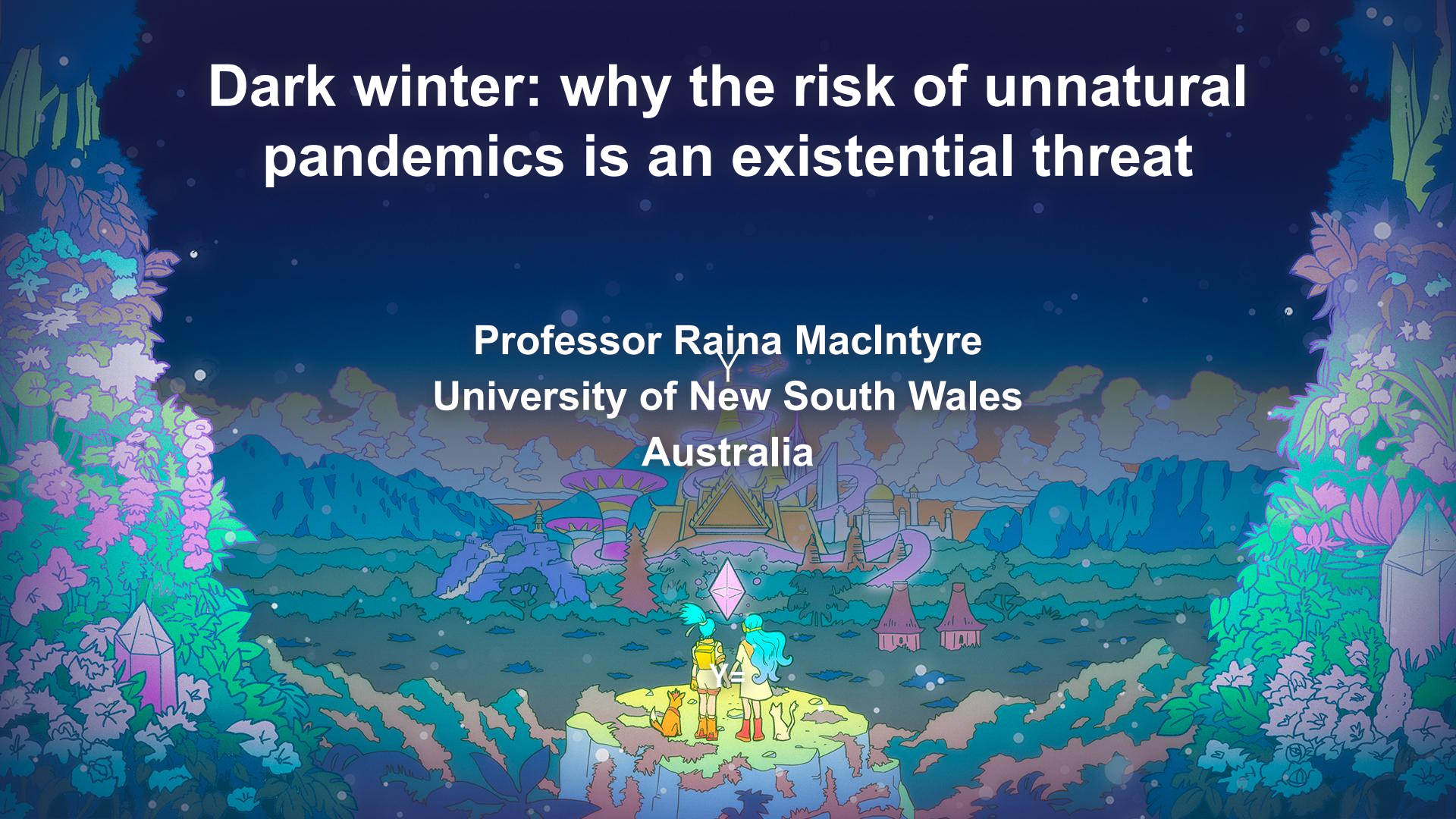
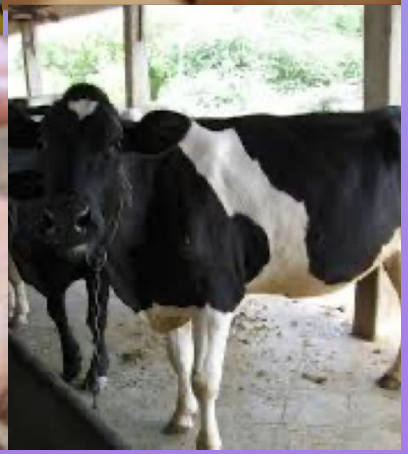
Dark winter: why the risk of unnatural pandemics is an existential threat

