UNIVERSITÉ DE GENÈVE
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Hôpitaux Universitaires Genève

# L'approche "precision public health" pour mieux éclairer les politiques publiques

Antoine Flahault

Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

Département fédéral de l'intérieur DFI

**Office fédéral de la santé publique OFSP**
Unité de direction Prévention et services de santé

**Health Equity Forum « Equité dans les soins : nouveaux savoirs et défis »**

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# La science des données a révolutionné la santé globale

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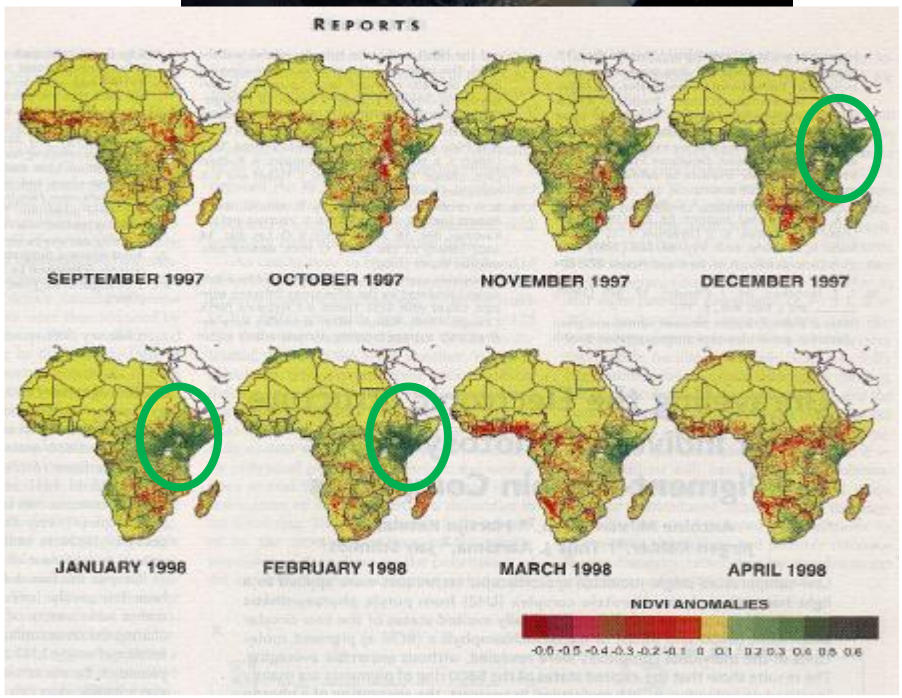
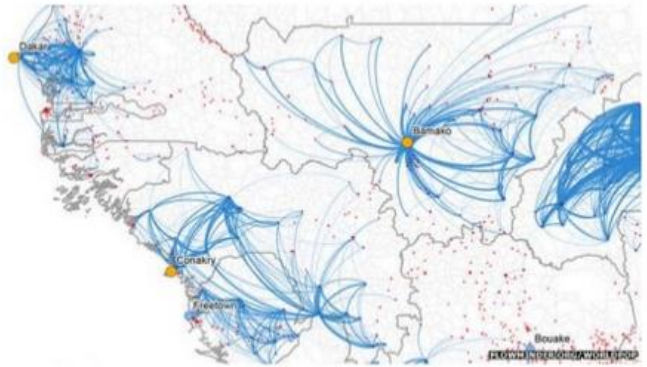
MÉDECINE TROPICALE ET HUMANITAIRE


## mHealth and Big Data



""We've never had this large-scale, anonymised mobile phone d
before as a species," says Nuria Oliver, a scientific director at m
phone company Telefonica." BBC News

Matthew Wall, "Ebola: Can big data analytics help contain its spread?", 14 October, BBC News, http://www.bbc.com/news/business-29617831

norut

**…avec pour objectif la santé publique de précision**

# La science si elle veut prétendre éclairer les décisions publiques, a besoin de mieux décrire et prédire les épidémies.


# Mais elle échoue en cela…

January 13, 2013 | 1:56 PM | Carey Goldberg

nature International weekly journal of science

Home | News & Comment | Research | Careers & Jobs | Current Issue | Archive

Archive > Volume 494 > Issue 7436 > News > Article

NATURE | NEWS

عربي

## When Google got flu wrong

**US outbreak foxes a leading web-based method for tracking seasonal flu.**

Declan Butler

13 February 2013

**Predicted Cases vs. Reported Cases in Liberia**

EPIDEMIOLOGY

## Models overestimate Ebola cases

*Rate of infection in Liberia seems to plateau, raising questions over the usefulness of models in an outbreak.*

