HEALTH IN A DIGITAL WORLD

SheffWHO

THEME GUIDE

SHEFFWHO 2020

MAY 1-2

THE UNIVERSITY OF SHEFFIELD

SHEFFIELD WORLD HEALTH ORGANIZATION SIMULATION

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We would like to recognize the Cathedral Archer Project, a charity based in Sheffield City Centre which helps homeless people achieve a better life through supporting them to develop their independence, improve their ability to tackle setbacks, identify and change negative behaviour and improve their wellbeing. The Cathedral Archer Project will be partnering with SheffWHO to provide conference photographers. More information on the Cathedral Archer project is available on page 33.

We would also like to extend our deepest gratitude to our amazing Theme Guide Directors who were directly involved in the development of this document: Ines Siepmann and Nguyen Thi Minh Anh. Your hard work and commitment to completing this document is greatly appreciated!

Lastly, we would like to thank you, the delegates for being a part of SheffWHO 2020. We look forward to an interesting and exciting conference centred around addressing the issue of "Health in a Digital World".

Regards,

SheffWHO Team 2020

Messages from the theme guide directors

I'm Ines Siepmann, a masters student at the University of Sheffield. I'm a member of the Erasmus Europubhealth+ programme, and am studying public health leadership and governance at the University of Sheffield and Maastricht University. I'm extremely passionate about public health and have loved working on the theme guide and exploring the extremely pertinent topic of digitization of health. This will be my first conference of this type, and I'm looking forward to engaging with the material and learning from all those attending.

My name is Minh Anh, a postgraduate student at the University of Sheffield, majoring in Public Policy. I started doing Model United Nations activities three years ago in Japan, and I am excited to continue doing United Nations simulations and challenge myself at World Health Assembly simulations in the UK. I believe SheffWHO is a platform for everyone from all disciplines and socioeconomic backgrounds to interact, to voice their opinions, to learn valuable professional skills, and to network. As your Theme Guide Director, I hope that after SheffWHO 2020 conference, all delegations will enrich themselves with knowledge of public health affairs, grow academically and personally, make unforgettable memories, and importantly, have fun!

Introduction to SheffWHO 2020

Model WHO events are educational simulations whereby participants recreate the process of the annual World Health Assembly (WHA) as held at the World Health Organization (WHO) Headquarters in Geneva. Here at SheffWHO, we will be offering students, alumni and professionals from all disciplines the opportunity to convene and engage with an important global health topic, embracing the role of delegates of the WHA.

SheffWHO is organised by a dedicated and passionate team of University of Sheffield postgraduate students in public health and international politics. We are mostly international students, representing 4 continents and regions of the WHO.

The third of its kind in the Steel City, SheffWHO 2020 will explore the theme “Health In A Digital World: From A Reactive to A Proactive Approach” from May 1-2, 2020. Delegates attending will represent as a WHO Member State (WHO Ambassador), whose role is to represent your country’s interests throughout the simulation, especially during regional blocs and plenary. Member States collaborate with other Member States to form alliances and write collaborative resolution papers. Throughout this event, delegates will discuss, cooperate, and negotiate with each other in order to produce resolution papers that address the simulation theme.

This simulation aims to address important questions across the weekend. Delegates can explore these questions over the course of the SheffWHO event, concluding with the development and approval of resolution papers with how to address this topic. Our aim is to transfer approved resolutions to WHO Headquarters to demonstrate the creative capacity of the next generation of global health leaders.

As delegates are not required to have any experiences in health policy to participate, we welcome delegates from all disciplines to mingle and enrich debates in digital health in this 2020 conference. Whether you're studying journalism, politics, economics, computer science, public health or medicine, this diversity will ensure the creation of a variety of interventions to tackle global health issues. At the end of SheffWHO 2020, people will be equipped with the tools to become a more confident and competent global health actor and practitioner.

SheffWHO

Introduction to the World Health Organization

The history of WHO dates back to the end of World War II, when global leaders came together to lay the foundation for the United Nations and discuss the necessity of a global health organisation. WHO was officially established in 1948 as the Constitution came into force on April 7, thus marking the celebration of the World Health Day.[1]

The organisation's roles of monitoring and coordination of international health cover various areas, including "health systems; health through the life-course; non-communicable and communicable diseases; preparedness, surveillance and response; and corporate services."[2] WHO also plays a pivotal role in supporting governments and partners to form bilateral or multilateral agreements as well as enhancing the role of civil society organisations and the private sector in forming and implementing national health policies and strategies.

Some of the most significant contributions of the WHO include its global vaccination programme which led to the eradication of smallpox by 1980, and its leadership in combating the severe acute respiratory syndrome (SARS) epidemic in 2003.[3] The

1. World Health Organization, 'Who We Are', World Health Organization, 2020 <who.int/about/who-we-are> [accessed 5 January 2020].
2. World Health Organization, 'About WHO', World Health Organization, 2020 <who.int/about> [accessed 5 January 2020].

organization has the exclusive authority to declare global health emergencies, with its most recent declaration in January 2020 due to the outbreak of the COVID-19 originating from China.[4]

The WHA is the decision-making organ of the WHO, in which delegations from all WHO Member States attend and direct attention to a specific health agenda that has been formulated by the Executive Board. The WHA does not, however, only focus on this specific health agenda. It also takes on the following functions: determining the organization's politics; supervising the financial policies; reviewing and approving programme budgets that have been proposed; and appointing the Director-General to the WHO.[5] The World Health Assembly takes place annually in Geneva, Switzerland.

The seventieth World Health Assembly 2017

For more information related to the WHO and the WHA, please visit: who.int/.

3. World Health Organization (WHO), 'Emergencies preparedness, response', World Health Organization, 2016 <who.int/csr/disease/smallpox/faq/en/>; Council on Foreign Relations, 'The World Health Organization', 2020 <cfr.org/backgrounder/world-health-organization> [accessed 5 February 2020].
4. WHO, 'Statement on the second meeting of the International Health Regulations (2005) Emergency Committee regarding the outbreak of novel coronavirus (2019-nCoV)', World Health Organization, <who.int/news-room/detail/30-01-2020-statement-on-the-second-meeting-of-the-international-health-regulations-(2005)-emergency-committee-regarding-the-outbreak-of-novel-coronavirus-(2019-ncov)> 2020 [accessed 5 February 2020].
5. WHO, 'World Health Assembly', World Health Organization, 2020 <who.int/about/governance/world-health-assembly> [accessed 5 January 2020].