Professor Raina MacIntyre
University of New South Wales
Australia



Declarations

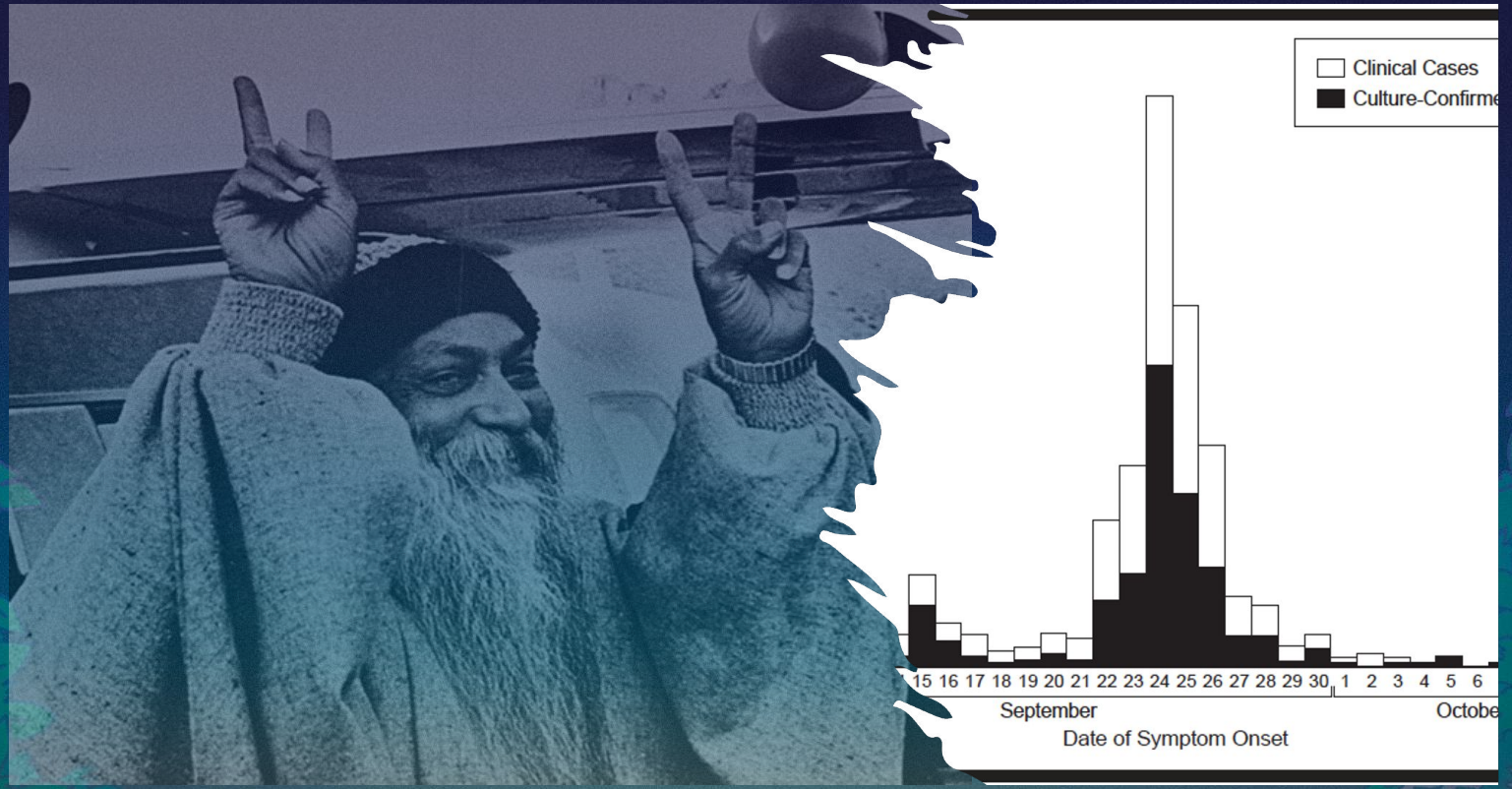
- •Raina MacIntyre leads EPIWATCH at UNSW, Sydney. EPIWATCH has received funding from Balvi Filantropik from 2022-24.
- •She is on the WHO Smallpox and Mpox Advisory Group, and was on the WHO COVID-19 Vaccine Composition Technical Advisory Group from 2021-2024.
- •She currently receives funding from the Australian government (NHMRC, MRFF) Sanofi, Balvi and The US DOD.
- •In the last 5 years she has been on advisory boards for Bavarian Nordic, Seqirus, Sanofi, Janssen, Moderna and Pfizer.
- •She is on editorial boards for BMJ Open, Vaccine, Epidemiology & Infection.
-

