

# How Culture Collections can Assist Responses to Emerging Diseases

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# The importance of isolating pathogens

Diagnosis typically by molecular methods

(RT)-PCR & sequence analysis:

Relatively fast

Inexpensive

Reduced biocontainment

Serology:

Can detect longer window than viraemia / bacteraemia

Can miss unexpected causes

Pathogen isolation is needed to:

- Validate molecular tests
- Identify genome sequences
- Generate antibodies
  
- Develop therapeutics
- Challenge pre-clinical vaccines
- Conduct basic research into pathogenesis, transmission, vector competence
  
- Increase preparedness for future emergence

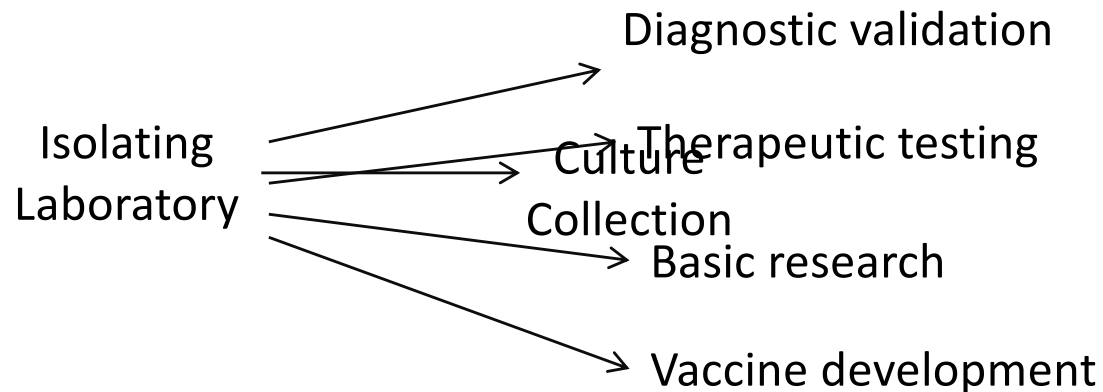


# The administrative burden of sharing

- Emergency preparedness requires many participants, not just the isolating laboratory
- Sharing biological resources often required by publishers & funders
  - Export licenses for sender
  - Import licenses for receiver
  - Dual-use regulations & permits
  - Environmental regulations for animal & plant pathogens
  - Intellectual Property rights
  - Terms & Conditions of use / onward transfer
  - Potential drift / loss of characteristics / contamination —————> reputation
  - Dangerous Goods shipping regulations & Declarations
  - Packaging requirements for IATA compliance