Introduction to the agenda

In the age of rapid technological development, our life greatly depends on and benefits from the technologies around us, from household appliances and transportation vehicles to communicative platforms and healthcare. *Artificial intelligence (AI)*, for example, is not only used in self-driving cars or voice-recognition smartphones but it also plays a key role towards the achievement of the Sustainable Development Goals (SDGs) of the United Nations, especially Goal 3: Good Health and Well-being.[6] In the AI for Good Global Summit, the UN Secretary-General António Guterres (2017) stated that: "Artificial Intelligence has the potential to accelerate progress towards a dignified life, in peace and prosperity, for all people [...] The time has arrived for all of us – governments, industry and civil society – to consider how AI will affect our future."[7]

6.UN News, 'UN artificial intelligence summit aims to tackle poverty, humanity's 'grand challenges', UN News <news.un.org/en/story/2017/06/558962-un-artificial-intelligence-summit-aims-tackle-poverty-humanitys-grand> [accessed 25 January, 2020].

7. United Nations Development Programme, 'Sustainable Development Goals', United Nations Development Programme <undp.org/content/undp/en/home/sustainable-development-goals.html> [accessed 25 January, 2020].

Indeed, as our conference focuses on the use of technology in healthcare, we strongly believe that technology, including but not limited to AI, has transformed the healthcare industry socially and economically from the dissemination of health-related information to diagnosis and treatment approaches. As the range of technological applications in healthcare is broad, we shall focus on the following themes: the application of telemedicine; the role of automation in healthcare; the influence of media in healthcare; the important impact of medical data collection; and the relationship between globalization and technological development. Yet, it is fundamental that digital healthcare enthusiasts recognize the serious challenges and ethical issues in the application of AI to healthcare, ranging from cybersecurity, liability, privacy, and the unequal development of technology between developed countries and developing countries, which bear the risks of being left behind.

Before proceeding to discuss technological application in healthcare, it proves to be useful to define and categorize the types of AI applicable in the healthcare industry. John McCarthy coined the term "Artificial Intelligence" in 1956, defining it as "the science and engineering of making intelligent machines, especially intelligent computer programs [...] AI does not have to confine itself to methods that are biologically observable."[8] The LexicoDictionary, powered by Oxford University, defines the tasks of AI as "tasks normally requiring human intelligence, such as visual perception, speech recognition, decision-making, and translation between languages."[9]

AI can be categorized into three types. The first type, *Artificial Narrow Intelligence (ANI)*, also known as Narrow AI, or Weak AI, is the only AI in existence today. This type of AI is capable of performing single narrow tasks. The main function of ANI is to automate a task typically performed by humans, with an aim to exceed the human ability in efficiency and endurance.[10] Examples of ANI include machine intelligence such as Google Assistant, Google Translate, Siri, Cortana, or Alexa, which is programmed with Natural Language Processing (NLP). Commonly used in chatbots, NLP is capable of understanding, analysing human speech and text and responding

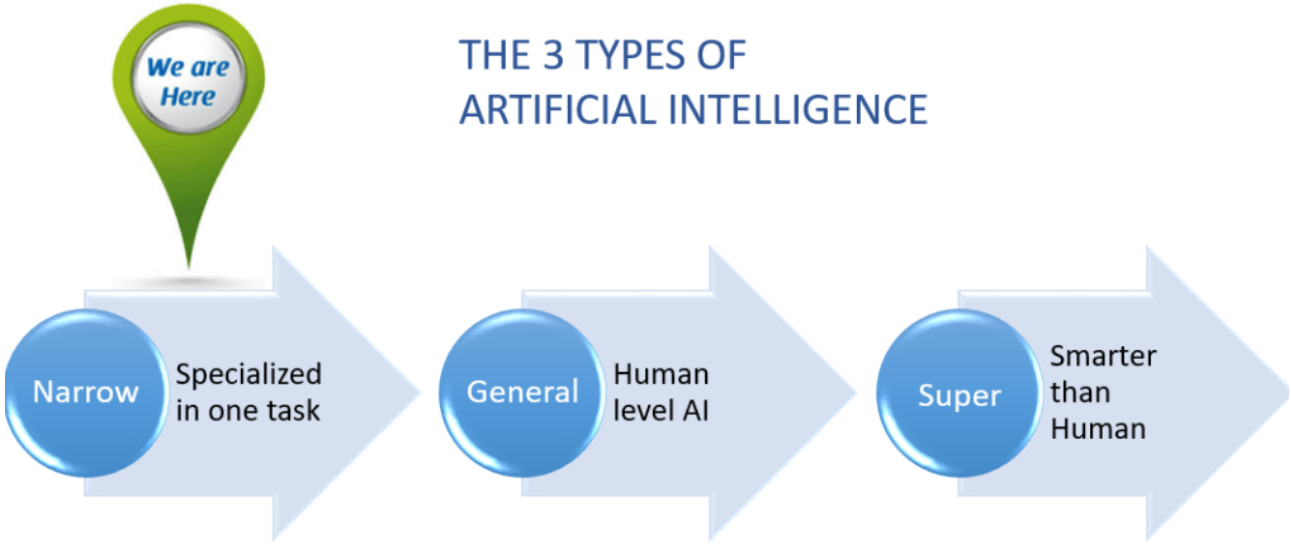
8. John McCarthy, 'What is Artificial Intelligence?', Formal Reasoning Group, 2007 <www-formal.stanford.edu/jmc/whatisai/node1.html> [accessed 5 January 2020].
9. Lexico Dictionary, 'Artificial Intelligence', Lexico.com, [n.d.] <lexico.com/definition/artificial_intelligence> [accessed 5 January 2020].
10. Certes, 'Types of Artificial Intelligence: A Detailed Guide', Certes, 2018 <certes.co.uk/types-of-artificial-intelligence-a-detailed-guide/> [accessed 5 January 2020].

in a personalized, natural way.[11] As ANI is able to form memories and use past experiences to inform current decisions, it is also seen in playing board games such as Deep Blue, an IBM's chess-playing supercomputer which makes prediction and chooses the most optimal moves among many possibilities. In healthcare, ANI are used to diagnose illnesses such as cancers with extreme accuracy by replicating human-like cognition and reasoning.[12]

The second type, *Artificial General Intelligence (AGI)*, is an emerging field which aims to create machines at human-like level. Rather than previous training and programming, these machines are capable of performing tasks across domains and making decisions based on learning, reasoning and planning - activities are thought to be unique to humans.

The last type, *Artificial Super Intelligence (ASI)*, is expected to surpass human's abilities and capable of performing extraordinarily well in arts, decision making, and emotional relationships, with greater information capacity and perfect memory.