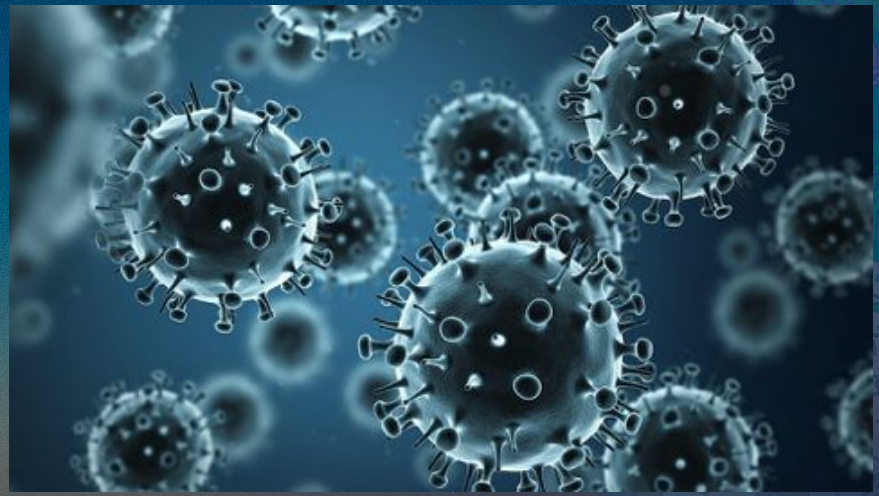


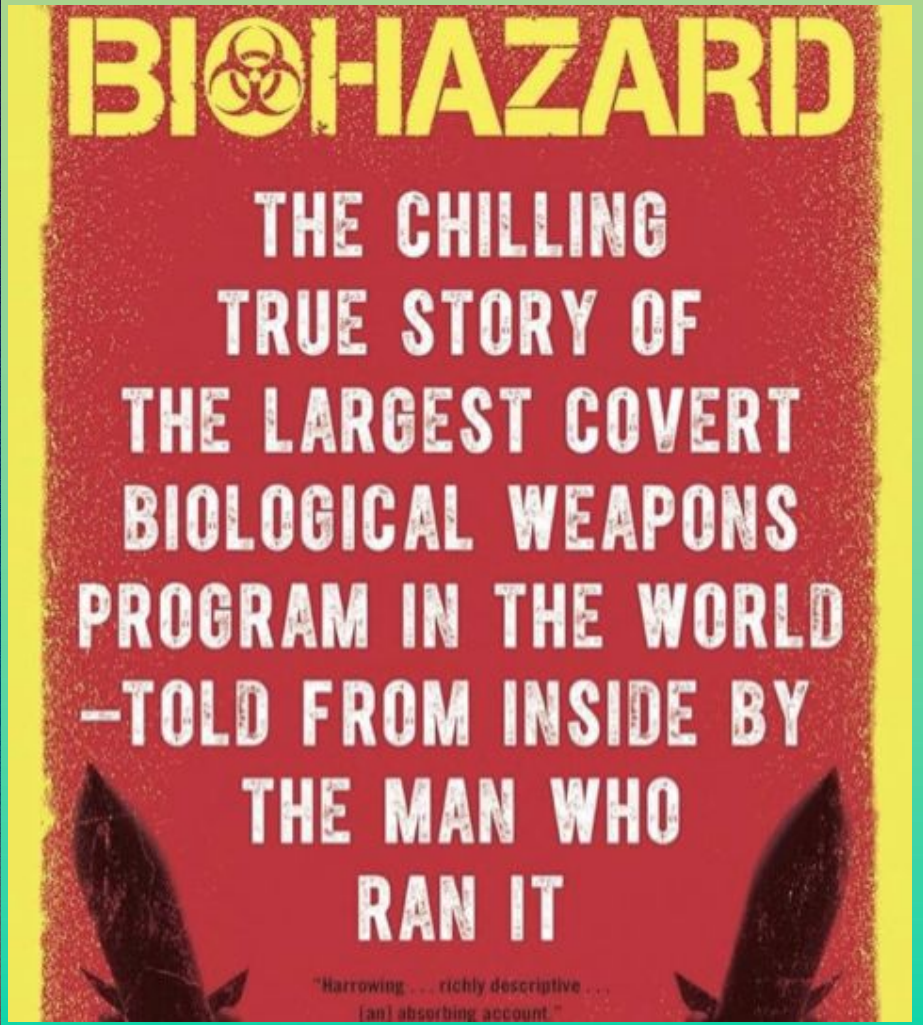
Epidemics

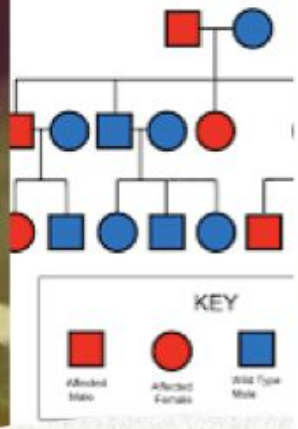
- Serious epidemics are a perennial threat
- Pandemics and epidemics spread rapidly, causing acute disruption to health systems, farming, the economy and society.
- The cost of the COVID-19 pandemic in 2020 alone to be more than **$16 trillion.**
- H5N1 avian influenza has caused major losses globally to farming.


PAST
PRESENT
FUTURE


Clinical Cases
Culture-Confirme
15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 1 2 3 4 5 6
September
Octobe
Date of Symptom Onset




BIOHAZARD
THE CHILLING TRUE STORY OF THE LARGEST COVERT BIOLOGICAL WEAPONS PROGRAM IN THE WORLD —TOLD FROM INSIDE BY THE MAN WHO RAN IT
"Harrowing . . . richly descriptive . . . [an] absorbing account"



THE CONVERSATION
Academic rigour, journalistic flair

Gene editing could create super soldiers. Gorodenkoff/Shutterstock

From bioweapons to super soldiers: how the UK is joining the genomic technology arms race

Published: April 30, 2021 1.32am AEST

Yusef Paolo Rabiah
PhD Candidate at Science, Technology, Engineering and Public Policy, UCL

Quantum advances


Dr. JEKYLL
and Mr. HYDE
A ROUBEN MAMOULIAN
Production
with
Fredric
MARCH
MIRIAM HOPKINS... ROSE HOBART
a Paramount Picture


JURASSIC
PARK

Error or terror

Lab in a box

- DIY lab

Exponential decline in cost

*"The advance of technology means that no disease-causing organism can forever be eradicated."**

*Noyce RS, Evans DH. Synthetic horsepox viruses and the continuing debate about dual use research. PLoS Pathog. 2018 Oct 4;14(10):e1007025

