



# COVID-19: insights gained from the global pandemic



Giuseppe Ippolito

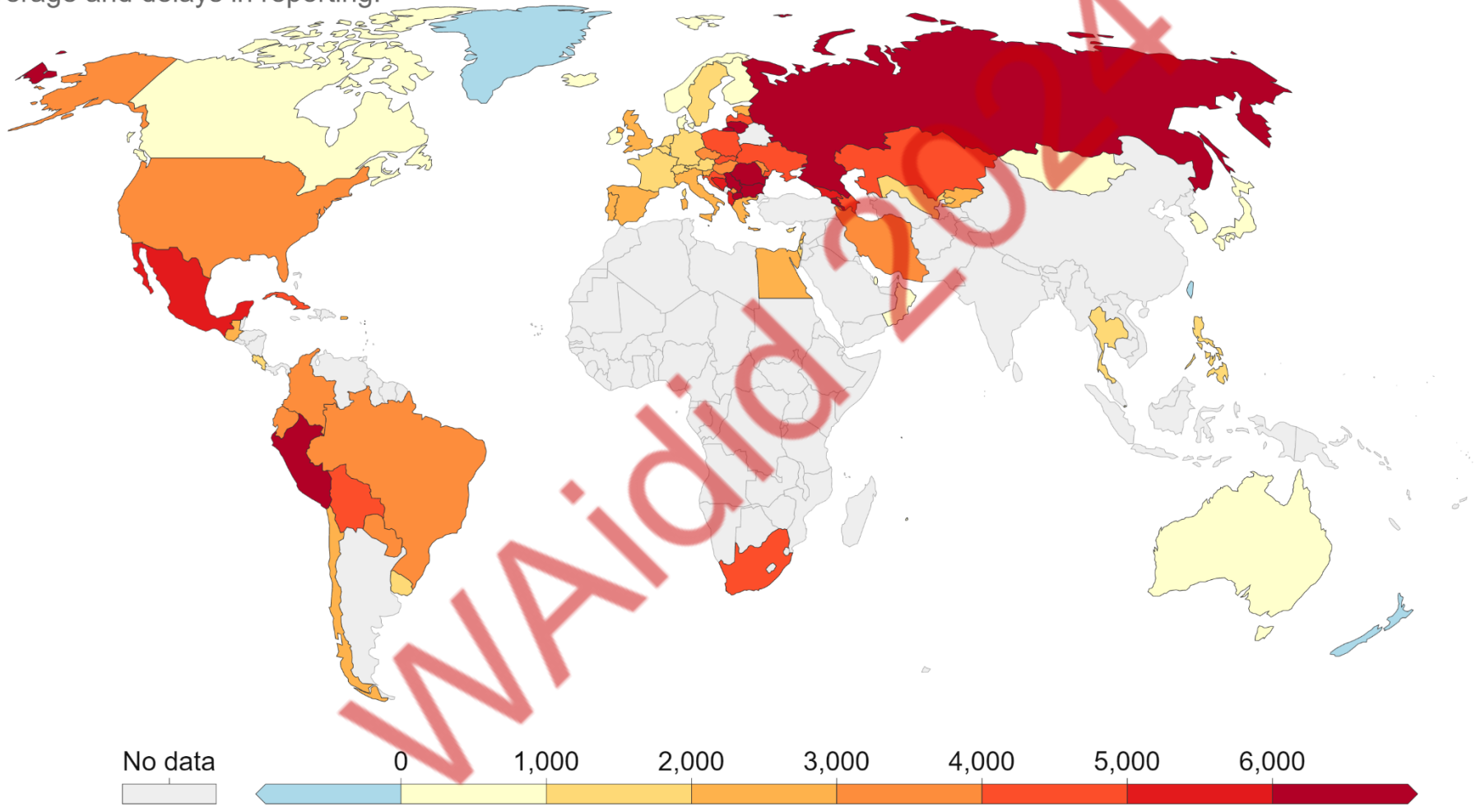
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- The views and opinions expressed in this presentation are those of the speaker and do not necessarily reflect the views or positions of any entities he represent or represented.
- The speaker has no conflict of interest to declare

# Excess mortality: Cumulative number of deaths from all causes compared to projection based on previous years, per million people, May 31, 2022

The cumulative difference between the reported number of deaths since 1 January 2020 and the projected number of deaths for the same period based on previous years. The reported number might not count all deaths that occurred due to incomplete coverage and delays in reporting.



Source: Human Mortality Database (2022), World Mortality Dataset (2022)

OurWorldInData.org/coronavirus • CC BY

Note: Comparisons across countries are affected by differences in the completeness of death reporting. Details can be found at our Excess Mortality page.

Hindsight is the best  
insight to foresight



Learn from your past mistakes  
to avoid making new ones.

