Covid-19 and the R&D Ecosystem

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The R&D ecosystem has been evolving....

R&D
product focused development

Preparedness R&D anticipates pathogens of concern, develops platforms, enabling science

H1N1

Ebola

CEPI
From: Keusch & Lurie, GPMB 2020
...toward better pandemic preparedness

R&D: product focused development

Preparedness R&D anticipates pathogens of concern, develops platforms, enabling science

Preparedness and response R&D leverages preparedness but prepositions science components to respond quickly

From: Keusch & Lurie, GPMB 2020
## Contrasting ecosystems for outbreak R&D

<table>
<thead>
<tr>
<th>Activity</th>
<th>US Responsible funder/ entity</th>
<th>Global Responsible funder/ entity</th>
<th>What happened during Covid-19 pandemic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enabling science activities</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Posting and curating gene sequences over time</td>
<td>GenBank</td>
<td>GISAID?</td>
<td>GISAID became de facto repository</td>
</tr>
<tr>
<td>Receiving, growing and sharing virus samples with laboratories</td>
<td>CDC/NIAID</td>
<td>none</td>
<td>When China did not share samples, Australia led effort once case identified there</td>
</tr>
<tr>
<td>Collection and dissemination of biological reference material</td>
<td>NIAID/CDC</td>
<td>none</td>
<td>Multiple ad hoc, unstandardized efforts</td>
</tr>
<tr>
<td>Animal model development</td>
<td>NIAID</td>
<td>none</td>
<td>Limited global resources Demand &gt;&gt;supply</td>
</tr>
<tr>
<td>Epidemiology</td>
<td>CDC</td>
<td>Country public health agencies; GOARN/WHO</td>
<td>Data collection often haphazard, poorly standardized; political interference in response</td>
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## Contrasting ecosystems for product development

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<td><strong>Product development</strong></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Diagnostics</td>
<td>CDC/NIH/BARDA</td>
<td>None/FIND?</td>
<td>Germany develops first NAT-testing, shared by WHO; remainder of tests slow to develop and scale; FIND and Global Fund part of ACT-A</td>
</tr>
<tr>
<td>Therapeutics</td>
<td>NIAID/BARDA</td>
<td>none</td>
<td>OWS in the US Therapeutics accelerator started by Gates/Wellcome/Mastercard; now part of ACT-A</td>
</tr>
<tr>
<td>Vaccines</td>
<td>NIAID/BARDA</td>
<td>CEPI?</td>
<td>OWS in the US CEPI became 'go-to' entity; China, Russia, others supported internal candidates; part of ACT-A/COVAX</td>
</tr>
<tr>
<td>Manufacturing scale up and innovation</td>
<td>BARDA</td>
<td>none</td>
<td>OWS in the US Still fundraising to finance globally</td>
</tr>
<tr>
<td>Advanced market commitment to purchase</td>
<td>BARDA</td>
<td>none</td>
<td>OWS in the US ACT-A/COVAX formed to finance on behalf of countries</td>
</tr>
<tr>
<td>Procurement</td>
<td>BARDA</td>
<td>none</td>
<td>OWS in the US Numerous bilateral deals; 180 countries join COVAX</td>
</tr>
<tr>
<td>Allocation, distribution and administration</td>
<td>CDC, state/local</td>
<td>none</td>
<td>OWS/USG in the US WHO, UNICEF through COVAX, country public health agencies</td>
</tr>
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</table>
Critical science preparedness gaps in the US

- Turning clinical observations into evidence
- Standing clinical trial networks and protocols for:
  - Clinical care
  - Therapeutics
  - Other innovation
- Inequality and racism
- Protecting of science from politicization
Evolving to an end-to-end global R&D ecosystem

Agree on core enabling science needs

Preposition funded hubs on each continent
  • Advances equity
  • Improves global research capacity

Develop pooled global research response fund with immediately releasable $$
  • Governance
  • Triggers
  • Preparedness and practice

Develop global strategy end-end for financing a global pandemic science preparedness and response
Can we get to the desired end state before the next pandemic?

R&D
product focused development

Preparedness R&D
anticipates pathogens of concern, develops platforms, enabling science

Preparedness and response R&D
leverages preparedness but prepositions science components to respond quickly

End-to-end preparedness and response ecosystem
Basic science through product development, to manufacturing and delivery; comprehensive public health response, fully financed

CEPI
A Foundation for the Future?

ACCESS TO COVID-19 TOOLS (ACT) ACCELERATOR
A Global Collaboration to Accelerate the Development, Production and Equitable Access to New COVID-19 diagnostics, therapeutics and vaccines

DIAGNOSTICS
- The Global Fund
- FIND

THERAPEUTICS
- Wellcome
- Unitaid

VACCINES (COVAX)
- CEPI: Development & Manufacturing
  Led by CEPI, with industry
- Gavi: Procurement and delivery at scale
  Led by Gavi
- WHO: Policy and allocation
  Led by WHO

Key players

Under Construction