Situational Analysis of Global Digital Health and Artificial Intelligence for Health

Digital health[1] tools have been proliferating globally, including in bioinformatics, telehealth, telemedicine, screening, diagnosis, biomarkers, omics, therapeutic selection, disease management (including remotely), medical image analysis and motion recognition, surgery, pathology, tumor and organ analysis, pandemic prediction, blockchain data/records management, trials and medicine discovery. Such tools have huge transformative potential for health and medicine, but also pose many challenges, each of which is potentially within the remit of the strategy group:

- Efficacy and equity — It is not always clear what works, in what settings, and who benefits. A particular focus will be on the needs of the bottom two billion people on the planet and vulnerable and ageing populations everywhere. Tremendous innovations in digital health have taken place in the global south during the current pandemic with many lessons to be shared with the global north. Those working on healthy ageing have also been innovating to foster healthy life for longer. Researchers and practitioners from the global south will be key partners in, and not mere recipients of, digital and AI innovation. Indeed, there is a huge opportunity for reverse innovation, from resource-poor settings—where digital (and, increasingly, AI) technologies have been used to make health systems more resilient and cost efficient—to more developed country settings.
- Ethics and trust — Patient data can be misused, leading to discrimination and exclusion. Data governance policies, ethical guidelines, and appropriate digital tools to enable their implementation need to be developed. Increased data sharing makes health-data cyber-security a high priority, too.
- Payment — Traditional approaches to demonstrating value, and modes of reimbursement, pricing, and financing are significant barriers to implementation, and are in need of pragmatic innovation.
- Funding and investment — Developing and implementing digital and AI technologies at scale needs resources, which means some attention is needed to digital tech finance mechanisms, including R&D incentives, and science funding mechanisms.
- Regulation — Common data standards and long-term inter-operability, shaped by patients' and service providers' needs and constraints, are critical for accelerating applications in resource-poor health settings.
- Health systems — Improving health data in LMIC hospitals means building local 'intelligence' in terms of skills and the organisation of people to meaningfully use such data, and health systems that are continuously learning and improving. Discovery, in digital health as much

[1] The World Health Organization (WHO) defines digital health as 'a broad umbrella term encompassing eHealth (which includes mobile health), as well as emerging areas, such as the use of advanced computing sciences in big data, genomics and artificial intelligence' https://www.euro.who.int/en/health-topics/Health-systems/digital-health.

as in any other area of medical intervention, becomes a natural outgrowth of patient care, leading to more rapid adoption of findings and improved quality and outcomes. Often, good innovations are not being used as a result of constraints elsewhere in the system or society. This necessitates proper focus on the techniques of health system implementation science and tackling such constraints so that proven effective interventions can be matched with knowledge on how to deliver them so that they can make a difference in real-world settings.

- Human-centered design of digital health — Most digital health innovations fail after they have been developed, not because they are technically deficient but because they do not fit workflows or help those providing, or receiving, care in their day-to-day activities. They have no value to users even if they have a logical value for the system. They solved the problems outsiders imagined, not the problems that insiders knew existed. Furthermore, perspectives shaped predominantly by academic approaches may not fully reflect local context and on-the-ground realities, which are often much better understood by practitioners and innovators with years of experience in such settings. Bringing these groups together is potentially extremely fruitful in both directions. Policy makers, service providers, local innovators, and patients in routine settings must become partners in the digital-health and AI learning enterprise.
- Supply chains and quality — in situ medical and public health sustainability, especially in resource-poor settings, can be greatly strengthened if data is better garnered from the whole supply chain, including medical research, and if local AI capacity is strengthened to make timely use of such data.
- Optimised health information systems — These are critical to effective performance measurement and management. Within Europe and globally, there are great opportunities for integrating and interrogating data at scales linked to respective health problems and clinical practices, and improving evidence-based medicine practices.

The above-described situational analysis is neither meant to be an exhaustive list nor a comprehensive summary of the key issues. Its goal is to serve as a basis for discussion within the DH&AI GHS group. We hope that the multi-disciplinary and international expertise gathered in the group will allow for the discussion of the global health possibilities of, and challenges facing, digital health and AI to 1) identify any key aspects omitted in the summary above, 2) bring clarity regarding the relative priorities, impacts, and inter-dependencies of the key challenges faced in utilising the potential of digital health innovations and AI effectively and equitably, and 3) inspire an action plan that reflects the steps required for a globally cooperative, equitable, implementation of digital health innovation and AI that promotes global health and well-being.