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Population Health Information Research Infrastructure

EUROPEAN PUBLIC HEALTH WEEK

WHAT NEXT FOR PANDEMIC PREPAREDNESS IN EUROPE?

Winter is coming: An outlook on medium-term COVID-19 measures and recommendations from Portugal

20.05.2022

Marília Silva Paulo & Luís Velez Lapão

UNIVERSIDADE NOVA DE LISBOA

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 101018317

Why winter is a problem: a rapid review into 'COVID-19: Preparing for the future'

The report highlights that despite a highly successful vaccination campaign in the UK, the **COVID-19 pandemic is not over**. We must sustain our efforts to limit the transmission and impacts of the virus.
The health and social care system is likely to face three key challenges:

- **A resurgence of respiratory infectious diseases**, including COVID-19, influenza and respiratory syncytial virus (RSV).

- **Pressures resulting from the wider health and wellbeing impacts of the pandemic**, including long COVID and the impact of delayed care seeking.

- **Continued disruptions to healthcare delivery**.

(The Academy Medical Sciences, 2021)

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‘COVID-19: Preparing for the future’

To mitigate the impact of these challenges and **prepare for the winter period** and beyond, our rapid review emphasizes that **the summer must be used to**:

- **Maximize the speed and uptake of COVID-19 vaccination**, and prepare for possible booster vaccines and vaccination against influenza later in the year.
- **Increase the ability of people with COVID-19 to self-isolate** through financial and other support.
- **Boost capacity in the NHS to build resilience against future outbreaks of COVID-19** and other infectious diseases, and reduce the backlog of non-COVID-19 care.
- **Provide clear guidance** about environmental and behavioural precautions that individuals and organizations can take to protect themselves and others from infection.

(The Academy Medical Sciences, 2021)

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‘Epidemiological scenarios for winter 2021 an OMICROM’ - Portugal

In September 2021, the National Institute of Health Dr. Ricardo Jorge and the Ministry of Health predicted for January and February:

- **High affluence of the health services first line of action** (NHS call center – Saúde 24; pharmacies, labs, primary healthcare centers and emergency departments);
- **High absenteeism at schools and workplaces**;
- **High to moderate hospital admissions** in general;
- **Moderate admission to ICU’s** and mortality;

(DGS and INSA, 2022)

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‘Epidemiological scenarios for winter 2021 an OMICROM’ - Portugal

The recommendation was similar to the UK:

“highly rates of vaccination for the population and keep on monitoring the population, in special the most vulnerable like chronic patients and people over 65 years old”

(DGS and INSA, 2022)

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From winter 2022 to winter 2023’ - Portugal

In March 2022 the National Institute of Health Dr. Ricardo Jorge and the Ministry of Health provided an analysis based on mortality, hospital admissions and vaccination rates:

- In early 2022 Portugal had mortality rates similar to other winters;
- Recognized the seasonality of the disease;
- It is probably that in winter 2023 we will have high rates of COVID-19 and some restrictions might be back - also due to the decrease of protection from the vaccines;

(DGS and INSA, 2022)

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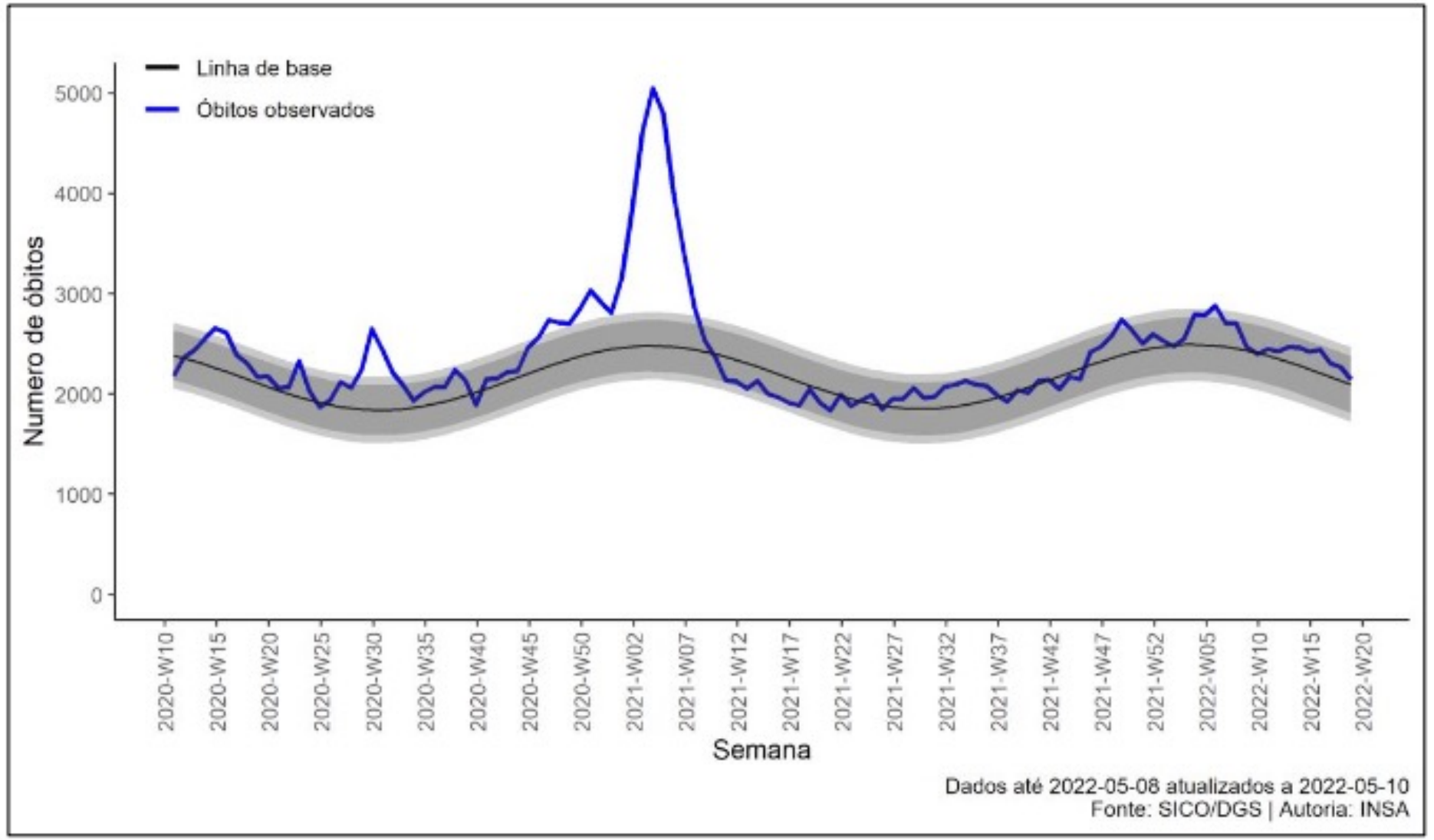

