Pathfinder Challenge:
EIC Pathfinder Challenge – Health Continuum
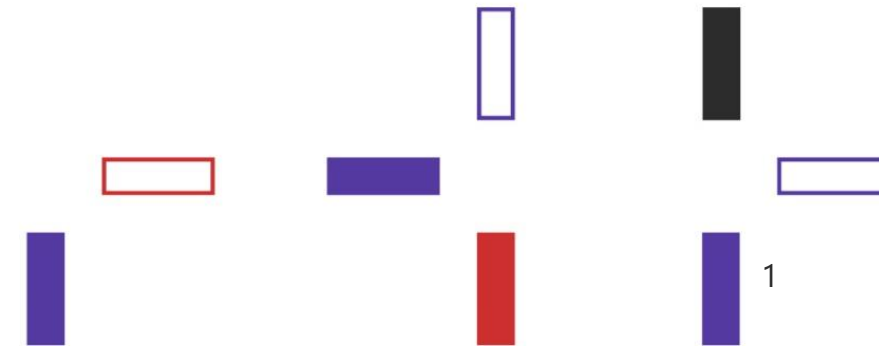**E. Claverol-Tinturé / Isabella Tamagnini / Lucia Farina**

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AGENDA for today

1. The European Innovation Council. Key Agency Objectives.

2. The concept of Challenges. Capturing an opportunity.

3. WorkProgramme 2022. Challenge: Health Continuum.

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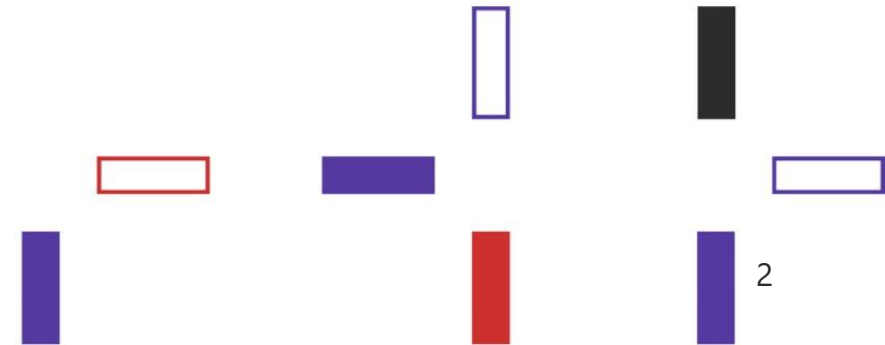1. **The European Innovation Council. Key Agency Objectives.**

EIC - 1st of April 2021

Core objective:

Create new technologies (from existing science) that reach the end-user / market.

Bring science to market.

Grow global technology-based startups.

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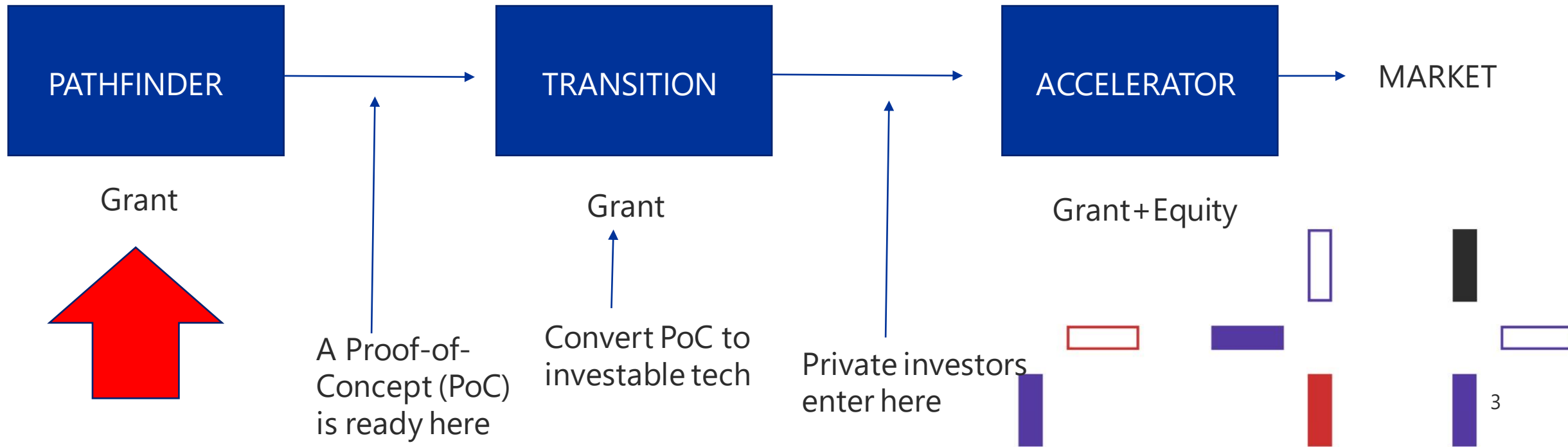EIC Pathfinder Challenge – Health Continuum
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THE ROLE OF PATHFINDER