NATURE | VOL 515 | 6 NOVEMBER 2014

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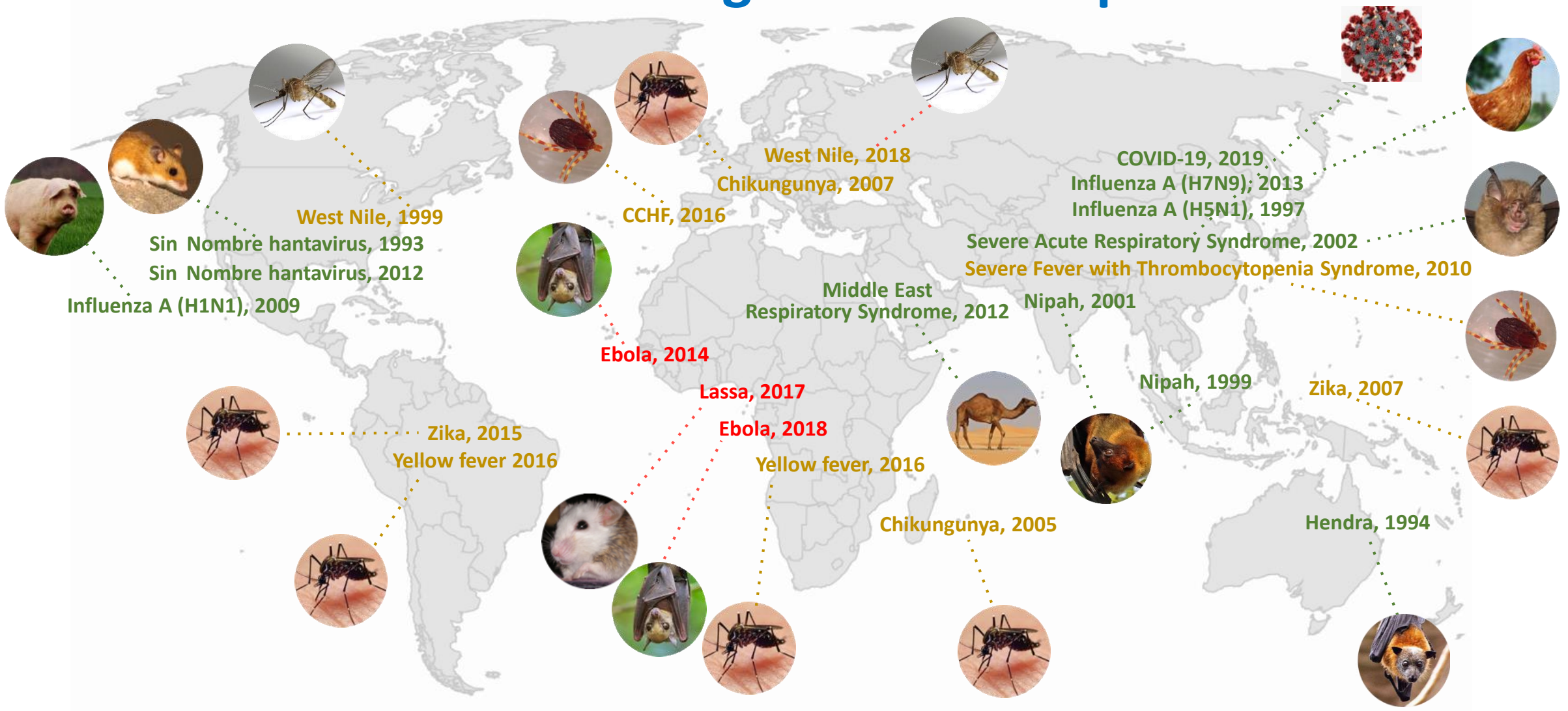
SSPH+ SWISS SCHOOL OF PUBLIC HEALTH +

# Aucune de ces récentes maladies infectieuses émergentes n'a été prevue !




Respiratory viruses | Arthropod-borne viruses (Arboviruses) | Hemorrhagic fever viruses

*Courtesy of Prof. Isabella Exckerle, 2019*

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# Même pour le COVID-19, les modèles ont échoué à prédire correctement

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## WHY PREDICTIVE MODELING IS CRITICAL IN THE FIGHT AGAINST COVID-19?

DEPARTMENT OF EVIDENCE AND INTELLIGENCE FOR ACTION IN HEALTH
OFFICE OF THE ASSISTANT DIRECTOR
www.paho.org/ish

ELSEVIER
Contents lists available at ScienceDirect
International Journal of Forecasting
journal homepage: www.elsevier.com/locate/ijforecast

## Forecasting for COVID-19 has failed

John P.A. Ioannidis [a,*], Sally Cripps [b], Martin A. Tanner [c]

