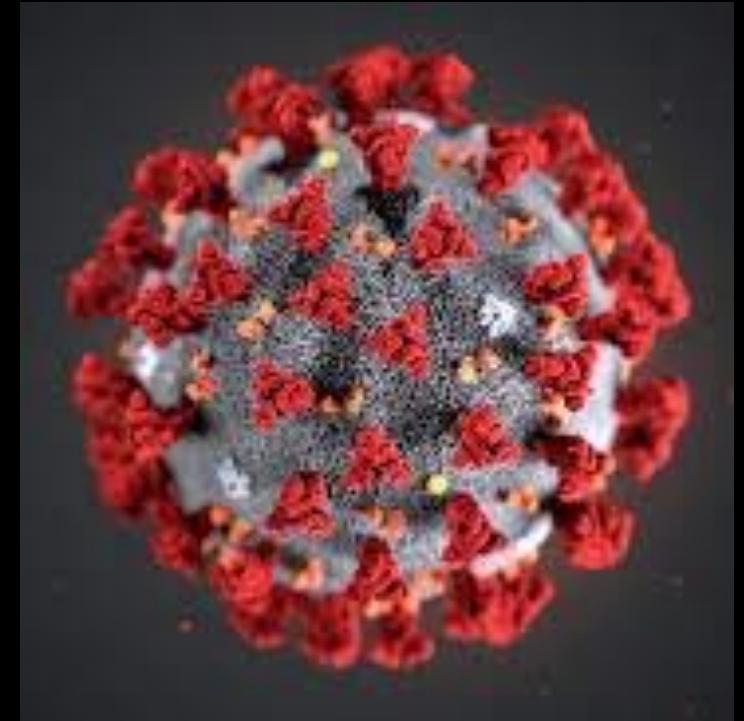# Evidence and Value:
Enhancing Strategic Investment in Epidemic Preparedness & Response

Roadmap

- [ ]   Setting priorities among key gaps identified by JEE
- [ ]   Toward a list of "Best Buys" for global health security in LMICs
- [ ]   Generating the right evidence to inform strategies
- [ ]   Minimising losses to other key health priority areas

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Ideas to Action: Independent research for global prosperity

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What COVID-19 Should Teach Us About Smart Health Spending in Developing Countries
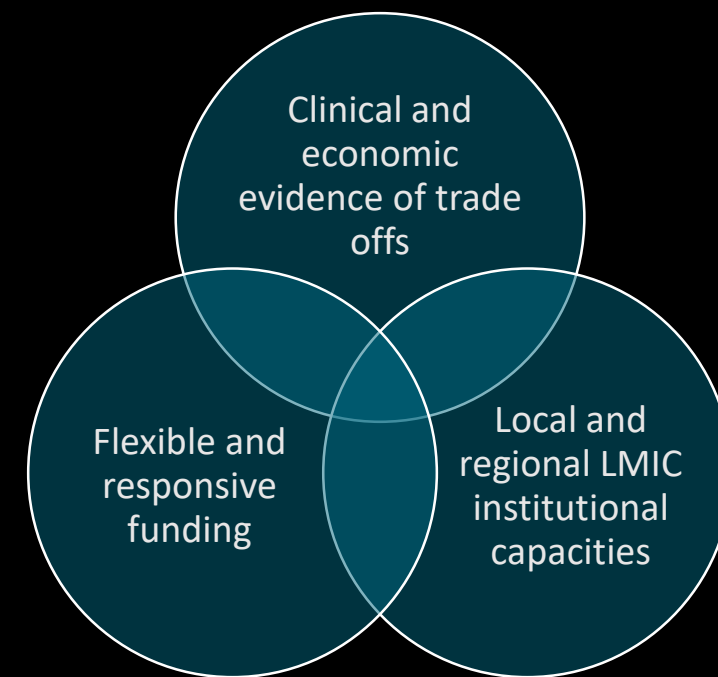
MARCH 5, 2020

Kalipso Chalkidou and Carleigh Krubiner

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With thanks to additional authors: Amanda Glassman (Center for Global Development), Adrian Gheorghe (Imperial College London), Francis Ruiz (Center for Global Development & Imperial College London), Tony Culyer (University of York), Ryota Nakamura (Hitotsubashi University), Yot Teerawattananon (HITAP), Edwine Barasa (KEMRI), and Mahlet Kifle Habtemariam (Africa CDC).

1. Commitments to strengthening capacity for systematically applying evidence to health policymaking in ways that mutually support ongoing progress toward Universal Health Coverage *and* Global Health Security;

2. Generating and using evidence that is fit-for-purpose and adaptable for local and regional contexts in the face of new epidemic or pandemic threats; and

3. Careful consideration of effectiveness, cost-effectiveness, and equity when comparing health investments and interventions—for routine healthcare provision and in combatting emergent infectious diseases—recognising that there are always opportunity costs and degrees of uncertainty in the evidence.

Clinical and economic evidence of trade offs

Flexible and responsive funding

Local and regional LMIC institutional capacities

"Best Buys" for Global Health Security?

> "Existing studies suggest that hospital quarantine, vaccination, and usage of the antiviral stockpile are highly cost-effective, even for mild pandemics. However, school closures, antiviral treatments, and social distancing may not qualify as efficient measures, for a virus like 2009's H1N1 and a willingness-to-pay threshold of $45,000 per disability-adjusted life-year.

STATE OF THE EVIDENCE:

- Little evidence on **cost-effectiveness** of preparedness and response interventions
    - Some studies on H1N1 Flu interventions, with mixed findings, largely based on HIC settings
    - In the last 10 years, PubMed search only returned 48 results for priority setting + outbreaks:
        - No actual HTA...
        ...just effectiveness
        - Nothing in LMICs
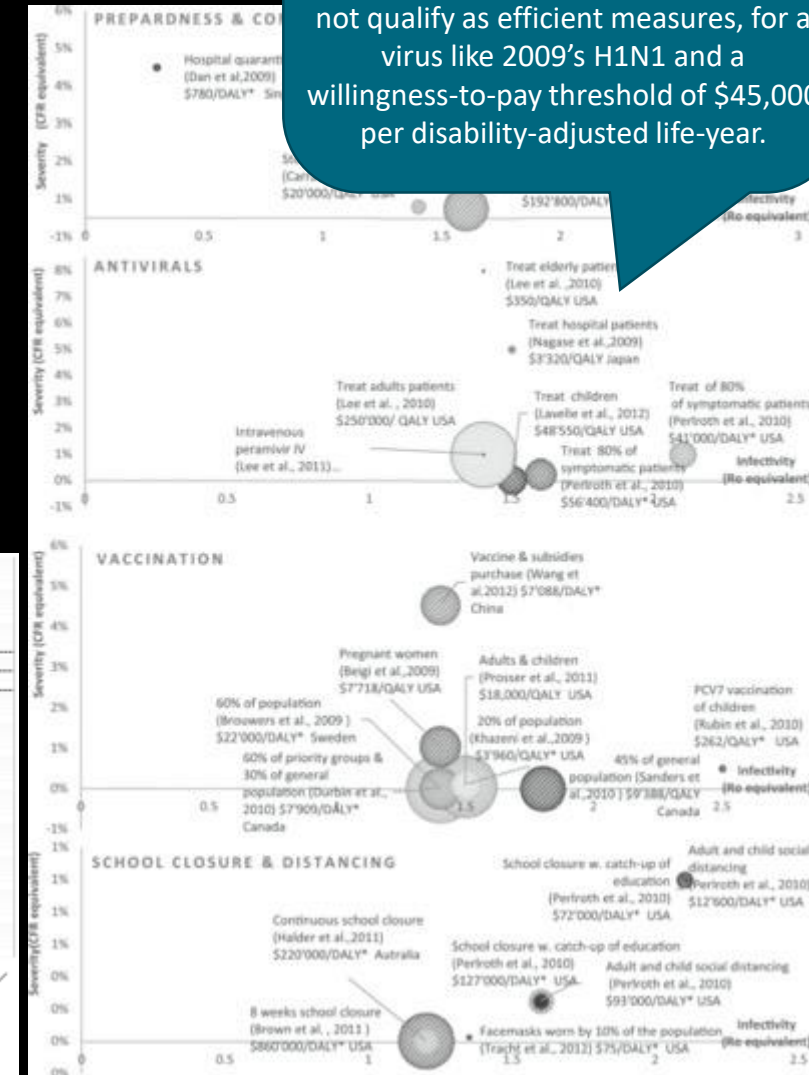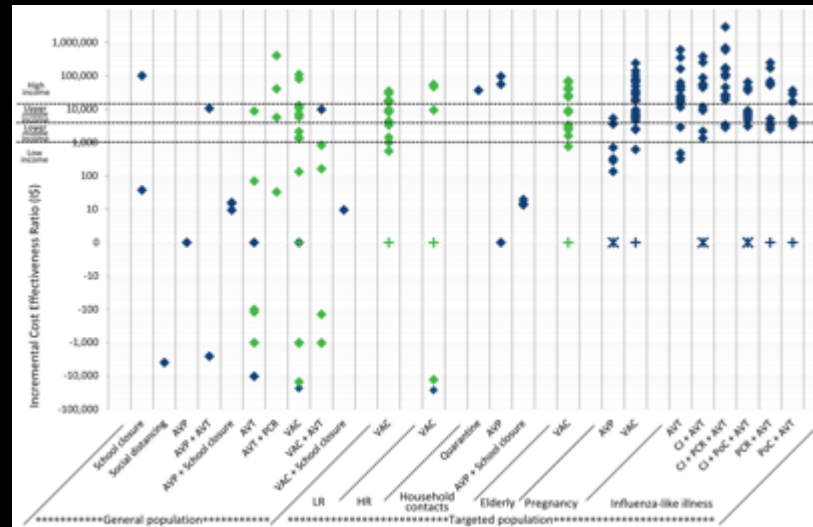
"Best Buys" for Global Health Security? Ranking by value (influenza)

Figure 17.5 Health Care System and Economic Costs per Death Prevented for Selected Interventions during the 2009 Influenza Pandemic
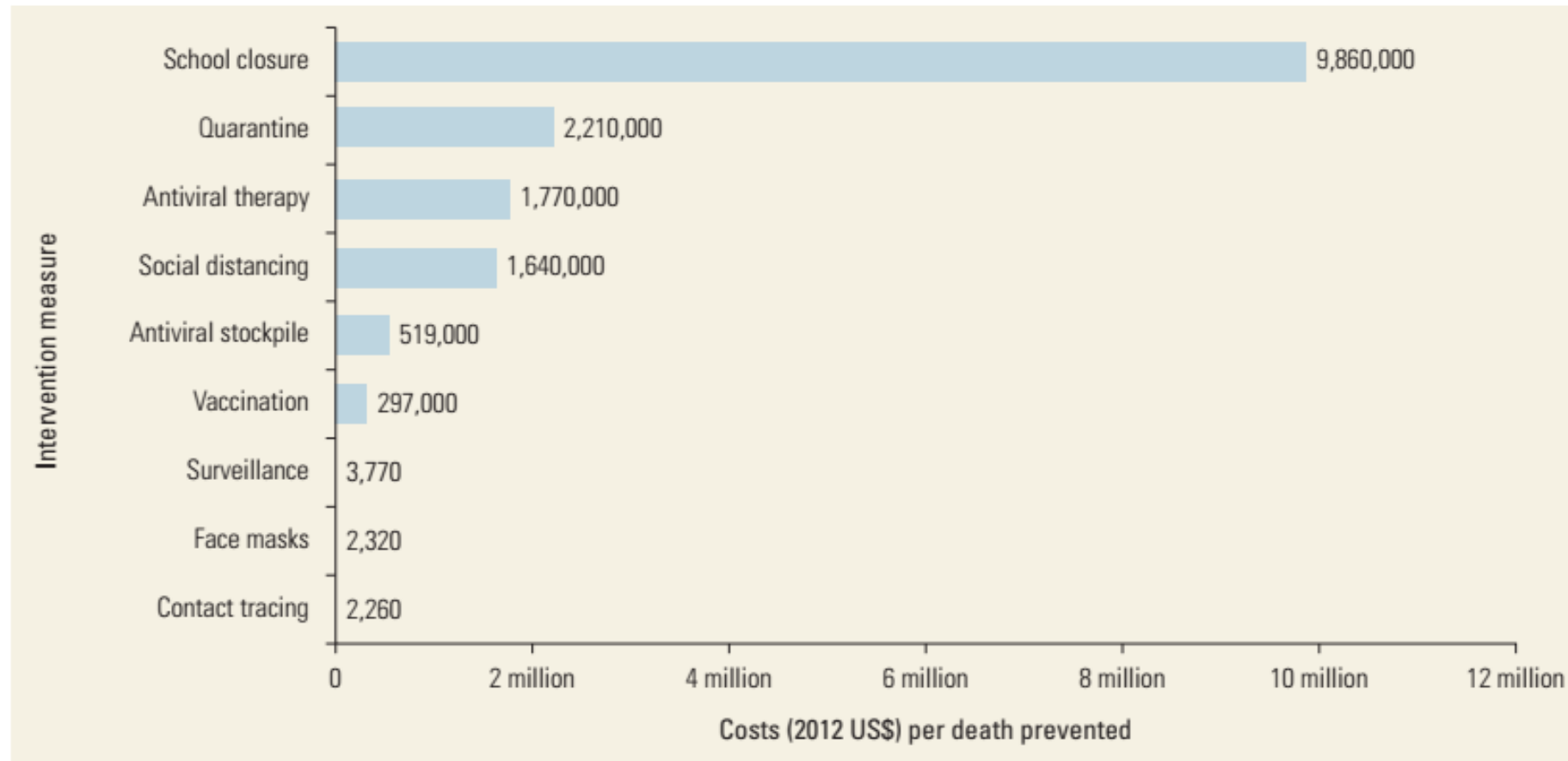

Source: Based on data from Pasquini-Descomps, Brender, and Maradan 2016.
Note: Includes studies from Australia, Brazil, Canada, China, Singapore, Sweden, the United Kingdom, and the United States.

