

Foresight brief series

Transforming health care for tomorrow



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Foresight brief series

Transforming health care for tomorrow

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Entrepreneurship Alliance for
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under the Telecommunication
Development Bureau



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The report contributes to the ITU Development Sector (ITU-D) priority of digital transformation and supports the efforts of Member States to integrate innovation into their national development agendas. It could not have been completed without the support of the Digital Innovation Board and their focal points, and the Expert Network of the Alliance, whose valuable feedback and contributions greatly enriched the analysis presented.

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Foreword



Health is the foundation of human dignity and development. It shapes the well-being of families, the resilience of communities and the productivity of nations. Yet health systems around the world are under growing pressure. Demographic shifts, climate-related stresses, rising health-care costs and the increasing burden of both infectious and noncommunicable diseases are challenging traditional models of care. At the same time, digital transformation is creating unprecedented opportunities to reimagine how health services are delivered, accessed and governed.

This foresight brief invites us to examine the future of health systems through the lens of innovation, resilience and equity. The brief is a product of the Innovation and Entrepreneurship Alliance for Digital Development. The foresight brief series envisions an equitable future and aims to inspire countries to develop digital ecosystems that can thrive in an evolving world. By analysing deep trends, signals of change and ecosystem expectations, the brief encourages us to rethink how technology, policies and communities can jointly contribute to strengthening health systems and ensuring quality of life for all.

Advanced connectivity, artificial intelligence, telemedicine, interoperable data systems and digital public health platforms are already reshaping the global health-care landscape. Yet the journey towards tomorrow's health systems is not driven by technology alone. It requires inclusive governance, trusted data frameworks, strong public-private partnerships, sustainable financing and a commitment to ensuring that digital health benefits are accessible to everyone—women and men, older persons, children, people with disabilities, front-line workers and underserved communities.

Foresight provides a powerful approach to navigate this complexity. By exploring future scenarios, countries are better able to anticipate risks, align investments, and design health systems that remain agile, secure, and people-centred. Participatory foresight further strengthens collective ownership of the health transformation journey, enabling governments, innovators, health professionals and citizens to work together towards a future where health care is smarter, fairer and more resilient.

The ITU Telecommunication Development Bureau remains committed to supporting its membership on this transformative journey. I look forward to seeing how this report informs national digital health strategies, guides investment priorities, and inspires new partnerships. We stand ready to work with all stakeholders to build health ecosystems that are innovative, trusted, sustainable, and future-ready.

A handwritten signature in black ink, reading "Dr. Cosmas Luckyson Zavazava".

Dr Cosmas Luckyson Zavazava

Director, Telecommunication Development Bureau (BDT)
International Telecommunication Union

Executive summary

The future of health care is being reshaped under intense pressure. Hard-won gains in life expectancy and health outcomes are undermined by rising costs, demographic shifts, climate stress and deepening inequality, as people increasingly expect to live not just longer but also better lives. At the same time, frontier technologies – from artificial intelligence (AI) and drones to digital health wallets and telemedicine – promise greater reach and efficiency, even as they introduce risks of surveillance, exclusion, cyberattacks and unsafe or biased systems, in a world where guardrails remain incomplete and unevenly enforced.

Drawing on extensive analysis, the study highlights the factors reshaping urban futures: demographic change shaped by ageing populations, the growing proportion of youth populations in some countries, urbanization, migration and displacement; the rising burden of noncommunicable diseases, mental health conditions and lifestyle risks, alongside climate shocks and zoonotic threats; and fragile trust in institutions amid growing misinformation and polarization, even as digital peer networks become alternative sources of health advice. While technological trends reveal expanding connectivity and powerful frontier tools, persistent access gaps and market concentration continue to shape standards and data flows. Economically, debt distress, shrinking aid and rising defence spending constrain fiscal space, while health systems face workforce shortages and escalating demand. Environmental pressures heighten the need for resilient infrastructure across energy, water, cooling and early warning systems. Efforts to improve regulations on data, AI, and health technology have improved but remain uneven, keeping equity, accountability, and distributive justice at the centre of discussions on ethics.

From this landscape, 12 key drivers emerge, of which eight stand out as both high-impact and highly uncertain: the diffusion of technology benefits; technology risk mitigation; public sector capacity; trust in public institutions; adaptation capacity; health financing; prevailing and emerging economic paradigms; and societal responses to the stressed other. Together, these drivers have the power to shape whether health-care futures are inclusive and resilient, or fragmented and fragile. On the basis of these drivers, the study develops contrasting future scenarios that range from hopeful to cautionary to business-as-usual for health care, technology, and society, as well as examines four transformational pathways in depth.

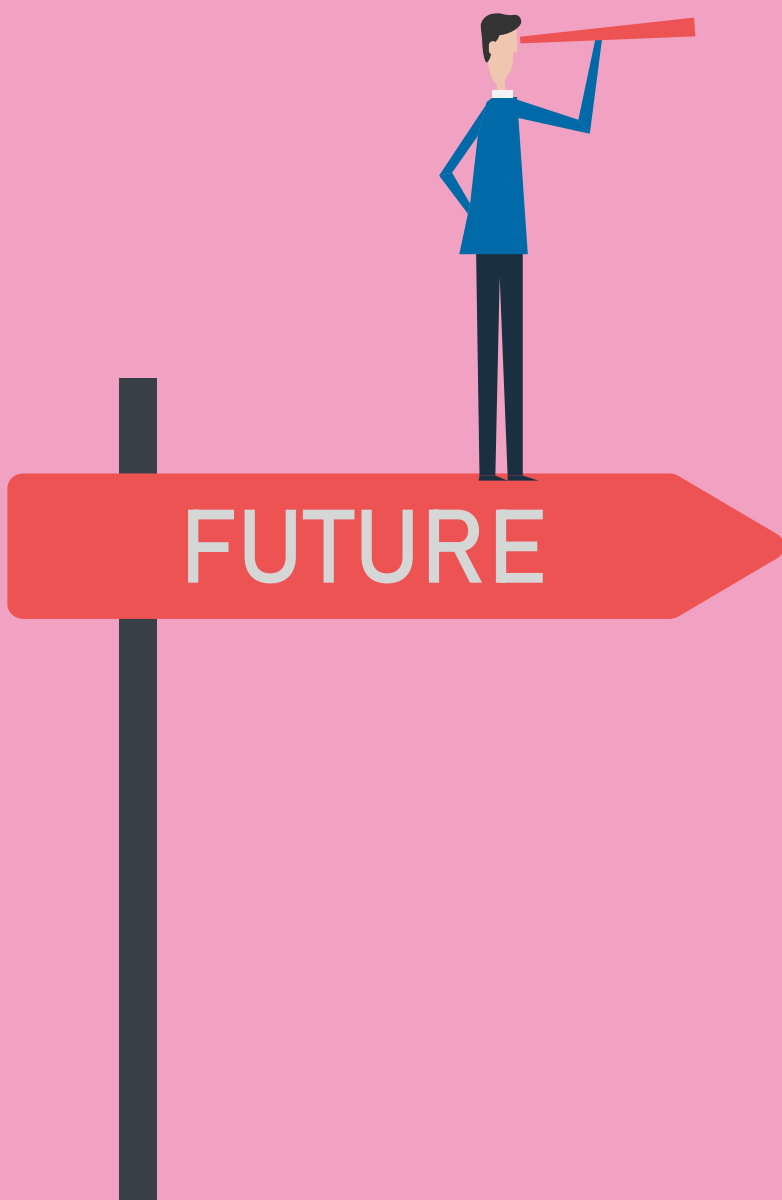
One future vision stands out as the most desirable: the public-purpose mission era. In this scenario, capable institutions mobilize health and technology for public goals; open digital rails enable innovation without lock-in; financing strengthens prevention and primary care; and communities, cities and national systems work together to anticipate shocks and protect the most vulnerable. This future best advances the study's five objectives: harnessing technological innovation to transform health care; securing universal and equitable access; strengthening local ownership and capacity; building resilient, prepared health systems; and ensuring that health solutions are safe, affordable and scalable.

To advance progress towards this horizon, the report outlines actions to strengthen systems, capabilities and governance. These include: aligning policies, regulations, infrastructure investment and emergency protocols with a public-purpose mission; reinforcing primary and public health systems, expanding data and digital skills, empowering citizens and supporting local innovators; improving procurement, value chains, digital marketplaces and living labs to

embed openness, resilience and equity in health technologies; advancing trusted research environments, impact assessments and learning loops that turn health data into public value while protecting rights; promoting knowledge-sharing through communities of practice, multi-stakeholder platforms and city networks; and deepening system-wide cooperation through pooled financing, co-governed DPI4H (Digital Public Infrastructure for Health) funds, cross-border crisis arrangements and adaptive frameworks that align incentives and accountability.

Global best practices show that elements of this future already exist: in the Republic of India, the Ayushman Bharat Digital Mission is building national health data rails; in the United Kingdom of Great Britain and Northern Ireland, OpenSAFELY is proving that large-scale research can happen without moving raw data; and in the Republic of Kenya, m-health wallets are demonstrating how digital tools and anticipatory finance can strengthen access and resilience.

Ultimately, health systems that prioritize public purpose, equity and trust – and treat digital infrastructure as a shared asset – are best placed to harness technological transformation for the benefit of society. With strategic foresight, inclusive ecosystems and a mission-led approach, fragmented efforts can be aligned. Together, they can shape health-care futures that are more resilient, more just and genuinely life-improving for all.



1. Introduction to futures thinking and strategic foresight

1.1 Futures thinking and strategic foresight

An approach to navigate uncertainty and shape desired futures

Futures thinking is the practice of exploring how different outcomes might unfold by identifying trends, emerging issues, and critical uncertainties, challenging linear thinking and imagining a range of plausible futures rather than relying solely on past patterns. Strategic foresight is the structured application of this approach to inform present-day decisions. It blends trend analysis with creative exploration, helping us prepare for multiple possibilities, anticipate disruptions, and build more resilient systems.

Together, futures thinking and strategic foresight provide a powerful toolkit for navigating change. Instead of predicting a single outcome, they prompt questions about what could happen, what ecosystems should prepare for, and what kind of future is desired. In doing so, these approaches shift the focus from reacting to events to proactively engaging with the forces shaping tomorrow.

Strategic foresight provides pathways to act intentionally in uncertain environments, equipping institutions, governments, and communities with the agility to adapt and the imagination to innovate. In essence, it is about expanding the field of vision to move forward with purpose, even when the road ahead is unclear.



1.2 The importance of futures thinking

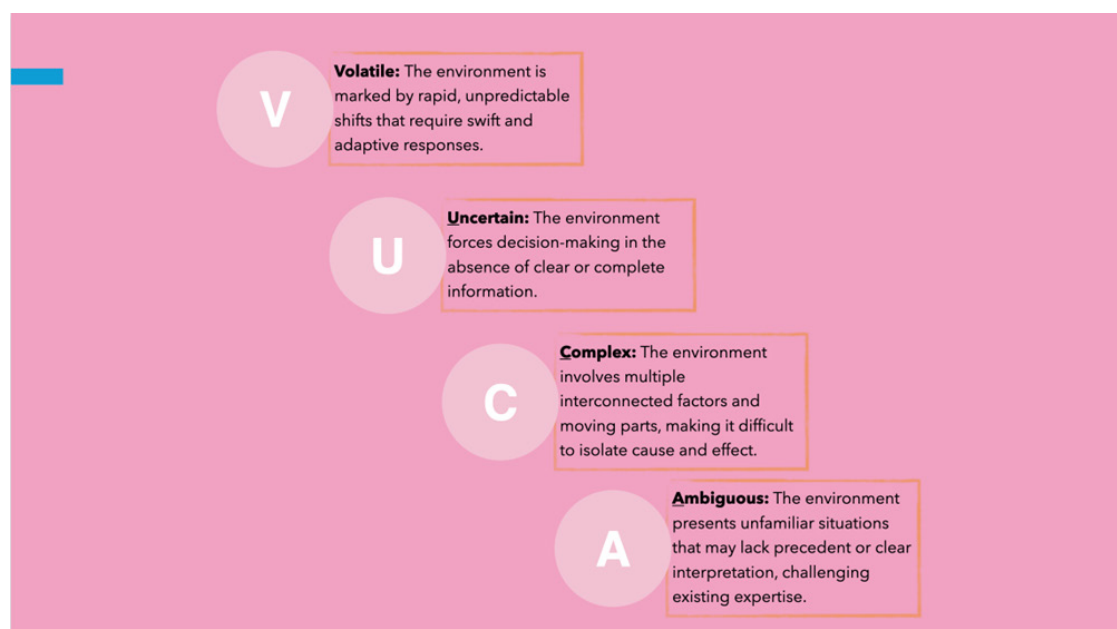
Addressing complexity and disruption in a volatile, digital world: The need for futures thinking

In an era of accelerating technological advancement, climate uncertainty, demographic shifts, and geopolitical turbulence, new ways of thinking are required to confront a volatile, uncertain, complex, and ambiguous (VUCA) environment.

Futures thinking is essential because it shifts the focus from short-term fixes to long-term preparedness, enabling policy-makers, innovators, and communities to anticipate disruptions and take advantage of emerging opportunities. In doing so, futures thinking fosters a mindset of resilience and adaptability, as it is about shaping the desired future and not just focused

on survival. It reflects the need to look beyond immediate pressures and attempts to answer deeper questions about the kind of society being built, who benefits from it, and who could be left behind. In answering these questions, futures thinking becomes an essential compass for navigating uncertainty and an invaluable tool for building more inclusive, sustainable, and forward-looking systems.

Figure 1: VUCA



Source: ITU

Utilizing futures thinking to improve long-term planning

Long-term planning often struggles to keep pace with the rate of change in the modern world. Futures thinking reinvigorates the planning process by anchoring it in possibility rather than assumption. Through structured scenario development, horizon scanning, and the identification of key drivers of change, futures thinking challenges existing mental models and opens new strategic options.

Futures thinking allows organizations and governments to test the resilience of their plans under multiple future conditions. It brings clarity to complex environments by highlighting not just what might happen, but what could be done in response. As a result, decision-makers can allocate resources more effectively, prioritize innovation, and align initiatives with emerging needs.

By integrating futures thinking, planning becomes a dynamic, iterative process that is better equipped to handle shocks, adapt to transitions, and pursue transformative outcomes. Ultimately, it strengthens the ability to act with foresight today to ensure a more equitable tomorrow.

1.3 Introducing the foresight brief series

Helping stakeholders stay ahead of the curve

The foresight brief series is a collection of research reports designed to help ITU Members navigate the uncertainties of an increasingly digital future. It is being developed by the

Innovation and Entrepreneurship Alliance for Digital Development (the Alliance) under the ITU Telecommunication Development Bureau.

Using structured strategic-foresight methodologies and presenting the findings in an accessible format, the series enables stakeholders to stay ahead of the curve by identifying weak signals, analysing trends, and exploring emerging disruptions that may reshape key sectors or focus areas. The briefs present scenario-based insights that impel policy-makers and ecosystem actors to consider multiple plausible futures and design strategies that are resilient, inclusive, and future-ready.

Rather than predicting the future, the series encourages a shift from short-term responses to long-term preparedness. By curating actionable futures intelligence, it empowers Members to make informed decisions in a rapidly evolving environment. The briefs are not meant to be conclusions, but to act as starting points for continued dialogue, collaboration, and development among stakeholders.

In line with these objectives, the briefs provide instructions for stakeholders seeking to move beyond fragmented initiatives towards an integrated vision supported by practical next steps.

Specifically, the briefs:

- illuminate emerging trajectories by mapping the structural trends, weak signals, and wildcard events shaping the topic in focus, informed by desktop research, stakeholder surveys, and expert interviews;
- define desirable futures using scenario thinking to articulate concrete visions for the future that advance the strategic objectives of the brief, while also examining alternative, less desirable, and even wholly undesirable pathways;
- develop strategic options by identifying policy levers, capacity-building measures, and ecosystem-building actions that support progress towards the desired future; and
- equip decision-makers by offering public and private stakeholders, financiers, researchers, innovators, and entrepreneurial support systems a clear roadmap for translating foresight conclusions into coordinated measures.

1.4 The ITU approach to strategic foresight

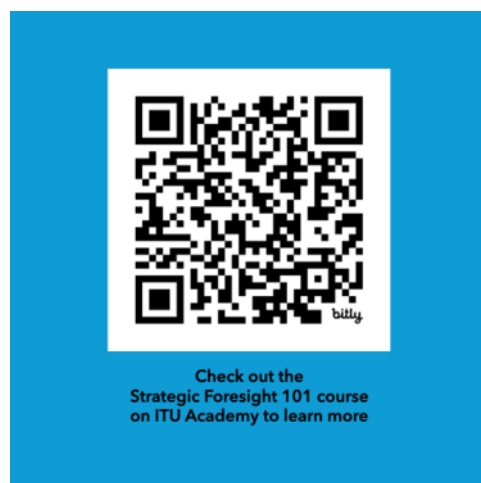
A structured and collaborative methodology to anticipate change

The strategic foresight methodology provides a structured yet flexible approach to help stakeholders anticipate change, navigate uncertainty, and accelerate digital transformation. By integrating systems thinking, design thinking, and futures thinking, the ITU ecosystem-based approach fosters collaboration and co-creation, while remaining aligned with national, regional, and global development goals. This empowers countries and communities to shape inclusive, resilient, and future-ready societies.

The methodology underpinning this foresight brief is drawn from the ITU Playbook on Strategic Foresight, a step-by-step, tool-based guide. The methodology aims to democratize foresight knowledge and practice, making these powerful tools accessible to a wide range of actors.

The basics of this methodology, for a foundational understanding of strategic foresight, are also outlined in a self-paced and free online course titled 'Strategic Foresight 101', available on ITU Academy.

The foresight journey unfolds across several stages. It begins with framing and scanning hundreds of environmental signals and trends to identify drivers of change through desktop research, surveys, interviews with subject-matter experts, and co-creation workshops with ecosystem stakeholders to ensure that diverse perspectives are heard and incorporated. These drivers are then analysed and mapped to assess their potential impact and uncertainty, laying the groundwork for exploring future possibilities. By pairing impactful and uncertain drivers, plausible scenarios are generated to highlight emerging opportunities and challenges. From these, a preferred scenario is chosen and shaped through the creation of a forward-looking action roadmap, which is further reinforced by mechanisms that help keep recommendations responsive, relevant, and managed over time.