# Have we learned anything?

[The Lancet Infectious Diseases](#)



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COVID-19 lessons learned as of 2024 November 27



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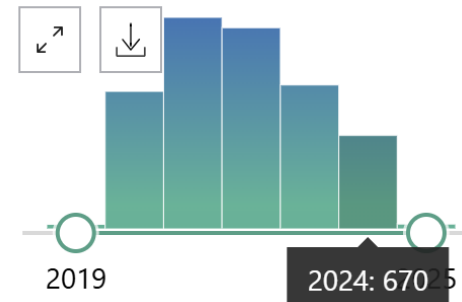
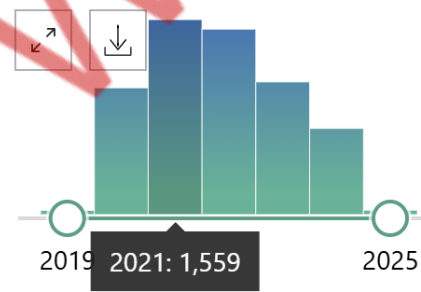
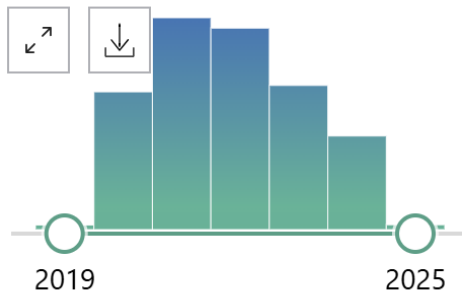
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5,120 results

Page 1 of 512

RESULTS BY YEAR



## Have we learned anything?

[The Lancet Infectious Diseases](#)

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- Have we learned from the COVID-19 pandemic?
- 4840 results searching for “COVID-19 lessons learned” on PubMed

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**Management in times of crises: reflections on characteristics, avoiding pitfalls, and pathways out**

Ricarda B. Bouncken, Sascha Kraus & Antonio de Lucas Ancillo

**volume 16**, pages 2035–2046 (2022)

WALDIA 2024

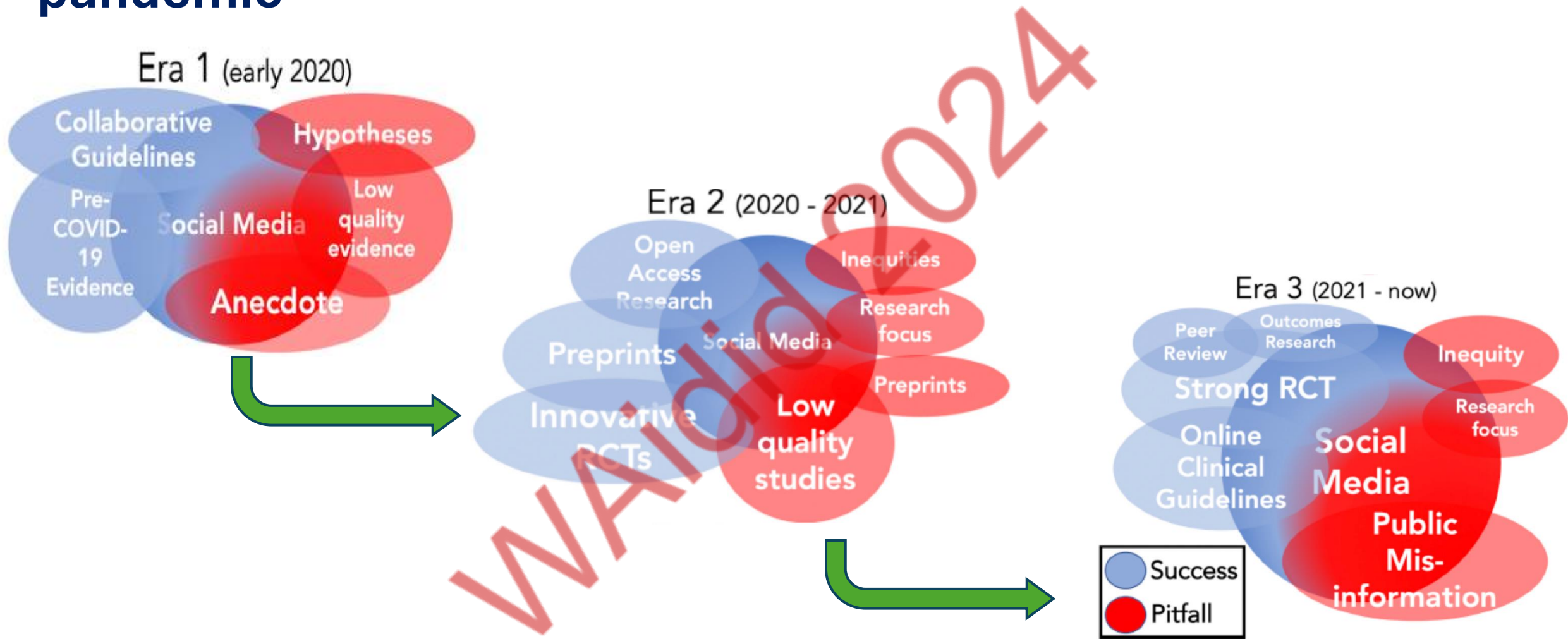


# Past/Current crises and their comparison

- Past/Current crises and their comparison
- Today, economies and firms face three major global crises.
- The most sudden and unanticipated (?) is the COVID-19 pandemic crisis.
- The second and also sudden crisis is the ongoing war in Ukraine and Palestine.
- The third crisis of this time – climate change



