

Nova sessió

scQA
Societat Catalana de
Qualitat Assistencial

La transformació digital basada en valor



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15 de març 2024



15.30 a 16.45 h



Presencial i en línia



scqa.cat



Societat Catalana de Salut Digital

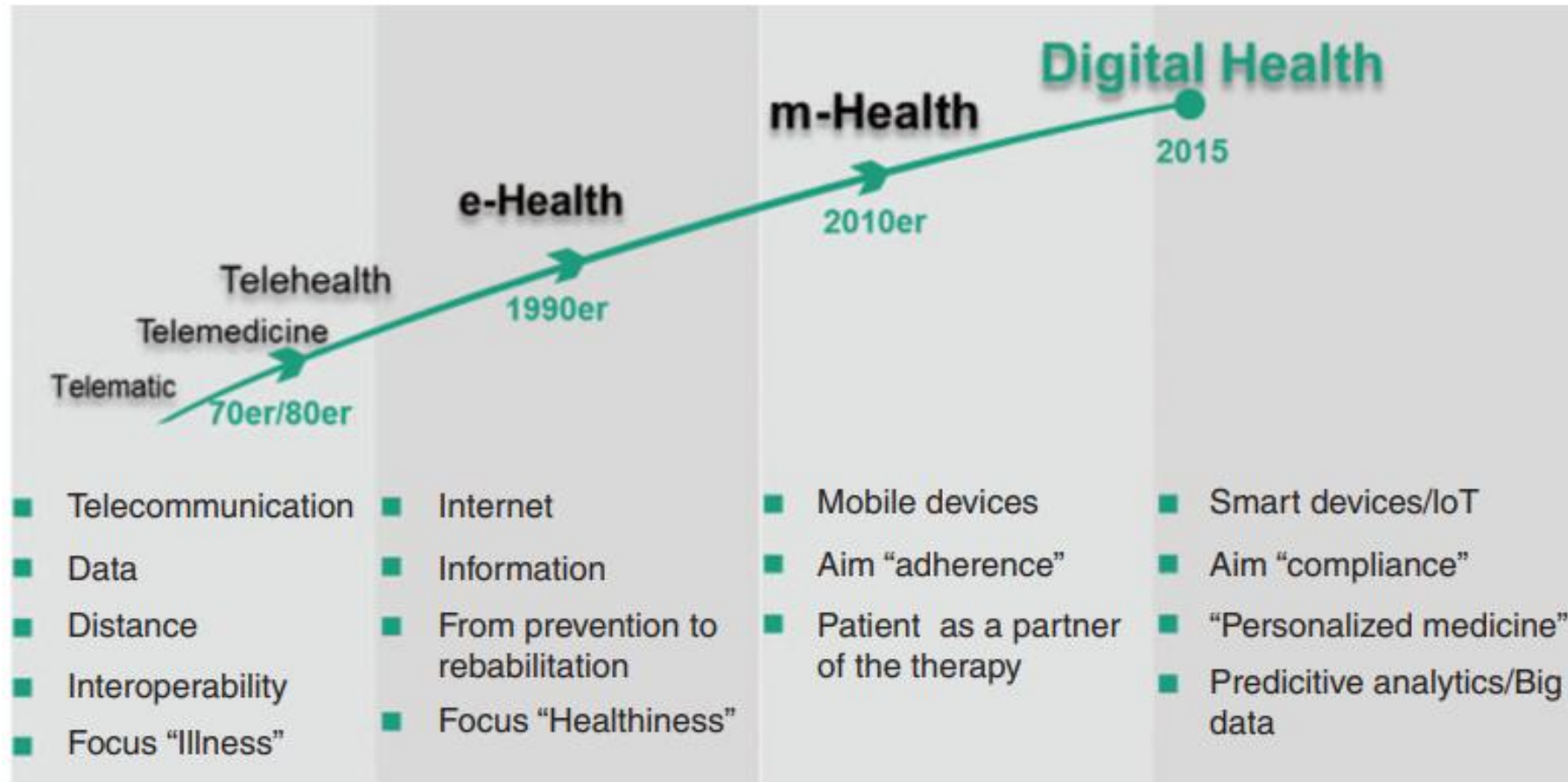
La Pregunta

- Quins són els reptes que tenim per davant com a Societat, en adoptar una estratègia de transformació digital centrada en el valor?
- Com afecta la transformació digital la relació entre els diferents agents de la Societat?
- Quins són els reptes principals en l'adopció de competències digitals a la nostra Societat?
- Com es poden abordar les bretxes en l'adopció de tecnologies digitals a diferents segments de la població per garantir l'equitat en l'accés a la informació i als serveis en general? I al cas de salut?