2)

Figura 13. Evolução da mortalidade semanal por todas as causas entre 02/03/2020 e 08/05/2022. A linha azul corresponde à mortalidade observada, a linha preta à linha de base e as áreas a sombreados ao seu intervalo de confiança a 95% e 99%. *Fonte: SICO | DGS; Autoria: INSA.*

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WHAT NEXT FOR PANDEMIC PREPAREDNESS IN EUROPE?

Predicting the future: COVID-19 models and forecasting at the transition from pandemic to (hyper-)endemic

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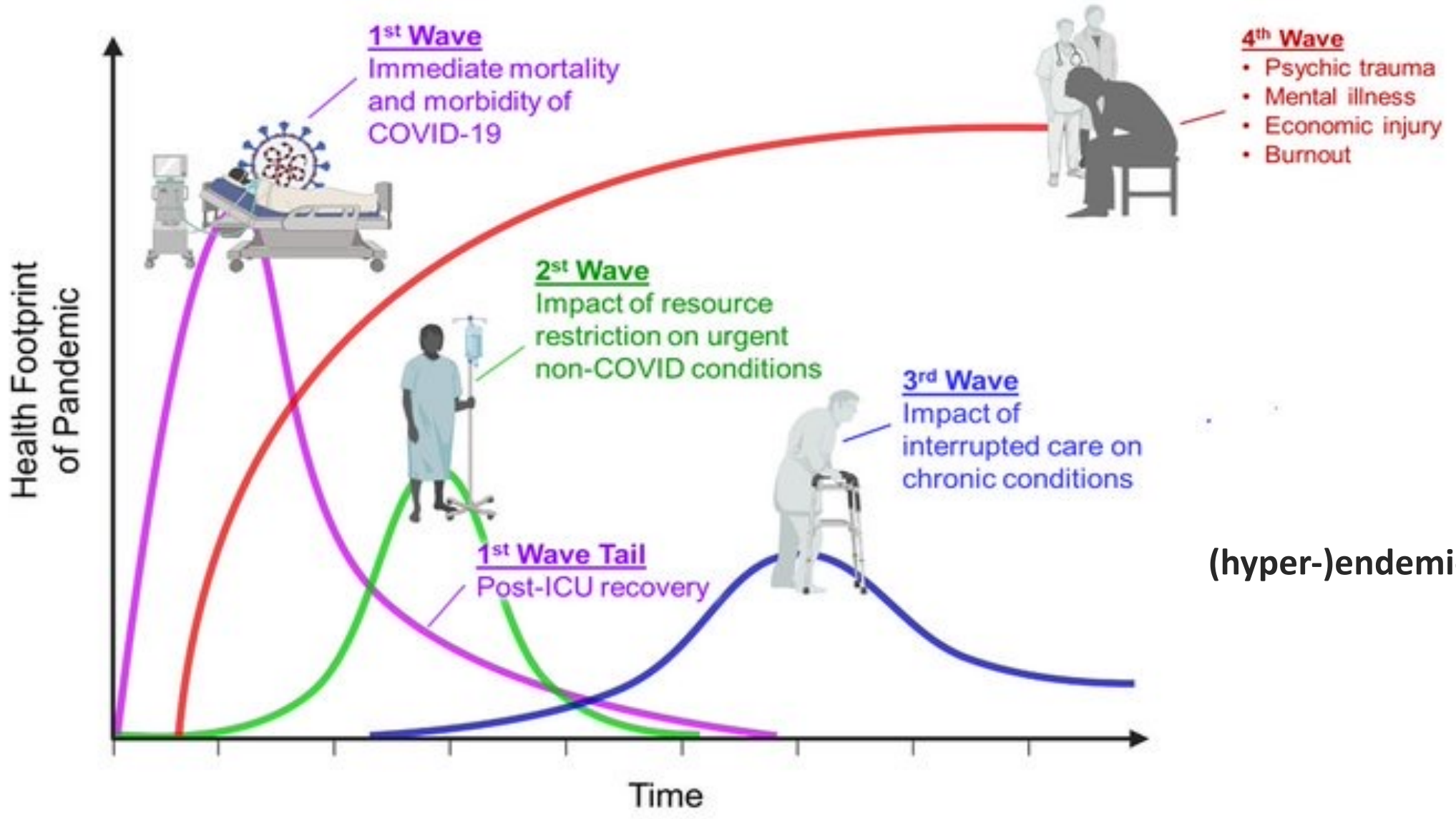

(hyper-)endemic

Fonte: Twitter post 7:04 PM · Mar 30, 2020 Victor Tseng

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Expresso

27 JUN 2020

COVID-19

Falta de técnicos impediu controlo da epidemia em Lisboa

A coerência é fundamental em política para que a mensagem seja aceite. E nas últimas semanas a incongruência não podia ter sido maior

WE SHOULD ALSO LEARN FROM OURS MISTAKES!

