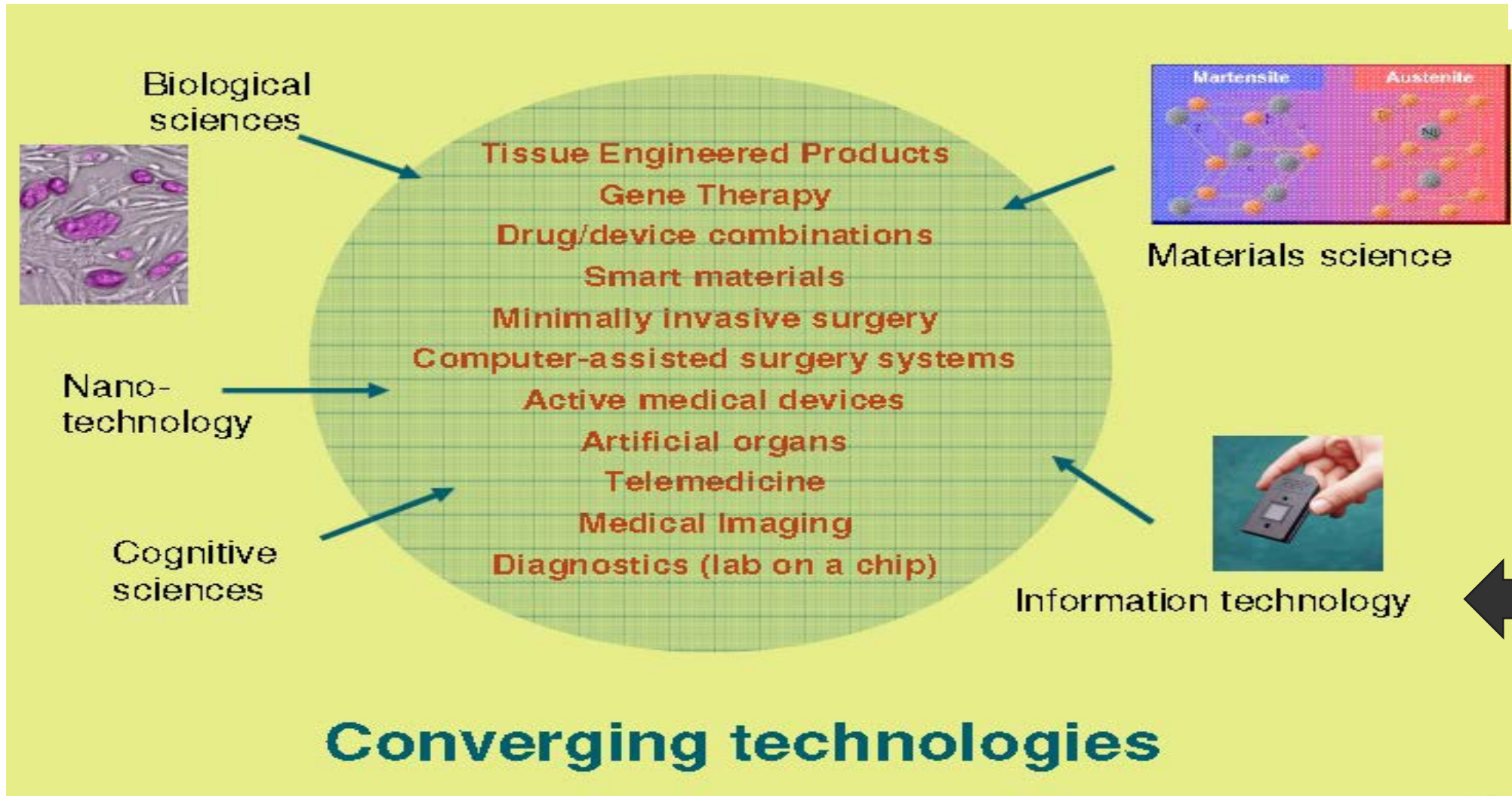




Strumenti ICT per la salute: la prospettiva del medico

New generations of medical technology products

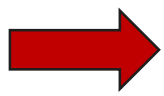




- The World Health Organization (WHO) defines [e-health](#) as the use of information and communication technologies (ICT) for health. Digital health includes e-Health, m-Health and telemedicine, in the widespread use of digital technologies for healthcare and health-related purposes in a wide range of settings, both inside and outside of healthcare settings.

ICTs can play a critical role in improving health care for individuals and communities.

They can promote patient-centered healthcare, improve quality of care, and educate health professionals and patients.



8 Smart Uses for Your Smartphone



How Smartphones Support Health

Many smartphones have features and apps that make them great resources for wellness – and they can benefit your medical needs as much as your well-being. Here are eight phone uses worth remembering when thinking about your health.

1. Your Phone as a Medical ID

Smartphones can often double as mobile medical alert bracelets. For example, some smartphones allow you to set up a mobile medical ID that contains your personal information, such as medical conditions, allergies, emergency contacts and blood type. In case of an emergency, physicians and emergency personnel can access your information through your phone's emergency button, even if it's locked.