The findings of this brief have been validated by the Members of the Innovation Alliance Strategic Foresight Thematic Group, as well as the Digital Innovation Board of the Alliance, to ensure that the findings are rigorous, future-aligned, and actionable for stakeholders.

This ecosystem-driven methodology reflects the principles of the ITU innovation framework, empowering countries and communities to develop inclusive, resilient, and future-ready societies.

Readers can explore other publications from the foresight brief series at bit.ly/itustrategiforesight.

1.5 Objectives of the 'Transforming health care for tomorrow' foresight brief

Unlocking the potential of health care

The future of health care, particularly in developing regions, lies in enhancing quality of life while ensuring equitable, resilient and sustainable systems. As demographic shifts, urbanization and rising disease burdens reshape demand, health care cannot be addressed by fragmented initiatives alone. Instead, a coherent vision needs to integrate innovation, equity and resilience across health systems and communities.

The five interlinked objectives shaping the path towards this goal are:

- technological innovation to transform health care, which entails harnessing emerging technologies to strengthen systems. In turn, this enhances efficiency, expands access, and builds resilience to improve quality of life for all;
- universal and equitable access, ensuring that quality health care is available to all, improving both the length and quality of people's lives;
- local ownership and capacity, empowering national and subnational institutions through financing, authority, skills, and accountability to fulfil their mandates;

- resilient and prepared health systems, which includes building health systems that can recover from shocks, continue to adapt, and innovate in the face of uncertainty; and

safe, affordable, and scalable health solutions that deliver health care that is safe and cost-effective, with broad benefits and mitigated risks.

Figure 2: Interlinked objectives intended to shape development of health care



Source: ITU

By grounding future-oriented analysis in evidence and anchoring recommendations in these objectives, this brief will help stakeholders move from fragmented initiatives to a coherent vision.

1.6 The case for health care

Opportunities and risks in shaping healthier futures

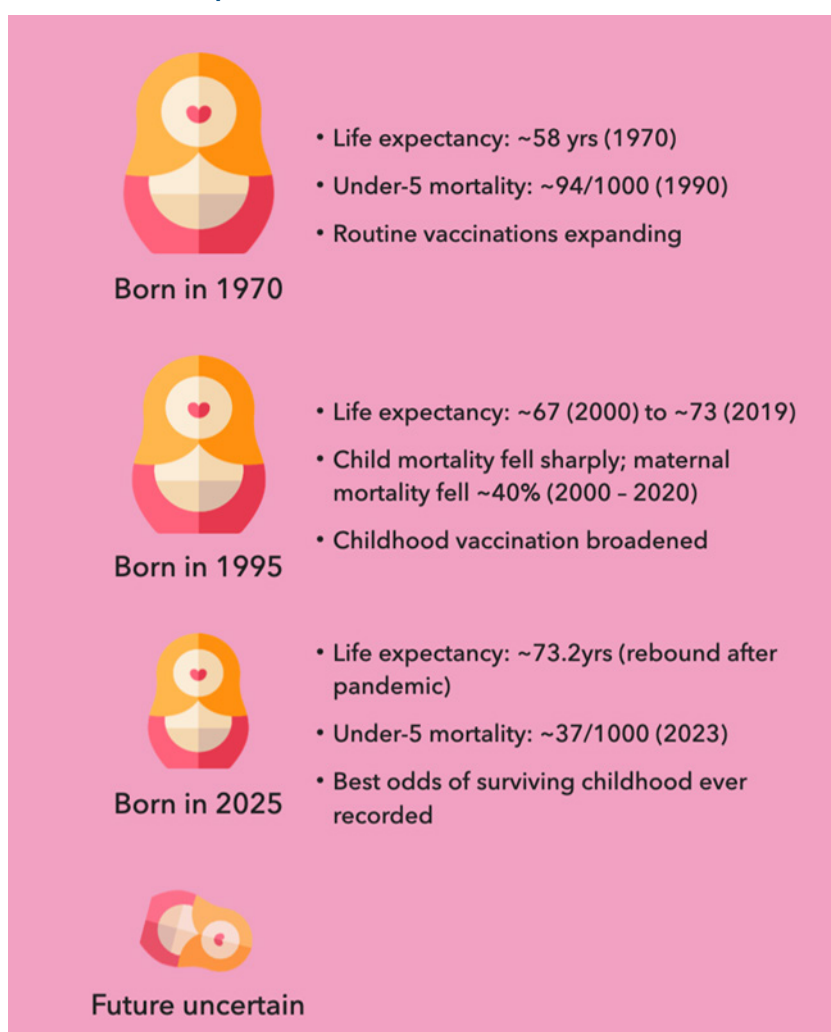
A child born in 2025 has the best odds of surviving childhood ever recorded. If all goes well, they should live at least as long as their parents, and longer than their grandparents (see figure below). However, it should not be assumed that straight trend lines will continue smoothly into the future. The latest reporting on progress towards Goal 3 of the United Nations Sustainable Development Goals indicates that not enough has been done, with progress on certain indicators slowing down, stalling, or even reversing (United Nations Statistics Division, 2024).

Recent shocks, such as COVID-19 or extreme weather events, point to turbulent times ahead. Vaccine hesitancy is a symptom of distrust in health institutions. The burden of noncommunicable disease places a strain on health systems. Newspapers regularly report on mental-health crises. Antimicrobial resistance is no longer a future risk, but a present reality. Out-of-pocket health expenses are increasing in most countries, leading to a rise in catastrophic health expenditure (CHE).

Today's health-care systems aim not only to deliver curative medicine, but also preventive care. For example, lifestyle improvements make a significant contribution to easing the burden of noncommunicable disease. Increasingly, the focus is shifting away from simply living longer (as measured by life expectancy) to also living better (that is to say, living healthier and safer lives). One measure of the disease burden is the quality-adjusted life year (QALY), which combines length of life and quality of life into a single numerical index.

In this context, health care is one of the sectors where digital and frontier technologies have the potential to create significant impact. They can improve reach and access through mobile and telehealth services, drone-enabled delivery and geographic information-system (GIS)-based targeting, enabling health systems to do more with fewer resources, for example through supply

Figure 3: Generational improvements in health outcomes, 1970-2025



Sources: World Bank, UNICEF/UN IGME, WHO, UN DESA, WHO/UNICEF/UNFPA/World Bank/UN DESA

chain optimization, administrative automation and task shifting. Moreover, these technologies can enable capabilities previously not possible, opening new frontiers in genomics and precision medicine.

These benefits are matched by risks at least equal in scale, ranging from threats linked to data protection and cybersecurity – including data breaches, ransomware or violations of privacy - to misinformation and manipulation, bias, discrimination and exclusion, surveillance and coercion. They also encompass challenges to sovereignty, such as over-dependence on platforms, monopolization and concentration of supply chains, interdependence and fragmentation, including data silos, vendor lock-in, brittle integrations and single points of failure, and issues linked to accountability and lack of transparency, including black-box decisions and liability-related issues. To date, the guardrails needed to mitigate most of these risks have been lacking.

The stakes are high. Health care is – or should be – a high-priority sector, where technology creates both significant opportunities and significant risks. Against this background, how can society work towards a preferred future for health care in an uncertain and changing world?



2 Sensing in a volatile, uncertain, complex, and ambiguous world

Identifying signals and emerging trends

This section presents the first step in the strategic foresight process: identifying early signals and emerging trends in the external environment. It begins with scanning the horizon across diverse domains (e.g. social, technological, economic, environmental, political, legal, and ethical) to identify patterns of change and map the underlying forces shaping the future.

This exploratory phase lays the foundation for the foresight process by framing the scope of an inquiry, revealing cross-cutting influences, and highlighting the dominant trends and marginal signals that may point to emerging disruption.



2.1 Exploring signals of change for a health care landscape

Signals are observable events, behaviours, or developments that indicate potential change. While individually they may appear incremental or isolated, collectively they provide early insight into how systems are evolving and where transformation may be gathering momentum. The following signals, mapped across social, technological, economic, environmental, political, legal, and ethical dimensions, highlight patterns that can shape the future landscape of the sector being analysed.

2.1.1 Evolving social landscape

Populations are ageing while fertility rates are declining across much of the world. The World Population Prospects 2024 report published by the United Nations projects a rapid increase

in the share of people aged 65 and over through mid-century, alongside widespread below-replacement fertility (United Nations Department of Economic and Social Affairs, 2024). While many states have rapidly ageing populations, countries in several regions have a disproportionately large proportion of young people, especially in sub-Saharan Africa, where around 60 per cent of the population is under 25; and parts of South Asia and Asia-Pacific, offering the potential for a demographic dividend, as long as job creation and skills development keep pace with population growth (United Nations Department of Economic and Social Affairs, 2024).

Human mobility and urbanization are reshaping exposure to risks and demand for services. The number of international migrants reached approximately 304 million in 2024, with demographic change among the factors contributing to migration (Migration Data Portal, 2025; World Bank, 2023). Climate change is expected to increase internal migration, including rural-to-urban and seasonal migratory flows (World Bank, 2021). Refugee and asylum movements represent a relatively small share of overall human mobility but are highly concentrated along particular corridors, often accompanied by rising anti-immigrant sentiment (OECD, 2024). Meanwhile, nearly 70 per cent of the world's population is projected to live in cities by 2050, compared with just over half today (World Bank, 2024).

More than 90 per cent of global population growth is expected to occur in large cities in developing regions, particularly in Africa. The African continent has recorded an average annual urban growth rate of 3.5 per cent over the past two decades – the fastest rate in the developing world – a trend expected to continue through 2050 (African Union, 2024). By then, the world's largest cities are expected to be concentrated in South Asia and Africa; Delhi is projected to rank at or near the top, alongside Mumbai, Dhaka, Manila, Kinshasa, Jakarta, Kolkata, Lagos, Tokyo and Karachi (Hoornweg & Pope, 2016). Africa's urban population is projected to surpass the combined population of Chinese cities, with rapid urban growth driven by exploding youth populations, in contrast to ageing cities in Europe and high-income Asian economies. For example, in 2024, the median age cohort in Delhi was 25 to 29, compared with 45 to 49 in Tokyo, and 15 to 19 in Kinshasa (Oxford Economics). By contrast, net migration is expected to be the primary driver of population growth in Chinese, European and wealthy Asian cities.

Trust remains fragile globally, and political polarization is deepening. The 2025 Edelman Trust Barometer describes a "crisis of grievance", characterized by waning confidence in leaders and growing acceptance of aggressive political action. Business remains the only institution perceived as both ethical and competent. Inequality is strongly correlated with trust: lower-income groups report significantly lower levels of trust than higher-income groups. A related health-care sector report, the Edelman Trust and Health Report, found that concerns about political interference in medical science exceed those recorded during the COVID-19 pandemic. In the health-care sector, trust remains strongest at the local and interpersonal level: people have greater confidence in their doctors, friends and family, than in leaders (including government and health-care CEOs) and the media.

The Global Risks Report 2025 published by the World Economic Forum identifies misinformation as the most significant immediate global risk. The 2025 Reuters Institute Digital News Report highlighted declining trust in news and a shift towards social and messaging platforms, alongside growing concerns about misinformation (Reuters Institute, 2025). In health care, the Edelman Health Report points to growing trust among young people in online peers with similar conditions and in individual creators with medical training—suggesting that digitally mediated connections may help to rebuild trust among younger populations (Edelman Trust

Barometer, 2025). Conversely, artificial intelligence can further undermine trust through the spread of deepfakes and AI-generated misinformation.

Noncommunicable diseases (NCDs), including cardiovascular disease, cancer, chronic respiratory diseases and diabetes, now account for 74 per cent of global deaths, largely driven by modifiable risk factors such as tobacco use, harmful alcohol consumption, unhealthy diets, physical inactivity and air pollution (WHO, 2025). People are generally living longer, eating better, and suffering less from diseases associated with deprivation. Maternal and infant mortality rates have also fallen. The WHO 2025 update estimates that more than one billion people are living with mental health conditions, and highlights urgent gaps in services. Earlier analyses from the Global Burden of Disease study also found that mental disorders remain among the leading causes of health loss globally, with no overall reduction in their burden since 1990 (GBD Mental Disorders Collaborators, 2019).

Interviews confirmed the importance of user experience, i.e. how people feel about the health-care system, in shaping health-seeking behaviour. For example, in the Republic of South Africa, although medical expertise and clinical capacity to treat tuberculosis are concentrated in the public health sector, people generally report a better user experience in the private sector. There is also a growing emphasis on gender equity, women's health, and broader inclusion, including neurodiversity and physical and learning disabilities.

2.1.2 Evolving technological landscape

An estimated 5.5 billion people (approximately 68 per cent of the global population) were online in 2024, while 96 per cent of the world's population lived within the footprint of a mobile-broadband network (ITU, 2025; GSMA, 2024). However, a substantial usage gap persists: more than 3 billion people do not use available mobile Internet services (GSMA, 2025). Last-mile connectivity options include Wi-Fi/mesh and community networks, point-to-point microwave links, and – where terrain or population density make cables uneconomic – low-Earth-orbit satellite broadband, which is expected to expand further (EY Parthenon, 2025).

ITU data indicate that the global median price of a 2GB mobile-broadband basket fell from 1.5 per cent to 1.3 per cent of gross national income per capita in 2023; the corresponding broadband figure stood at 2.9 per cent, reflecting improvement in affordability, albeit not evenly distributed (ITU, 2023). Wholesale prices are also declining; international internet protocol (IP) transit prices continue to fall, while sustained growth in international bandwidth use is contributing to cheaper connectivity over time (TeleGeography, 2024).

Rapid advances in connectivity and digitalization are enabling the development of frontier technologies including AI, robotics, drones, gene editing, 3D printing, nanotechnology, blockchain and quantum technologies. These technologies can enable better use of resources and enhance existing functions (including through collective intelligence) and create entirely new capabilities, including in health care.

The Australian Strategic Policy Institute's Critical Technology Tracker shows a dramatic shift in research leadership between 2003-2023. During the period 2003-2007, the United States of America led 60 of 64 frontier technologies; by 2019-2023, it only led in seven. Meanwhile, during the same period, the People's Republic of China increased the number of technologies in which it held a research lead from three to 57 of 64 technologies (Leung, Robin & Cave, 2024).

Market power is concentrated among a small number of cross-border platforms that shape data, standards and distribution. United Nations Trade and Development has highlighted the implications of this concentration, including resulting cross-border governance challenges, while economists have noted declining contestability driven by network effects (United Nations Trade and Development, 2021). The World Health Organization (WHO) warns that multimodal AI systems carry risks of bias, hallucination and privacy breaches, and the OECD underscores gaps in privacy and cross-border health data governance (WHO, 2025; OECD, 2025). Health care remains a prime cybertarget, with widespread ransomware attacks and breaches; meanwhile, WHO points out that infodemics have eroded trust since 2023 (American Hospital Association, 2025). Equity concerns also persist: 2.6 billion people remain offline; and women in low- and middle-income countries are around 15 per cent less likely to use mobile Internet (ITU, 2024). Moreover, biases in algorithms and devices – such as racial bias in care-management tools and pulse-oximetry errors – can worsen health outcomes (Obermeyer *et al*, 2019). Innovation is outpacing oversight, underscoring the need for agile, anticipatory governance, regulatory experimentation, adaptive learning and multi-stakeholder approaches.

There are many high-potential technologies for health care. For example:

- AI could be used in diagnostics, triage, administrative tasks and population health analytics, provided it is deployed within strong governance frameworks. The latest guidance from the WHO on generative AI in health sets out high-value uses and guardrails;
- continued reductions in genetic sequencing costs could enable risk stratification, pharmacogenomics and rare disease diagnosis at scale;
- rapid design and development platforms can shorten the path from the design stage to clinical application; their potential extends beyond COVID-19 vaccines to areas such as oncology and RSV;
- technologies such as CRISPR (Clustered Regularly Interspaced Short Palindromic Repeats) offer the potential for curative treatments for monogenic and haematologic disease; the first FDA-approved CRISPR-edited therapies for sickle cell disease were authorized in 2023;
- low-cost, rapid diagnostic technologies could bring testing closer to patients; CRISPR diagnostics are an example of such technology;
- continuous data and virtual care could improve chronic disease management and access;
- approaches such as federated learning or trusted research environments (TREs) are creating opportunities for institutions to learn from data without sharing it; and
- advances in automation are creating opportunities, ranging from automated dispensing to surgical assistance and clinical digital twins.

2.1.3 Evolving economic landscape

Capitalism appears simultaneously resilient and under pressure. The Fortune Global 500 recorded a combined total of USD 41.7 trillion in revenue in 2024 – a record high - and its second-most profitable year on record (USD 2.98 trillion), with firms headquartered on every continent (PR Newswire). At the same time, influential institutions describe a polycrisis,

characterized by widening inequality, fragile social cohesion and weak economic growth (World Bank, 2024). Total global debt reached a record high of more than USD 324 trillion in the first quarter of 2025 (R. Campos, 2025). The United Nations warns that rising debt-servicing costs are crowding out investment in health, education and climate resilience. The pressures are particularly acute for many low- and middle-income countries, where higher interest rates and slow growth are making repayment unsustainable.

Although inflation has eased, prices remain elevated in many economies, with food and energy costs placing a particularly heavy burden on developing countries (United Nations Trade and Development, 2025). Financial protection is also deteriorating: around 2 billion people face hardship because of out-of-pocket health spending, including some 1 billion who incur CHE and around 1.3 billion who are pushed (or pushed further) into poverty by health costs (WHO, 2024).

In 2024, official development assistance fell for the first time in six years, declining by 7.1 per cent to USD 212 billion (OECD, 2025). In 2025, United States development assistance for health fell by more than USD 9 billion year-on-year (a decline of 67 per cent) (Krugman, 2025). A further USD 4-5 billion in congressionally-approved foreign aid was temporarily frozen by the Supreme Court, compounding programme disruptions (Falconer, 2025). The United States' notice to withdraw from WHO (January 2025) delivered a further blow to development funding for health. The World Bank's IDA21 replenishment partially offset some of these shortfalls, mobilizing a record USD 100 billion (leveraged from USD 23.7 billion in pledges); however, the shift points to a greater reliance on concessional lending rather than grant-based financing (World Bank, 2024). In summary, there are fewer grants and more loans being issued.