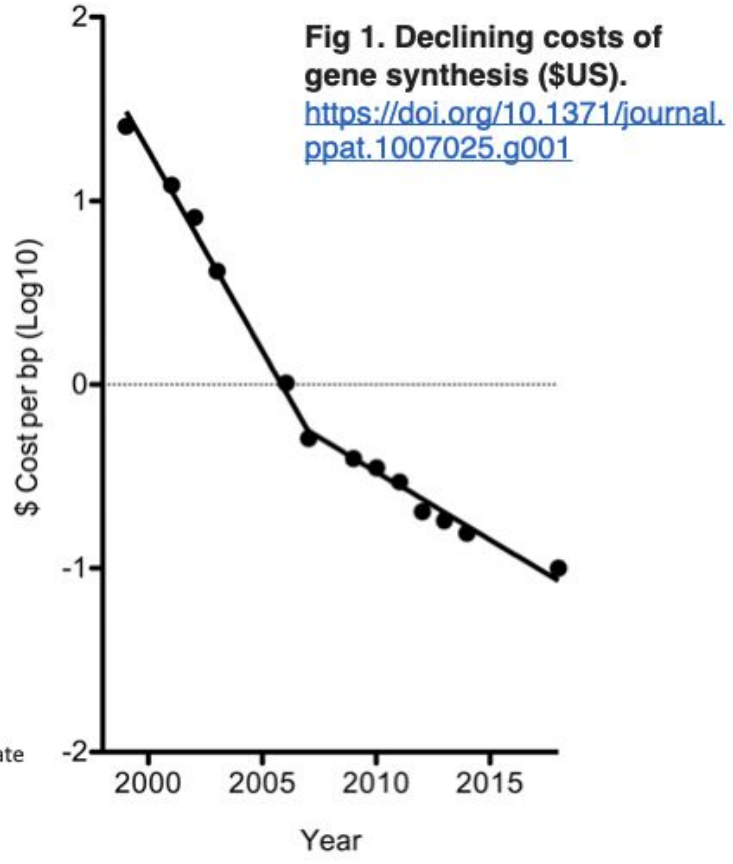
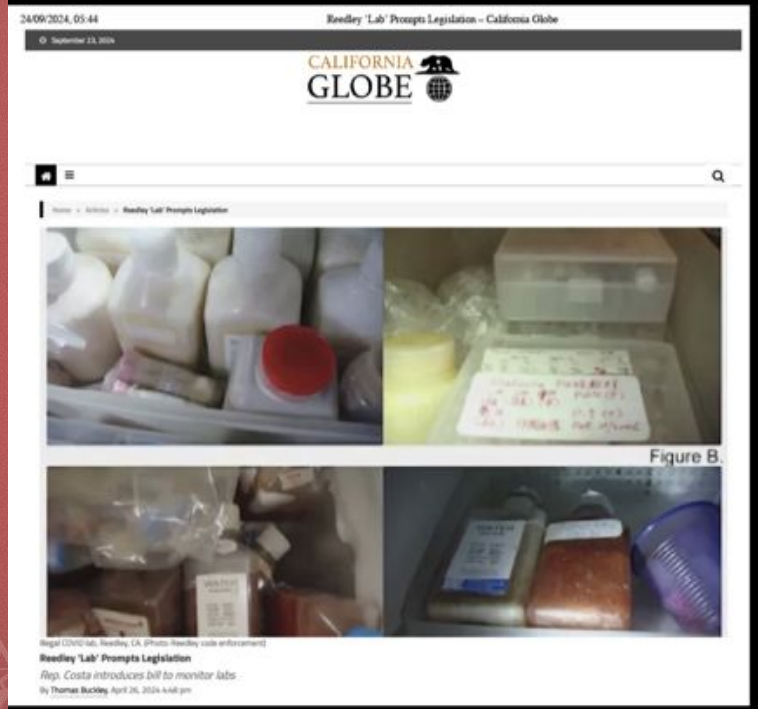


Fig 1. Declining costs of gene synthesis ($US).
https://doi.org/10.1371/journal.ppat.1007025.g001

Illegal biolabs



24/09/2024, 05:44 Reedley 'Lab' Prompts Legislation – California Globe

CALIFORNIA GLOBE

Figure B.

Illegal COVID lab, Reedley, CA. (Photo: Reedley code enforcement)

Reedley 'Lab' Prompts Legislation

Rep. Costa introduces bill to monitor labs

By Thomas Buckley, April 26, 2024 4:48 pm

03/12/2023, 10:20 House committee releases report on illegal Ree

kvpr

A biolab was operating in a California city. Here's what a congressional committee found

KVPR | By Cresencio Rodriguez-Delgado

Published November 15, 2023 at 1:30 PM PST

Members of the House Select Committee on the Chinese Communist Party listen in during a report from an investigation into an illegal medical lab in Reedley, Calif.