Madhav et al: Pandemics: Risks, Impacts and Mitigation. DCP3 Volume 3, Chapter 17:

"Best Buys" for Global Health Security? Context matters

Figure 17.6 Cost Utility of Antiviral Stockpiling for Pandemic Influenza Preparedness, by Share of Population Covered and Country Income Level, 2011


Costs (2012 US$) per death prevented

- 10% of population covered
- 20% of population covered
- 30% of population covered
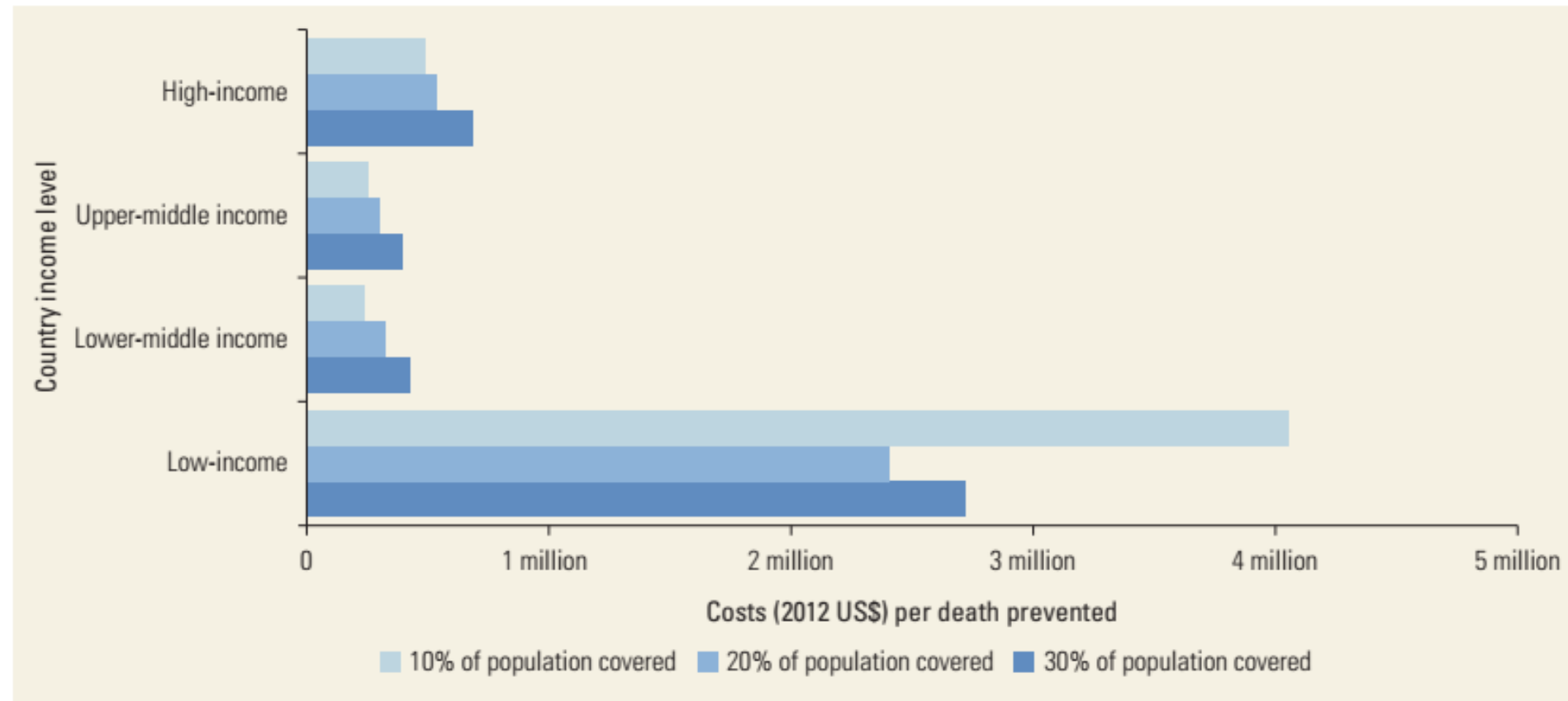
Source: Based on data from Carrasco and others 2011.

Note: Includes data from one low-income country (Zimbabwe), three lower-middle-income countries (Guatemala, India, and Indonesia), two upper-middle-income countries (Brazil and China), and four high-income countries (New Zealand, Singapore, the United Kingdom, and the United States).