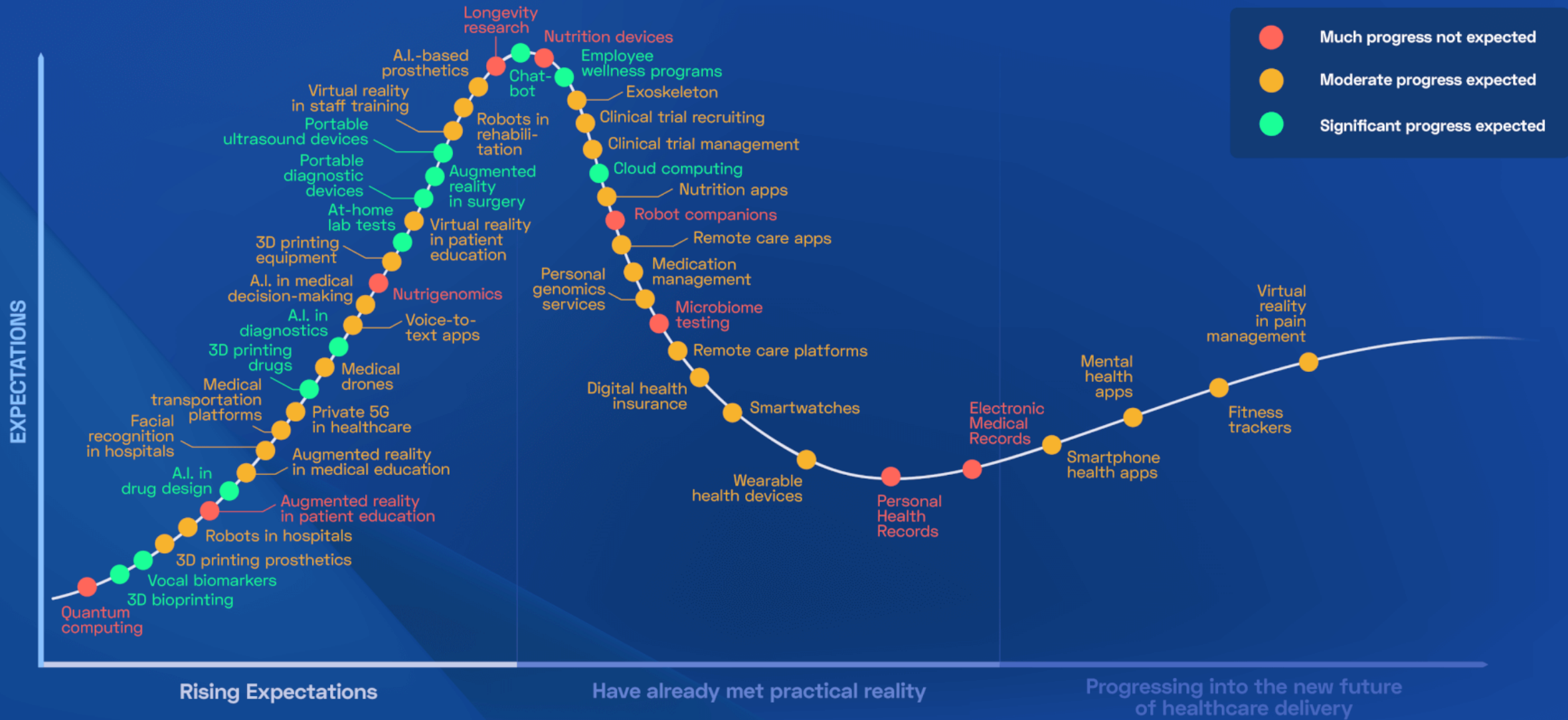
Open Access

Sven Meister*, Wolfgang Deiters and Stefan Becker

Digital health and digital biomarkers – enabling value chains on health data



Hype Cycle Of The Top 50 Emerging Digital Health Trends



THE DIGITAL HEALTH REVOLUTION

Infographic by Paul Sonnier

DIGITAL
REVOLUTION
+
GENOMIC
REVOLUTION

WIRELESS SENSORS & DEVICES

MOBILE CONNECTIVITY

SOCIAL NETWORKING

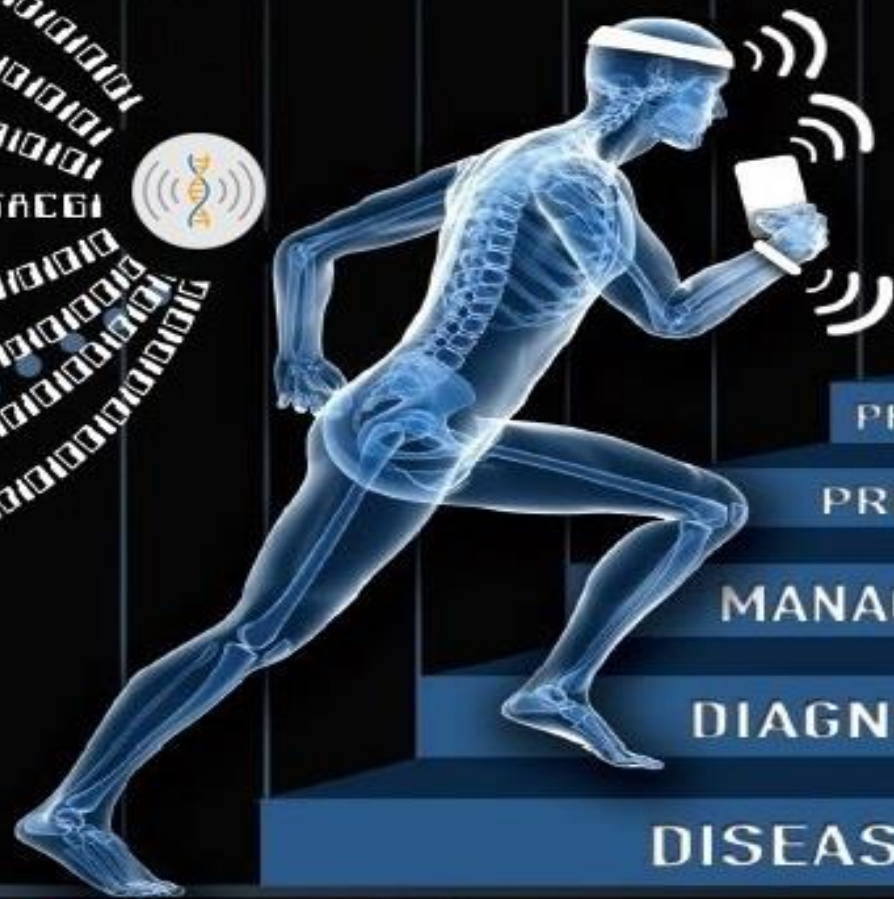
GENOMICS

INTERNET

IMAGING

DATA UNIVERSE

HEALTH INFO SYSTEMS



R
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S

PREVENTION

PREDICTION

MANAGEMENT

DIAGNOSIS

DISEASE

1970

1980

1990

2000

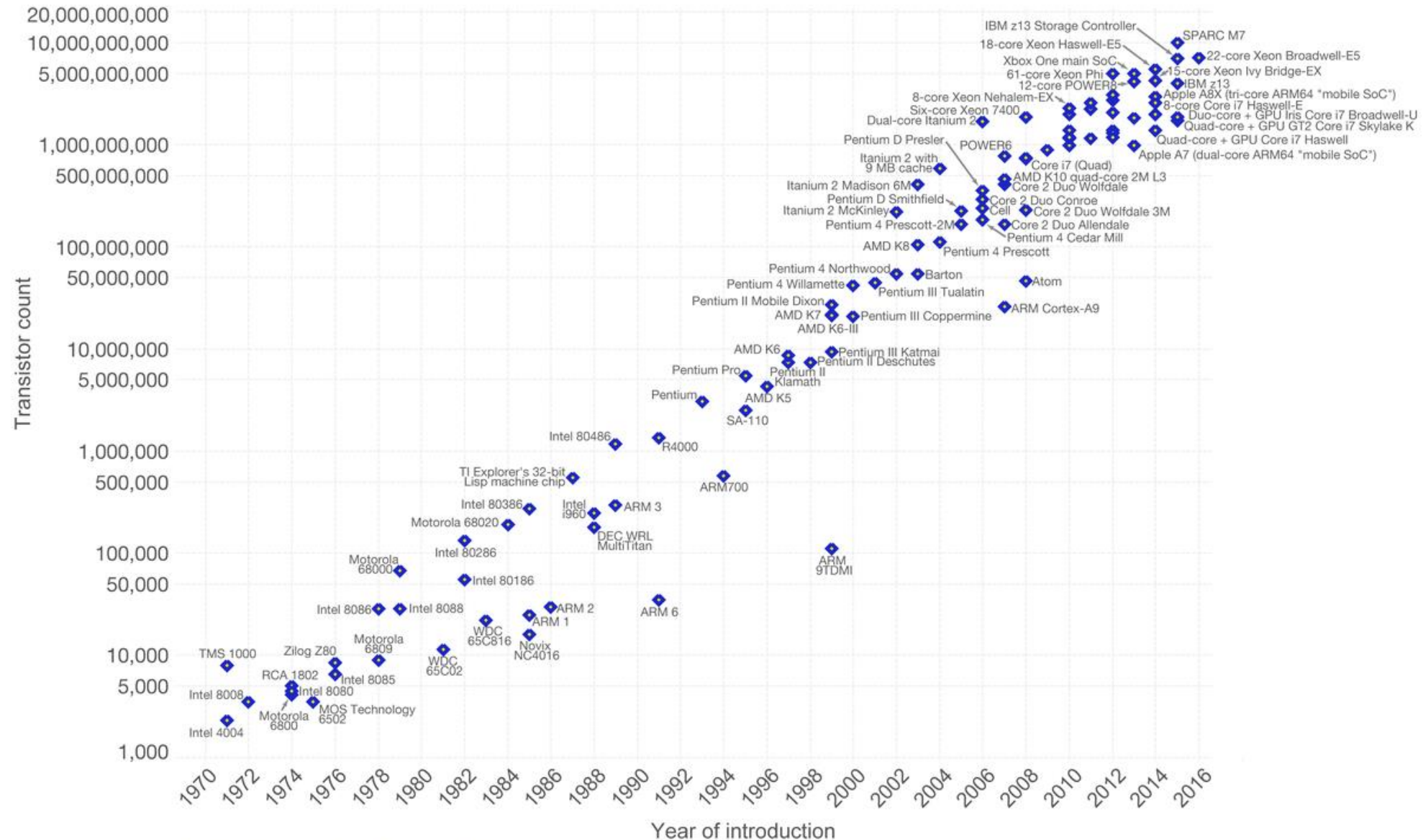
storyofdigitalhealth.com

2010

2020

Moore's Law – The number of transistors on integrated circuit chips (1971-2016)

Moore's law describes the empirical regularity that the number of transistors on integrated circuits doubles approximately every two years. This advancement is important as other aspects of technological progress – such as processing speed or the price of electronic products – are strongly linked to Moore's law.



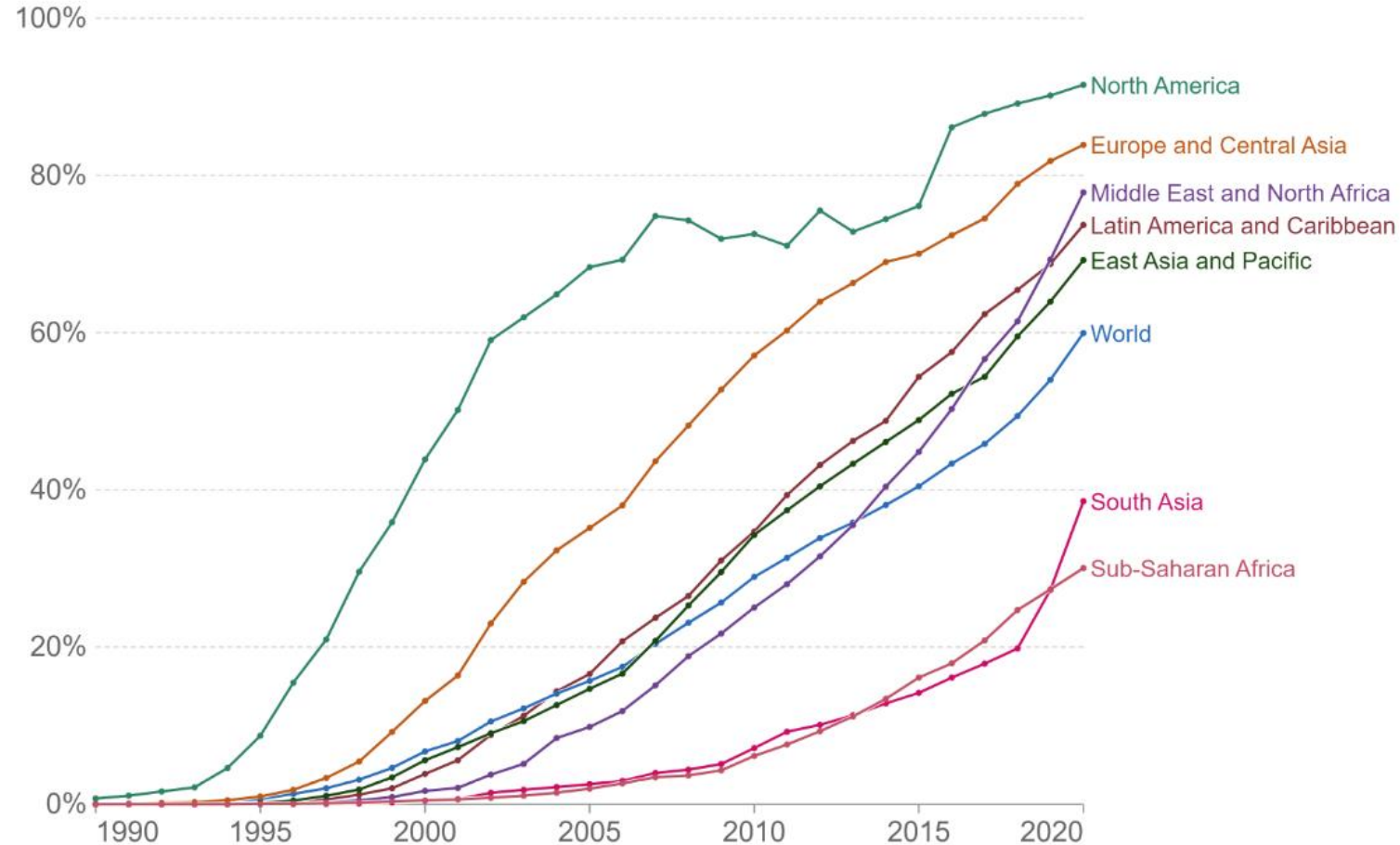
Data source: Wikipedia (https://en.wikipedia.org/wiki/Transistor_count)

