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Digital Public Health Framework 2.0

"Some hints for a research agenda"

Luís Velez Lapão

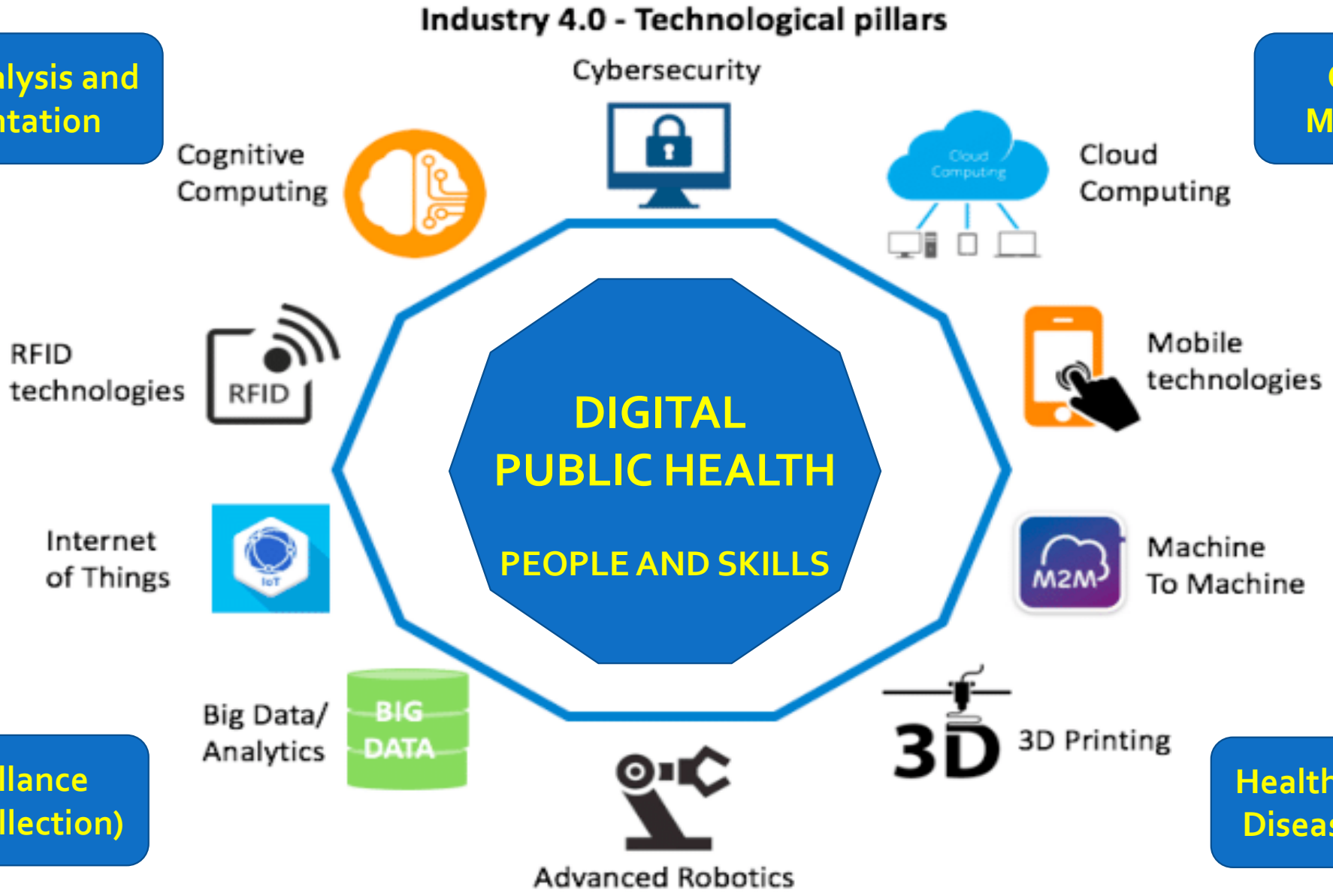
Prof. Global Health Information

UNIVERSIDADE NOVA DE LISBOA

25th May 2021

Public Health is Driven by Information

PUBLIC HEALTH 4.0 – Digital Public Health – Research Challenges



Data Analysis and Presentation

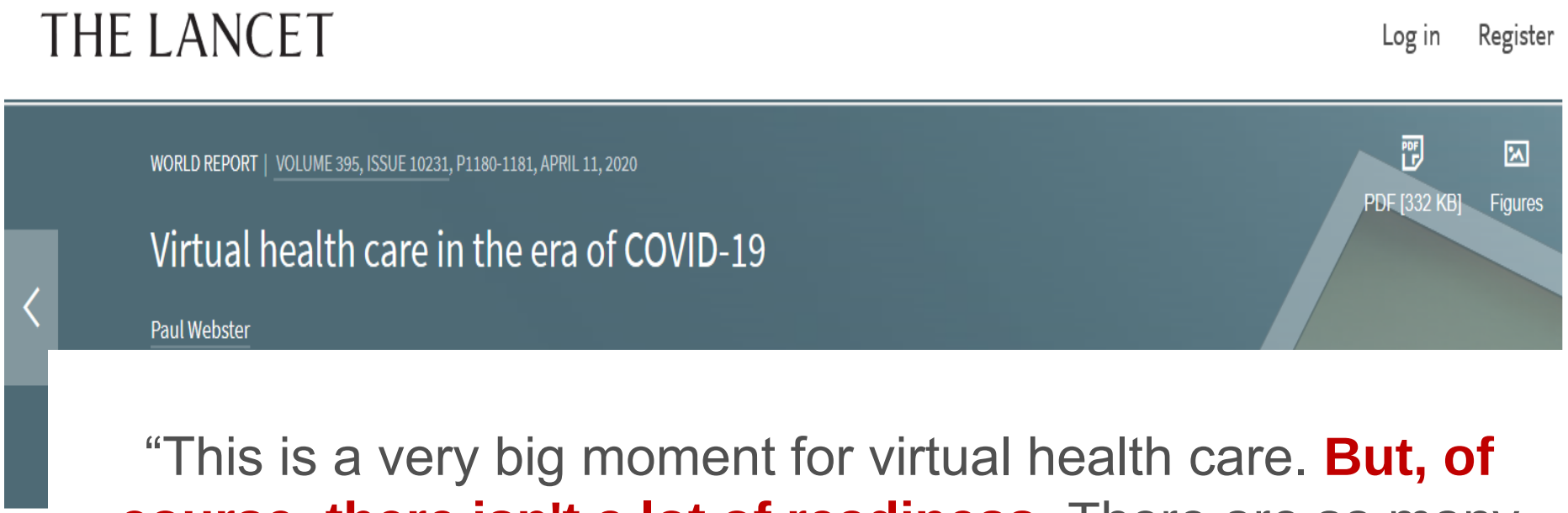
Outbreaks Management

Surveillance (Data Collection)