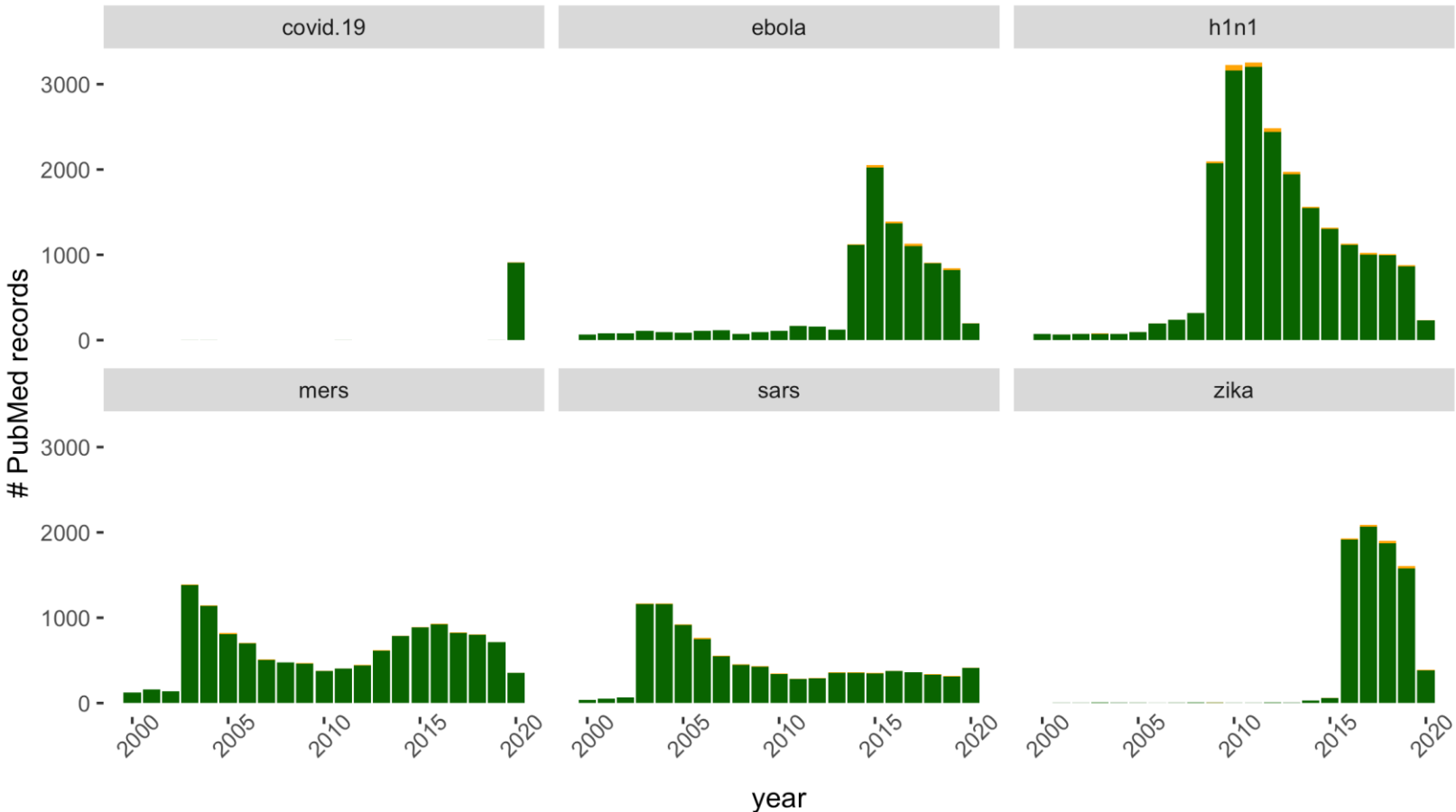Madhav et al: Pandemics: Risks, Impacts and Mitigation. DCP3 Volume 3, Chapter 17:

Knowledge production (1): countries
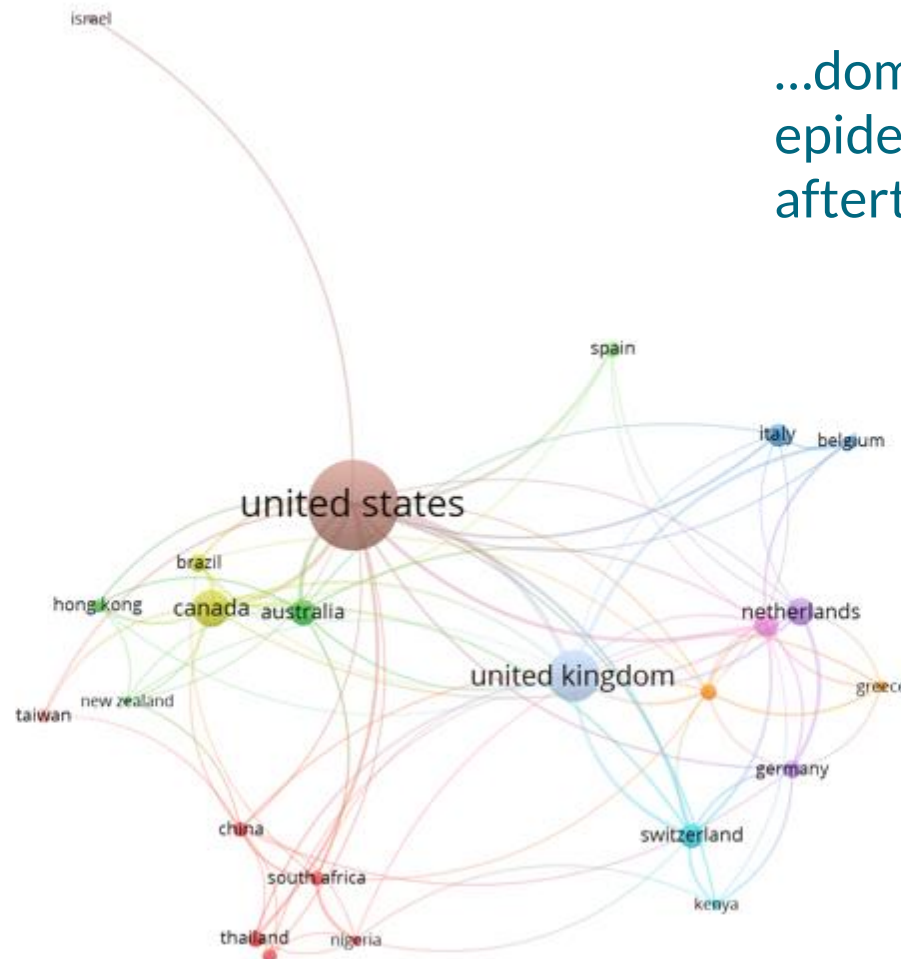
...dominated by Northern institutions and by epidemiological modelling with economics an afterthought.

Knowledge production (2): seasonality

PubMed records of major international outbreaks 2000-2020

Types of records
- Records that don't mention priority-setting terms
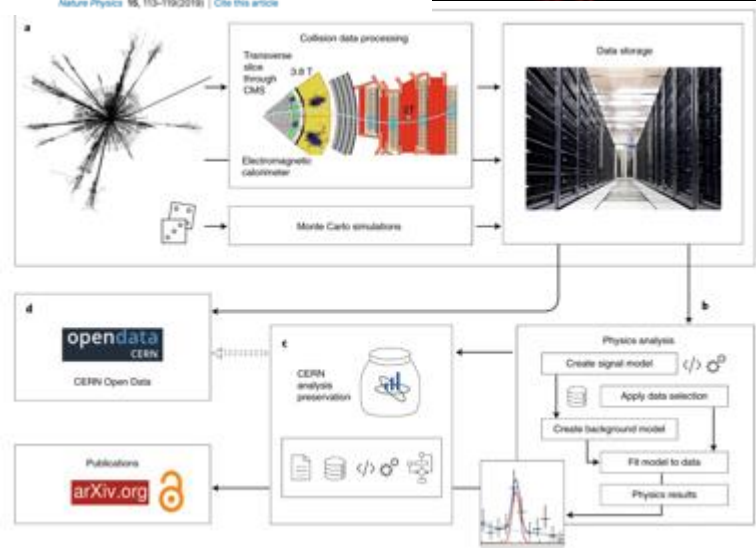- Records that mention priority-setting terms