The data visualization is available at [OurWorldinData.org](https://www.ourworldindata.org). There you find more visualizations and research on this topic.

Licensed under CC-BY-SA by the author Max Roser.

Share of the population using the Internet

Internet users¹ are those who have used the Internet from any location in the last three months.



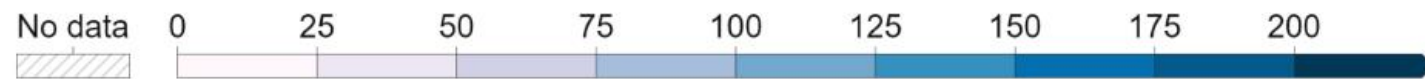
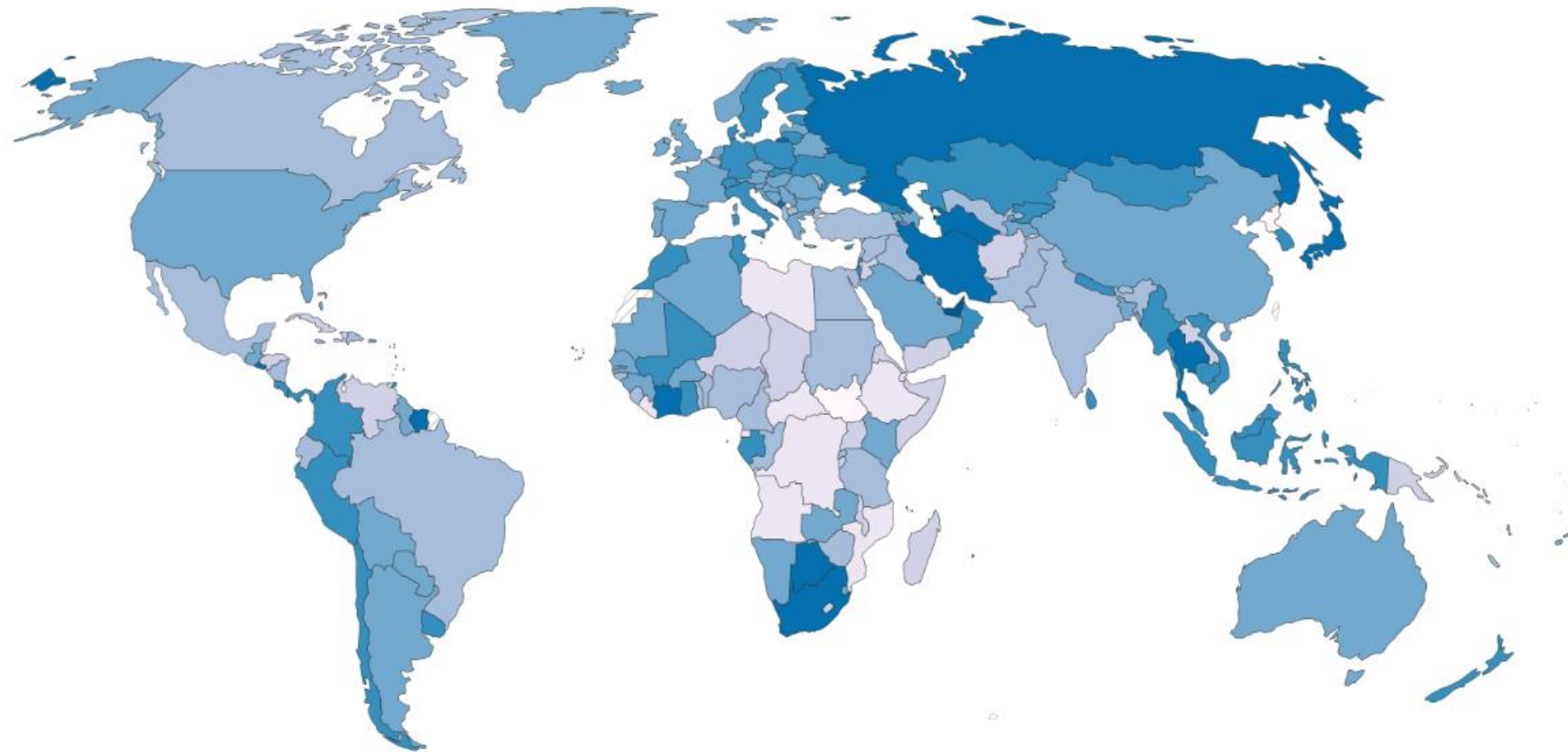
Source: International Telecommunication Union (via World Bank)

OurWorldInData.org/internet • CC BY

1. Internet user: An internet user is defined by the International Telecommunication Union as anyone who has accessed the internet from any location in the last three months. This can be from any type of device, including a computer, mobile phone, personal digital assistant, games machine, digital TV, and other technological devices.

Mobile phone subscriptions per 100 people, 2020

Subscriptions to a public mobile telephone service that provides access to the Public Switched Telephone Network (PSTN) using cellular technology.





DATA

Artificial Intelligence

Machine Learning

Deep Learning

Generative AI

1956

Artificial Intelligence

the field of computer science that seeks to create intelligent machines that can replicate or exceed human intelligence

1997

Machine Learning

subset of AI that enables machines to learn from existing data and improve upon that data to make decisions or predictions

2017

Deep Learning

a machine learning technique in which layers of neural networks are used to process data and make decisions

2021

Generative AI

Create new written, visual, and auditory content given prompts or existing data.

Què és la IA predictiva?

La IA predictiva, un subconjunt de l' anàlisi predictiva, utilitza algorismes estadístics i ML per pronosticar tendències, comportament, patrons i prediccions a partir de grans fonts de dades.

Què és la IA generativa?

La IA generativa és una forma avançada d' aprenentatge automàtic que genera contingut nou des de zero.

Pren dades sense processar i crea una cosa nova però també reconeixible (per exemple, text, imatges, vídeo).

Això és diferent dels models d'IA més antics que normalment se centraven a identificar patrons i fer prediccions.

La IA generativa necessita un gran volum de dades per funcionar. Això pot incloure text, imatges, àudio o codi

<https://www.coveo.com/blog/generative-vs-predictive-ai/>

How Does Predictive Analytics Work?

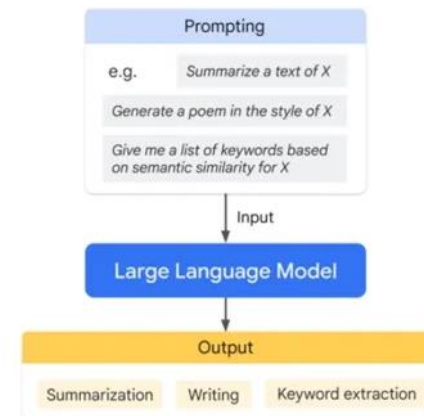
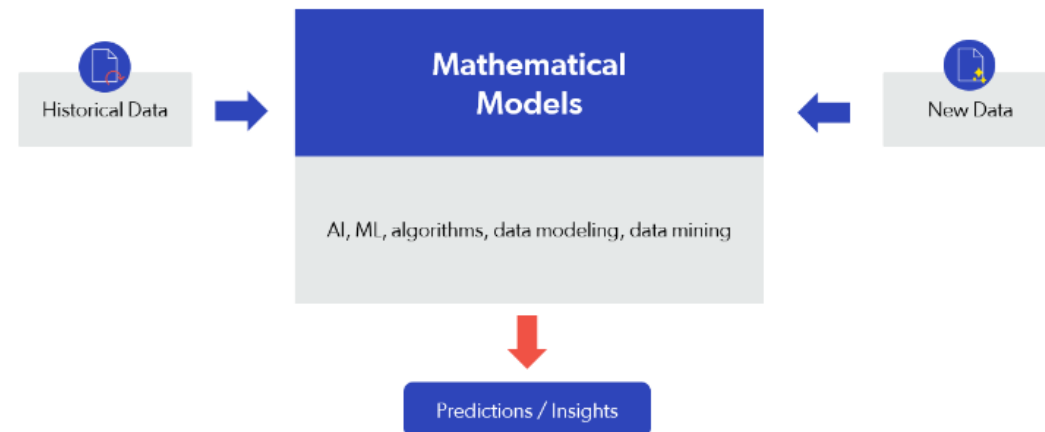