# Treating COVID-19: Evolving approaches to evidence in a pandemic



# What COVID19 pandemic touch us - 1

## Changing Perspectives



From individual patient care to public health/community care

# Offline: COVID-19 is not a pandemic

- *Richard Horton*
- [The lancet](#)
- **Vol 396 September 26,**





ACCADEMIA NAZIONALE DEI LINCEI

Preparedness to pandemics

- COVID-19 has been described as a “**syndemic**”, i.e. **the impact of the infectious agent on predisposing conditions such as non-communicable diseases and social inequalities.**

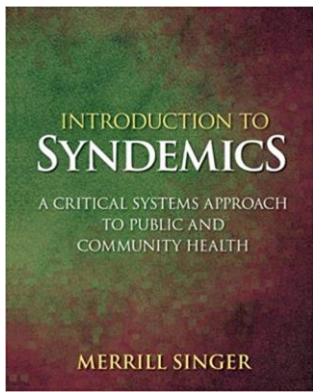
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# Offline: COVID-19 is not a pandemic

- The notion of a syndemic (from the greek συν and δήμος) was first conceived by Merrill Singer in the 1990s.
- A syndemic is not merely a comorbidity.

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# Key Elements

## 1. Disease Concentration

- 2 or more diseases concentrate in a particular **social context** (population, geography, etc.)

## 2. Disease Interaction

- Interactions between epidemics at individual and population level **amplify** disease burden

## 3. Large scale social forces

- **Harmful social conditions** drive the disease concentration and synergistic interaction