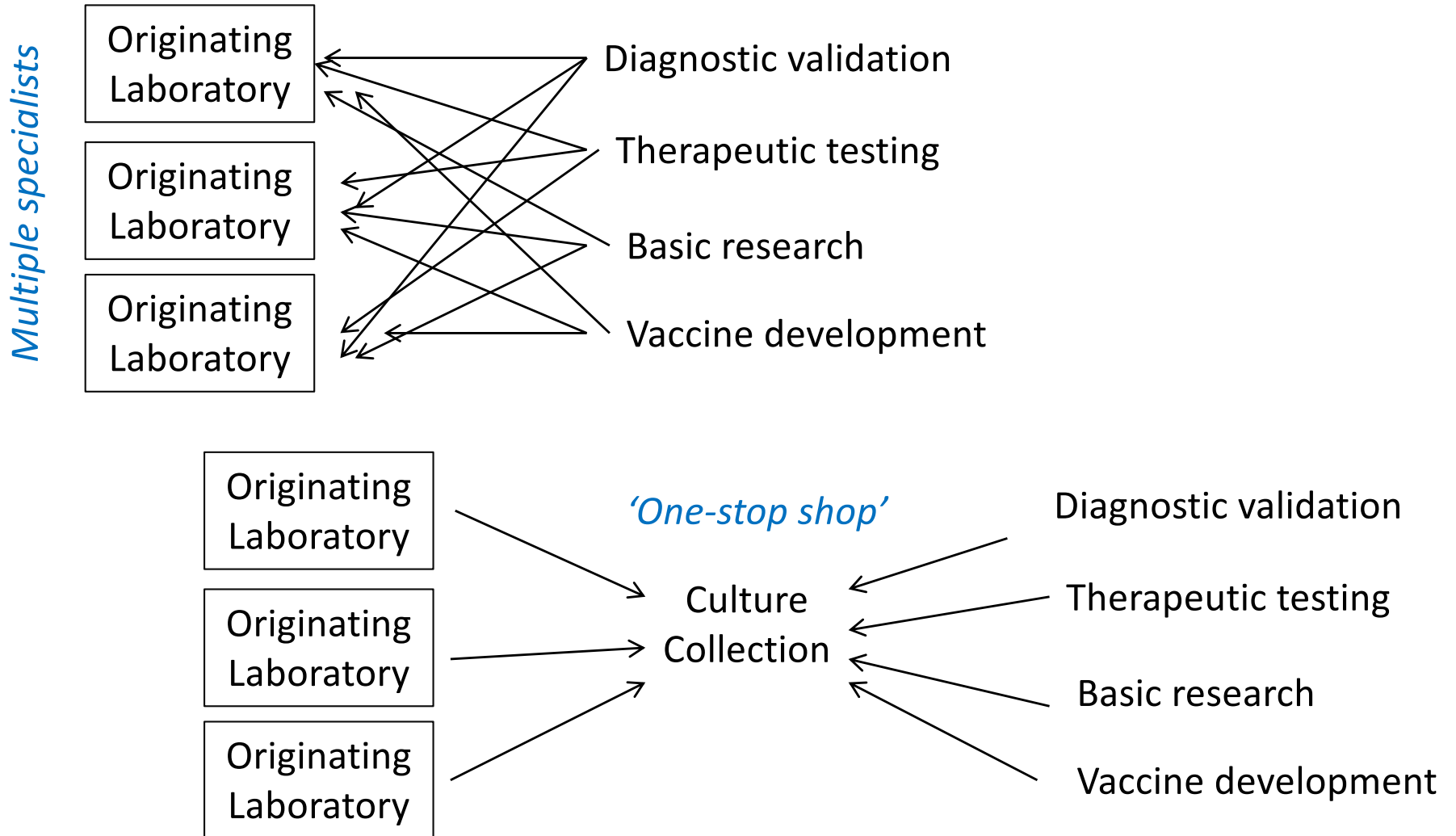
# Delegate sharing to a Culture Collection



- ✓ Logistics and dispatch systems well established
- ✓ Intellectual Property rights retained by Depositor
- ✓ Quality management systems in place to authenticate every batch