2. Your Phone as a Fitness Tracker

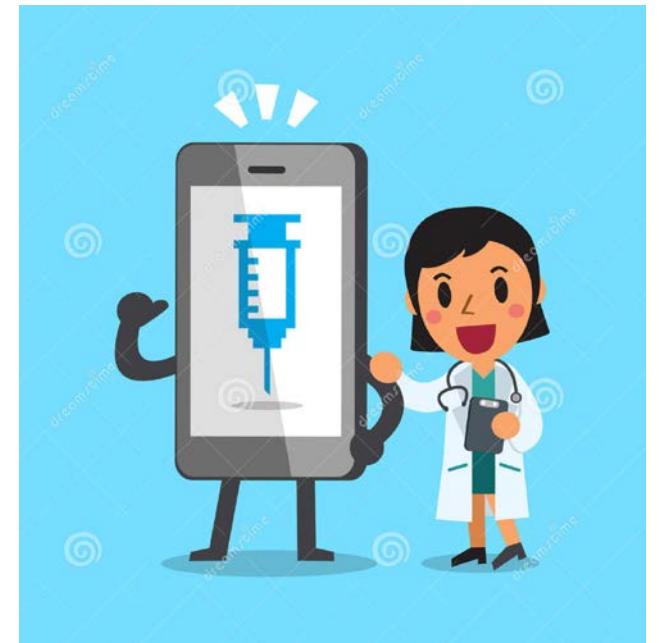
Wearable technology is one of the most popular ways to track health – and it's easy to get the most out of your wristband and its corresponding app, but what you may not know is that, depending on your goals, you may not even need the wearable at all. Most smartphones are equipped with motion sensors that measure steps, distance traveled and even stairs climbed. It shows your daily, weekly, monthly and yearly totals and no setup is required.

3. Your Phone as a Heart Rate Monitor

You may think the wearable tracker has the upper hand with heart rate monitoring, but that's not always the case. Smartphones can also have built-in heart rate monitors, and some smartphones let you measure and track your own health trends. Take this all with a grain of salt, though. Both wearable and smartphone heart rate tracking should be taken as an estimate and technology shouldn't replace a regular visit with your physician.

4. Your Phone as a 911 Caller

Some smart phones use voice activation, so you can literally yell at your phone for help. Other phones have a built-in SOS. On certain phones, rapidly pressing the power key three times records a photo, audio clip and sends a Google Maps link of your location to any contact you've instructed it to.



5. Your Phone as a Meal Planner

Smartphones allow you to download apps and log food and exercise information directly into your phone. Many healthy eating apps let you use your smartphone's camera to scan a product's barcode to add to a food journal. These nutritional tools are not only helpful, but educational as well, enabling you to make healthy choices even when you're not using your phone.

6. Your Phone as a Sleep Guide

If you suffer from sleep apnea, which is marked by pauses in breathing or shallow infrequent breathing during sleep, you understand how scary this medical condition can be. Certain apps can offer relief by "training" you to move from your back to your side while sleeping, reducing these poor breathing episodes.

Other sleep apps offer motion tracking, sound recording and a smart alarm. With your phone plugged in, the apps can detect and record your sleep-talking, snoring and other sleep disturbances so you can better understand in the morning why you may be having sleep issues.

7. Your Phone as a Medication Reminder

A number of apps can help you (and your family members) manage medications with reminders, including refills. You should discuss the best app for your health needs with your physician.

8. Your Phone as a Family Health Tracker

Your smartphone's organizational capabilities can make it a huge help when it comes to managing not only your own health, but also that of your family. The calendar can help you manage everyone's appointments, but apps from your insurance provider, pharmacy or an independent medication tracker can also help you keep your family's health on track.



Disadvantages of Smartphones in Healthcare



Not everyone has a smartphone.

Smartphones don't age v

Smartphones are expensive.

Apps often require Internet access.

A lot of healthcare apps aren't good.

Patients have reservations with mHealth.

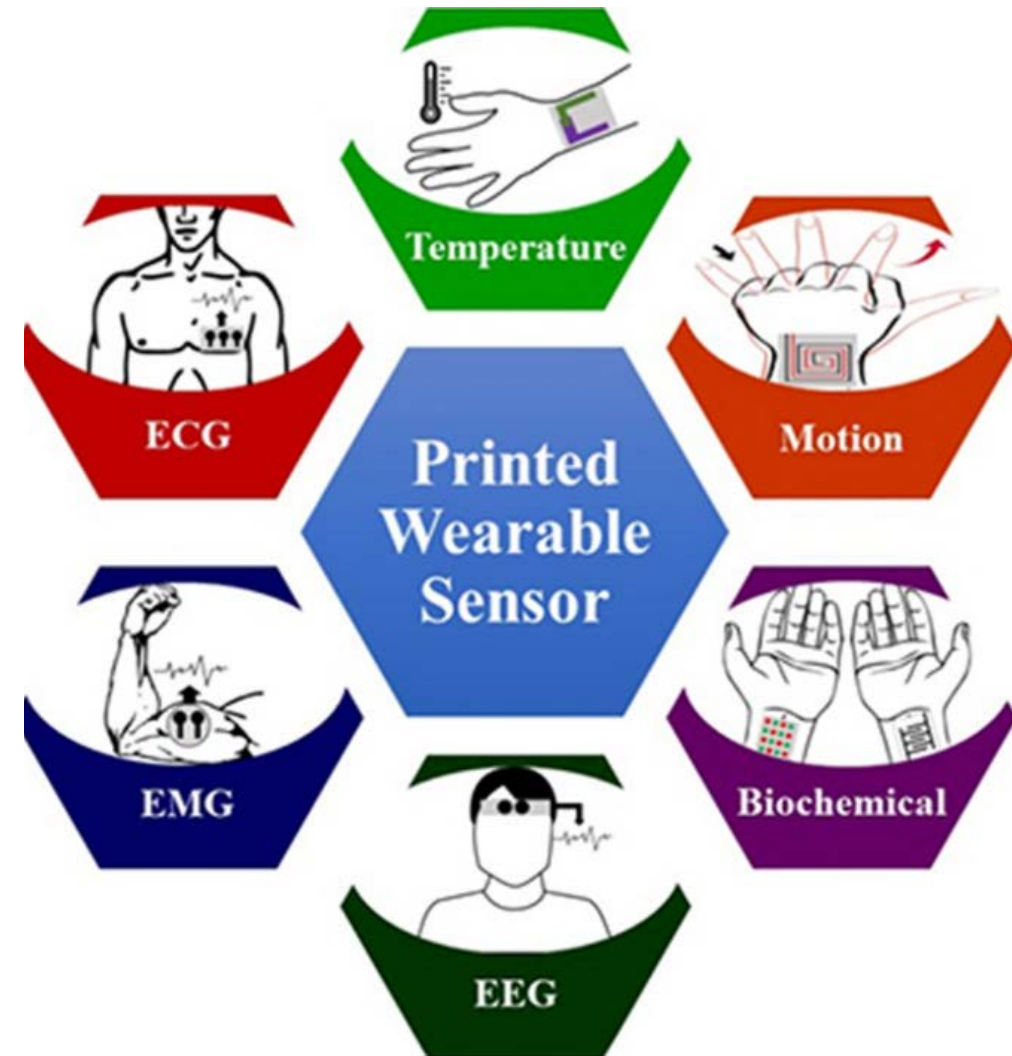
Data privacy and security is a significant concern.