Health Promotion & Disease Prevention

ALIGNED DIGITAL HEALTH STRATEGY: An European Perspective

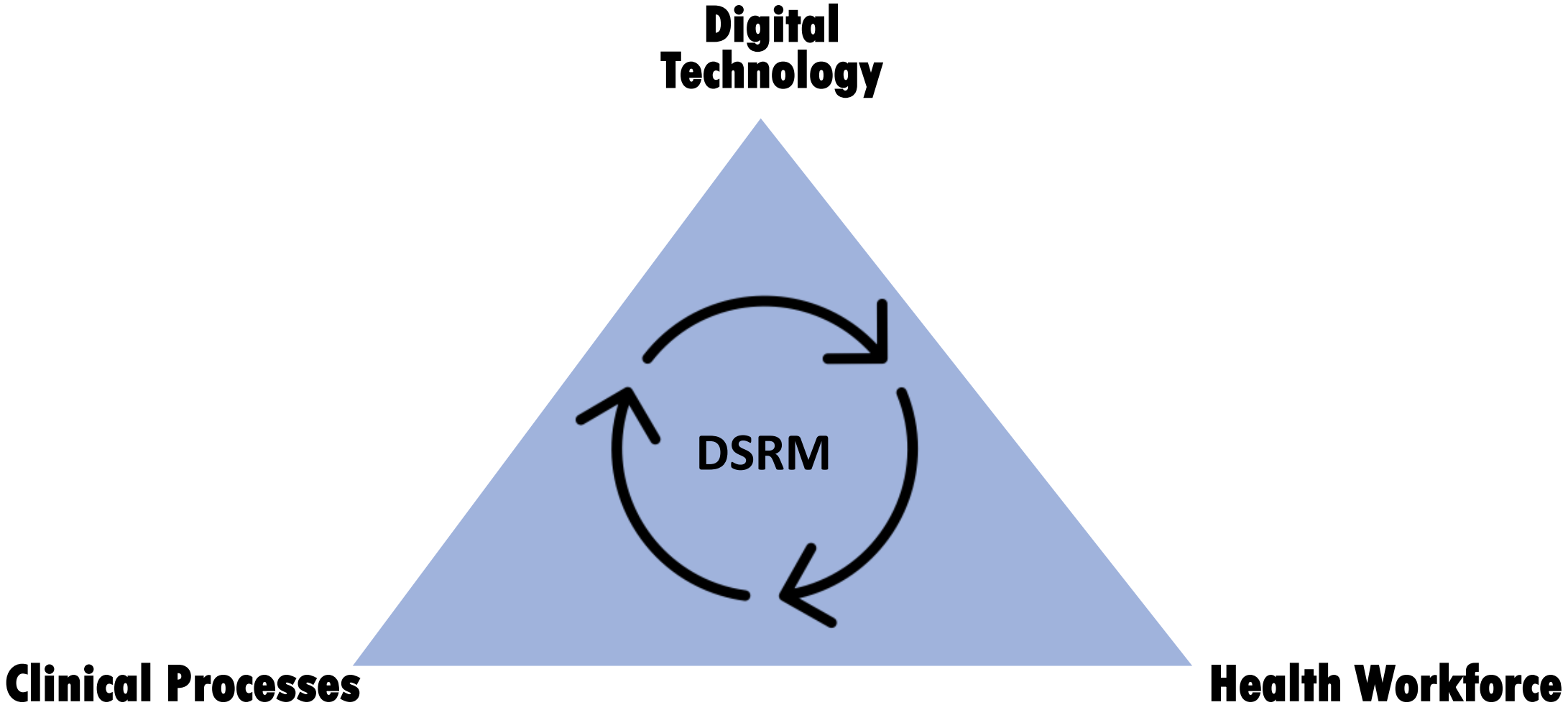
ALTHOUGH, WE ARE NOT READY, YET!



"This is a very big moment for virtual health care. **But, of course, there isn't a lot of readiness.** There are so many ways to monitor people's health that we aren't doing at any scale, in large part due to … regulatory barriers that have meant **we are in no way ready for this moment.**"