BUSINESS COLUMNS & BLOGS

Coronavirus spotlights perils of the global supply chain

BY BILL VIRGIN *CONTRIBUTING WRITER*

SCIENCE | CORONAVIRUS COVERAGE

U.S. has only a fraction of the medical supplies it needs to combat coronavirus

m/2020/03/05/world/europe/coronavirus-united-kingdom-national-health-service.html

The New York Times

The Coronavirus Outbreak | LIVE Latest Updates Maps How to Prepare Market Updates Newsletter

Doctors Say U.K. Is Ill Prepared for Coronavirus

The COVID-19 pandemic has forced public health professionals across the globe to reevaluate what it means to be prepared for, respond to, recover from, and mitigate disaster response.

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“We are not ready for the next pandemic”

Bill Gates, 2015

"It is 100% certain that pandemics will be a part of our future. The uncertainties are: when, how often and how severe.”

Frederik Kristensen, CEO of CEPI, 2021

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Scientist from all over the world have been warning on the threat posed by other viruses!

Now is the next time to prepare for the next pandemic!

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Working on preparedness

Several webinars, summits, workshops and conferences have been addressing preparedness at local, regional and global level:

- Global Pandemic Preparedness Summit & CEPI Replenishment (7-8 March 2022)
- Reimagining Preparedness in the era of COVID-19 – Preparedness Summit (4-7 April 2022)

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Crisis preparedness and response is a complex process – it requires training

"We can see the preparedness and response system as an adaptative complex system" (Plsek & Wilson, 2001).

During a pandemic crises:

- The professionals working to mitigate the crisis should know how to deal with paradox (i.e. they were trained), meaning that they accept several perspectives about the same reality;

- They are organized as a "self-organized" Tema, with distributed internal controle, with clear rules: action protocols, properly validated and tested;

- Tackling open to Innovation
  - "emergency" is a complex phenomena resulting from the "non-linear" interaction of many players

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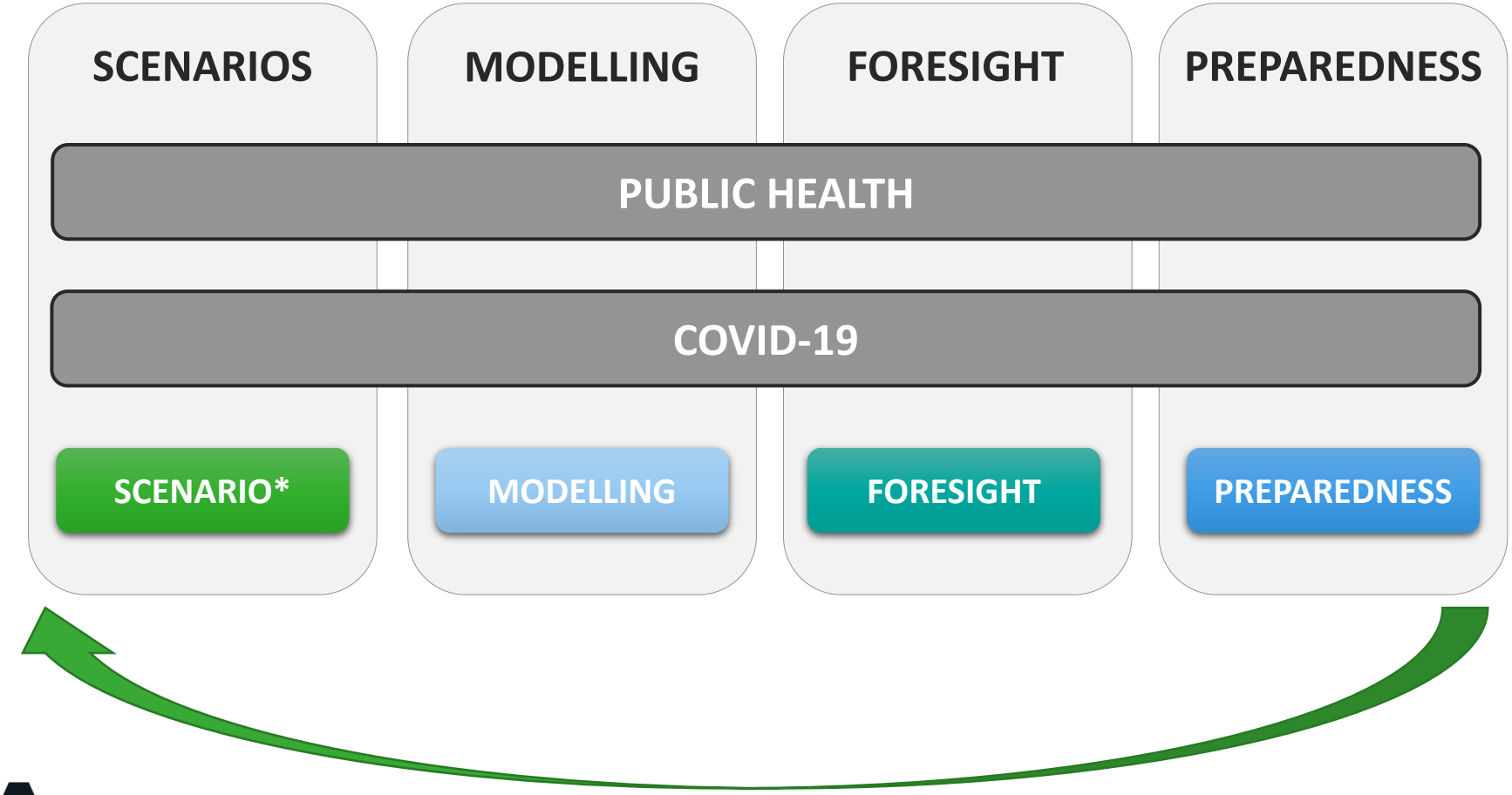
Combined Forecasting and Preparedness Framework



