

# All.Can

Changing cancer care together

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## L'intelligenza artificiale nell'ambito delle cure oncologiche

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All.Can International is a not-for-profit organisation (ASBL) registered in Belgium. Its work is made possible with financial support from Bristol Myers Squibb (sustaining partner) and Roche, MSD, Johnson & Johnson and Illumina (funding members).

# Overview – the promise of AI in health

Artificial Intelligence will have profound impacts across health systems, transforming health care, public health, and research. Responsible AI can accelerate efforts **toward health systems being more resilient, sustainable, equitable, and person-centred**. (OECD, 2024)

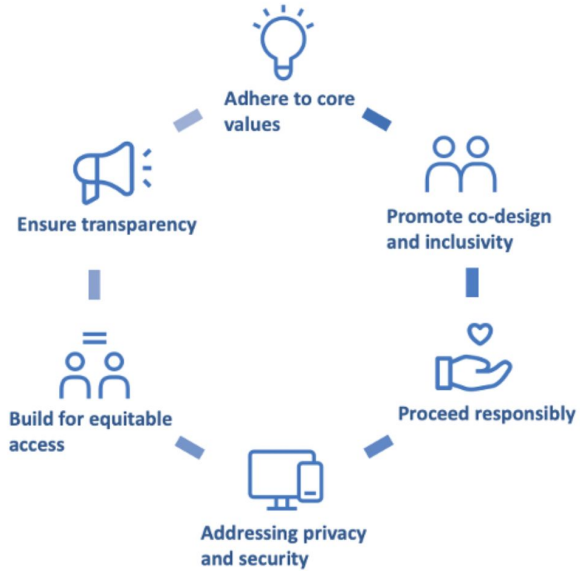
With the increasing availability of health care data and the rapid progress in analytic techniques – whether machine learning, logic-based or statistical – WHO recognizes **the potential of AI in enhancing health outcomes by strengthening clinical trials; improving medical diagnosis, treatment, self-care and person-centred care; and supplementing health care professionals’ knowledge, skills and competencies** – including in settings with a lack of medical specialists, e.g. in interpreting retinal scans and radiology images among many others. (WHO, 2023)

The EU’s approach to artificial intelligence centers on excellence and trust, aiming to boost research and industrial capacity while ensuring safety and fundamental rights. (European Commission, 2023-24)

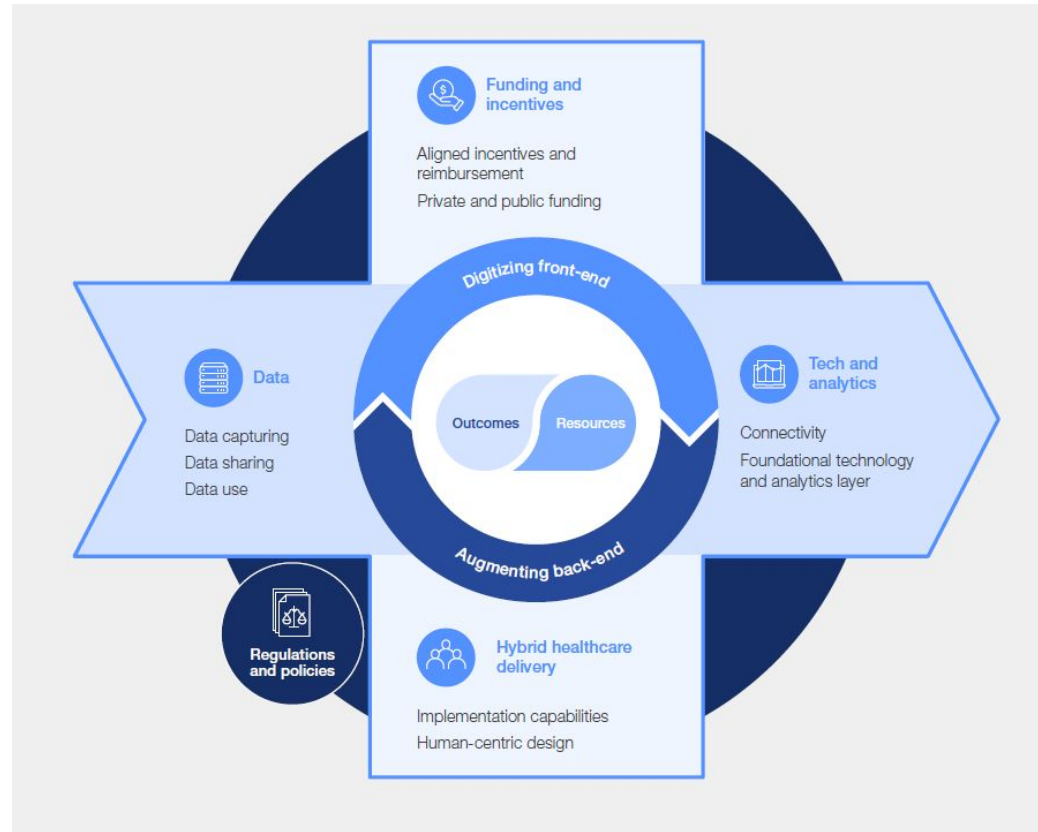
**Data, transparency and scalability** play crucial roles in maximizing AI’s impact. Strong data foundations and thoughtful AI policies are needed to build trust and accelerate adoption... Implementation will require coordination between public- and private-sector.. (World Economic Forum, 2023)