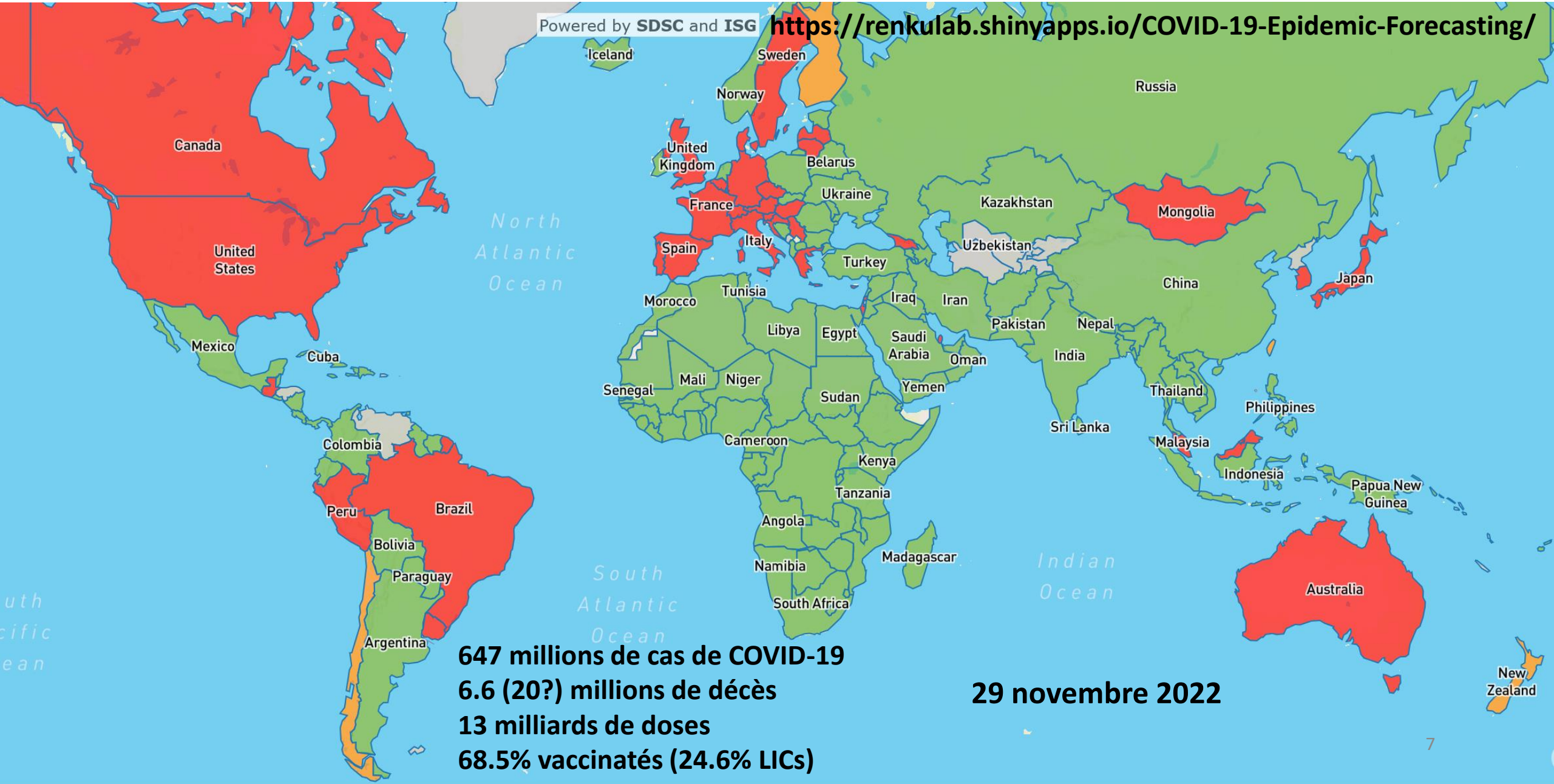
*The Journal of Infectious Diseases*
SUPPLEMENT ARTICLE
IDSA Infectious Diseases Society of America
hivma hiv medicine association
OXFORD

## Epidemic Forecasting is Messier Than Weather Forecasting: The Role of Human Behavior and Internet Data Streams in Epidemic Forecast

**Kelly R. Moran,[1] Geoffrey Fairchild,[1] Nicholas Generous,[1] Kyle Hickmann,[2] Dave Osthus,[3] Reid Priedhorsky,[4] James Hyman,[2,5] and Sara Y. Del Valle[1]**

[1]Analytics, Intelligence, and Technology Division, [2]Theoretical Division, [3]Computer, Computational & Statistical Sciences Division, [4]High Performance Computing Division, Los Alamos National Laboratory, New Mexico; and [5]Department of Mathematics, Tulane University, New Orleans, Louisiana