Note: PubMed searched on 16 March 2020 with 'ebola', 'zika', 'mers', 'sars', 'h1n1' and 'covid-19' in All Fields. Priority-setting terms searched with AND for each disease term in All Fields: ('cost-effectiveness' or 'cost-benefit' or 'priority-setting' or 'decision-making' or 'economic evaluation' or 'health technology assessment' or 'opportunity cost' or 'net benefit')
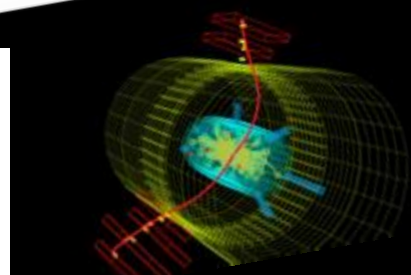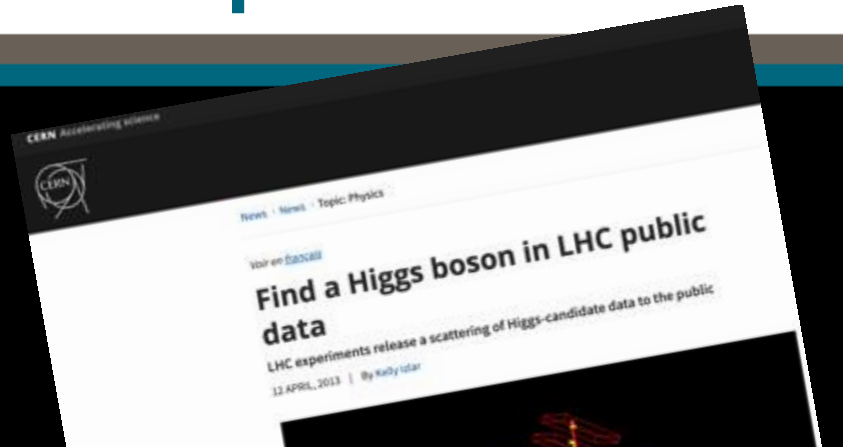
- Research interest in outbreaks tends to diminish quickly (1-2 years) after the crisis

- Extremely limited evidence on making decisions, setting priorities, cost-effectiveness of interventions during outbreaks (barely visible on bar charts to left)

- In the Tufts Medical Centre cost-effectiveness analysis registry of 5500+ global health interventions, only 11 and 13 interventions on epidemics and disease outbreaks, respectively

Medical epi and modelling way behind other disciplines in sharing

Financing Flows:
SWAP and HSS combined are 14.35% of all DAH
Pandemic preparedness less than 1% of all DAH
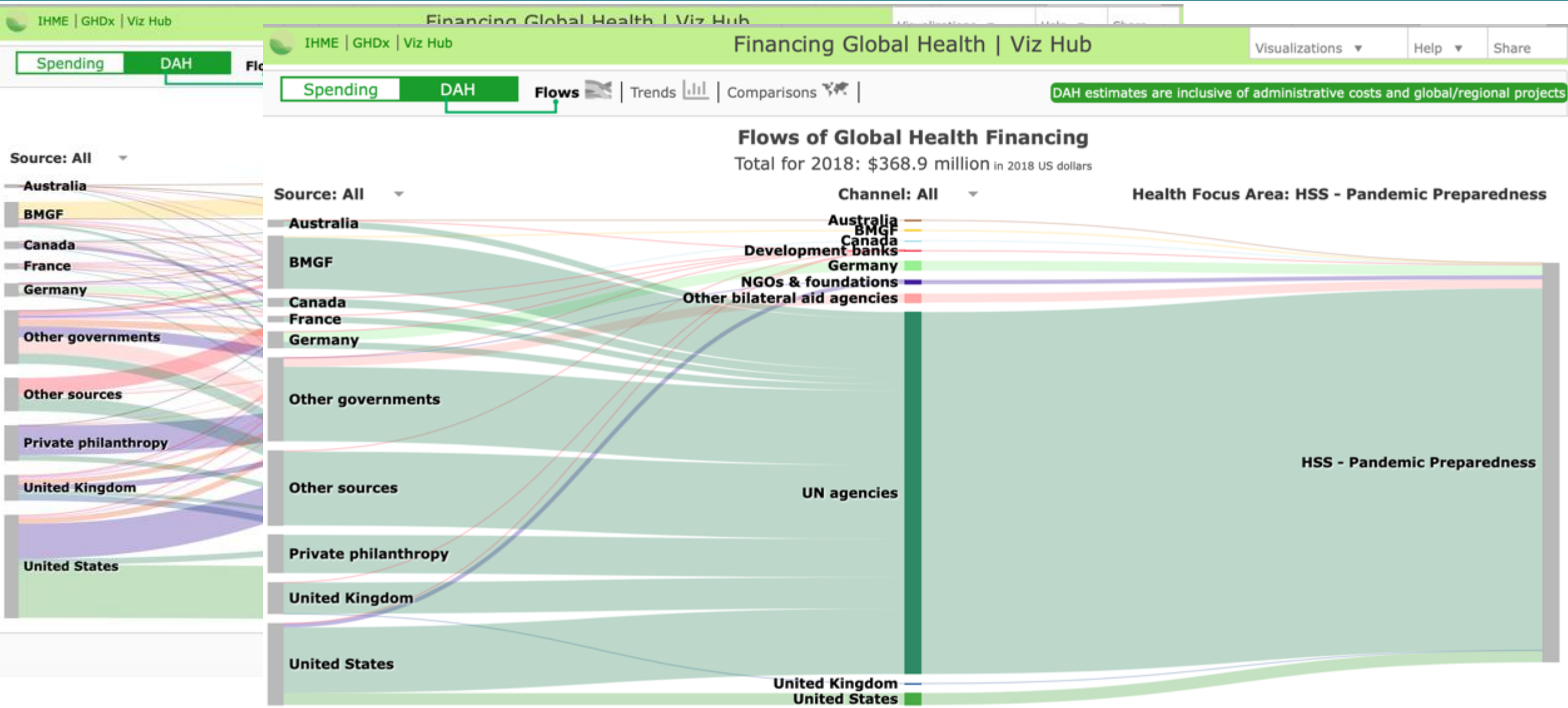
When you can't cost it reliably, you can't budget for it nor finance it: Nigeria…

- NAPHS includes FEPT

- IHR includes procurement of medical countermeasures

- Costing JEE takes countries an average of a year to complete (when they do)

- General emphasis on commodities (ideally DP funded) than local HSS/HRH/facilities

	WHO NAPHS Costing Tool (USD)	IHR Costing Tool (USD)	PACT Tool (USD)
Recruit, enroll, and train FETP trainees	$21,419,174	–	$3,136,255
Integrated Disease Surveillance and Response (IDSR) trainings for 774 people	$3,464,328	–	–
Advocacy and resources for veterinarians	$6,817,106	–	–
Development of animal health policy and programs	$5,141,033	–	–
Total of Not-Aligned Activities	$36,841,641	–	$3,136,255
Grand Total	$37,226,226	$606,954	$3,400,623

	WHO NAPHS Costing Tool (USD)	IHR Costing Tool (USD)	PACT Tool (USD)
Procure and deploy medical countermeasures, including equipment, reagents, and medicines[a]	$26,229,508	$387,675,990	–

"Best Buys" for Global Health Security?