Smartphones are dirty.

WEARABLE SENSORS

Wearable sensors for continuous monitoring of vital signs for extended periods of weeks or months in the home and workplace as well as in hospitals and nursing homes.

Unlike traditional snap-shot measurements, continuous monitoring with wearable sensors opens up the possibility to treat the physiological system as a dynamical process.



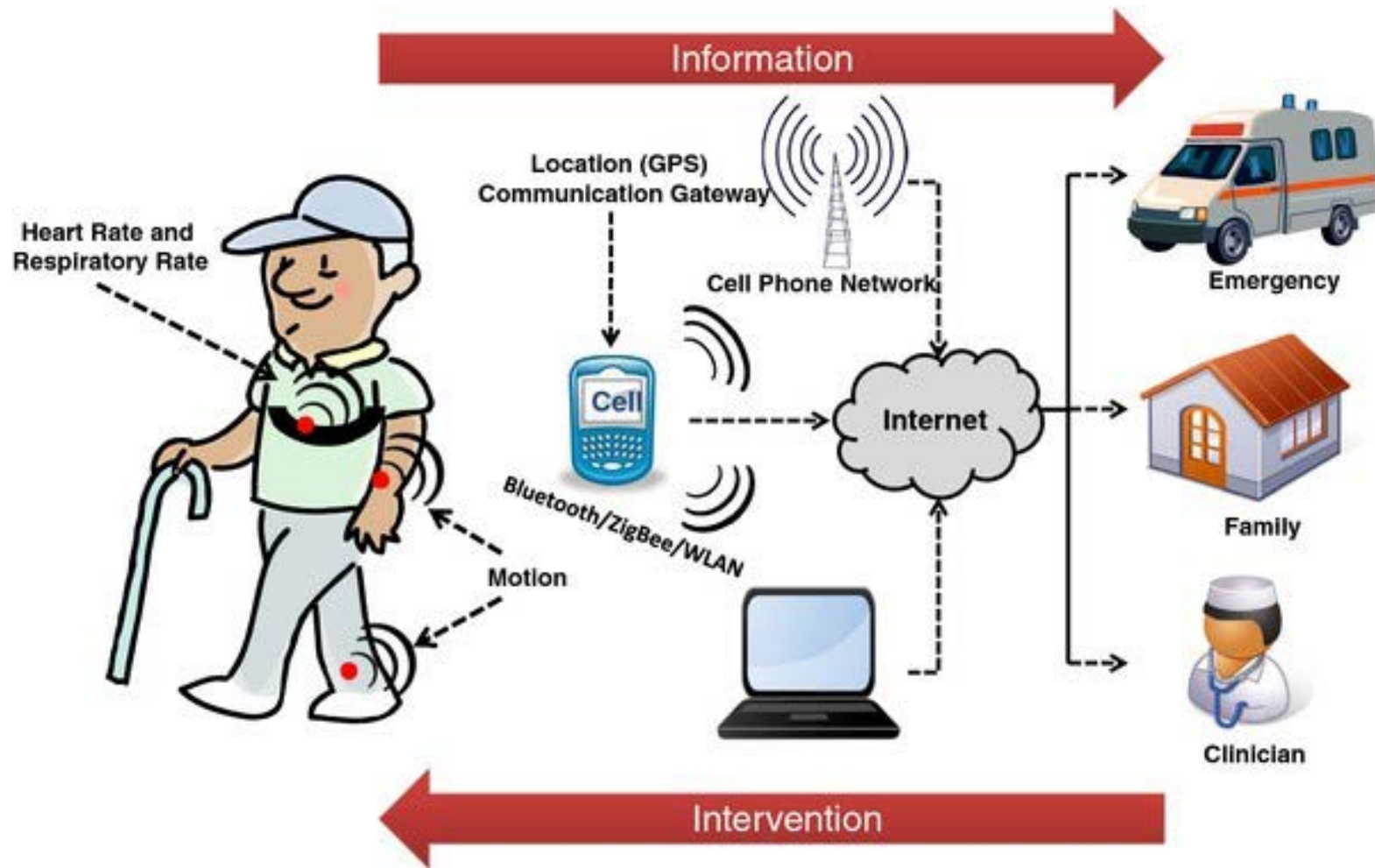
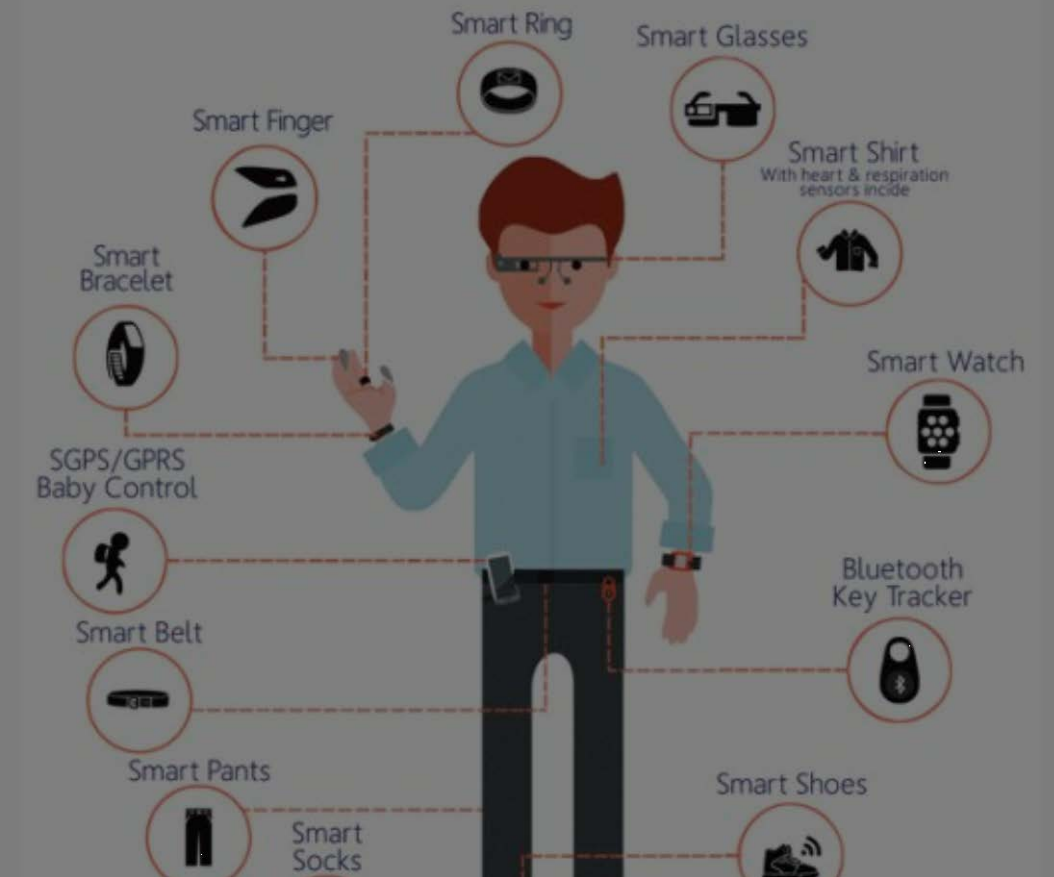


