Executive Summary

Reimagining Global Health
through Artificial Intelligence:
The Roadmap to AI Maturity

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BROADBAND COMMISSION
FOR SUSTAINABLE DEVELOPMENT

Reimagining Global Health through Artificial Intelligence: The Roadmap to AI Maturity

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Executive summary

The report holds that while low- and middle-income countries may have the most to gain from the radical potential of Artificial Intelligence (AI) to transform health systems, they may also have the most to lose.

AI is revolutionizing healthcare with game-changing capabilities

AI should not replace humans but rather enhance capabilities

AI-powered solutions are participating in more and more medical tasks traditionally performed by healthcare practitioners. AI capabilities can assist with tasks performed by highly skilled medical workers and tasks that go beyond human cognition (e.g., processing big data to diagnose illness), as well as tasks that support humans but are often subject to inattention, cause fatigue, or are physically difficult to perform. Across the entire care spectrum, AI capabilities in healthcare are performing hard work.

AI should not replace health workers, but the profession will undoubtedly evolve

As AI increasingly enters healthcare, good governance should ensure that physicians will see the upside of less administrative work and more patient-facing time. Humans and machines should work together to improve patient outcomes, strengthen health systems, and drive progress towards universal health coverage (UHC). AI will also create new jobs across sectors. Yet, the new jobs will not necessarily emerge within the same professional specialization or same geography where old jobs are being replaced by AI. Therefore, sequenced action and policy timing are crucial, with measures taken to ensure workforce disruption is accompanied by appropriate change management, social safety nets, and professional retraining opportunities.

AI addresses key global and national health issues

In low- and middle-income countries (LMICs), AI has the potential to address longstanding, systemic health issues with new advanced capabilities. Many LMICs are dealing with:

A shortage of health workers

The doctor-to-population ratio is markedly lower in LMICs, especially in rural settings.

Emerging threats

From COVID-19 to climate change and antimicrobial resistance (AMR), emerging threats present new challenges to existing health systems.

A dual burden of disease

Rising rates of noncommunicable diseases (NCDs) and infectious diseases combine to present a dual burden of disease in many LMICs.

Underserved populations

Over 734 million people live on less than USD 1.9 per day[1] and lack access to essential health and care services.

Rapid urbanization

Urbanization is increasing rapidly, with nearly 70% of people projected to live in cities by 2050[2], which is expected to widen health inequities.

Misinformation & disinformation

Adequately managing Ebola, COVID-19, or other outbreaks and diseases is often hindered by a deluge of misinformation and disinformation, causing unnecessary suffering.

To combat today's growing health challenges, we need to systematically integrate AI-enabled tools into the way healthcare is delivered and expand access for all. Without AI, UHC may not be achieved.

Yet, there are also risks associated with the use of AI in health, particularly for vulnerable populations, youth, and children. Successful integration of AI into health and care delivery depends on appropriate risk management processes that have been defined and operationalized for AI development, deployment, and continuous improvement.

To deliver on its promise, AI boasts an arsenal of capabilities
The report identifies five use cases for how AI is applied to address global and public health priorities, strengthen health systems, and improve outcomes for patients.

1. **AI-enabled population health**
   Solutions that use AI to monitor and assess the health of a human population, and select and target public health interventions based on AI-enabled predictive analytics.

2. **AI-enabled preclinical research & clinical trials**
   Solutions that use AI to assist drug discovery and design, omics technologies for highly personalized treatments, and AI tools for clinical trial design and execution.

3. **AI-enabled clinical care pathways**
   AI-based solutions that can be integrated into existing and new clinical workflows.

4. **AI-enabled patient-facing solutions**
   AI solutions that interact directly with patients, including personalized health coaching and life-style advice, the delivery of (mostly non-clinical) therapies, chatbots, interventions without the risk of harm, and information provision.

5. **AI-enabled optimization of health operations**
   AI solutions that optimize back-end processes in healthcare, such as procurement, logistics, staff scheduling, emergency service dispatch management, automated medical notes, and patient experience analyses.

The results so far are encouraging. AI has a proven track record across all five use cases, having improved or saved patient lives, augmented the capabilities of health workers, and strengthened health systems across the world. **Yet, we have only scratched the surface!**

Top 5 use cases for AI in health

1	2	3	4	5
Population health	Preclinical research & clinical trials	Clinical care pathways	Patient-facing solutions	Optimization of health operations