- Proposed resource to evaluate in real-time what investments will or are offering the highest returns – using best available evidence, local data and assumptions, and mathematical modelling
  - within and between categories of technical areas that are lagging on the JEE
  - with attention to likelihood of emergence of a particular type of threat in the country/region
  - recognizing which interventions or investments have complementary value for endemic ID threats and routine health services
- Led by health financing and PFM landscapes to allow for dynamic reallocation of resources; addressing legal constraints, absorbability and donor ringfenced budgets to accelerate execution.

"What is Working" before "What Works"

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Take advantage of natural experiments as outbreak develops and health systems react, adapt, mitigate, control.

"In HICs, learning health systems (LHS) are emerging to meet similar needs. The LHS vision aspires to engage policy makers, researchers, service providers, and patients in learning that uses and strengthens routinely collected data to conduct pragmatic, contextually appropriate research, promote rapid adoption of findings to improve quality and outcomes, and promote continuous learning."

"The research must happen in a context that allows it to be quickly implemented, and the aim is for the research to be pragmatic and be done quickly and cheaply."

Example from real world simulations in a Singaporean hospital (H1N1)

Figure 3. Incremental cost/death for 3 viruses with different alert status. Incremental cost to avert 1 additional death moving through ascending levels of alert status. Cost-effectiveness 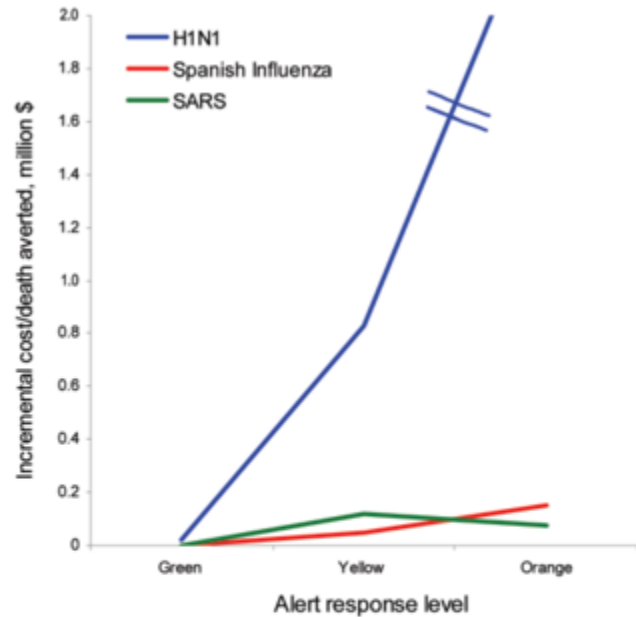increases exponentially for pandemic (H1N1) 2009 while maintaining an almost linear fashion for both Spanish influenza and severe acute respiratory syndrome (SARS). The incremental cost/death averted ratio is lower for Alert Orange compared to Alert Yellow for SARS.

Cost-effectiveness Analysis of Hospital Infection Control Response to an Epidemic Respiratory Virus Threat

Yock Young Dan, Paul A. Tambyah, Joe Sim, Jeremy Lim, Li Yang Hsu, Wai Leng Chow, Dale A. Fisher, Yue Sie Wong, and Khek Yu Ho.
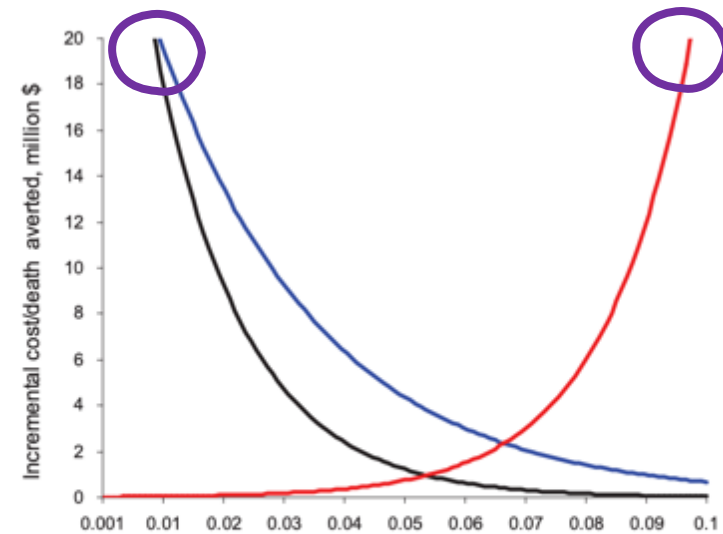
Figure 4. Sensitivity analysis for case-fatality rate (black line), % exposure reduction (red line), and secondary attack rate (blue line). Exponential graphs show poor cost-effectiveness at extremes of low case-fatality rate and low transmissibility (high % exposure reduction and low secondary attack rate).

- **Green** (316 infections, 1 death)→**Yellow** (59 infected, no deaths)→**Orange** (24 cases, no deaths) **alert**

- **$95 to prevent 1 additional infected patient and $23,600 to prevent 1 death→$3,221 to prevent an infection and $828,000 to prevent a death→$7,153 per infection prevented and a$2.5 million to infinity for 1 death averted**

- **Side effects from Orange not included in analysis – orange alert includes cancelling all elective procedures**

"The economic shockwave would be gravest when absenteeism (through school closures) increases beyond a few weeks, creating policy repercussions for influenza pandemic planning as the most severe economic impact is due to policies to contain the pandemic rather than the pandemic itself."

Learning Health Systems - Better Evidence on What Works and for How Much?

Investing in evidence generation/real-world evidence as different approaches are taken in response to COVID-19

- Leveraging current activities to learn how to improve effectiveness and efficiency of future responses to respiratory threats

- Pragmatic trials of any new countermeasures introduced in LMIC settings

Investing in platforms and capacities to enable Learning Health Systems that can also be leveraged for preparedness and response efforts

- Better Outcomes through Learning, Data, Engagement, and Research (BOLDER)

How to consider "low hanging fruit" vs. critical gaps?