As the ANI is the only AI in existence today, it will be the main focus of our conference. Delegates may refer to the other two types of AI as foundations for future development.



3 Types of Artificial Intelligence. Girablog <girablog.com/artificial-intelligence-art-ai/>

11. Susan Fourtané, 'The Three Types of Artificial Intelligence: Understanding AI', Interesting Engineering, 2019 <interestingengineering.com/the-three-types-of-artificial-intelligence-understanding-ai> [accessed 5 January 2020].
12. Arend Hintze, 'Understanding the Four Types of Artificial Intelligence', Government Technology, 2016 <govtech.com/computing/Understanding-the-Four-Types-of-Artificial-Intelligence.html> [accessed 5 January 2020].

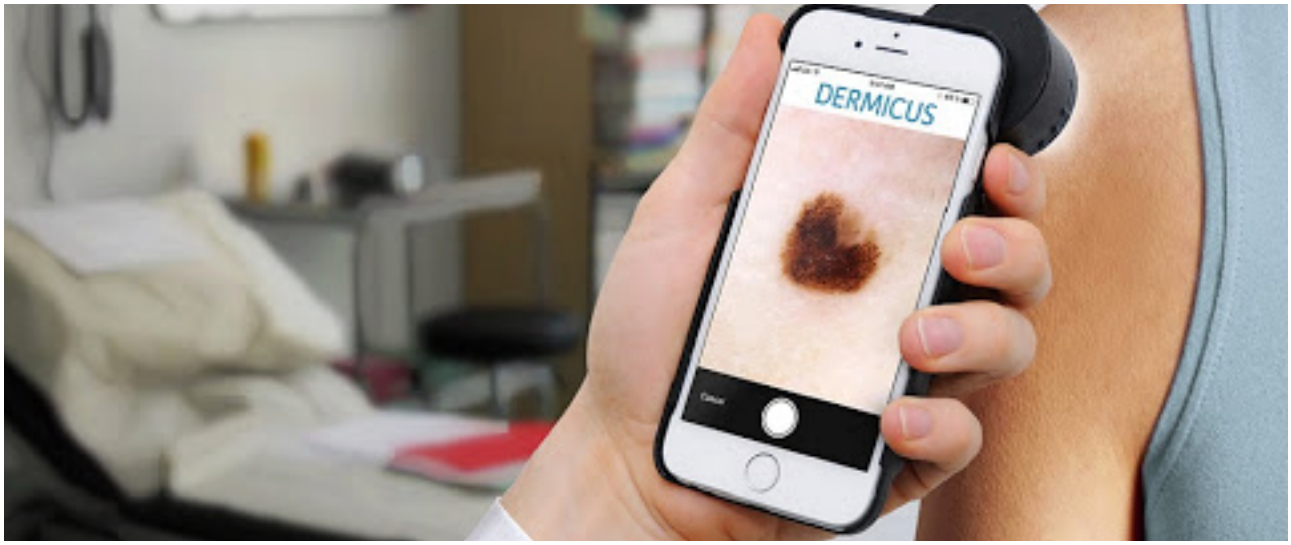
Telemedicine

Telemedicine originally referred to the health care provided from a remote place using telecommunications. The first steps of telemedicine were achieved by telephone calls and usually connected specialized doctors with less experienced doctors in hard-to-reach locations.[13] While services similar to these remain a key provision of telemedicine, the technological advances achieved in the last decades have allowed telemedicine to evolve and be implemented globally. The current use of telemedicine is observed in different health areas which include remote general practice consultations in areas without health care professionals, medical consultations in emergency settings, and surgeries using controlled robots, among other common uses.[14] The two main types of telemedicine are defined by their temporality: telemedicine can either be provided as a simultaneous service, such as a patient video conferencing with a specialist in real time, or as a separated service, such as a scan being taken of a patient and sent to a remote specialist, who then looks at it and provides a response.

Telemedicine has also been adapted by diverse specialists. A clear example is the development of teledermatology using special equipment to evaluate skin lesions

13. Seong K. Mun, Jeanine W. Turner, 'Telemedicine: Emerging e-medicine', *Annual review of biomedical engineering*, 1 (1999), 589-610 <https://www.researchgate.net/publication/11652200_Telemedicine_Emerging_e-medicine>
14. WHO, 'Telemedicine: Opportunities and Development in Member States', World Health Organization, 2010 <who.int/goe/publications/goe_telemedicine_2010.pdf> [accessed 5 January 2020].

with suspicion to be carcinogenic or the use of telestroke to evaluate patients who can benefit from early stroke therapy resulting not only in an increase of patients timely treated but also in a reduction of the diseases' burden.[15] These examples focus on increasing access to specialists and "out-sourcing" medical services. By incorporating telemedicine into medical practice, and utilizing the communication systems available in this digital age, medical services can be provided on a more global scale.



Teledermatology – For Patients

Telemedicine is not only useful to increase access, it has also proven beneficial to increase safety and accuracy of treatments. The automation of services can ensure their consistency, and utilizing tele-services or automated services can make things safer for medical professionals. For example, when dealing with a highly infectious disease, it is useful to be able to provide as many of the health services as possible remotely to prevent the spread of infection. This was utilized by the United States in the recent novel Wuhan coronavirus outbreak. The first diagnosed individual in the U.S. was treated partially by a robot, which took the vitals of the patient and monitored him. The doctors in charge of his care were then able to monitor his condition while minimizing contact as much as possible.[16]

15. Jonathan J. Lee, Joseph C. English III, 'Teledermatology: A Review and Update', *American Journal of Clinical Dermatology*, 19 (2018), 253–260 <ncbi.nlm.nih.gov/pubmed/28871562>

16. Nicole Chavez , Nadia Kounang, 'A man diagnosed with Wuhan coronavirus near Seattle is being treated largely by a robot', CNN, 2020, <edition.cnn.com/2020/01/23/health/us-wuhan-coronavirus-doctor-interview/index.html>, [accessed 10 January 2020]

Through these examples and others, it can be seen that the future of telemedicine is vast and promising in terms of increasing access, cost-effectiveness, and quality of health services.[14] Despite evidence about the benefits and feasibility of implementing telemedicine programs, it has not been adopted worldwide due to challenges that need to be addressed. Implementation of telemedicine requires an active role of the government, non-governmental organizations and the academic community. The combination itself of these parties make telemedicine a challenging objective. Some of these challenges include buy-in of users, who may lack trust in the provision of telemedicine. Additionally, providing remote services introduces more room for challenges regarding linguistic and cultural differences in terms of understanding and care. Technological literacy is required, along with certain tools and machines. Legality and privacy pose problems regarding what level of sharing information via online services is safe in terms of personal medical privacy. And, if the services are shared between different countries and regions as telemedicine often is, there may be discrepancies and disagreements between the different areas' data privacy protection regulations and cybersecurity.