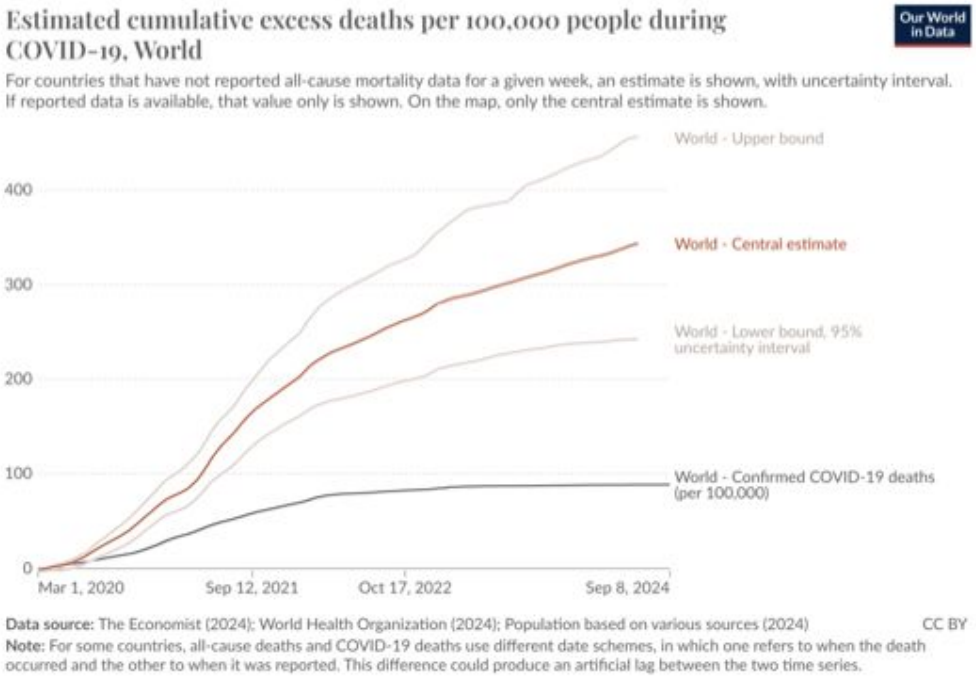
FRESNO, Calif. – The House Select Committee on the Chinese Communist Party on Wednesday issued a report about an illegal biolab that was discovered in Reedley and called for a more coordinated response from federal agencies on similar issues across the country.

The committee's report came after a subpoena was issued in September in relation to the lab found inside an old Reedley warehouse where multiple agencies investigated a number of infectious diseases and hazardous chemicals, including COVID-19, malaria, HIV and hepatitis.

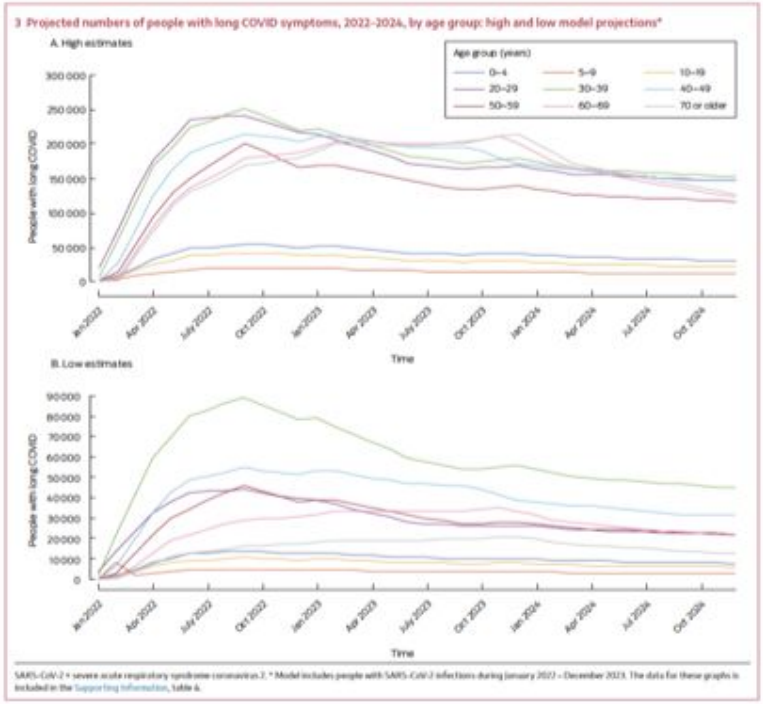
Clade 1 Mpox in DRC 2016-2024

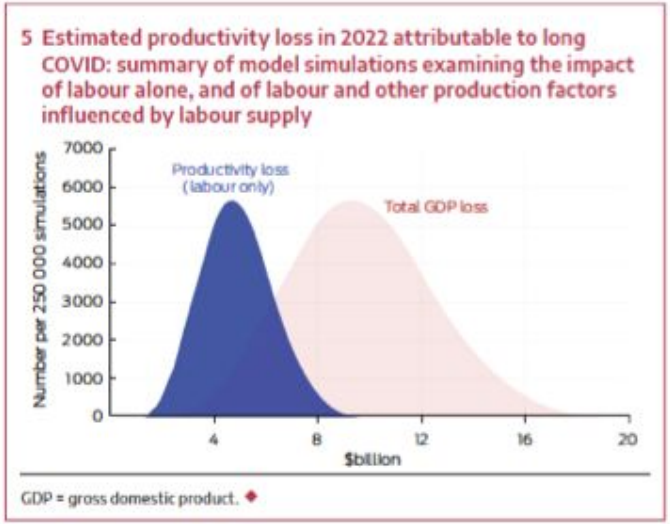
- Data Sources: Mpox - Democratic Republic of the Congo (who.int) McCollum AM, Shelus V, Hill A, Traore T, Onoja B, Nakazawa Y, et al. Epidemiology of Human Mpox - Worldwide, 2018-2021. MMWR Morb Mortal Wkly Rep. 2023;72(3):68-72.
- 20240523_rag_pra_mpox.pdf (sciensano.be) Africa CDC https://x.com/AfricaCDC/status/1825882382936977691

SARS-CoV-2


Estimated cumulative excess deaths per 100,000 people during COVID-19, World
Our World in Data
For countries that have not reported all-cause mortality data for a given week, an estimate is shown, with uncertainty interval. If reported data is available, that value only is shown. On the map, only the central estimate is shown.
World - Upper bound
World - Central estimate
World - Lower bound, 95% uncertainty interval
World - Confirmed COVID-19 deaths (per 100,000)
400
300
200
100
0
Mar 1, 2020
Sep 12, 2021
Oct 17, 2022
Sep 8, 2024
Data source: The Economist (2024); World Health Organization (2024); Population based on various sources (2024)
CC BY
Note: For some countries, all-cause deaths and COVID-19 deaths use different date schemes, in which one refers to when the death occurred and the other to when it was reported. This difference could produce an artificial lag between the two time series.