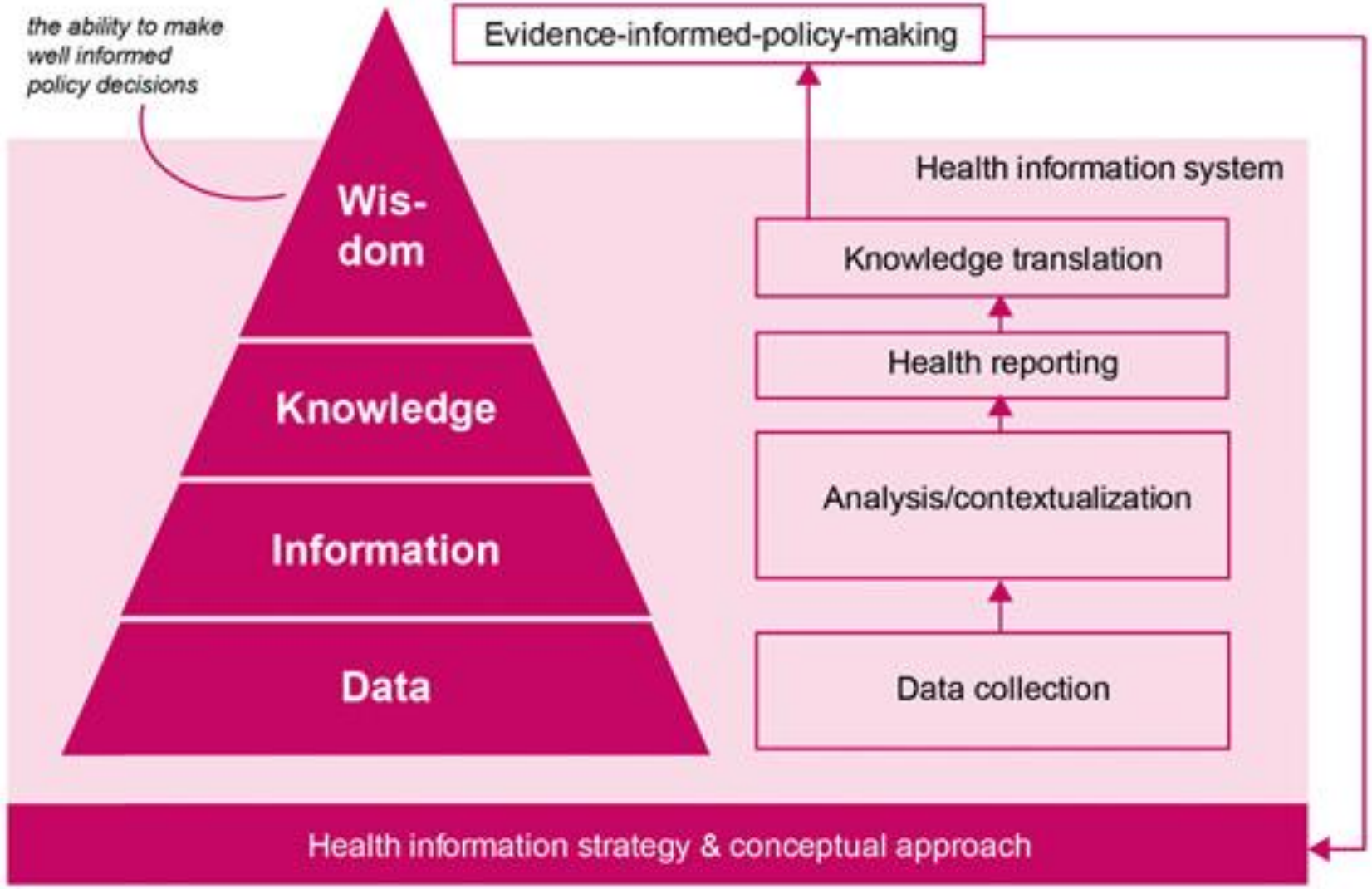
Eric Topol

DIGITAL HEALTH TRANSFORMATION



Source: Based on Lapão 2020

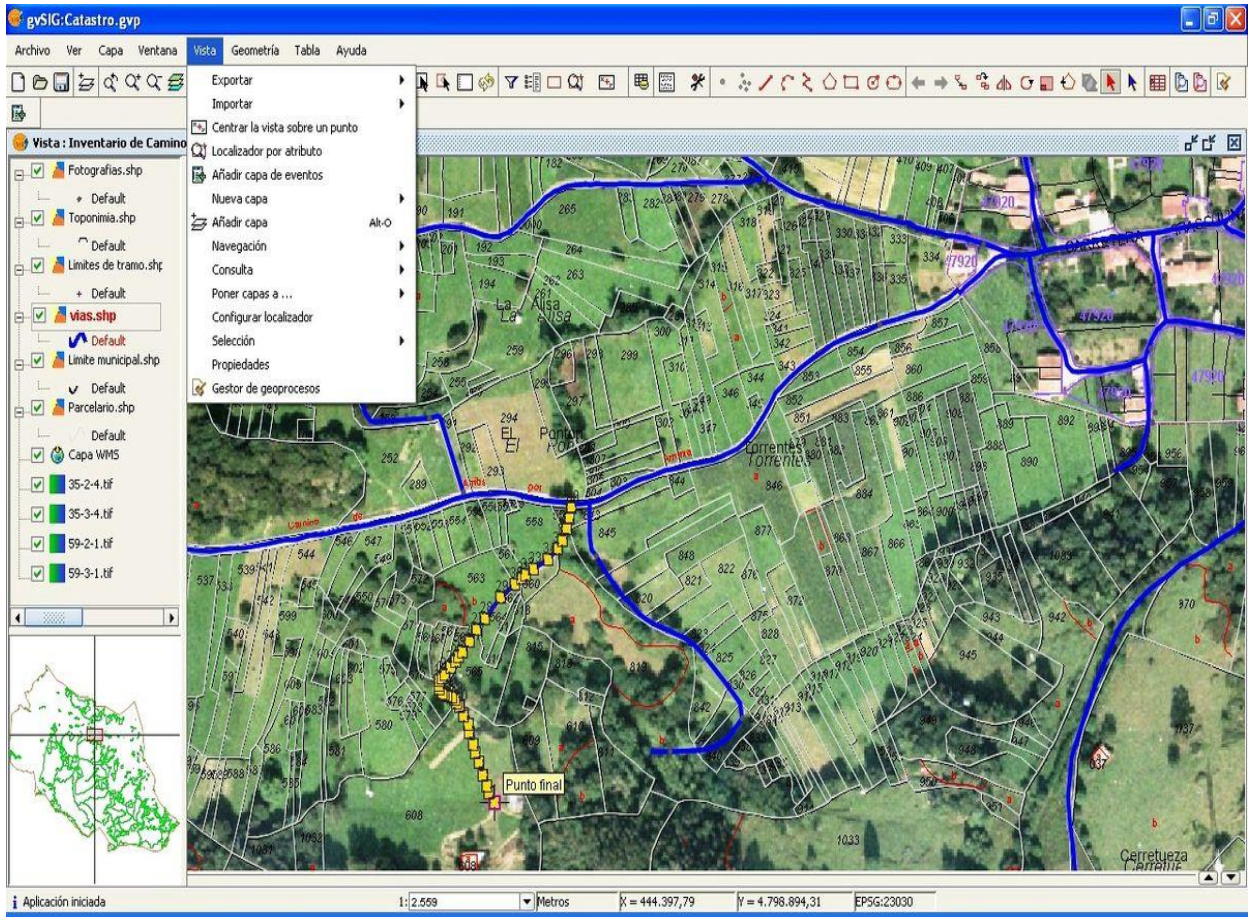
BASED ON A PUBLIC HEALTH INFORMATION FRAMEWORK

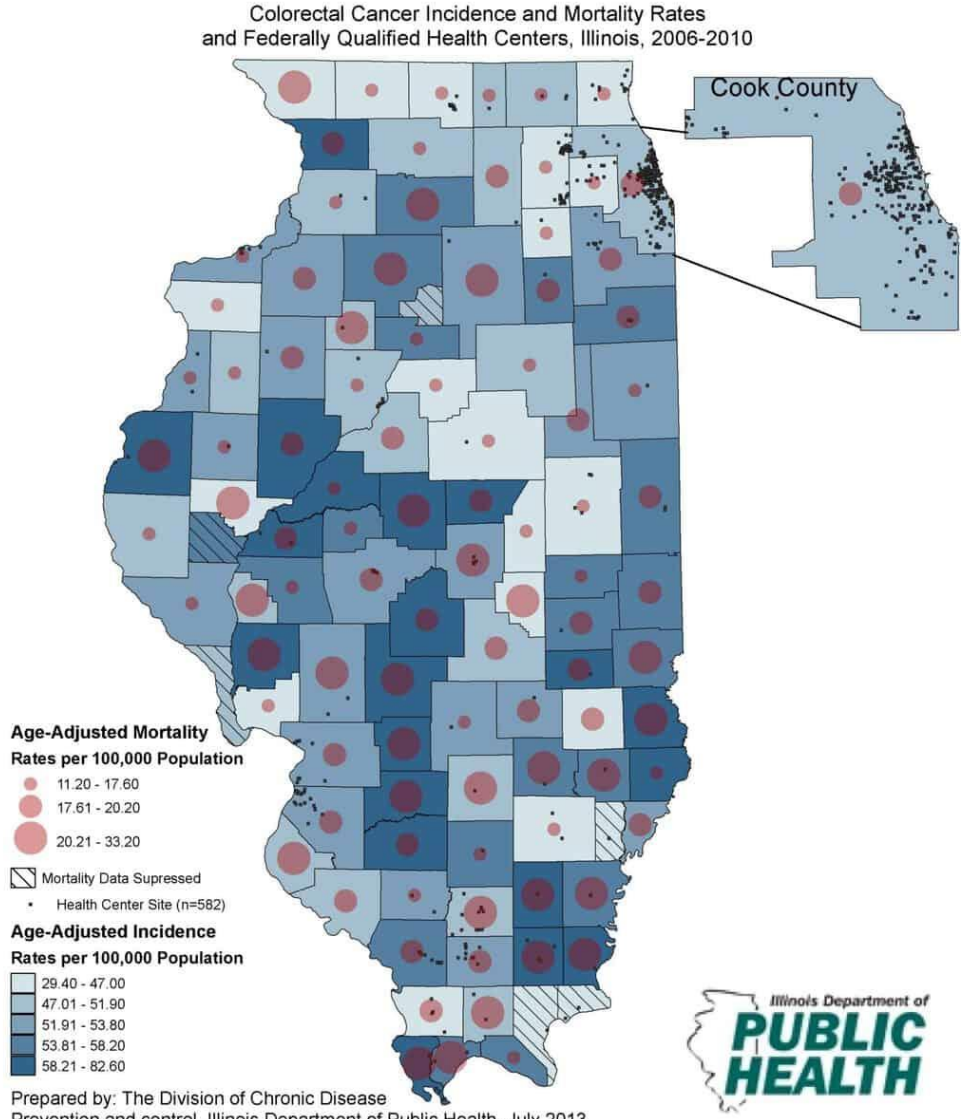


Source: Marieke Verschuuren, Annemiek van Bolhuis, Nicole Rosenkötter, Mariken Tijhuis, Hans van Oers; Towards an overarching European health information system, *European Journal of Public Health*, Volume 27, Issue suppl_4, 1 October 2017, Pages 44–48, https://doi.org/10.1093/eurpub/ckx153

This project is funded by the Health Programme of the European Union

EXPLOITING OUR EXPERTISE IN GEOGRAPHIC INFORMATION SYSTEMS





Source: Illinois Department of Public Health

IMPROVING PUBLIC HEALTH ONE DRONE AT A TIME

"So we asked the population if they would be willing to perform these exams if we take their samples to the nearest primary care centers with drones.