Notwithstanding, the World Health Organization must take its role as the main body to facilitate the implementation of telemedicine in every country. This will involve developing regulations for confidentiality and liabilities, along with identifying ways in which to alleviate the burden of set-up costs of both material and skill sets to build technological literacy. The future of telemedicine is constantly changing, and the potential it has to provide worldwide access is not to be ignored.

Automation in healthcare

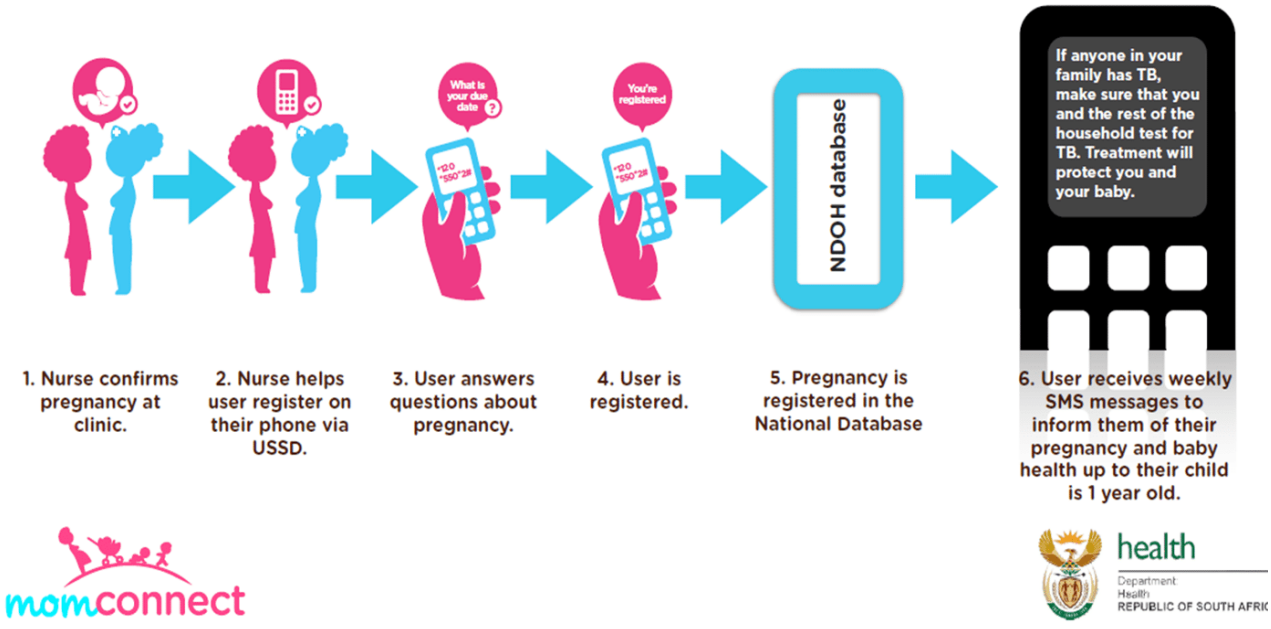
Automation in healthcare refers not only to the digital storage of medical data, thus reducing the logistics costs, but also to the provision of healthcare through digital options. With digital automation, patients can now access their own medical records and communicate with their medical providers through email or online portals rather than visit a medical facility, also known as telemedicine, as discussed above. Patients can also actively record their health data and discuss health-related concerns with their doctors through mobile health applications, known as mHealth.

mHealth is defined by the Global Observatory for eHealth as "medical and public health practice supported by mobile devices, such as mobile phones, patient monitoring devices, personal digital assistants (PDAs), and other wireless devices."[17] mHealth relies on the utility of mobile devices from basic functions such as short messaging service (SMS) to advanced functions such as general packet radio service (GPRS), third and fourth generation mobile telecommunications (3G and 4G systems), global positioning system (GPS), and Bluetooth technology. According to the Global System for Mobile Communications, there are over five billion unique mobile phone subscribers,[18] with more than 70 percent of them residing in low-and middle-income countries,[13] proving that digital revolution is not only limited to rich countries. Yet, although mHealth is becoming more popular in lower-income countries, mHealth activities remain more robust in high-income countries.

17. WHO, mHealth: New Horizons For Health Through Mobile Technologies (Switzerland: World Health Organization, 2011) <who.int/goe/publications/goe_mhealth_web.pdf> [accessed 5 January 2020]
18. GSMA Intelligence, 'Definitive data and analysis for the mobile industry', 2020 <gsmaintelligence.com/>

The most frequently cited applications of mHealth are health call centres/healthcare telephone help lines, emergency toll-free telephone services, emergencies, and mobile telemedicine through the core functionality of a mobile device.[13] Beyond that, mHealth plays a vital role in maternal, child health and sexual health. In Zanzibar, Tanzania, where the majority of child births are performed at home, a pilot mHealth for Safer Deliveries program was launched by the D-tree International to promote the provision of skilled care at delivery and reduce maternal mortality.[19] The pilot result shows a substantial increase in facility delivery rates and postnatal care attendance, indicating the success of the program and the important role of mHealth in reaching women in the most remote communities with accurate information, childbirth education, and safe delivery facility services.

In South Africa, more than two million pregnant women and new mothers have access to accurate information regarding sex, health, and motherhood thanks to MomConnect, a stage-based health messages launched by the government.[20] Mobile health applications which allow women to track their menstrual cycle also empower women to understand their bodily functions and take a proactive approach to their sexual health, which might be a taboo subject in some countries.



MomConnect - a South African National Department of Health initiative

19. J. D. Battle, L. Farrow, J. Tibaijuka, M. Mitchell, 'mHealth for Safer Deliveries: A mixed methods evaluation of the effect of an integrated mobile health intervention on maternal care utilization', Healthc (Amst), 3.4 (2015), 180-4. doi: 10.1016/j.hjdsi.2015.10.011

20. MomConnect South Africa, <praekelt.org/momconnect/> [accessed 5 January 2020]

Another benefit from the use of mHealth is in treatment compliance. Some illnesses require patients to take their medication in the correct order and at a specific time. In 2014, a study on medication nonadherence in chronic diseases reveals that the most commonly reported reason for missing medication is forgetfulness, which then leads to health deterioration, increase in healthcare service utilization and overall medical costs.[21] Fortunately, there are mHealth applications readily downloadable on the digital market which reminds patients to take their pills on time and record any symptoms they have, for example the Medisafe Pill Reminder application. Other applications of mHealth include appointment reminders, community mobilization and health promotion, health surveys and surveillance, raising awareness, and decision support systems.