Areas where incremental investment can leverage and enhance existing capacity to meet broader needs of emergent threats

- e.g., Building on countries' lab capacity for HIV testing and other endemic threats to expand the range of pathogens they can test for; sentinel surveillance sites; plan for surge capacity

Areas and interventions where significant investments are needed to protect against/mitigate worst-case outbreak scenarios

- e.g., building of new facilities /purchase of equipment for purposes of isolation and treatment

And how should domestic vs. international financing should directed to address different gaps?

Who should pay?

DP/HIC funded global public goods → Poorest nations → significant externalities (e.g. WB emergency fund?) → potential for economies of scale/scope

Co-financed investment → funding by DPs to the point where investments become locally CE → incentivise use of domestic ££ (eg IDA regional funds) → Can donors leave truly Best Buys to local ££?

Wholly domestically funded → But investment decisions dominated by commodities → Longer term HSS perspective and trade offs across non emergency

Safeguarding other key health priorities?

Epidemics and response activities can limit access to essential health services

- RMNCH: increases in maternal mortality, drops in facility-based birth, routine childhood immunization, management of diarrheal disease in <5 *(Ribacke et al, 2016)*

- HIV, TB, Malaria: estimated excess deaths attributable to disrupted care during W. Africa Ebola epidemic for these three was approx. 11,000 *(Parpia et al, 2016, DOI: 10.3201/eid2203.150977)*

- Both acute and long-lasting impacts on health system capacity and health workforce
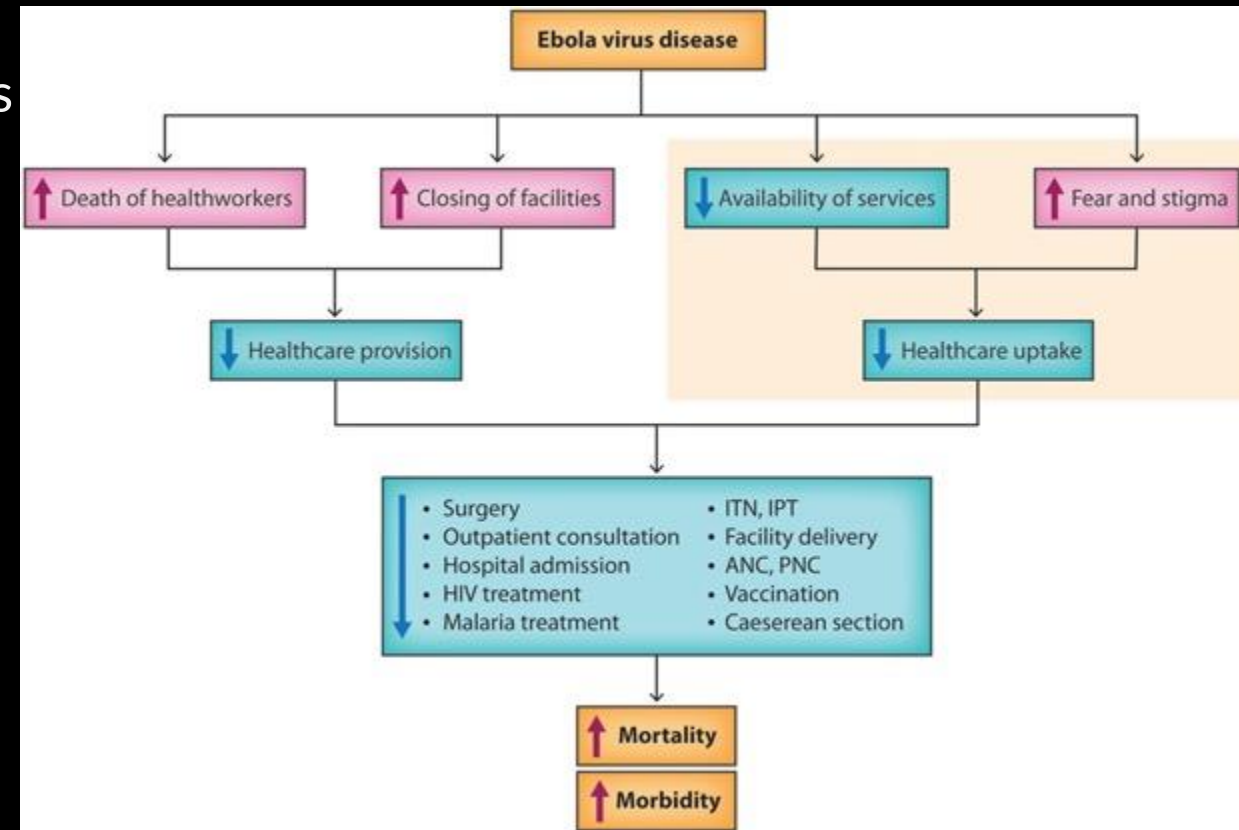
Safeguarding other key health priorities?

Need for evidence-based solutions that examine costs and benefits of reallocated resources during epidemics and various mitigation strategies

- Comparative effectiveness and cost-effectiveness of re-allocations

- Approaches to continue offering services <u>during epidemics</u> (e.g. dedicated sites/facilities for affected patients separate from standard care; different dispensing strategies for medications/FP; etc.)

- Supplemental activities <u>post-epidemic</u> to address negative impacts (e.g. immunisation catch-up campaigns when routine vaccination interrupted)