Illustration of a remote health monitoring system based on wearable sensors. Health related information is gathered via body-worn wireless sensors and transmitted to the caregiver via an information gateway such as a mobile phone. Caregivers can use this information to implement interventions as needed.



Rise of Wearables and future of Wearable technology



The industry of wearable tech is expected to grow exponentially from \$23 billion to \$54 billion by 2023, according to GlobalData forecasts.

AI-POWERED WEARABLES

AI enabled wearables can not only track the data, but also defines what the user needs to eat, how much they should sleep, and how they should train to improve their fitness



What is Artificial Intelligence

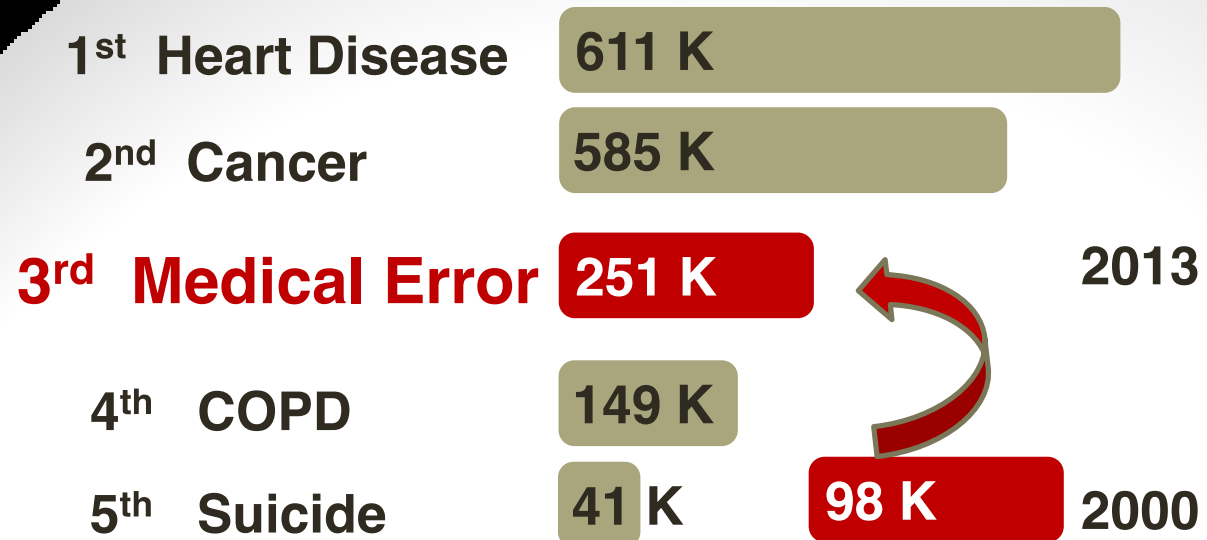
- John McCarthy first described the term AI in 1956 as the science of making intelligent machines.
- Use of a computer to model intelligent behaviour with minimal human intervention”
- TRECCANI: L’intelligenza artificiale studia i fondamenti teorici, le metodologie e le tecniche che consentono di progettare sistemi hardware e sistemi di programmi software atti a fornire all’elaboratore elettronico prestazioni che, a un osservatore comune, sembrerebbero essere di pertinenza esclusiva dell’intelligenza umana.
- Suo scopo non è quello di replicare tale intelligenza, bensì di riprodurne o emularne alcune funzioni.