Source: Inter-American Development Bank

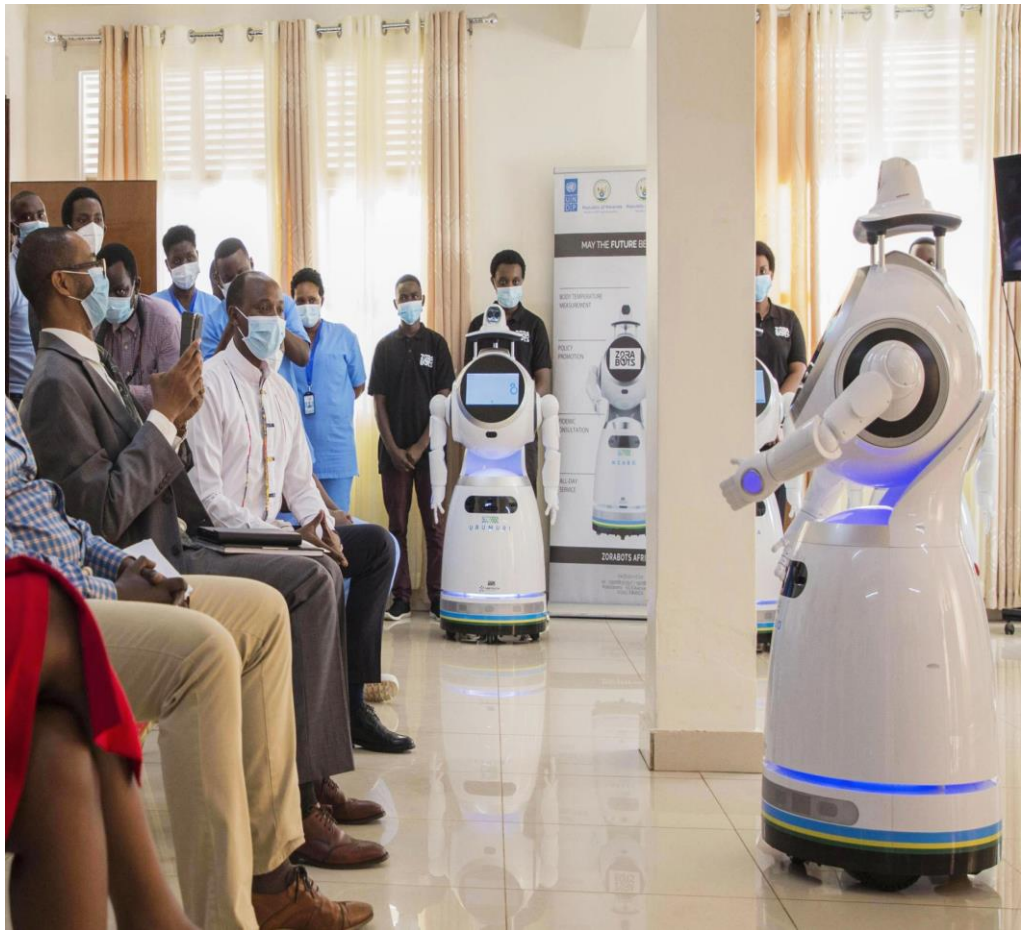
PUBLIC HEALTH EXPERTS TURN TO MEDICAL ROBOTS TO FIGHT EBOLA

Worchester, Massachusetts – Public health experts have explored the use medical robots in a bid to stop the spread of the fatal Ebola virus.

The best form of personal protective equipment is to put a stop to the sending human to the Ebola-ravaged countries.

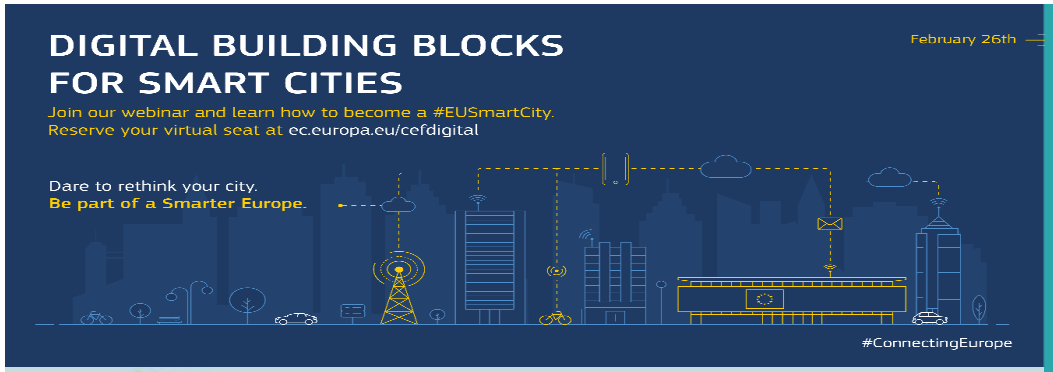
The medical robots could be sent to Africa for help in disposing contaminated medical waste.