Some challenges in the implementation of mHealth initiatives include concerns over data privacy, confidentiality, and questions over data ownership,[22] which will be further discussed below. The accessibility in analyzing and reproducing digital data leads to concerns over data breaches and abuses by commercial or governmental enterprises for financial gains. In addition, questions of who owns the data and the systems which store and collect data are important as monopoly over medical records by a certain enterprise (e.g. Epic medical record system in the United States) might restrict the accessibility of medical records for research purposes. There also remain important barriers to mHealth applications including competing health system priorities, as countries may allocate funding to other more important or emergency areas other than mHealth; lack of knowledge concerning the positive outcomes of mHealth applications in public health; and lack of telecommunication infrastructure and network capacity in low-income countries.

21. Aurel O. Iuga, Maura J. McGuire, 'Adherence and health care costs', Risk Manag Healthc Policy, 7 (2014), 35–44. doi: 10.2147/RMHP.S19801

22. Marc Mitchell, Lena Kan, 'Digital Technology and the Future of Health Systems', Health Systems & Reform, 5.2 (2019), 113-120. DOI: 10.1080/23288604.2019.1583040

Influence of media in healthcare

Media plays two main roles in our lives: it is influenced by us and influences us. The increased presence of media in daily life has significant ramifications for healthcare in a variety of ways. As discussed in other sections, media and digital health have the capacity to provide health services through applications, communication networks, and other technological formats. Social media itself has been identified as something that both positively and negatively impacts the mental and physical health of users. Media in the digital age is immensely flexible: it is possible to search within seconds for medical advice on the internet, and it is possible to shape what media reports and deems as important. In this way, a new form of prioritisation of health is built.

Media influences society by disseminating certain information. It can create and perpetuate social constructs, and can sensationalize or ignore certain topics, forming a hierarchy of shared information. In health contexts specifically, the media has influenced public — and often professional and private — opinions in a variety of ways. This can be done both in how information is shared, and in the act of choosing which information is shared at all. For example, a case study exploring the impact of the portrayal of trans women in film on a viewer's opinion of trans women found that negative film portrayals led to more negative attitudes towards trans women—something that further stigmatizes them and may depress their mental and physical health.[23] The questions of representation, lack thereof, and how groups are

23. Haley E. Solomon1 & Beth Kurtz-Costes, 'Media's Influence on Perceptions of Trans Women', Sexuality Research and Social Policy, 15 (2018), 34-47 <link.springer.com/content/pdf/10.1007%2Fs13178-017-0280-2.pdf>

represented influence the health of these groups themselves and others who interact with them, including healthcare professionals.[30] Additional studies have found similar strong connections with media in terms of creating norms and introducing stigma.[24]

Media additionally impacts societal opinion of the medical profession. Depending on how things are reported and portrayed in the media can greatly impact doctor-patient trust and confidence in the medical establishment.[25] This introduces questions about what level of media control is permissible, if any, and what level of fact-checking is necessary to prevent negative health outcomes. For example, the increase in anti-vaccination rhetoric has little base in scientific knowledge, but has become widely spread and reduced trust in both the medical professionals distributing the vaccinations and the scientific researchers studying them. Indeed, social media could be used as a positive tool for the field of medicine to create more transparency by providing a method of reaching more people with new information.[26] Utilising media effectively while still remaining evidence-based is proving to be a very difficult challenge for the media and medical worlds at large.

Social discourse guides media coverage, and societal perspectives prioritise certain issues over others. The anti-vaccination example is a useful case study for considering some of the ramifications of media on health. Vaccinations were associated with autism in a now-retracted study in the 1990s. This information, through very sudden and intense dissemination by the media, became common discourse and has prevailed to this day.[27] It is not certain why the anti-vaccination rhetoric became so instantly media-popular. It may be because certain topics, such as something that impacts young children from affluent families, tends to draw significant attention. The lack of certainty in what sticks in media and what doesn't poses part of the problem in understanding media's impact. Over twenty years later,

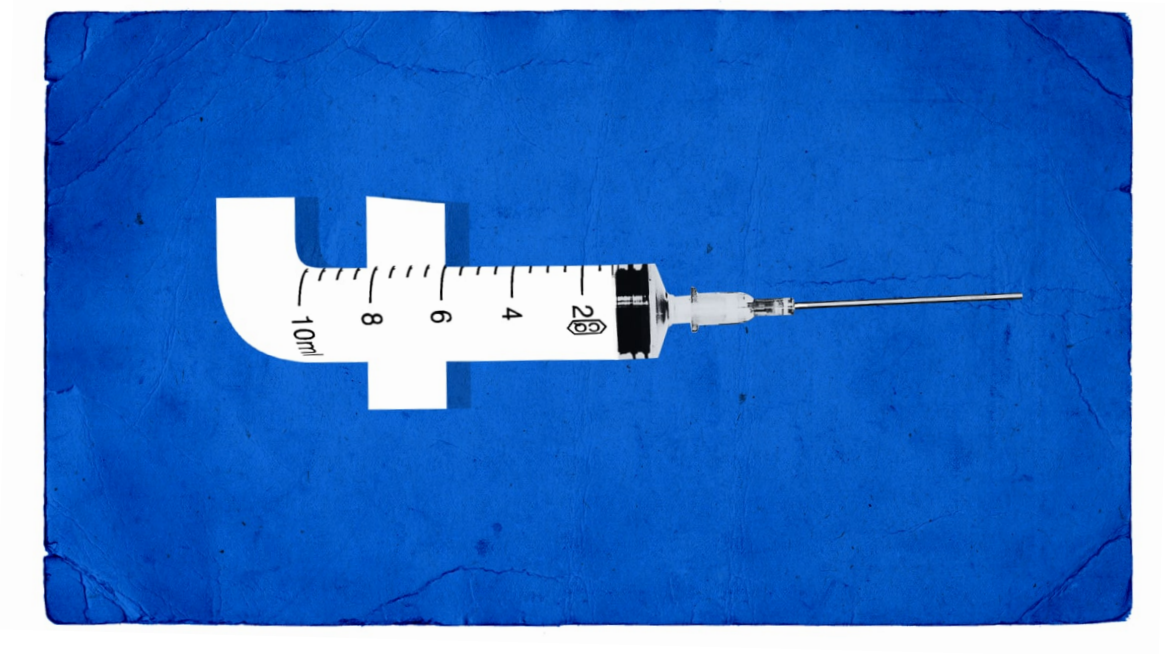
24. Seham M. Alyousef, Sami A. Alhamidi, Monirah Albloushi, and Thurayya A. Eid, 'Perceptions of Media's Contribution Toward Stigmatization of Mental Health by Saudi Arabian Nurses', Journal of the American Psychiatric Nurses Association, (2019), 1-8, <journals.sagepub.com/doi/pdf/10.1177/1078390319855771>

