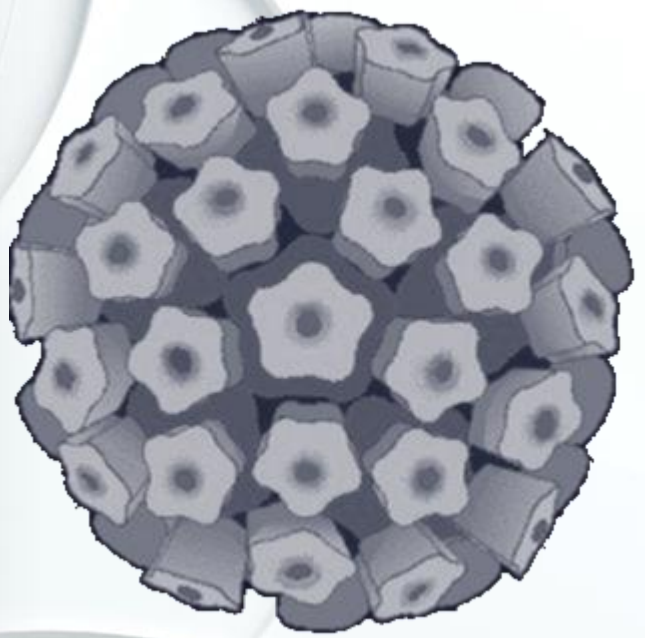
Innovation in the field of anal dysplasia screening



Francesc Garcia Cuyas, MD PhD

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Hospital Sant Joan de Dèu de Barcelona

Surgeon of HPV Unit. Fundació Lluita contra la SIDA

Francesc.garcia@sjd.es

@garciacuyas

Outline

1. What we mean when we say "innovation"
2. Where we can apply it associated with HPV
3. Some ideas

How is innovation defined?

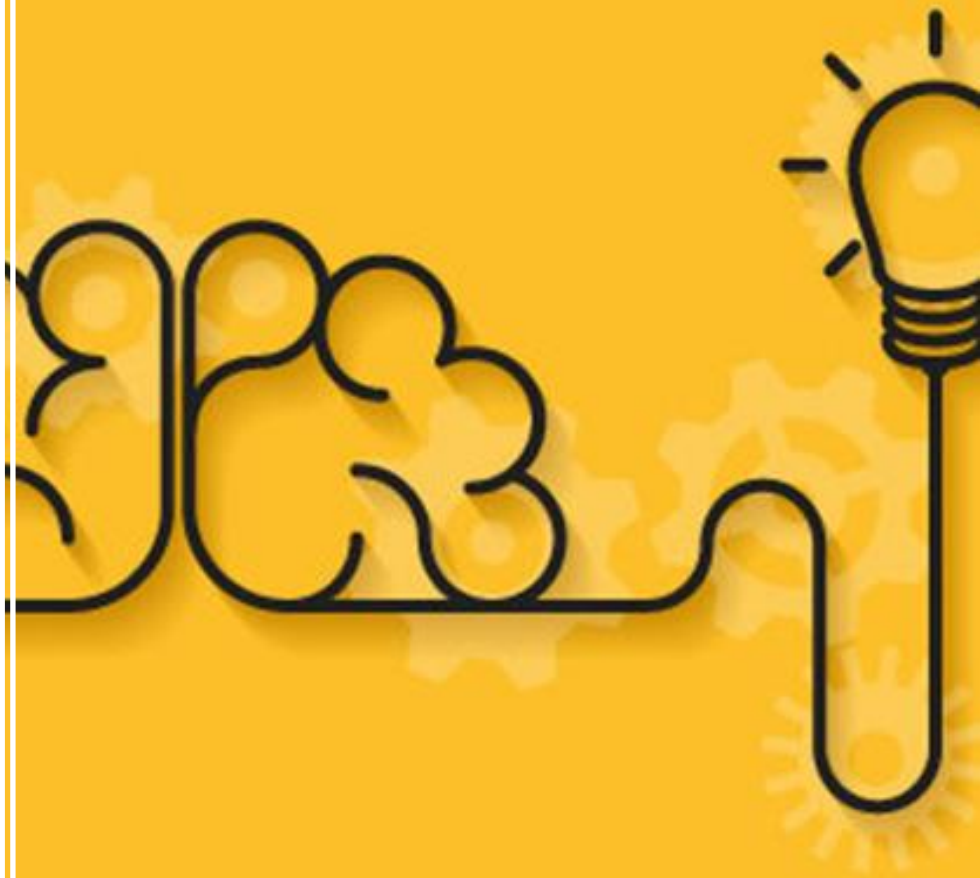
Introduction for the **first time in the market** of a product, or a modified process, from an idea, invention or recognition of a need, and that has been **accepted by the market**

Characteristics of innovation

- It's an action, a process, an activity. Innovation requires **doing things.**
- This action requires a change or modification that involves significant differences. Innovation requires **change**.
- It is a change that must be introduced to the market, applying to the improvement of the results. Innovation requires that actions have a benefit in the **market**.
- But it also requires it to be **sustainable** over time.

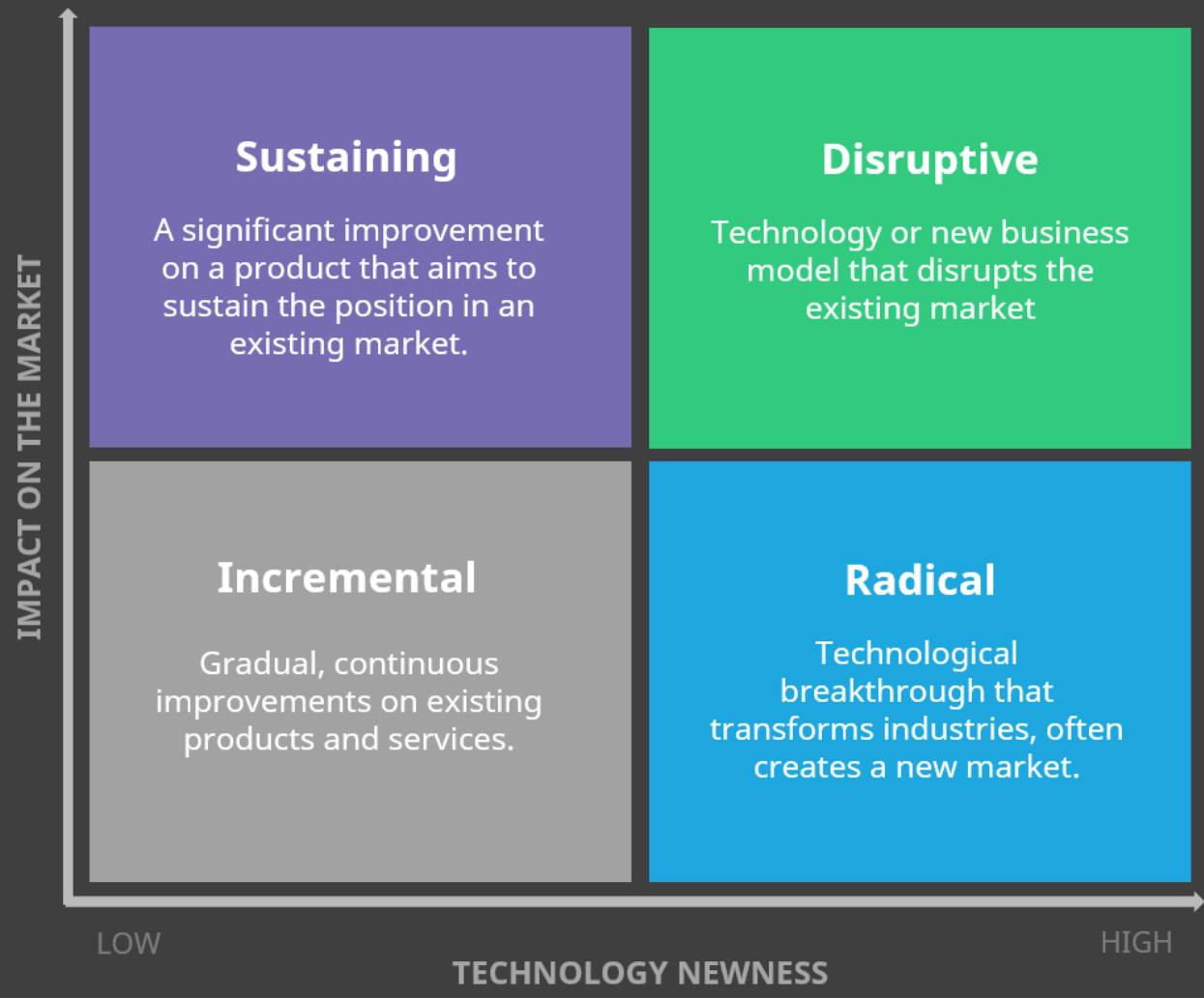
In short, we could define innovation as:

"Original ideas that generate value, socially or economically, in a sustainable way"



- If you want to be an **inventor**, invent something that currently doesn't exist.
- If you want to be an **innovator**, do or create something different from what has already been done or created.
- If you want to be an innovator, *create something that is better, faster, cheaper and more environmentally friendly than there is today*.

Innovation Classification



Open innovation

"If you want to arrive fast, walk alone. If you want to go far, walk in a group»

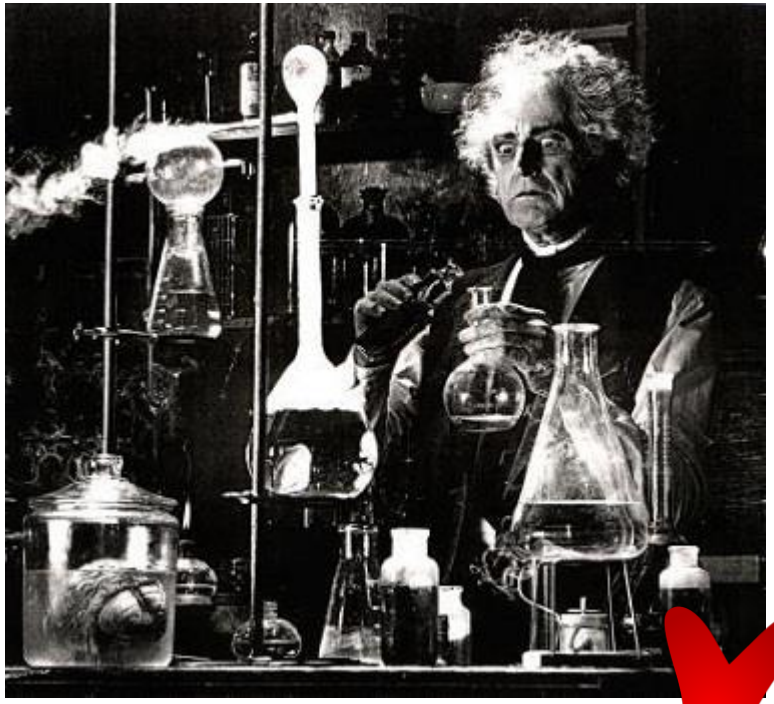
African proverb

Innovating is not always right

Innovation myths

Innovation myths

1 Innovation usually involves a single inventor



Innovation myths

2 Innovation often has "Eureka moments!"

It's 10% inspiration

90% perspiration
(sweat, hard work).