AI can bring opportunities for **keeping people healthy (patient empowerment), improving care (generation of novel scientific insights, optimal drug therapies), saving lives (personalised and higher quality care plans) and saving money for healthcare systems** (automation of tasks for efficiency and standardisation). (EFPIA, 2023)

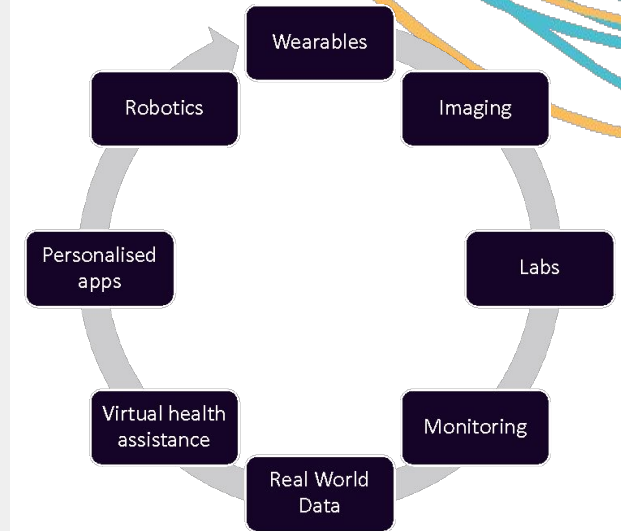
# Principles, enablers and applications



© Gates Foundation's guiding AI principles



Enablers to achieve better outcomes and efficiency  
*World Economic Forum*



AI for patient-centric personalisation of medicine: applications  
*Deloitte / MedTech Europe*

# Shared goals: *“mitigate risks, improve trust, accelerate progress towards responsible implementation”*

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## Opportunities:

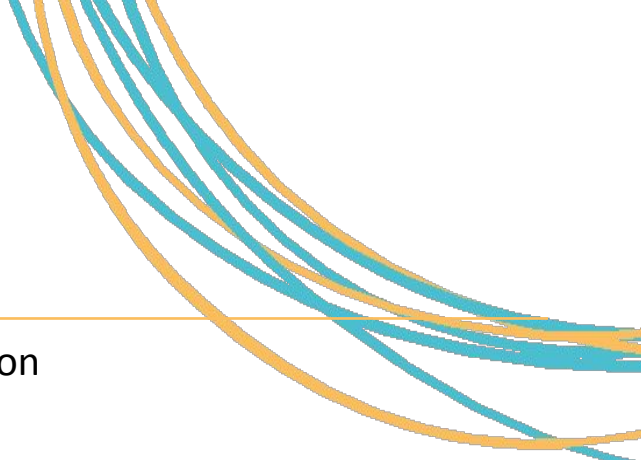
personalised care, enhancing decision-making, advancing research, optimising efficiency, strengthening health systems, supporting HC workforce, offering regulatory sandboxes

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## Challenges:

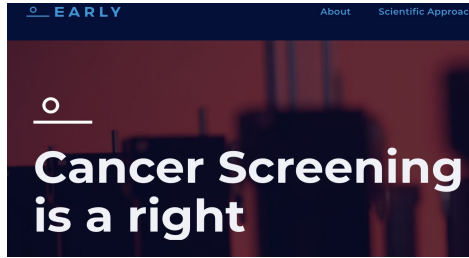
data bias and access, health discrimination, cloud access, privacy and security concerns, lack of explainability, job displacement, capability and skills development, trust and collaboration, regulatory overlaps or gaps (e.g., compliance burden, risk classification, liability)