25. Jing Sun, et al., 'Impact of adverse media reporting on public perceptions of the doctor–patient relationship in China: an analysis with propensity score matching method', BMJ Open 2018. doi:10.1136/bmjopen-2018-022455

26. Keir A, Bamat N, Patel RM, et al., 'Evidence-Based Medicine', 24(2019), 87–89 <ebm.bmj.com/content/ebmed/24/3/87.full.pdf>

27. Alan Carter, 'Debunking the anti-vaccination myths', *Medical News Today*, 2019, <medicalnewstoday.com/articles/325371> [accessed 10 January 2020]

anti-vaccination is still a common topic. It is now facing censorship control and undergoing the unique process of deciding how and when media misinformation should be controlled to prevent public health crisis — such as currently under-control diseases coming back.

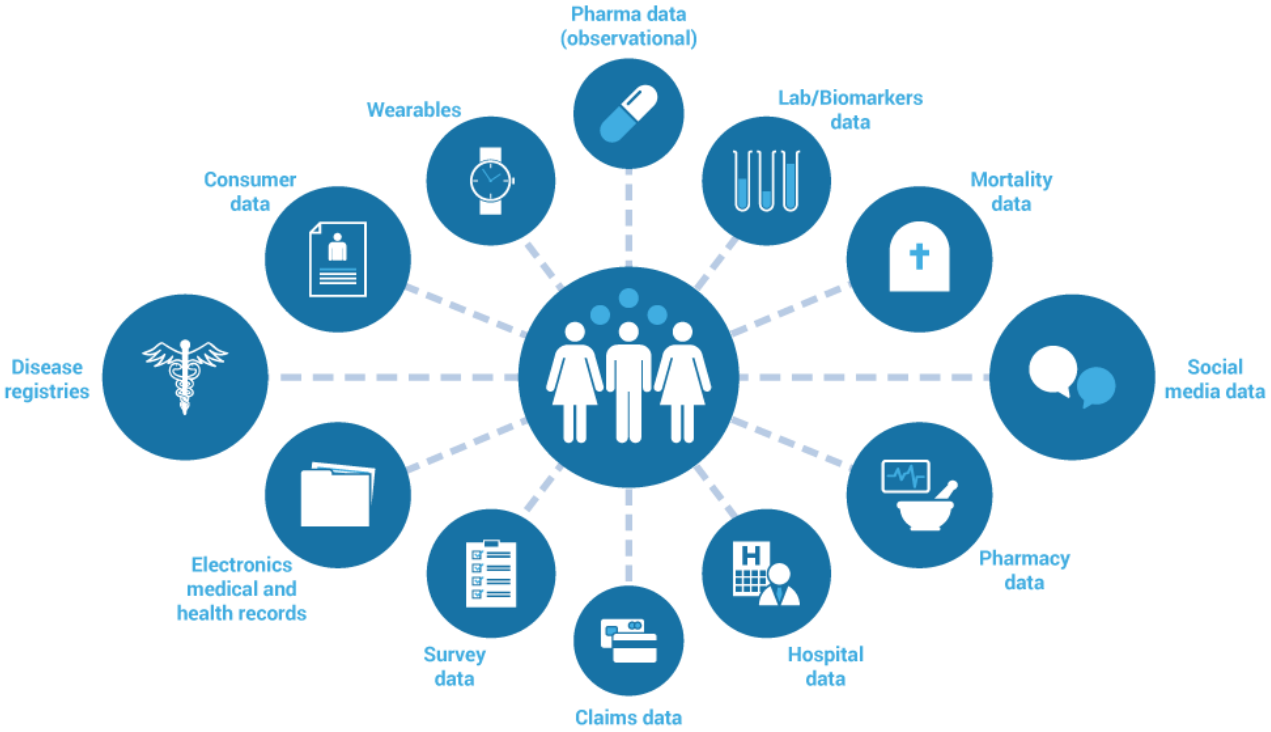


Facebook: a health threat?

In 2019, Facebook announced that it would lessen the reach of anti-vaccination content on its site in response to the growing measles outbreak.[28] This introduces a new age for medical and media professionals in trying to understand when media coverage is a health threat, and how to combat that. Indeed, it is already known that the media can affect the supply and demand for medical treatments and prioritisation of medical concerns, as in an Italian example in which demands for an untested drug skyrocketed following sensational media reports about its efficacy — with no basis in fact. However, undoing these reports proved extremely difficult, as the medical journals in which pre-existing information were reported were not accessible to the wider population, and reversing media coverage in the age of the internet is impossible.[29] Media holds significant power, both in impacting financial and political decisions, and ensuring that it maintains a certain level of integrity and honesty about health is crucial to ensure safe populations and appropriate health interventions.

28. Louise Matsakis, 'Facebook Will Crack Down on Anti-Vaccine Content', *Wired*, 2019, <wired.com/story/facebook-anti-vaccine-crack-down/>, [accessed 10 January 2020].

29. Eva Benelli, 'The role of the media in steering public opinion on healthcare issues', *Health Policy*, 63.2(20003), 179-186 <https://doi.org/10.1016/S0168-8510(02)00064-7>



Collection of medical data

Perhaps you wear a smartwatch and track your heart rate. Maybe you've done a personal genome-sequencing service. You might use an app to record your sleep schedule, or to send messages to your physician. Every time you go in for a doctor's appointment, your height and weight are recorded. With modern technology, data collection is easier than it ever has been. Your smartwatch might be collecting your heart rate every three seconds every hour of every day — imagine how many data points you accumulate in a month, year, or the five years during which you wear that watch. This is big data: data with a depth and vast quantity.[30] Big data is described as having volume, variety, velocity, and veracity that separates it from previous concepts of data.[31] This routine and normalized collection of information about health has already shown to hold significant potential for the healthcare field; however, the consequences and challenges of it are not yet completely understood.[30]

In contrast to previous usage of data, big data is more useful for hypothesis generation,[31] detection of population-level and individual health patterns,[32] and