Global military expenditure reached USD 2.718 trillion in 2024, an increase of 9.4 per cent year-on-year – the steepest rise since the cold war – with defence spending accounting for 2.5 per cent of global GDP (Liang, 2024). Spending on aid is expected to decrease further as European governments divert resources towards defence priorities. In addition, the World Trade Organization (WTO) estimates that as of October 2024, nearly USD 2.94 trillion in world imports was subject to new or continuing restrictions, up from USD 2.48 trillion a year earlier (WTO, 2024). Reciprocal tariffs introduced in 2025 by the United States and others have added to this pressure. United Nations Trade and Development has also documented a shift in supply chains towards friend-shoring and more concentrated trade relationships since 2022 (United Nations Trade and Development, 2024). Although some of these trends have moderated, the underlying fragmentation remains significant.

Global labour markets are cooling from their post-pandemic highs. The International Labour Organization (ILO) estimates that the global unemployment rate remained at around 5.0 per cent in 2024, while job creation is expected to slow in 2025 (OECD, 2025). Although advanced economies continue to show historically low unemployment figures (an OECD average of 4.9 per cent in May 2025), demographic pressures (ageing) and the impact of AI are expected to have an impact on labour markets. In developing economies, labour market conditions vary considerably. In Africa – the world's youngest continent – many countries report single-digit unemployment rates, with Southern Africa as an outlier (in South Africa the unemployment rate stood at 32.9 per cent in the first quarter of 2025), and youth unemployment remains among the highest globally in North Africa (22-23 per cent). The ILO estimates that informal employment in Africa accounts for around 83 per cent of total employment (ILO, 2024), disproportionately affecting women and youth. Globally, the ILO also estimates that in 2025 approximately 262 million young people (equivalent to around 1 in 4) will be not in employment, education or training (NEET).

Alternative forms of finance are expanding, including distributed ledgers, blockchain, cryptocurrencies, alternative currencies and trade denominated in different currencies, alongside the widespread use of mobile money. Alternatives to the dominant economic system are also attracting renewed interest, ranging from degrowth or post-growth models and doughnut/wellbeing/circular economics, to variations on socialist models (democratic, market and green variants) and commons- or solidarity-based approaches (European Environment Agency, 2021; ILO, 2025). These discussions are accompanied by calls for a stronger role for the public sector; examples include mission-oriented public economies, universal basic services, and digital public infrastructure (European Commission, 2025).

In the health-care sector, human capacity remains a fundamental constraint. WHO projects a global shortfall of approximately 11.1 million health workers by 2030, concentrated in low- and lower-middle-income countries. In 2023, 40 per cent and 37 per cent of the projected shortage was in Africa and South-East Asia, respectively. These include nurses and midwives, with a projected shortfall of 4.8 million shortfall by 2030; doctors, surgeons, anaesthetists and obstetricians - with specialist, anaesthetist and obstetrician (SAO) density estimated at approximately 0.7 per 100 000 population in low-income countries, compared with approximately 56.9 per 100 000 in high-income countries; diagnostic professionals, including laboratory and imaging staff, where the estimated shortfall is about 840 000 and nearly half the world's population has either limited or no access to basic diagnostic services (Wireko, 2023). Significant human resources shortages also persist with respect to community health workers and within the mental health workforce, where the global median is approximately 13 workers per 100 000 population, with more severe shortages in low-and middle-income countries.

2.1.4 Evolving environmental landscape

The world is not on track to limit global warming to 1.5°C. The United Nations Environment Programme (UNEP) 2024 Emissions Gap Report shows that current pledges would lead to global warming of around 2.6-3.1°C by 2100, while a 1.5°C pathway requires emissions cuts of 42 per cent by 2030 and 57 per cent by 2035 (United Nations Environment Programme, 2024). The year 2024 was the warmest on record (approximately 1.55°C above pre-industrial levels). Although this represents a temporary exceedance rather than an outright breach of the Paris Agreement's long-term temperature goals, scientists warn that warming beyond 1.5°C could trigger multiple tipping points, including irreversible ice-sheet loss in West Antarctica (World Meteorological Organization, 2025; DIA McKay, 2022).

The findings of the Intergovernmental Panel on Climate Change indicate that extreme heat events are becoming more frequent and intense, while heavy precipitation has likely increased across most land regions (IPCC, 2023). Data indicate that, in 2023, 399 hazard-related events took place, affecting 93.1 million people and causing USD 202.7 billion in losses. Climate change is also linked to increases in vector-borne diseases. Together, these trends underscore the importance of adaptation, early warning systems and disaster risk management.

Although multilateral development banks delivered a record USD 137 billion in climate finance in 2024, of which about 31 per cent was directed towards adaptation, the United Nations Environmental Programme estimates that annual adaptation needs stand at around USD 194-366 billion and warns that progress in closing adaptation gaps remains limited (World Bank, 2025; UNEP, 2024). The agreement and initial operationalization of the Fund for Responding to Loss and Damage at the United Nations Framework Convention on Climate Change COP27-28

was hailed as a win for developing nations; however, as of April 2025, pledges remain far below estimated needs (UNFCCC, 2024).

Air pollution contributes to approximately 7 million premature deaths annually, mainly through respiratory and cardiovascular disease (WHO, 2023). Six of the nine planetary boundaries have now been transgressed, approximately 1 million species face extinction and zoonotic diseases and antimicrobial resistance are spreading – strengthening the case for One Health approaches linking human, animal, plant and environmental health (Richardson *et al*, 2023; IPBES, 2019; Carlson *et al*, 2022; WHO, 2022).

Global primary energy consumption reached a record 620 exajoules in 2023, with fossil fuels still accounting for over 81–82 per cent of the energy mix (DieselNet, 2024). Use of renewable energy continues to expand, accounting for some 32 per cent of global electricity in 2024, while nuclear power continues to account for about 9 per cent (Twiddle S, 2025). However, major access gaps persist. In 2022, an estimated 685 million people lacked access to electricity and 2.1 billion lacked access to clean cooking fuels. Energy efficiency gains slowed to around 1 per cent in 2023–24 – roughly half the pace recorded during 2010–2019, and far below the goal of the International Energy Agency (IEA) to double efficiency this decade (World Bank, 2024).

Facilities are increasingly shifting to hybrid systems – solar photovoltaic generation and battery storage with generator backup or mini-grids to maintain operations during outages and other shocks (Archimi *et al*, 2025). Programmes such as Sustainable Energy for All's Powering Healthcare programme, alongside humanitarian deployments, illustrate this shift. Guidance for hospitals increasingly emphasizes storage-backed renewables as essential for the continuity of operations (Practice Greenhealth, 2025).

JET partnerships in countries such as South Africa, the Republic of Indonesia, the Socialist Republic of Viet Nam, and the Republic of Senegal support transitions away from coal to cleaner energy (DGAP, 2022). However, geopolitical developments can disrupt financing (Cocks *et al*, 2025). Since the energy shocks of 2022, energy security and affordability have re-emerged as central policy and industrial priorities, with the IEA highlighting increased uncertainty over how these priorities will shape national energy strategies (IEA, 2024).

Data centre energy consumption is expected to more than double, to around 945 TWh, by 2030, driven largely by AI. Regulators are increasingly requiring disclosure of energy and water use, as centres consume water directly for cooling. Frontier technologies – from electric vehicle batteries and wind/solar technology components to AI chips – require minerals for which demand is rising rapidly (demand for lithium, for example, increased by 30 per cent in 2023). Mining is geographically concentrated and refining often even more so, giving rise to significant supply-security risks (IEA, 2024).

2.1.5 Evolving political landscape

Political power is diffusing from the G7 core towards a more plural (though not necessarily multilateral) order, as minilateral groupings expand and compete to set rules, alongside sustained demand for forms of coordination outside traditional Western-led structures (Patrick, 2016). Traditional forums are also adapting; for example, in 2023, the African Union joined the G20, giving the continent a permanent voice in a leading forum for macroeconomic and geopolitical coordination (WEF, 2023).

The energy and technology transitions are reshaping value chains: demand for critical minerals is rising rapidly (with lithium demand increasing by 30 per cent in 2023 and nickel/cobalt/graphite demand rising by 8–10 per cent); computing and semiconductors have emerged as new chokepoints; and AI activity is increasingly concentrated among a small number of dominant cloud providers (Vipra and West, 2023; OECD, 2025). Techno-nationalism, is on the rise, supply chains are being re-routed along friend-shored corridors (e.g. Mexico overtook China as the United States' top goods supplier in 2023), intra-bloc ties are tightening and cross-bloc links are dissolving. Analysis by the International Monetary Fund (IMF) indicates that trade and foreign direct investment between opposing geopolitical blocs fell by around 12 per cent and by around 20 per cent more than flows within blocs since 2022, pointing to ongoing geo-economic fragmentation (Gopinath *et al*, 2024).

Universal rulemaking mechanisms are stalling, prompting countries to develop workarounds, including arrangements to bypass the WTO Appellate Body's dispute settlement function (Le Poidevin, 2025). In the absence of global rules, coalitions and individual jurisdictions are exporting their own rules, with standards developed in one market influencing practices beyond it. Examples include the European Union's Artificial Intelligence Act providing an AI governance model; the European Union Carbon Border Adjustment Mechanism, which extends climate-related rules to imports; the partnership between the United States and the United Kingdom on AI safety and testing; and the United States–European Union Trade and Technology Council, which promotes interoperable principles and codes for developers (European Commission, 2024; European Commission, 2023; Shepardson, 2024; United States Trade Representative, 2024). China is also exporting technical standards through the Digital Silk Road, and the Association of Southeast Asian Nations (ASEAN) has developed an AI governance guide. These initiatives are leading to the creation of de facto standards beyond national and regional borders. The multilateral system is not disappearing but becoming weaker and more fragmented; global rules are increasingly shaped through minilateral groupings and rule exporters, and arbitrated through stopgap mechanisms rather than a single, universal system.

Global defence spending reached a record USD 2.718 trillion in 2024, an increase of 9.4 per cent, or equivalent to 2.5 per cent of GDP. This is the sharpest annual rise since the cold war (Stockholm International Peace Research Institute, 2025). Borders and battlefields are hardening, with the European Union's Frontex corps planning to expand to 10 000 personnel by 2027 and state-based conflicts reaching their highest count since 1946 (Frontex, 2025; Uppsala University, 2025). Security alliances are widening too, as both NATO and the Shanghai Cooperation Organisation expanded in 2024.

Local authorities are essential actors in the fields of climate adaptation and health care. The United Nations Office for Disaster Risk Reduction (UNDRR) describes cities as being on the front lines of climate adaptation, with 110 countries reporting local disaster risk reduction strategies aligned with national plans (Pruksapong, 2025; UNDRR, 2025). In the field of health care, delivery is anchored in primary health care, bringing services closer to people's everyday environments. Strong PHC systems are capable of meeting 80–90 per cent of people's lifetime health needs (WHO, 2025).

Cities are moving beyond service delivery to engage in diplomacy. Mayors now participate in high-level forums through the Urban20 initiative, which coordinates common city positions and brings them into G20 deliberations (Urban20). Transnational networks turn these collective voices into de facto rules and pooled climate action: the C40 Cities network brings together nearly 100 member cities, representing some 582 million people and approximately one-fifth

of the global economy, while the Global Covenant of Mayors connects more than 12 500 cities around shared targets and reporting. Beyond climate, the United Nations 2024 Global Compact for Migration recognizes the Mayors Migration Council as a key partner, reflecting the fact that cities increasingly shape global governance rather than simply implementing decisions and rules developed elsewhere.

The Cities Coalition for Digital Rights, launched by Amsterdam, Barcelona and New York City, sets out shared principles that many municipalities use to steer AI and data policy. Eurocities promotes a people-centred AI framework for urban governance; Dubai has issued AI Ethics Principles and Guidelines; Mexico City's INFO CDMX (Instituto de Transparencia, Acceso a la Información Pública, Protección de Datos Personales y Rendición de Cuentas de la Ciudad de México) has advanced a bill regulating AI use in the city's public administration; and Jakarta's Satu Data regulation formalizes city-level data governance that supports AI-enabled services.

Public trust and institutional legitimacy are under pressure. The 2025 Edelman Trust Barometer reported rising grievance and low confidence in government. Multilateral rulemaking is also becoming more fragmented; WTO dispute settlement remains constrained despite limited progress at the 13th WTO Ministerial Conference and, in Our Common Agenda, the United Nations has explicitly called for renewed trust in multilateralism. As formal mechanisms weaken or leave gaps, private and para-public actors increasingly set de facto rules: platform co-regulation and company policies now shape online speech and cross-border data flows.

2.1.6 Evolving legal landscape

Rules are becoming more fragmented but with a broader reach. The General Data Protection Regulation (GDPR) expressly applies to non-European Union firms that offer services to, or monitor, individuals in the European Union (Article 3); the Chinese Government's generative-AI regulations require providers offering generative-AI services to the public to meet filing and security assessment requirements – creating de facto compliance export obligations for providers serving users in China. Meanwhile, the United States is extending its extraterritorial reach via advanced-chip export controls and proposed Know Your Cloud Customer requirements for infrastructure-as-a-service providers (Federal Register, 2024).

The European Health Data Space has established European Union-wide rules for primary and secondary health data use and interoperability, while the NIS2 Directive strengthens security obligations for health as critical infrastructure. The Indian Digital Personal Data Protection Act of 2023 and the Brazilian Data Protection Law establish horizontal data requirements that health-sector and digital health providers must meet.

Regulators are shifting away from principles towards binding requirements. WHO has issued AI ethics and governance guidance for large multimodal models, based on guidance published in 2021 on ethics and governance of AI for health (WHO, 2025). The European Union's Artificial Intelligence Act classifies most medical AI as high-risk, and sets out obligations for both service providers and users. Regulators are also beginning to address the iterative nature of AI-enabled technologies: the United States Food and Drug Administration has finalized guidance on predetermined change control plans, allowing AI-enabled devices to undergo updates within a pre-cleared safety framework (United States Food and Drug Administration, 2025). In Singapore, the Health Sciences Authority (HSA) operates a lifecycle-based regulatory regime for software and AI-enabled medical devices (HSA, 2024).

To keep pace with fast-moving technologies, governments are using sandboxes and evolving rules. The OECD now treats regulatory experimentation as part of a core toolkit; in the United Kingdom, the Information Commissioner's Office (ICO) operates a data-protection sandbox.

To tackle digital bottlenecks affecting health-tech markets, the European Union has begun enforcing the Digital Markets Act, including early non-compliance decisions and fines for Apple and Meta (European Commission, 2025). In India, proceedings before the Competition Commission and National Company Law Appellate Tribunal cases continue to challenge aspects of Google's mobile ecosystem (Economic Times, 2025). Nevertheless, key frameworks still need to be implemented at the national level and transposed into national law, and many sectors – including health care – are struggling to meet NIS2 requirements. Public confidence reflects this implementation gap: over one-third of people surveyed reported limited confidence in their government's ability to regulate new technology effectively (OECD, 2025).

Many low- and middle-income countries are borrowing from the European Union playbook, in part because multinationals already comply with regulatory approaches developed by major markets. By early 2025, 36–39 of 55 African states had enacted data-protection laws, and the African Union Convention on Cyber security and Personal Data Protection (Malabo Convention) had entered into force, creating a continental framework for privacy and cybersecurity. The growing use of the GDPR as a de facto reference point, including outside of Europe, illustrates how large blocs can shape regulatory practices beyond their borders.

Regions are developing their own regulatory frameworks: the AI Governance Guide published by the Association of Southeast Asian Nations (ASEAN), which was expanded in 2024–25, provides common principles for public and private actors. In the field of health, the African Medicines Agency in Kigali is driving regulatory convergence across the continent.

Regulatory decisions by major blocs have global impacts. The EU-US Data Privacy Framework provides a legal basis for transatlantic data transfers (Court of Justice of the European Union, 2025). The Brazilian data protection authority, ANPD, has demonstrated assertive enforcement by ordering Meta to suspend the use of Brazilians' data to train its AI models (Brazilian Ministry of Justice, 2024). However, many jurisdictions struggle to meet new baseline requirements, such as those under NIS2, illustrating that technical capacity – not only the adoption of laws – can be a binding constraint.

Large jurisdictions (such as the European Union, the United States, or China) and are using tools such as privacy rules, AI regulations and export controls to export compliance globally. Major emerging economies are also developing and enforcing rules of their own. For example, the Digital Personal Data Protection Act (2023) in India and the LGPD (Lei Geral de Proteção de Dados) in Brazil (the latter enforced by the Autoridade Nacional de Proteção de Dados/ANPD) illustrate this growing role.

Rulemaking is advancing rapidly, but implementation capacity and interoperability remain uneven. Continued hybrid governance is likely to persist: countries may selectively align with major-bloc rules to maintain market access, while regional frameworks promote convergence to build capacity, rather than a single global rulebook.

2.1.7 Evolving ethical landscape

Inequality remains a major source of tension within and between countries. In 2020, after two decades of convergence, the gap between the richest and poorest countries began to widen again (UNDP, 2024). The World Inequality Lab argues that, by 2050, income distribution within countries could shape global inequality more than differences in economic growth between countries (Fauvel, 2024). Wealth is also becoming more concentrated: in India, the richest 1 per cent holds around 40 per cent of the wealth (2022–23), with the same pattern echoed elsewhere. Billionaire wealth is increasing rapidly while median fortunes remain stagnant; Oxfam estimates that billionaire wealth grew by around USD 2 trillion in 2024, or the equivalent of roughly four new billionaires per week (Oxfam, 2025).

Health care reflects these wider inequalities: socioeconomic disadvantage affects health outcomes (including poverty and nutritional deficiencies), gender gaps persist and access to health services varies between urban and rural areas, and between public and private systems. Digital inequality mirrors these divides. The CEOs of major technology and pharmaceutical firms count among the world's richest individuals. While philanthropy remains a significant force (for example, the Gates Foundation is the biggest philanthropic donor to WHO), demands for adaptation and equitable development increasingly emphasize distributive justice approaches (such as the Fund for Responding to Loss and Damage and energy transition financing) over charity.