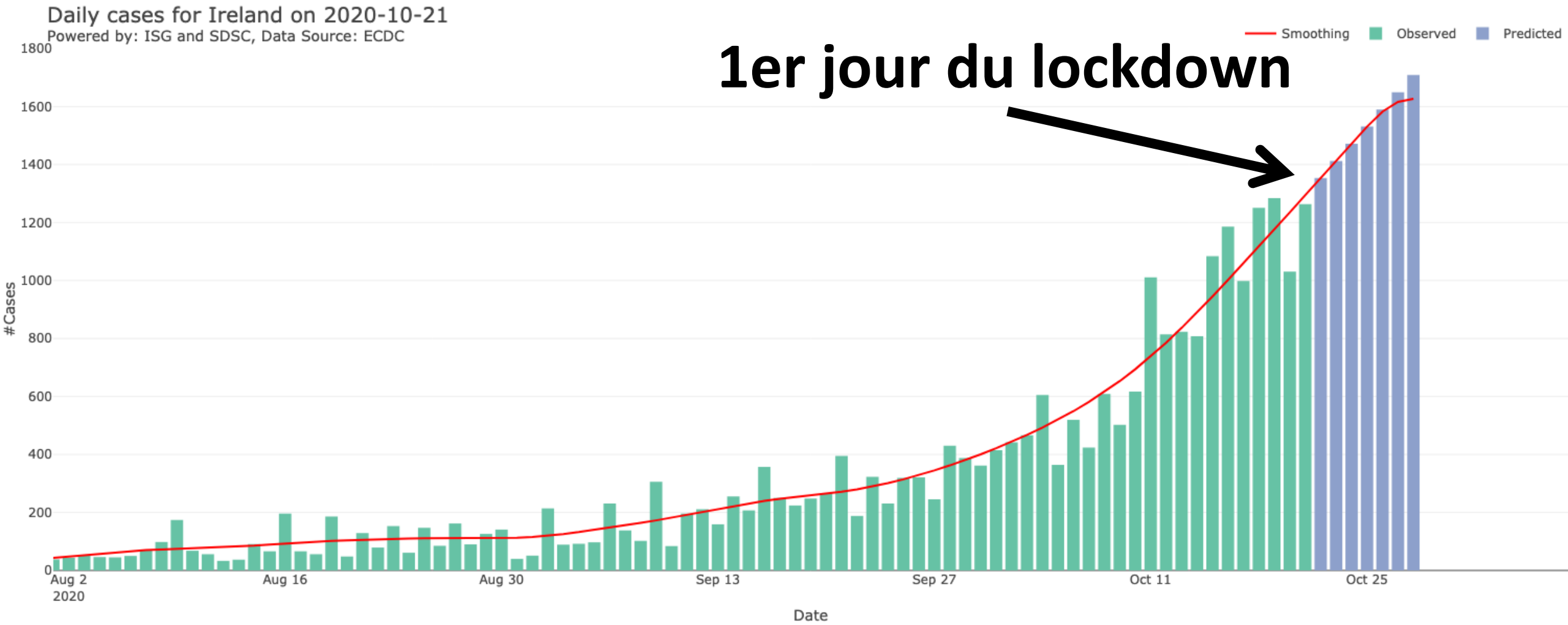
# Nos prévisions du COVID-19… à 7 jours




**647 millions de cas de COVID-19**
**6.6 (20?) millions de décès**
**13 milliards de doses**
**68.5% vaccinatés (24.6% LICs)**