Long COVID





Costantino V, Grafton Q, Kompas T, Chu L, Honeyman D, Notaras A, MacIntyre CR. The public health and economic burden of long COVID in Australia, 2022-24: a modelling study. Med J Aust. 2024 Aug 19;221(4):217-223.

H5N1 2.3.3.4b

SA α2,3

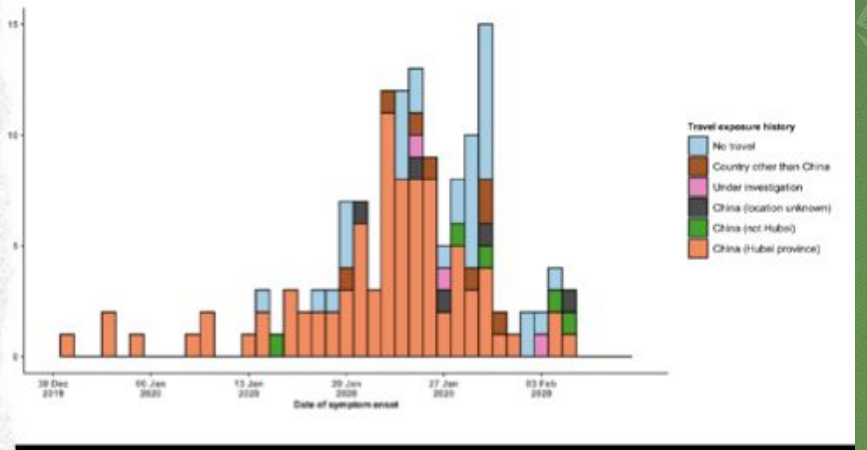
SA α2,3

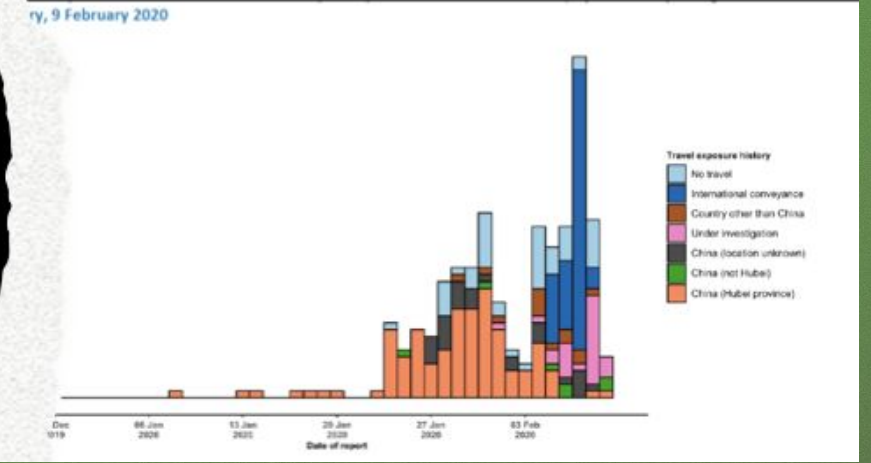
SA α2, 6

SA α2, 6

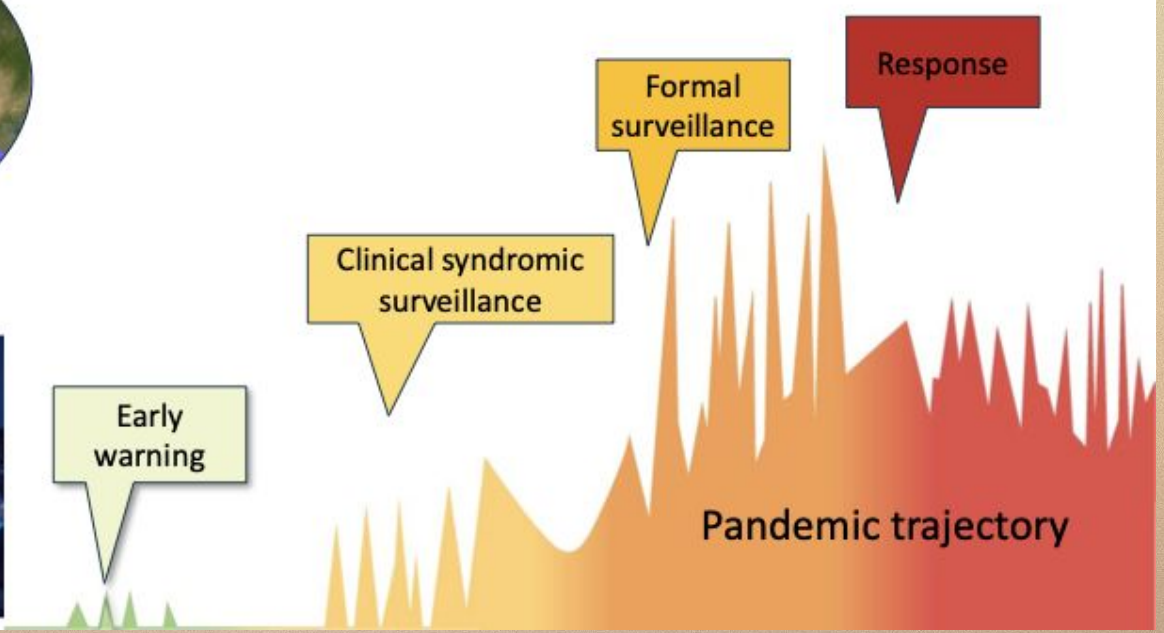
Delay in warnings

- Pandemics grow exponentially
- Formal surveillance is critically delayed
- COVID spread to Europe and the US by Nov-Dec 2019.
- Epidemic growth is exponential
- Early warnings MUST precede formal surveillance