Corruption, conflicts of interest and weak accountability can undermine institutional legitimacy and service delivery. Fraud and poor oversight erode trust in public institutions and weaken their ability to implement policies effectively. In health-care and technology governance, such lapses reduce effectiveness and reinforce public scepticism. When people are stressed, their response to the stressed other is divided between control and care, as reflected in metaphors such as “higher walls versus longer tables” and in noticeable shifts (e.g. increasing defence spending while shrinking aid budgets).

Frontier technologies raise wide-ranging ethical issues, including AI bias; data and intellectual-property ownership; privacy, confidentiality and consent; competition and antitrust; sovereignty and growing private sector power; misinformation and truth; liability of machines versus humans; and deeper questions about work, the value of human life, consciousness and intelligence. While these concerns may appear philosophical, they have direct implications for health-care systems.

An emphasis on individual self-realization – linked to neoliberal norms and influencer culture – contrasts with collectivist traditions found in parts of Asia and Africa. Concepts such as Ubuntu (often described as the philosophy of “I am because we are”) emphasize deep interconnectedness. These differing orientations shape social cohesion, perceptions of individual and collective responsibility, and approaches to well-being.

Although the pursuit of more and faster remains embedded in consumerist economies, a growing number of counter-movements are challenging this approach. Minimalist and low-effort lifestyles, the *tang ping*, or lying flat, social movement in China, four-day work weeks, and Generation Z's focus on balance are all examples of resistance to intensive work schedules and social pressure (Banfield-Nwachi, 2023). These shifts affect productivity, norms and health behaviours, reflecting changing attitudes towards consumption and well-being.

A perceived loss of coherence – a sense that there is no single story to explain the world – combined with a weaker perceived link between effort and reward, has been associated with two seemingly opposing trends: the pursuit of chance (through maximum risk-taking, dopamine-seeking behaviours and sports betting) and a renewed search for meaning and purpose (Bina, 2025).

Diversity, equity and inclusion (DEI) policies remain contested. Many organizations and governments promote DEI as a means of supporting innovation and fairness (McKinsey & Company, 2023). At the same time, resistance in some contexts – often centred on perceived overreach or cultural misalignment – reflects the continuing debate concerning how diversity should be embedded as a societal norm.

Visions of the future vary widely. Dystopian scenarios, ranging from societal collapse and elite bunkers to the mainstreaming of prepping culture, exist alongside more optimistic ones, such as solarpunk's sustainable, community-led futures. These cultural and political narratives shape people's expectations and fears, as well as the futures they strive to build or resist. As Meta's Director of Engineering, Saranyan Vignanam, observes, "different cultures dream and nightmare so differently about our algorithmic future" (Vignanam S, 2025).



3 Analysing and refining key drivers of change

This section explores the second phase of the foresight process: analysing and refining drivers of change. Building on the insights derived from the previous phase, key drivers are identified and assessed based on their potential impact on the future and the degree of uncertainty surrounding their realization. Efforts are also made to look for weak signals, which are early, often ambiguous signs of emerging change that may evolve into significant drivers over time.



3.1 Drivers and critical forces influencing future evolution of health care

Drivers shaping the future of health care

The future of health care is being shaped by a set of powerful drivers, each playing a vital role in influencing how the landscapes will evolve.

Drivers are key forces or underlying factors that influence or shape change within a system. They often interact and evolve over time, shaping future scenarios. While these forces present both opportunities and challenges, their levels of impact and certainty vary. Together, however, they offer a composite view of the transformations ahead—across social dynamics, economic shifts, technological advances, environmental imperatives and institutional reforms.

The 12 drivers identified and presented on this page reflect the most influential forces likely to shape the trajectory of the health-care landscape globally. A shift in any one of these could fundamentally redirect the pathway of health-care evolution.

Table 1: Drivers shaping the future of the health care landscape

Driver	Impact	Uncertainty
Demography	High	Low
A planet under stress	High	Low
Diffusion of technology benefits	High	High
Mitigation of technology risks	High	High
Public sector capacity	High	High
Trust in public institutions	High	High
Adaptation capacity	High	High
Health financing	High	High
Economic paradigms	High	High
Response to the stressed other	High	High
Coherence and effectiveness of global rules	High	Medium
Connectivity and digital infrastructure	High	Medium

3.2 Drivers

Understanding the impact and uncertainties surrounding drivers

Demography

Demographic shifts are a high-impact, low-uncertainty driver. Across much of the world, populations are expected to continue to age as fertility rates decline, while sub-Saharan Africa and parts of South Asia and Asia-Pacific will retain large, youthful populations. Climate instability will drive migration, primarily within countries through rural-to-urban and seasonal movement. Urbanization will also continue, with about 70 per cent of the global population expected to live in cities by 2050; the largest cities will likely be concentrated in South Asia and Africa. Refugee and asylum migration flows will persist and, although they will account for a small share of overall migration, will be concentrated along specific corridors. The research therefore treats these demographic shifts as relatively certain trends that will inform every scenario produced.

A planet under stress

A planet affected by climate change is a high-impact, low-uncertainty driver. The world is no longer on track to limit warming to 1.5°C, and the window for changing course sufficiently has largely closed. Current pledges and policies point to 2.6°C or more of warming by 2100. Warming is already triggering climate tipping points, while extreme weather is becoming more frequent. Other environmental pressures include pollution, biodiversity loss, and the crossing of planetary boundaries, such as disruption of the nitrogen cycle. Mitigation measures remain essential, but these trends show that adapting to a stressed planet will also be critical. This certain trend will influence every scenario produced.

Diffusion of technology benefits

The diffusion of technology benefits is a high-impact, high-uncertainty driver. Rapidly emerging technologies are advancing on the back of expanding connectivity and digitalization. Many of these frontier technologies could deliver a significant positive impacts, including in the health-care sector. To date, however, access to, uptake of, and use of frontier technologies have been highly unequal. Looking ahead, it remains uncertain whether the benefits of these technologies will be widely shared or concentrated among elites. Different levers can shape different outcomes, providing stakeholders with agency over this driver. Given that equity and access are key objectives of the study, it is therefore an important driver to consider.

Mitigation of technology risks

Technological risk mitigation is a high-impact, high-uncertainty driver. The potential benefits of new technologies are matched by risks of comparable scale. At present, safeguards remain insufficient. Technologies are spreading faster than many governments can regulate them. Moreover, market power has become concentrated among a small number of cross-border platforms, giving major technology players excessively significant influence over data, standards and distribution. These dynamics require new approaches to governance and regulation. It remains unclear whether these evolving risks can be effectively mitigated as technologies continue to develop. Embedded within these tech-related trends are questions related to the influence of the private sector and public trust in technology.

Public sector capacity

Public sector capacity is a high-impact, high-uncertainty driver. Public sector capacity refers to whether (or not) national and subnational institutions are committed and have the necessary financing, authority, skills and responsibility to fulfil their mandates. This differs widely by country, city and institution. The public sector has a key role to play in delivering public goods. Health care is at least partly a public good, particularly in areas such as public health and communicable disease control. Some argue that, ideally, a larger share of health care should be delivered by the public sector, as reflected in calls for universal basic services. In addition to delivering services, governments regulate health care and shape health policy, and the public sector also has a role to play in creating an enabling environment for tech innovation, while mitigating associated risks. Governments themselves are also users of technology. More broadly, there are growing calls for countries' basic digital infrastructure backbone to be considered a public good, as reflected in discussions around digital public infrastructure.

Trust in public institutions

Trust in public institutions is a high-impact, high-uncertainty driver. It is regarded as distinct from public sector capacity (as, for example, the public might trust an institution with low capacity). Moreover, trust could be misplaced (for example, an institution could be trustworthy but mistrusted by the public, or not be trustworthy but enjoy public trust). (Dis)trust emerged as a key theme in our scanning: the 2025 Edelman Trust Barometer describes a "crisis of grievance", with waning faith in leaders. There is also a strong correlation between trust and equality: people with low incomes are generally less trusting than their higher-income counterparts. Globally, however, levels of trust vary widely. For example, the 2024 Ibrahim Index of African Governance identified high levels of trust in the United Republic of Tanzania, a lower-middle-income country.

Trust is also closely related to misinformation, an issue that the World Economic Forum's Global Risk Report describes as the biggest immediate- and short-term risk facing the world in 2025, and one that has a significant impact on health-care.

Adaptation capacity

Adaptation capacity is a high-impact, high-uncertainty driver. Intensifying environmental stress requires adaptation measures, as well as well-functioning early-warning and disaster risk management systems. It is uncertain whether everyone – including in the developing world – will have the capacity and financing to adapt and respond effectively. Some of the most severe impacts of global warming will be felt in areas that are the least prepared (and have contributed the least to climate change). As things stand, climate finance, including adaptation finance and the Fund for Responding to Loss and Damage, remains insufficient to match the scale of need.

Health financing

Health financing is a high-impact, high-uncertainty driver. It is a key determinant of health system capacity, closely linked to universal and equitable access, and to affordability of care – a core theme in our scanning. Health financing includes public financing (including public sector budgets), as well as private and development finance. It can either be sufficient, pooled and predictable, or insufficient and fragmented.

Economic paradigms

Economic paradigms are a high-impact, high-uncertainty driver. Until relatively recently, there was a widespread feeling that it was easier to imagine the end of the world than the end of capitalism

(captured in the acronym TINA, or “there is no alternative”). Today, there is greater openness to alternative economic paradigms. These range from post-growth models centred on planetary boundaries, well-being or sufficiency (such as Thailand's sufficiency economy), to approaches focused on reviving state capacity (including mission-oriented public economies and digital public infrastructure), and models that seek to shift value creation and coordination away from private capital to shared ownership and governance (for example, data trusts and commons). Other alternative paradigms aim to decouple basic security from wage volatility and market cycles (for example by redistributing cash or services through universal basic services or income). Still others prioritize local resilience, through initiatives such as local energy commons, circular economies and right-to-repair frameworks, or simply by reforming markets to ensure broader prosperity (for example through antitrust measures or actions to reduce bottlenecks). Although there are indications that growth-first, market-maximizing capitalism is deeply entrenched, there is also evidence that this model is under strain or in crisis. While the ultimate form and viability of these alternative paradigms remains unclear, it is worth considering where some of these other paths may lead.

Response to the stressed other

Response to the stressed other is a high-impact, high-uncertainty driver. As people come under stress, how do they respond to others who are themselves under pressure? This driver explores the concept of control versus care, initially framed as higher walls versus longer tables, or a

scenario where defence spending increases as aid budgets shrink. However, it should not be understood as a simple framing of good versus bad, and will further evolve as the study develops.

Coherence and effectiveness of global rules

The coherence and effectiveness of global rules is a high-impact, medium-uncertainty driver. The multilateral system is unlikely to disappear, but it is becoming weaker and more fragmented. In the medium-term, global rules are likely to be increasingly shaped by minilateral groupings and rule exporters.

Connectivity and digital infrastructure

Connectivity and digital infrastructure is a high-impact, medium-uncertainty driver. Digital connectivity has expanded rapidly, while the cost of access has generally declined. Although there is a medium level of uncertainty around these trends – for example, coverage, affordability and uptake remain uneven – it is assumed that connectivity will continue to improve. However, the goal posts for connectivity continue to shift. While a dial-up/3G connection may once have been sufficient, newer technologies increasingly require 5G/6G. In addition, large data centres required for technological applications are concentrated in a handful of countries. Finally, benefiting from frontier technologies such as AI increasingly depends on a digital infrastructure backbone, including digital identity systems, payment rails, secure data exchange and cybersecurity.

3.3 Weak signals with disruptive potential

Potential disruptors that could redefine the sector

Often overlooked or underestimated, weak signals are unpredictable forces that can either catalyse or hinder the evolution of systems. About 20 such signals were identified, of which five that add nuance and sometimes unpredictability to our scenarios were prioritized.

Techno-feudalism

This describes an emerging order where value and power are concentrated in a handful of digital platforms that own the digital infrastructure underpinning everyday life (e.g. cloud services, data, logistics, and payments) while everyone else operates more like a tenant, paying for access. In health care, weak signals include the dominance of Big Tech-run health clouds (e.g. Amazon, Microsoft, Google, Oracle), proprietary wearables and applications that mediate access to services, and data-driven subscription models that resemble rent extraction more than conventional markets.

Drugs that short the desire circuit

GLP-1 diabetes drugs (such as Ozempic) work by dampening dopaminergic reward loops linked to hunger, with emerging research indicating that their impact extends beyond food to other forms of reward-seeking behaviour, including alcohol and nicotine consumption, and impulse spending. If a sizeable share of society experiences a reduction in such appetites, there could be less demand for ultra-processed foods, alcohol and snack foods, accompanied

by a drop in rates of noncommunicable diseases. Given that consumerism is driven by desire, such a future could contribute to a shift away from a growth-first, market-maximizing economic paradigm. Other spillover effects could include new norms around body image, as well as positive environmental impacts owing to reduced consumption. However, there are counter-risks and uncertainties, including inequitable access, supply volatility and unknown long-term effects on motivation and fertility.

Super-ageing

This is a future where scientific advances successfully extend healthy human lifespans by decades, with longevity interventions moving from fringe labs into mainstream clinical practice. Such a transformation could reshape society: retirement ages could be extended, family structures could span five or six living generations, and political debates could increasingly centre on distributing the costs and benefits of longer lives. Entire industries – from housing to insurance – would need to adapt to serve populations of centenarians. Health systems would be required to integrate longevity medicine as a core service, balancing prevention, equity and the ethical issues associated with extending life itself. In a negative wildcard scenario, the advantages of super-ageing (including both longer and healthier lives) benefit primarily a small number of privileged groups.

A jobless future

This is a world where automation outpaces job creation, paid employment is scarce and income becomes decoupled from employment (Bina, 2025). This transition could create significant disruption in the short- to medium-term: small businesses could fail, tax bases could collapse and employer-linked benefits could vanish, with an impact on personal identity. Potential consequences include increases in debt defaults, evictions, food insecurity, mental-health crises, stress, and political turbulence, alongside growing geographic divides as economic opportunity becomes more concentrated. In the field of health care, coverage gaps would likely widen, emergency rooms and pharmacies experience increased demand, rates of noncommunicable diseases would rise, adherence to chronic care regimes would decrease, and health-care staff burnout rates would increase. Over time, societies may find ways to reorganize themselves. In the medium- to long-term, the benefits of such a transition would hinge on whether societies are able to create dignified roles outside of paid work and establish universal access to basic services quickly enough.

Geo-engineering

Interest in geo-engineering to artificially cool the planet – for example through stratospheric aerosol injection – reflects a turn towards large-scale technological solutions to address environmental stress (UN Scientific Advisory Board, 2025). Proponents argue that such interventions could buy time for deeper structural changes. While cooling might ease some direct health impacts associated with extreme heat and vector-borne diseases, it would introduce new and poorly understood risks. Critics point out that large-scale geo-engineering risks entrenching a growth-first, techno-managerial paradigm, delaying transitions towards more equitable, regenerative socio-economic models while creating new layers of health vulnerability (such as increases in respiratory and cardiovascular diseases, changes in ultraviolet ray exposure, and disruptions to precipitation patterns that affect food and water security).



4 Visualizing possible future scenarios

Possible transformational scenarios

This section presents the process of envisioning a diverse set of possible futures by examining how selected drivers of change might interact and intersect over time. Through structured exploration, several scenarios have been developed, each of which reflects a different combination of risks, opportunities, and system dynamics.

These scenarios are then studied to understand their implications, including their potential strengths, vulnerabilities, and cascade effects on a possible future health care landscape.



4.1 Key drivers for exploring potential future scenarios

Tensions expected to critically influence system dynamics over time

To explore how the health care landscape around the world might unfold, particularly in developing countries, this foresight study began by mapping more than 200 signals and identifying the key drivers of change (i.e. forces expected to significantly influence system dynamics over time) indicated in the previous section. From this broader set of 12 drivers, eight high-impact and high-uncertainty drivers were shortlisted.

These shortlisted drivers were then paired to reflect their interconnectedness, including any critical tensions and/or trade-offs likely to emerge in the future. The mapped pairs represent a distinct lens through which the future could evolve, producing a contrasting set of future scenarios. For this study, the following pairings were explored—where each mega-driver reflects a key axis of uncertainty and opportunity.

Table 2: Drivers selected to explore the interplay shaping scenario development

Driver	Impact	Uncertainty
Diffusion of technology benefits	High	High
Mitigating the risks associated with technology	High	High
Public sector capacity	High	High
Trust in public institutions	High	High
Adaptation capacity	High	High
Health financing	High	High
Economic paradigms	High	High
Response to the stressed other	High	High

Diffusion of technology benefits × mitigation of risks associated with technology: Highlights the tension between how widely technology's gains are distributed and how effectively safeguards are applied to ensure safe, equitable use.

Public sector capacity + adaptation capacity × health financing Reveals the interplay between the state's ability and legitimacy to deliver services with capacity for climate adaptation and the financial resilience needed to sustain reliable health systems.

Trust in public institutions × response to the stressed other: Underscores the contrast between societal institutional trust on one hand, and the tendency towards supportive or coercive responses to vulnerable groups under pressure on the other.

Public sector capacity × economic paradigms: Highlights how the strength of public institutions shapes—and is shaped by—the dominant economic logic guiding health innovation, investment, and public-purpose outcomes.