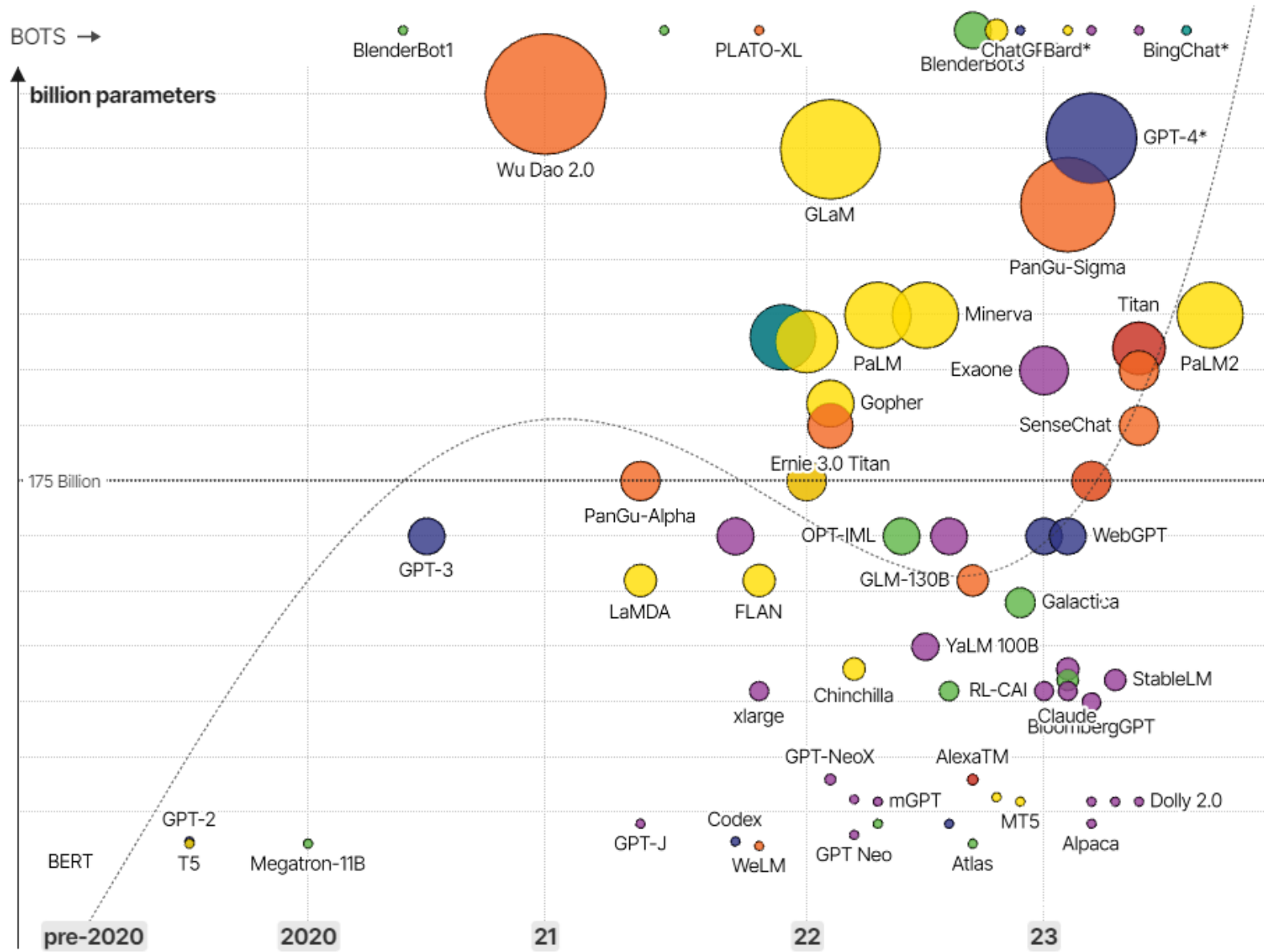
Image by Google

LLM

LARGE LANGUAGE MODEL



● Amazon-owned ● Chinese ● Google ● Meta / Facebook ● Microsoft ● OpenAI ● Other

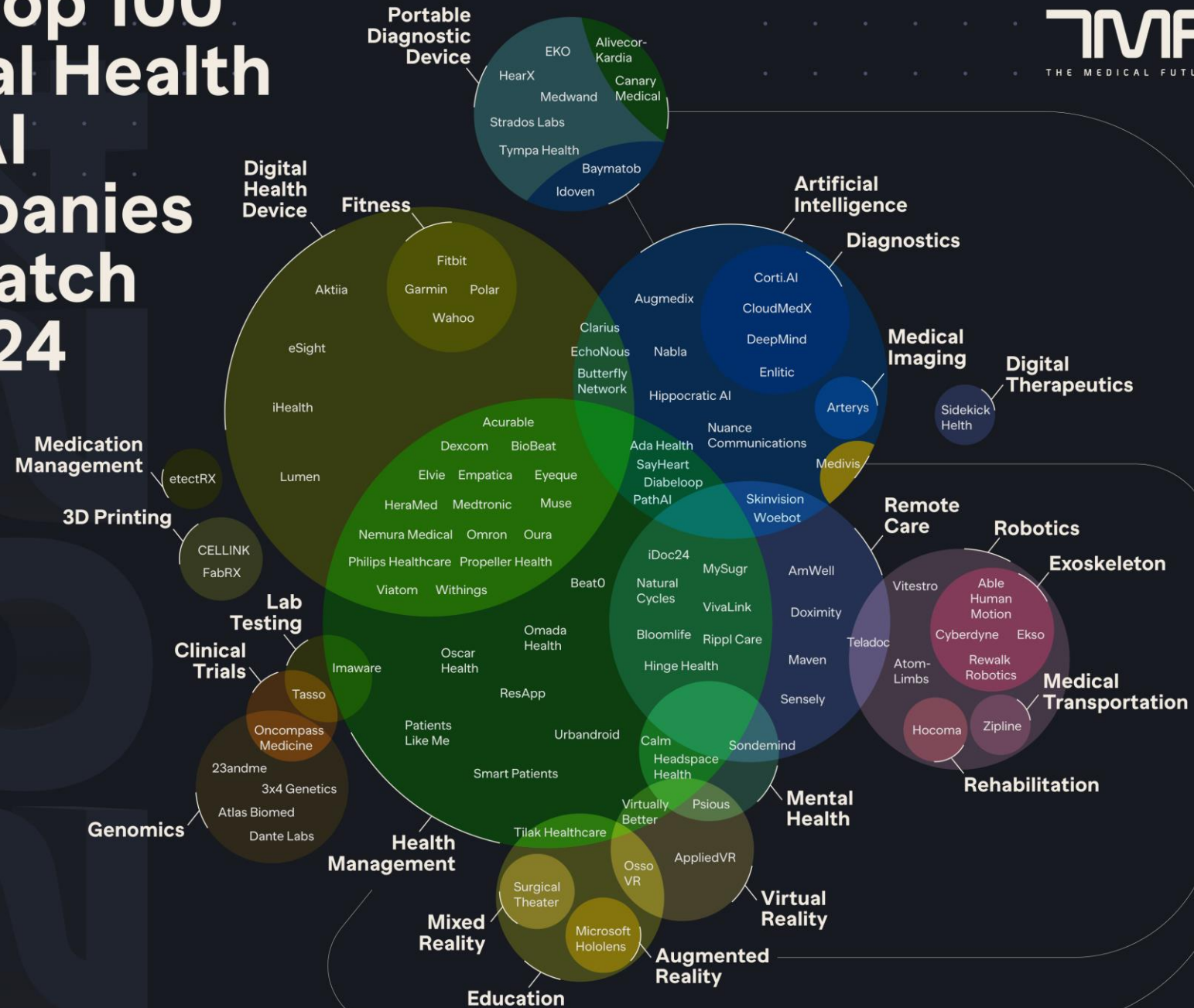


David McCandless, Tom Evans, Paul Barton
 Information is Beautiful // May 2023

source: news reports, [LifeArchitect.ai](https://lifeaiarchitect.ai)
 * = parameters undisclosed // see [the data](#)