# AI in a patient-centred approach



Research insights	Disease understanding, fast-track drug discovery and clinical trial optimization
Risk estimation	Risk factors assessment and long-term predictability
Data challenges	Explainability, reproducibility, bias, fairness
Detection and diagnosis	Imaging
Treatment optimisation and Prognosis prediction	Predict response or resistance Adapt or design optimal drug combinations (through predictive modeling)
Process efficiency	Automation of manual tasks to aid standardisation, NLP-assisted unstructured content processing (publications, databases, 'smart libraries'), patient empowerment

# Case studies in oncology



A novel urine test for early detection of lung cancer is combining AI and one of the most sensitive biosensors known to man – the Long Evans rat. Trial results show 93% sensitivity in stage I lung cancer samples, and 88% overall sensitivity.

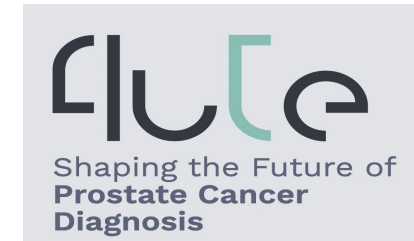


**An Artificially Intelligent Diagnostic Assistant for gastric inflammation**

The AIDA project aims to develop and validate an artificial intelligence (AI)-powered assistant that will support clinicians in gastric cancer prevention by diagnosing precancerous gastric inflammation and suggesting personalized therapeutics and monitoring.



European Cancer Imaging Initiative: unlocking the power of imaging and Artificial Intelligence (or High-Performance Computing, HPC) for the benefit of cancer patients, clinicians and researchers.



The FLUTE project aims to improve predictions of aggressive prostate cancer through AI support to physician, while minimizing unnecessary biopsies, ultimately benefiting patients and reducing associated costs.

# QALYfAI® with the Cancer Performance Indicator

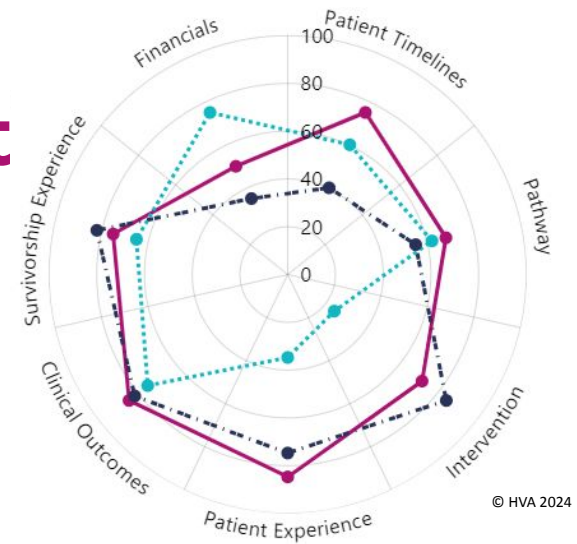
The Health Value Alliance (HVA) was formed at the request of international stakeholders who were frustrated by wholly disjointed pathway management and the ever-declining affordability and value proposition in cancer care. HVA has drawn together a Collaboration, comprising of providers, payers, patients, clinicians, pharma, policy makers and academics from the UK, EU and US. Starting with a broad set of multi-perspective, academic and evidence-based definitions\* of quality, outcomes and costs, the Collaborators applied a rigorous, iterative derivation to ultimately **agree on a common set of real-world measures for showcasing value and insight** - the **Cancer Performance Indicator (CPI)** - underpinned by **HVA's global, independent data-driven analytics engine QALYfAI®**.

The CPI Model comprises a **core set of Service Requirements** that the Collaborators identified as being mandatory for a cancer care service provider to evidence when stating they deliver high-quality and best value cancer care, and a **core set of CPI Measures** that evidence achievement of the Service Requirements and demonstrate performance across seven key domains. A foundational assessment of data coverage and data quality permeates the whole framework to ensure that the CPI outputs are sufficiently robust.