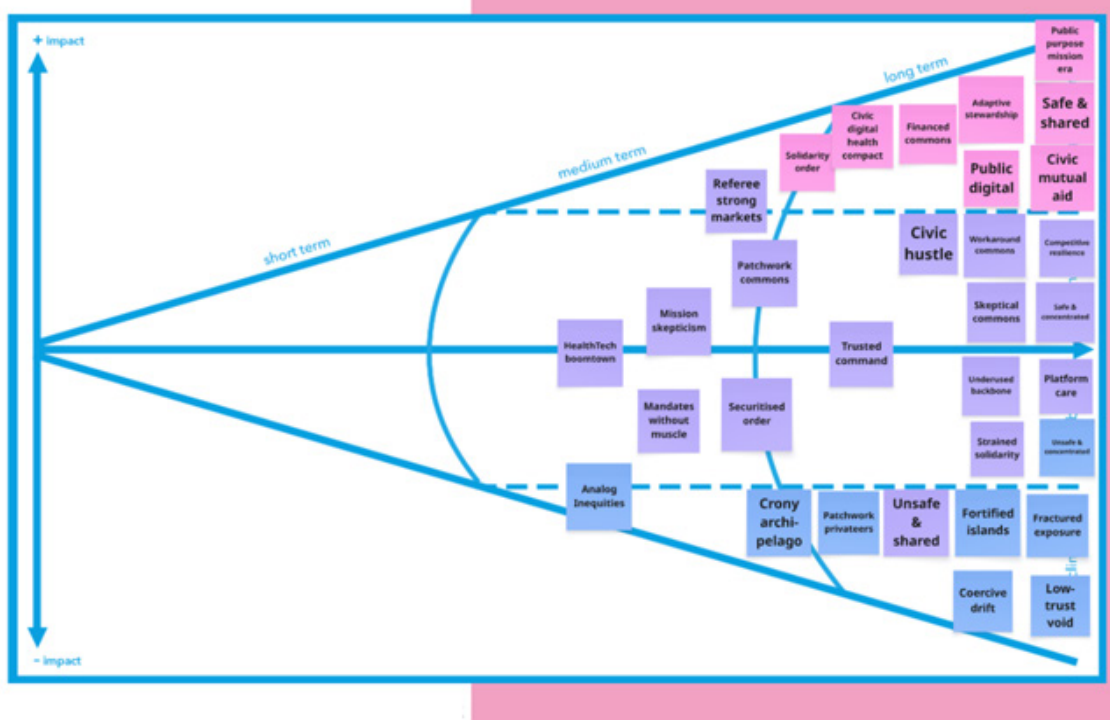
4.2 Exploring a range of scenarios

Potential directions for the future landscape of health care

The future of health care is explored through a set of diverse scenarios, each shaped by different combinations of critical drivers. These plausible futures span a wide spectrum—from optimistic and transformative possibilities to more challenging or status-quo trajectories—illustrating potential directions ranging from fragmentation to alignment, and from scarcity to innovation. Together, they present a range of potential trajectories, shaped by varying levels of impact and uncertainty linked to the drivers most relevant to the future of health care. The ITU Playbook on Strategic Foresight (see image on this page) uses an adapted futures cone canvas to map out how these different scenarios could play out over time.

The timeline for realizing these scenarios may vary from the short (0-5 years) to the long term (15-20 years), depending on how quickly uncertainties unfold and how system-level responses develop. In addition to these core scenarios, a wildcard scenario was also explored to consider potential high-impact disruptions to current trajectories.

Figure 4: Potential trajectories and outcomes



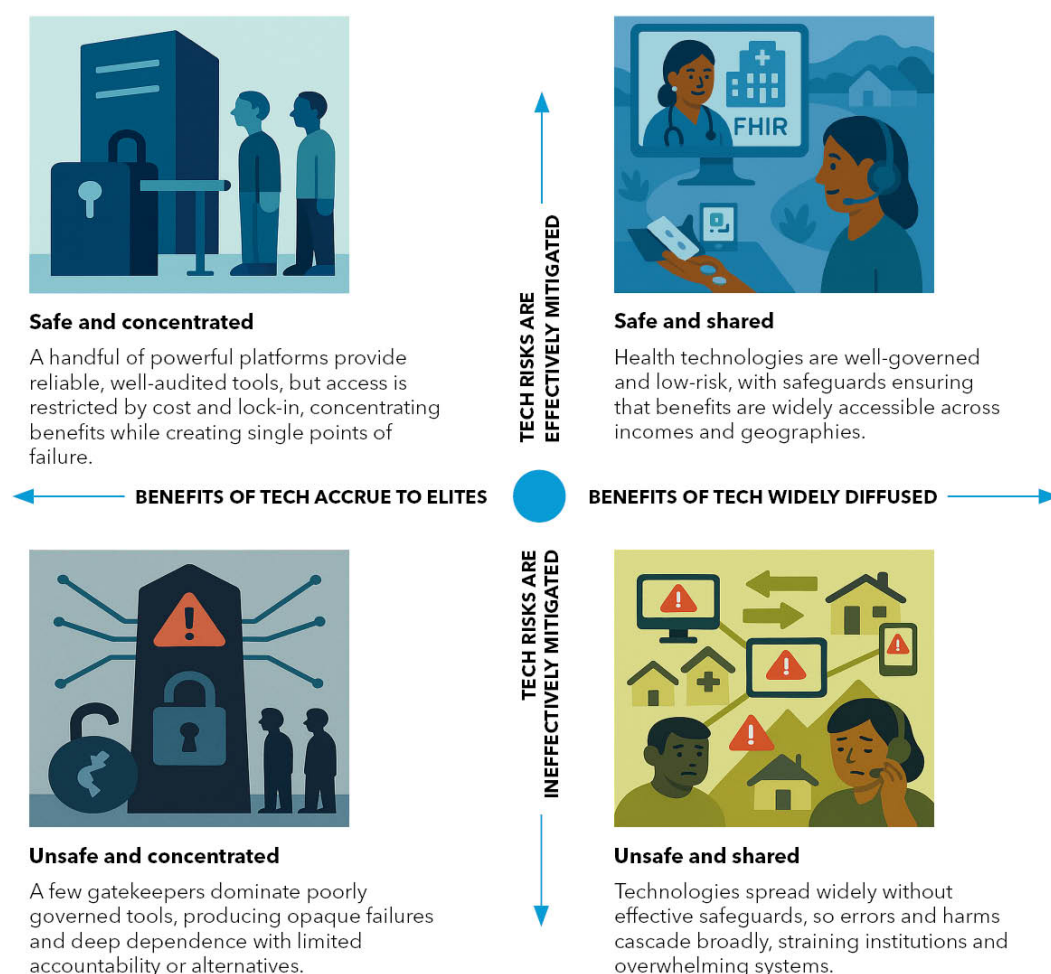
Source: ITU

Within each set of future scenarios presented in the following pages, the scenarios in red represent a path of decline, while those in green reflect a more transformative direction. Different countries may find themselves aligned with different scenario trajectories, and they are encouraged to reflect on their own positions and consider how they might move towards more desirable futures.

4.3 Envisioning scenarios through the interplay of key drivers

The following scenarios have been developed by assessing the interplay between key drivers. The four scenario matrices below illustrate how different combinations of these drivers give rise to distinct yet plausible futures, highlighting the strategic choices and systemic conditions that may shape long-term trajectories.

Figure 5: Navigating diffusion of technology benefits x mitigation of risks associated with technology



Source: ITU

This scenario set applies a technology-governance and equity lens, mapping how widely technology benefits are distributed—from broad to narrow diffusion— against how safe and accountable systems are, depending on whether they have strong or weak guardrails. These dynamics produce four possible outcomes: unsafe and shared, where access to technology is inclusive but rollouts are risky; unsafe and concentrated, where access is both restricted and risky; safe and concentrated, where access is tightly governed but paywalled; and safe and shared, the preferred future scenario.

This framing reflects current digital health realities, where markets are dominated by a handful of large platforms. For example, Epic holds around 42 per cent of the acute-care electronic health records market in the United States, with most major contracts worldwide concentrated among vendors including Epic, Oracle Health, Dedalus and MEDITECH. High compliance, safety and cybersecurity costs favour economies of scale, further reinforcing dependence on these vendors.

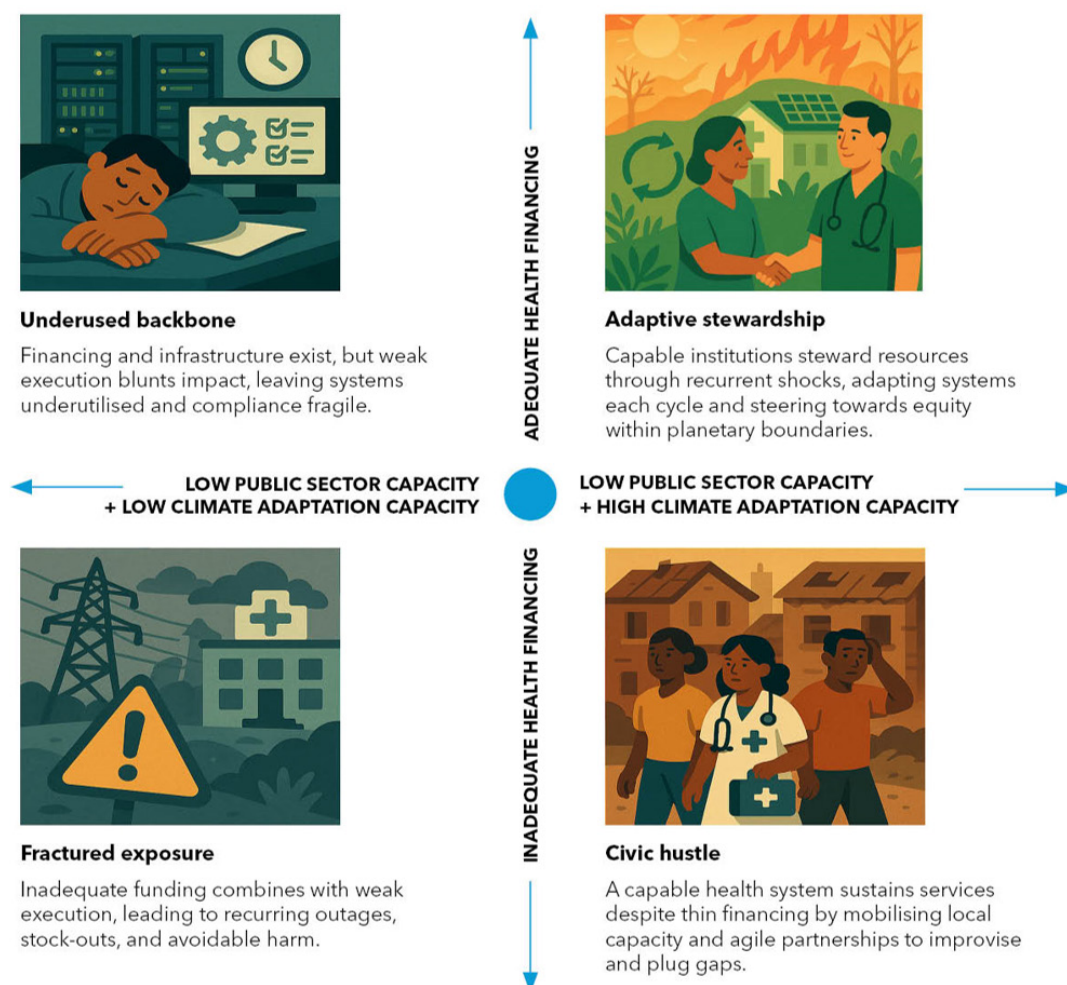
Scale can offer benefits, including more predictable and integrated care, high-quality data for monitoring and research, lower integration costs, and clearer accountability. However, concentration risks widening equity gaps, increasing dependence on privately controlled digital rails, increasing systemic fragility when outages occur, and constraining innovation when dominant platforms restrict interoperability or research access.

In this context, the trade-off between safety and diffusion becomes central. When guardrails are weak, exclusivity may slow the spread of harm but may also entrench inequity. Where risks and benefits cannot be directly compared, the key question becomes whether risks can be managed; if they cannot, safety should take precedence.

Even a safe and shared future does not fully resolve issues around local ownership or resilience to shocks. As global multilateralism becomes weaker and more fragmented, the design of guardrails becomes even more important.

Progress towards a safe and shared future will require public-interest safeguards, including architectures built around digital public infrastructure, strong interoperability mandates, equity-linked procurement contracts, and federated research environments that allow data to remain local while enabling shared insights. Together, these mechanisms will ensure that digital health transformation remains safe, inclusive and accountable, supporting rather than eroding health equity.

Figure 6: Navigating health financing x public sector capacity x climate adaptation



Source: ITU

This scenario set offers a feasibility lens, mapping state capacity – whether it can deliver, including under pressure – against available resources, including pooled funding and supply chains. It distinguishes between scenarios where actors are able but broke (civic hustle), well-funded but weak (underused backbone), or broke and weak (fractured exposure), as compared with the preferred capable-and-funded scenario of adaptive stewardship.

This set emphasizes that both health service delivery and adaptation take place at the local level. Cities and local governments are responsible for local regulations, policies and byelaws. Moreover, cities are playing an increasingly active role on the global stage. The scenarios therefore highlight the importance of including not only national institutions but also local/city-level entities in strategy and planning relating to health, adaptation and technology.

The set also underscores the links between health and the environment (including through OneHealth approaches) and highlights the importance of sufficient financing for both health and adaptation. The recent floods in the People's Republic of Bangladesh prove an example of how a country with high levels of public trust and high compliance with emergency protocols, may nevertheless be approaching its adaptation limits (Alam, 2024; Begum, 2024). When it comes to health care, the recent decline in development finance is having a significant impact, particularly in aid-dependent countries but also globally (as reflected, for example, in budget

tightening at WHO). From a financing perspective, the scenarios show how fragmented funding streams burden managers and strengthen the case for pooled, coordinated financing, which also aligns well with systems and portfolio approaches (Dkhimi, 2023).

These scenarios also emphasize the value of early-warning systems and anticipatory cash transfers for disaster preparedness – something that the health sector is also piloting. Consider, for example, African Risk Capacity's (ARC) parametric insurance for high-impact epidemics, which could be regarded as a type of preventive financing (African Risk Capacity, 2022). While it does not prevent shocks, this approach helps people and institutions to take precautionary, protective measures to soften their impact and build resilience.

This set of scenarios explicitly addresses local ownership, capacity and financing to implement strategies and to respond to shocks (adaptation); however, it does not specifically focus on the role of technology in providing safe, affordable and accessible health solutions.

Figure 7: Navigating responses to the stressed other x trust in public institutions



Source: ITU

This scenario set applies a social contract lens, with the scenario matrix mapping trust in public institutions against how societies respond to stress, from supportive services to coercive

surveillance and gating. The scenarios illustrate how the same shocks – whether it be climate, health or other – could lead either towards mutual aid and dignity, or towards curfews, scoring and exclusion.

While this framing broadly produced the outcomes expected, interesting nuances were identified: while **civic mutual aid** emerged as the preferred scenario, namely a world in which people trust the state and help each other, it was noted that, particularly during rapid-onset crises such as natural disasters and pandemics, societies often require a fast, coordinated response. In terms of the Cynefin framework, emergencies require leaders to adopt an approach of act, sense, and respond, i.e. act quickly to stabilize the situation, then make sense of what happened to prevent future occurrences (Whatfix, 2025). This favours a command-and-control strategic posture, or trusted command.

This framing emphasizes that maintaining trust and perceived legitimacy, including or especially during crises, is paramount. Importantly, command-and-control should be understood as a temporary strategic posture. The danger arises when emergency measures become sticky, such as when temporary societal monitoring evolves into permanent surveillance and control in the form of over-policing, rationing, and restrictions. Crisis playbooks and incident command systems should therefore include not only provisions for centralized decision-making and communication, but also for rollback and oversight. In addition, there is a risk that equity may be undermined, for example through erosion of eligibility and increased bias. To maintain public trust, it is important that outcomes are fair and visible, with effective grievance channels (Moyal-Smith R, 2024).

Figure 8: Navigating public sector capacity x economic paradigms



Source: ITU

This scenario set applies a political-economy lens to the future of health care and technology. The scenarios explore futures both within and beyond the current dominant growth-first, market-maximizing economic paradigm. Rather than mapping a single paradigm or path along the opposing axis, the scenario matrix examined how different emerging alternative approaches could contribute to a public-purpose mission. The current dominant economic paradigm could also be oriented towards public purpose, provided that sufficiently strong public sector capacity exists, including the capacity to regulate and enforce.

The preferred scenario of public purpose mission era emerged as the most preferred of all scenarios and provides the basis for the actions proposed in this study.

In this preferred scenario, a clear public-purpose mission, such as adding 60 healthy days per person in every neighbourhood by 2040, acts as a galvanizing force for a whole-of-society society response that brings together the public and private sectors, financiers, innovators, researchers and citizens. Crucially, the mission does not prescribe a single specific pathway to achieve that outcome (as different stakeholders may have different roles and pathways need to remain adaptive).

4.4 Wildcard events

Potential disruption to the future of health care

Alongside the driver-based scenarios, several negative wildcards – low-probability events capable of overturning assumptions – were also identified. The wildcard scenario presented here illustrates how a disruptive event can dramatically reshape systems.



The heat should have broken overnight. Instead, a heat dome settles over the basin, trapping smoke and leading to an increase in emergency calls for respiratory distress and heat-related illness. Then, as if to compound the pressure, a digital outage strikes. It begins upstream, with a cyberattack on the country's digital identity system. Because Overwatch operates the critical infrastructure on a single stack, the failure cascades across systems within minutes. At a local clinic, systems do not slow down but instead grind to a halt. On clinic computers, the login

spinner freezes on “ID unavailable – try later”. Aya, a community health worker, sighs and reaches for a backup tablet.

Aya’s next patient is a street vendor with tuberculosis. He coughs into his sleeve, a deep, persistent rasp. His treatment stalled weeks ago. The Coverage Optimizer flags him as out of area. Then a banner appears: “Eligibility engine: documentation required”. Two simple checks would restore his eligibility: a verified address and a digital identity. However, he is an undocumented migrant living in an unnumbered room behind the market. The appeal link depends on the same disabled digital rails. The patient is therefore told to come back next week. These problems did not start today. They can be traced back through a trail of minor decisions, including pandemic-era derogations that routed raw data into a central pool for greater situational awareness; the approval of vertical integration to boost resilience; Overwatch being designated a national champion and allowed to bundle cloud services, digital identity, and electronic health records; and interoperability being repeatedly deferred.