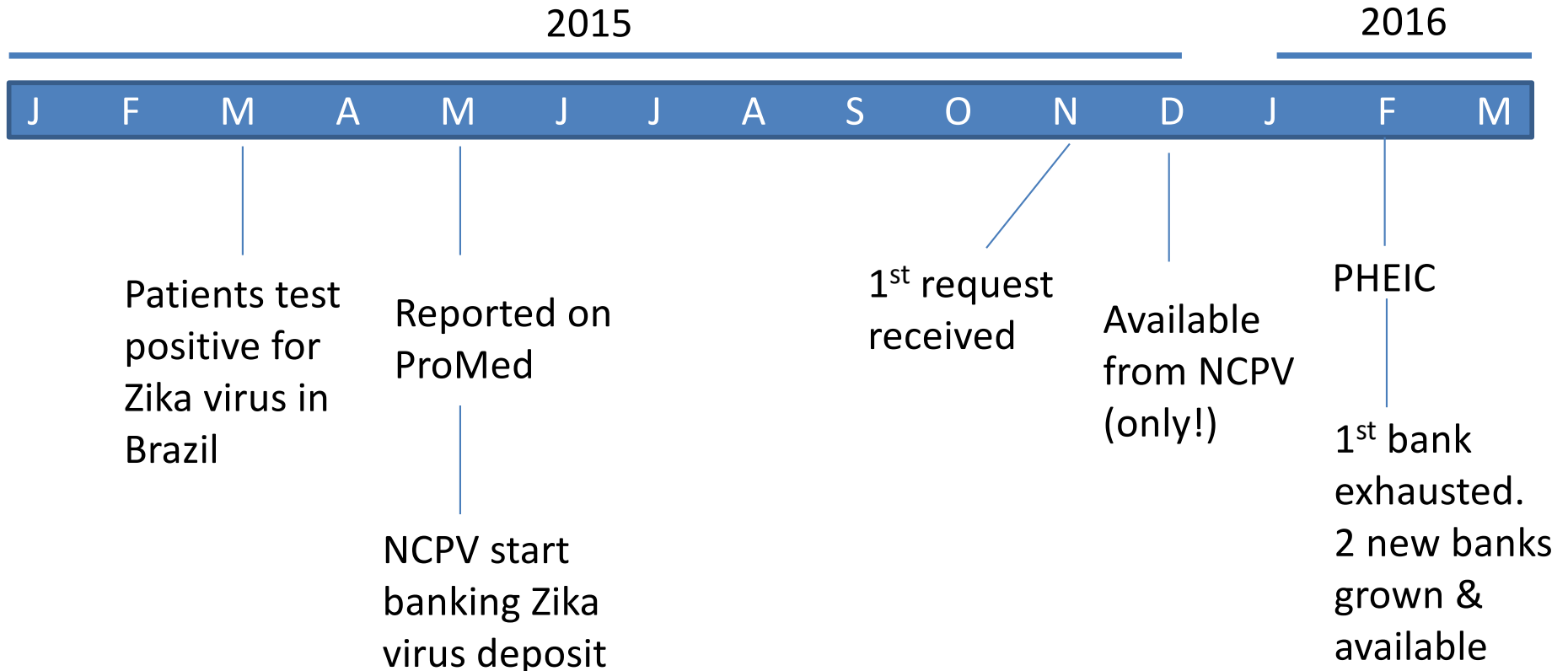
# This helps recipient researchers too



# Best to deposit *before* an outbreak

- Much preliminary administration already in place before high-throughput dispatch required
- Cryopreserved, authenticated product already prepared ready for dispatch

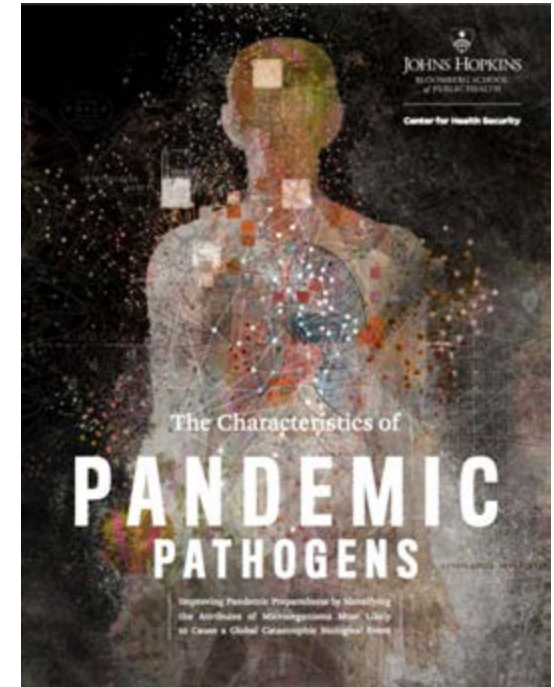
Zika virus strain MP1751 held at Porton Down since 1962. Deposited in NCPV in 2013.



# Prioritisation of pathogens

World Health Organisation Blueprint priority diseases:

- Zika
- Rift Valley fever
- MERS-CoV / SARS
- Nipah
- CCHF
- Ebola virus / Marburg virus
- Lassa fever
- Disease X



Johns Hopkins Center for Health Security study “The Characteristics of Pandemic Pathogens”:

**Respiratory RNA viruses** are *most likely* to cause a global pandemic, but don't ignore other possibilities



# Summary



1. Live pathogens are needed for preparedness and response to emerging diseases
2. Sharing of biological material is necessary, but requires a lot of administration
3. Depositing strains with a Culture Collection allows faster, more efficient sharing
4. Deposits can be made before, during or after an outbreak
5. Pandemics cannot be accurately predicted, so a broad range of pathogens should be continuously deposited, as part of ongoing surveillance





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