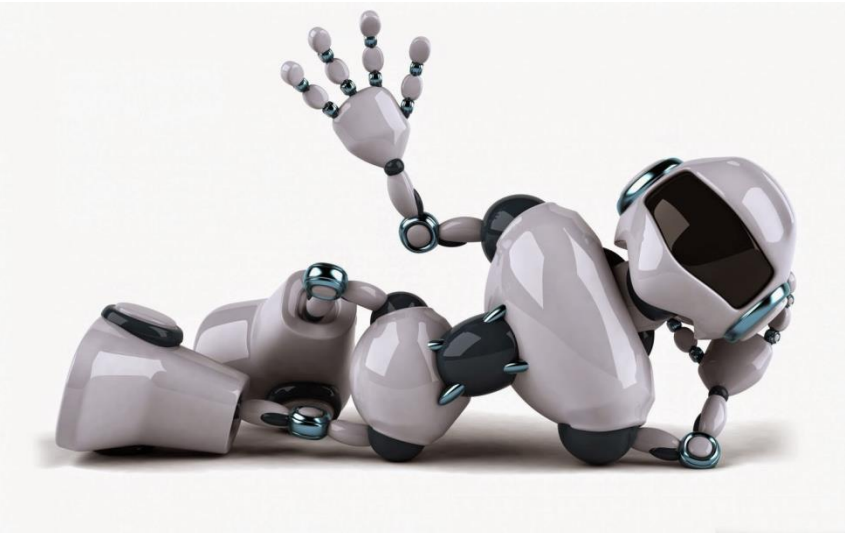
and 100% PASSION

Innovation myths

3 Innovation and creativity are qualities that are inherited

Innovation myths

4 Innovation is synonymous with new technology



Innovation myths

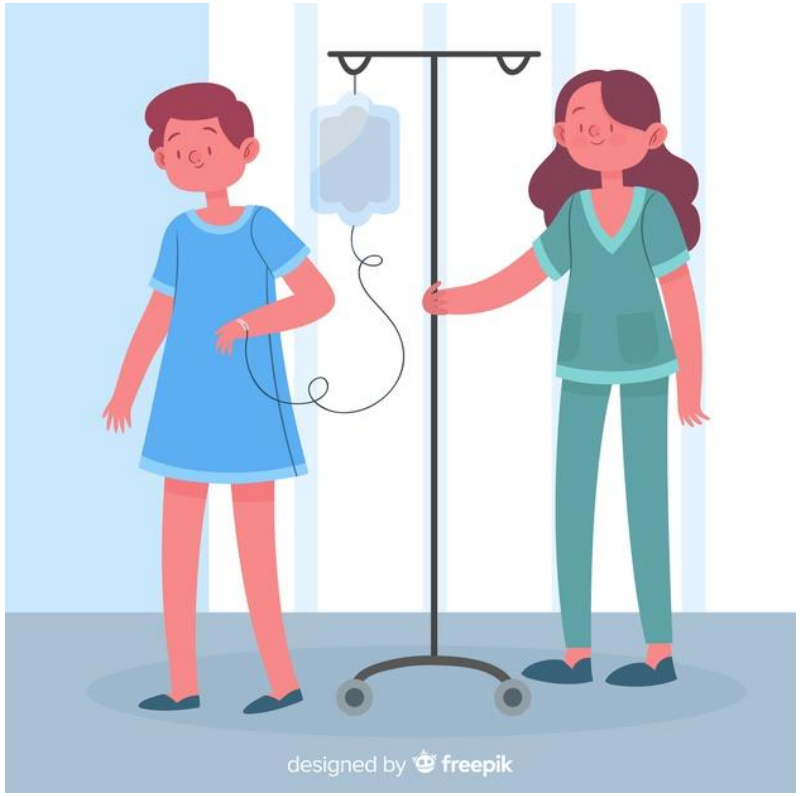
5 Innovation is expensive

[Innovation ≠ Ideas]

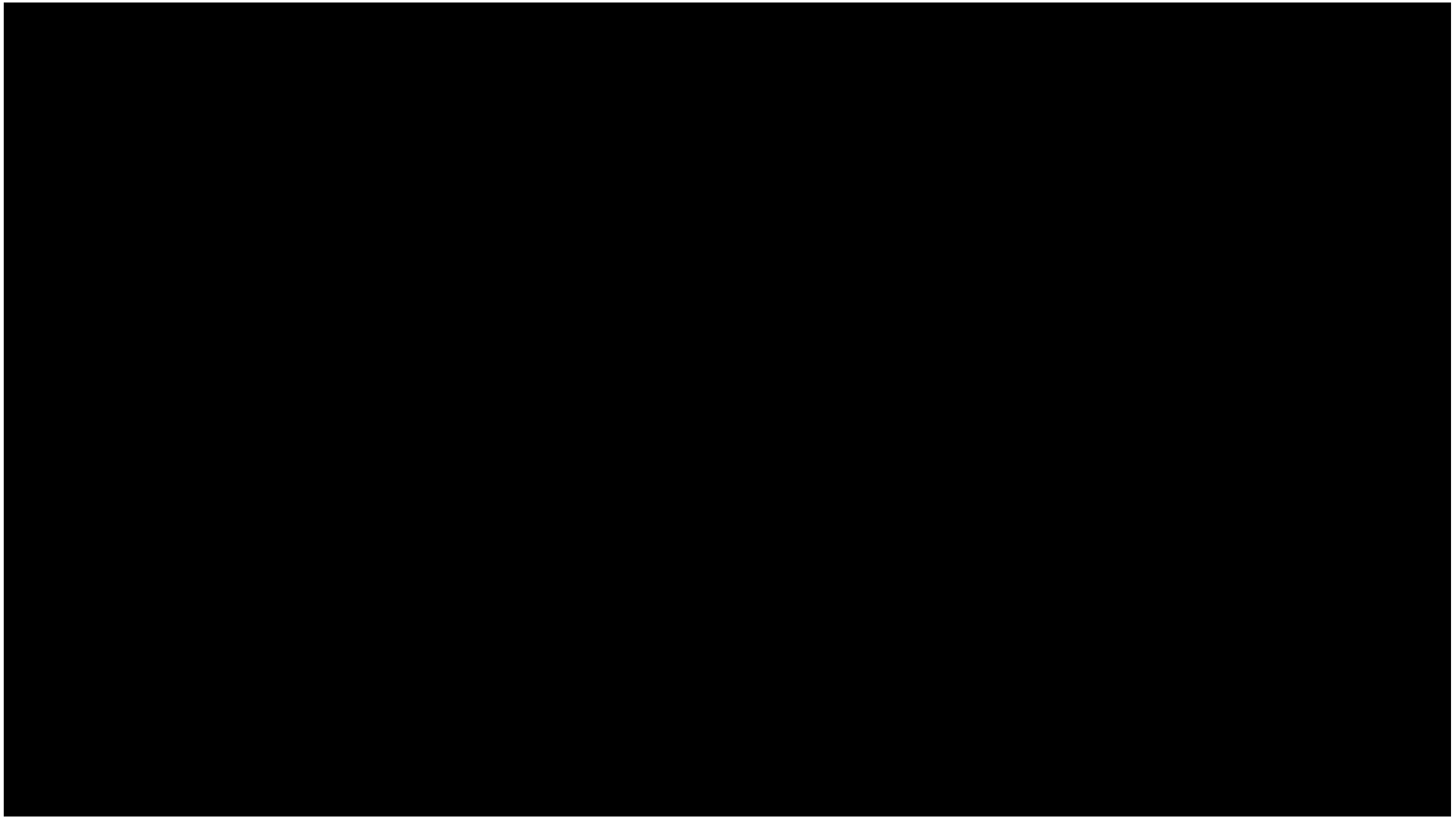
[Ideas + execution + Results

= Innovation (VALUE)]