# Biopsychosocial Drivers of the Syndemic in Gay, Bisexual and Other Men Who Have Sex With Men

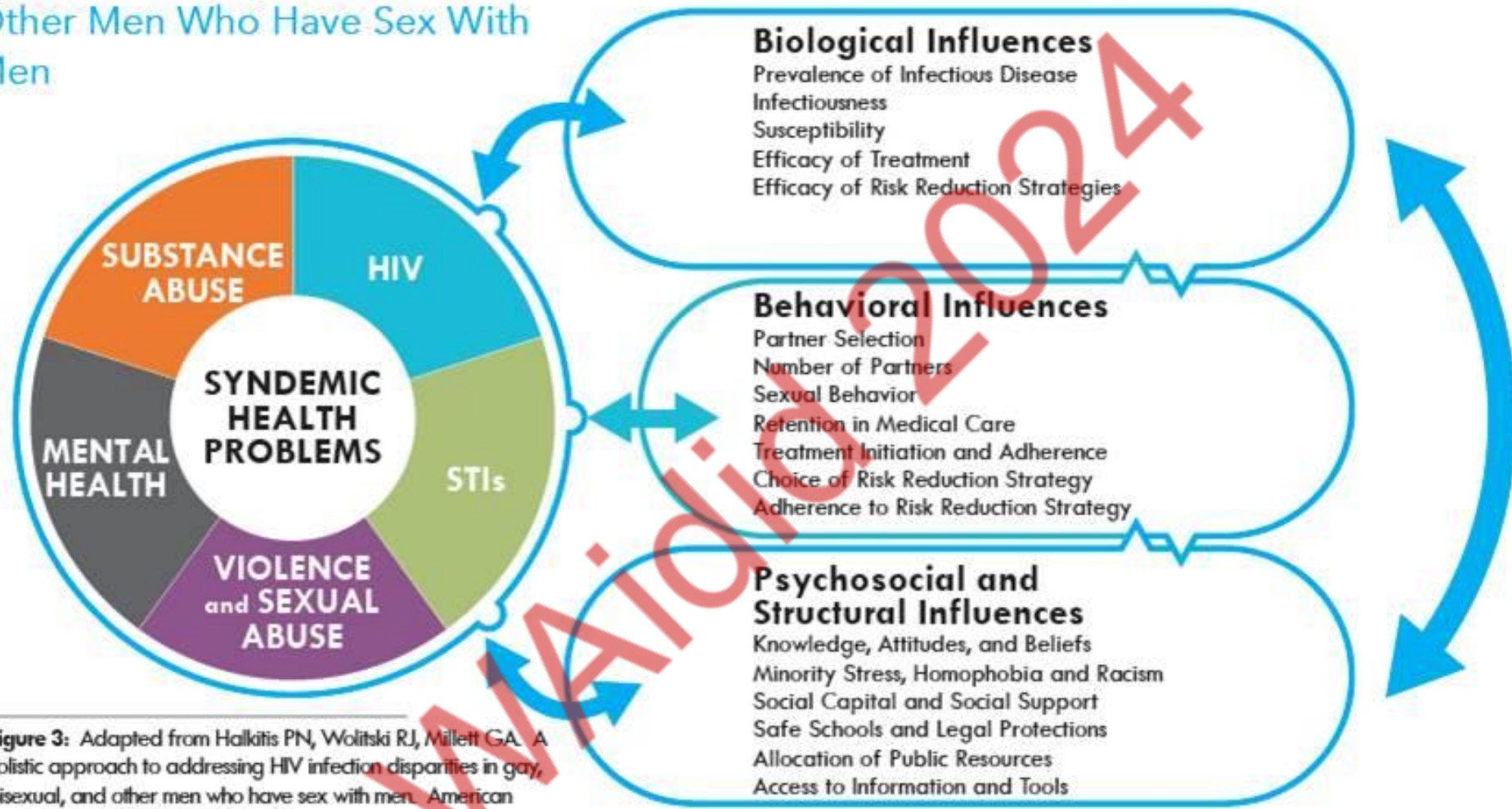


Figure 3: Adapted from Halkitis PN, Wolitski RJ, Millett GA. A holistic approach to addressing HIV infection disparities in gay, bisexual, and other men who have sex with men. *American Psychologist*, 2013;68/4:261-73.

# Key problems



- Lack of right definition and understanding of crises
- Overconfidence
- Gaps of knowledge and experience
- Lack of independent thinking
- Complexity and its underestimation
- A glimpse of how crises affect entrepreneurship and innovation



# Innovation: McKinsey Technology Trends Outlook 2022

**Most industry sectors display a meaningful association with five or more technology trends.**

Relevance of trend to industry<sup>1</sup>

Minimal relevance     High relevance

## Silicon Age

## Engineering Tomorrow

	Advanced connectivity	Applied AI	Cloud and edge computing	Immersive-reality technologies	Industria-lizing ML	Next-generation software development	Quantum technologies	Trust architectures and digital identity	Web3	Future of bio-engineering	Future of clean energy	Future of mobility	Future of space technologies	Future of sustainable consumption
Aerospace and defense	High	Low	High	High	High	High	High	High	High	High	Low	High	High	High
Agriculture	High	Low	High	Low	High	High	High	High	High	High	Low	High	High	High
Automotive and assembly	High	Low	High	High	High	High	High	High	High	High	High	High	High	High
Aviation, travel, and logistics	High	Low	High	High	High	High	High	High	High	High	Low	High	High	High
Chemicals	High	Low	High	High	High	High	High	High	High	High	High	High	High	High
Construction and building materials	High	Low	High	High	High	High	High	High	High	High	High	High	High	High
Consumer packaged goods	High	Low	High	High	High	High	High	High	High	High	Low	High	High	High
Education	High	Low	High	High	High	High	High	High	High	High	Low	High	High	High
Electric power, natural gas, and utilities	High	Low	High	High	High	High	High	High	High	High	Low	High	High	High
Financial services	High	Low	High	High	High	High	High	High	High	High	Low	High	High	High
Healthcare systems and services	High	Low	High	High	High	High	High	High	High	High	Low	High	High	High
Information technology and electronics	High	Low	High	High	High	High	High	High	High	High	High	High	High	High
Media and entertainment	High	Low	High	High	High	High	High	High	High	High	Low	High	High	High
Metals and mining	High	Low	High	High	High	High	High	High	High	High	High	High	High	High
Oil and gas	High	Low	High	High	High	High	High	High	High	High	High	High	High	High
Pharmaceuticals and medical products	High	Low	High	High	High	High	High	High	High	High	Low	High	High	High
Public and social sectors	High	Low	High	High	High	High	High	High	High	High	Low	High	High	High
Real estate	High	Low	High	High	High	High	High	High	High	High	Low	High	High	High
Retail	High	Low	High	High	High	High	High	High	High	High	Low	High	High	High
Telecommunications	High	Low	High	High	High	High	High	High	High	High	Low	High	High	High

<sup>1</sup>Relevance estimated qualitatively by industry experts based on trend's potential to affect an industry; degree of relevance is scaled at both trend and industry levels.

# Securing a positive health care technology legacy from COVID-19

- The increased use of health care technology during the pandemic
- Mapping the increased use of technology
- Challenges created by the rapid implementation of technology during the pandemic
- Patient and staff experiences of using technology
- Lessons for deploying health care technology after the pandemic

# What industries are most affected by the trend?

**Healthcare**, including pharmaceuticals and fitness, is the leading industry in adoption of bioengineering, especially in development of new medical treatments

Other industries scaling adoption are **retail, consumer goods, agriculture, energy and utilities, and materials**

## Industries affected<sup>1</sup>

## Impact from technology trend



**Healthcare systems; pharmaceuticals and medical products**

**Advancements across healthcare, pharmaceuticals, wellness and fitness, and biological sciences** for improved understanding of health conditions and diseases (eg, diagnosis, monitoring), treatment, patient outcomes, and scientific discovery

Ethical and long-term health concerns around use of novel and innovative technologies on humans (eg, impact of germ line gene editing on future generations)



# Health services disruption

Disruptions to essential health services are still geographically widespread across the globe