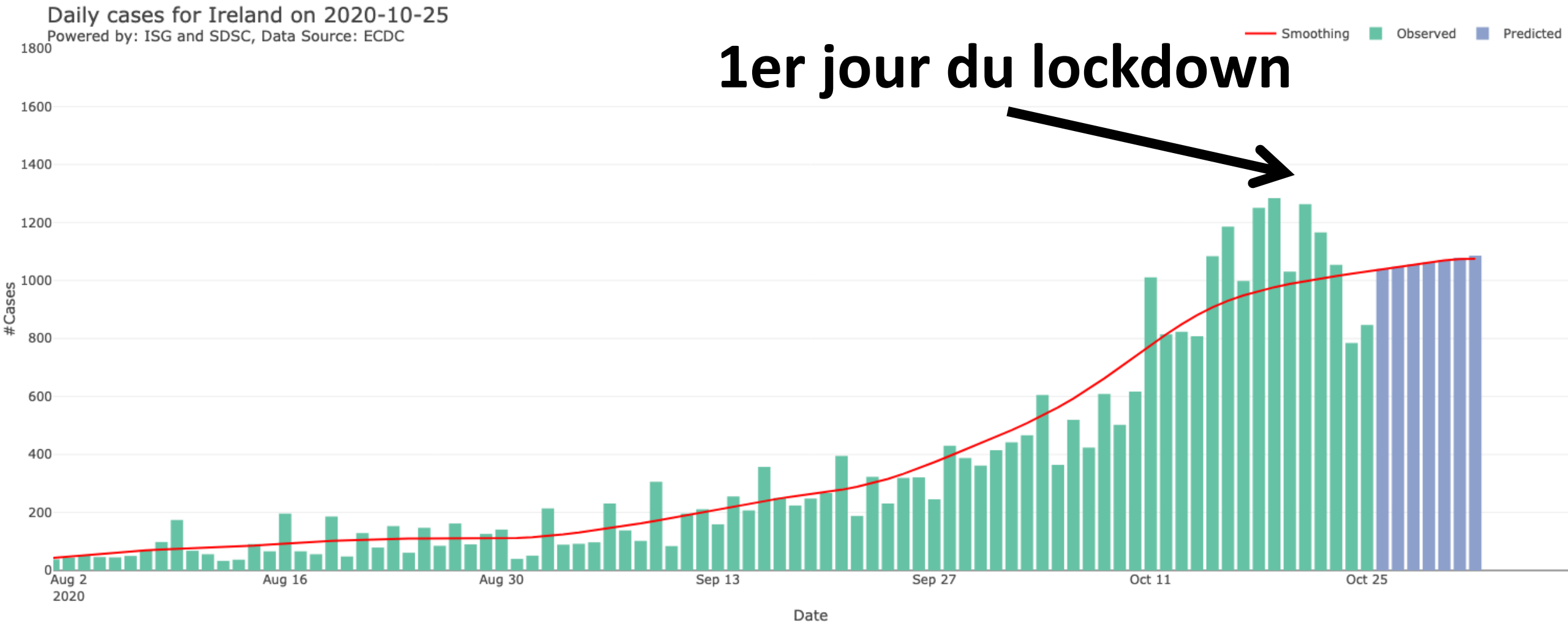
**29 novembre 2022**

# Irlande: 21 octobre 2020



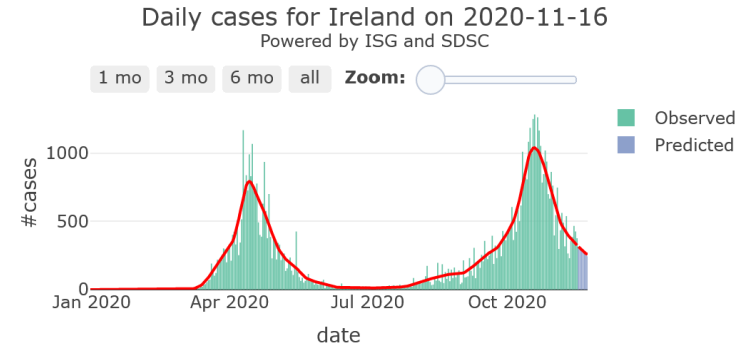

https://renkulab.shinyapps.io/COVID-19-Epidemic-Forecasting/

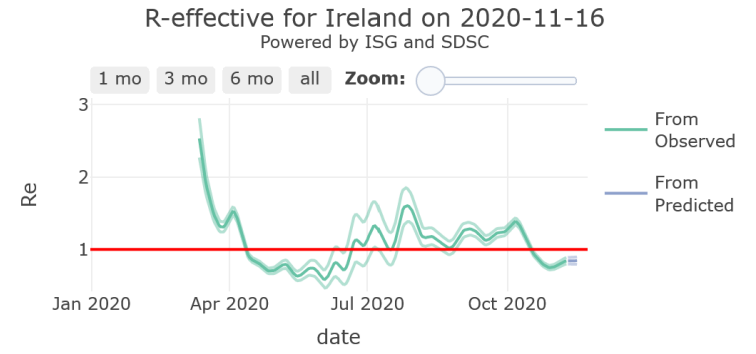
# Irlande: 25 octobre 2020

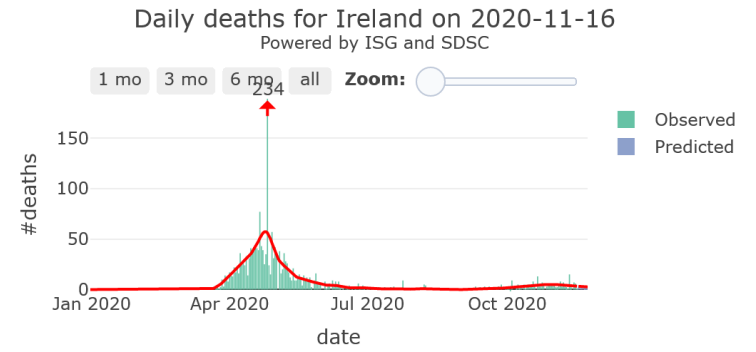



https://renkulab.shinyapps.io/COVID-19-Epidemic-Forecasting/