The Top 100 Digital Health and AI Companies To Watch In 2024

Data visualization by The Medical Futurist

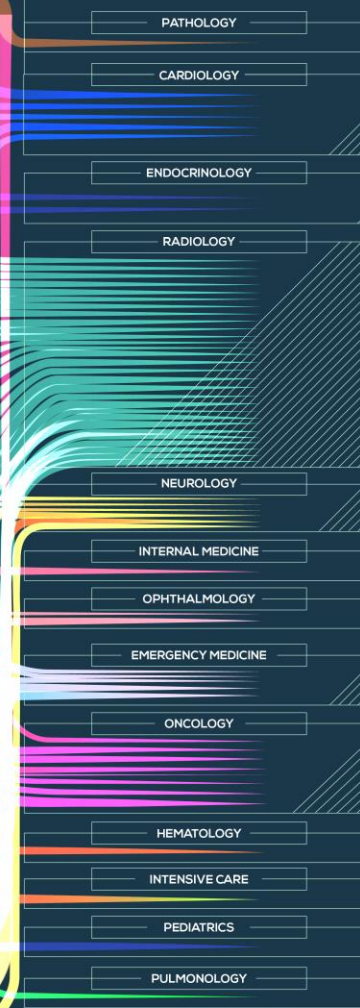


Data visualization by The Medical Futurist

FDA APPROVALS FOR ARTIFICIAL INTELLIGENCE-BASED DEVICES IN MEDICINE

Date	Device Name	Approval Type	Description
2010.06.	Pathwork Tissue of Origin Test	SIO(K) PREMARKET NOTIFICATION	to diagnose tumors using formalin-fixed, paraffin-embedded samples
2016.11.	Arterys Cardio DL	SIO(K) PREMARKET NOTIFICATION	software analyzing cardiovascular images from MR
2017.03.	EnsoSleep	SIO(K) PREMARKET NOTIFICATION	diagnosis of sleep disorders
2017.11.	Arterys Oncology DL	SIO(K) PREMARKET NOTIFICATION	medical diagnostic application
2018.01.	Idx	DE NOVO PATHWAY	detection of diabetic retinopathy
2018.02.	ContaCT	DE NOVO PATHWAY	stroke detection on CT
	OsteoDetect	DE NOVO PATHWAY	X-ray wrist fracture diagnosis
2018.03.	Guardian Connect System	PMA	predicting blood glucose changes
2018.05.	EchoMD (AEF Software)	SIO(K) PREMARKET NOTIFICATION	echocardiogram analysis
2018.06.	DreaMed	DE NOVO PATHWAY	managing Type 1 diabetes
2018.07.	BriefCase	SIO(K) PREMARKET NOTIFICATION	triage and diagnosis of time sensitive patients
	ProFound™ AI Software V2.1	SIO(K) PREMARKET NOTIFICATION	breast density via mammography
2018.08.	Arterys MICA	SIO(K) PREMARKET NOTIFICATION	liver and lung cancer diagnosis on CT and MRI
2018.09.	SubtlePET	SIO(K) PREMARKET NOTIFICATION	radiology image processing software
	AI-ECG Platform	SIO(K) PREMARKET NOTIFICATION	ECG analysis support
2018.10.	Accipialx	SIO(K) PREMARKET NOTIFICATION	acute intracranial hemorrhage triage algorithm
	icobrain	SIO(K) PREMARKET NOTIFICATION	MRI brain interpretation
2018.11.	FerriSmart Analysis System	SIO(K) PREMARKET NOTIFICATION	measure liver iron concentration
2019.03.	cmTriage	SIO(K) PREMARKET NOTIFICATION	mammogram workflow
2019.04.	Deep Learning Image Reconstruction	SIO(K) PREMARKET NOTIFICATION	CT image reconstruction
2019.05.	HealthPNX	SIO(K) PREMARKET NOTIFICATION	chest X-Ray assessment pneumothorax
2019.06.	Kaios DS for Breast	SIO(K) PREMARKET NOTIFICATION	diagnostic software for lesions suspicious for cancer
	Advanced Intelligent Clear-IQ Engine	SIO(K) PREMARKET NOTIFICATION	noise reduction algorithm
2019.07.	SubtleMR	SIO(K) PREMARKET NOTIFICATION	radiology image processing software
	AI-Rad Companion (Pulmonary)	SIO(K) PREMARKET NOTIFICATION	CT image reconstruction - pulmonary
2019.08.	Critical Care Suite	SIO(K) PREMARKET NOTIFICATION	chest X-Ray assessment pneumothorax
	Caption Guidance	DE NOVO PATHWAY	software to assist in cardiac ultrasound images
2019.09.	AI-Rad Companion (Cardiovascular)	SIO(K) PREMARKET NOTIFICATION	CT image reconstruction - cardiovascular
2019.11.	EchoGo Core	SIO(K) PREMARKET NOTIFICATION	quantification and reporting of results of cardiovascular function
2019.12.	TransparaTM	SIO(K) PREMARKET NOTIFICATION	mammogram workflow
2020.01.	QuantX	DE NOVO PATHWAY	radiological software for lesions suspicious for cancer
	Eko Analysis Software	SIO(K) PREMARKET NOTIFICATION	cardiac monitor
2020.02.	red dot	SIO(K) PREMARKET NOTIFICATION	prioritisation of pneumothorax on chest X-rays
2020.03.	AIMI-Triage CXR PTX	SIO(K) PREMARKET NOTIFICATION	chest X-ray prioritization service
2020.06.	EyeArt	SIO(K) PREMARKET NOTIFICATION	automated detection of diabetic retinopathy
	qER	SIO(K) PREMARKET NOTIFICATION	computer aided triage and notification software for CT images
2020.08.	AVA (Augmented Vascular Analysis)	SIO(K) PREMARKET NOTIFICATION	analysis and reporting of vascular ultrasound scans
2020.11.	Genius AI Detection	SIO(K) PREMARKET NOTIFICATION	software to identify abnormalities in breast tomosynthesis images
2021.01.	CLEWICU System	SIO(K) PREMARKET NOTIFICATION	A.I.- driven Intensive care decision support system
	Quicktome	SIO(K) PREMARKET NOTIFICATION	Digital brain mapping platform
2021.06.	Cognoa ASD Diagnosis Aid	DE NOVO PATHWAY	Software aid in the diagnosis of Autism Spectrum Disorder

TYPE OF FDA APPROVAL	
	SIO(K) PREMARKET NOTIFICATION
	DE NOVO PATHWAY
	PMA





Future of Health:

The Emerging Landscape of Augmented Intelligence in Health Care

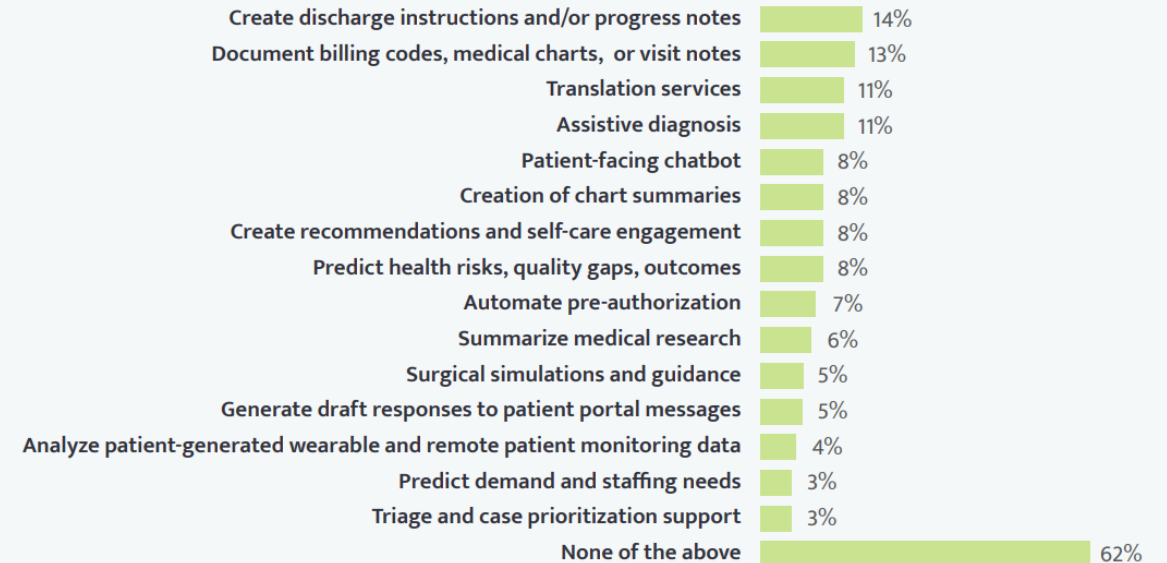


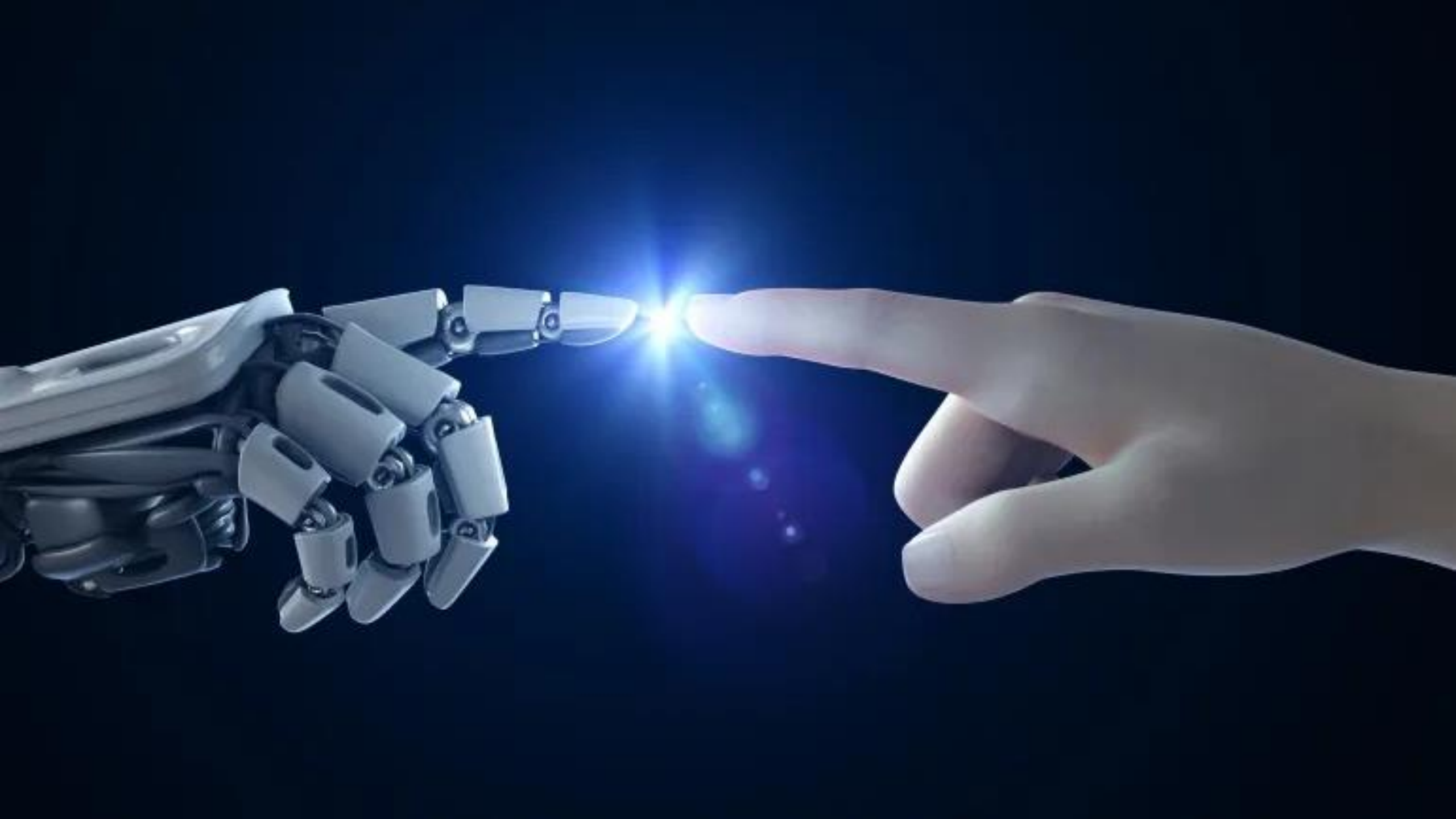
Research collaboration led by

manatt

Although physicians recognize AI's advantages—65% of physicians surveyed by the AMA indicated they see definite or some advantage to using AI tools—overall, physicians are cautious in their optimism: 30% of respondents are more excited than concerned, 29% are more concerned than excited, and the remaining 41% are equally concerned and excited (Figure 1).

Figure 4: AMA 2023 AI Physician Survey: Current use cases across specialties







La intel·ligència
està en la
pregunta
(Prompts)



Algunes
alertes

SALUD • I.A.

Un estudio explosivo de Stanford encuentra que ChatGPT y Bard de Google responden preguntas médicas con teorías racistas y desacreditadas que dañan a los pacientes negros

OpenAI y Google respondieron que han estado trabajando para reducir el sesgo en sus modelos, que a veces hacían declaraciones completamente poco científicas.

POR **GARAN BURKE**, **MATT O'BRIEN**, Y **LA PRENSA ASOCIADA**

20 de octubre de 2023 10:47 a.m. EDT



CHINA'S SOCIAL CREDIT SCORE

Sesame Credit



Harnessing the power of big data + court, police, banking, tax and employment records. Doctors, teachers, local governments and businesses could additionally be scored by citizens for their professionalism and probity.

Que estem fent

- Algoritmes predictius assistencials

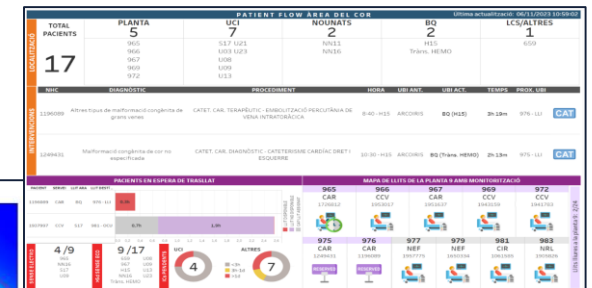
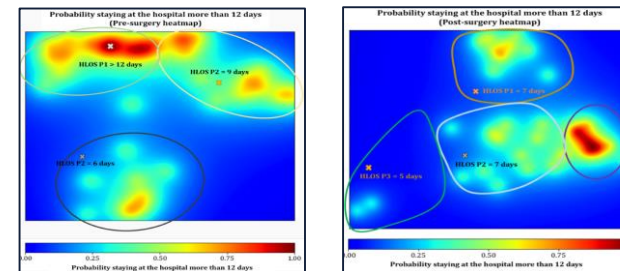
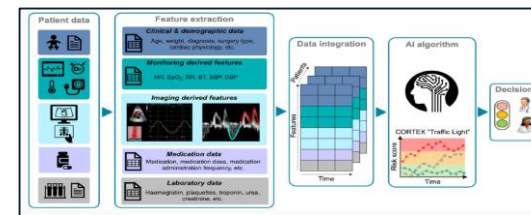
- La Bola
- Arribada a UCI
- Sèpsia i bronquiolitis
- Cardio
- Necessitats de pal·liatius
- Pacients candidats a SJD a casa

- Algoritmes predictius per l'IP

- RPA

- Codificació
- DPV
- Dir Econòmica

- IA lectura de llenguatge Natural



HPOs Extraction

The problem

Texto libre

Paciente de X años con diagnóstico previo de **distrofia muscular de Duchenne**. Presenta **debilidad muscular generalizada**, **fatiga** persistente, **dificultades en la movilidad** y **atrofia muscular** en áreas específicas. Durante el examen físico, se observa **debilidad en varios grupos musculares** y **alteraciones en la marcha**. Las pruebas diagnósticas, como la **electromiografía** y la **biopsia muscular**, respaldan el diagnóstico. El tratamiento actual incluye **prednisone**, **albuterol** y terapia física.

Identificación de "categorías"

Diagnóstico - SNOMED-CT

Síntomas - HPO

Pruebas diagnósticas - LOINC

Medicación – RxNorm

Procedimientos – ICD10-PCS

Codificación

76670001

**0003324, 0012378,
0100022, 0003202**

10548-7, 5523-3

Rx8640, Rx435

DxGPT



Enter a brief patient's description and DxGPT will provide a list of possible disease diagnoses.

Type here!

For best results, indicate when and why you think the symptoms appeared.

Search

[Need help?](#)



What are
YOU
going to do
about it?
Fight Chronic Absenteeism
www.fightabsenteeism.com

STRONGER TOGETHER
STRONGER TOGETHER
STRONGER TOGETHER
STRONGER TOGETHER
STRONGER TOGETHER

Figura 3. Hogares con acceso a banda ancha por CCAA (% / total hogares)