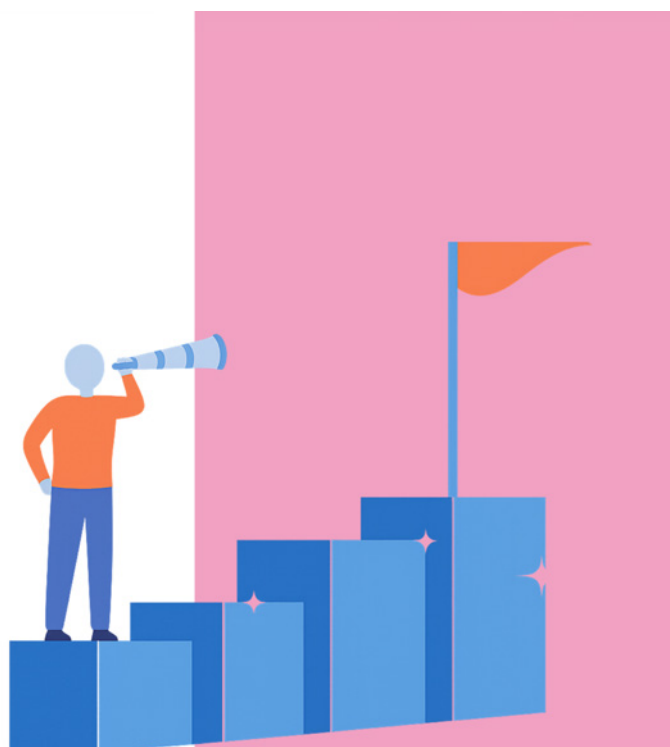
By noon, the smoke has thickened. The staffing application automatically extends Aya’s shift. There is no overtime, only ratings that feed back into the same optimizer. Across the bay, inside the Harbor Shield Enclave, the air is cool and clean. Rooms are sealed against particulates. A concierge physician monitors residents’ biosecurity system and precision antivirals. Under a service-level agreement, private partners receive priority access to care. At dusk, the spinner finally stops. System restoration follows contract tiers: Tier-1 (enclave, airport), Tier-2 (port logistics), Tier-3 (everyone else). The personal identification system is back online by 8 p.m., but delays have consequences. Clinics face a crush of patients. The outage review is sealed under rules covering critical infrastructure; requests for records come back marked as related to national security. Down the block, a church basement runs a cash-only exchange for leftover tuberculosis pills and expired antibiotics. At the door, an undocumented migrant is turned away.

Overwatch’s contract is renewed. Next year’s budget contains further cuts to funding for community health workers and climate adaptation measures, while increasing spending on public safety.



5 Prioritizing the desired scenario

This section stress-tests some of the scenarios identified so far against the objectives of the study to assess their potential impacts and alignment. Using this assessment, a desired scenario is identified and analysed, offering a shared vision to guide planning and decision-making.



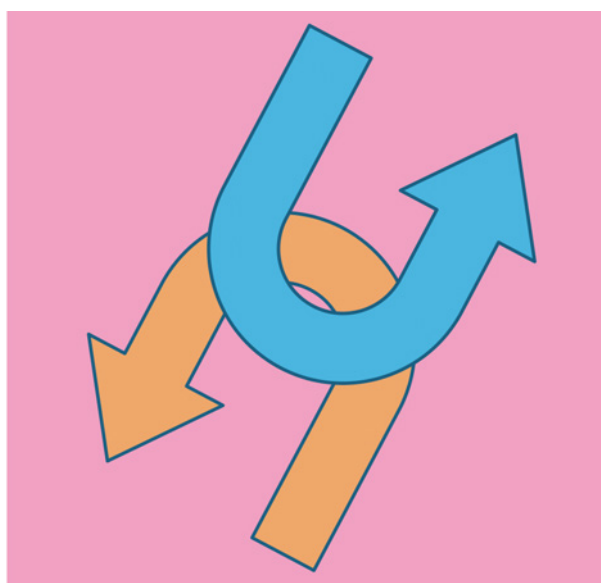
5.1 Four transformational scenarios

Analysing optimistic futures for lasting progress

Using collaborative analysis, stakeholder engagement, and expert review, this report presents and examines a shortlisted set of transformational scenarios. These scenarios illustrate a range of potential pathways shaped by the drivers most relevant to the future of health care.

The following pages introduce these shortlisted scenarios and their narratives through Aya to support the prioritization of a desired future vision that will guide subsequent strategic recommendations.

Although the four scenarios may appear similar in ambition and direction at first glance, each reflects a distinct blend of capacities, trade-offs, and systemic behaviours that create markedly different futures.



5.2 Visualizing transformational scenarios

Figures 9 to 12 serve to visualize and discuss potential future transformational scenarios.

Safe and shared

Figure 9: Safe and shared



Source: ITU

Aya works in a clinic where digital systems are stable, transparent and designed with strong safeguards. Government investment in rigorous standards ensures that every tool, from diagnostic models to medication alerts, has undergone extensive safety checks. As she moves between patients, Aya uses devices that are affordable and widely available across all communities, reflecting a health system in which the digital benefits reach both densely populated urban districts and remote settlements.

A mother arrives with her asthmatic son. Aya's tablet provides a clear risk assessment supported by an audited clinical model trained on diverse datasets. The same interface is used across clinics nationwide, providing families with consistent, predictable care, regardless of where they live. Virtual consultations and subsidized devices ensure that no one is denied access to essential services. Strong accountability mechanisms mean that outages are rare, cyberattacks are contained quickly, and any errors trigger rapid public alerts.

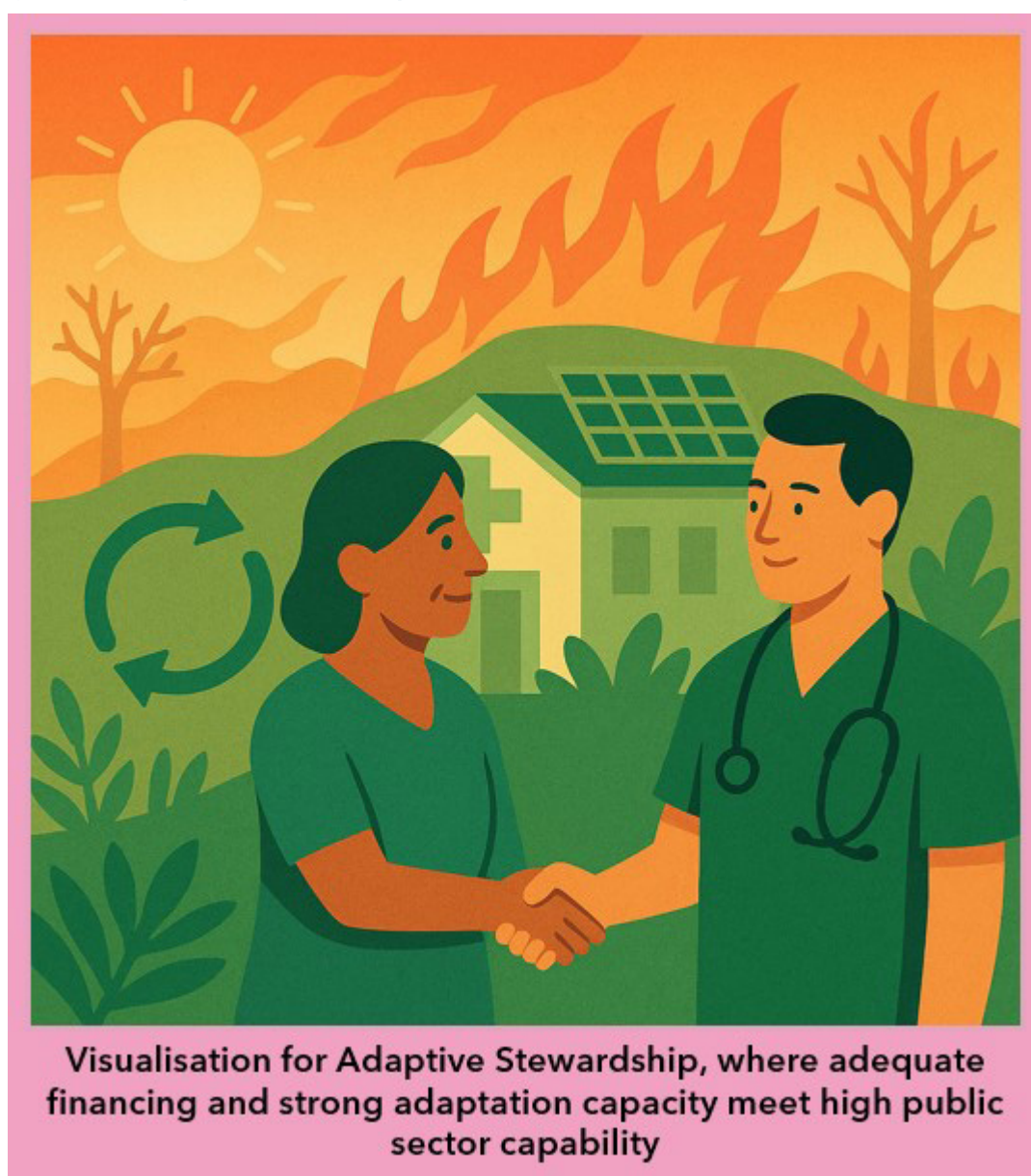
While this world delivers safe, widely accessible tools, it also includes areas that require further strengthening. Most technologies are produced by a small group of compliant, risk-averse vendors. High compliance costs create barriers for local innovators, limiting the ecosystem's ability to develop tools tailored to local needs. Community ownership remains moderate, and while systems are effective, meaningful participation in their design and implementation is limited.

Similarly, resilience is adequate rather than deeply adaptive. Systems generally handle routine stress well, but responses to shocks still depend on centralized interventions rather than distributed local capacity.

Overall, the safe and shared scenario provides inclusive and dependable digital health services. It improves quality, strengthens access and protects communities from avoidable harm. However, Aya's daily experience also reveals the limitations of this scenario: safety and diffusion have been achieved, but deeper local capabilities, innovation rooted in diverse contexts, and system-wide adaptability remain only partially developed.

Adaptive stewardship

Figure 10: Adaptive stewardship



Source: ITU

In the region where Aya works as a community health worker, heavy rainstorms have become more frequent but the clinic remains fully functional. Backup power engages seamlessly, medicine fridges maintain temperature and hazard dashboards guide local decisions. These reliable responses are implemented by institutions that are well-funded, trusted, and coordinated.

Aya begins her rounds using a locally designed workflow system adapted to the area's flood patterns. Community health committees provide real-time updates on vulnerable households. When supply routes are blocked, municipal authorities shift procurement channels with little delay. Citizens comply with evacuation and care instructions because trust in public institutions runs deep.

This is a world where the fundamentals are strong: services remain accessible even during crises, local clinics help shape preparedness plans, and front-line workers such as Aya operate with clarity and confidence. Financing mechanisms support preventive care, adaptation infrastructure and community health workers.

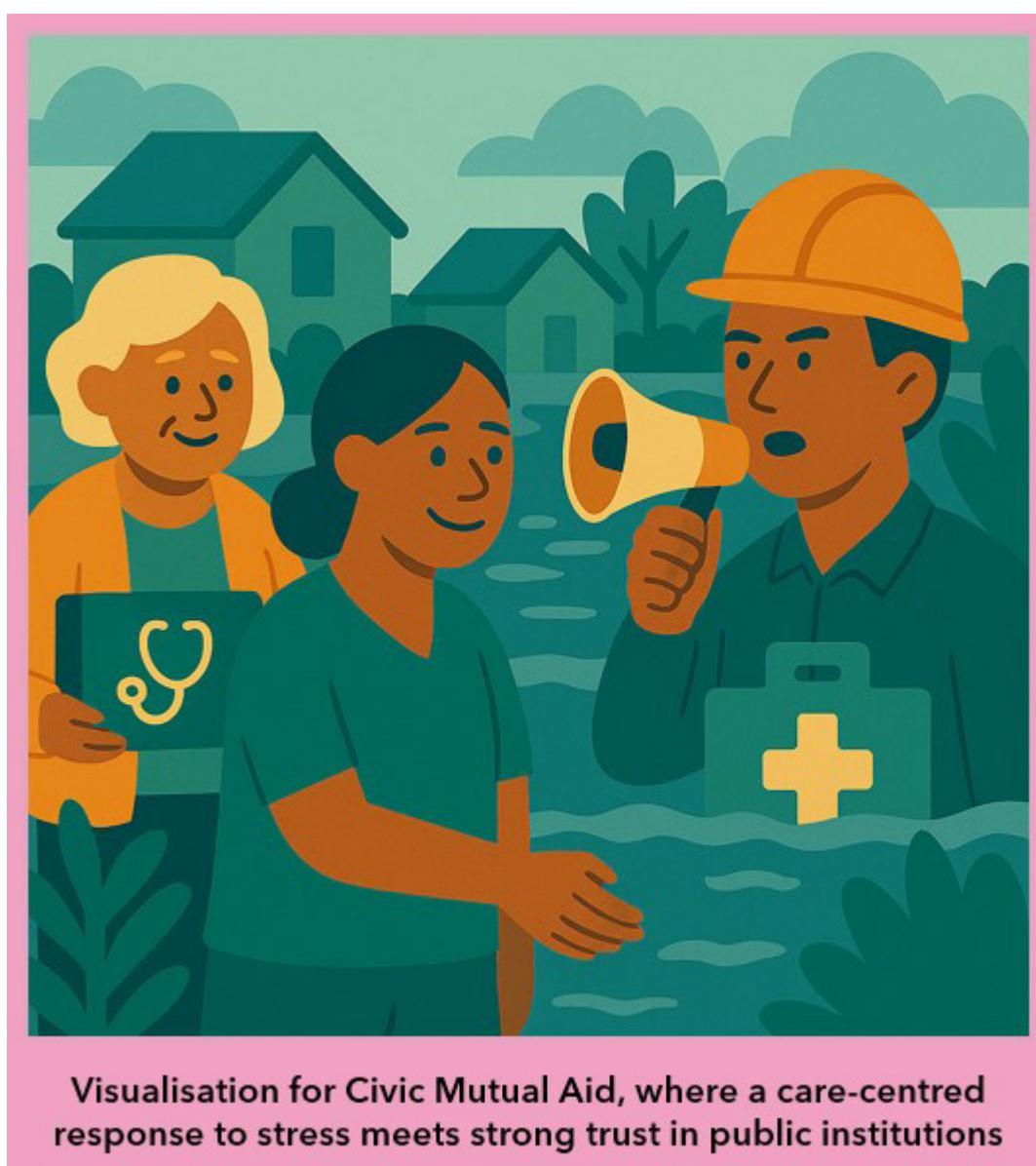
However, while the system is robust, it remains cautious. Innovation exists but tends to evolve incrementally, rather than in forward leaps. Technologies used for diagnosis, monitoring or logistics prioritize reliability over breakthrough advances. Digital tools are safe and affordable, but not always cutting-edge.

Resilience is the defining feature here, as institutions absorb shocks and restore services quickly. Community participation strengthens continuity of care. Yet the system's stability can sometimes limit its ambition, making it slow to adopt transformative technologies or experiment with new models.

Aya's clinic thrives in the face of climate stress, budget pressures and operational disruptions. However, resilience alone is not enough, as achieving transformative gains will require a system that not only withstands shocks but also leverages innovation at scale. Adaptive stewardship builds strength and trust, but falls short of delivering the full, catalytic transformation envisioned in the public-purpose mission era scenario.

Civic mutual aid

Figure 11: Civic mutual aid



Source: ITU

In Aya's city, the health system operates on trust, with actors ranging from community organizations to private suppliers treating the well-being of residents as a shared mission. Public institutions are respected and transparent, but their budgets are limited; core services are maintained, but there is little room for expansion or risk-taking. However, because officials openly acknowledge these constraints, society responds not with frustration but with collective resolve.

When a landslide cuts off several neighbourhoods, the municipal health office activates its coordination hub. The guidance is to identify priority patients, essential routes, and available capacities. Civic associations, businesses, and faith groups align. A logistics cooperative donates cold-chain storage; youth groups escort residents across temporary footbridges;

and neighbourhood committees check in on households with patients suffering from chronic conditions. A philanthropic partner provides emergency transport vouchers.

At the clinic, Aya works with a modest but reliable set of tools, including an open-source patient-tracking app, built in partnership with a local tech collective; a basic telehealth line; and volunteer rosters. The technology is simple but well-adapted, because it has been designed in cooperation with users. The result is a system where functionality depends less on expensive infrastructure and more on shared ownership and social cohesion.

However, the city's reliance on generosity introduces low-level tensions. With government resources stretched thin, many upgrades or pilot programmes materialize only when an outside partner chooses to invest. Private clinics support diagnostic camps, which can skew their focus towards conditions they are equipped to address. A donor sponsors the telehealth platform, and its feature roadmap evolves around what that donor can sustain. Resource flows subtly shape the innovation agenda, which means continually balancing public ambition with the practical boundaries set by those who control the purse strings. Managing multiple funding streams, each with its own reporting requirements and formats, further strains already stretched managers.

Nevertheless, the system excels at upholding dignity and ensuring collective care. Access remains equitable, not because the state has the resources to provide abundance, but because communities and institutions extend the reach of every dollar. Local capacity sustains the system, supported by development funding. This model is particularly resilient in times of stress. Mutual aid helps to absorb shocks, while strong social ties reduce the risk of people falling through cracks. However, the model has its limits: although social innovation is vibrant, large-scale digital systems, diagnostic platforms and transformative technologies remain out of reach. Ultimately, the pace and shape of progress are constrained by affordability.

A scenario based on civic mutual aid is one of the most humane possible futures, as it is grounded in trust, agency and social cohesion. It demonstrates how solidarity can sustain a health system through periods of scarcity. However, to unlock the next leap in health outcomes, the city will eventually require more than collective goodwill. It will also need sustained investment and correspondingly stronger institutional capabilities.

Public-purpose mission era

Figure 12: Public-purpose mission era



Source: ITU

The storm should have moved on. Instead, rain stalls over the coast, flooding streets and cutting power. Yet inside the local clinic, systems continue to run smoothly: solar microgrids keep essential equipment running, mesh networks maintain connectivity, and offline-first records support uninterrupted triage. Aya, a community health worker, checks her roster on a phone that doubles as a secure health wallet. Above the intake desk, a poster sets out the national mission: by 2040, add 60 healthy days per person, in every neighbourhood. This goal guides public authorities, private providers, financiers, academics, innovators, and civil society towards the shared goal of providing care that is preventive, continuous, and equitable.