World Health Organization

94% of responding countries (n= 135) experienced a disruption to some extent



9% of countries reported disruptions in 75-100% of services

25% of countries reported disruptions in 50-74% of services

29% of countries reported disruptions in 25-49% of services

32% of countries reported disruptions in less than 25% of services

Only 6% of countries reported no disruptions

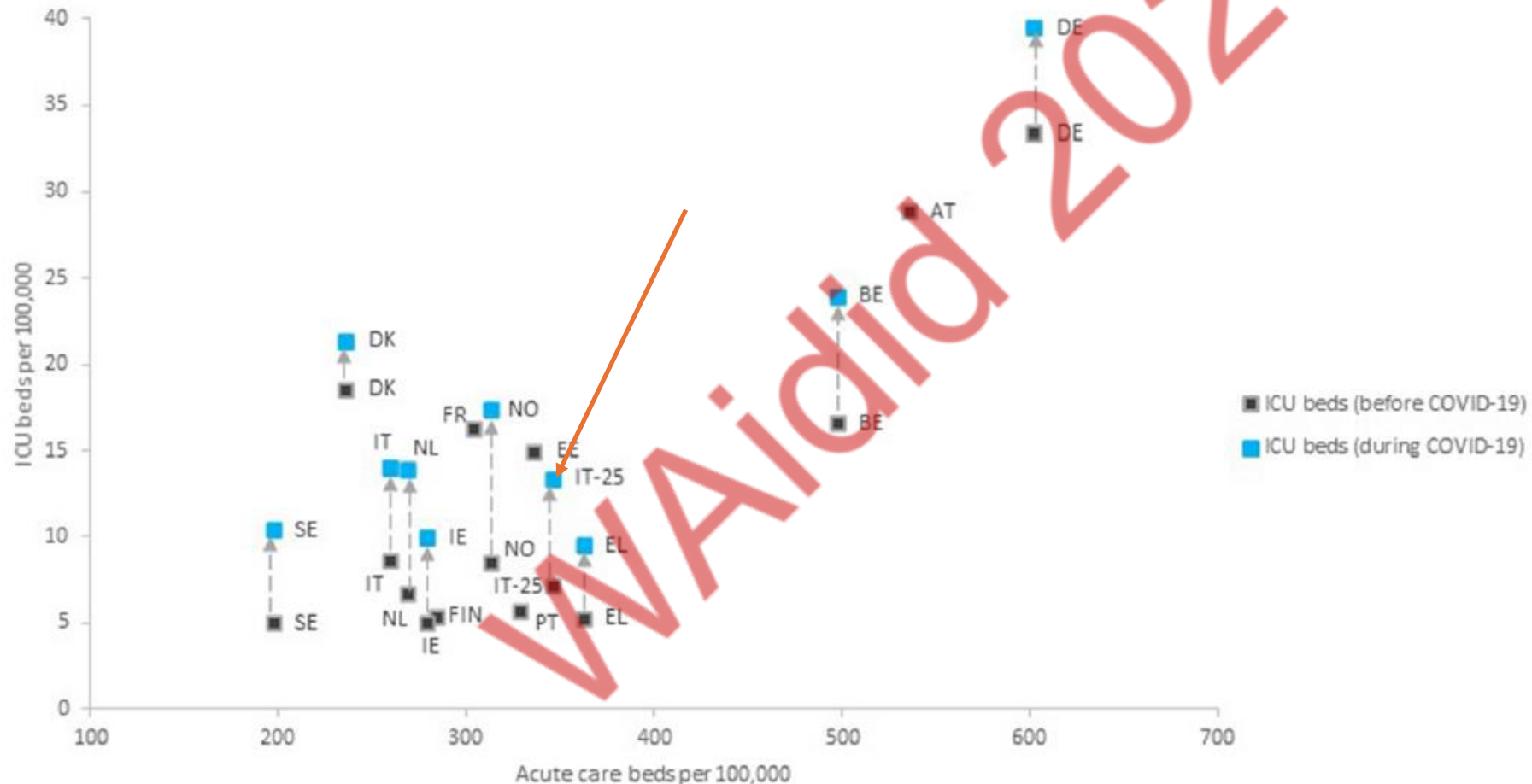
Denominator: represents responses from countries/territories that responded to at least one survey section and consented to data sharing agreement. Percentage of countries reporting disruptions may not add up to exactly 100% due to rounding. Services include: primary care, emergency and critical care, surgical care, rehabilitation, palliative care, long-term care, auxiliary services, and tracer services for reproductive, maternal, newborn, child and adolescent health and nutrition, immunization, communicable diseases, noncommunicable diseases, neglected tropical diseases, and mental, neurological and substance use disorders



# Cumulative hospital days and ICU days of patients with COVID-19 (per 100,000)



# Hospital and ICU capacities before COVID-19 and the ICU surge capacity created for COVID-19 (per 100,000).



SQUARE FEET

# 'The Future of Hospitals': Flexible Space for the Next Pandemic



After struggling to respond to a crushing Covid caseload, many hospitals are remodeling so that when the next crisis comes, they'll be better able to meet it.