- Further consideration of role of donors / external aid in supporting key areas and objectives that are strained during outbreaks
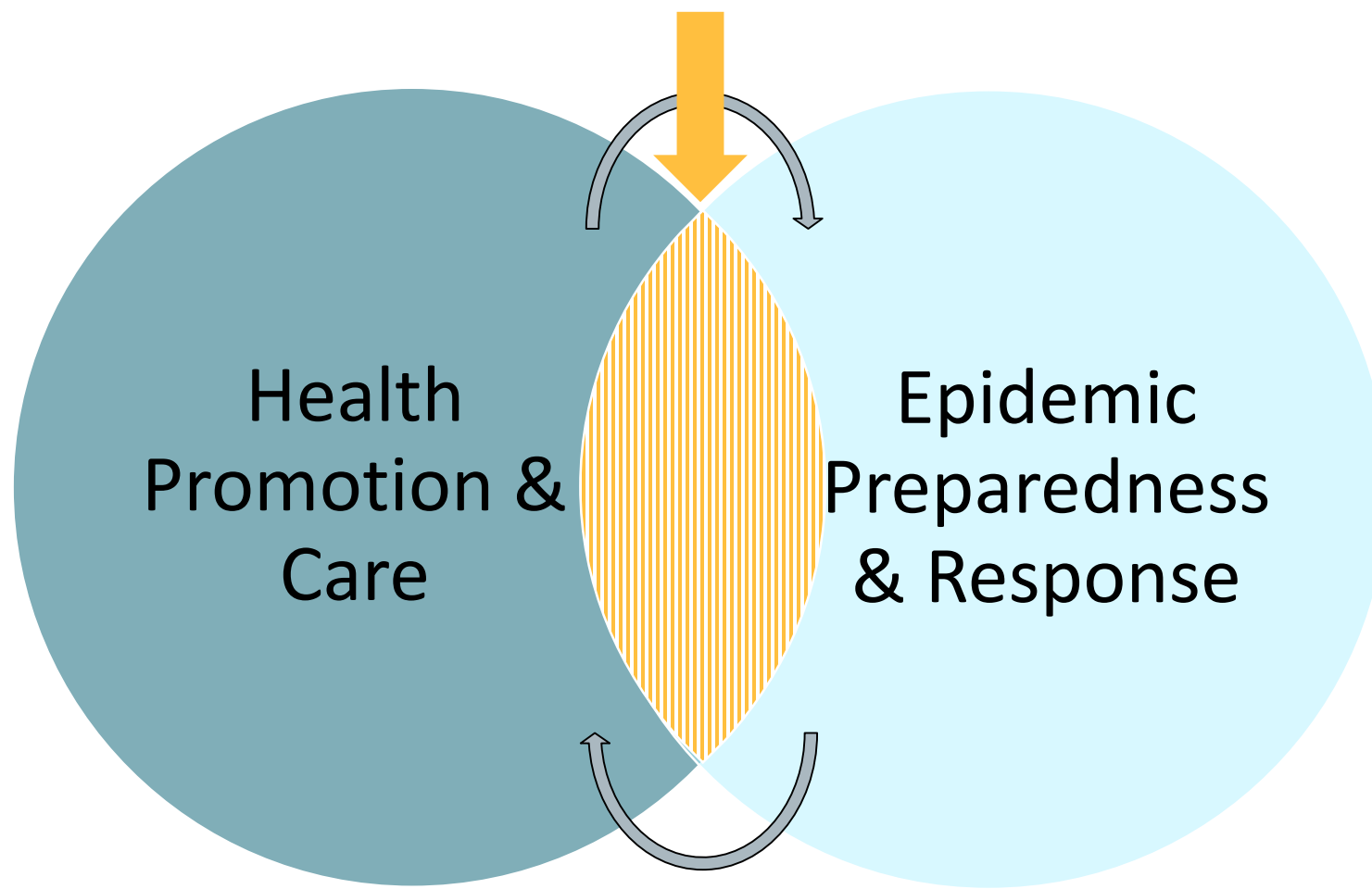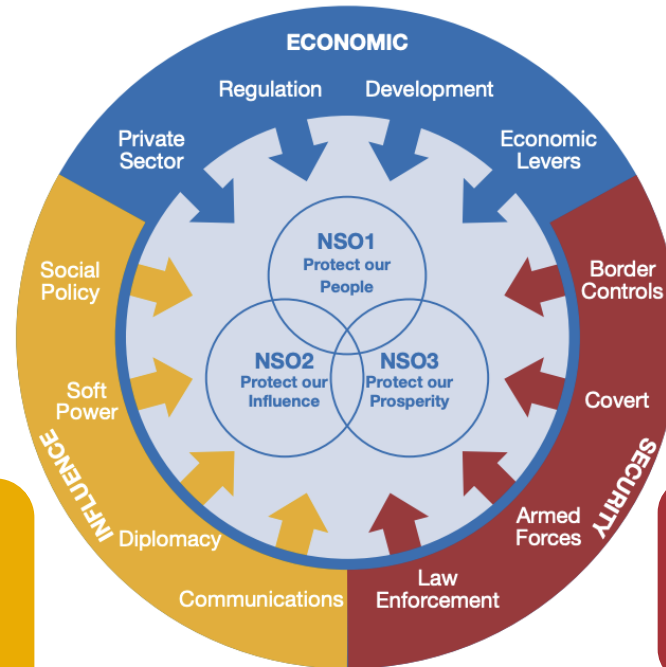
2020 HMG launches: "the biggest review of Britain's place in the world since the end of the Cold War." *Daily Telegraph Feb 2020*

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Global Health Systems:
Universal Healthcare Coverage
affordable access to care for all those in need

Global Health Diplomacy:
Knowledge sharing and cooperation, ODA, health-friendly migration & trade policies

Global Health Security:
Antimicrobial resistance, pandemics, bioterrorism

ECONOMIC

Regulation   Development

Private Sector

Economic Levers

Social Policy

NSO1
Protect our People

Border Controls

Soft Power

NSO2
Protect our Influence

NSO3
Protect our Prosperity

Covert

INFLUENCE

Diplomacy

Armed Forces

Communications

Law Enforcement

SECURITY

Principle: "To deploy security, economic and influence capabilities to protect, promote and project our national security, economic and influence goals."

Adapted from National Security Capability Review, 2018

Next steps: immediate and post-outbreak

- Include global health (security, diplomacy, systems) in ongoing HMG integrated review

- <u>Learn</u> from current outbreak and <u>prepare</u> for the next...
  - **"What is Working"** rather than **"What Works"** ("Best Buys") to account for dynamic effects and fast changing realities. Support real-time efforts to measure comparative effectiveness and cost-effectiveness of interventions coupled with a quick feedback loop.

  After the fact...
  - Produce policy brief/note with menu of options for adapting and integrating HTA-type processes for outbreak preparedness, response and post-epidemic rebound mechanisms in LMICs (leveraging iDSI's and others' experience) to propose regional solutions in SSA, S. Asia
  - Start planning the health system rebuilding process – including institutions for priority setting (e.g. what is the evidence for 'best buys' for rebuilding HS disrupted by shocks?) including resources for **Best Buys** commissioning, updating, adapting, and acting on locally

Next steps: post-outbreak

- Sponsor resource(s) for Best Buys
  - EvidenceAid for pandemic preparedness spanning clinical, epi/modelling, behaviour and economic evidence
  - Modelling and data sharing (ongoing) platform with parallel sustained capacity building effort (AU CDC, NCDC, SSA Unis)
  - Inform the uses of response and preparedness financing available from global institutions incl. **World Bank**, **WHO** (and proposed GHS Challenge Fund *in future*)

- Beef up processes and Institutions for commissioning and using Best Buys esp in light of aid transition
  - Africa CDC and hubs on global public good analyses using HTA methods and process
  - Local contextualisation through priority setting processes in countries

- Commission baseline assessment(s): what is currently prioritised and funded and why (not)? Which Best Buys/cost saving interventions are included in IHR/NAPHSs?
  - What is the process followed for prioritising, costing and budgeting for and then financing preparedness investments?
  - What can Covid19 teach us? (e.g. responses + sequencing + financing source to Covid19 in LMICs mapped against evidence base; what is the decision process (post outbreak deep dives)

Thank you

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