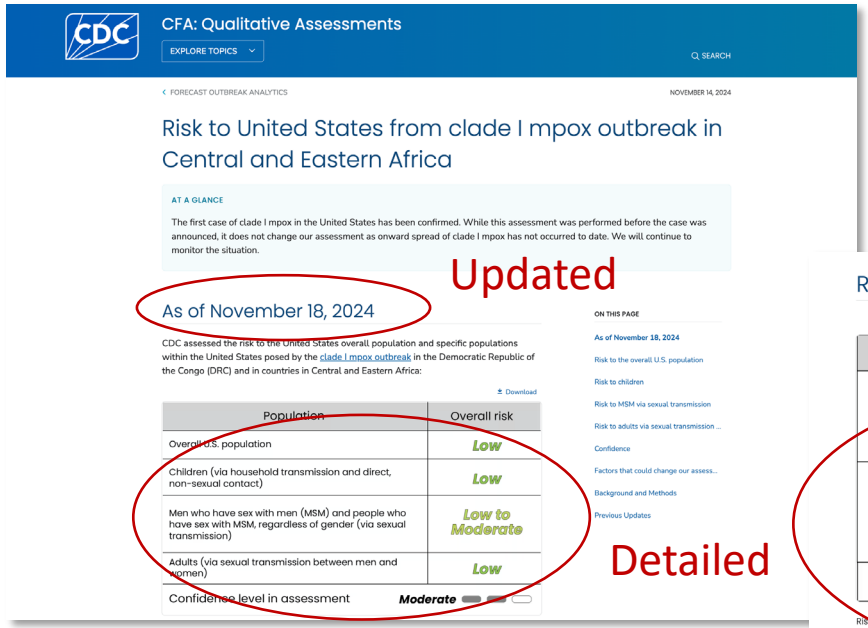
Wilson & Baker, *Eurosurveillance* 2009
Garske, *BMJ* 2009

# "Model-based thinking"

- Disease transmission modelers think quantitatively about disease transmission, which is not intuitive to everyone
- The best modelers also understand where data come from, what aspects may be missing or biased, and what questions to ask to assess key components of risk

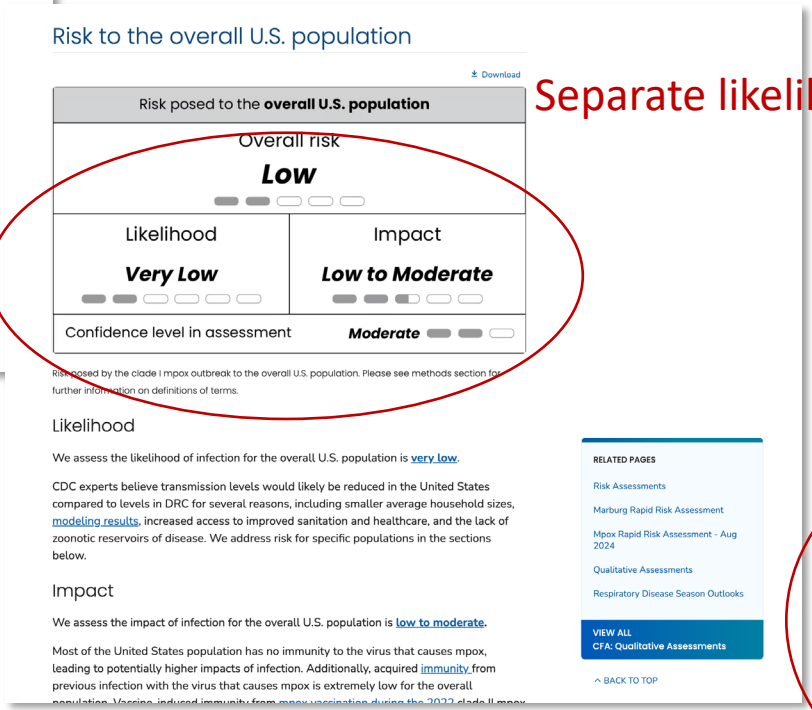
- They have empirically been very helpful in designing surveillance systems (eg UK-REACT and ONS CIS) and contact tracing as threat grows