The aim of AI is to help doctors in clinical diagnosis and treatment and to reduce the rate of medical error.

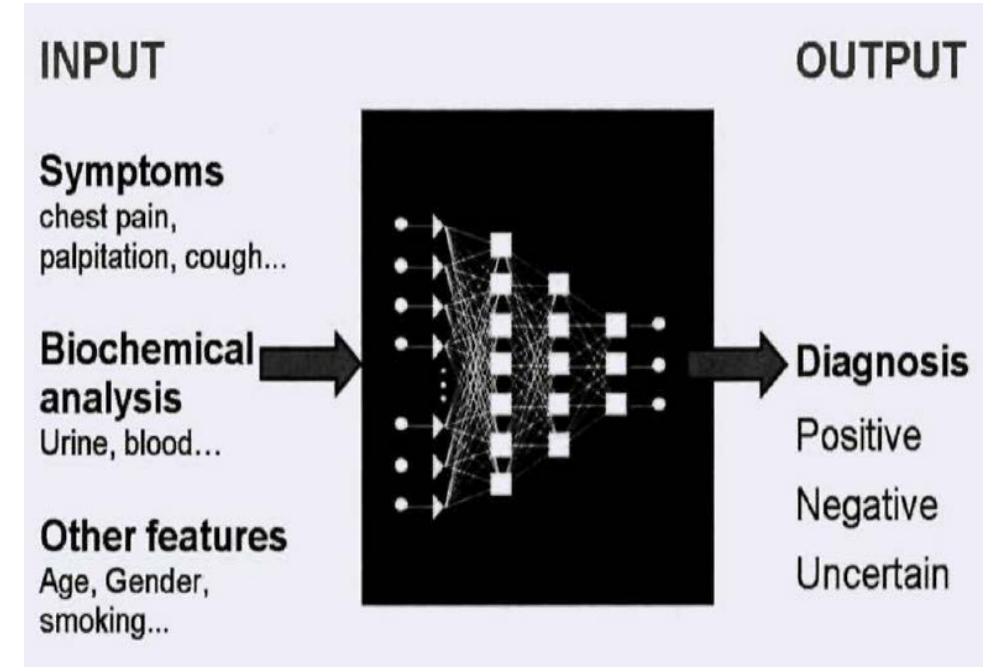


Causes of Death Per Year, USA



Benefits of Artificial intelligence

- AI can definitely assist physicians
 - Clinical decision making - better clinical decisions
 - Replace human judgement in eg, radiology.
 - up-to-date medical information from journals, textbooks and clinical practices
 - Experienced vs fresh Clinician
 - 24x7 availability of expert
- Early diagnosis
- Prediction of outcome of the disease as well as treatment
- Feedback on treatment
- Reinforce non pharmacological management
- Reduce diagnostic and therapeutic errors
- Increased patient safety and Huge cost savings associated with use of AI
- AI system extracts useful information from a large patient population
- Learning and self-correcting abilities to improve its accuracy based on feedback.



Emerging AI Applications in Oncology

NCI-funded research has already led to several opportunities for the use of AI.

Improving Cancer Screening and Diagnosis

Aiding the Genomic Characterization of Tumors

Accelerating Drug Discovery

Improving Cancer Surveillance

Bridging the Gap from Research to Practice

Accessing Quality Cancer Data

Cancer Classification



Understanding the Method Behind the Machine

Making these algorithms transparent could help researchers identify new biological features relevant to disease diagnosis or treatment.



Explainable artificial intelligence for breast cancer: A visual case-based reasoning approach

Jean-Baptiste Lamy, Boomadevi Sekar and 3 more

Open Access | March 2019

Simultaneous segmentation and classification of the retinal arteries and veins from color fundus images

José Morano, Álvaro S. Hervella, Jorge Novo, José Rouco

Open Access | August 2021

Efficient treatment of outliers and class imbalance for diabetes prediction

Nonso Nnamoko, Ioannis Korkontzelos

Open Access | April 2020

A review of AI and Data Science support for cancer management

E. Parimbelli, S. Wilk and 8 more

Open Access | July 2021

Bayesian networks in healthcare: Distribution by medical condition

Scott McLachlan, Kudakwashe Dube and 3 more

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Resolution-based distillation for efficient histology image classification