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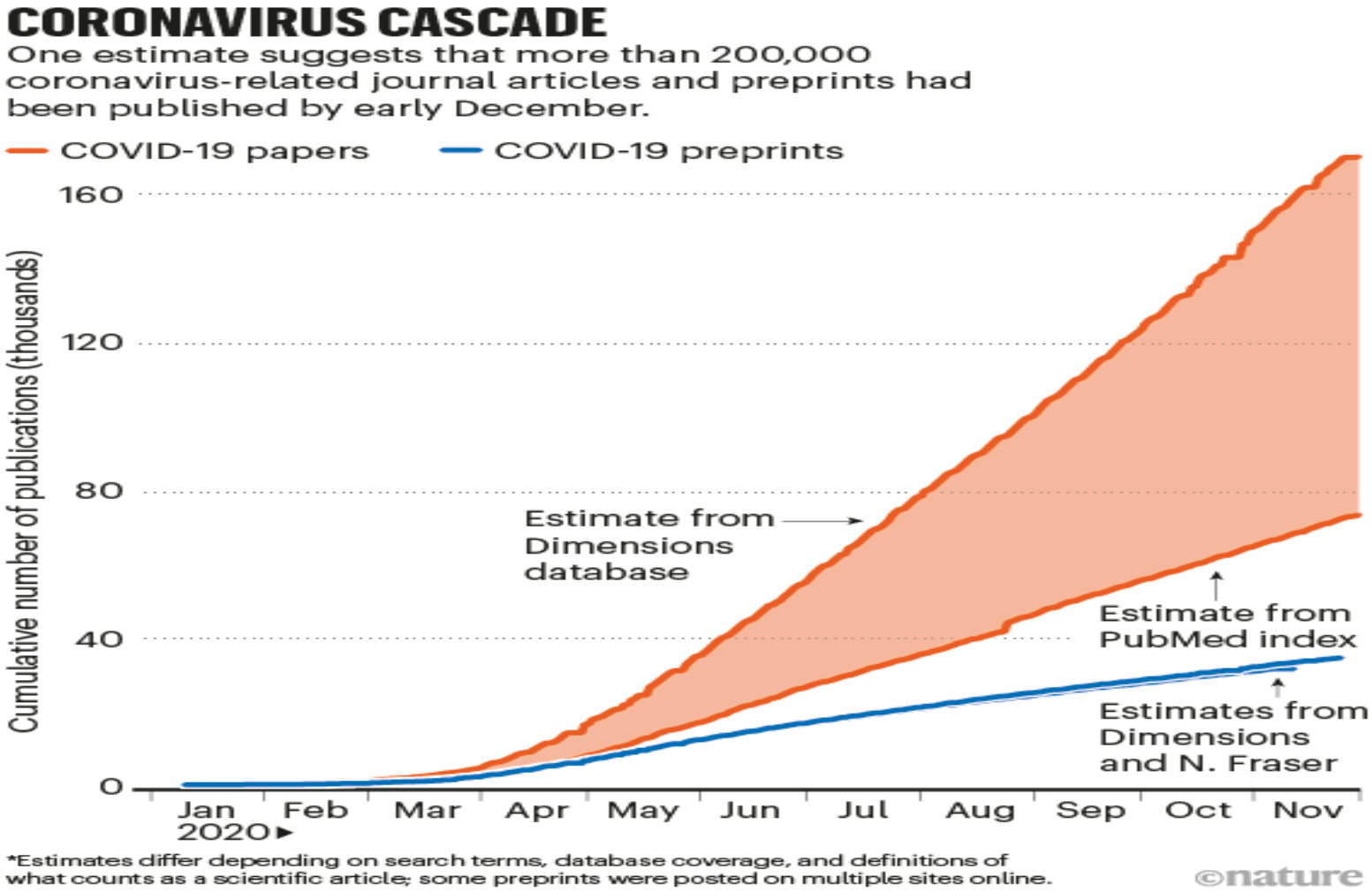
During Pandemic: How to deal with the information Deluge?



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“Public Health” AND “COVID-19” AND “Scenarios”

20 100 results *

* Without any restrictions

ECONOMICS	McKibbin, W. J., & Fernando, R. (2020). *The global macroeconomic impacts of COVID-19: Seven scenarios.*
	Ataguba, John E. "COVID-19 pandemic, a war to be won: understanding its economic implications for Africa." (2020): 1-4.
INTERVENTIONS	Mukandavire, Zindoga, et al. "Quantifying early COVID-19 outbreak transmission in South Africa and exploring vaccine efficacy scenarios." *PloS one* 15.7 (2020): e0236003.
	Augeraud-Véron, Emmanuelle. "Lifting the COVID-19 lockdown: different scenarios for France." *Mathematical Modelling of Natural Phenomena* 15 (2020): 40.
	Wallentin, Gudrun, Dana Kaziyeva, and Eva Reibersdorfer-Adelsberger. "COVID-19 intervention scenarios for a long-term disease management." *International journal of health policy and management* 9.12 (2020): 508-516.
	Wu, Huai-liang, et al. "Facemask shortage and the novel coronavirus disease (COVID-19) outbreak: Reflections on public health measures." *EClinicalMedicine* (2020): 100329.
	Nussbaumer-Streit, Barbara, et al. "Quarantine alone or in combination with other public health measures to control COVID-19: a rapid review." *Cochrane Database of Systematic Reviews*9 (2020).

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“Public Health” AND “COVID-19” AND “Modeling”

28 200 results *

* Without any restrictions

STRATEGIES

Reddy, Krishna P., et al. "Cost-effectiveness of public health strategies for COVID-19 epidemic control in South Africa: a microsimulation modelling study." *The Lancet Global Health*(2020).