# What are the most noteworthy technologies?

Across biomolecules and biosystems, several technologies have recently made significant progress

Nonexhaustive

Topic	Technology <sup>1</sup>	Description	Benefits	Example
Omics	 <b>Viral-vector gene therapy</b>	Permanent replacement of poor-functioning genes to treat genetic diseases, where modified viruses act as drug-delivery vehicles of genetic sequences	Treats previously incurable diseases Can address diseases before they are symptomatic	Treatment for cystic fibrosis
	 <b>mRNA therapy</b>	Temporary use of synthetic mRNA translated into protein to compensate for missing or mutated genes	Offers temporary alternative to gene therapy that aids gene expression without risk	COVID-19 vaccine

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# THE NOBEL PRIZE IN PHYSIOLOGY OR MEDICINE 2023



Illustrations: Niklas Elmehed

Katalin Karikó

Drew Weissman

“for their discoveries concerning nucleoside base modifications that enabled the development of effective mRNA vaccines against COVID-19”

THE NOBEL ASSEMBLY AT KAROLINSKA INSTITUTET

# What disruptions could the trend enable in healthcare systems and services and in pharmaceuticals and medical products?

**\$0.5–\$1.3 trillion**

Forecast global impact, 2030–40

Increasing number of therapies, including those that can treat or even prevent previously incurable diseases



## Examples of technologies

■ Benefits ■ Risks and uncertainties



### Viral-vector gene therapy

As of Feb 2022, there are 8 FDA-approved therapies, with 25 in late-stage development and another 120 in Phase II trials, and growing work on more therapies



### mRNA therapy

As of 2022, there are ~130 RNA assets in the pipeline, with a predicted 40% annual growth rate for ~1,800 RNA assets by 2030



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## Expected outcomes

### Treatment for monogenic and polygenic diseases

Treatment for ~10,000 diseases caused by a single gene (eg, sickle cell anemia, hemophilia, inherited blindness, immune deficiencies) and diseases caused by a combination of genes (eg, cardiovascular, neurodegenerative, metabolic, reproductive)

### Personalized treatments

Bespoke treatments using genetic data to identify risk of certain diseases (eg, COVID-19, HIV) and to provide targeted treatment

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### Novel cancer treatment

Treatments addressing all stages of cancer (from screening to treatment to cure), especially cancer linked to genes (eg, BRCA1 and BRCA2 for breast cancer)

### Ageing prevention

Anti-ageing therapies that eventually assist with tissue repair, longevity, mental cognition, and physical capabilities

### Health risks

Long-term health effects are also still being investigated

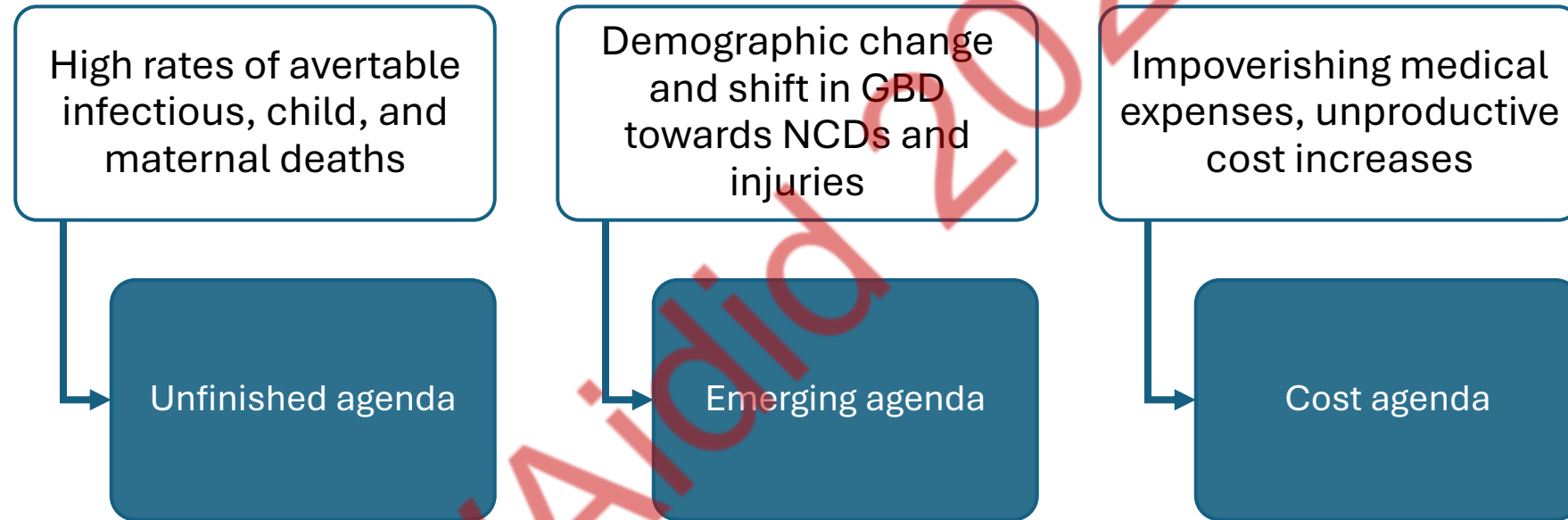
### Ethical concerns

Ethical and moral concerns about potential unintended side effects of modifying genes, and when applied to embryos/germ lines, its impact on future generations

# Offline: COVID-19 is not a pandemic

- The economic crisis that is advancing towards us will not be solved by a drug or a vaccine.
- Nothing less than national revival is needed.
- Approaching COVID-19 as a syndemic will invite a larger vision, one encompassing education, employment, housing, food, and environment.
- Viewing COVID-19 only as a pandemic excludes such a broader but necessary prospectus.