Fuente: INE

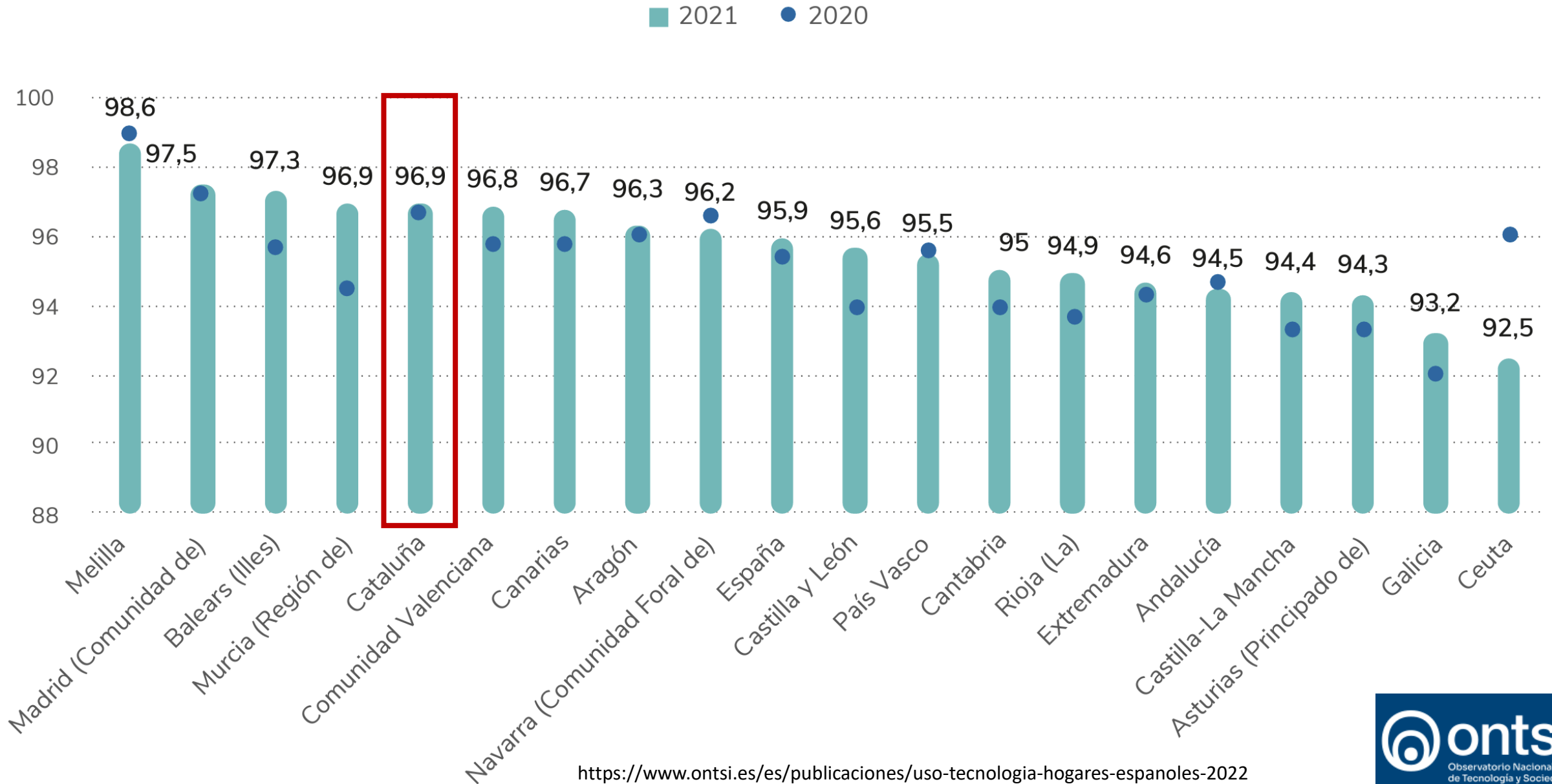


Figura 6. Personas que usan regularmente Internet por CCAA en 2021 (% / total personas)

Fuente: INE

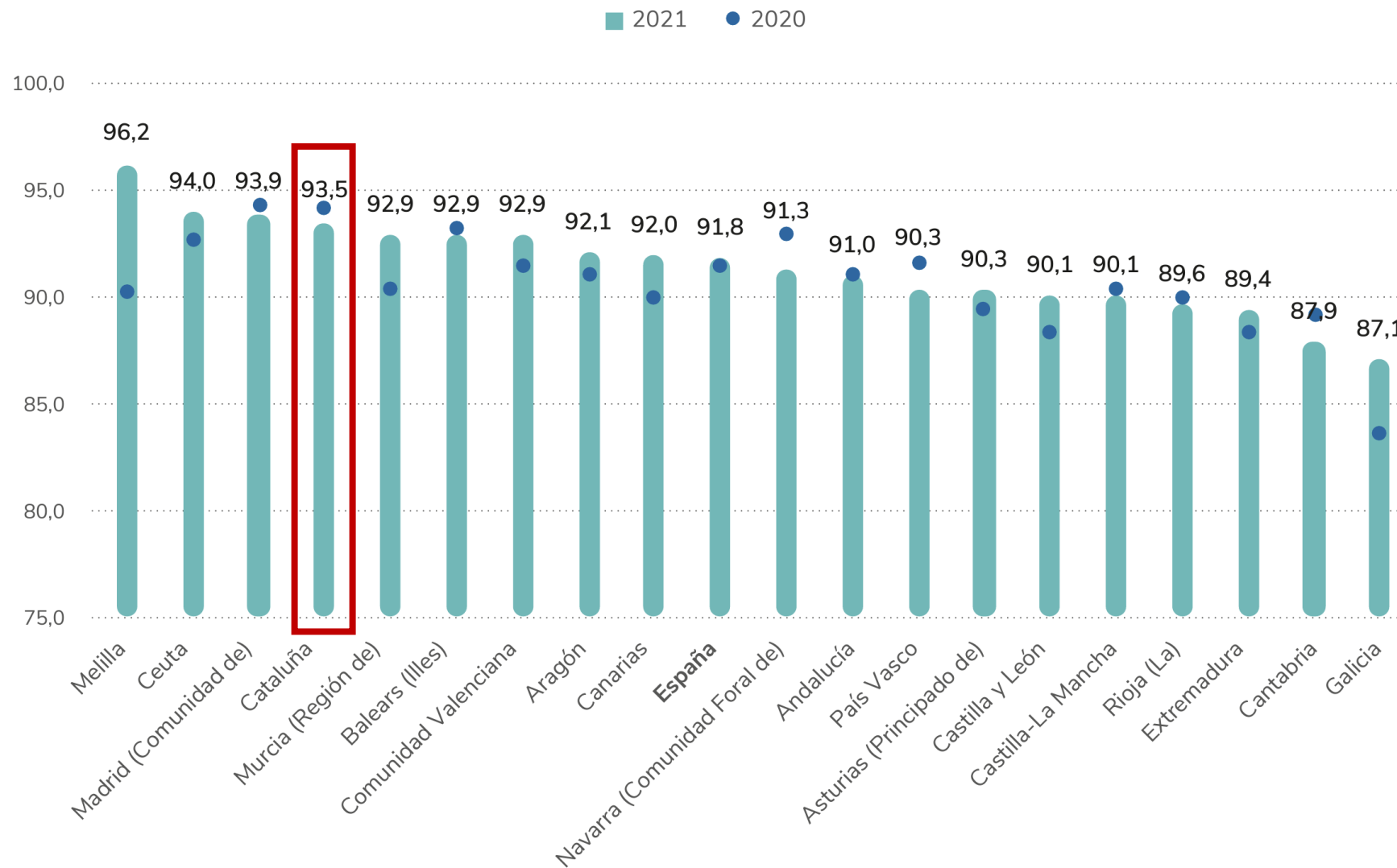
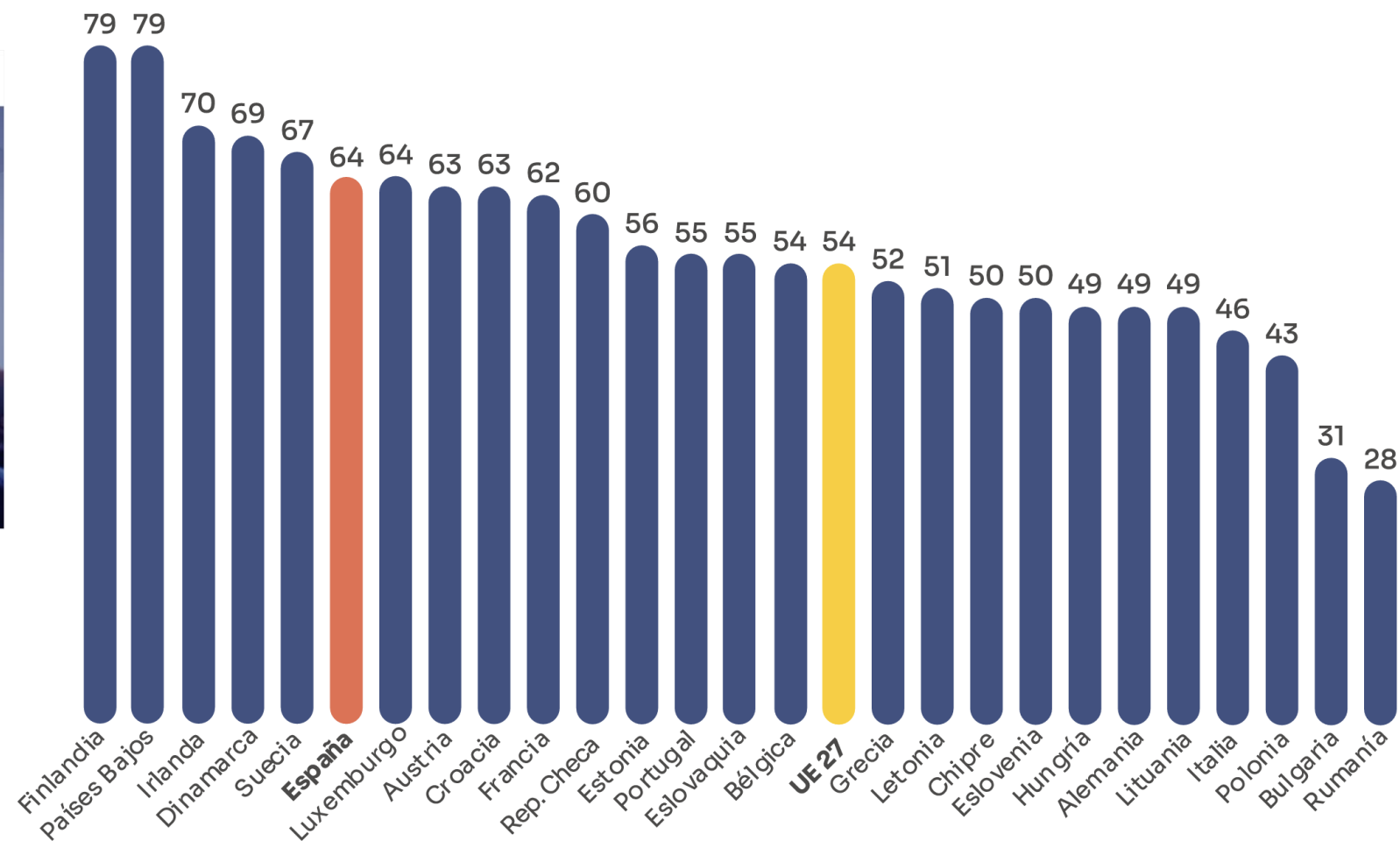