**Suitable for use by all stakeholders across the cancer care ecosystem, the CPI supports stakeholders in benchmarking high quality and performance, delivering innovation and improving outcomes in cancer care, and ultimately determines if synergistic value is being achieved. The CPI enables sophisticated root cause analysis to understand the drivers of value improvement or decline, and thereby inform and drive targeted transformation strategies.**

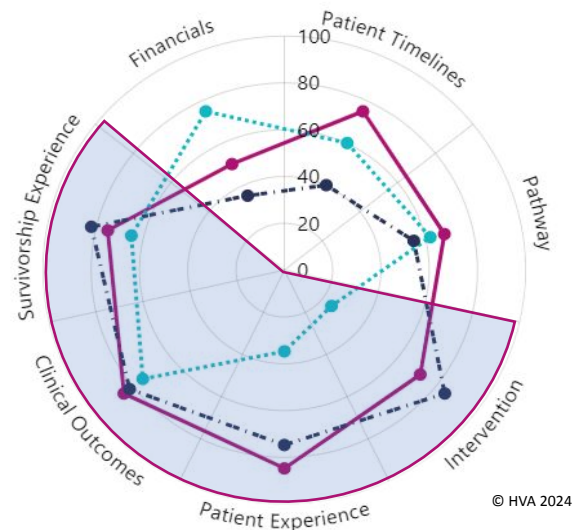
Figure 1 demonstrates how the CPI Measures can be applied at the highest level when comparing performance between different groups, be that different organisations, treatment, interventions, or patient cohorts. Similarly, as in Figure 2, the model can be pivoted when under the lens of a particular stakeholder to focus on the domains of particular interest.

\* In addition to traditional metrics such as survival and the direct cost of treatment, alternative metrics were considered, including those proposed in the All.Can Efficiency Metrics Study (June 2022, <https://www.all-can.org/publications/all-can-efficiency-metrics-study/>), a policy research providing a set of internationally applicable and real-world measures generated and collected from daily clinical practice.



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Figure 1: Different organisations, treatments, interventions, patient cohorts, etc. can be easily visually compared within the approach of the CPI Model.

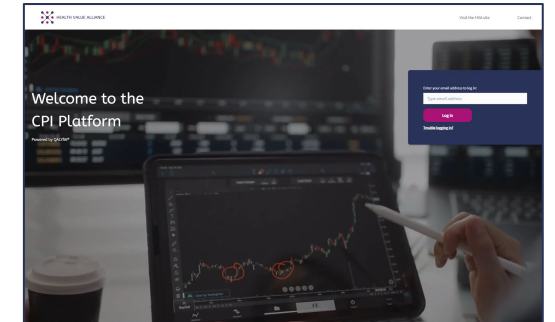
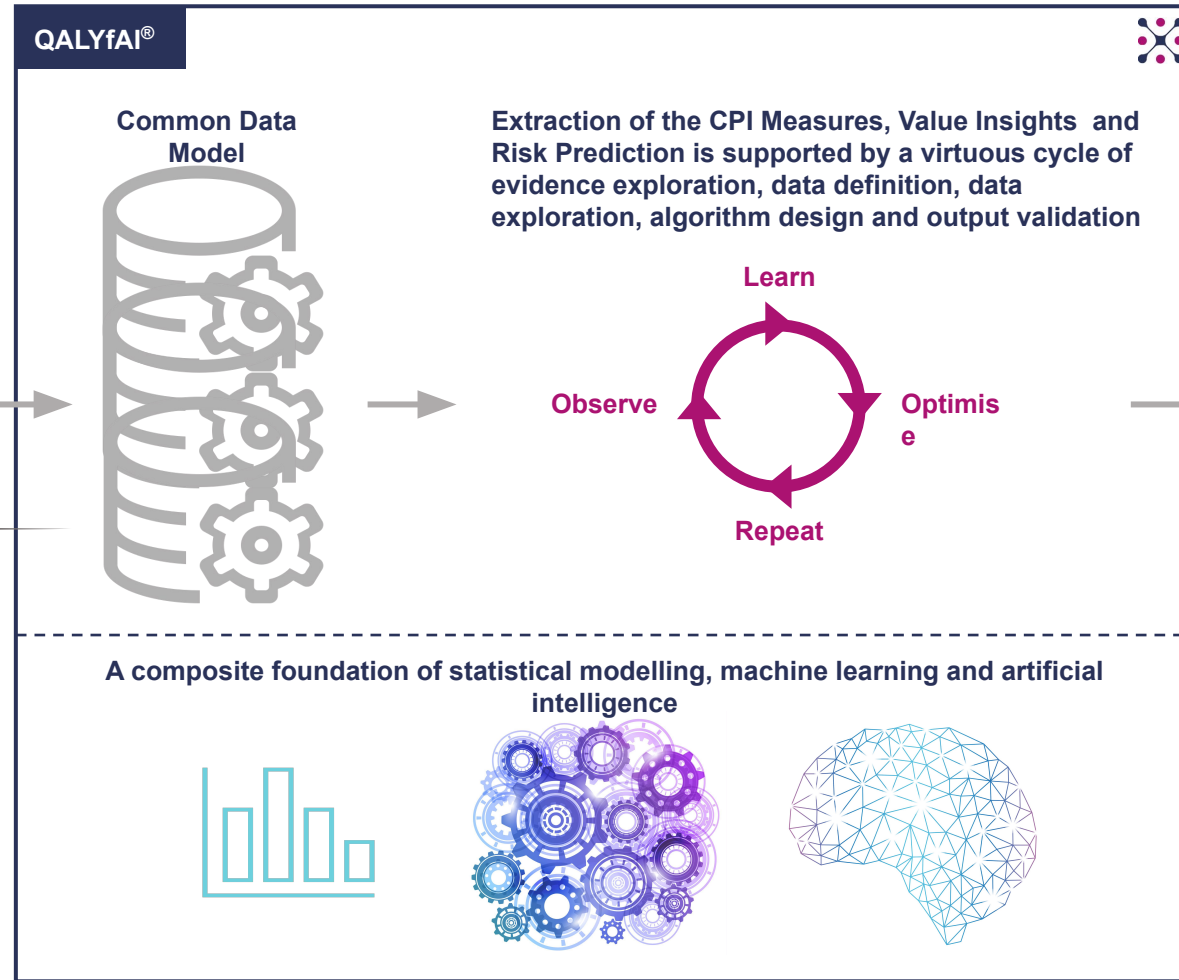