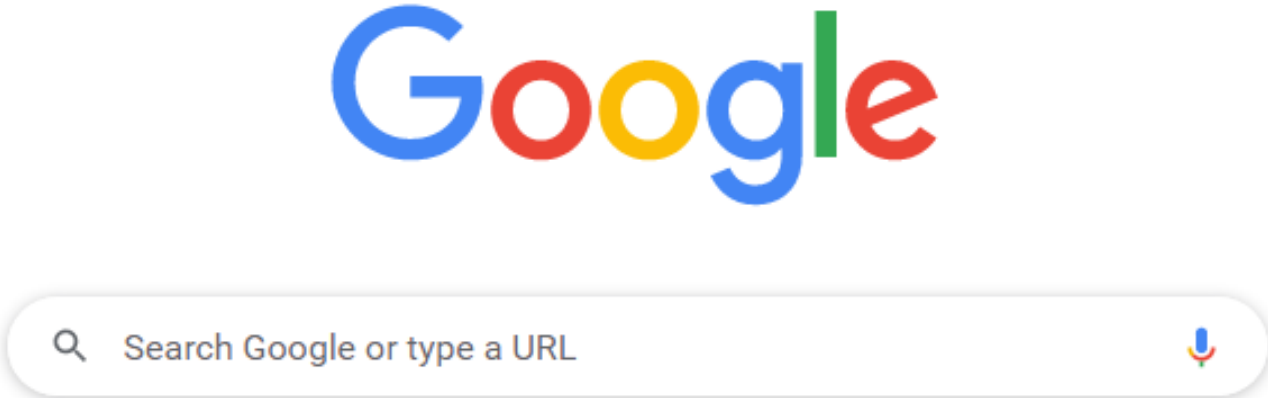
CHIC – Innovation

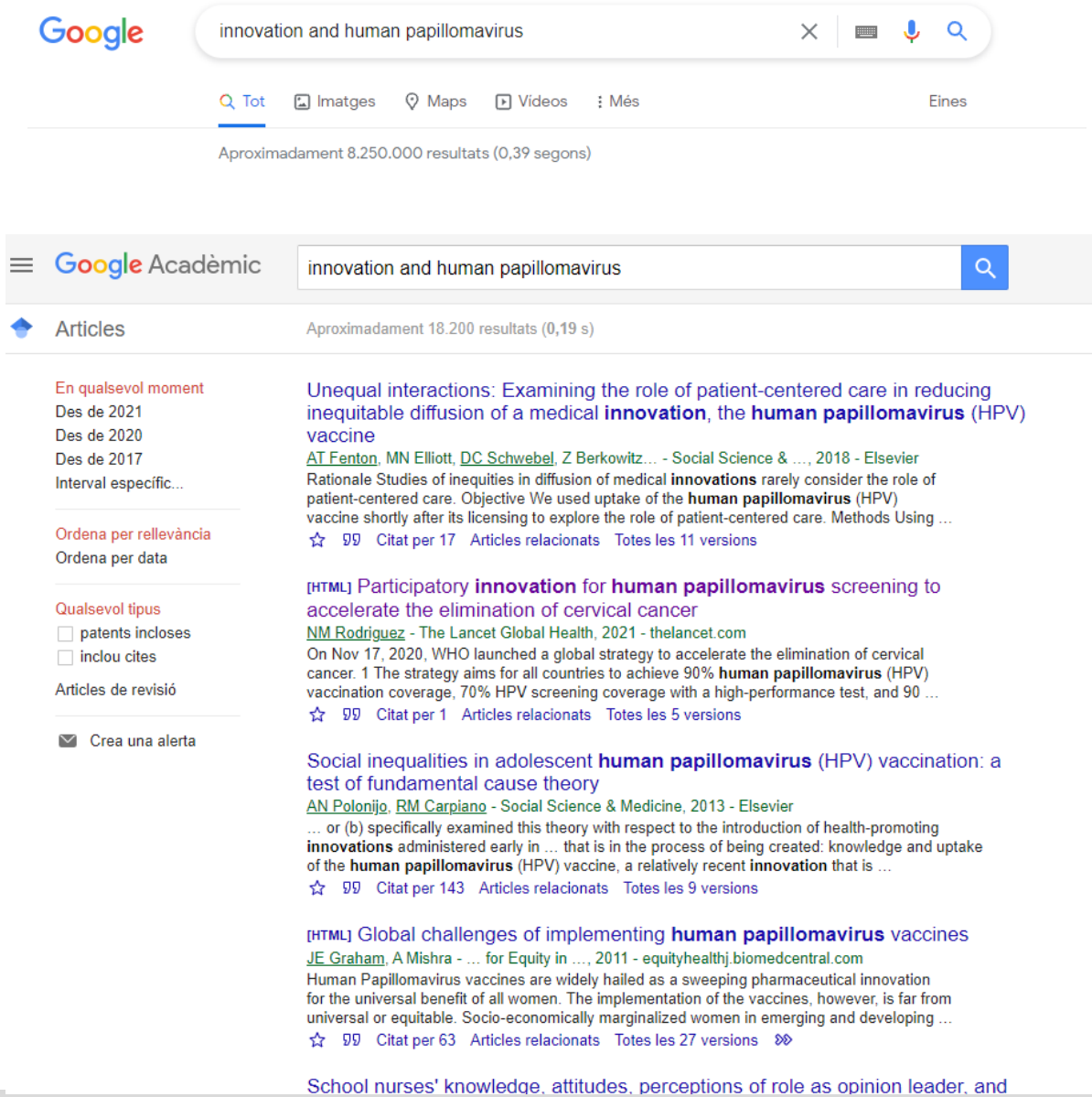


CHIC – Innovation

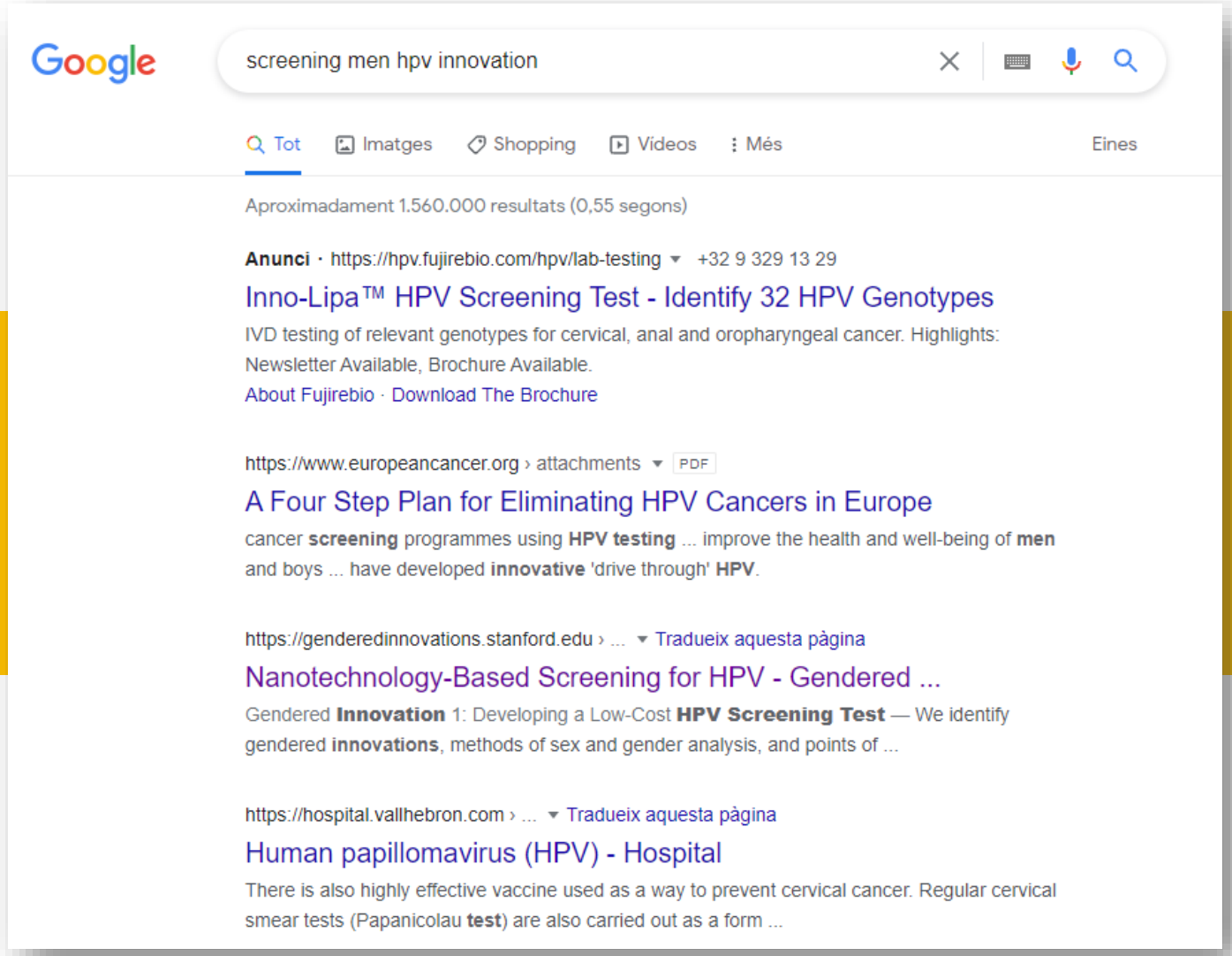


And when we look for “HPV innovation”, what we find?

