



Politecnico  
di Torino



UNIVERSITÀ  
DEGLI STUDI  
DI TORINO

**16 giugno 2022**  
**ore 9.30/12.00**  
Sala Agorà I3P e  
Laboratori PAsTISs

EVENTO DI PRESENTAZIONE

**PAsTISs** - PARCO per le Tecnologie Innovative per la Salute

La ricerca di laboratorio per i cittadini, al fianco delle imprese



Alberto Audenino  
Coordinatore



Politecnico  
di Torino



Managing Company BIOINDUSTRY PARK



per una crescita intelligente,  
sostenibile ed inclusiva  
[www.regione.piemonte.it/europa2020](http://www.regione.piemonte.it/europa2020)  
INIZIATIVA CO-FINANZIATA CON FESR

# How long will people live in the future?



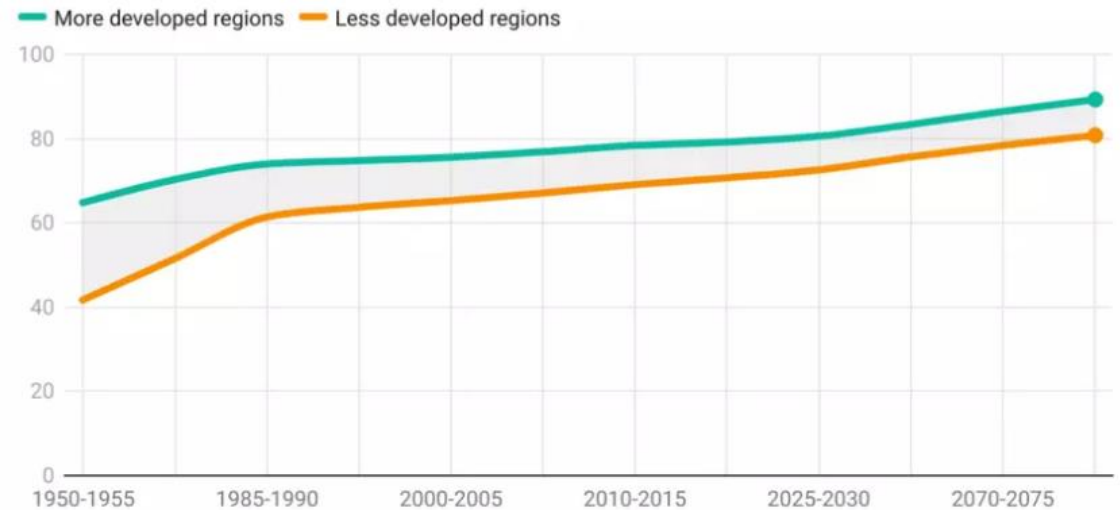
Jeanne Calment celebrates her 121st birthday with a kiss from Catherine Sautecoeur in Arles, France, February 21 1996.

Questions have been raised about Calment's true longevity, but researchers from France and Switzerland say she was the oldest human being. Regardless, her official biography has captured the fancy of those who like the idea of being able to [sip Port wine](#) and eat more than [two pounds of chocolate](#) per week well past the century mark.

- The pandemic has caused setbacks in life expectancy in some places.
- But a recent study suggests under ideal conditions a person can live to 150.
- Efforts are underway to further extend and enhance longevity.

## Living Longer

Estimated years of life expectancy at birth from 1950-1955 to 2095-2100 (projected)