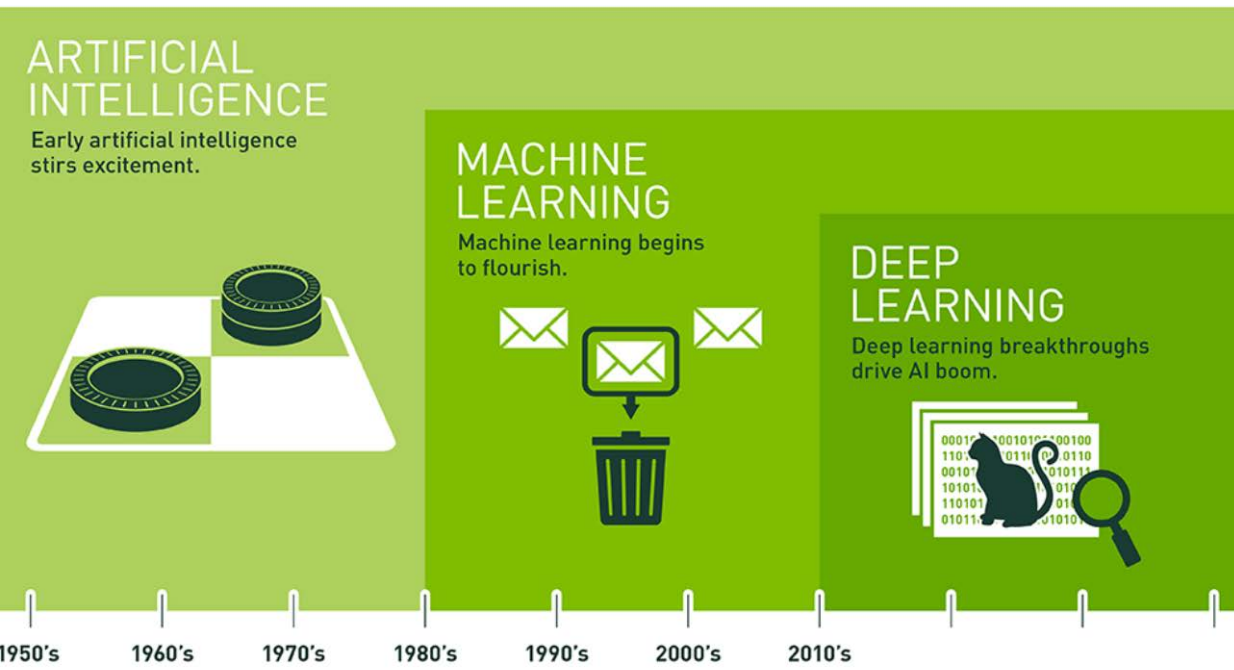
Joseph DiPalma, Arief A. Suriawinata and 3 more

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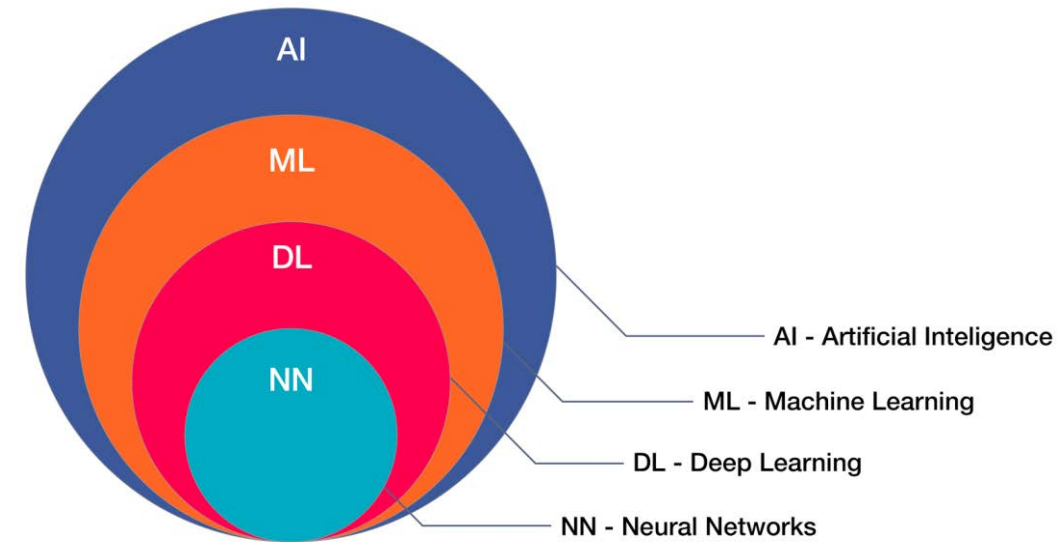
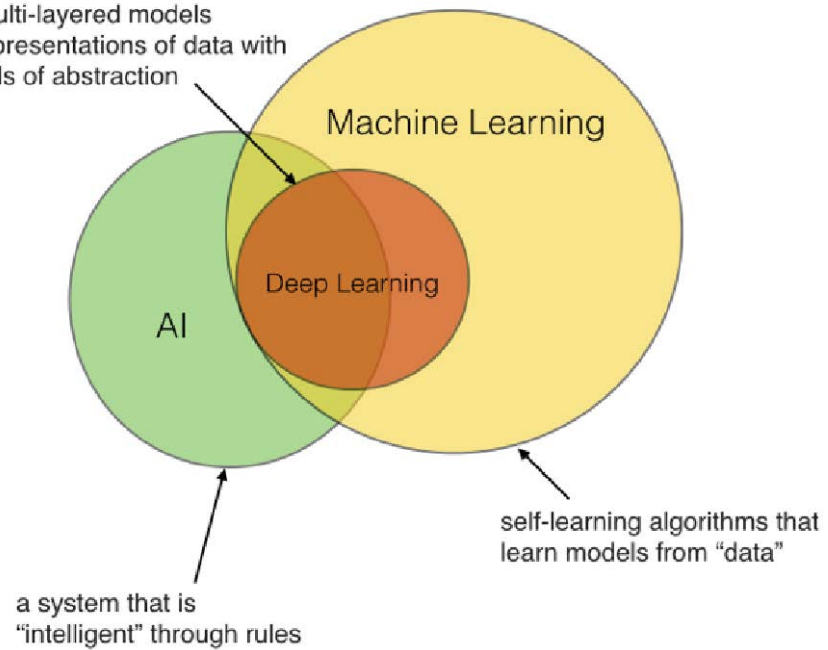
Early detection of sepsis utilizing deep learning on electronic health record event sequences