# 2015-2035: Three Domains of Health Challenges



# What needs to happen

- When the pandemic is over, **the temptation will be to move on and reclaim what had been normal life.**
- At a time of growing international distrust we need to work to increase trust and mutual cooperation. **We need to better understand how to rapidly incorporate evidence into scientific policy and to better understand human response to such major, complicated events.**
- If we can do that, **to save lives and ease suffering in the future, it will not make up for all the loss and hardship we have endured in the last two years. But we can at least say we did our best to learn from it, and let that be the one positive legacy of all this.**

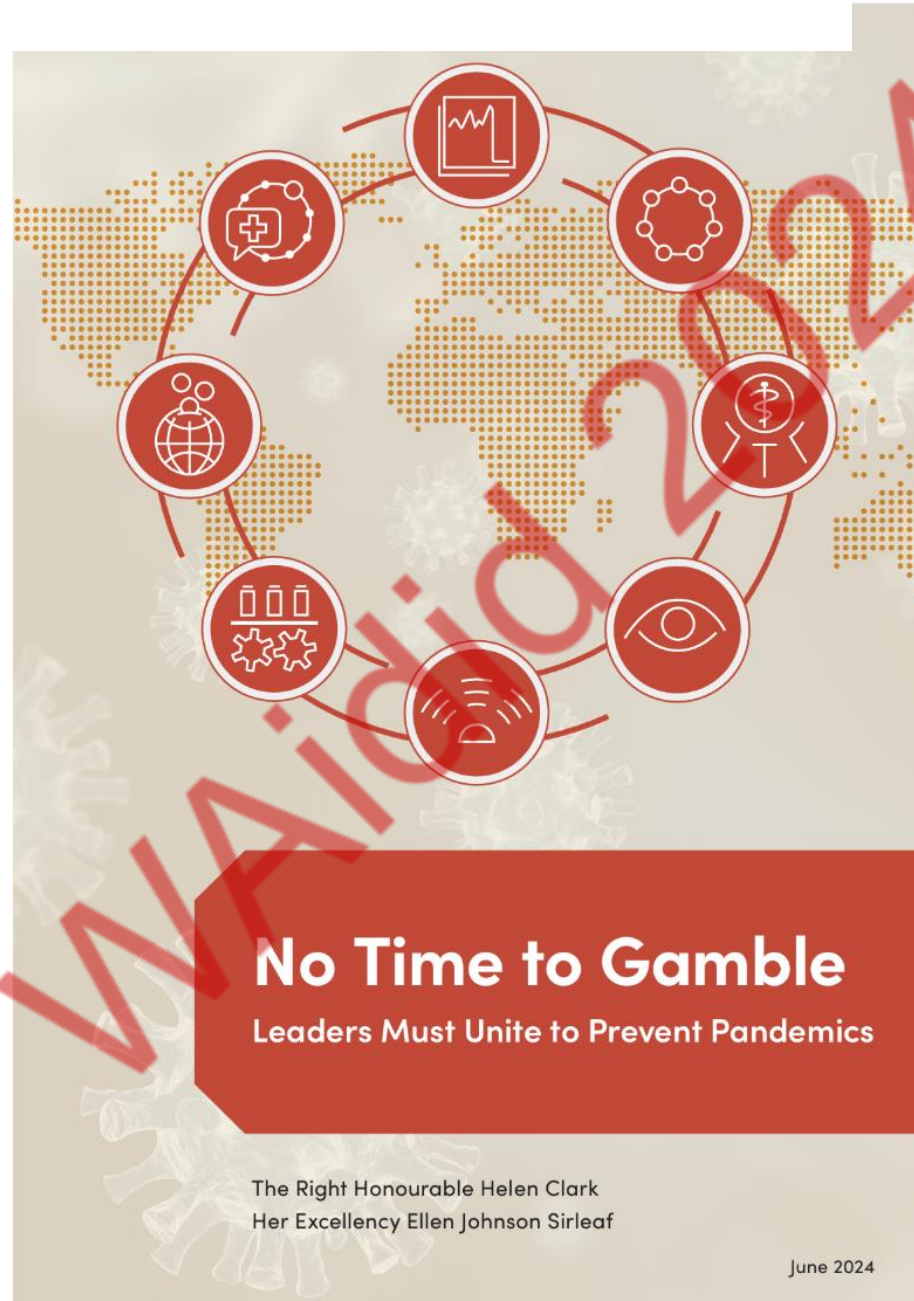
# World is woefully unprepared for another pandemic, experts warn

BMJ 2024;385:q1355 19 June 2024

Adrian O'Dowd

Independent Panel for Pandemic Preparedness and Response

established by the WHO Director-General in response to the World Health Assembly resolution 73.1.