- Where the technology (from existing science) is invented
- But the goal remains to move rightwards to Accelerator within a <u>reasonable time-frame</u>

| PATHFINDER | → | TRANSITION | → | ACCELERATOR | → MARKET |

Grant

Grant

Grant+Equity

A Proof-of-Concept (PoC) is ready here

Convert PoC to investable tech

Private investors enter here

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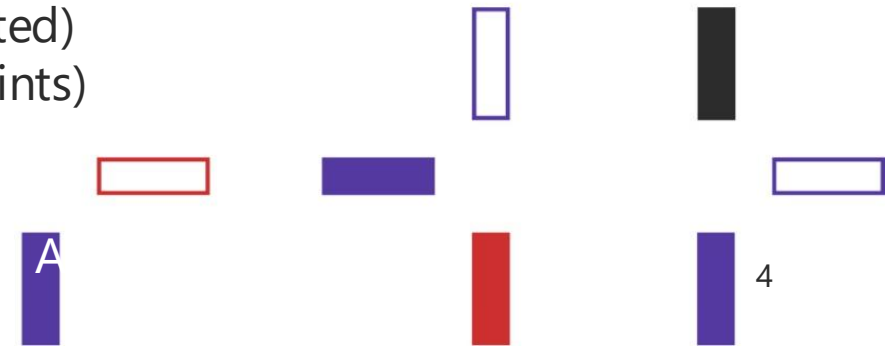
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THE METRICS OF SUCCESS FOR EIC

Success is linked to:

- Number of technologies invented in Pathfinder
- Number of technologies Transitioned to the clinic
- Number of European tech companies created with global outreach

RESULTING CONSTRAINTS

- Low Technology-Readiness TRL ok (but core science already completed)
- But limited room for exploratory basic research (due to time constraints)
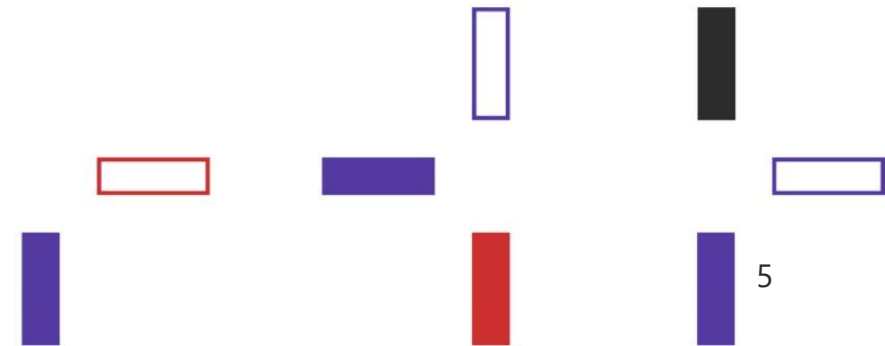- Patient-need driven

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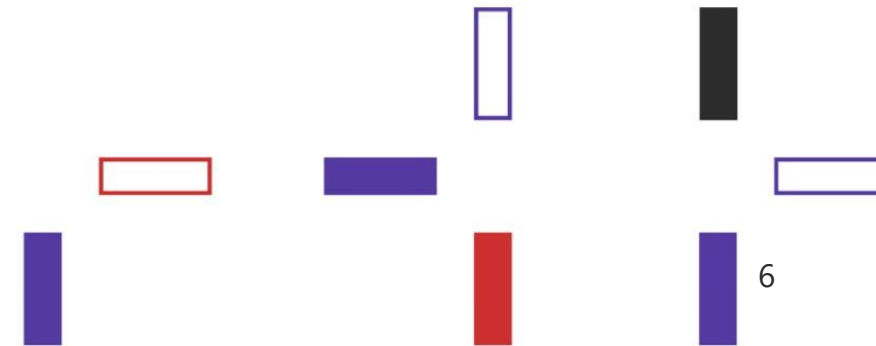**2. The concept of Challenges. Capturing an opportunity.**