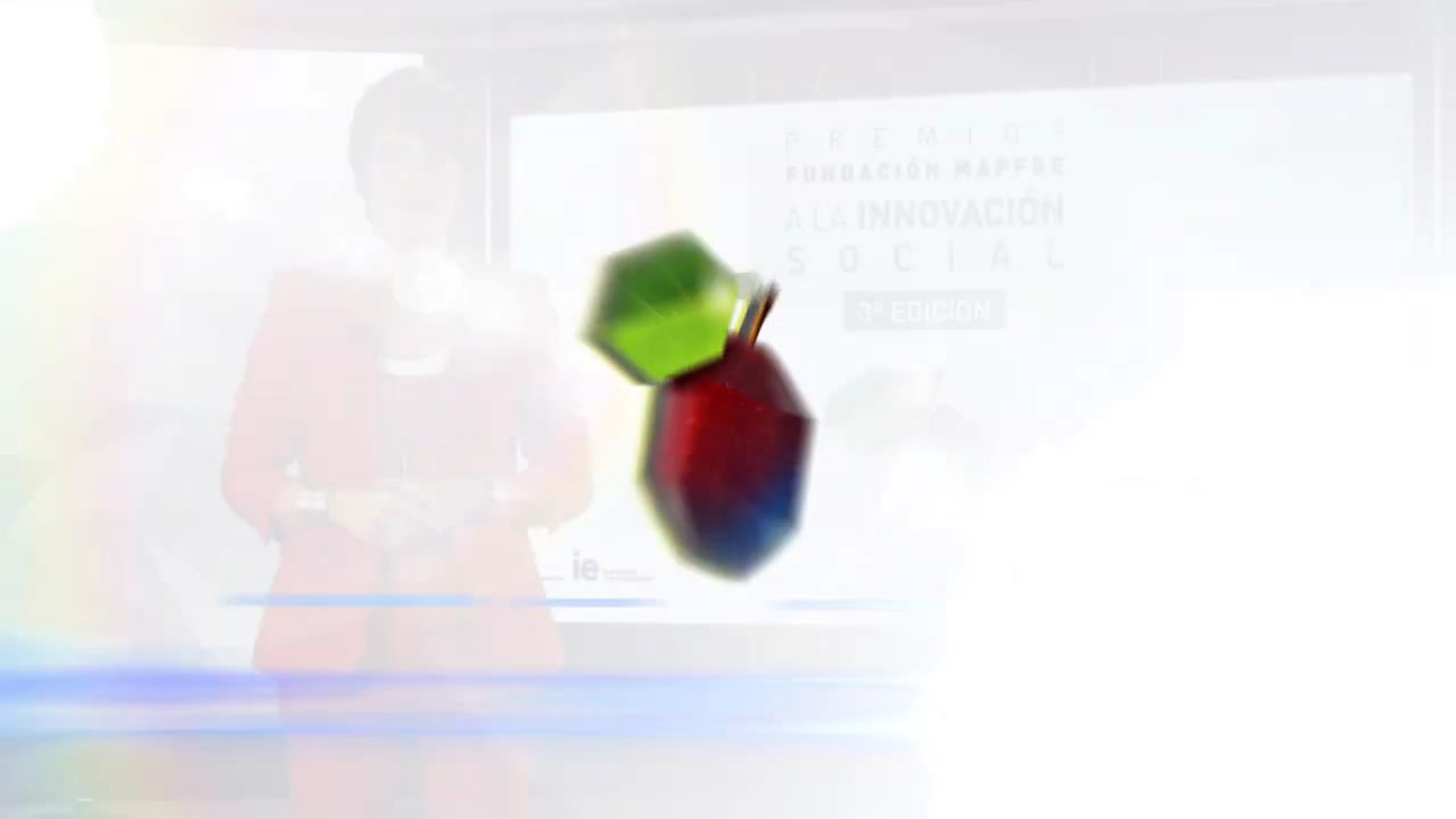



Google
innovation and human papillomavirus
Tot
Imatges
Maps
Vídeos
Més
Eines
Aproximadament 8.250.000 resultats (0,39 segons)
Google Acadèmic
innovation and human papillomavirus
Articles
Aproximadament 18.200 resultats (0,19 s)
En qualsevol moment
Des de 2021
Des de 2020
Des de 2017
Interval específic...
Ordena per rellevància
Ordena per data
Qualsevol tipus
patents incloses
inclou cites
Articles de revisió
Crea una alerta
Unequal interactions: Examining the role of patient-centered care in reducing inequitable diffusion of a medical innovation, the human papillomavirus (HPV) vaccine
AT Fenton, MN Elliott, DC Schwebel, Z Berkowitz... - Social Science & ..., 2018 - Elsevier
Rationale Studies of inequities in diffusion of medical innovations rarely consider the role of patient-centered care. Objective We used uptake of the human papillomavirus (HPV) vaccine shortly after its licensing to explore the role of patient-centered care. Methods Using ...
Citat per 17 Articles relacionats Totes les 11 versions
[HTML] Participatory innovation for human papillomavirus screening to accelerate the elimination of cervical cancer
NM Rodriguez - The Lancet Global Health, 2021 - thelancet.com
On Nov 17, 2020, WHO launched a global strategy to accelerate the elimination of cervical cancer. 1 The strategy aims for all countries to achieve 90% human papillomavirus (HPV) vaccination coverage, 70% HPV screening coverage with a high-performance test, and 90 ...
Citat per 1 Articles relacionats Totes les 5 versions
Social inequalities in adolescent human papillomavirus (HPV) vaccination: a test of fundamental cause theory
AN Polonijo, RM Carpiano - Social Science & Medicine, 2013 - Elsevier
... or (b) specifically examined this theory with respect to the introduction of health-promoting innovations administered early in ... that is in the process of being created: knowledge and uptake of the human papillomavirus (HPV) vaccine, a relatively recent innovation that is ...
Citat per 143 Articles relacionats Totes les 9 versions
[HTML] Global challenges of implementing human papillomavirus vaccines
JE Graham, A Mishra - ... for Equity in ..., 2011 - equityhealthj.biomedcentral.com
Human Papillomavirus vaccines are widely hailed as a sweeping pharmaceutical innovation for the universal benefit of all women. The implementation of the vaccines, however, is far from universal or equitable. Socio-economically marginalized women in emerging and developing ...
Citat per 63 Articles relacionats Totes les 27 versions
School nurses' knowledge, attitudes, perceptions of role as opinion leader, and

VACCINE



Improve screening test


PREMIO
FUNDACIÓN MAPFRE
A LA INNOVACIÓN
SOCIAL
3ª EDICIÓN
ie

THE LANCET
Global Health

COMMENT | VOLUME 9, ISSUE 5, E582-E583, MAY 01, 2021

Participatory innovation for human papillomavirus screening to accelerate the elimination of cervical cancer

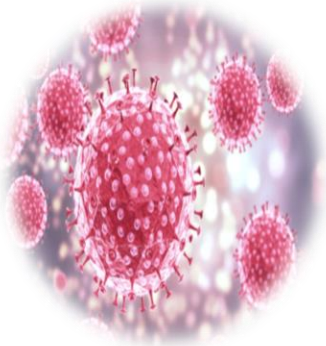
Natalia M Rodriguez

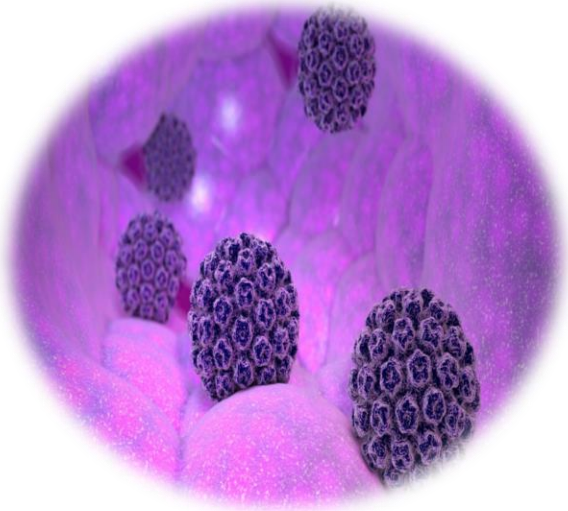
Open Access • Published: May, 2021 • DOI: https://doi.org/10.1016/S2214-109X(20)30522-2 •

The Next 10 Years To Serve As A Booster To Innovation For Human Papillomavirus Testing Market (Reaching US$ 1,130 Million)

Friday, September 24th 2021, 12:29 PM EDT

Types of innovation and HPV





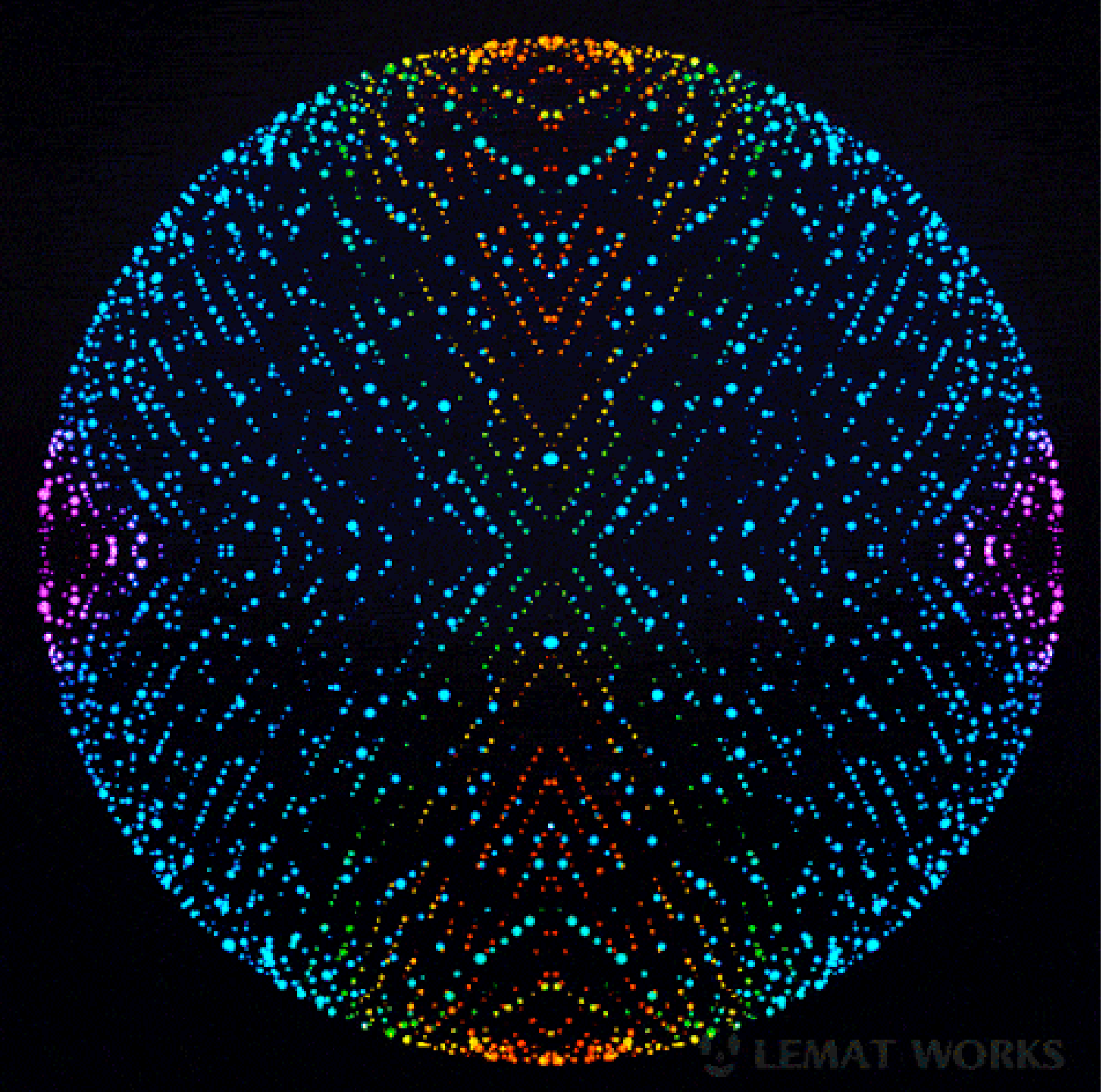
Types of innovation and HPV

Where can we act ?

- In the process
- In the technique
- In training

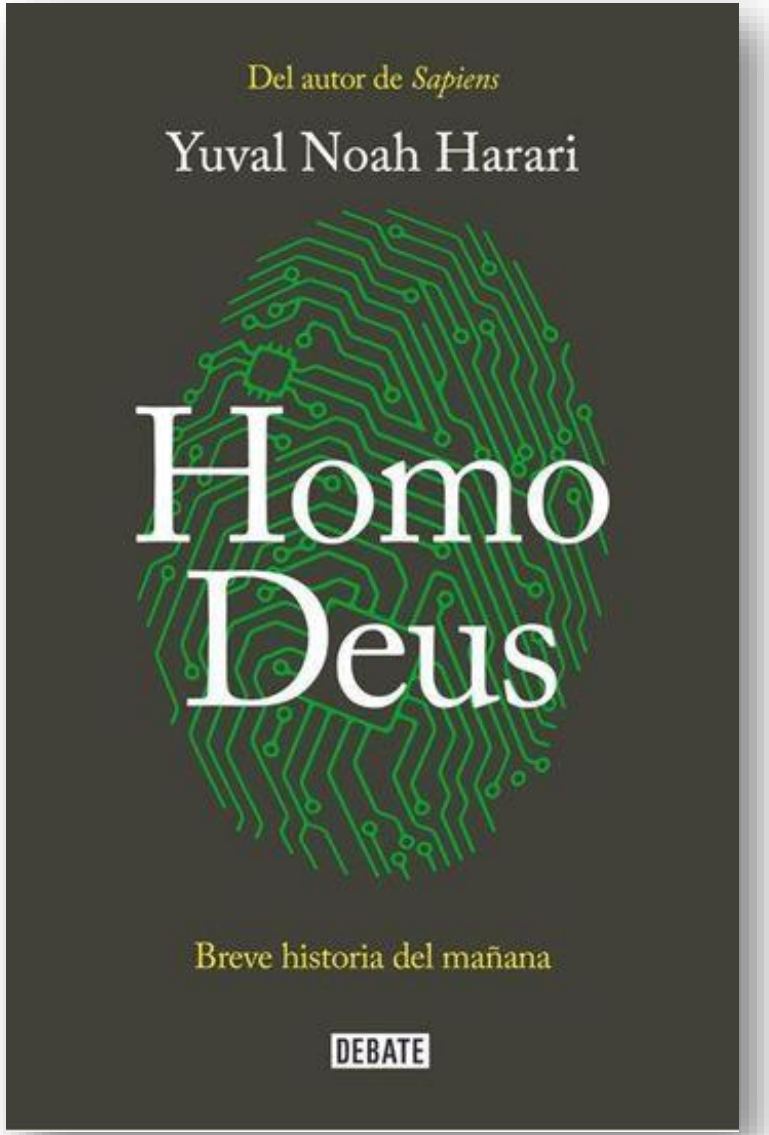
What we could use to improve both the process and the technical