30. Michael Snyder, Wenyu Zhou, 'Big data and health', 2019, <http://dx.doi.org/10.1016/S2589-7500(19)30109-8>

31. Choong Ho Lee, Hyung-Jin Yoon, 'Medical big data: promise and challenges', Kidney Research and Clinicial Practice 36(2017), 3-11 <https://doi.org/10.23876/j.krcp.2017.36.1.3>

32. Roberta Pastorino, Corrado De Vito, et al., 'Benefits and challenges of Big Data in healthcare: an overview of the European initiatives', European Journal of Public Health, 29.3(2019), 23–27 <https://doi.org/10.1093/eurpub/ckz168>

identification of ways in which to optimize health care systems.[33] It has the potential to analyse and associate information that classic data analysis, which relies on small subsets of data, has not been able to accomplish (see Table 1).[31]

Table 1. Medical big data analysis vs. classical statistical analysis

	Medical big data analysis	Classical statistical analysis
Application	Hypothesis-generating	Hypothesis-testing
Questions of interest	Overcoming the limitation of locally or temporally stable association with continually updating the data and algorithm	Trying to prove causal relationships
Domain knowledge	More important in interpretation of the results	Important both in collection of data and interpretation of the results
Sources of data	Any kind of sources; frequently multiple sources	Carefully specified collection of data; usually single source
Data collection	Recording without the direct supervision of a human	Human-based measurement recording
Coverage of data to be analyzed	Substantial fraction of entire population	Small data samples from a specific population with some assumptions of their distribution
Data size	Frequently huge	Relatively small
Nature of data	Unstructured and structured	Mainly structured
Data quality	Rarely clean	Quality controlled
Research questions of data analysis	May be different from those of data collection	Same as those of data collection
Underlying assumption of the model	Frequently absent	Based on various underlying probability distribution function
Analytic tools	Frequently automated with data mining algorithm	Manually by expert with classical statistics
Main outputs of analysis	Prediction, models, patterns identified	Statistical score contrasted against random chance
Privacy & ethics	Concerns about privacy and ethical issues	Data collection according to the pre-approved protocol; informed consent from the participants

Choong Ho Lee, Hyung-Jin Yoon: Medical big data: promise and challenges, 2017.

Big health data can be used to predict onset of diseases, identify new connections and interactions between symptoms, lifestyles, genomics, and outcomes, and record minute health changes that previously may have gone unnoticed.[30] It can help individuals track — and better understand — their own health, what constitutes as healthy for their bodies, and how to best prevent and treat illness for themselves.[30] It can also be used for pharmacovigilance, and identify best care practices.[32] All of these changes could lead to more effective, efficient, and cost-effective prevention, prediction, and treatment.[34]

In a cost-effective, logistical example of big data usage, Paris hospitals used longitudinal analyses of all their admittance rates to optimise staffing and provide more relevant care.[34] In a biological example, genomic markers that are only present

33. Mohammad Adibuzzaman, Poching DeLaurentis, Jennifer Hill, Brian D. Benneyworth, 'Big data in healthcare– the promises, challenges and opportunities from a research perspective: A case study with a model database', <ncbi.nlm.nih.gov/pmc/articles/PMC5977694/pdf/2731403.pdf>

34. Mona Lebied, '12 Examples of Big Data Analytics In Healthcare That Can Save People', *The Datapine Blog*, 2018, <https://www.datapine.com/blog/big-data-examples-in-healthcare/> [accessed 15 January 2020].

in a brief period of time but could be recorded have been associated with lymphoma onset.[30] Regarding medical service, big data was used to predict U.S. patients at high-risk of becoming addicted to prescribed opioids and using that information to provide more intentional care.[34]

While the positive possibilities of big data may appear endless, several concerns about big data usage still remain. The amount of data now collected may overwhelm technological systems with significant amounts of data that are occasionally irrelevant and prediction models may lead to increased caution and thus overuse of prevention measures, such as expensive screening tests.[30] Perhaps the most prevalent concern is that of data privacy. If entire health profiles of individuals exist that can predict their health patterns and outcomes, it is understandable that there is a consumer fear of this data being leaked and of facing discrimination in receiving health care, employment, insurance, and other services based off of what the profile contains.[30] While health providers may be able to claim careful collection practices, the threat is not limited to user errors. The incentive to hack health data and exploit it also increases as the data holds increased meaning.[34] In addition, there needs to be some shareable component to big data if it is to be analysed and utilised. This poses additional legal concerns. Ethical concerns — and concerns regarding the validity of data — arise from the non-representative collection of data, in which some populations have far more access to data collection services.[32]

While the challenges need to be addressed and considered, the existence and usage of big data is no longer under contestation. The amount of data that already exists is past a point in which medical systems and researchers are choosing whether or not to utilise big data; the key discussion now is how — and how much — to use big data while remaining legal and ethical.

Technology and globalization of healthcare

Globalization is, as described by the Peterson Institute for International Economics, "the growing interdependence of the world's economies, cultures, and populations, brought about by cross-border trade in goods and services, technology, and flows of investment, people, and information."[35] Healthcare services and ideologies are one some of the goods and services included in this international flow. Technology is clearly stated as a crucial part of globalization, and has played a significant role in driving an increased rate of globalization. While the positives and negatives of the influence of technology itself are contested, the globalization of healthcare has been hugely impacted by the digitisation of health. All of the previous sections have discussed how technology and digitisation are and will continue to impact healthcare; however, it is prudent to note that these impacts will be disproportionate and potentially lead to negative health outcomes and an increase in the health equity gap between populations with access to technology and those without.

35. Lukas Fervers, Philipp Oser & Georg Picot, 'Globalization and healthcare policy: a constraint on growing expenditures', *Journal of European Public Policy*, 23,2(2016), 197-216, <DOI: 10.1080/13501763.2015.1028965>

Globalisation itself has been contested as to whether it is truly globalisation or westernisation, in which western, developed countries set the standards for the globe.[36] For example, when foreign aid was provided in response to the 2004 Sri Lankan tsunami, western mental health experts expected the Sri Lankans to exhibit the symptoms of PTSD they knew. However, the locals experienced different symptoms in response to the trauma, and instead of being well-equipped to treating these symptoms, the western psychiatrists introduced their form of PTSD to the community.[37] This can impact health in a variety of ways by setting western standards for global health. This ignores the cultural differences in health concepts and beliefs, which can play a role in how and why illness manifests.[36]

Ethan Watters, “Crazy Like Us: The Globalization of the American Psyche"