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Example of Pathfinder-type of technology development (<u>**NOT RELEVANT FOR THIS CALL**</u>)

STEP 1 (<u>not suitable</u> for EIC Pathfinder). In 2002 basic research on algal phototaxis led to the discovery of light-sensitive ion channels (ChannelRhodopsins)
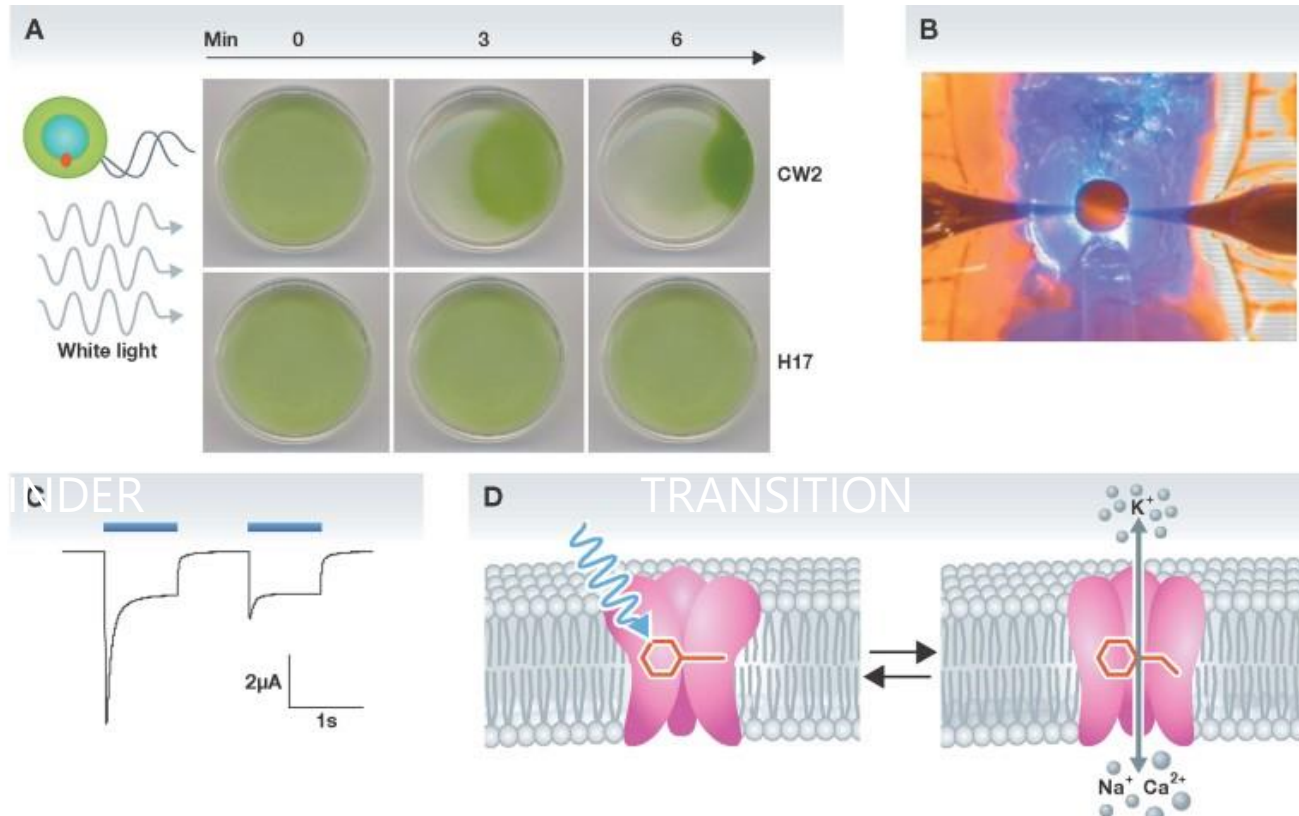
Hegemann P, Nagel G. From channelrhodopsins to optogenetics. EMBO Mol Med. 2013 Feb;5(2):173-6.