Meehan, Michael T., et al. "Modelling insights into the COVID-19 pandemic." *Paediatric respiratory reviews* (2020).

Kretzschmar, Mirjam E., et al. "Impact of delays on effectiveness of contact tracing strategies for COVID-19: a modelling study." *The Lancet Public Health* 5.8 (2020): e452-e459.

Ogden, Nick H., et al. "Artificial intelligence in public health: Modelling scenarios of the epidemic of COVID-19 in Canada." *Canada Communicable Disease Report* 46.8 (2020): 198.

Prem, Kiesha, et al. "The effect of control strategies to reduce social mixing on outcomes of the COVID-19 epidemic in Wuhan, China: a modelling study." *The Lancet Public Health* (2020).

Tsang, Tim K., et al. "Effect of changing case definitions for COVID-19 on the epidemic curve and transmission parameters in mainland China: a modelling study." *The Lancet Public Health*(2020).

McBryde, Emma S., et al. "Role of modelling in COVID-19 policy development." *Paediatric respiratory reviews* (2020).

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“Public Health” AND “COVID-19” AND “Foresight”

1 490 results *

* Without any restrictions

POLITICAL	Greer, Scott, and Anniek de Ruijter. "EU health law and policy in and after the COVID-19 crisis." *The European Journal of Public Health* 30.4 (2020): 623.
	Donthu, Naveen, and Anders Gustafsson. "Effects of COVID-19 on business and research." *Journal of business research* 117 (2020): 284.
	Hilderink, Henk BM. "The corona crisis and the need for public health foresight studies." (2020): 616-616.
SOCIAL	Monaghan, Lee F. "Coronavirus (COVID-19), pandemic psychology and the fractured society: a sociological case for critique, foresight and action." *Sociology of Health & Illness*(2020).
	Buheji, Mohamed, and I. J. Y. E. Founding. "Future Foresight of Post COVID-19 Generations." *International Journal of Youth Economy* 4.1 (2020).
ENVIRONMENTAL	Buheji, Mohamed, and Dunya Ahmed. "Foresight of Coronavirus (COVID-19) opportunities for a better world." *American Journal of Economics* 10.2 (2020): 97-108.
	Machado, Silvia, and Samina Mehnaz. "Foresight from the impacts of COVID-19 on air pollution." (2020): 1-3.

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“Public Health” AND “COVID-19” AND “Preparedness”

23 600 results *

* Without any restrictions

PAST

World Health Organization. *Critical preparedness, readiness and response actions for COVID-19: interim guidance, 4 November 2020*. No. WHO/COVID-19/Community_Actions/2020.5. World Health Organization, 2020.

Chetterje, Patralekha. "Gaps in India's preparedness for COVID-19 control." *The Lancet Infectious Diseases* 20.5 (2020): 544.

Gudi, Sai Krishna, and Komal Krishna Tiwari. "Preparedness and lessons learned from the novel coronavirus disease." *The International Journal of Occupational and Environmental Medicine* 11.2 (2020): 108.

FUTURE

World Health Organization. *Critical preparedness, readiness and response actions for COVID-19: interim guidance, 4 November 2020*. No. WHO/COVID-19/Community_Actions/2020.5. World Health Organization, 2020.

Jacobsen, Kathryn H. "Will COVID-19 generate global preparedness?." *The Lancet* 395.10229 (2020): 1013-1014.

Pak, Anton, et al. "Economic consequences of the COVID-19 outbreak: the need for epidemic preparedness." *Frontiers in public health* 8 (2020).

Smith, Nathaniel, and Michael Fraser. "Straining the system: Novel coronavirus (COVID-19) and preparedness for concomitant disasters." (2020): 648-649.

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COVID-19 models and forecasting

Data-driven methods for present and future pandemics: 3M approach

Monitoring, modelling and managing

Data-driven tools are fundamental to:

- monitor the spread of the epidemic and assess the potential impact of adopted countermeasures, not only from a healthcare perspective but also from a socioeconomic one;
- model and forecast the epidemic evolution;
- manage the epidemic by making timely decisions to mitigate and suppress the contagion.