Today, Aya is helping a street vendor whose tuberculosis treatment was disrupted during the previous month's floods. The sputum analyser comes back online and routes encrypted data, using open interoperability standards, to the district health information exchange. A

drug-resistant strain is detected. The query then runs in the city's TREs, where universities and accredited innovators train edge-AI models while keeping data local, consent-bound and auditable. When the patient opts in, his encrypted record unlocks access to a pooled financing mechanism that blends national budgets, municipal allocations, parametric insurance payouts, and a global solidarity fund for migrants and refugees. Civil society partners provide nutritional vouchers; entrepreneurial support networks coordinate follow-ups; and financial institutions disburse prevention-linked payments when climate triggers are activated.

A teleconsultation alert arrives. A pulmonologist across the border reviews the patient's imaging, as part of a regional telemedicine consortium. A university team in another country uploads anonymized datasets to refine diagnostic models. Local repair clubs maintain open-hardware devices, ranging from blood-pressure cuffs and spacer valves to ubuntu bands, which are right-to-repair wearables that track vital signs and mood. Residents decide what data to share, and consent requests are multilingual and clear.

Outside, the floodwaters continue to rise, but systems remain online. The mesh network updates a public dashboard with open routes, medicine stocks and drone schedules. A drone from the pooled-procurement platform, which is co-managed by government bodies, private logistics groups and development partners, delivers thermostable tuberculosis treatment packs and solar test kits. By the evening, the vendor logs his treatment plan into the health wallet. Access to personal identification is not a barrier to care. Service providers compete on quality, rather than lock-in, because contracts require open interfaces and audit rights.

As the lights come back on across the district, the overarching mission remains clear: care that includes everyone, systems that adapt, and a whole-of-society coalition working for the public good.

5.3 Stress-testing the scenarios

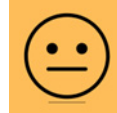
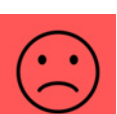
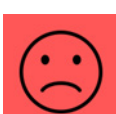
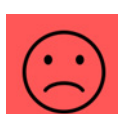
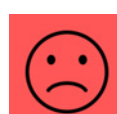
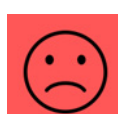
Stress-testing strategic objectives across transformational and wildcard scenarios

The transformational and wildcard scenarios were mapped against the intended research outcomes and stress-tested to evaluate whether they align with core objectives to prioritize the desired scenario.

In the table on this page, a smiling-face emoji indicates a positive impact on an objective, a straight-face emoji indicates a neutral impact, and a sad-face emoji indicates a negative impact. The comparison shows that while each scenario has distinct strengths and weaknesses, one clearly emerges as the most desirable future, demonstrating strong alignment across all four objectives.

This mapping is also in line with the scenarios presented earlier. Although the four transformational scenarios may have appeared similar in ambition and design at first glance, three of them lacked critical pillars. Without these pillars, progress remains unpredictable and over time the entire vision risks falling apart.

Table 3: Stress-testing the shortlisted scenarios against the objectives of the foresight study

Objective / Scenario	Objective 1: Technological innovation to transform health care	Objective 2: Universal and equitable access	Objective 3: Local ownership and capacity	Objective 4: Resilient and prepared health systems	Objective 5: Safe, affordable and scalable health solutions
Safe and shared					
Adaptive stewardship					
Civic mutual aid					
Public-purpose mission					
Fortress over-watch					

5.4 Enablers of the desired scenario

Factors that make 'public-purpose mission era' the desired scenario

Commitment to public good

Health care and digital technology have a strong public-good dimension. In a public-purpose mission era, this is made tangible through a mission statement, such as adding 60 healthy days per person in every neighbourhood by 2040. The mission concept should be broad enough to be adapted and applied across actors.

Equity should be embedded as a key objective from the outset, as part of a public-purpose mission, translating into strategies, policies, plans and contracts (including equity-related key performance indicators, equity floors in procurement, zero-rating for USSD/SMS-based health services such as appointments, prescription refills, heat- and air-quality alerts). Strategies and plans should take into account different levels of institutional capacity and financial resources. In under-resourced environments, this means developing a package that delivers immediate value, minimizes the administrative burden, provides users with a meaningful voice, and avoids technology or vendor lock-in. A phased approach, as per the recommended actions outlined below, can support these goals.

Whole-of-society mobilization

A strong public-good dimension reaffirms the role of the public sector in setting and enforcing rules; creating an enabling environment; building essential infrastructure (including public health and digital infrastructure) and delivering services. Political will and trust can be effective enablers: steps should be taken to harness them where they exist and reintroduce them where they have been lost. Strong governance mechanisms are essential. Misinformation can undermine social cohesion and the social contract when they are needed most. It is therefore imperative to address that problem.

Health care cannot be addressed by governments alone. A public-purpose mission serves to galvanize a whole-of-society response, bringing together the public and private sectors, financiers, innovators, researchers, civil society and citizens. Health-care delivery and adaptation both happen at the local level. Cities are also increasingly active on the global stage, cooperating, shaping regulation and engaging in diplomacy. They should therefore be active participants in the mission.

A phased approach to infrastructure

Action needs to focus on resilience: hospitals and clinics, reliable energy, water and connectivity (including last-mile solutions and backup capacity). Examples include solar power with battery and storage, resilient connectivity such as mesh networks and offline-first systems. Light public digital rails are needed, including digital identity, payments, data protection and cybersecurity baselines.

Infrastructure should enable private sector and innovators to plug in, while protecting against vendor or technology lock-in. Laws, regulations and procurement policies need to be aligned. Contracts, for example should include escrow, switching rights, open formats and local data residency requirements. Providers should pay for results, not lock-in.

For health care, such infrastructure could include core registries (for patients, facilities or health workers), open application programming interfaces (APIs), interoperability standards (such as fast health-care interoperability resources/FHIR), messaging and scheduling services and analytics.

Sector-specific open data standards for health care (FHIR) should be adopted. It is also important to mandate interoperability, portability, and vendor-neutral core services and provide a high-quality open reference stack, so that local firms can compete without creating new forms of lock-in. In addition, it is essential to support data integration and exchange for distributed or federated analyses without requiring raw data to be moved. This would include developing a lightweight, open-source trusted-research-environment-in-a-box, with policy-as-code and auditable logs.

Pooled financing models

Robust health-care and adaptation financing is crucial. The goal should be a financing stack that ensures that prevention and primary health care is affordable. This starts with prioritizing health care in domestic budgets, complemented by pooled and blended finance and procurement. That approach aligns well with portfolio and mission-based approaches.

Pooled procurement and stockpiles should be used for essential equipment and supplies, such as medicines and vaccines. The same principle can apply to services, enabling national and local governments to share resources rather than building every capability independently. Examples could include regional TRE hubs and model evaluation labs that red-team algorithms and issue stop-go recommendations. It would also be useful to maintain reference stacks (including digital forms of identification, facility registries, scheduling, and health wallets) as global public goods, with turnkey options available in local languages.

Learning, adaptation and resilience

By definition, adaptation requires strong learning loops, as does regulating innovation (innovation often precedes regulation, hence the need to learn and adapt). In addition, it is important to build health-care sector capacity, with an emphasis on public and primary care, as well as on digital infrastructure, data and technology use (and risk mitigation).

Emergency preparedness should include crisis playbooks, incident command systems, centralized communication and decision-making systems. Safeguards are also needed to prevent purpose creep (such as temporary surveillance becoming permanent) and overreach, with rollback provisions and citizen oversight.

Tracking progress

Achieving the public-purpose mission era scenario requires practical indicators that measure whether progress is being made in the right direction. The presented illustrative indicators (see table on this page) can help policy-makers and partners monitor whether technology and finance systems are delivering on the public purpose effectively and equitably.

Table 4: Indicative measures of success

Enabler area	Example indicator
Energy resilience	Percentage of clinics powered by hybrid/renewable/microgrids, with storage and backup
Connectivity resilience	Percentage of clinics with reliable connectivity, including backup and fallback options
Resilient primary care	Percentage of primary care facilities with offline-first EHR functionality
Rapid response financing	Percentage of parametric insurance claims settled within 72 hours
Data governance	Percentage of health data queries processed within TREs
Open standards	Percentage of new health contracts using FHIR standards and open APIs
Equitable access	Percentage of residents (including migrants) with self-managed digital health credentials
Responsible AI	Percentage of AI tools in clinical use with published audit trails
Equity-linked finance	Share of health-innovation funding tied to prevention or access outcomes

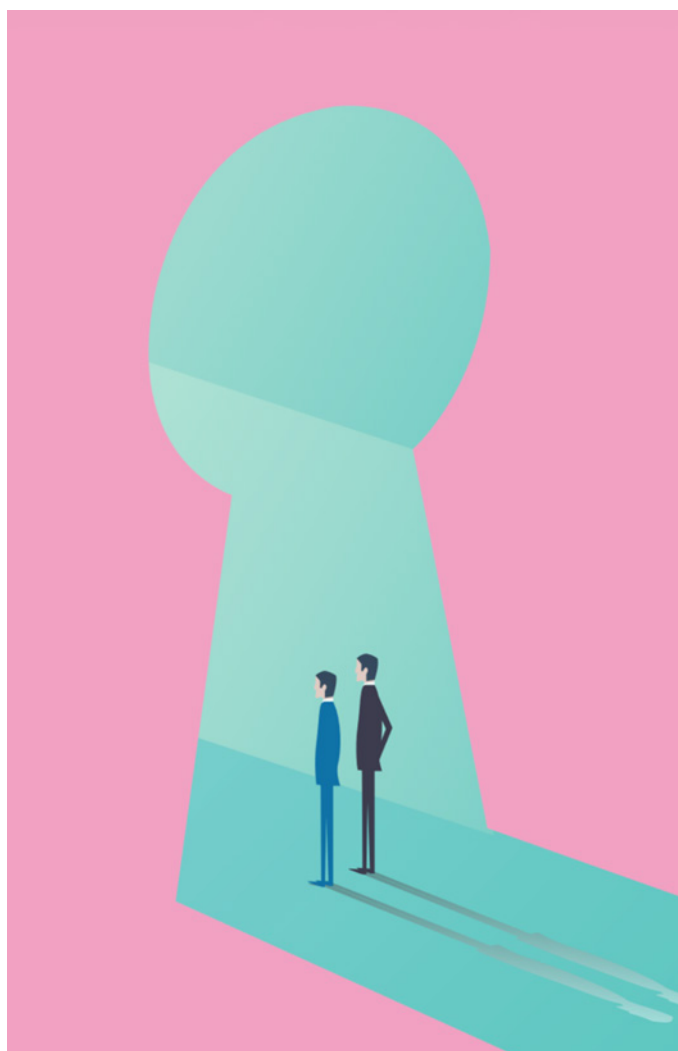


6 Actioning the desired future

Shaping the future

This section marks the transition from foresight to strategy by translating the desired future into reality through an actionable agenda. It outlines the key interventions and strategic priorities needed to close the gap between the present conditions and the desired future.

A preliminary roadmap grounded in a shared understanding of stakeholder roles, the order of actions to be taken, and areas for coordination has been developed to guide implementation, setting the direction for proactive and inclusive changes in existing systems.



6.1 A roadmap to maturity

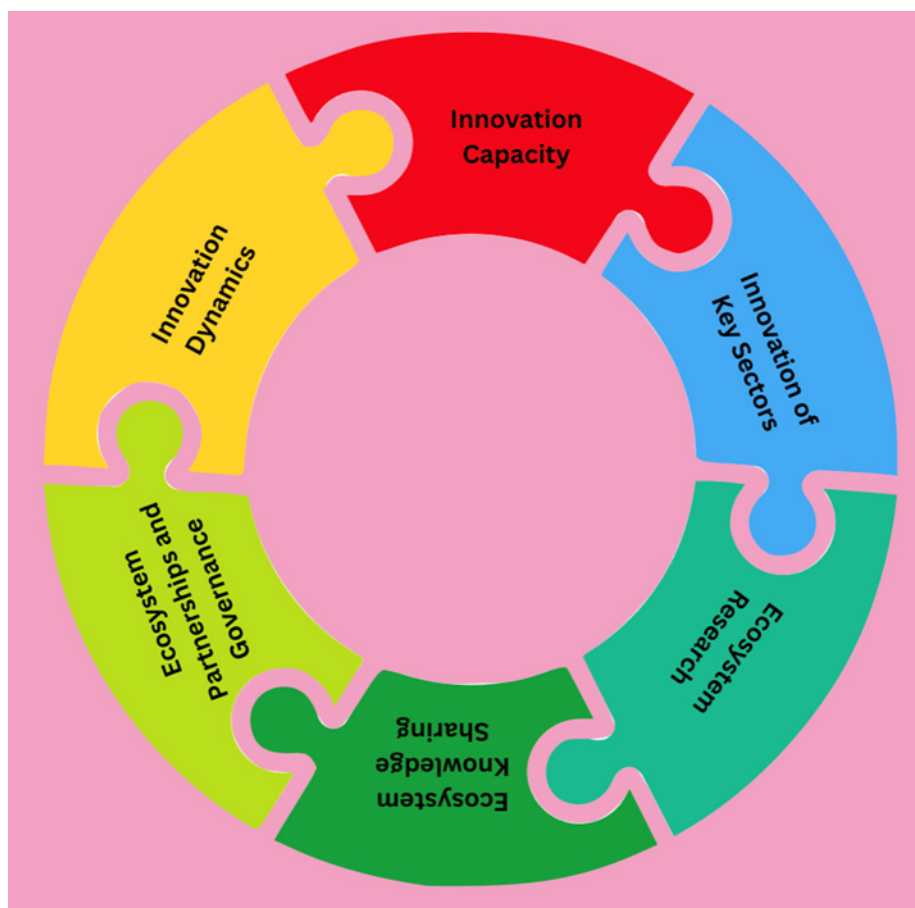
Building blocks of innovation-led growth

The actions recommended in this section are grounded in research insights and reflect the collective ambition to realize the desired public-purpose mission era vision, a scenario that is in line with the core objectives of this brief. Accordingly, the recommendations given to address systemic gaps along the entrepreneurial journey have been shaped by ecosystem consultations, expert inputs, and engagement with G20 members.

The recommendations are structured around six pillars that together provide a coherent roadmap for connected, inclusive, and sustainable economic growth powered by innovation. The first three pillars of innovation dynamics, innovation capacity, and innovation of key sectors

provide the foundation for building the ecosystem, while the other three pillars of ecosystem research, ecosystem knowledge sharing, and ecosystem partnerships and governance play critical roles in leading the ecosystem towards maturity.

Figure 13: Six pillars of an integrated framework for action



Source: ITU

Together, these pillars form an integrated framework for action, although the pathways to implementation will naturally differ across countries. Domestic ecosystems vary when it comes to institutional readiness, resource availability, technological maturity, and governance capacity. As a result, governments and stakeholders may prioritize recommendations depending on local conditions while still moving in the collective long-term direction set out in this study. The roadmap is therefore not meant to be linear or prescriptive. Rather, countries are encouraged to adapt and sequence actions in ways that best fit their domestic context, identifying appropriate champions across government, industry, finance, academia, support networks, and civil society.

In doing so, each ecosystem can translate the overarching framework into tailored implementation plans and collaboration models that reflect local needs while also contributing to the shared vision of equitable, affordable, and resilient health care for all.

6.2 Actions to drive future-ready health care systems

To translate the desired vision into tangible outcomes, the following roadmap is proposed. It encompasses a comprehensive set of interventions involving policy, capacity development, market activation, research, knowledge sharing, and collaboration, ensuring a coordinated and systemic approach to implementation.

Table 5: Proposed roadmap to realize the desired vision

Innovation dynamics (ID) <i>Actions that develop the policies and strategies guiding health-care innovation, digital transformation and resilient health systems</i>	Innovation capacity (IC) <i>Actions that strengthen the ability of health-care systems to access, absorb and apply resources</i>	Innovation of key sectors (IKS) <i>Actions that drive innovation within health care, and across related sectors, to enhance universal and equitable health outcomes</i>
ID1: Finance and build public health-care and essential infrastructure, prioritizing equity and rural inclusion to ensure universal and affordable access to resilient health services.	IC1: Create a programme to strengthen health-care system capacity—especially primary and public health—to ensure high-quality, affordable care for all.	IKS1: Integrate procurement guidance into the DPI4H implementation guide, mandating open-by-default standards for all new digital health procurements.
ID2: Develop a digital-public-infrastructure-for-health (DPI4H) diagnostic and a roadmap to guide planning for a locally-owned, foundational digital architecture that enables safe and shared health-care innovations.	IC2: Develop a training initiative for health-care facilities to safely collect, store and use health data.	IKS2: Create linkages between health-care institutions to share resources, coordinate supply chains and enable pooled procurement of essential items.
ID3: Ensure robust regulations and policies on data protection and privacy, aligned with secondary data use frameworks, that unlock societal benefits while safeguarding individuals from risks.	IC3: Establish a programme to build public sector capacity for implementing and governing DPI4H roadmaps.	IKS3: Develop sustainable, climate-adaptive health technology value chains, including local clusters linked to global markets.
ID4: Establish regulatory sandboxes for health-care innovation, providing regulators, innovators, and researchers a safe environment to test solutions.	IC4: Launch a citizen empowerment and digital health literacy programme to build trust, enable informed consent, and strengthen public engagement.	IKS4: Establish a health sector living lab to test, validate and commercialize cross-sector innovations relevant to health-care delivery and resilience.
ID5: Design, pilot, and regularly test emergency protocols and action plans that incorporate equity considerations, safeguards and rollback mechanisms to protect rights during crises.	IC5: Design and host a health-tech programme for startups, to foster an inclusive ecosystem and develop affordable and safe shared innovations.	IKS5: Develop a digital marketplace for inclusive health technology, connecting innovators to solutions, data marketplaces (including TREs), cloud services and specialized AI/ML platforms, with an emphasis on open, interoperable, safe and equitable design.
	IC6: Build capacity for technology-enabled health care and adaptation through innovation hubs at the local and city levels.	