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Example of Pathfinder-type of technology development (<u>NOT RELEVANT FOR THIS CALL</u>)

STEP 2 (could have been suitable for an EIC Pathfinder, if EIC had existed back then…)

In 2005: Transfer to Neuroscience, Birth of Optogenetics Technology.

<u>New technology to control neuronal activity using light.</u>

By Laboratories of Zhuo Pan, Karl Deisseroth, Stefan Herlitze, Hiromu Yawo and Alexander Gottschalk

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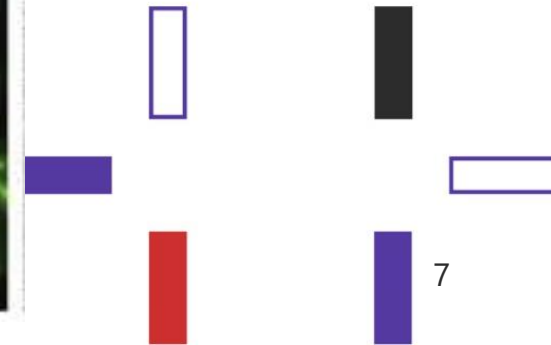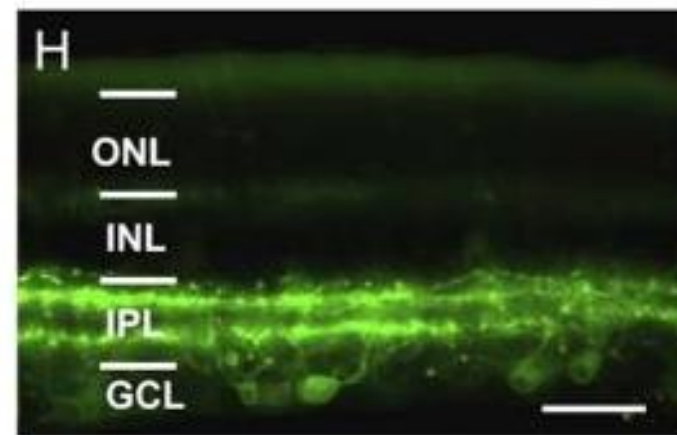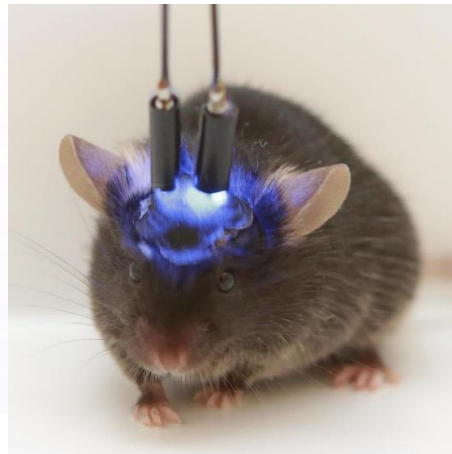
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3. WorkProgramme 2022. Challenge: Health Continuum.

https://eic.ec.europa.eu/eic-work-programme-2022_en

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II.2.4 EIC Pathfinder Challenge: Towards the Healthcare Continuum: technologies to support a radical shift from episodic to continuous healthcare

Challenge Guide

https://eic.ec.europa.eu/system/files/2022-06/Challenge%20Guide%202022_Healthcare%20continuum.pdf
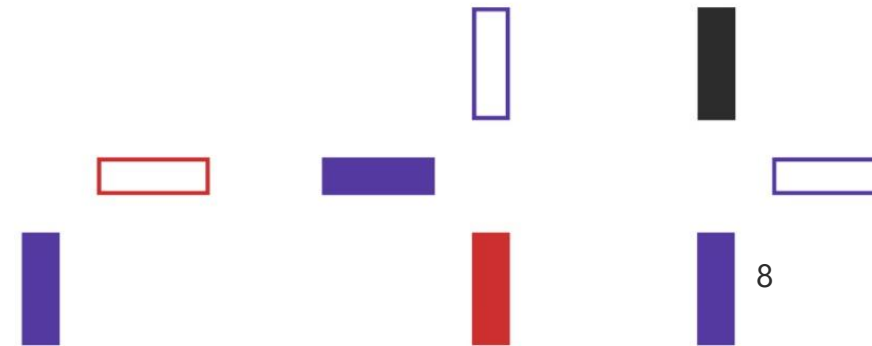
II.2.4 EIC Pathfinder Challenge: Towards the Healthcare Continuum: technologies to support a radical shift from episodic to continuous healthcare Introduction and scope