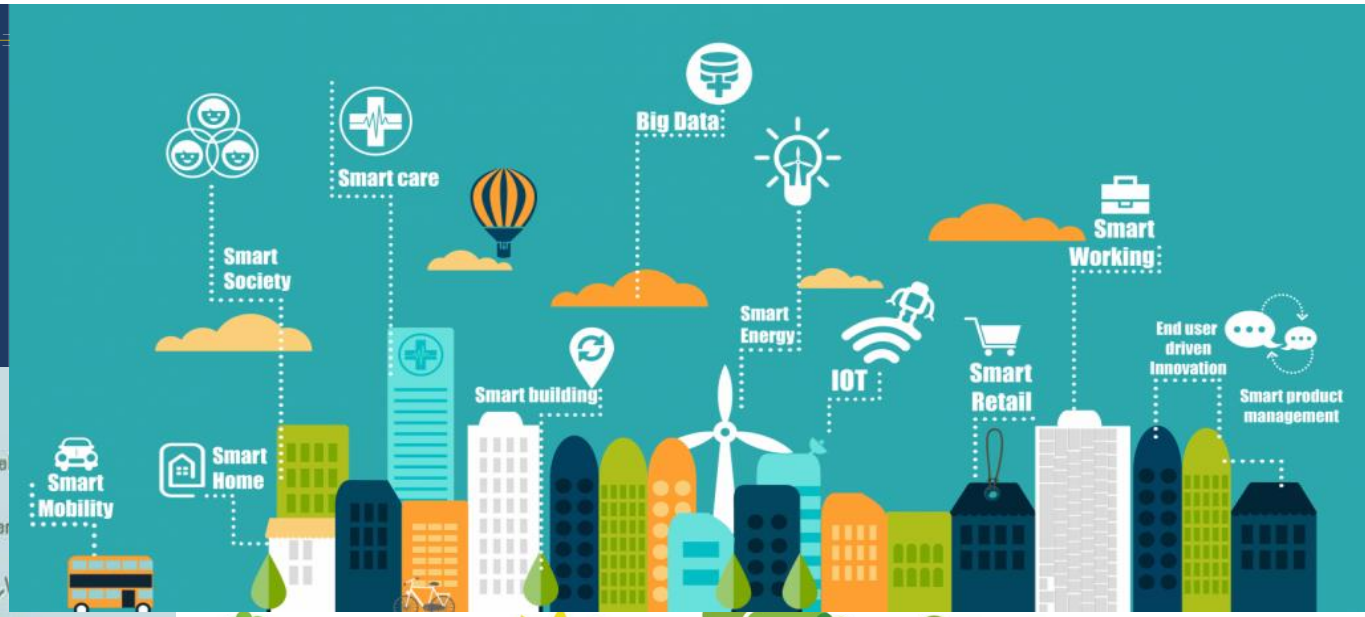
ALSO WITH COVID-19

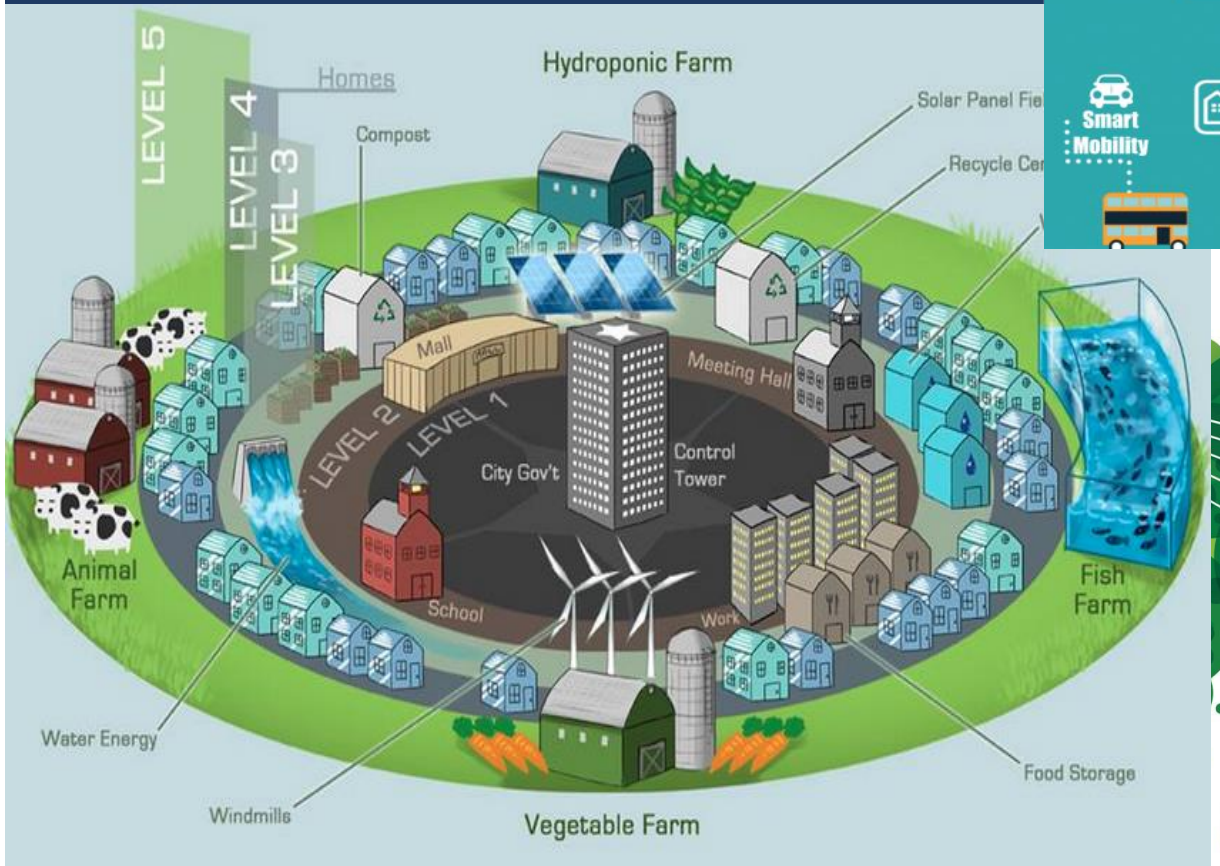


SITUATION ROOMS ARE ENABLING THE FUTURE OF PUBLIC HEALTH ACTION

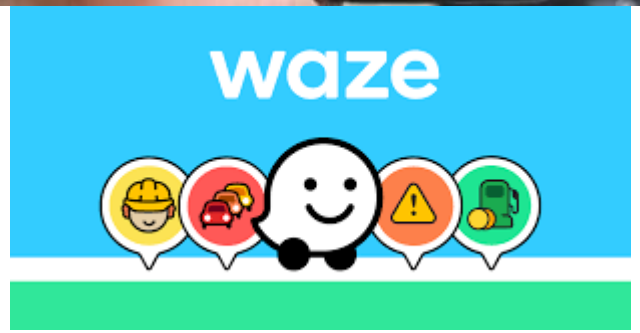
ONE CAN EXPECTED AN IMPORTANT ROLE FOR PUBLIC HEALTH IN SMART CITIES







SMART CITIES – WHERE CITIZENS WILL BE THE CITY'S SENSORS



[Smart City – Acetech India (digicliff.in)]

Published online: 16.08.2019

Artificial Intelligence for Surveillance in Public Health

Rodolphe Thiébaut[1,2,3], Sébastien Cossin[1,2], Section Editors for the IMIA Yearbook Section on Public Health and Epidemiology Informatics

[1] Univ. Bordeaux, Inserm, Bordeaux Population Health Research Center, UMR 1219, Bordeaux, France

[2] Centre Hospitalier Universitaire de Bordeaux, Service d'Information Médicale, Bordeaux, France

[3] Inria, SISTM, Talence, France

One study is about the **surveillance of flu**, another about **emerging animal infectious diseases** and the last one is about **foodborne illness**.

The sources of information are **Google news, Twitter, and Yelp restaurant reviews**. Machine learning approaches are most often used to detect signals.

