

**WHO Consultation
Towards the
Development of guidance on ethics and governance of artificial
intelligence for health**

Geneva, Switzerland, 2–4 October 2019

Meeting report



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Contents

<i>Acknowledgements</i>	iv
<i>Executive Summary</i>	v
1. Introduction	1
2. The importance of ethics in artificial intelligence	2
3. Artificial intelligence is changing the health sector	3
4. Ethical use of artificial intelligence: principles, guidelines, frameworks and human rights standards	8
5. Challenges to ethics and governance	11
6. Addressing challenges to ethics and governance	16
7. Consensus points	20
8. Conclusion	20
References	22
Annex 1. List of participants	25
Annex 2. Agenda	28

Abbreviations and acronyms

AI	artificial intelligence
LMIC	low- and middle-income countries
OECD	Organization for Economic Co-operation and Development

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WHO convened an expert consultation to discuss ethics and governance in use of artificial intelligence for health, at WHO headquarters in Geneva, Switzerland, on 2–4 October 2019. The meeting was organized by Andreas Reis (Global Health Ethics unit) and Sameer Pujari (Department of Digital Health), under the guidance of Vasee Moorthy and John Reeder (Director, Department of Research for Health), Bernardo Mariano (Director, Department of Digital Health), and Soumya Swaminathan (Chief Scientist). WHO is grateful to the panel of experts who contributed to this report (Annex 1) and notably to the Chairs of the expert group, Professor Effy Vayena and Professor Partha Majumder, for their input in the conceptualization and realization of the project.

Special thanks are due to Tracy Swan, who served as rapporteur and prepared the first draft of this report. All the experts were invited to comment on the draft. Rohit Malpani, a consultant with the WHO Health Ethics and Governance Unit, supported the meeting, prepared the concept note and communicated with the invited experts.

Executive Summary

Artificial Intelligence (AI) consists of computing technology that performs similarly to human intelligence. AI might transform medicine, and its applications could be adapted for broader use, including pharmaceutical research and development, public health surveillance and health care management. While AI offers possibilities for improving health services and delivery, there are numerous questions about the ethics of developing and using these technologies, including whether and how AI can cross the digital divide to ensure that low- and middle-income countries (LMIC) will benefit from it. Many trans-national ethical, legal and social concerns should also be addressed, including equitable access, privacy, appropriate use and users, liability, bias and inclusiveness.

Although some government agencies, academic institutions, nongovernmental organizations and national ethics committees are addressing the ethical issues associated with use of digital technology in health care, there is no international guidance specific to health care. Harmonized ethics guidance is essential for the design and implementation of ethical AI in global health.

As the specialized United Nations agency for health, WHO is well-placed to develop a global framework for ethics and governance in AI to ensure that such technology is aligned with the broader aims of promoting fair, equitable global health, that it satisfies human rights standards and contributes to the commitments made by Member States to achieve universal health coverage. WHO is convening a group of international experts to develop guidance for Member States on ethics and governance of AI in health. The guidance development is a collaborative initiative of the Global Health Ethics unit and the Digital Health Department in WHO's Division of the Chief Scientist and WHO collaborating centres and colleagues. The process of guidance development will be in line with WHO's policies for developing norms and standards and will include several consultations of the established multi-disciplinary expert group, wide consultation with all relevant stakeholders and peer-review.

The present document is the report of the first expert meeting, which was held 2–4 October 2019 at WHO in Geneva. Participants discussed current and potential AI applications for global health in the context of existing frameworks and human rights standards. The participants considered the main challenges of ethics, governance and equitable access and discussed potential solutions. The expert meeting has established a foundation for the second meeting which will be held on 5 and 6 March 2020 in Copenhagen, Denmark. The publication of the WHO guidance document on Ethics and governance of AI for health is envisaged for completion in 2020.

1. Introduction

Digital technologies, machine learning and artificial intelligence (AI) could transform the fields of medicine, research and public health. The tools, methods and technology used for “Big Data” and in AI are being applied to health services and systems globally. While they hold great promise, this rapidly developing field raises trans-national ethical, legal and social concern about equitable access, privacy, appropriate uses and users, liability, bias and inclusiveness. Machine learning algorithms also pose novel ethical challenges in software engineering. Many unanswered questions remain about the ethical development and use of these technologies, including whether and how low- and middle-income countries (LMIC) will benefit from the developments.