## No Time to Gamble

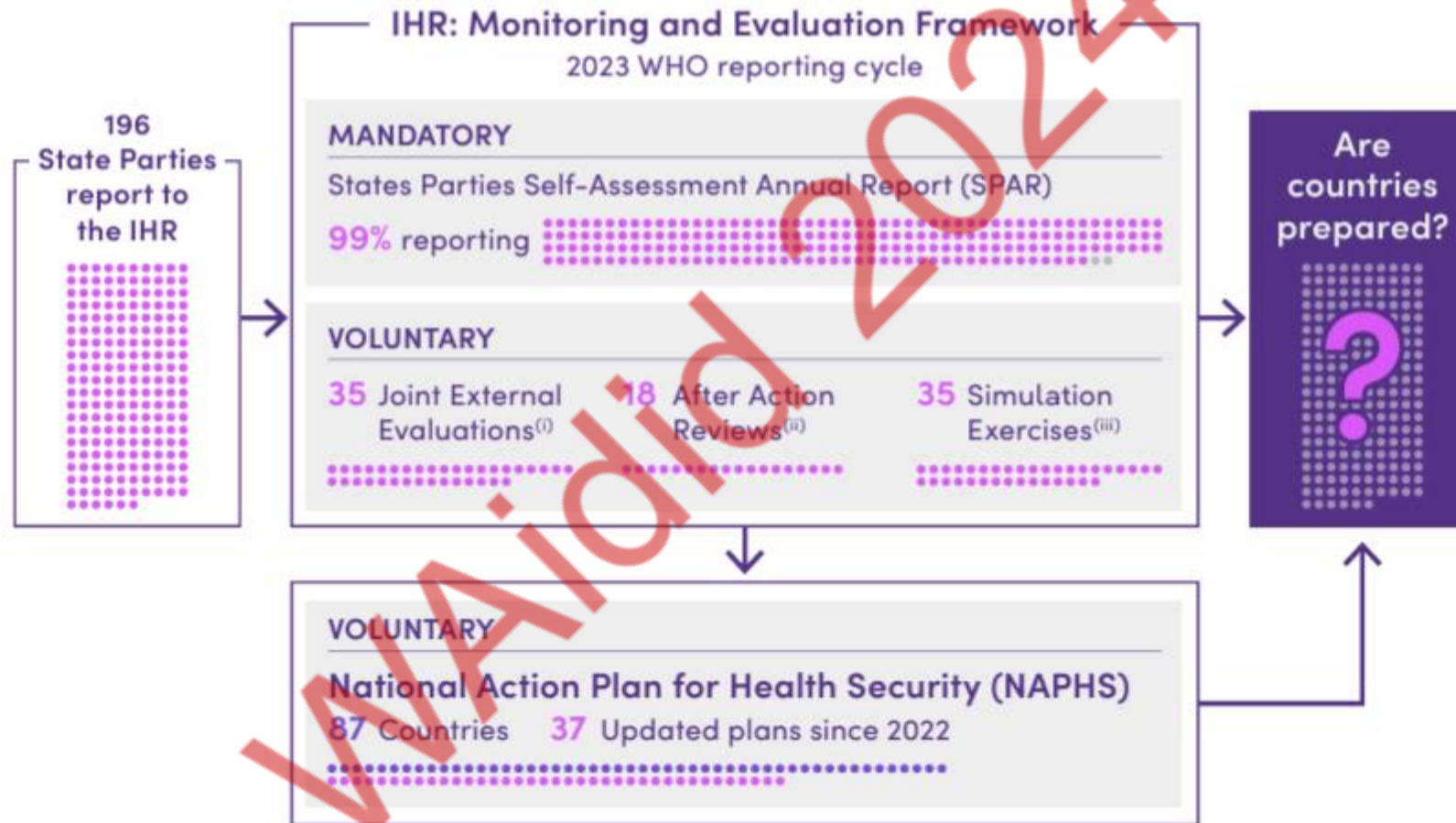
Leaders Must Unite to Prevent Pandemics

The Right Honourable Helen Clark  
Her Excellency Ellen Johnson Sirleaf

June 2024



## Are countries prepared?



(i) every 4–5 years; (ii) within 3 months of a public health event; (iii) regularly

Source: WHO

## Have we learned anything?

[The Lancet Infectious Diseases](#)

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- Have we learned from the COVID-19 pandemic?
- Judging from the H5N1 and mpox outbreaks, not really. **Or maybe not the right people.**
- The cynical view is that instead of producing all those biomedical “lessons learned” articles, we should have been focusing more on **political lessons from the devastating economic impact of the pandemic and the influence of a country’s pandemic performance on subsequent voter behaviour.**
- **The time to react is now, before we have the next pandemic.**