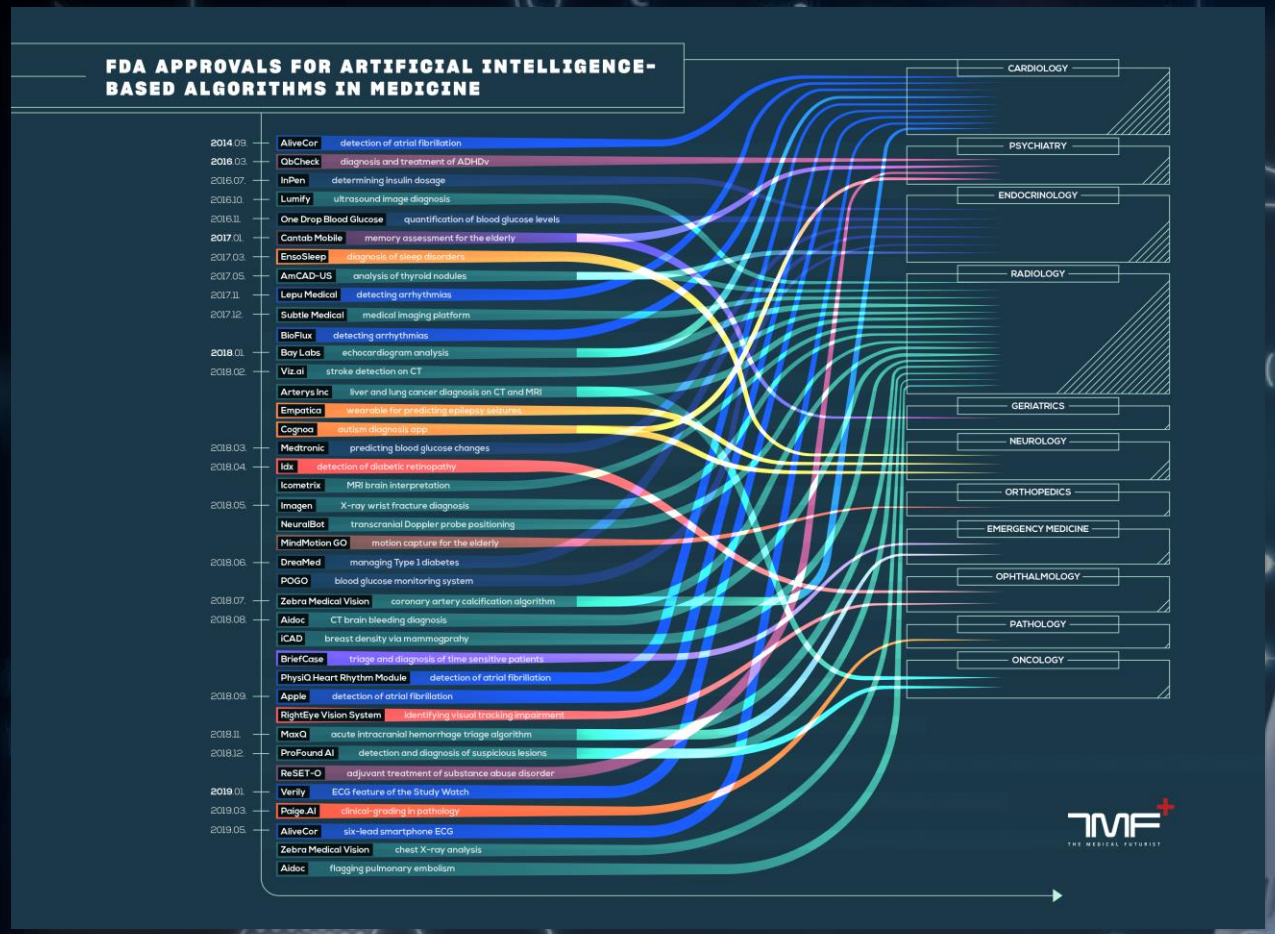
- Data
- Proactive identification systems for lesions