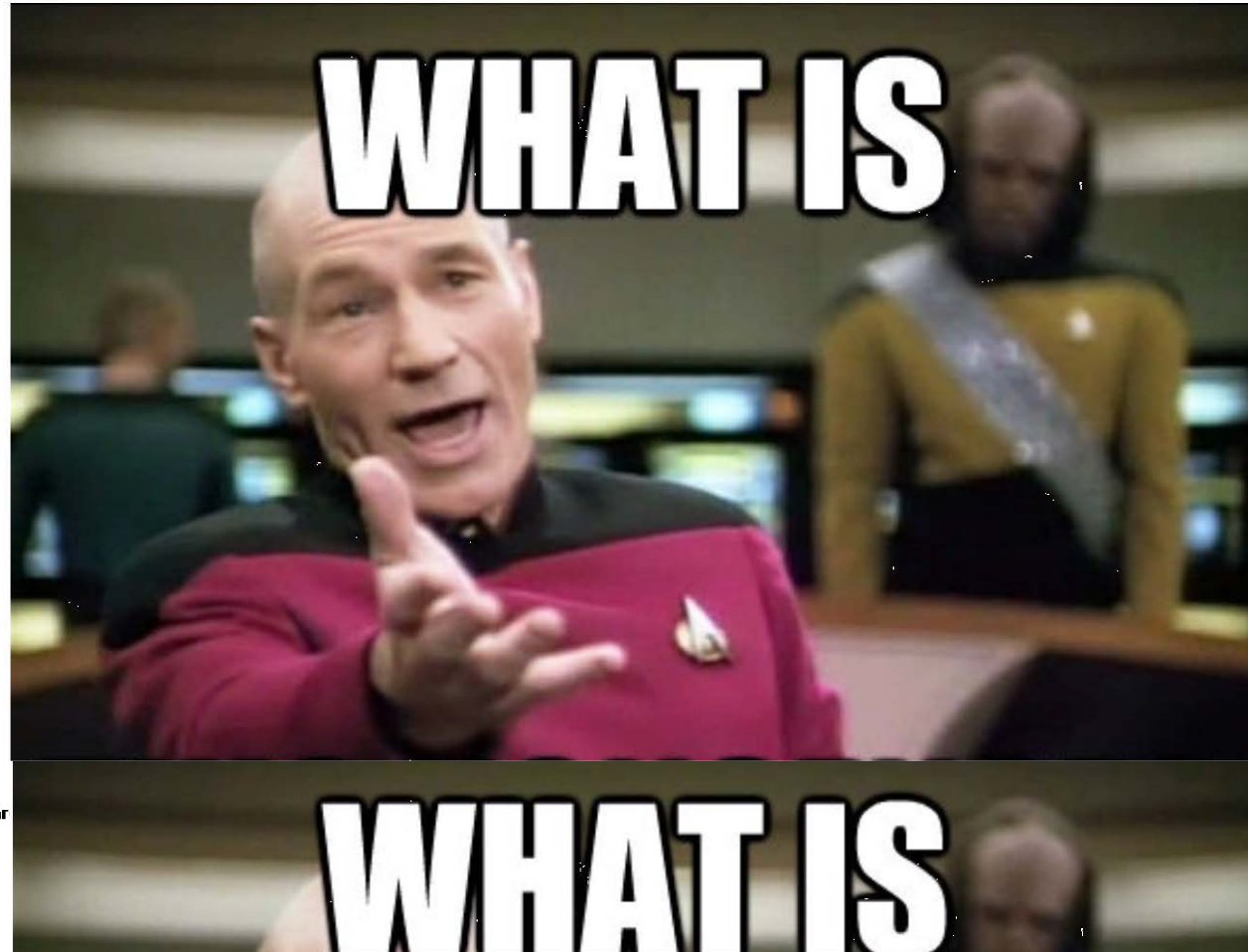
Simon Meyer Lauritsen, Mads Ellersgaard Kalør and 5 more

Open Access | April 2020



particular, multi-layered models that learn representations of data with multiple levels of abstraction





war

1 of 6



Original Paper

Artificial Intelligence and the Future of Primary Care: Exploratory Qualitative Study of UK General Practitioners' Views

Charlotte Blease^{1,2}, PhD; Ted J Kaptchuk¹, OMD; Michael H Bernstein³, PhD; Kenneth D Mandl^{4,5,6}, MD, MPH; John D Halamka^{7,8}, MD, PhD; Catherine M DesRoches⁹, DrPH

Conclusions: This study presents timely information on physicians' views about the scope of artificial intelligence (AI) in primary care. Overwhelmingly, GPs considered the potential of AI to be limited. These views differ from the predictions of biomedical informaticians. More extensive, stand-alone qualitative work would provide a more in-depth understanding of GPs' views.

Artificial Intelligence and Family Medicine: Better Together

Winston Liaw, MD, MPH | Ioannis A. Kakadiaris, PhD
Fam Med. 2020;52(1):8-10.



As family physicians, we know that computers are not the most important tool in medicine—personal relationships are and always will be. When it comes to executing complicated tasks, computers will outperform us, but our ability to establish and sustain these relationships, understand and manage their complexity, and use them to elicit and integrate preferences into medical decisions cannot be effectively replicated. In family medicine, humans and computers are not alternatives but rather, complements, with opposite strengths and weaknesses.²⁵

Computers can facilitate human interactions and make the time we have with patients more meaningful. But first, we need to recognize that computers are our partners and not our adversaries.