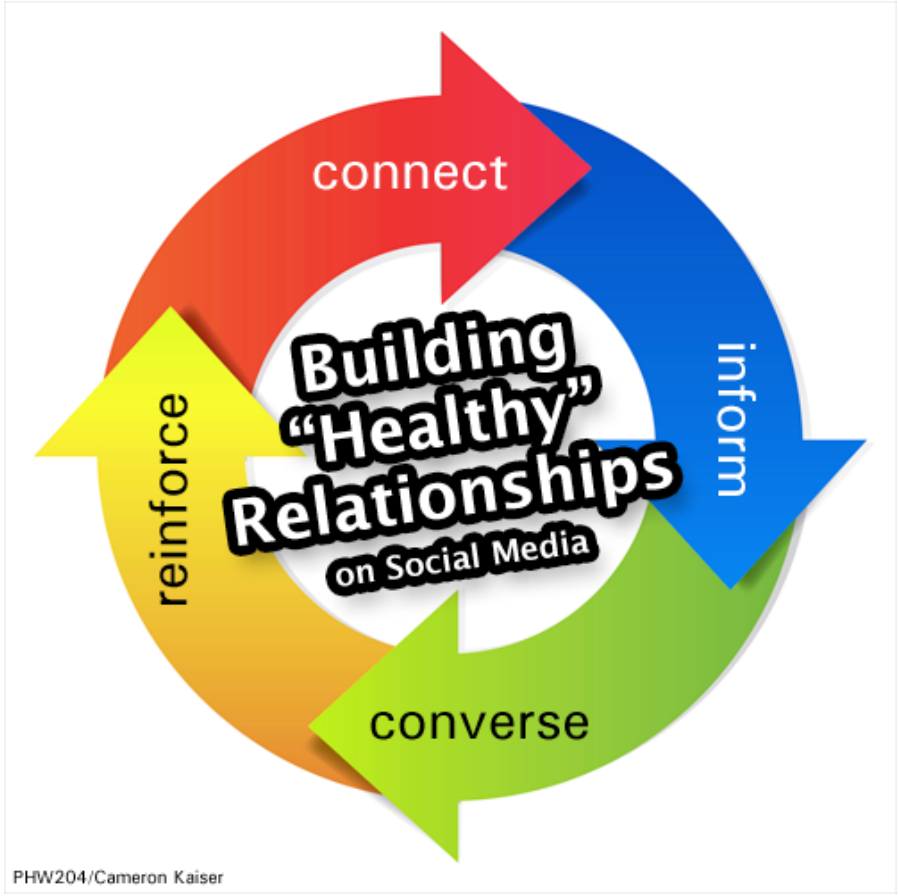
Surveillance is a central topic in public health informatics with the growing use of machine learning approaches in regards of the size and complexity of data.

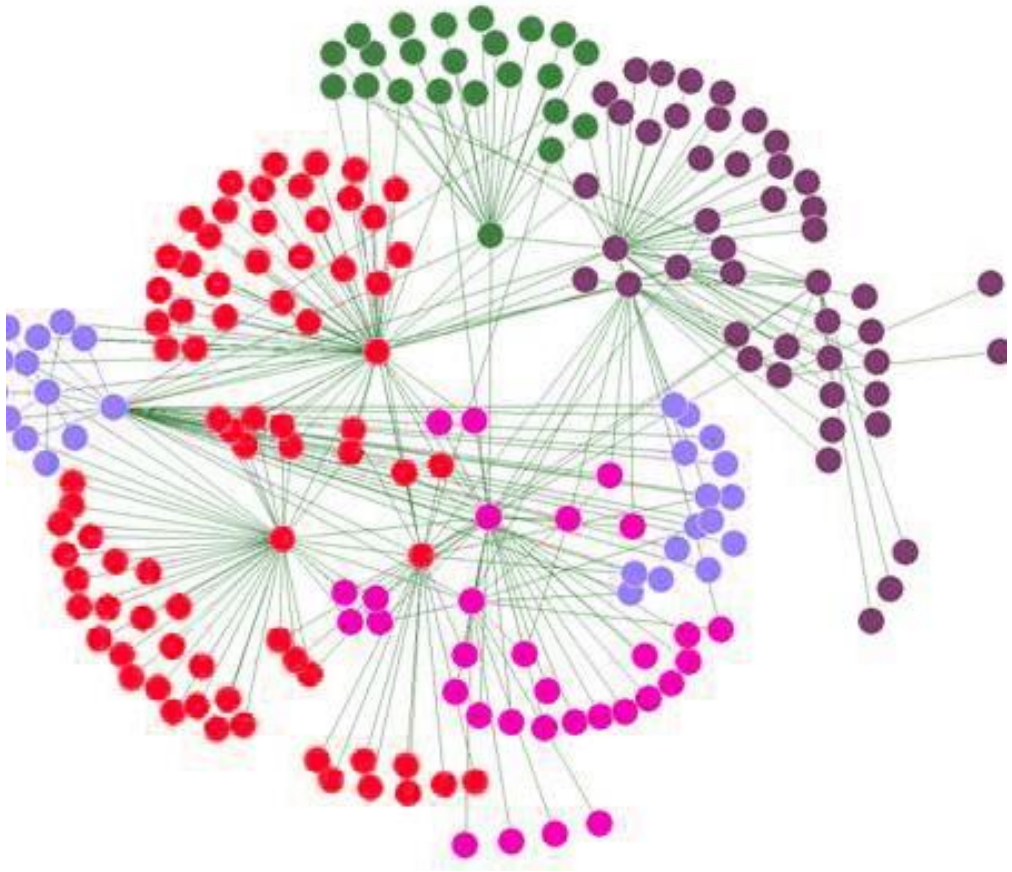
papers were then peer-reviewed by external reviewers to give the

of Digital epidemiology, a new term has appeared in 2018: infodemiology and info-

lined in a systematic review [7], the transfer from research to practice is not obvious, es-

PUBLIC HEALTH SOCIAL NETWORKS OPPORTUNITIES





PERSPECTIVE OPEN

Social media interventions for precision public health: promises and risks

Adam G. Dunn[1], Kenneth D. Mandl[2,3,4] and Enrico Coiera[1]

Social media data can be used with digital phenotyping tools to profile the attitudes, behaviours, and health outcomes of people. While there are a growing number of examples demonstrating the performance of digital phenotyping tools using social media data, little is known about their capacity to support the delivery of targeted and personalised behaviour change interventions to improve health. Similar tools are already used in marketing and politics, using individual profiling to manipulate purchasing and voting behaviours. The coupling of digital phenotyping tools and behaviour change interventions may play a more positive role in preventive medicine to improve health behaviours, but potential risks and unintended consequences may come from embedding behavioural interventions in social spaces.

npj Digital Medicine (2018)1:47 ; doi:10.1038/s41746-018-0054-0

INTRODUCTION

In 2013, a series of new methods were published demonstrating the possibility of using Facebook 'likes' to predict aspects of personality and demographics.[1–3] These experiments showed the ease with which individuals can be profiled using the digital traces they leave behind online, and generated interest among academics as well as commercial and political organisations. Then in 2017, we saw experimental evidence that these tools can be wielded for the purposes of social manipulation,[4] as well as evidence that tools based on these methods were being deployed at unprecedented scales to manipulate voting in elections.[5] News about the way Cambridge Analytica accessed and used Facebook data remind us not only that our personal data can be leveraged to influence our behaviour, but also that the regulatory and ethical frameworks around those activities are underdeveloped.

To understand the role that similar approaches might play in or health outcomes, but the ways they are operationalised to change health behaviours are different.