Today, episodic (symptom-triggered) healthcare remains the norm. To a large extent, **individuals are entrusted with the responsibility to self-monitor and trigger requests to the health system** upon identification of relevant symptoms. In spite of the growing number of screening programmes, the diagnosis of a vast majority of disorders, including those in which early action has a direct impact on morbidity or survival, still relies heavily on the individual to initiate the process. Further, a substantial fraction of outpatients manage the post-treatment phase, particularly of non-life threatening conditions, with qualitative self-monitoring, seeking help only upon perceived evidence of disease recurrence. In essence the current approach to healthcare is mostly reactive

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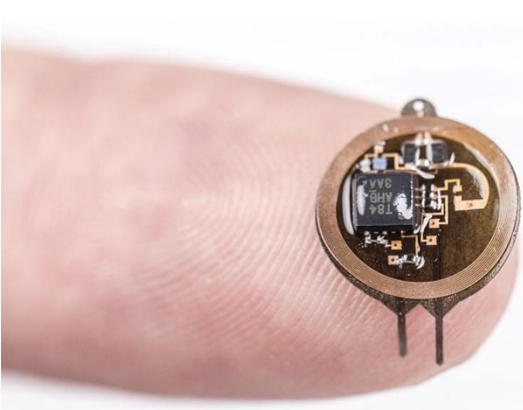**E. Claverol-Tinturé / Isabella Tamagnini / Lucia Farina**

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While the **episodic (reactive) model could be perceived as economically advantageous**, drawing on healthcare resources only intermittently, it is clearly not optimal.

In self assessing their health status independently, **individuals miss early signs of disease**, sometimes with devastating results. The large spectrum of possible conditions and associated symptoms, particularly as age progresses, and the high behavioural resistance to seek medical assistance without clear symptomatic evidence, compounds the problem. Often the prodromal phase advances to full blown symptomatic phase before the diagnosis is triggered by the patient.

Further, the **emotional burden under the episodic healthcare model** in which individuals are responsible to gauge severity and make decisions on when and how to seek help, should not be underestimated. Periods of raised health awareness, chronic conditions, slow convalescent recoveries, etc. in adult and pediatric populations can be particularly emotionally draining for patients and families under the episodic care model.

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Technology can support much needed progress towards continuous and preventive healthcare, in which **individuals are accompanied continuously and unobtrusively by health monitoring technology** and practitioners, proactively offering diagnosis, treatment or follow up at the optimal pace and with the optimal protocol as dictated by clinical evidence.

Under this model, human beings will heavily rely on technology seamlessly integrated in their lives, becoming recipients of proactive healthcare with minimal disruption and cognitive load. **The burden of early spotting of disease will be shifted to unobtrusive technology.**

This requires careful consideration of all potential ethical issues that may arise, particularly related to data processing, data ownership and trustworthy artificial intelligence. **Successful examples of such technologies already exist.** Continuous Glucose Monitoring (CGMs) devices in skin-patch formats, for instance, offer diabetics relative unobtrusive and uninterrupted detection of inadequate glucose levels, with the possibility for remote diabetes care. Furthermore, body motion sensors (e.g. accelerometer-based), respiration monitors and oxygen saturation (SpO2) sensors, cell phone-enabled behavioural analysis, fitness devices and many others are also available.

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However, the **full potential of the continuous healthcare model has not been fully realised** as, for most conditions, diagnostic technologies do not exist with the required attributes: unobtrusiveness (environment-embedded, body-embedded, object embedded, home-integrated, etc.), clinical grade reliability, affordability, etc.

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The objective of this EIC Pathfinder Challenge is to develop systems and technologies **starting at very low TRL** for unobtrusive monitoring of human health with new continuous and personal imaging and sensing modalities, implementing continuous assessment, processing and analysis of the data to identify early signs of disease.