High-performance medicine: the convergence of human and artificial intelligence

Eric J. Topol 

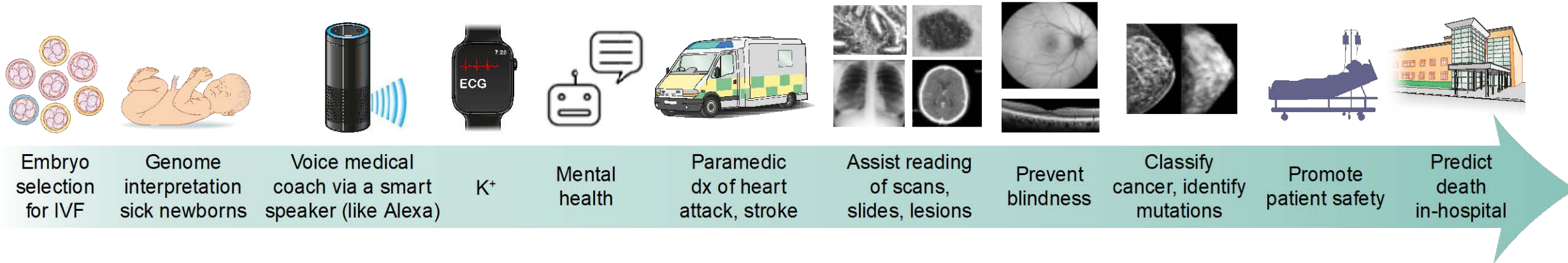


Fig. 2 | Examples of AI applications across the human lifespan. dx, diagnosis; IVF, in vitro fertilization K⁺, potassium blood level. Credit: Debbie Maizels/ Springer Nature

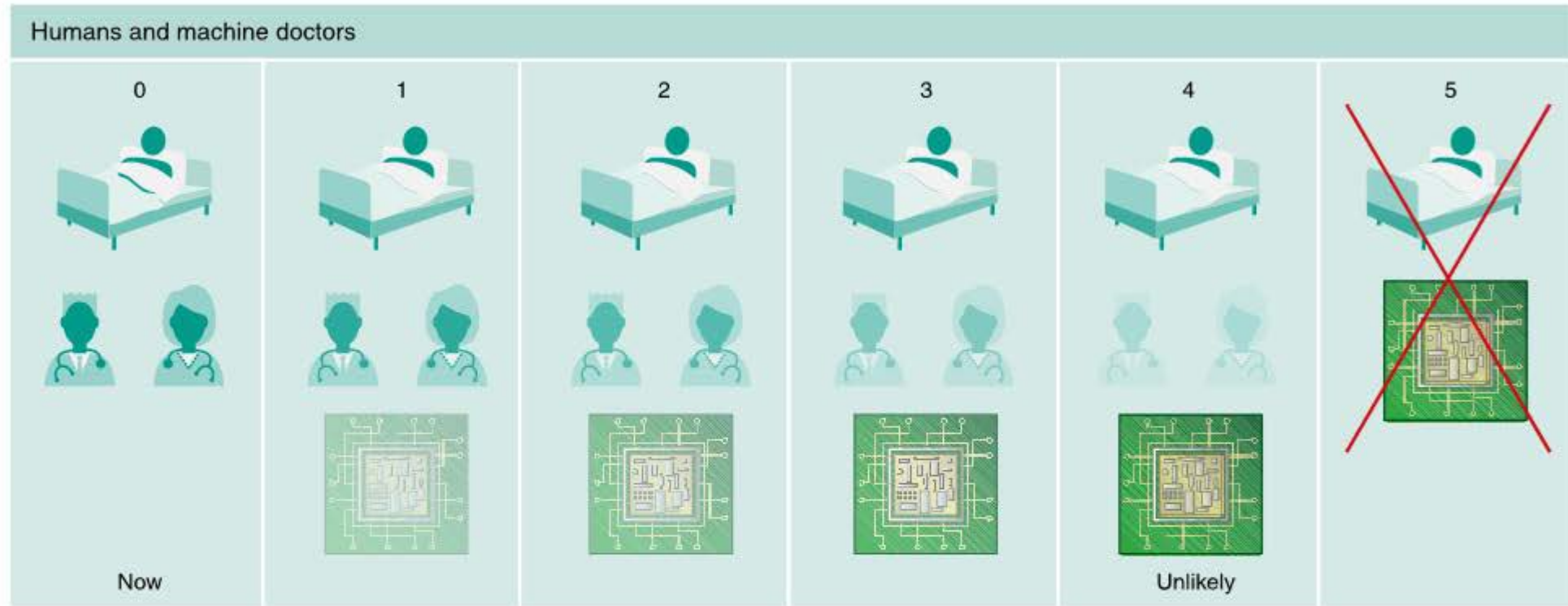


Fig. 5 | The analogy between self-driving cars and medicine. Level 5, full automation with no potential for human backup of clinicians, is not the objective. Nor is Level 4, with human backup in very limited conditions. The goal is for synergy, offsetting functions that machines do best combined with those that are best suited for clinicians. Credit: Debbie Maizels/Springer Nature

***“Technology is a useful servant but a dangerous master.”
-Cristian Louis Lange, recipient of the Nobel Peace Prize 1921***

Potential challenges

- Development costs
- Integration issues
 - Ethical issues
 - Reluctance among medical practitioners to adopt AI
 - Fear of replacing humans

**Harvard
Business
Review**

Technology And Analytics

AI Can Outperform Doctors. So Why Don't Patients Trust It?

by Chiara Longoni and Carey K. Morewedge

- Data Privacy and security
- Data exchange
 - Need for continuous training by data from clinical studies
 - Incentives for sharing data on the system for further development and improvement of the system. Nevertheless,
 - All the parties in the healthcare system, the physicians, the pharmaceutical companies and the patients, have greater incentives to compile and exchange information
- State and federal regulations
- Rapid and iterative process of software updates commonly used to improve existing products and services



- **Understanding the Method Behind the Machine**
- As we foresee an AI future in the near future it is mandatory that all medical professionals must know the fundamentals of AI technology and their basic solutions which will help them in getting better outcomes to their patients.

International Conference on Robotics and Artificial Intelligence (RoAI) 2020

SYNERGY