Population-level studies that aggregate publicly-accessible data have demonstrated the capacity to model spatial variations in voting behaviours,[10] cardiovascular mortality,[11] and vaccine coverage.[12] Studies tend to use Twitter when larger volumes of data are required.[13] These types of studies are validated against traditional data sources including surveys, disease notifications, and census data. In most cases, data from social media platforms produce a biased representation of location or demography.[14,15] Accounting for biases in data are important in studies that conclude about incidence and prevalence without validating models against other data sources (especially social media studies that draw conclusions based on number of tweets).[16] Because studies examining associations between what can be observed on

OJPHI

Effective uses of social media in public health and medicine: a systematic review of systematic reviews

Dean Giustini[1], Syed Mustafa Ali[2], Matthew Fraser[3], Maged N. Kamel Boulos[3]

1. University of British Columbia, Biomedical Branch Library, Vancouver Canada

2. Mercy Corps, Islamabad, Pakistan

3. Alexander Grah
Elgin, United Kingdom

Need to measure the effectiveness of social technologies

Abstract

Introduction: Research examining the effective uses of social media (SM) in public health and medicine, especially in the form of systematic reviews (SRs), has grown considerably in the past decade. To our knowledge, no comprehensive synthesis of this literature has been conducted to date.

Aims and methods: To conduct a systematic review of systematic reviews of the benefits and harms ("effects") of SM tools and platforms (such as Twitter and Facebook) in public health and medicine. To perform a synthesis of this literature and create a 'living systematic review'.

Results: Forty-two (42) high-quality SRs were examined. Overall, evidence of SM's effectiveness in public health and medicine was judged to be minimal. However, qualitative benefits for patients are seen in improved psychosocial support and psychological functioning. Health professionals benefited from better peer-to-peer communication and lifelong learning. Harms on all groups include the impact of SM on mental health, privacy, confidentiality and information reliability.

Conclusions: A range of negatives and positives of SM in public health and medicine are seen in the SR literature but definitive conclusions cannot be made at this time. Clearly better research designs are needed to measure the effectiveness of social technologies. For ongoing updates, see the wiki "Effective uses of social media in health: a living systematic review of systematic reviews". http://hlwiki.slais.ubc.ca/index.php/Effective_uses_of_social_media_in_healthcare:_a_living_systematic_review_of_reviews

DOI: 10.5210/ojphi.v10i2.8270

#8 Ice Bucket Challenge: ALS Association

The ALS Association 'Ice Bucket Challenge' social media campaign raised over $115 million in August 2014 for ALS research.

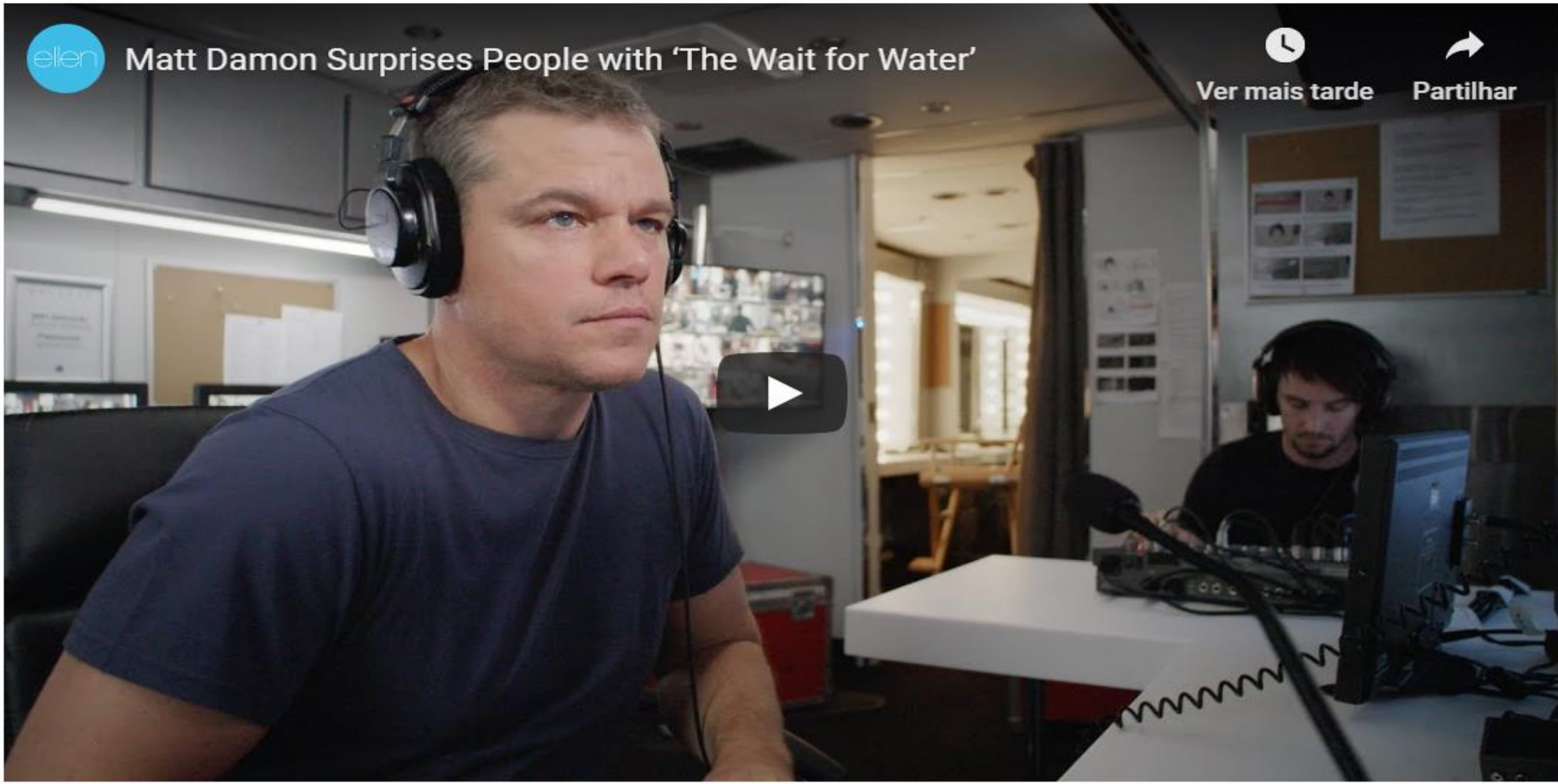
It started when three men living with ALS posted a video of themselves dumping buckets of ice water on themselves. Then they each called out one person to perform the same challenge. Before they knew it, 17 million people had uploaded their videos to social media over a span of one month. Over 400 million people watched these videos 10 billion times.

#9 Know your Lemons: Worldwide Breast Cancer

The Worldwide Breast Cancer organization designed an image illustrating the twelve signs of breast cancer. This image is of 12 lemons sitting in an egg carton and it spread like wildfire over social media.