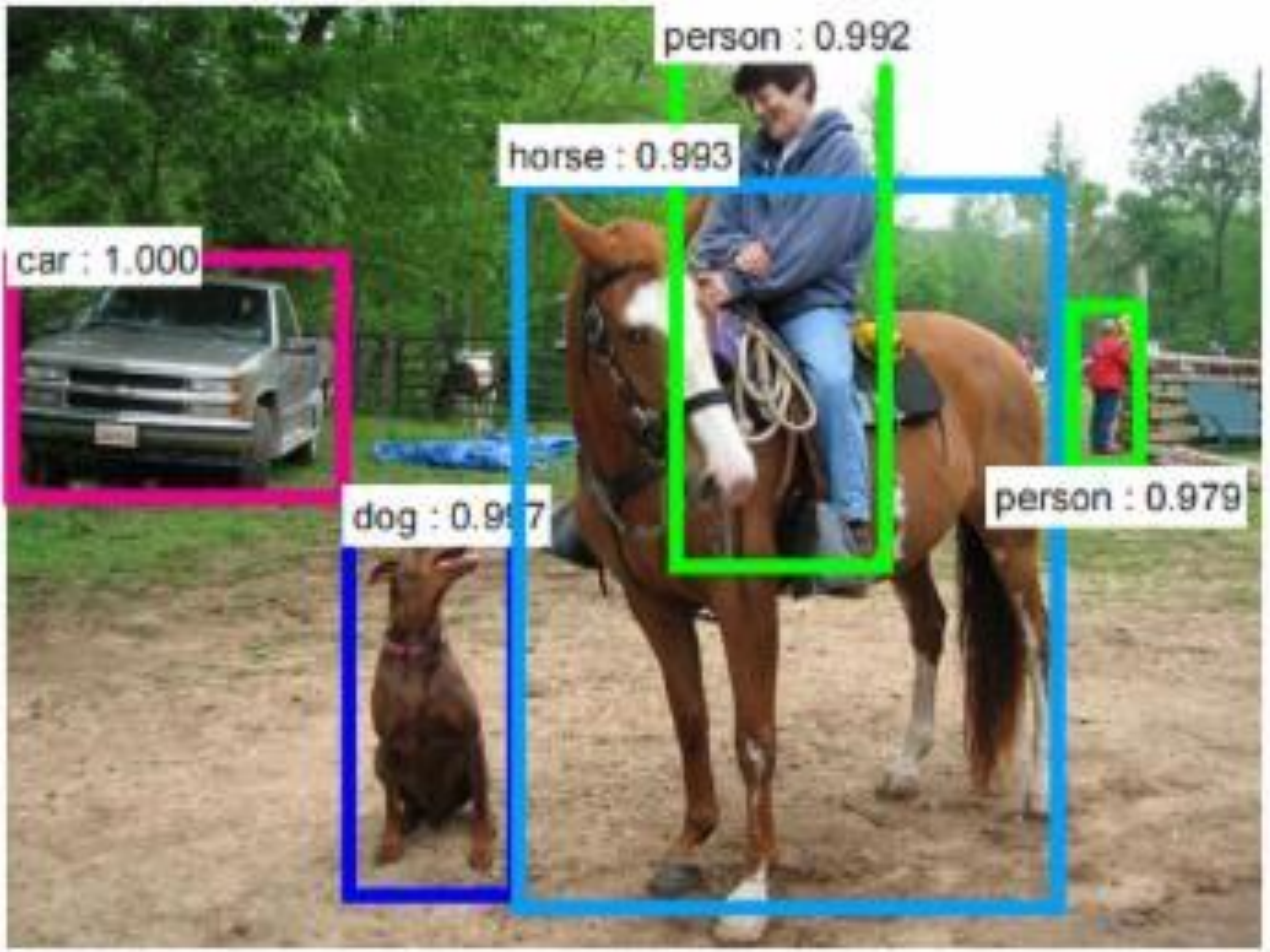


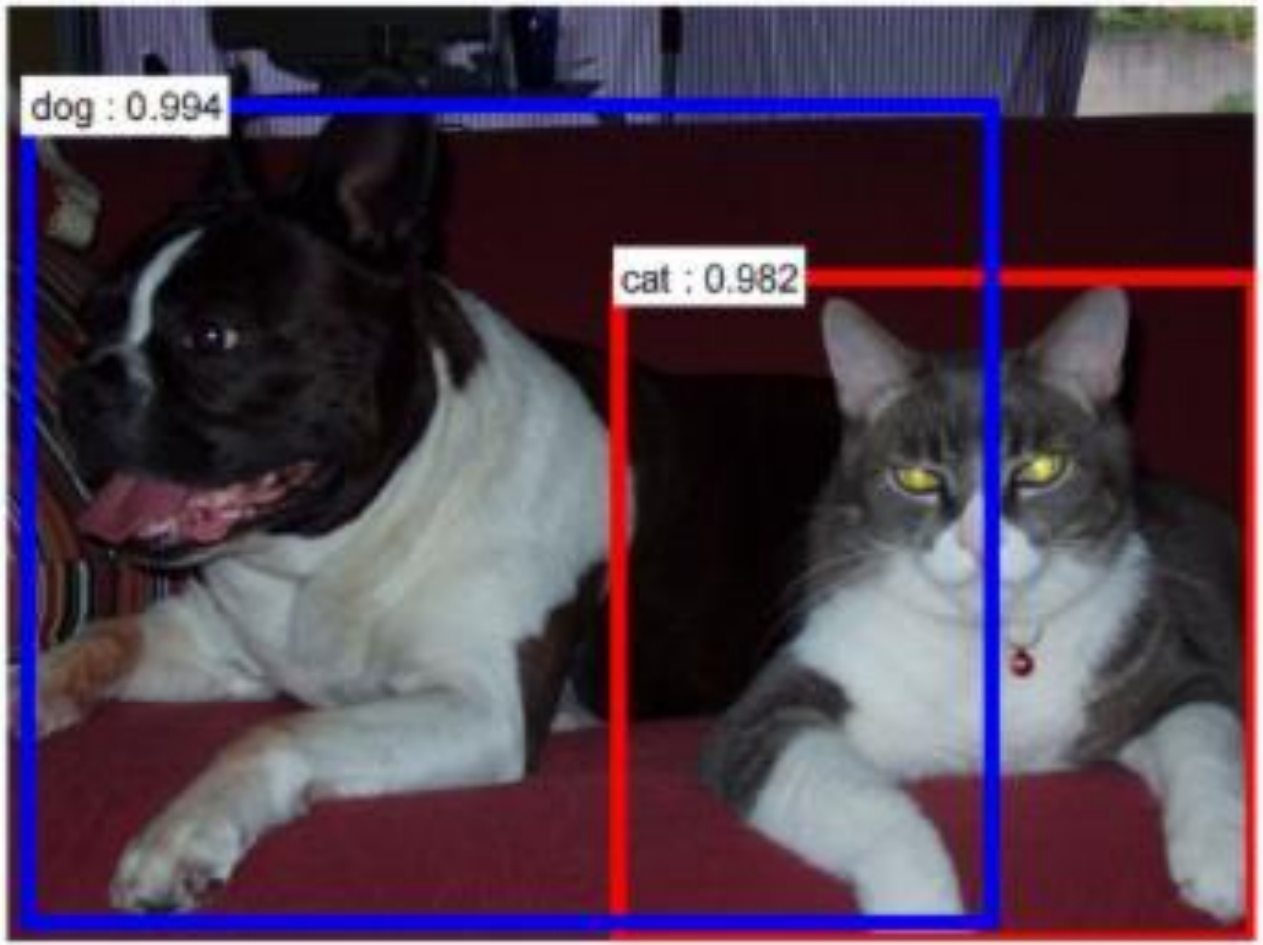
With out data there is not intelligence

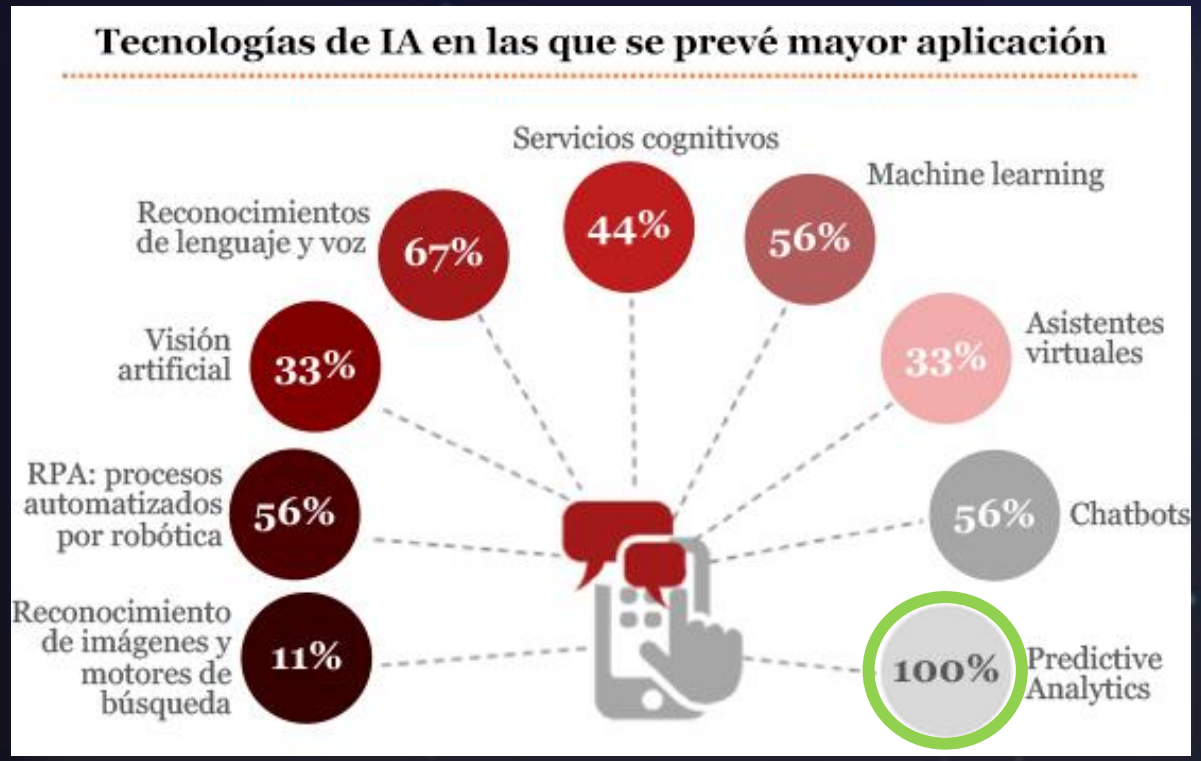
The amount of data available is growing at an incredible rate, doubling every two years. In 2013, it reached 4.4 zettabyte, but in 2021 the digital universe will reach 44 Zettabyte or 44 billion gigabytes.


Del autor de *Sapiens*
Yuval Noah Harari
Homo Deus
Breve historia del mañana
DEBATE


FDA APPROVALS FOR ARTIFICIAL INTELLIGENCE-BASED ALGORITHMS IN MEDICINE
2014.09. AliveCor detection of atrial fibrillation
2016.03. QbCheck diagnosis and treatment of ADHDv
2016.07. InPen determining insulin dosage
2016.10. Lumify ultrasound image diagnosis
2016.11. One Drop Blood Glucose quantification of blood glucose levels
2017.01. Cantab Mobile memory assessment for the elderly
2017.03. EnsoSleep diagnosis of sleep disorders
2017.05. AmCAD-US analysis of thyroid nodules
2017.11. Lepu Medical detecting arrhythmias
2017.12. Subtle Medical medical imaging platform
BioFlux detecting arrhythmias
2018.01. Bay Labs echocardiogram analysis
2018.02. Viz.ai stroke detection on CT
Arterys Inc liver and lung cancer diagnosis on CT and MRI
Empatica wearable for predicting epilepsy seizures
Cognoa autism diagnosis app
2018.03. Medtronic predicting blood glucose changes
2018.04. Idx detection of diabetic retinopathy
Icometrix MRI brain interpretation
2018.05. Imagen X-ray wrist fracture diagnosis
NeuralBot transcranial Doppler probe positioning
MindMotion GO motion capture for the elderly
2018.06. DreaMed managing Type 1 diabetes
POGO blood glucose monitoring system
2018.07. Zebra Medical Vision coronary artery calcification algorithm
2018.08. Aidoc CT brain bleeding diagnosis
iCAD breast density via mammography
BriefCase triage and diagnosis of time sensitive patients
PhysiQ Heart Rhythm Module detection of atrial fibrillation
2018.09. Apple detection of atrial fibrillation
RightEye Vision System identifying visual tracking impairment
2018.11. MaxQ acute intracranial hemorrhage triage algorithm
2018.12. ProFound AI detection and diagnosis of suspicious lesions
ReSET-O adjuvant treatment of substance abuse disorder
2019.01. Verily ECG feature of the Study Watch
2019.03. Paige.AI clinical-grading in pathology
2019.05. AliveCor six-lead smartphone ECG
Zebra Medical Vision chest X-ray analysis
Aidoc flagging pulmonary embolism
CARDIOLOGY
PSYCHIATRY
ENDOCRINOLOGY
RADIOLOGY
GERIATRICS
NEUROLOGY
ORTHOPEDICS
EMERGENCY MEDICINE
OPHTHALMOLOGY
PATHOLOGY
ONCOLOGY
THE MEDICAL FUTURIST


person : 0.992
horse : 0.993
car : 1.000
dog : 0.9
person : 0.979


dog : 0.994
cat : 0.982



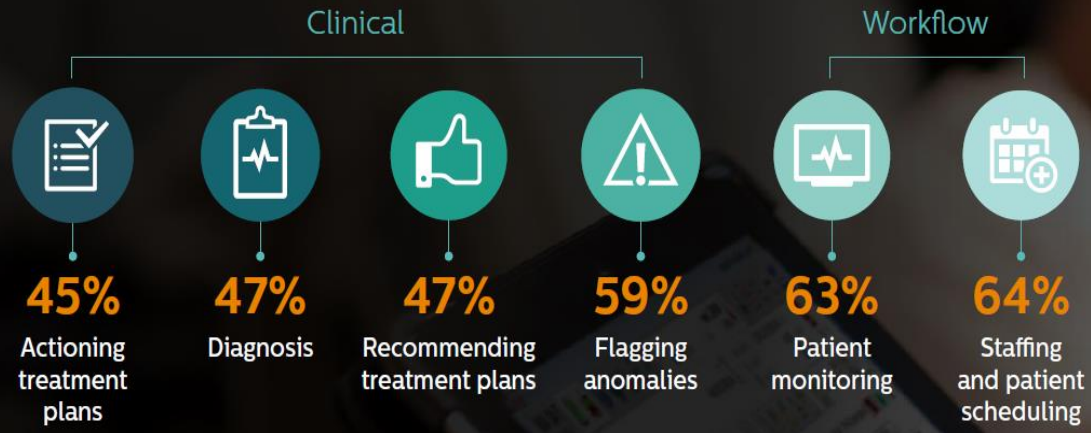
"Realidad y perspectivas de la IA en España, 2018. Bots, Machine Learning, Servicios Cognitivos". Madrid: PwC y Microsoft, 2018

Healthcare professionals are gradually becoming **comfortable with AI**

Familiarity with using AI for workflow purposes could have a positive effect on **clinical implementation**

Healthcare professionals are most comfortable using artificial intelligence (AI) for administrative tasks, such as scheduling (**64%**). To help provide the highest quality care to patients, healthcare professionals' use of AI can move beyond these tasks into spaces where there is room for growth and a more profound impact on both the healthcare professional and patient experience, including diagnosis and treatment.

Percentage of healthcare professionals who are **comfortable with using AI** for the following:



Base: Total healthcare professionals

A 2018 Ipsos study looked at AI adoption across a range of business sectors. In workplaces that use AI-powered tools, more than two-thirds of the employees surveyed say the tools have already had a positive impact on their efficiency (75% cite improvements in their effectiveness, 75% in their results, and 74% in how their work is structured). They also note that AI has had a positive impact on the appeal of their work (70%), on their level of well-being at work (69%), and on the training courses made available to them (67%).