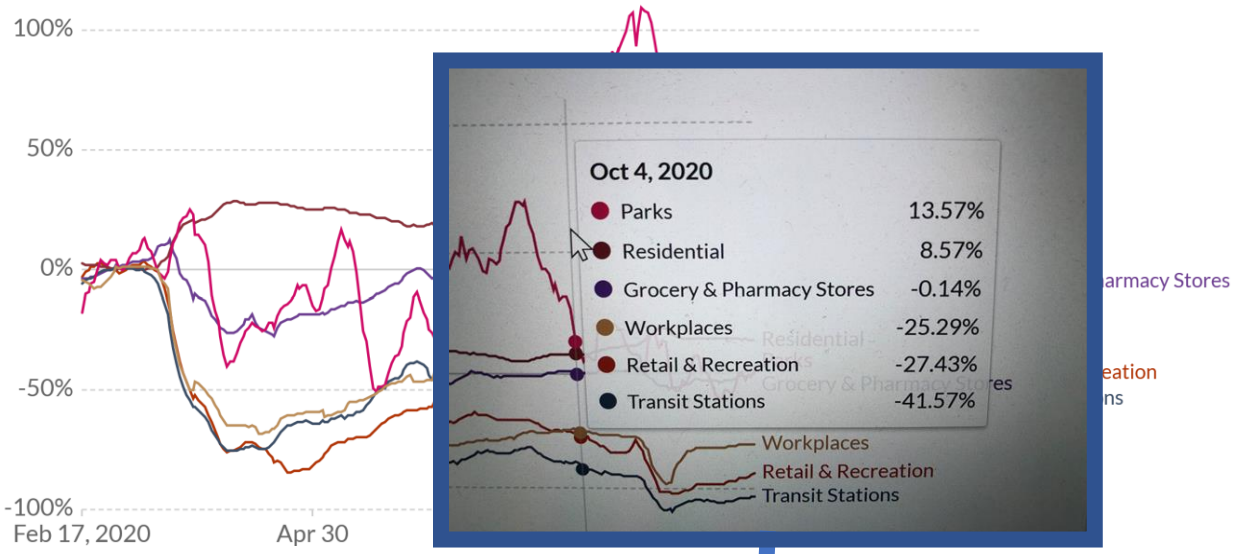
# Le facteur humain




## Irlande :
## Lockdown d'octobre 2020




Source: Google COVID-19 Community Mobility Trends – Last updated 30 November, 17:02 (London time)
Note: It's not recommended to compare levels across countries; local differences in categories could be misleading.