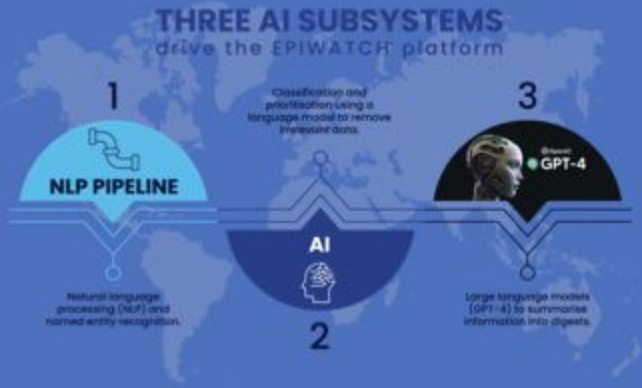




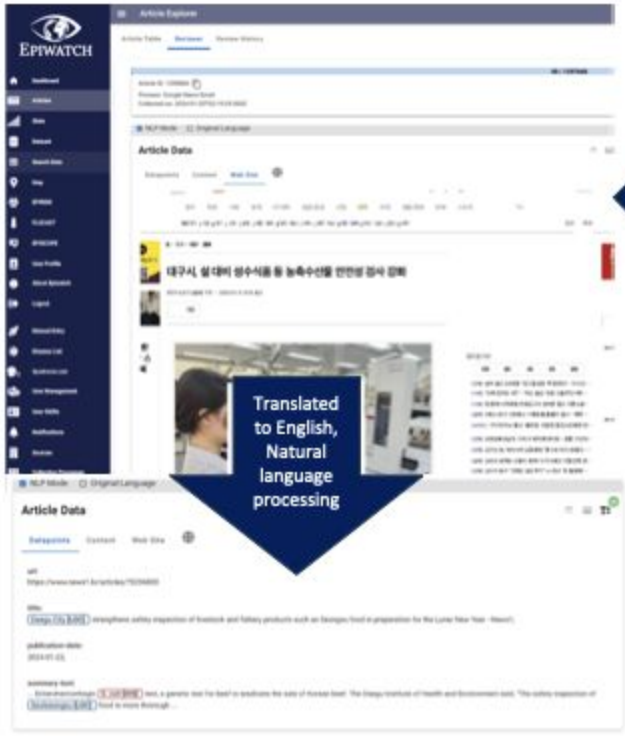
Early warnings for a new pandemic



EPIWATCH® AI system

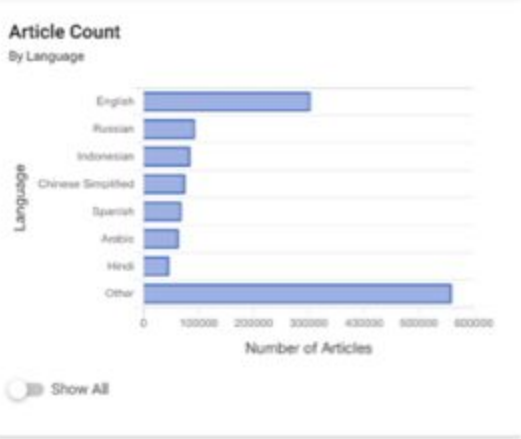


EPIWATCH® - vast, multilingual intelligence

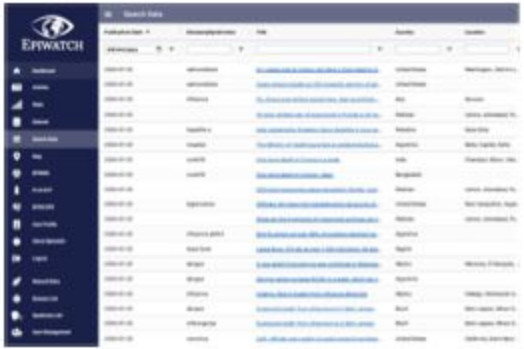


EPIWATCH® has >50 languages

70% of all intelligence in EPIWATCH® is non-English and cannot be found on a Google search in English.



EPIWATCH® data visualization



PANDEMIC WATCH

EPIWATCH

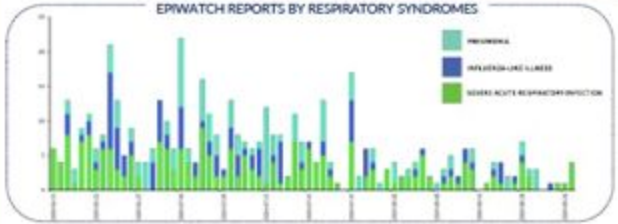
A new pandemic of a respiratory virus will present first as unknown pneumonia or respiratory illness. EPIWATCH® can monitor trends in respiratory illness. An increase may signal adaptation of avian influenza to humans and should warrant further investigation. The Americas and Europe are of specific interest due to the widespread epidemics in birds and animals.
The map and graphs are analysed on a rolling 12-weeks reporting period.