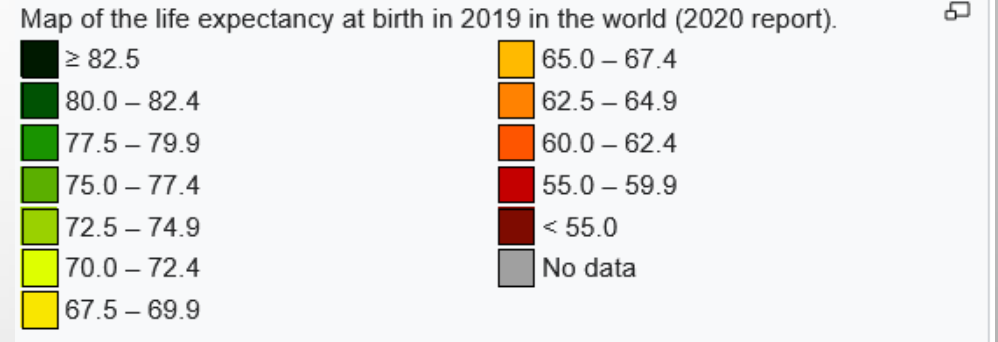
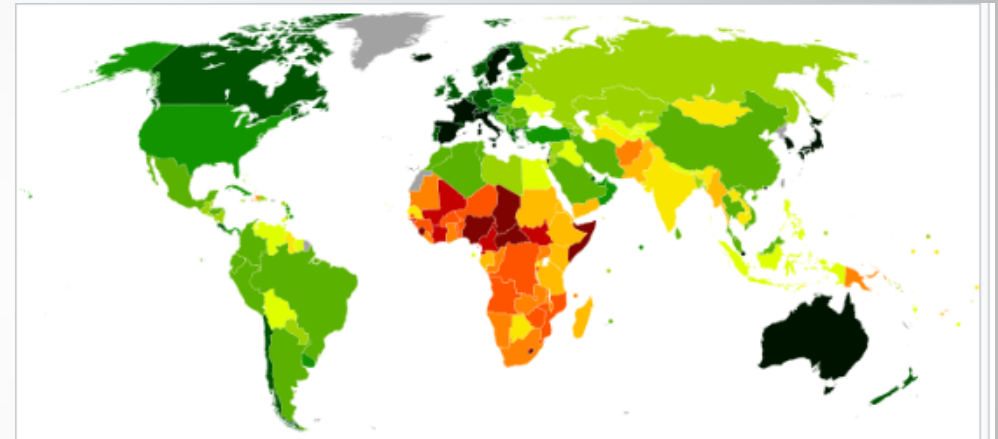
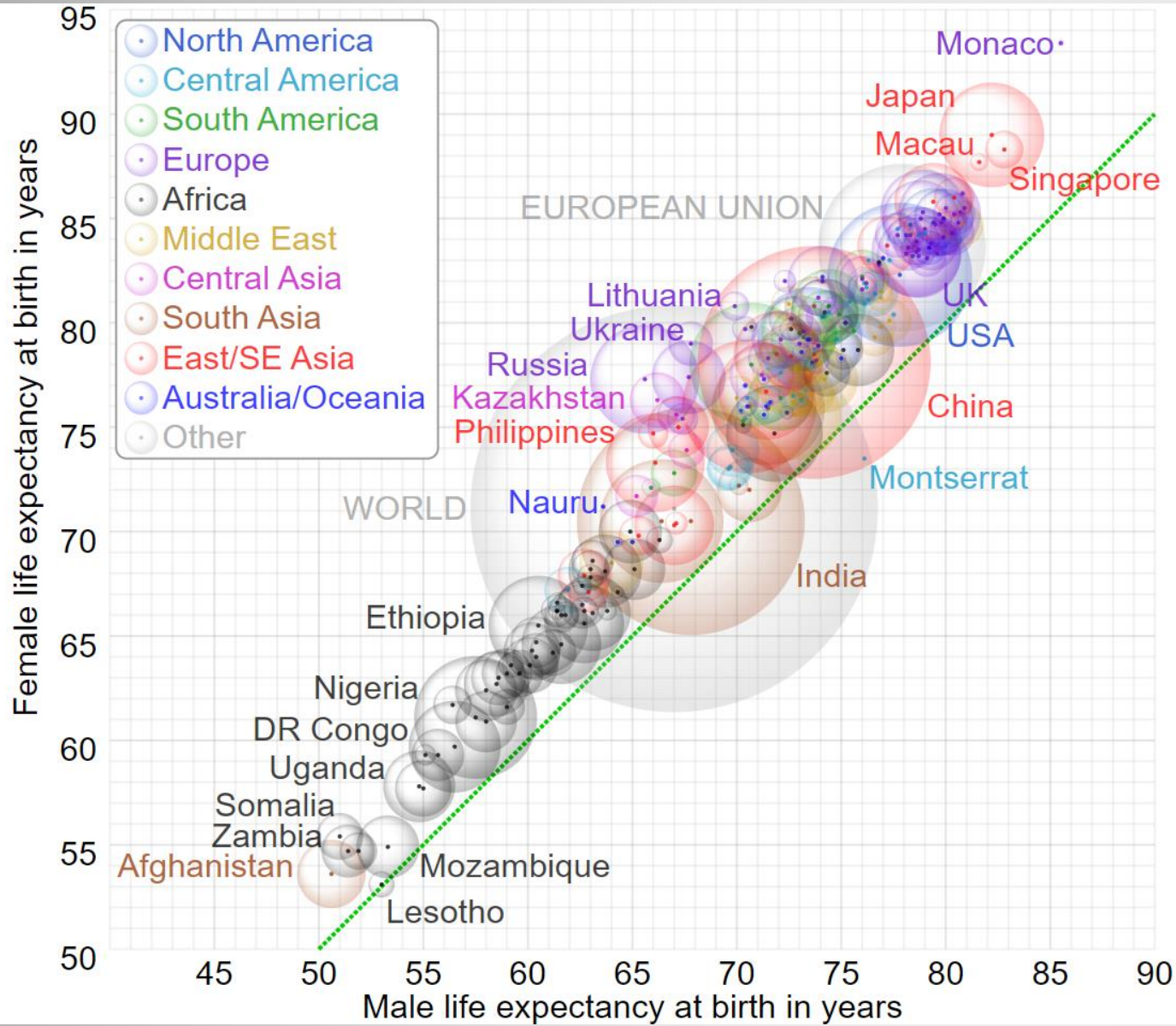