Source: https://www.ipsos.com/en/revolution-ai-work\

Where the AI can act

Before seeing the patient

- Model of prediction of the probability of having a Grade III dysplastic lesion

With the patient

- Aid for the identification of lesions

After seeing the patient being treated

- Recurrence prediction

Original Investigation | Innovations in Health Care Delivery

December 13, 2016

More

Development and Validation of a Deep Learning Algorithm for Detection of Diabetic Retinopathy in Retinal Fundus Photographs

Varun Gulshan, PhD[1]; Lily Peng, MD, PhD[1]; Marc Coram, PhD[1]; et al

» Author Affiliations

JAMA. 2016;316(22):2402-2410. doi:10.1001/jama.2016.17216

Key Points

Question How does the performance of an automated deep learning algorithm compare with manual grading by ophthalmologists for identifying diabetic retinopathy in retinal fundus photographs?

Finding In 2 validation sets of 9963 images and 1748 images, at the operating point selected for high specificity, the algorithm had 90.3% and 87.0% sensitivity and 98.1% and 98.5% specificity for detecting referable diabetic retinopathy, defined as moderate or worse diabetic retinopathy or referable macular edema by the majority decision of a panel of at least 7 US board-certified ophthalmologists. At the operating point selected for high sensitivity, the algorithm had 97.5% and 96.1% sensitivity and 93.4% and 93.9% specificity in the 2 validation sets.

Meaning Deep learning algorithms had high sensitivity and specificity for detecting diabetic retinopathy and macular edema in retinal fundus photographs.

Comparative Study > Eur J Cancer. 2019 Sep;119:11-17. doi: 10.1016/j.ejca.2019.05.023.
Epub 2019 Aug 8.

Deep neural networks are superior to dermatologists in melanoma image classification

Titus J Brinker [1], Achim Hekler [2], Alexander H Enk [3], Carola Berking [4], Sebastian Haferkamp [5], Axel Hauschild [6], Michael Weichenthal [6], Joachim Klode [7], Dirk Schadendorf [7], Tim Holland-Letz [8], Christof von Kalle [2], Stefan Fröhling [2], Bastian Schilling [9], Jochen S Utikal [10]

Affiliations + expand

PMID: 31401469 DOI: 10.1016/j.ejca.2019.05.023

Free article

Abstract

Background: Melanoma is the most dangerous type of skin cancer but is curable if detected early. Recent publications demonstrated that artificial intelligence is capable in classifying images of benign nevi and melanoma with dermatologist-level precision. However, a statistically significant improvement compared with dermatologist classification has not been reported to date.

Methods: For this comparative study, 4204 biopsy-proven images of melanoma and nevi (1:1) were used for the training of a convolutional neural network (CNN). New techniques of deep learning were integrated. For the experiment, an additional 804 biopsy-proven dermoscopic images of melanoma and nevi (1:1) were randomly presented to dermatologists of nine German university hospitals, who evaluated the quality of each image and stated their recommended treatment (19,296 recommendations in total). Three McNemar's tests comparing the results of the CNN's test runs in terms of sensitivity, specificity and overall correctness were predefined as the main outcomes.

Findings: The respective sensitivity and specificity of lesion classification by the dermatologists were 67.2% (95% confidence interval [CI]: 62.6%-71.7%) and 62.2% (95% CI: 57.6%-66.9%). In comparison, the trained CNN achieved a higher sensitivity of 82.3% (95% CI: 78.3%-85.7%) and a higher specificity of 77.9% (95% CI: 73.8%-81.8%). The three McNemar's tests in 2 × 2 tables all reached a significance level of $p < 0.001$. This significance level was sustained for both subgroups.

Interpretation: For the first time, automated dermoscopic melanoma image classification was shown to be significantly superior to both junior and board-certified dermatologists ($p < 0.001$).

Vol. 36. Núm. 5.
páginas 331-335 (Mayo 2021)

TÉCNICAS DE DIAGNÓSTICO

DOI: 10.1016/j.piel.2020.06.003

La inteligencia artificial: ¿reemplazará al dermatólogo para hacer diagnósticos?

Artificial intelligence: Will replace the dermatologist making diagnoses?

Mariángeles Jofre, Alejandra Abeldaño

Unidad de Dermatología, Hospital General de Agudos Dr. Cosme Argerich, Buenos Aires, Argentina

redacción médica

"Nuestro algoritmo consigue un diagnóstico instantáneo de cáncer de piel"

El Virgen del Rocío desarrolla una tecnología capaz de solventar los tres meses de demora del diagnóstico

José Juan Pereira.

18 oct 2021. 17.40H

SE LEE EN 5 MINUTOS

POR IVÁN FERNÁNDEZ

BioMind

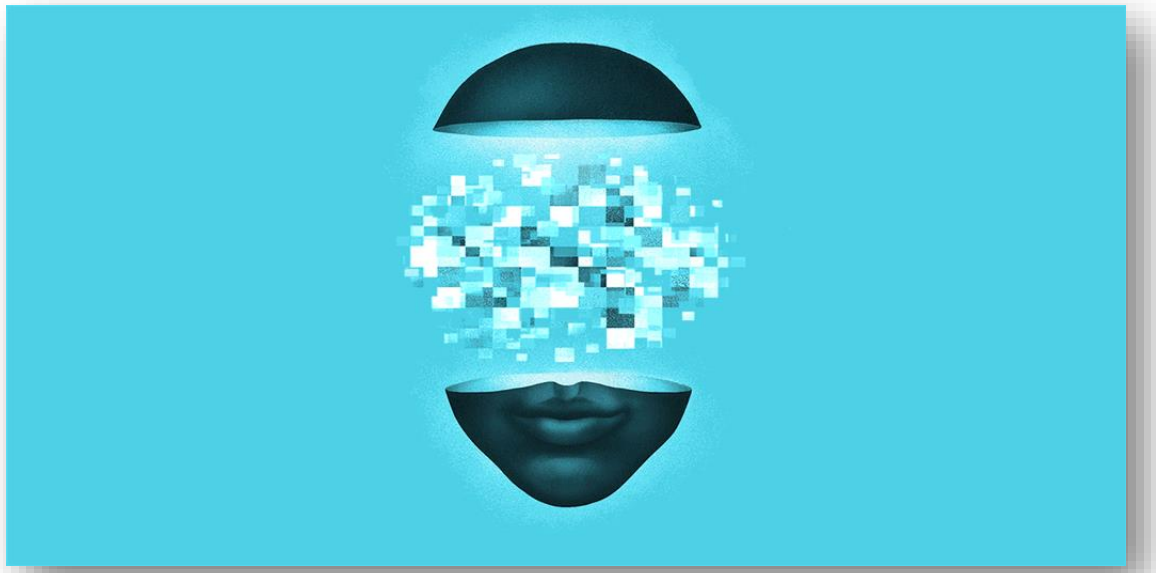
An artificial intelligence system has registered a 2-0 victory against renowned doctors and specialists, in a competition in Beijing to diagnose brain tumors and predict the expansion of brain bruises or contusions.

BioMind, which was developed by researchers at the AI Neurological Disorders Research Center and Capital Medical University, made correct diagnoses in **87% of the 225 cases** in approximately 15 minutes. A team of 15 doctors from the best hospitals in China achieved **66% accuracy in 30 minutes**.

The artificial intelligence system also made correct predictions, in **83 percent** of cases, of brain hematoma expansion, outperforming doctors, who were only **63 percent** accurate.

Prediction of thoughts

Prediction of compound thoughts by knowing the brain patterns of a human



Technique Innovation

New technology

- Intraoral scanner

Add systems to actual technology

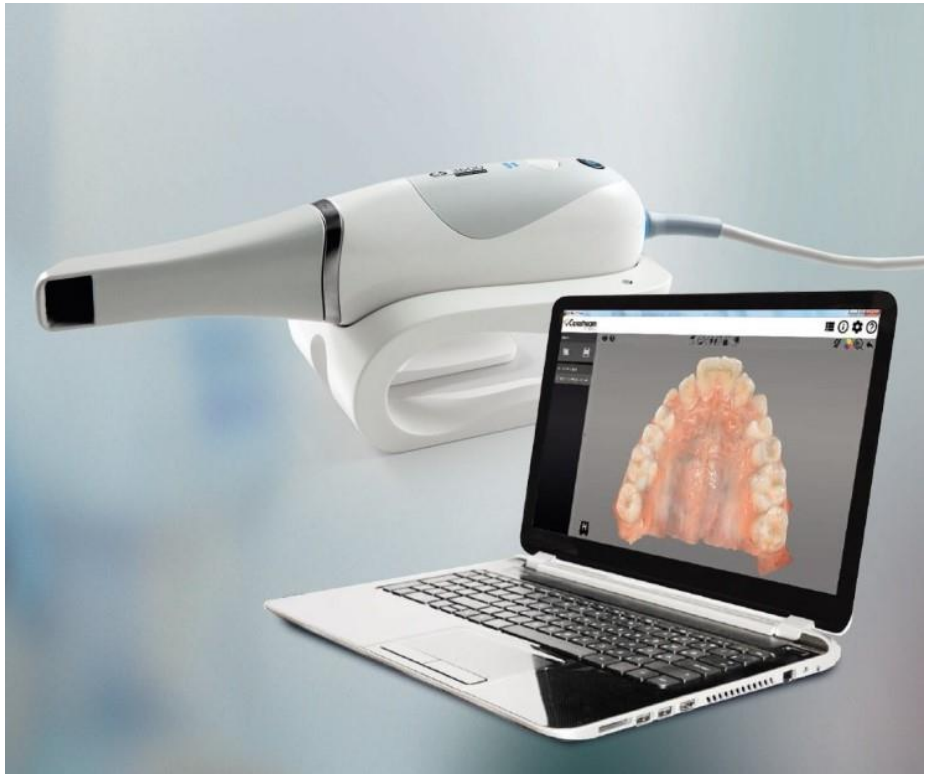
- Frequency of light

Mix data and technology

- Biopsy equivalent….