Note: H5N1 Clade 2.3.4.4b may also present with neurological and gastrointestinal symptoms.

12-week period: 16 June - 27 August 2024

GLOBAL RESPIRATORY OUTBREAKS REPORTS

EPIWATCH REPORTS BY RESPIRATORY SYNDROMES



Respiratory syndromes EPIWATCH reports on the previous 12 weeks per WHO region (bar plot) and associated seven day rolling average of EPIWATCH reports (shaded areas).

African Region

Americas Region

South-East Asian Region

European Region

Eastern Mediterranean Region

Western Pacific Region

Insights into war zones – epidemic signals Ukraine
1 Jan - 28 March 2022

CDC Centers for Disease Control and Prevention
CDC 24/7: Saving Lives, Protecting People™

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EMERGING INFECTIOUS DISEASES®

EID Journal · Volume 30 · Number 9—September 2024 · Main Article

Volume 30, Number 9—September 2024

Research

Use of Open-Source Epidemic Intelligence for Infectious Disease Outbreaks, Ukraine, 2022

Anjali Kannan, Rosalie Chen, Zubair Akhtar, Braidy Sutton, Ashley Quigley, Margaret J. Morris, and C. Raina MacIntyre
Author affiliation: University of New South Wales, Kensington, Sydney, New South Wales, Australia

Cite This Article

On This

Methods
Results
Discussion
Cite This

Figures

Figure 1
Figure 2
Figure 3

Tables

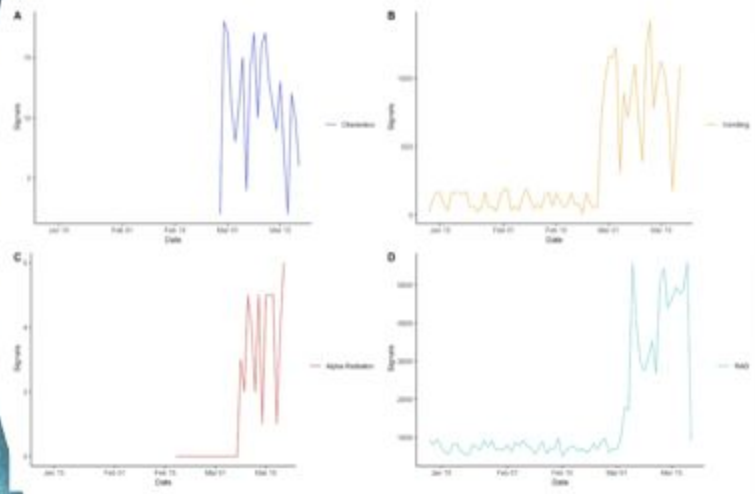
Table 1
Table 2

Abstract

Formal infectious disease surveillance in Ukraine has been disrupted by Russia's 2022 invasion, leading to challenges with tracking and containing epidemics. To analyze the effects of the war on infectious disease epidemiology, we used open-source data from EPIWATCH, an artificial intelligence early-warning system. We analyzed patterns of infectious diseases and syndromes before (November 1, 2021–February 23, 2022) and during (February 24-July 31, 2022) the conflict. We compared case numbers for the most frequently reported diseases with numbers from formal sources and found increases in overall infectious disease reports and in case numbers of cholera, botulism, tuberculosis, HIV/AIDS, rabies, and salmonellosis during compared with before the invasion. During the conflict, although open-source intelligence captured case numbers for epidemics, such data (except for diphtheria) were unavailable/underestimated by formal surveillance. In the absence of formal surveillance during military conflicts, open-source data provide epidemic intelligence useful for infectious disease control.

On February 24, 2022, Russia forces launched an armed attack against Ukraine (1), escalating the ongoing Russo-Ukrainian conflict that began in 2014 when Russia annexed Crimea and resulting in one of Europe's biggest threats to peace and security since the Cold War (2). The healthcare sector in Ukraine has been heavily affected, and 18 months into the recent conflict, ≈10,000 civilians had died (3). Such conflict situations increase the risk for epidemics (4), and the disruption or cessation of public health surveillance creates challenges for tracking them. Rapid epidemic intelligence using open-source data may be an alternative form of surveillance for infectious disease

EPIWATCH



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Published on 28.6.2023 in Vol 3 (2023)

Preprints (earlier versions) of this paper are available at https://preprints.jmir.org/preprint/39895, first published May 27, 2022.

Open-Source Intelligence for Detection of Radiological Events and Syndromes Following the Invasion of Ukraine in 2022: Observational Study

Haley Stone[1]; David Heslop[2]; Samsoung Lim[3]; Ines Sarmiento[1]; Mohana Kunasekaran[1]; C Raina MacIntyre[1,4]

Citation

Please cite as:

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Open-Source Intelligence for Detection of Radiological Events and Syndromes Following the Invasion of Ukraine in 2022: Observational Study
JMIR Infodemiology
2023;3:e39895
doi: 10.2196/39895
PMID: 37179069

Radiation signals Ukraine 2022

EPIWATCH

एपिवॉच प्लेटफार्म पर आपका स्वागत है

दुनिया भर शीघ्र महामारी का पता लगाना

Open sourcing and access at grass roots

Thank you!

Dr Raina MacIntyre
UNSW
rainam@protonmail.com