**https://renkulab.shinyapps.io/COVID-19-Epidemic-Forecasting/**

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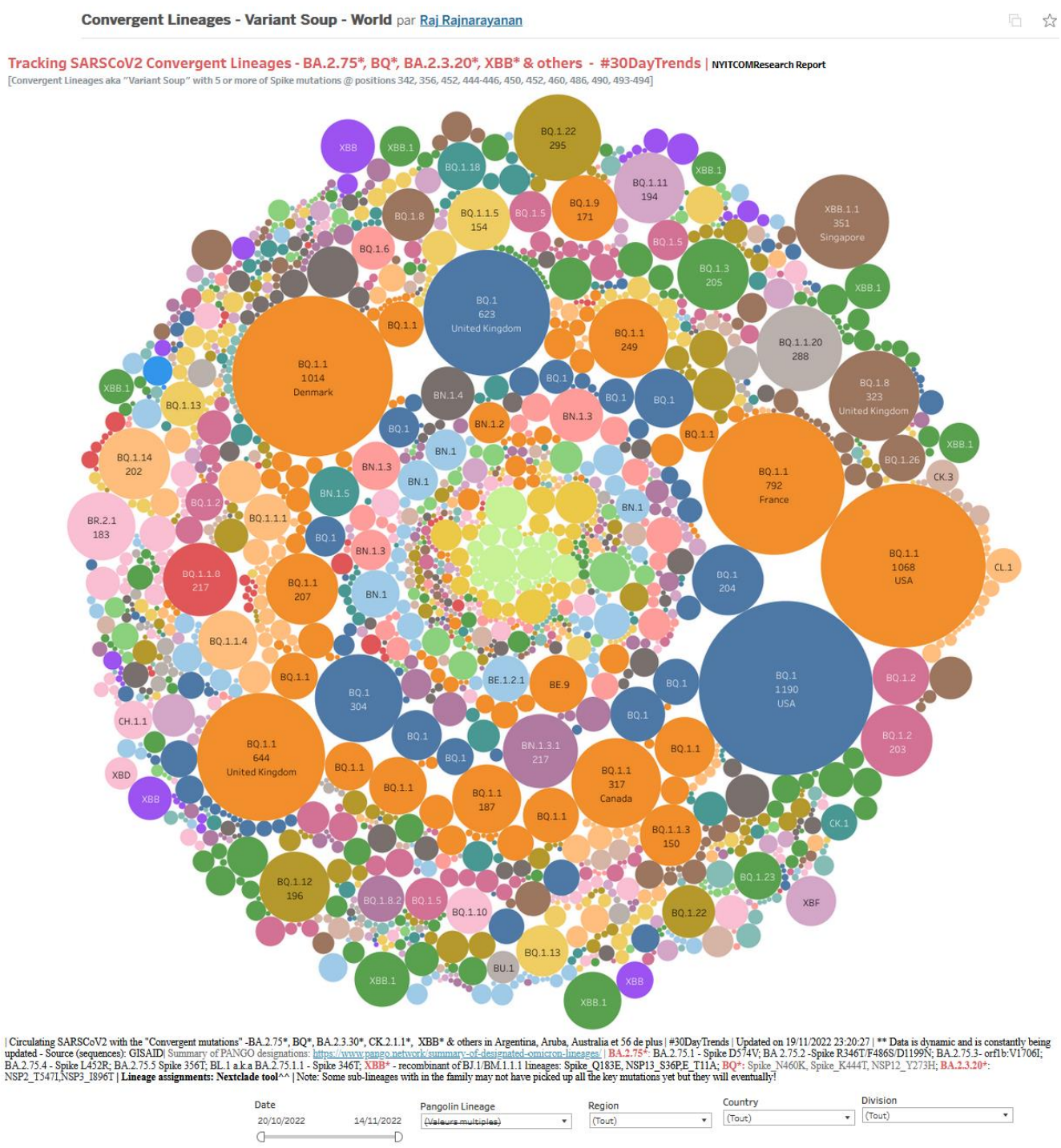
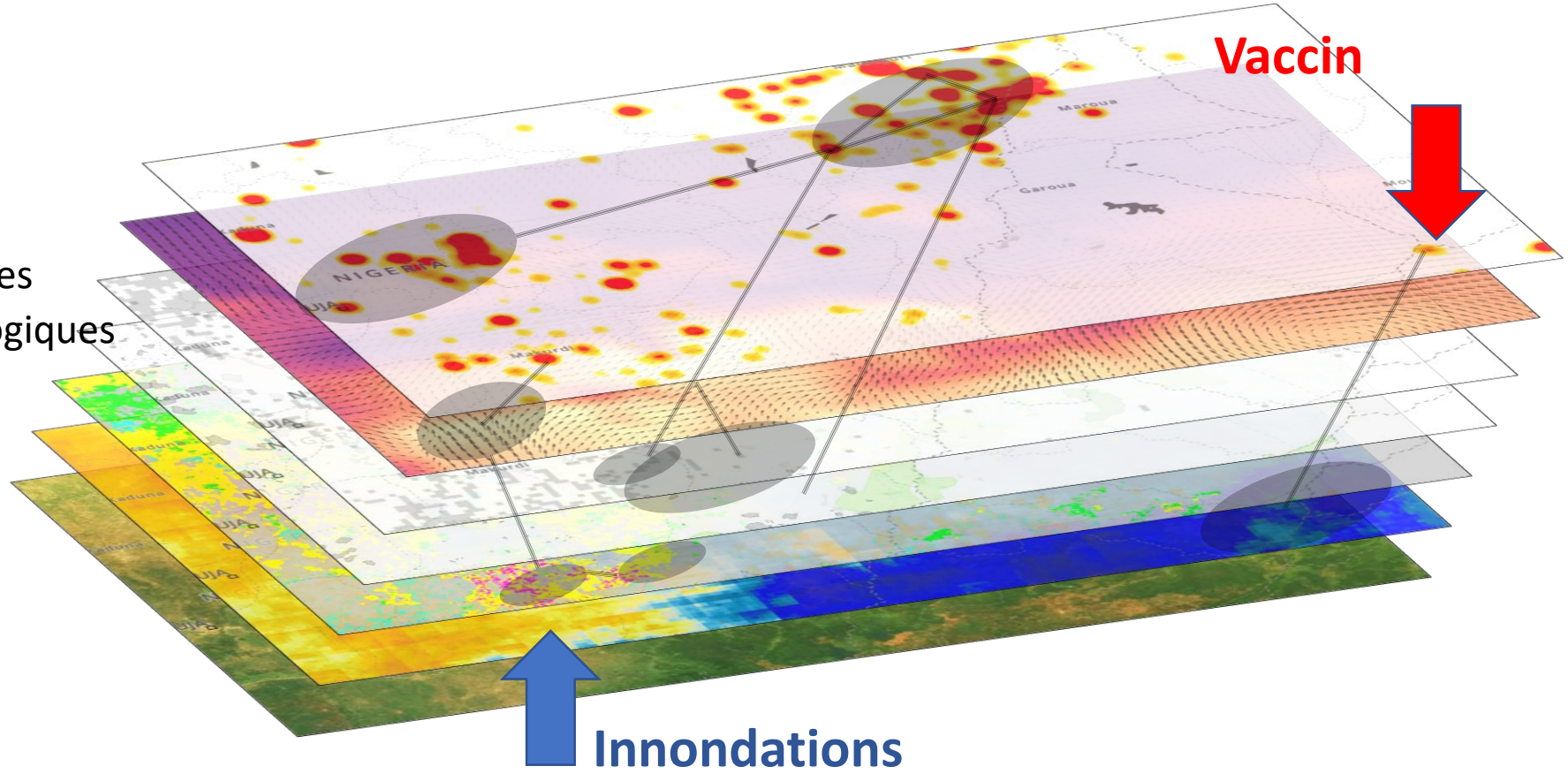
# La soupe de variants

**14 novembre 2022**



# Ce que l'on voudrait construire, c'est donc une technique de modélisation multi-niveaux, ou chaque strate d'information pourrait contribuer à la prédiction

Epidémiologie/veille sanitaire
Vecteurs
Données économiques et sociales
Données biologiques/immunologiques
Conditions Environnementales
Conditions climatiques
Imagerie satellitaire




Courtesy: N. Ray, Inst Glob Health, UNIGE, 2019

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# Conclusion: un champ actif de recherche..