Source: UN Department of Economic and Social Affairs • Created with Datawrapper

# Will we be able to become immortal?

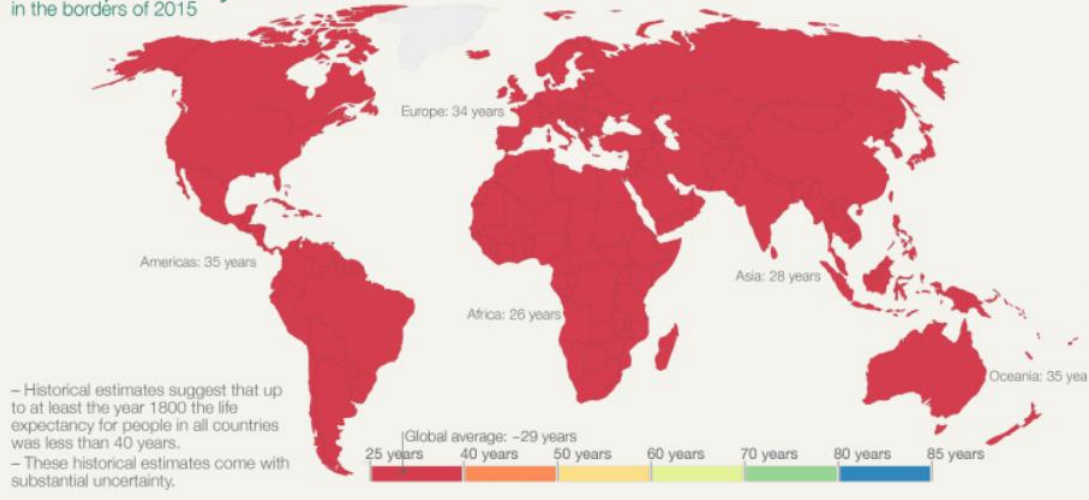


Ray Kurzweil, an inventor and futurist, has likened the human genome to **outdated software**, and described ageing as a **solvable engineering problem**. Eventually we could extend our longevity **“indefinitely,”** Kurzweil has said, and relatively soon it may be possible to start adding one additional year to our lifespan every year.

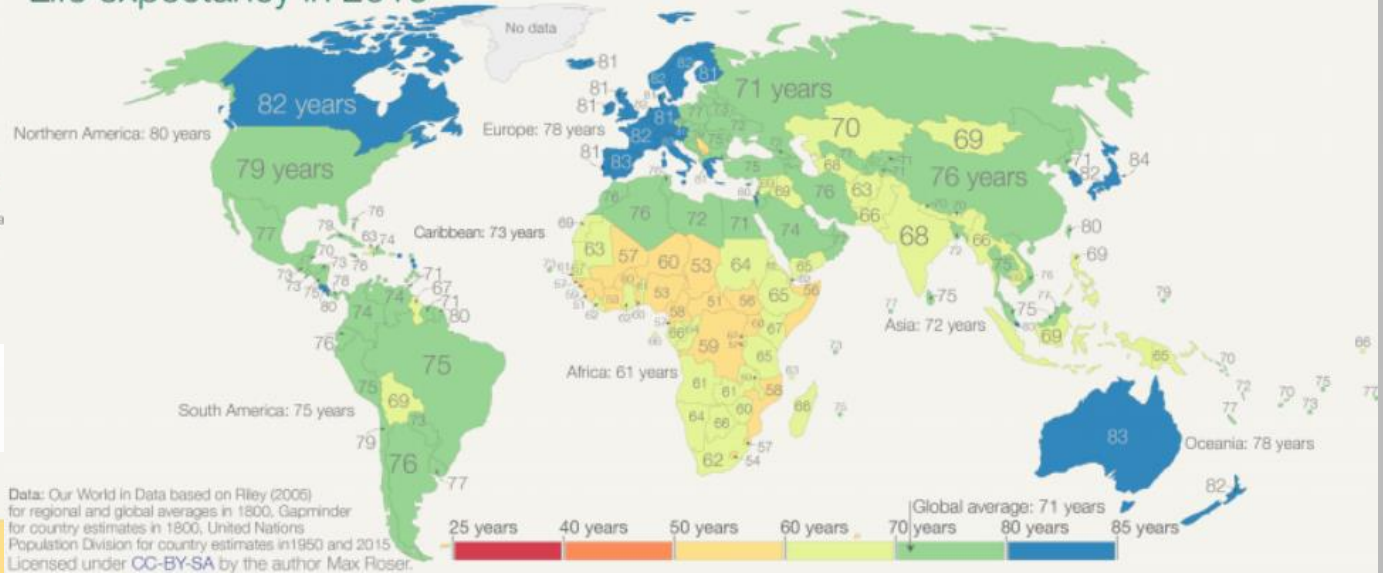


# Life expectancy in 1800, 1950 and 2015

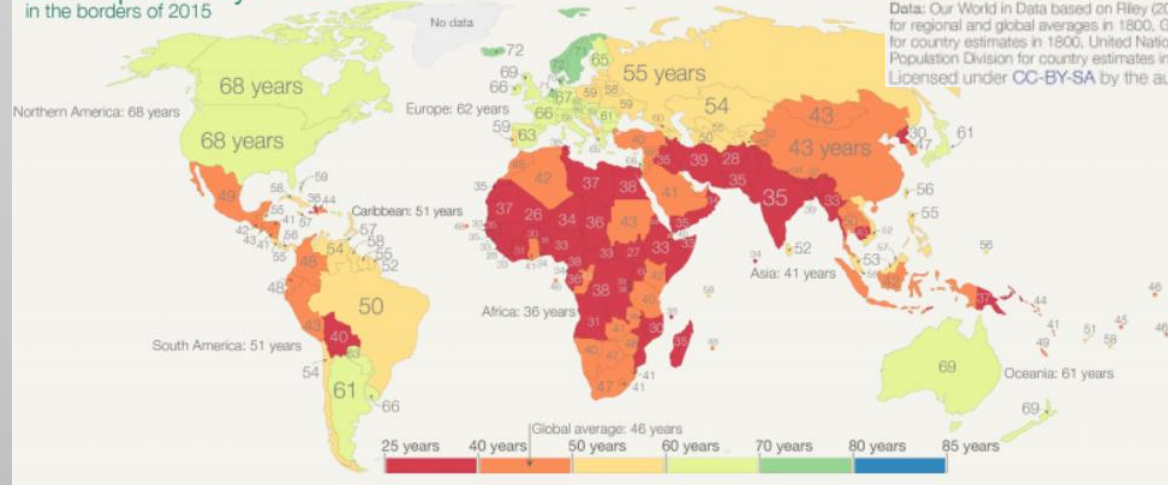
Life expectancy in 1800  
in the borders of 2015