# Model-based thinking in action

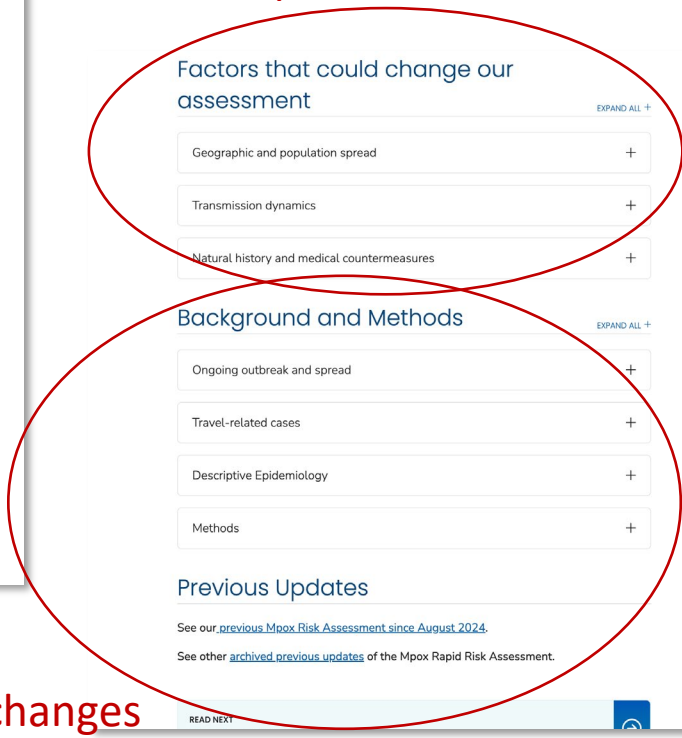



Updated

Detailed



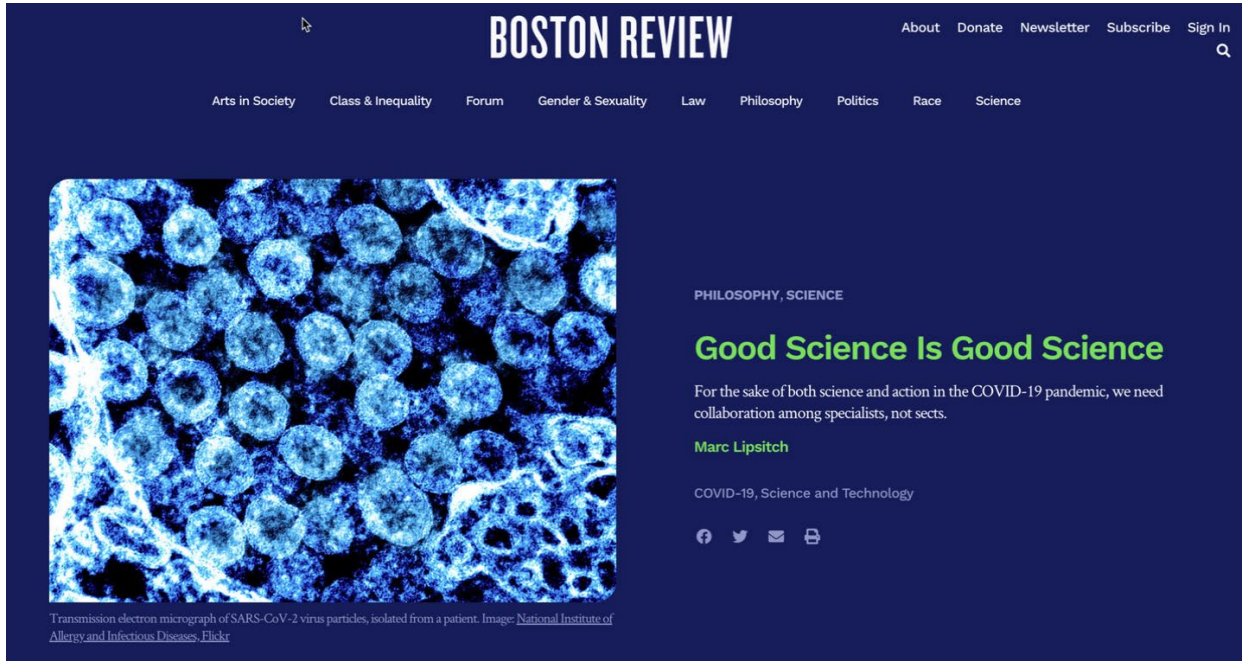

Separate likelihood and impact




Explain rationale for view and changes

# Interdisciplinarity

- Multiple types of evidence inform the hugely complex issue of how to address a potential or actual pandemic
- Intense uncertainty triggers retreat to disciplinary prejudices when the opposite is needed
- Rapid decisions are required so assembling evidence from multiple disciplines is essential
- Examples: airborne transmission and masks



# Off-ramps

- Rapid response is essential when uncontrolled spread is a possibility
- Runs risk of over-response and/or of a response that outlasts its usefulness
- Avoiding this pitfall:
  - Strengthen surveillance, analytics and modeling to provide a credible evidence base for changing recommendations
  - Design automatically triggered reviews of policy and guidance -- ”off-ramps”
  - Put public releases of data on a regular schedule
  - Start in peacetime: condition the public to expect honesty not magical consistency from science experts