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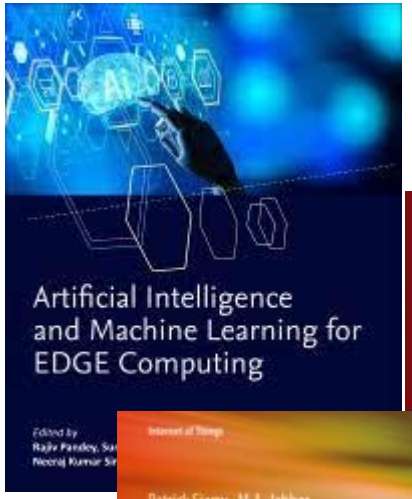




frontiers in Big Data

ORIGINAL RESEARCH
published: 13 January 2022
doi: 10.3389/fdata.2021.784159

## Correlation-Based Discovery of Disease Patterns for Syndromic Surveillance

*Michael Rapp*[1]*, *Moritz Kulessa*[1], *Eneldo Loza Mencía*[1] *and Johannes Fürnkranz*[2]

[1] *Knowledge Engineering Group, Technical University of Darmstadt, Darmstadt, Germany,* [2] *Computational Data Analysis Group, Johannes Kepler University Linz, Linz, Austria*

frontiers in Artificial Intelligence

REVIEW
published: 14 May 2021
doi: 10.3389/frai.2021.652669

## The Promise of AI in Detection, Diagnosis, and Epidemiology for Combating COVID-19: Beyond the Hype

*Musa Abdulkareem*[1,2,3]* *and Steffen E. Petersen*[1,2,3,4]

[1] *Barts Heart Centre, Barts Health National Health Service (NHS) Trust, London, United Kingdom,* [2] *National Institute for Health Research (NIHR) Barts Biomedical Research Centre, William Harvey Research Institute, Queen Mary University of London, London, United Kingdom,* [3] *Health Data Research UK, London, United Kingdom,* [4] *The Alan Turing Institute, London, United Kingdom*


Harvard Business Review

Analytics And Data Science | Why AI Failed to Li...

Analytics And Data Science

## Why AI Failed to Live Up to Its Potential During the Pandemic

by Bhaskar Chakravorti

March 17, 2022

Original Article

## Modified SEIR and AI prediction of the epidemics trend of COVID-19 in China under public health interventions

Zifeng Yang[1,2#], Zhiqi Zeng[1#], Ke Wang[3#], Sook-San Wong[1,4#], Wenhua Liang[1#], Mark Zanin[1,4#], Peng Liu[5#], Xudong Cao[5], Zhongqiang Gao[5], Zhitong Mai[1], Jingyi Liang[1], Xiaoqing Liu[1], Shiyue Li[1], Yimin Li[1], Feng Ye[1], Weijie Guan[1], Yifan Yang[6], Fei Li[6], Shengmei Luo[6], Yuqi Xie[1], Bin Liu[7], Zhoulang Wang[1], Shaobo Zhang[3], Yaonan Wang[3], Nanshan Zhong[1], Jianxing He[1]

Received: 26 September 2020 | Revised: 27 November 2020 | Accepted: 29 November 2020
DOI: 10.1002/rmv.2205

REVIEW

WILEY

## How artificial intelligence may help the Covid-19 pandemic: Pitfalls and lessons for the future

Yashpal Singh Malik[1,2] | Shubhankar Sircar[1] | Sudipta Bhat[1] | Mohd Ikram Ansari[1] | Tripti Pande[1] | Prashant Kumar[3] | Basavaraj Mathapati[4] | Ganesh Balasubramanian[5] | Rahul Kaushik[6] | Senthilkumar Natesan[7] | Sayeh Ezzikouri[8] | Mohamed E. El Zowalaty[9,10] | Kuldeep Dhama[11]

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# Santé Publique de Précision

HUG Hôpitaux Universitaires Genève
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Precision public health is about using the power of data to improve health and achieve social justice—equity, social inclusion, and empowerment. It should not be feared. It should be embraced.

*Richard Horton*
richard.horton@lancet.com


Richard Horton


Richard Horton

interventions of all kinds to those most in need. Nothing in this definition excludes the traditional concerns of public health. On the contrary, precision public health emphasises the importance of those determinants for communities that have been invisibilised. The fact is that the power of data to transform what we understand about the health predicaments of communities has entered a new era. Two examples. Work from the Institute for Health Metrics and Evaluation, published last month, reviewed over 200 geographically detailed surveys and censuses on child mortality across 46 African countries. When under-5 mortality was estimated at a spatial resolution of 5 km×5 km pixels, a remarkable and disturbing picture emerged. Far from showing the Context—the historical evolution of a country's health system, for example—matters. While digital tools offer tremendous opportunities, they cannot deliver their full value unless equal attention is paid to enlarging and improving the skills and capabilities of the health workforce. "Pilotitis"—a preoccupation with pilot projects that are ultimately unsustainable—must be avoided. Precision public health is about using the power of data to improve health and achieve social justice—equity, social inclusion, and empowerment. It should not be feared. It should be embraced.

*Richard Horton*
richard.horton@lancet.com