Life expectancy in 2015



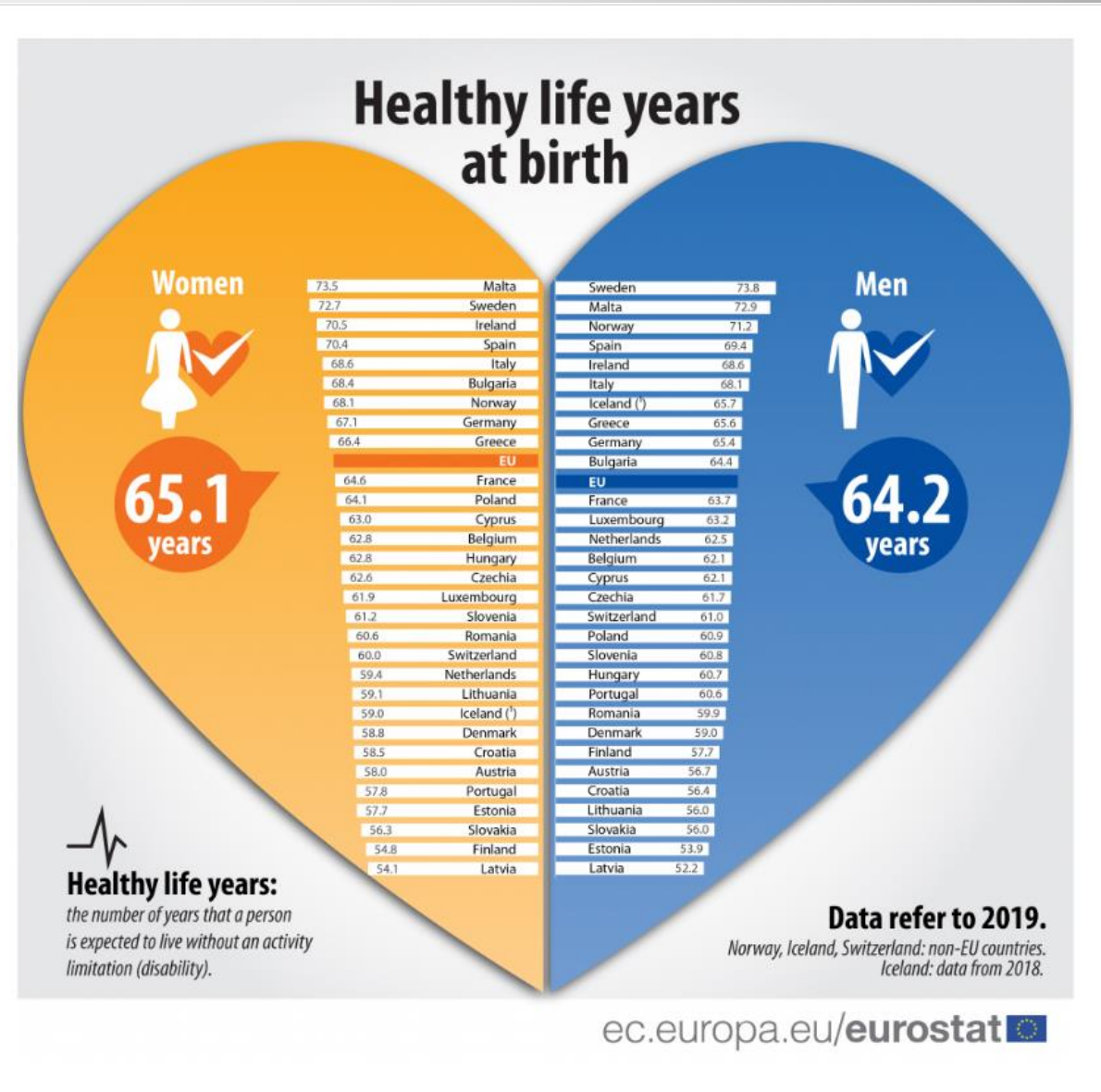
Life expectancy in 1950  
in the borders of 2015



## The current focus of medical research increases the quantity, rather than the quality, of life

Whether extra years of life gained through increased longevity are spent in good or bad health is a crucial question. Since life expectancy at birth is not able to fully answer this question, indicators of health expectancies, such as healthy life years (also called disability-free life expectancy) have been developed. These focus on the quality of life spent in a healthy state, rather than the quantity of life, as measured by life expectancy. Healthy life years are an important measure of the relative health of populations in the European Union (EU).