- Note: Pathfinder is where new technologies are invented. Incremental developments are more suited for TR and ACCEL.

This call can support innovative technologies ranging from the sensor level up to the system level for effective integration of multimodal data.

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Proposals can aim at monitoring a family of conditions or a wider mix of health factors, using the optimal combination of single-point or historic multi-point sensor data and, if appropriate, clinical records, genomic data, etc. to realise maximal performance.

Involvement of relevant stakeholders (e.g. clinical experts and patient organizations) from an early stage is recommended.

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From the Challenge Guide:

- This Challenge aims at the development of technologies that make continuous healthcare a reality.

- Several disease families and a non-exhaustive background of their monitoring technologies are provided below. However, the **applicants are invited to address the monitoring of any aspect of the health status**.

- Further, this Challenge is **not limited to a specific technological strategy** towards the goal of continuous healthcare. For example, ambient sensors, home-use devices (Point-of-Living testing), wearables, implantable devices, smart home appliances enhanced with health sensors and others are within scope.

- **This Challenge does not target the incremental development** of existing solutions, but the creation of disruptively new technologies derived from recent or insufficiently explored scientific data

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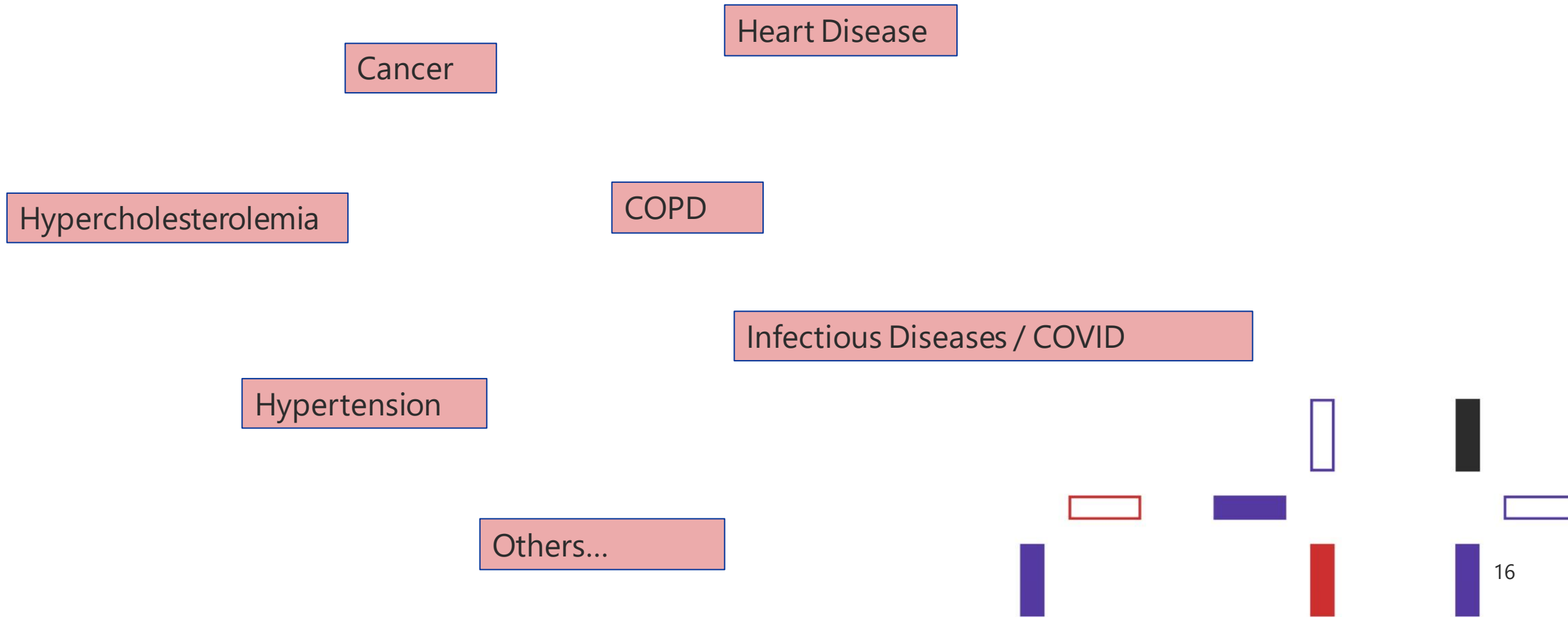
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From the Challenge Guide:

Heart Disease

Cancer

Hypercholesterolemia

COPD

Infectious Diseases / COVID

Hypertension

Others...