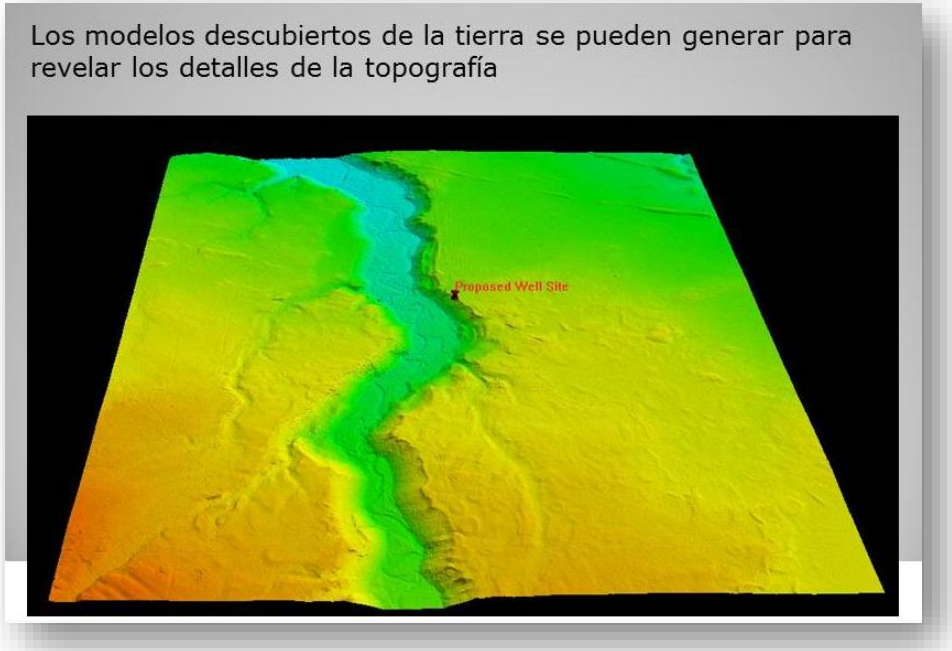
Technique Innovation

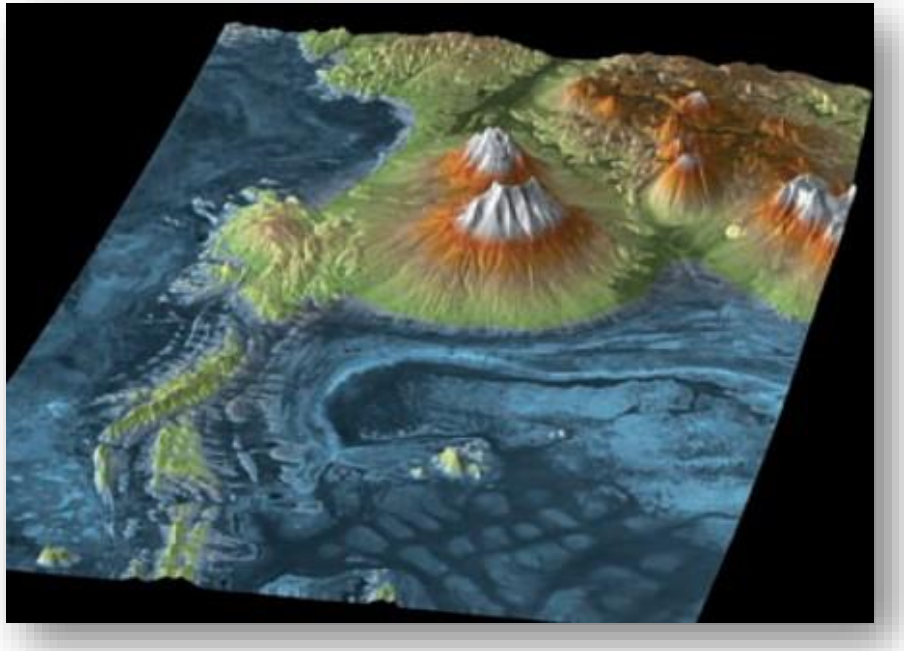
Intraoral scanner

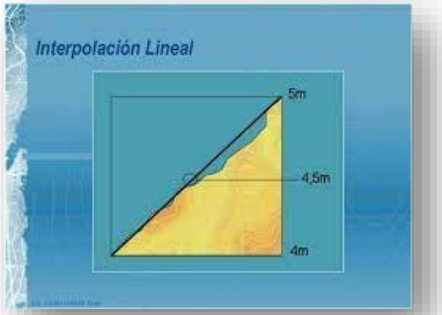


Technique Innovation

Intraoral scanner + surface scanner







Technique Innovation

Add systems to actual technology

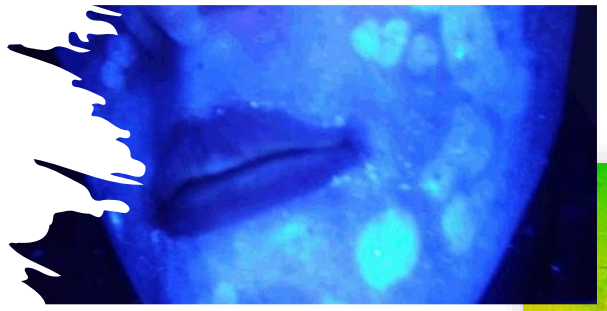
Applying a frequency of light with the endoscope that identifies injuries

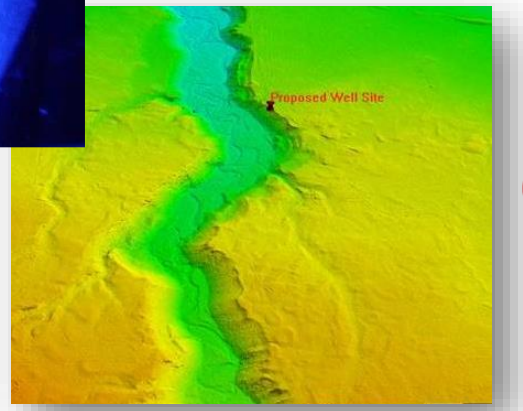
Could this substitute the use of acetic acid or lugol?

Technique Innovation

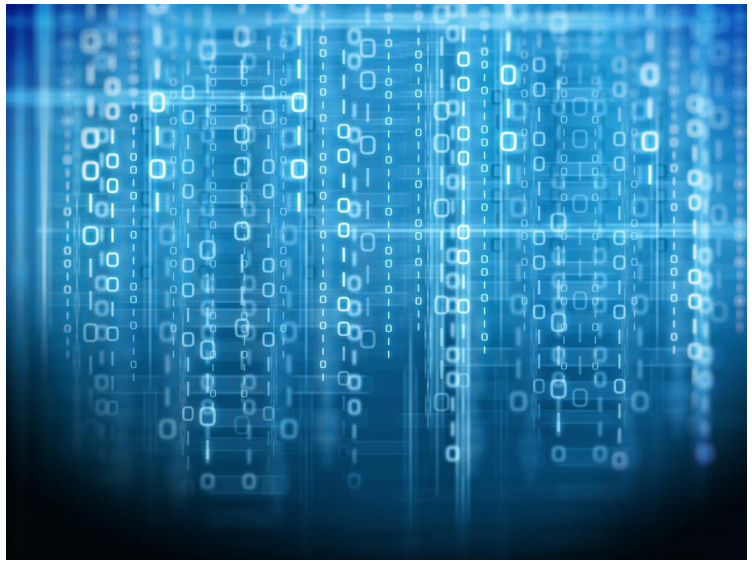
Mix data and technology

Technology





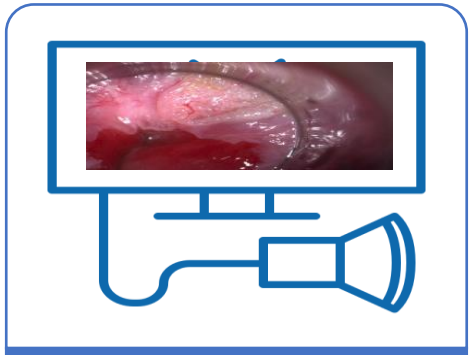
Knowledge



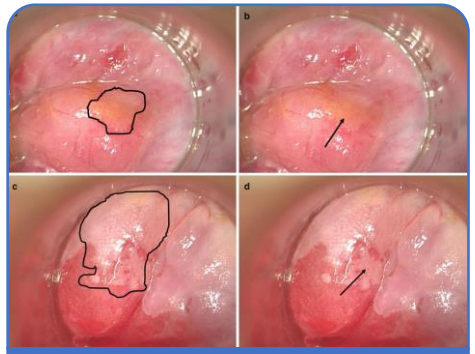
Could this supply the biopsy?

It would allow us to

Make diagnosis at a distance



Let a technician do it



Apply layers of data with identification models

Make inquiries with other specialists

INNOVATION TRAINING

Innovation in training

New technology

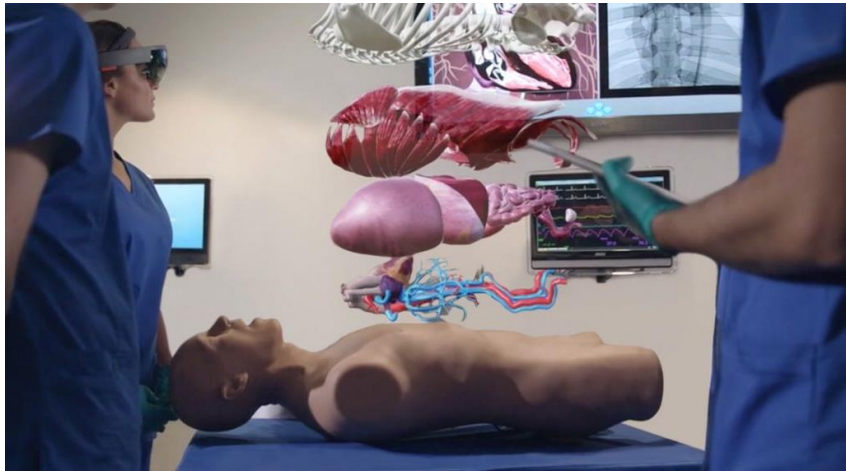
Augmented reality

Injuries simulation

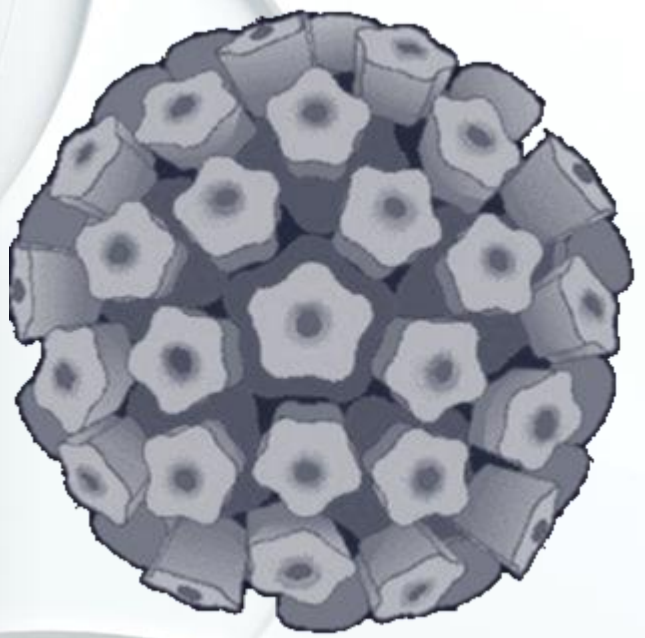
Placement of lesions

New challenge

Levels of experience



Innovation in the field of anal dysplasia screening



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