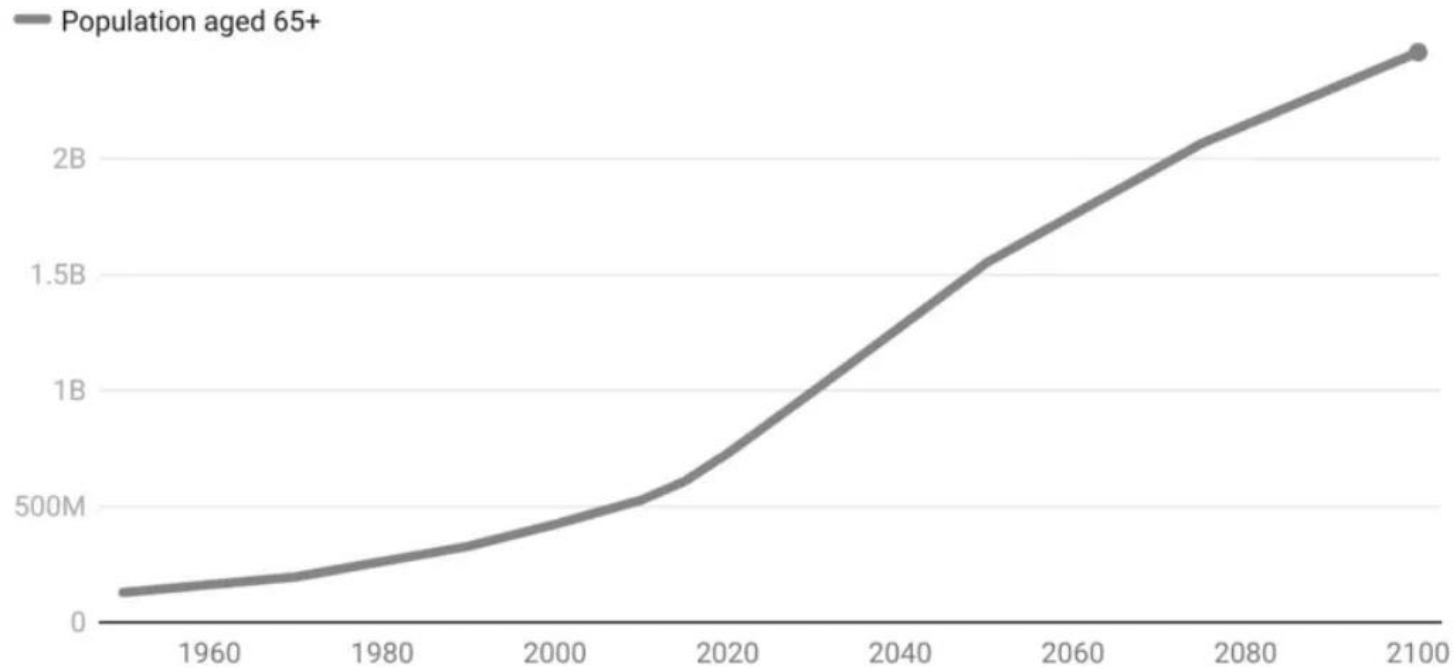
## Healthy life expectancy at birth (HALE)



# “the Silver Economy”

## More Silver Years

Size of the global population aged 65 or older from 1950 to 2100 (projected)



Source: UN Department of Economic and Social Affairs • Created with Datawrapper

There are potential economic benefits if people become able to live longer while staying healthier. This study suggests that effectively slowing the typical ageing process could create **\$38 trillion in value in a year of added life expectancy.**

Analysis | [Open Access](#) | [Published: 05 July 2021](#)

### The economic value of targeting aging

[Andrew J. Scott](#) , [Martin Ellison](#) & [David A. Sinclair](#)

[Nature Aging](#) **1**, 616–623 (2021) | [Cite this article](#)

**32k** Accesses | **7** Citations | **715** Altmetric | [Metrics](#)

# Will healthcare spending still be sustainable?

The challenge of the health system today is called sustainability, we often hear that it would be threatened by several factors:

- increase in chronic diseases and the progressive aging of the population
- growing spread of obesity and overweight problems in more than half of OECD countries
- the increase in the income of the population which determines a increase in consumption
- the doctor makes the choice on patient's behalf; the doctor knows, and sometimes determines, the patient's need and he also retains the role of producer of services
- the induction of demand due to the increase in the number of doctors and the introduction of mechanisms of volume-based financing
- the doctor choose, the patient use, the national health system pays
- It has been demonstrated that sometimes it is not demand that determines supply, but supply that produces the corresponding demand
- the introduction of new and often more expensive technologies health care (equipment, drugs, care procedures) with consequential induction of the request of the related services.