Alamo et al, 2021

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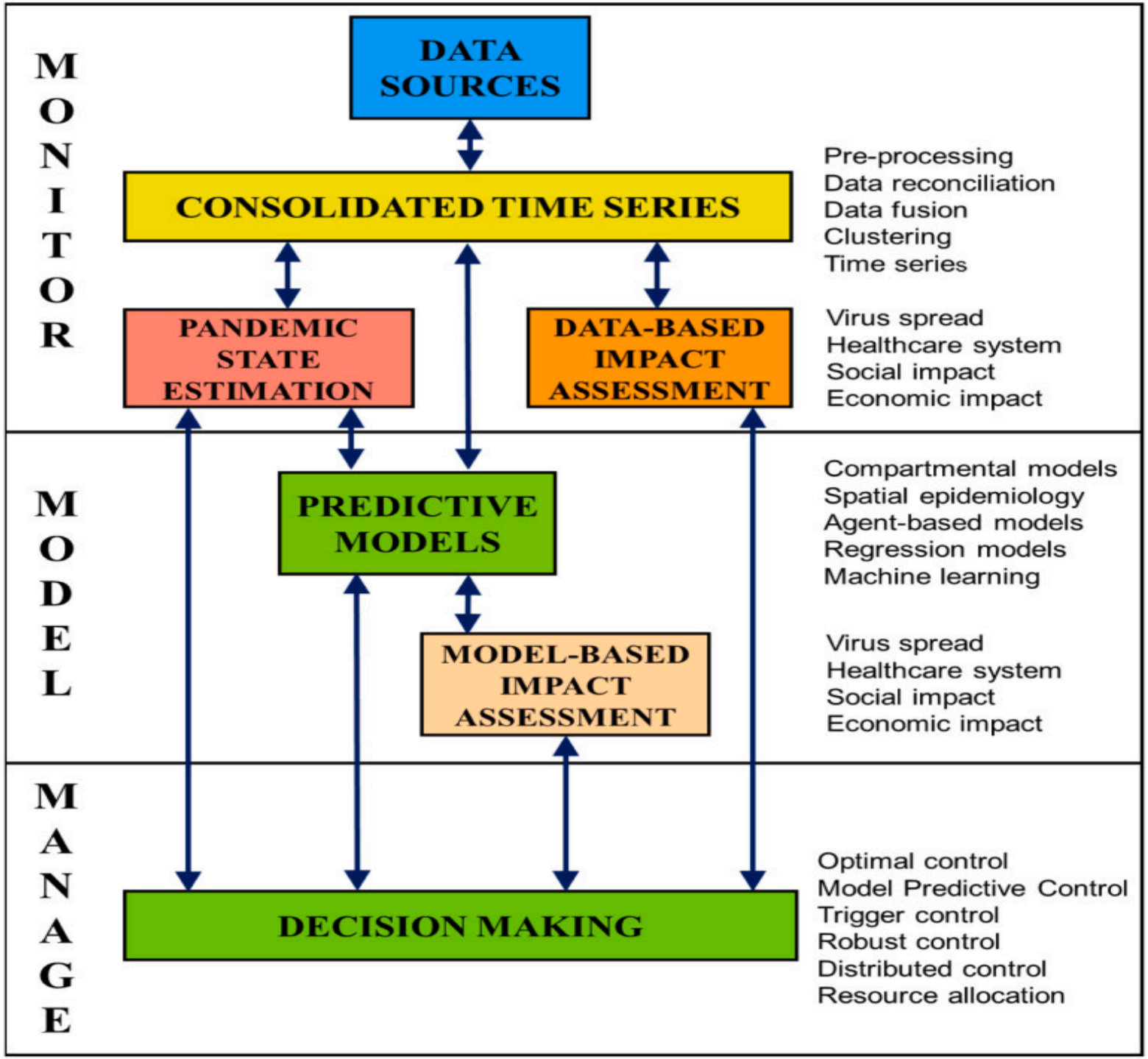

PREPAREDNESS

Alamo et al, 2021

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COVID-19 models and forecasting

In the understanding of change: from pandemic to endemic

This 3M-approach also shows the importance of the real-time surveillance of the epidemic, that was implemented by monitoring mobility, using social media to assess the compliance to restrictions and recommendations, pro-active testing, contact-tracing, etc. The design and implementation of surveillance systems capable of early detecting secondary epidemic waves is also very important.

Alamo et al, 2021

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Current as of May 20, 2020

Scenarios B2, A1, A2, and A3 have varying profiles of effectiveness of public health and economic interventions

Fonte: COVID-19 Briefing materials: Global health and crisis response, McKinsey, 2020

B2

Virus recurrence; slow long-term growth insufficient to deliver full recovery

Ineffective economic interventions, effective public health response

Slow long-term growth insufficient to deliver full recovery of world output to 2019Q4 levels until 2026

Economic policy is ineffective spurring self-reinforcing recession dynamics and meager growth results that cause long-term structural damage to the economy

Long-term capacity of the economy to deliver output is reduced as

- Widespread business closures lead to a reduction in the physical capital stock
- Employment levels and participation rates drop as individuals drop out of the labor force
- Productivity growth to near-zero as investment in innovation and human and physical capital stagnates

A1

Virus recurrence; slow long-term growth with muted world recovery

Partially effective economic interventions, effective public health response

Slow long-term growth with muted world recovery returning output to 2019Q4 levels in late 2022

Economic policy responses are effective in stopping the rapid decline of the economy in 2020, but are insufficient to raise confidence and restart growth

Insufficient government stimulus in the face of recurrent regional lockdowns result in

- Significant business closures and lack of confidence lead businesses to pull back on investment and fragmentation of supply chains
- Widespread job losses and continued weakness in consumer spending as as household focus on necessities
- Steep drop in tourism, and other service related industries persist

A2

Virus recurrence; return to trend growth with strong world rebound

Highly effective economic interventions, effective public health response

Return to trend growth with strong world rebound returning output to 2019Q4 levels in late 2021

Economic policy responses deliver robust relief packages that not-only back-stop activity in 2020 but also deliver sufficient stimulus to raise confidence and drive growth in 2021

Fiscal and monetary authorities take measures to boost effectiveness and speed of policy impact

- Fewer bankruptcies and layoffs support stronger business investment and release pent-up demand driving more spending
- Increase in business and consumer confidence is boosted by more effective public health responses that successfully contain the regional virus occurrences and fewer periodic restrictions

A3

Virus contained; growth returns

Partially effective economic interventions, rapid and effective control of virus spread

Return to trend growth with world rebound returning output to 2019Q4 levels in late 2020

Economic policy responses are effective in stopping the rapid decline of the economy in 2020 and return the economy to pre-crisis levels after the virus is quickly contained in Q2

Fiscal and monetary authorities mitigate economic damage with only some delays in transmission

- Fewer bankruptcies and layoffs support stronger business investment and release pent-up demand driving more spending
- Business and consumer confidence is quickly restored by effective public health responses

Preparedness and logistics in crisis management

Checklist provided by the Medicis-Sen Frontrieres (2020)

- **Evaluate logistic resources and identify key missing resources** (materials, transports, energy)
- **Check the *stocks* of equipments** (PPE, food, medicines) and **esterilization capacity**
- Check **communication capacity**
- **Evaluate availability of water, electricity and food to support response teams**
- Check **availability of skilled human resources**
- **Visit and assess available services (beds, isolation rooms, logistic chain, water supply)**
- Evaluate the **potential demand for additional care**
- Evaluate the **security aspects**

Medicis-Sen Frontrieres (2020)

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PREPAREDNESS AND LOGISTICS IN CRISIS MANAGEMENT

Checklist provided by the Medicis-Sen Frontrieres (2020)

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Preparedness and logistics in crisis management

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A new understanding of pandemic and epidemic risks

We need the capability to analyse and interpret data so that they become useful information, and we need to understand the context of that information to turn it into the intelligence that policy- and decision-makers need for action. Moreover, we must do this equitably, bringing these capabilities to all countries and communities of the world in a collaborative way so that we all benefit. The WHO Hub for Pandemic and Epidemic Intelligence (the WHO Hub) will be the catalyst for creating this new approach.