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Figure 2: Weighting of the CPI domains can be adjusted depending on the lens of the stakeholder, e.g. a focus on patient experience and quality of life as shown here.

# QALYfAI® and the CPI Platform

-  Patient electronic medical records and billing from Providers
-  Patient-reported experience and outcomes
-  Claims data and payment models from Payers
-  Pharma and med-tech data to evaluate innovation
-  Academic research, national benchmarking and audits



**Outcomes reporting in the CPI Model** demonstrates high quality care, and is supported by the Cost Risk Insight System (CRIS) in correlating patient outcomes with Payer data.

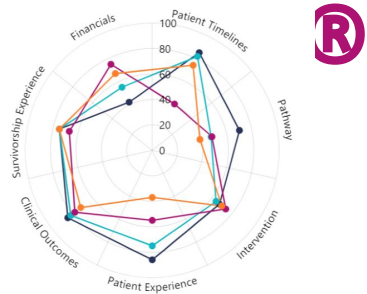
**Value Insights** support service and innovation approval, market entry, differentiation and reimbursement, and allow Payers to direct patients to high performing pathways.

**Risk prediction** for both patients and Payers supports appropriate interventions, resource planning and cost modelling. Strategies to reduce risk can be explored, leading to more sustainable ecosystem and enhanced value, for all.

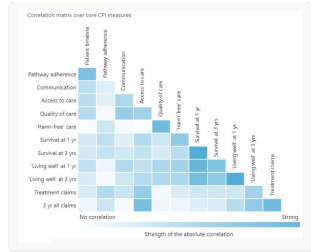
Note: QALYfAI® can be deployed as a local, on-premise service only. In this case, the application of the CPI is typically one of local transformation and comparison with publicly available benchmarks.



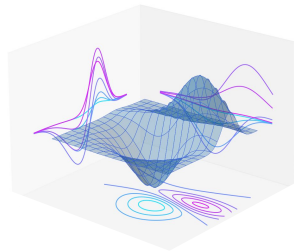
# Examples of data-driven analysis and AI outputs in



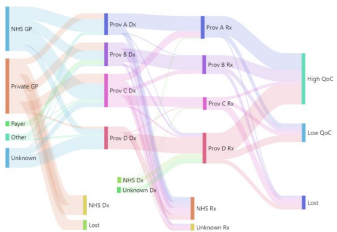
AI-supported data ingestion and continuous validation maximises the information available and ensures that **performance** is presented within a robust **data quality assessment**.



Multi-variable analysis identifies significant **relationships between CPI Measures**, with support from model-agnostic interpretation methods to provide **explainability** and drill-down into root cause.



Clustering of individually weak predictors of clinical risk or survivorship outcomes identifies cohorts and individuals at risk and supports **targeted interventions**.



Longitudinal, far horizon patient pathways inform **resource planning, cost-risk modelling** and reimbursement policy design.