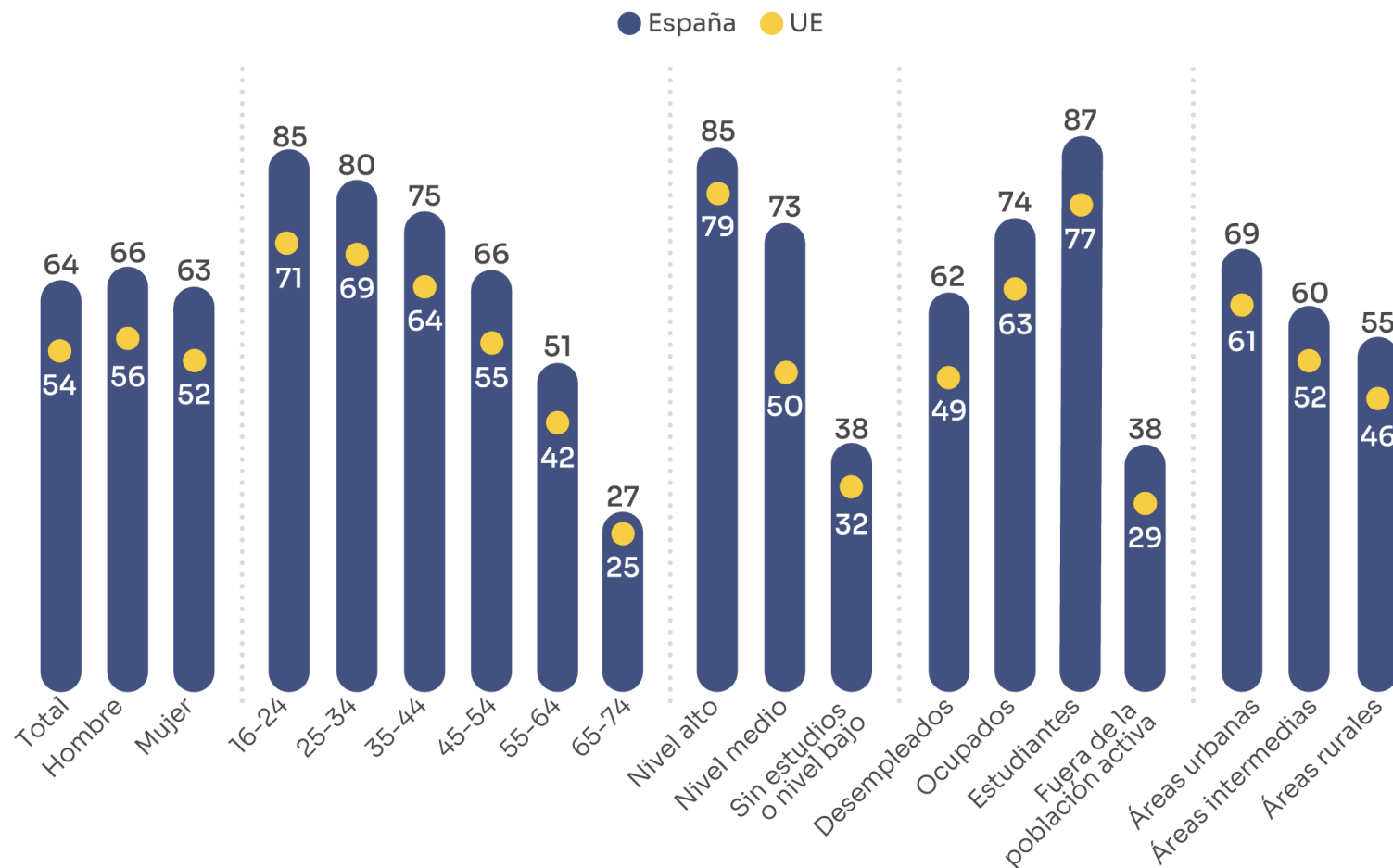
Gráfico 1 – Porcentaje de población con competencias digitales básicas o avanzadas 2021



Fuente: Eurostat. Elaboración propia.

<https://www.ontsi.es/es/publicaciones/competencias-digitales>

Gráfico 4 – Porcentaje de personas con competencias digitales básicas o avanzadas según categoría sociodemográfica (2021).



Fuente: Eurostat. Elaboración propia.

The Topol Review

Preparing the healthcare workforce to deliver the digital future

An independent report on behalf of the Secretary of State for Health and Social Care
February 2019



Technological advances impacting healthcare and the magnitude of disruption.

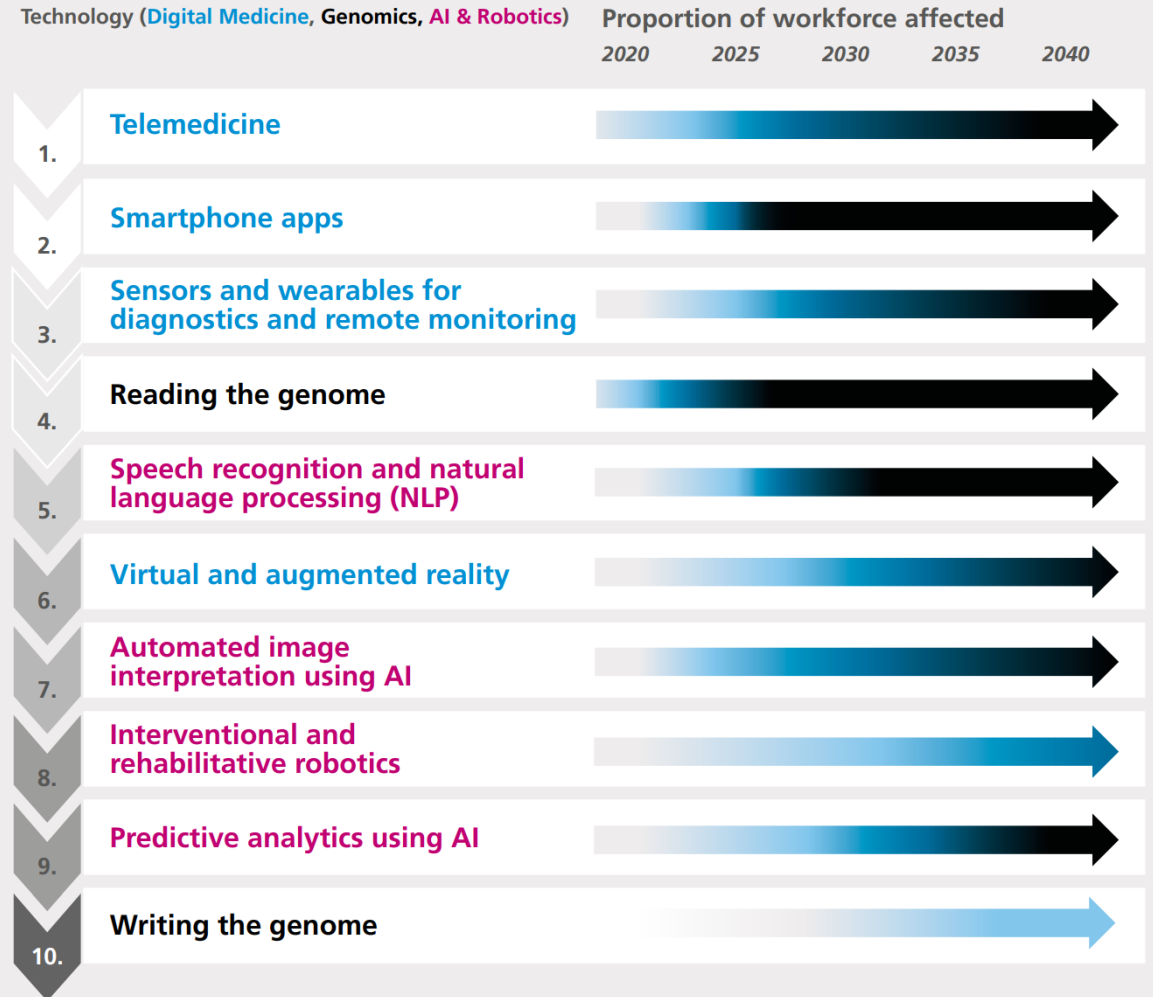


Figure 1: Top 10 digital healthcare technologies and their projected impact on the NHS workforce from 2020 to 2040

Towards a comprehensive definition of digital skills