Figure 1: Top 5 use cases for AI in health

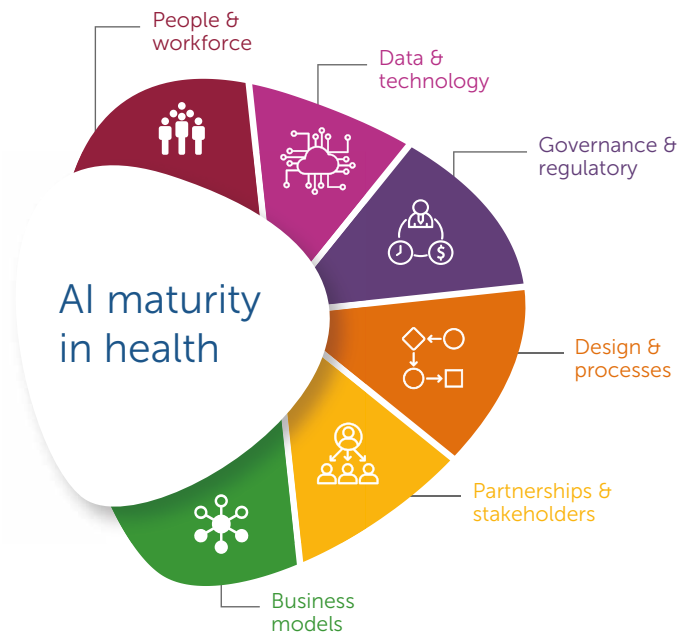## Six areas for AI maturity in health

Figure 2: Six areas for AI maturity in health

To bring AI capabilities to the next level for health systems, UHC and patients, countries need to be proactive and foster a robust enabling environment for needs-driven AI.

To build and continuously improve a healthcare innovation ecosystem, the report identifies **six areas for AI maturity in health** that countries should prioritize to advance on their journey to AI maturity.

1. People & workforce
   Countries should prioritize AI and data science in their national health education curricula for pre- and in-service training and formal education. They should strengthen level-appropriate offerings for both technical and non-technical roles and prioritize the soft aspects of technology solutions: human-centric design and behavioral aspects.

2. Data & technology
   Countries should prioritize the foundations: robust technology architecture, connectivity, access to quality and representative data, data privacy and security layers, data stewardship, interoperability, fair and transparent algorithms and AI models, and explainability. Critical to achieving this are consent-driven policy frameworks, a strong data and AI strategy, robust technology implementation roadmaps, and the formulation of relevant best practices.

3. Governance & regulatory
   Leadership is critical to establish the robust governance structures and regulations necessary to ensure AI innovation targets national health priorities. Keys to good AI governance are: a national strategy and budget development, clear costing and implementation plans, privacy- and security-preserving regulations that put people first while balancing innovation, and the integration of human rights and a social contract. Likewise, regulators should continuously develop appropriate clinical and scientific validation pathways.

4. Design & processes

Existing national health systems and clinical workflows are not always ready to integrate AI solutions. Relevant stakeholders may want to perform gap analyses for technical and user requirement specifications and collaborate broadly to ensure successful integration. Professional societies and academies, government agencies, and the private sector should collaborate to streamline the integration of AI into health systems. The localization of solutions into deployment contexts, performance measurements for outcomes-based validation, and human-centric design should also be prioritized to enable AI impact in healthcare.

5. Partnerships & stakeholders

Countries should support effective, goal-oriented partnerships (e.g., multi-sectoral public-private partnerships, data collaboratives), coordinated prototyping, stakeholder engagement and participation in international working groups or task forces, and strong relationships with local partners and patient organizations. Perhaps most important of all, progress on the path to AI maturity requires the cultivation of high-level political support across ministries and the head of state.

6. Business models

Innovative and sustainable business models should be a priority for countries and stakeholders across the healthcare, tech, and life sciences industries, and for the public sector. Countries should foster a diverse set of funding mechanisms guided by a long-term outlook for AI in health solutions. They can develop incentive mechanisms, experiment with novel pricing models and monetization strategies for assets, and advance the use of innovative financing mechanisms for social impact.

To create an AI-enabling environment, policymakers, donors, private companies, and other stakeholders should proactively invest in the six areas for AI maturity in health. The recommendations in the report's last chapter detail specific action points and recommendations for each stakeholder group, and can help navigate challenges, pursue best practices, and strengthen AI-enablers.

Policymakers, the private sector, international non-governmental organizations (INGOs), and other stakeholders have a wealth of experience and knowledge capital. To truly maximize the impact of AI on health, collaboration is essential to cultivate an AI-enabling environment that accelerates the achievement of Sustainable Development Goal 3 and health for all, and facilitates progress towards extending and improving people's lives and health.

References

1   The World Bank (2020). Poverty: Overview. Available at: https://www.worldbank.org/en/topic/poverty/overview (Accessed July 2020)
2   United Nations, Department of Economic and Social Affairs (2018). News: 68% of the world population projected to live in urban areas by 2050, says UN. Available at: https://www.un.org/development/desa/en/news/population/2018-revision-of-world-urbanization-prospects.html (Accessed July 2020)

AI is "the science of making machines do things that would require intelligence if done by people".

— John McCarthy

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