# Is the biomedical healthcare industry really effective and efficient?

## Definitely not, some example concerning Big Pharma:

- the price of drugs is secret
- Roche Herceptin (anticancer) : 2018, Piemonte 163€, Umbria 762 €!
- Bosentan (hypertension) from 2210€ to 27€; Imantinib from 1907€ to 27€ → both -99%!
- Insulin syringe: 0,033€ in Liguria, 0,165€ in Lazio; Pen needle 0,015€ in Liguria, 0,165€ in Lazio
- 2019: Italian Competition Authority fine Novartis and Roche €182.5 million for creating false distinctions between Avastin (82€) and Lucentis (902€) for the treatment of maculopathy
- Anticancer (Alkeran): Aspen buys the patent from GlaxoSmithKline → price +1540%, same drug, same factory
- Ministry of Health: “with a more prudent purchase, 2.5 billion euros could be saved a year”



# The Pharma System → “...transfers of value”

- European Medicines Agency, EMA, funded at 84% by the companies it has to control
- Doctors are funded: 550 millions/year in Italy
- Most medical societies are funded
- Most patient associations are funded
- Some ASL and ISS funded as well
- Many commonly used drugs are useless
- 320M€ for the vitamin D: the third best-selling drug in Italy
- Each Italian takes an average of one and a half pills a day, half of the elderly reach ten
- excess antibiotics kills one person every hour
- One hundred drugs more harmful than useful in France in 2021

## Médicaments à écarter pour mieux soigner - bilan 2022

Le résultat d'une méthode fiable, rigoureuse et indépendante



### Cancérologie - Greffes - Hématologie

Défibrotide (Defitelio°) - un médicament à écarter des soins

Mifamurtide (Mepact°) - un médicament à écarter des soins

Panobinostat (Farydak°) - un mé



### Cardiologie

Trabectédine (Yondelis°) - un mé

Aliskirène (Rasilez°) - un médicament à écarter des soins

Vandétanib (Caprelsa°) - un méd

Bézafibrate (Befizal°) - un médicament à écarter des soins

Vinflunine (Javlor°) - un médicar

Ciprofibrate (Liponor° ou autre) - un médicament à écarter des soins

Dronédarone (Multaq°) - un médicament à écarter des soins

Fénofibrate (Lipanthyl° ou autre) - un médicament à écarter des soins



### Diabétologie - Nutrition

Alogliptine (Vipidia°, et associée avec la metformine dans Vipdomet°) - un médicament à écarter des soins

Bupropione + naltrexone (Mysimba°) - un médicament à écarter des soins

Linagliptine (Trajenta°, et associée avec la metformine dans Jentadueto°)



### Douleur - Rhumatologie

Acéclofénac (Cartrex° ou autre) - un médicament à écarter des soins

Capsaïcine en patchs (Qutenza°) - un médicament à écarter des soins

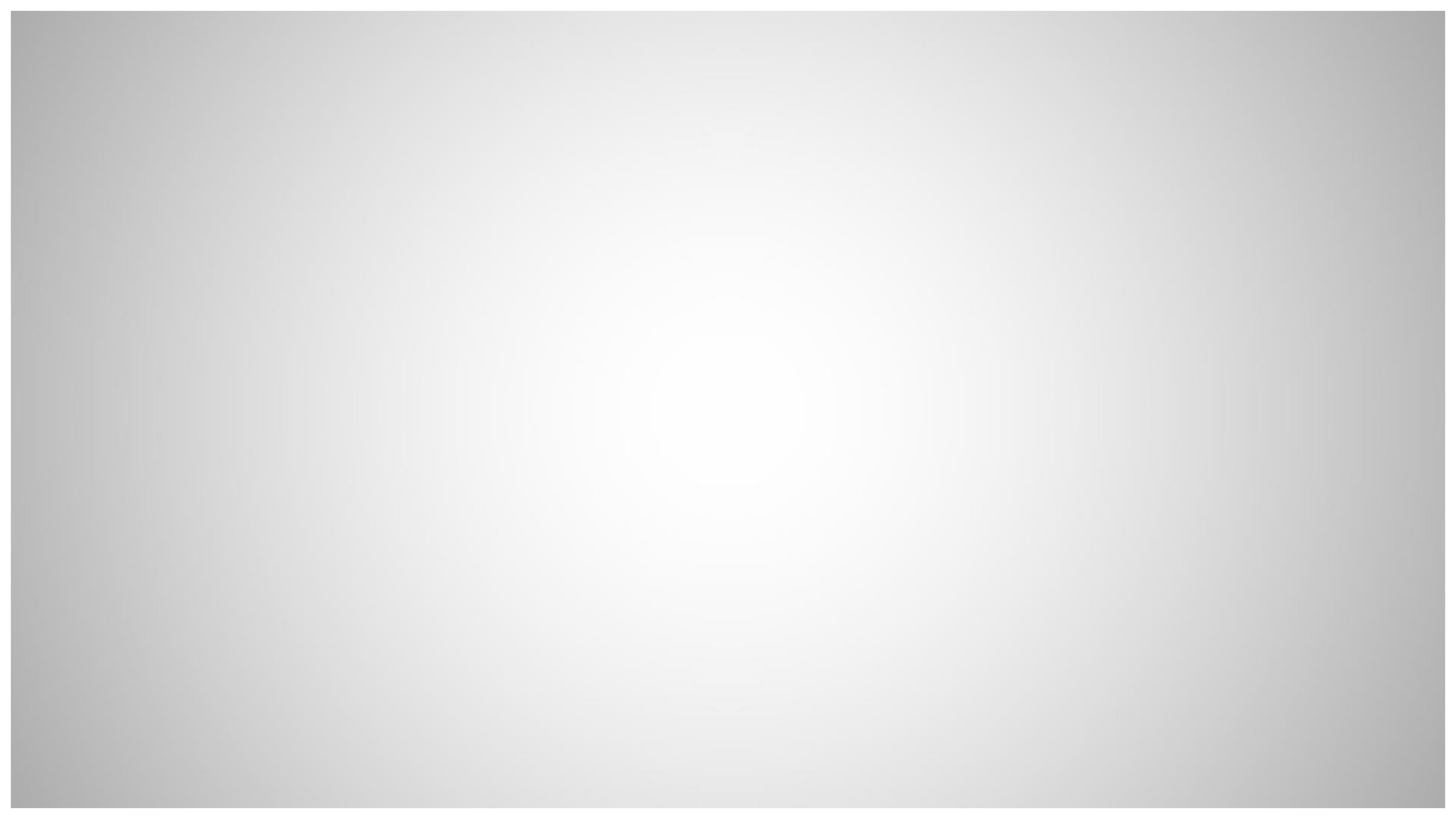
Célécoxib (Celebrex° ou autre) - un médicament à écarter des soins