The campaign that backed up this image was called #KnowYourLemons and it taught women and men to easily recognize the 12 most common breast cancer symptoms. It also inspired the

Matt Damon Surprises People with 'The Wait for Water'



In this example, Matt Damon does a great job bringing people's attention to the fact that women in the developing world have to wait up to six hours collecting water each day. Matt Damon and his foundation Water.org joined Stella Artois for "The Wait for Water," showing what happens when unsuspecting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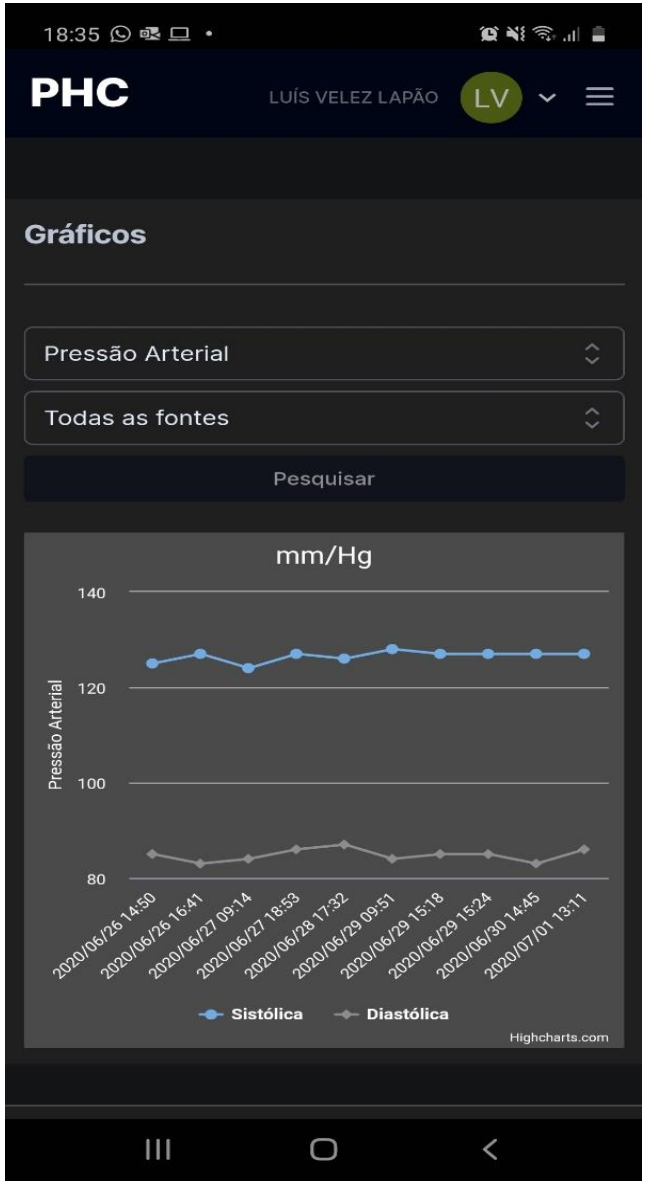
Digital Platform for Supporting Chronic Patients and COVID-19 consultations and Monitoring in Primary Care

With Smartphone…

Anywhere…

Anytime…



PHIRI – POPULATION HEALTH INFORMATION RESEARCH INFRASTRUCTURE

PHIRI
Population Health Information Research Infrastructure

PHIRI will lay the foundation to build a **Distributed Infrastructure on Population Health (DIPoH)**

The PHIRI project

Welcome to the official webpage of PHIRI, *the Population Health Information Research Infrastructure.*

PHIRI is the implementation of the **research infrastructure on population heal**
best available evidence for research on health and well-being of populations
better coordinated European efforts across national and European stakehold
health knowledge. In doing so, PHIRI will lay the foundation to build a **Distribu**
(DIPoH) to be used to overcome future crisis and ensuring the sustainability o
across Europe through the identification, access, assessment and reuse of po
underpin public health policy decisions. This will be achieved through a close
countries over a period of 36 months starting in November 2020. The project is divided in 9 ambitious work packages with three transversal topics. PHIRI builds on the achievements of the BRIDGE Health and the Joint Action on Health Information (InfAct) projects.

A PORTAL FOR POPULATION HEALTH INFORMATION IN EUROPE

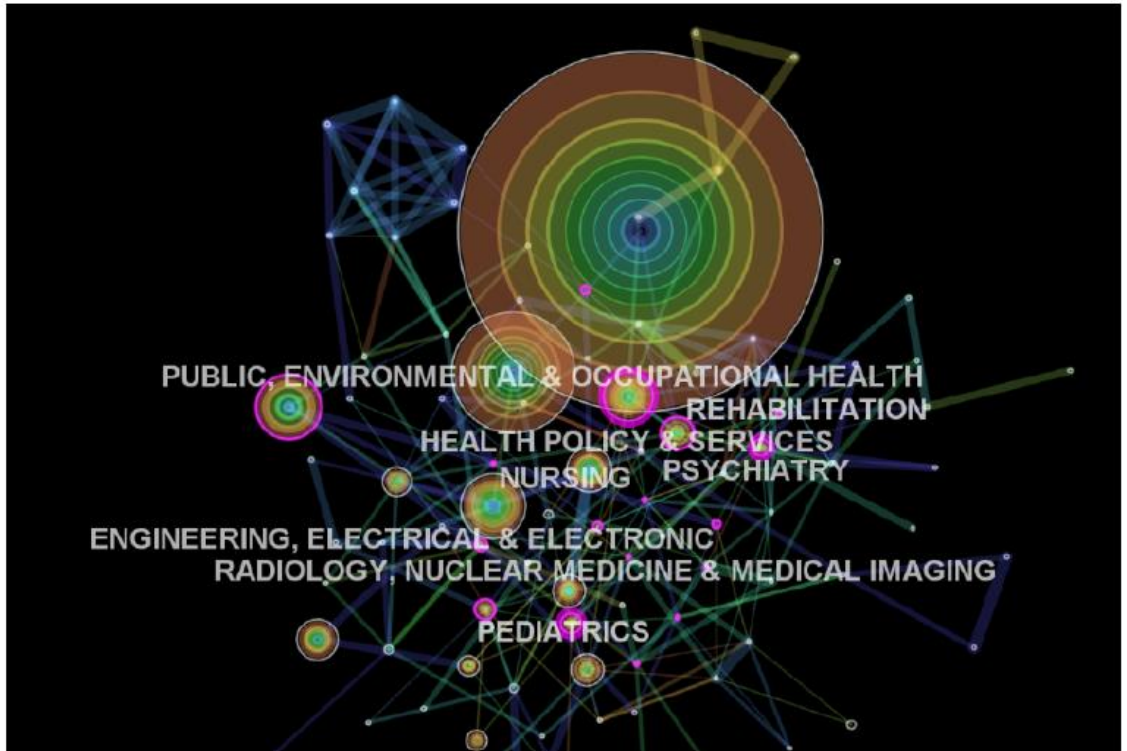
Original Paper

Harnessing Telemedicine for the Provision of Health Care: Bibliometric and Scientometric Analysis

Ahmed Waqas[1], MBBS, FRSPH; Soo Huat Teoh[2], MD; Luís Velez Lapão[3], PhD; Luiz Ary Messina[4], PhD; Jorge César Correia[5], MD

[1]Institute of Population Health, University of Liverpool, Liverpoo
[2]Lifestyle Science Cluster, Advanced Medical and Dental Institut
[3]Global Health and Tropical Medicine, Instituto de Higiene e Me
[4]Telemedicine University Network, Rede Nacional de Ensino e P
[5]Unit of Patient Education, Division of Endocrinology, Diabetol Hospitals and University of Geneva, Geneva, Switzerland

Figure 4. Discipline-specific trends in telemedicine research.



INCREASING USE OF TELEMEDICINE IN PUBLIC AND ENVIRONMENT HEALTH

Thank you!

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