Ecosystem research (ER) <i>Actions that generate data, evidence and insights to inform decision-making</i>	Ecosystem knowledge sharing (EKS) <i>Actions that create platforms for the exchange of knowledge, data and lessons to build trust, alignment, and collaboration</i>	Ecosystem partnerships and governance (EPG) <i>Mechanisms that align capital, partnerships, and governance frameworks to scale transformative health care</i>
ER1: Improve the availability, access, and use of privacy-respecting and secure health data to support decision-making across preventive care, curative care, early warning and crisis response.	EKS1: Launch a community of practice on regulating health tech innovation, supporting regulators in balancing risks and benefits in a fast-moving space.	EPG1: Launch a global health tech standards coalition to accelerate convergence on data and technology norms in areas where international rules are still absent.
ER2: Design and build a TRE, a tightly governed and privacy-preserving safe space that enables the use of health data at scale.	EKS2: Establish a multi-stakeholder Tech4Health platform to exchange knowledge, strengthen partnerships, facilitate learning tools, and co-develop approaches that advance health system resilience, frontier technology innovation, and effective governance.	EPG2: Establish a co-governed universal service and access fund for DPI4H that blends public, private, and donor financing, tied to measurable roadmap milestones.
ER3: Encourage and support research on data and frontier technologies that can expand affordable and universal access to health care and improve quality of life.	EKS3: Establish the Health4All Cities Platform to connect health programmes across locations for shared learning, pooled resources and integrated action across health, environment and urban development.	EPG3: Create public-private governance consortia to operate and finance TREs, ensuring sustainability, accountability, and safe use of data for health innovation.
ER4: Support linkages for research and development to inform the design of technology-for-health initiatives such as digital public infrastructure for health, TREs and regulatory sandboxes.	EKS4: Strengthen community health initiatives by creating platforms for local organizations, health workers and citizens to exchange knowledge, share resources and build trust in the use of technology for health-care delivery.	EPG4: Set up cross-border health crisis response networks with interoperable data corridors, pooled resources and coordinated early-warning and action systems.
ER5: Conduct research that simulates the impacts of shocks on health systems, to strengthen prevention, mitigation, preparedness and adaptation.		EPG5: Establish adaptive monitoring and evaluation systems to generate evidence, manage feedback loops, and refine health-innovation policies and programmes.



7 Managing the ecosystem

This section outlines structured mechanisms for providing guidance, supporting implementation, activating inclusive platforms, and enabling strategic partnerships and communication pathways, ensuring that the roadmap remains responsive, relevant, and ecosystem-driven over time.

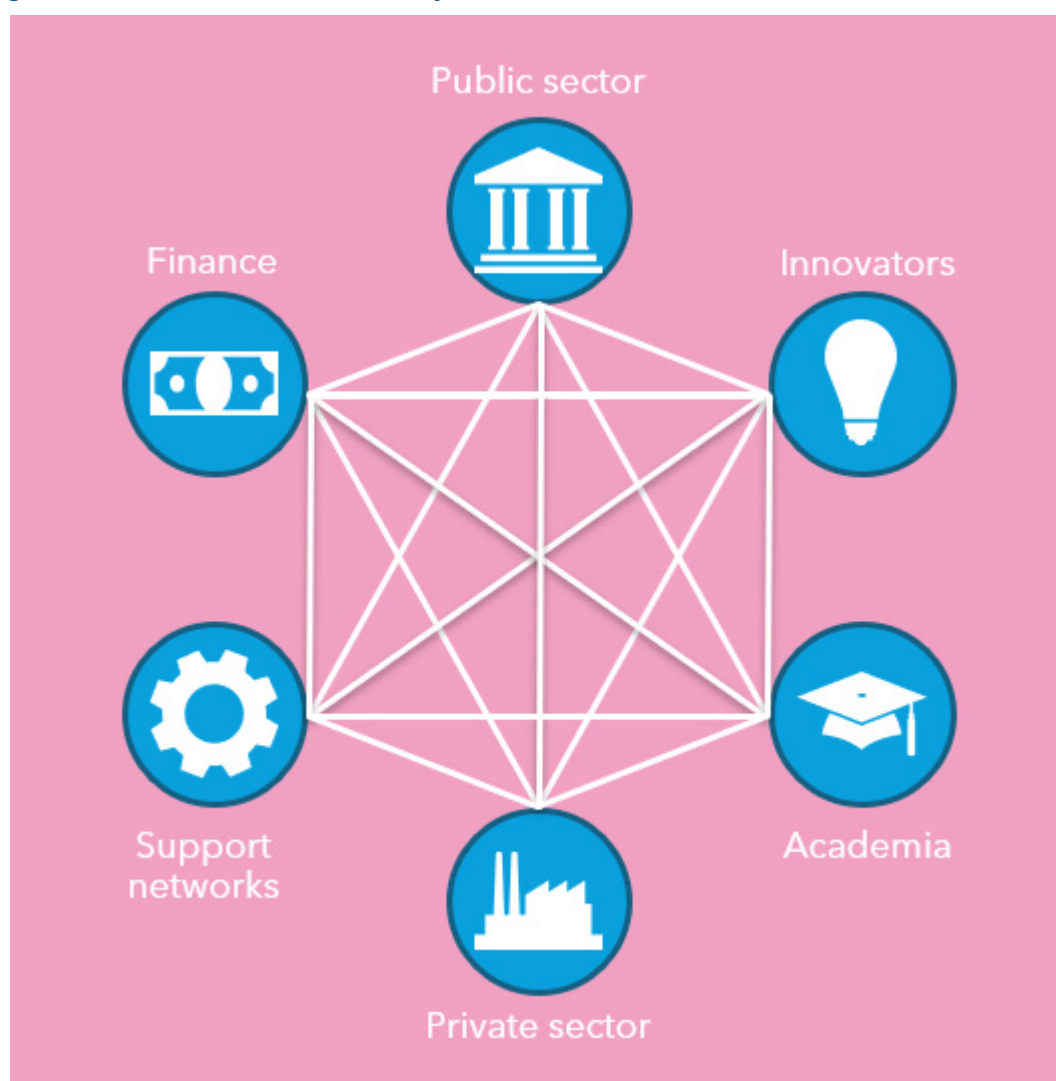


7.1 Strength in stakeholder collaboration

An ecosystem approach to building future-ready health care systems

Translating recommendations into lasting results requires a system in which diverse stakeholders not only participate but actively co-create, implement, and champion transformation. Realizing the desired future scenario depends on each actor fulfilling a specific role that strengthens the system as a whole.

Figure 14: A well-connected ecosystem



Source: ITU

National and local governments – alongside wider public institutions – must articulate a public-purpose mission, set and enforce coherent rules, and provide the enabling environment for equitable, safe and accountable health care. Their responsibilities include building core public health and digital infrastructure, coordinating emergency responses, and ensuring that services reach all communities.

The private sector must build and operate essential infrastructure – including health-care facilities, energy systems, connectivity, digital rails and health-tech solutions – and align products with public-purpose standards. By investing in interoperable, affordable and high-quality innovations, private actors can help to expand access and strengthen system performance.

Financiers – including public budgets, development finance institutions, blended-finance vehicles, private investors and venture capital – need to mobilize and allocate capital in ways that strengthen prevention, resilience and equity. This involves prioritizing primary health care in national budgets, pooling predictable funds for mission-aligned projects, and using development finance strategies to de-risk new solutions.

Researchers and academic institutions contribute by strengthening learning loops: setting relevant research agendas, analysing evidence, and providing insights for adaptive governance. Training institutions must develop a workforce with the scientific, technical and managerial skills needed to operate in modern health-care systems.

Innovators, entrepreneurs, small and medium-sized enterprises and support networks must develop inclusive, context-appropriate solutions that improve access, safety and resilience. Their contribution includes building on open digital rails, partnering across sectors and designing tools that strengthen, rather than bypass, public capacity.

Delivering such an ambitious future requires deliberate collaboration mechanisms rather than transactional engagement. Deliberate collaboration mechanisms provide the structures around which diverse actors can align. Together, they can enable the health-care ecosystem to harness technology responsibly, adapt to evolving societal needs, and advance towards a digitally-enabled, inclusive and resilient future for health-care.

7.2 Activating implementation mechanisms

Building processes and platforms for meaningful collaboration

Delivering on a shared vision requires not just defined roles, but also structured mechanisms that enable stakeholders to collaborate effectively over time. Platforms for engagement, transparent governance arrangements, catalytic partnerships, and open communication channels are essential to translate strategic intent into coordinated action. By institutionalizing inclusive processes and feedback loops, ecosystems can sustain momentum, strengthen trust, and ensure that implementation remains adaptive, accountable, and aligned with long-term objectives.

Table 6: Platforms and structured mechanisms for stakeholder collaboration

CHAMPIONS FOR SHARED OWNERSHIP		
The success of a roadmap depends on the active involvement of stakeholders. Stakeholder analysis can assist in identifying priority stakeholders and champions from across the public and private sectors, financial institutions, academia, and entrepreneurial ecosystems. For this study, these include ministries and departments responsible for health, finance and ICT (or digital economy, technology or innovation – names differ by country); regulators; local/city government; telecommunication companies, medical tech companies, cloud services and infrastructure providers; development finance institutions and investors; entrepreneurial support agencies; civil society; startups and small, medium and micro enterprises. Engagement strategies could include bilateral consultations, communities of practice or public-private co-design workshops to identify interests, shape alignment and build shared responsibility.		
GOVERNANCE FOR TRUST AND ACCOUNTABILITY	PARTNERSHIPS FOR CATALYTIC ENGAGEMENT	COMMUNITY FOR SHARED LEARNING
In a world of strained relationships and growing distrust – including in government and technology companies – the success of any roadmap depends on governance mechanisms that builds legitimacy through substantive engagement and transparent oversight. A dedicated, multi-stakeholder coordination body should be established, comprising representatives from across the stakeholder landscape (see above). It should also ensure the inclusion of diverse social groups to embed equity into governance structures. The formation of this governing body should be guided by structured consultations and co-creation processes that build legitimacy, ensure local ownership, and secure long-term commitment across stakeholder groups.	Catalytic partnerships are essential to mobilize capital, accelerate knowledge transfer and learning, and build capacity of governments and entrepreneurs. Governments, corporates, investors, academia, multilateral bodies, regional development banks, and enterprise leaders must align around shared objectives—such as universal and equitable access to health-care services; local ownership; safe tech and shared benefits—to coordinate priorities and scale good practices, across borders. These partnerships should be anchored in co-investment, policy co-creation, and ecosystem development, and initiated through thematic roundtables, sectoral working groups, or co-design workshops to activate purpose-driven alliances.	When it comes to the fast-changing world of technology, applied in a high priority sector such as health care, it is crucial to learn from one another, share what works and navigate change together. The roadmap therefore proposes the creation of two communities of practice – one on regulating for tech innovation in health care, and one on resilient health systems – as well as a Tech-4Health research consortium or network. In addition, an overarching community can share knowledge and lessons across themes and initiatives. Co-design workshops or ecosystem events should be held to test the appetite for such a community and give shape to a grouping that can catalyse continuous learning, shared responsibility, and mutual support.
COMMUNICATING AND ADVOCATING FOR IMPACT		
The first objective of any communications campaign that touches on health-care and frontier technologies should be to address mis- and disinformation. This is what the proposed digital health literacy campaign aims to do. Achieving that goal is vital to ensuring the development and adoption of trusted and trustworthy health technologies that contribute to improved quantity and quality of life for all. In addition, ecosystem actors should jointly develop a compelling communication strategy—highlighting enterprise success stories, policy wins, inclusive innovation, and transformative sectoral breakthroughs. Narratives should be anchored in data and focused on impact, including improvements in QALY and reductions in CHE. Methods could include media campaigns and thought leadership in forums such as the United Nations, the G20 or the World Economic Forum.		



Annex

Global best practices

Parametric insurance to top up the health response (Africa)

African Risk Capacity's outbreak and climate risk management products (e.g. in Malawi 2025) release pre-agreed financial payouts quickly, which is especially useful in situations where timing could save lives.

Pooled procurement reduces stock-outs (Americas)

Pooled procurement mechanisms (such as the Pan American Health Organization Revolving Funds) reduce medical supply stock-outs. This is an example of strong execution paired with pooled financing.

Anticipatory finance buffers against shocks (Bangladesh)

Parametric insurance funds heat and health management measures before impact; the government of Bangladesh activated a heatwave early action protocol in 2024. This is a signal that the agenda for combatting climate-related health risks is moving to pre-agreed, rules-based finance.

Personal data vaults (Belgium)

Athumi and Inrupt are rolling out solid server personal data vaults in Flanders, with health being one the first domains covered. This is an example of a state-backed path to citizen-centric data-sharing and consent at scale.

Development impact bonds for care delivery (Republic of Cameroon)

The Cameroon Cataract Development Impact Bond provided a loan to fund the building of a hospital. The aim of the project was to use the revenue generated by middle-income patients to pay for or subsidize care for low-income patients. This is evidence that pay-for-performance care can work outside of high-income countries.

National Telemedicine Platform (China)

The Chinese national telemedicine platform connects top-tier hospitals in major cities with smaller hospitals and clinics in rural areas, as well as with partner medical institutions in other countries, including the Republic of Zambia and the Kingdom of Morocco, allowing doctors to share diagnostic imaging, lab results and patient data in real time.

Debt-for-health swaps (Federal Republic of Germany-Indonesia)

Debt for health swaps turn debt service into domestic health investment. The landmark agreement between Germany and Indonesia, the largest to date, was signed in 2024 (amounting to EUR 75 million) and reviewed in 2025, showing a growing pipeline.

Mayors Migration Council (MMC - Global)

The Global Cities Fund for Migrants and Refugees channels financial and technical resources directly to city governments via MMC, so that mayors are able to address urgent needs while building the case for sustained investment and lasting change.

Ayushman Bharat Digital Mission (ABDM)/Unified Health Interface (UHI) (India)

The ABDM is building a national digital rail system, including by issuing millions of Ayushman Bharat Health Account identification numbers and developing a unified health interface that integrates telemedicine.

Mobile health wallet (Kenya)

M-TIBA is a mobile health wallet and platform linked to the Kenyan Social Health Authority that connects patients, health-care providers, and payers to medical payments, insurance benefits, and savings.

Digital Tanzania Project (Tanzania)

The Digital Tanzania Project is modernizing public services, with a strong focus on health care. It features telemedicine, connecting rural clinics with urban specialists, integration with mobile platforms, data analytics providing actionable insights, and strong governance and legal framework (Tanzania Personal Data Protection Act, 2022).

Sufficiency economy (Thailand)

Sufficiency economy philosophy, an economic theory introduced by the King of Thailand in 1974, contributes to lifestyle improvements and preventive care in Thailand.

OpenSAFELY – a national-scale TRE (United Kingdom)

OpenSAFELY is a TRE at national scale that supports distributed or federated analyses. This initiative shows that it is possible to conduct large-scale, reproducible health science research without moving raw data.

Regulatory sandbox for health AI (United Kingdom)

The Medicines and Healthcare products Regulatory Agency in the United Kingdom has developed AI Airlock - a regulatory sandbox for health AI. The live sandbox for AI-as-a-medical-device is due to trial safe, adaptive algorithms with the NHS. AI Airlock builds real-world oversight for high-risk AI before mass roll-out.

Regulations against information blocking (United States)

In the United States, regulations against information blocking mandate that health-care providers offer patients access to all health information contained in their medical records, without delay and without charge, with steep fines for non-compliance.

City-run health access programme (United States)

NYC Care is a municipal programme successfully facilitating access to primary care for previously uninsured residents.

Abbreviations

Abbreviation	Full form
AI	Artificial intelligence
CHE	Catastrophic health expenditure
CHWs	Community health workers
DPI	Digital public infrastructure
EHR	Electronic health records
FHIR	Fast health-care interoperability resources
GDP	Gross domestic product
GDPR	General Data Protection Regulation (European Union)
GIS	Geographic Information System
IP	Intellectual property
NCDs	Noncommunicable diseases
NEET	Not in employment, education, or training
NIS2	Network and Information Systems Directive 2 (European Union)
OOP	Out-of-pocket (referring to health expenditure)
PHC	Primary health care
QoL	Quality of life
QALY	Quality-adjusted life year
TRE	Trusted research environment

Glossary

Term	Definition
Catastrophic health expenditure (CHE)	A measure of financial hardship caused by health-care costs. It occurs when a household's out-of-pocket spending on health exceeds a defined share of its income or capacity to pay—often set at thresholds such as 10 per cent, 25 per cent, or 40 per cent. CHE indicates that health expenses are large enough to threaten a household's ability to maintain basic living standards.
Desired scenario	The most desirable future outcome, based on stakeholder values, aspirations, and strategic priorities.
Drivers	The key forces or underlying factors that influence or shape change within a system. Drivers may be internal or external, and they can feature economic, technological, political, environmental, or social aspects. They often interact and evolve over time, shaping future scenarios.
Health-care system	The overall structure and dynamics of the health-care system, including institutions, policies, practices and technologies.
Foresight	A structured approach to exploring possible futures by identifying trends, drivers, uncertainties, and opportunities to inform long-term decision-making and strategy.
Futures thinking	The mindset and practice of considering multiple plausible futures to anticipate change and guide proactive action in the present.
Innovation ecosystem	A dynamic network of institutions, stakeholders, policies, and technologies that collectively enable innovation, collaboration, and systemic transformation.
QALY	An indicator used in health economics that covers both quantity and quality of life in a single measure. One QALY represents one year of life lived in perfect health. Years lived in less-than-perfect health are weighted by a quality factor (for example, 0.5 for moderate illness). Compared to life expectancy, QALY considers both length and quality of life in assessing health outcomes.
Scenario	A narrative or model that describes a plausible future state based on drivers and uncertainties.
Signals	Early indicators or weak signs of change that may point to emerging trends, disruptions, or innovations in their early stages.
Stakeholder engagement	A participatory process of involving key actors in shaping decisions, aligning efforts, and ensuring the shared ownership of outcomes.
Transformation pathways	Strategic routes or sequences of actions taken to move from current conditions towards a preferred future scenario.
Trends	Patterns of change that have already gained momentum and may continue to shape the future over time.

Term	Definition
Trusted research environment (TRE)	A secure, governed digital environment that allows approved researchers to access and analyse sensitive health data without removing or duplicating it. TREs operate under strict controls—such as audit logs, data minimization, and policy-as-code frameworks—to protect privacy and maintain trust while enabling data-driven innovation and public interest research.
Weak signals	Early signs of potentially important changes that are not yet widely recognized or understood. Weak signals may indicate the emergence of new trends, disruptions, or innovations, and they are often detected on the margins of mainstream awareness.
Wildcards	Low-probability, high-impact events or developments that could significantly disrupt current trajectories.

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