Colchicine + poudre d'opium + tiémonium (Colchimax°) - un médicament

# In all other industrial sectors, innovation enters freely and induces a general lowering of prices

- In biomedical healthcare industry prices are always getting higher
- sometimes centralized regional purchases with public tender have induced some cost reduction in medical devices
- ... the price is high because it saves our lives ....
- so how much should an airbag, a climbing rope or a life preserver cost?
- Research, safety and certification issues?





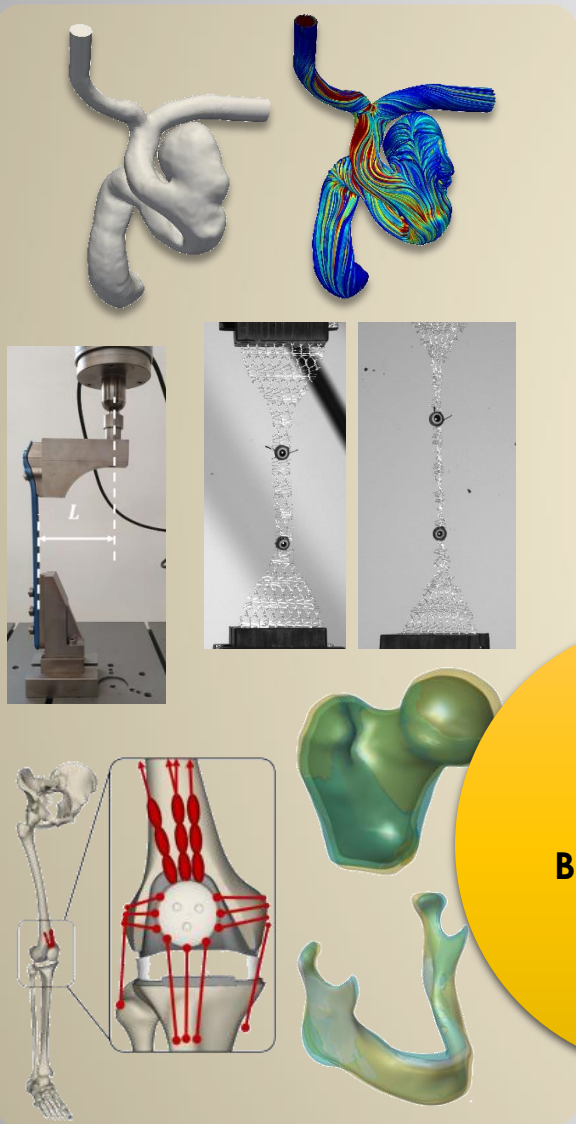
# Mission

To stimulate a critical mass of research and innovation efforts needed to address the social challenge of promoting the health and the well-being of all citizens throughout their entire life cycle.



Technology Transfer to Territory  
Scientific Excellence  
Advanced certification services for PMI  
Increase in Piemonte competitiveness

# PAsTISs Architecture

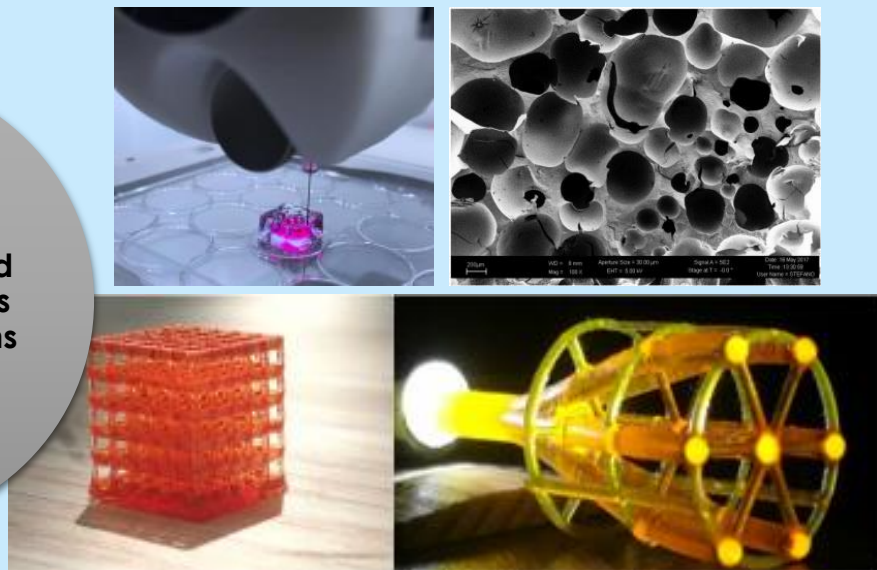


**Integrative  
Biomechanics**

**Information and  
Communication  
Technologies**



**New Materials and  
Nanotechnologies  
for Bio-applications**



# In all other industrial sectors, innovation enters freely and induces a general lowering of prices

- In biomedical healthcare industry prices are always getting higher
- sometimes centralized regional purchases with public tender have induced some cost reduction in medical devices
- ... the price is high because it saves our lives ....
- so how much should an airbag, a climbing rope or a life preserver cost?
- Research, safety and certification issues?