(WHO 2021)

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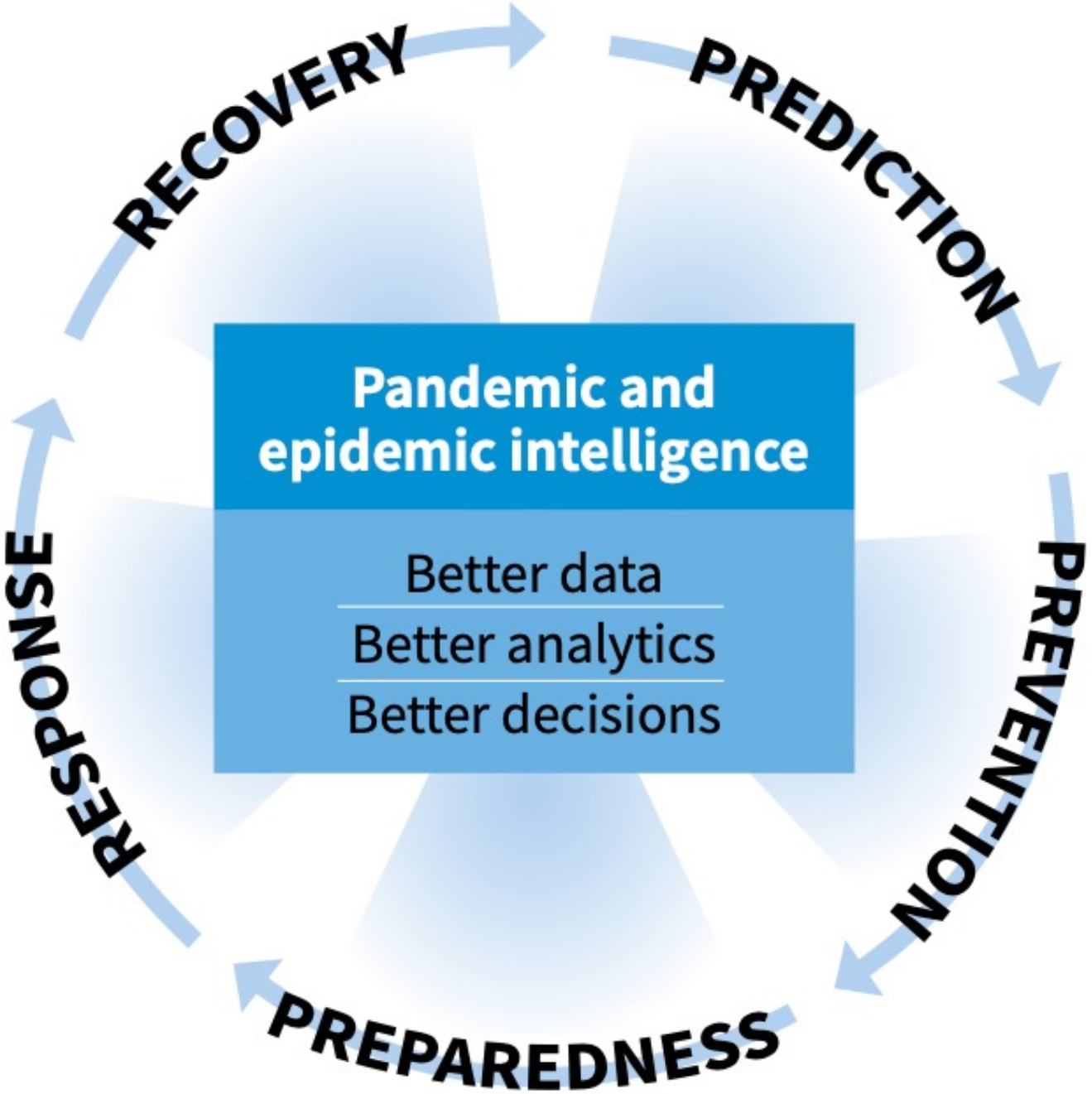