Currently, there is no universal definition of AI. The term is commonly used to describe computing technology that works similarly to human intelligence, such as visual recognition, learning, reasoning, problem-solving, decision-making and adapting to change. The main objectives of AI technologies and applications are to emulate, complement, augment and enhance human capabilities in solving tasks. Although these processes may be like those performed by humans, their scope in AI systems is strongly limited, and they are not combined in the complex ways that allow human decision-making. Nonetheless, AI-based applications could be adapted for use in the health sector in research and development, public health and health care management. Currently, AI-based applications in health care are used mainly in high-income countries for individualized health care and for strategies such as automated diagnostics and promoting healthy behaviour.

Several government agencies, academic institutions, nongovernmental organizations and national ethics committees have begun to address the ethical issues and challenges associated with digital technology in general, but there is no international guidance on its use in health. Harmonized ethics guidance should therefore be developed for the design and implementation of AI in global health. For this reason, WHO has started an initiative to develop a global framework for ethics and governance to ensure that AI-based technologies are consistent with the broader aim of promoting fair, equitable global health and assuring universal health coverage.

Building on a previous WHO consultation on ethics, Big Data and AI (1), WHO aims to prepare guidance for Member States on ethics and governance of AI in health in 2020. This initiative is a collaboration of the Global Health Ethics team and the Digital Health Department in WHO's Division of the Chief Scientist, other WHO colleagues, and WHO collaborating centres with specialized expertise. A group of external international experts was convened to advise WHO on the development of a globally relevant framework and guidance.

WHO's Department for Digital Health and Innovation

WHO has established a new Department of Digital Health and Innovation to enhance its role in assessing digital technologies and supporting Member States in prioritizing, integrating and regulating these technologies. WHO is committed to harnessing the possibilities of digital technologies through its programmes and collaboration and by:

- issuing evidence-based guidelines on mobile and digital technologies and recommendations after extensive consultation with experts on ways to maximize the impact of these tools on health systems and people's health (2);
- communicating with other stakeholders to ensure that new and existing digital platforms have a positive impact on people's lives; and

- participating in new collaborations and partnerships, such as the Precision Public Health Initiative (see below), Be He@lthy, Be Mobile (3), a joint initiative with the International Telecommunication Union on use of mobile technology to improve the health of people at risk of or with a noncommunicable disease and the WHO–International Telecommunication Union and European Commission mHealth Innovation and Knowledge Hub (4), a collaboration funded by the European Union Horizon 2020 to establish an mHealth Innovation and Knowledge Hub for Europe.

The mission of WHO's Department for Digital Health and Innovation is to ensure that digital health contributes to attainment of the highest level of health for all through the “triple billion” goals of the WHO 13th General Programme of Work and Sustainable Development Goal 3, to ensure healthy lives and promote well-being for all people at all ages (5).

At the World Health Assembly in 2018, Member States unanimously adopted resolution WHA71.7 (6), which calls on WHO to prepare a global strategy on digital health to support national health systems in achieving universal health coverage. In September 2019, the United Nations hosted a high-level meeting to finalize commitments and recommendations for achievement of universal health coverage by 2030.

WHO guidance on ethics and governance of artificial intelligence in health

In 2019, WHO's Digital Health Department and Global Health Ethics unit, under the Office of the Chief Scientist, initiated a project to prepare guidance on ethics and governance for the design and use of AI in global health. The first step was a joint international consultation in October 2019, with participants from government, inter-governmental agencies, academia, civil society and industry. The objectives of the consultation were to:

- discuss current and anticipated uses of AI technology for health and the ethical considerations and human rights principles that should guide their use;
- examine the initiatives of international organizations and governments; and
- give advice on the format and content of guidance on ethics and governance to be elaborated at further consultations planned for 2020.

This report summarizes the presentations and discussions at the meeting.

2. The importance of ethics in artificial intelligence

AI could help shape the future of individual and global public health and help countries to achieve universal health coverage. However, AI can be part of both the solution and the

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