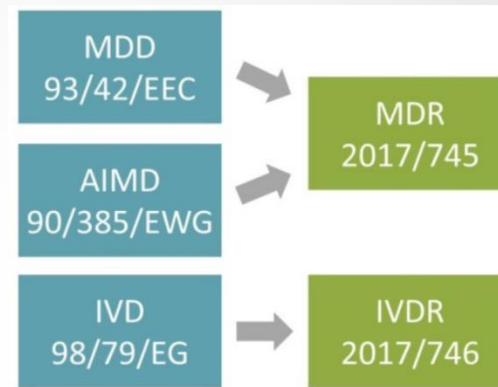


# Medical Device Regulation 2017/745 (MDR)

In May 2017, important changes were made to the medical device legislation of the European Union. Medical Device Regulation 2017/745 (MDR) and In Vitro Diagnostic Device Regulation 2017/746 (IVDR). They replace the three existing directives: 93/42/EEC (Medical Device Directive, MDD), 90/385/EEC (Active Implantable Medical Devices, AIMD) and 89/79/EC (In Vitro Diagnostic Device Regulation, IVD)

**The aim of the new EU-wide and uniform regulations is to ensure patient safety and to enhance the quality of medical devices on the European market for the benefit of all.**

All economic operators must comply with the regulation by 26 May 2021, with some exceptions. The requirements of the MDR, e.g. that manufacturers have a **complete MDR-compliant technical documentation of their medical devices**, must be met by this date.

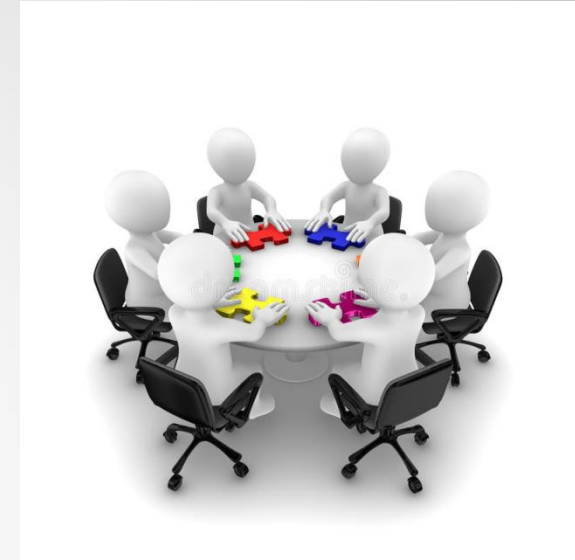


**Manufacturers in particular are facing major challenges, as the implementation of the new requirements involves high effort and costs.**



# Ethics in medical research – Ethics committees

Ethics, an essential dimension of human research, is considered both as discipline and practice. For clinical research, ethically justified criteria for the design, conduct, and review of clinical investigation can be identified by obligations to both the researcher and human subject. Informed consent, confidentiality, privacy, privileged communication, and respect and responsibility are key elements of ethics in research.



Research ethics committees must promote greater understanding of ethical issues on biomedical research. These committees function for submission, consideration, evaluation, and communication of findings. Application, research protocol, patient information leaflet and informed consent form, and any other supporting documentation are thoroughly reviewed by research ethics committees for legal and moral safety, integrity, and welfare of the research subjects.

Review

## Ethics in medical research

Salman Yousuf Guraya <sup>a</sup> , N.J.M. London <sup>b</sup>, Shaista Salman Guraya <sup>a</sup>

# The medical device industry in Italy

- 4.546 enterprises
- 112.534 employees
- 16.2 G€ turnover
- 10.8 G€ Ita + 5.4 G€ Export
- (8.4 G€ Ita health exp.)

Italy  
78 %  
sales

Public  
Health



**3rd** European market, the **6th** worldwide  
(after the United States, Japan, China, Germany,  
France)

<https://www.confindustriadm.it/il-settore-in-numeri/>



**Roberto Burioni** @Roberto... · 11h

Un mondo dove gli ingegneri parlano di virus (o dove i virologi progettano ponti in cemento armato) non promette nulla di buono.



**Ing. Antonio Caramia** @... · 13h

Lasciare che il virus circoli indisturbato non è mai stata una buona idea... [twitter.com/EnemyInAState/](https://twitter.com/EnemyInAState/)

[Mostra questa discussione](#)

08:06

## SUSTAINABILITY



The technological innovation in healthcare is part of the solution, not part of the problem.

The fear that it can push public spending out of control is not only lacking in real foundations, but above all it prevents us from fully grasping the opportunities that Italy would expect from the enhancement of its National Health Service.