WHOI, 2021

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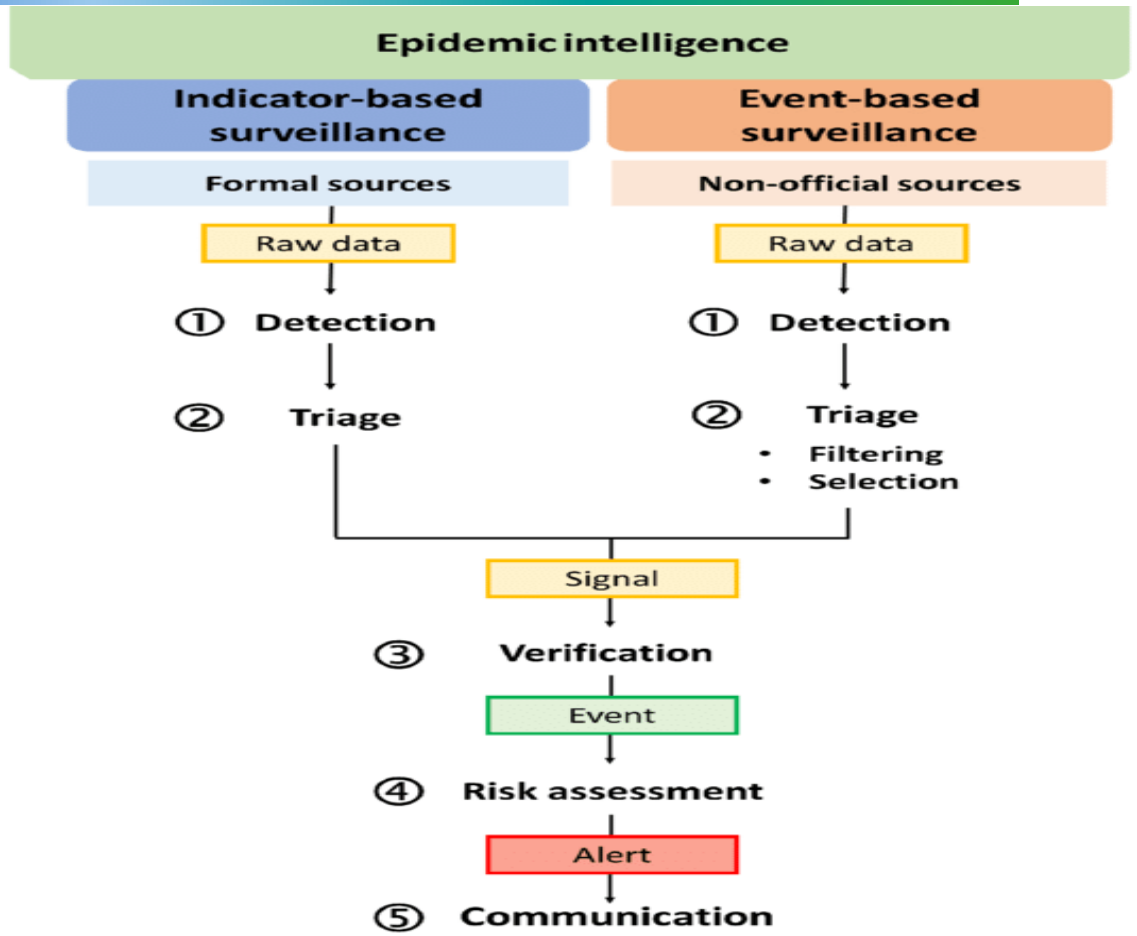
From surveillance to pandemic and epidemic intelligence



In the understanding of change: from pandemic to endemic

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Manage information properly

- Frequent fragility in responding to crisis situations: information management.
- Avoid incomplete records or double counting of cases.
- Information must be shared correctly and in a timely manner to allow for an agile response (WHO, 2021).
- Ensure data security, privacy and protection of patients and victims, avoiding the potential risk of social stigmatization.
- Ability to store information, in order to free professionals in the field of this task (Lapão et al, 2020).

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(Hyper-)endemic management

Endemic refers to the constant presence and/or usual prevalence of a disease or infectious agent in a population within a geographic area. Hyperendemic refers to persistent, high levels of disease occurrence. (CDC, 2022)

- The health systems needs to be organized to cope with hyperendemics
- Information management is key!
- Skilled human resources are paramount to address the many challenges

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Summary

- Public Health strategy and planning should include Foresight and Preparedness;
- Lessons learned;
- Human resources training;
- Digital public health tools and infrastructure;
- Faster vaccine development and more equitable access;

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References

- Alamo T, G Reina D, Millán Gata P, Preciado VM, Giordano G. Data-driven methods for present and future pandemics: Monitoring, modelling and managing. *Annu Rev Control*. 2021;52:448-464. doi:10.1016/j.arcontrol.2021.05.003
- Ashley[a]; Jain, Vageesh[b]; Alimi, Yewande[c]; Bausch, Daniel G.[a] Policy and planning for large epidemics and pandemics – challenges and lessons learned from COVID-19, Current Opinion in Infectious Diseases: October 2021 - Volume 34 - Issue 5 - p 393-400 doi: 10.1097/QCO.0000000000000778
- CEPI. The global pandemic preparedness summit: On the road to 100-day vaccines. 2022.

  https://cepi.net/news_cepi/the-global-pandemic-preparedness-summit-on-the-road-to-100-day-vaccines/ Sharp,
- LV Lapão, A Silva, N Pereira (2015) Ebola impact on African health systems entails a quest for more international and local resilience: the case of African Portuguese speaking countries. The Pan African Journal
- Luís Velez Lapão, "Preparação para a Resposta a Situações de Crise: A Resiliência Assente na Capacitação com Sistemas Inteligentes de Apoio à Decisão." Nação e Defesa (2020).MSF, 2020. Médecins sans frontiers: Ebola. Disponível em http://www.msf-azg. be/fr/
- theme/ebola

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References

- Rosenfeld R, Tibshirani Rj. Epidemic tracking and forecasting: Lessons learned from a tumultuous year. PNAS, Vol. 118, No 51, 2021. https://doi.org/10.1073/pnas.2111456118.
- The Academy of Medical Sciences. *COVID-19: looking ahead to winter 2021-22 and beyond*. 2021. https://acmedsci.ac.uk/policy/policy-projects/covid-19-looking-ahead-to-winter-2021-22-and-beyond
- Wei EK, Long T, Katz MH. Nine Lessons Learned From the COVID-19 Pandemic for Improving Hospital Care and Health Care Delivery. *JAMA Intern Med.* 2021;181(9):1161–1163. doi:10.1001/jamainternmed.2021.4237
- World Health Organization. (2021). Framework and toolkit for infection prevention and control in outbreak preparedness, readiness and response at the national level.
- World Health Organization (WHO). WHO HUB for pandemic and epidemic intelligence. Better data. Better analytics. Better decisions. Geneva. 2021. https://cdn.who.int/media/docs/default-source/2021-dha-docs/who_hub.pdf?sfvrsn=8dc28ab6_5

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Thank you

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