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Specific conditions

Proposals for this Challenge can be submitted by single applicants or by consortia, as dictated by the activities to be performed.

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Table 3. Award criteria for EIC Pathfinder Challenges

Excellence (Threshold: 4/5; weight 60%)

Objectives and relevance to the Challenge: How clear are the project's objectives? How relevant are they in contributing to the overall goal and the specific objectives of the Challenge?

Novelty: To what extent is the proposed work ambitious and goes beyond the state-of-the-art?

Plausibility of the methodology: How sound is the proposed methodology, including the underlying concepts, models, assumptions, appropriate consideration of the gender dimension in research content, and the quality of open science practices?

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Impact (Threshold: 3.5/5; weight 20%)
Potential Impact: How credible are the pathways to achieve the expected outcomes and impacts of the Challenge? To what extent would the successful completion of the project contribute to this?
Innovation potential: How adequate are the proposed measures for protection of results and any other exploitation measures to facilitate future translation of research results into innovations with positive societal, economic or environmental impact? How suitable are the proposed measures for involving and empowering key actors that have the potential to take the lead in translating research into innovations in the future?
Communication and Dissemination: How suitable are the proposed measures, including communication activities, to maximise expected outcomes and impacts for raising awareness about the project results' potential to establish new markets and/or address global challenges?

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Quality and efficiency of the implementation (Threshold 3/5; weight 20%)
Quality of the applicant/consortium (*depends if mono or multi-beneficiaries*): To what extent do(es) the applicant/consortium members have all the necessary high quality expertise for performing the project tasks?
Work plan: How coherent and effective are the work plan (work packages, tasks, deliverables, milestones, timeline, etc.) and risk mitigation measures in order to achieve the project objectives?
Allocation of resources: How appropriate and effective is the allocation of resources (person-months and equipment) to tasks and consortium members?

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Portfolio level evaluation (step 2 of the evaluation)

Categories

For this specific Challenge, the evaluation committee will map each proposal against the following categories:

- Medical condition addressed
- Type of technology proposed.
- Barriers to successful adoption addressed by the proposal. (see section "Remaining barriers and possible technological approaches")

Barrier 1: Invasiveness associated with biomarker quantification.
Barrier 2: False positives.
Barrier 3: Implantable biosensors: limited operational lifespan and reliability in physiological matrices.
Barrier 4: Need for multiplexed technologies
Barrier 5: User compliance. Need for integration with daily user routines.
Barrier 6: Need for human intervention in the analysis of large datasets.
Barrier 7: Need for attention to gender-dependent symptoms and course of disease

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Specific objectives

Proposals submitted to this EIC Pathfinder Challenge should tackle the following specific objectives:

+ develop a novel technology (device, instrument or full system)for unobtrusive proactive healthcare. The targeted technology should offer life-long health status monitoring and elements of predictive medicine with methodologies grounded in existing scientific evidence;

+ the end objective must be a Proof-of-Concept and preliminary data suggestive of adequate safety and performance, while paying attention to minimising false positives that could hamper its real-world use;

+ the targeted technology should make the case for a clinically acceptable solution amenable to successful evaluation under common Health Technology Assessment (HTA) methodologies;

+ the path to future integration in the European healthcare workflow, specifically in relation to the inter-operability with existing infrastructures, as well as take up and compliance by appropriate patient populations, should be plausible.

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Deadline   19 October 2022   (see WP2022)

Budget   approx. 28M€ (167M for 6 Challenges)

Project Size (see WP2022)
"For this call, the EIC considers proposals with an EU contribution of up to EUR 4 million as appropriate. Nonetheless, this does not preclude you to request larger amounts, if properly justified or stated otherwise in the specific Challenge. The funding rate of this grant will be 100% of the eligible costs. "

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WorkProgramme 2022

https://eic.ec.europa.eu/eic-work-programme-2022_en
support@eic.eismea.eu

Challenge Guide

https://eic.ec.europa.eu/system/files/2022-06/Challenge%20Guide%202022_Healthcare%20continuum.pdf