By placing western ideas onto global contexts, health initiatives can also be less effective and impactful because they are ignorant of the true causes of disease in the specific population. For example, an application designed for a wealthy, overweight, urban user to lose weight is likely not going to provide the same tips, tools, and guidance that a poor, overweight, rural user with limited access to nutrition needs. However, through the quick and easy spread of digital health and technology, there

36. Ulrike Schuerkens, 'The Sociological and Anthropological Study of Globalization and Localization', Current Sociology, 51(2003), 209–222 <https://doi.org/10.1177/0011392103051003004>

37. Ethan Gilsdorf, 'Crazy Like UsWestern ideas can strip away local beliefs', *Psychology Today*, 2010, <psychologytoday.com/us/blog/geek-pride/201002/crazy-us>

is little control over how and to whom digital health tools are spread. The accessibility of information on the internet may lead to a reformation of disease concepts in developing nations as they adopt the diseases of developed nations through a symptom pool concept: when people know that something exists, such as depression, and hear that it is a common ailment associated with sleeplessness, stress, anxiety, and depressed mood, it becomes a part of their discourse, and an increased number of people begin to feel more depressed than they previously had. This increase may be due to the knowledge that depression exists.[37] Westernisation, then, is perpetuating countless symptom pools of western illnesses that are, through technology and foreign medical aid, being spread to places that may not have experienced those illnesses in the same way otherwise. While technology is not intrinsically at fault for this scenario, it increases the likelihood of it occurring because information is so readily transferred.

These countries and cultures may then be unprepared to adequately deal with these "new" ailments — which may have already existed but have been presenting themselves in a different way that medical professionals were trained to identify and treat — and increases the reliance on western knowledge, treatments, and technology. Additionally, the use of technology to analyse global health data may leave certain populations excluded and unrepresented in concepts of illness because of their lack of access to technology. The flow of information, too, is slower for those without daily technology use, which may increase the burden of disease.[32]

The connection of globalisation and technology is not all negative. By connecting health care professionals, researchers and policy-makers across cultural borders, a more comprehensive outlook of global health can be achieved. Technology access is increasing throughout the globe, and this will hopefully have positive impacts on the dissemination of knowledge that is culturally aware. Indeed, technology may allow for ease of making simple changes and translations to medical services and research methodologies that make them more globally applicable.[38] Tools like translation services can increase communication in health services, and the more data that is recorded, the more chances there are for an accurate understanding of the health concepts in developing countries to be determined and accounted for in global health actions.

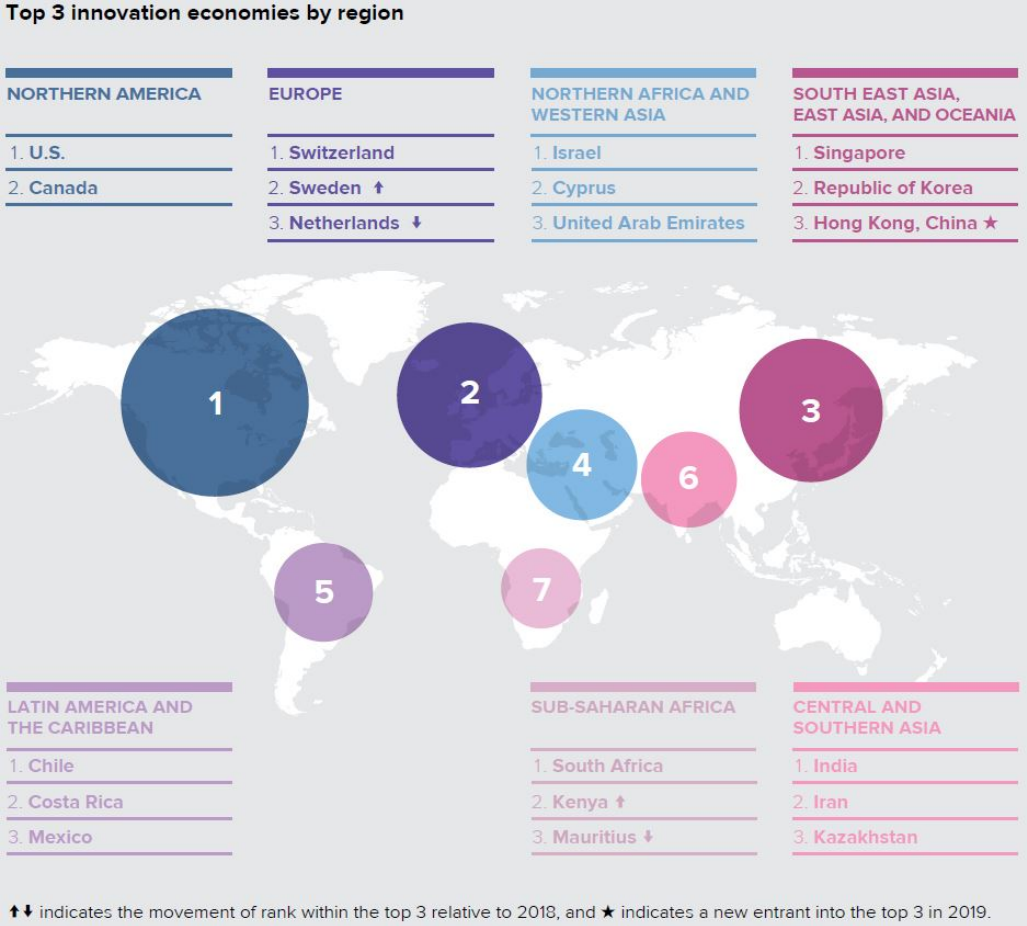
38. Valmi D. Sousa and Wilaiporn Rojjanasrirat, 'Translation, adaptation and validation of instruments or scales for use in cross-cultural health care research: a clear and user-friendly guideline', *Journal of Evaluation in Clinical Practice*, 17(2011), 268-274 <doi:10.1111/j.1365-2753.2010.01434.x>

TECHNOLOGY READINESS AMONG MEMBER STATES

Despite the rapid growth of technological development and the widespread use of mobile devices globally, there remains an unequal gap between developed countries and developing countries in terms of technological advancement and technology (AI) learning readiness. This section will show various indicators that can be used to examine how the governments, society and business sectors of WHO Member States are ready for responding to the rise and the current movement of the sets of new technologies.

The Global Innovation Index (GII) 2019

The GII 2019 report has a particular focus on the role of technological medical innovation in transforming the delivery of healthcare worldwide. [39] It evaluates 129 economies based on 80 indicators, ranging from the application of AI and big data in healthcare services, human capital and research to computer software spending and intellectual property receipts.

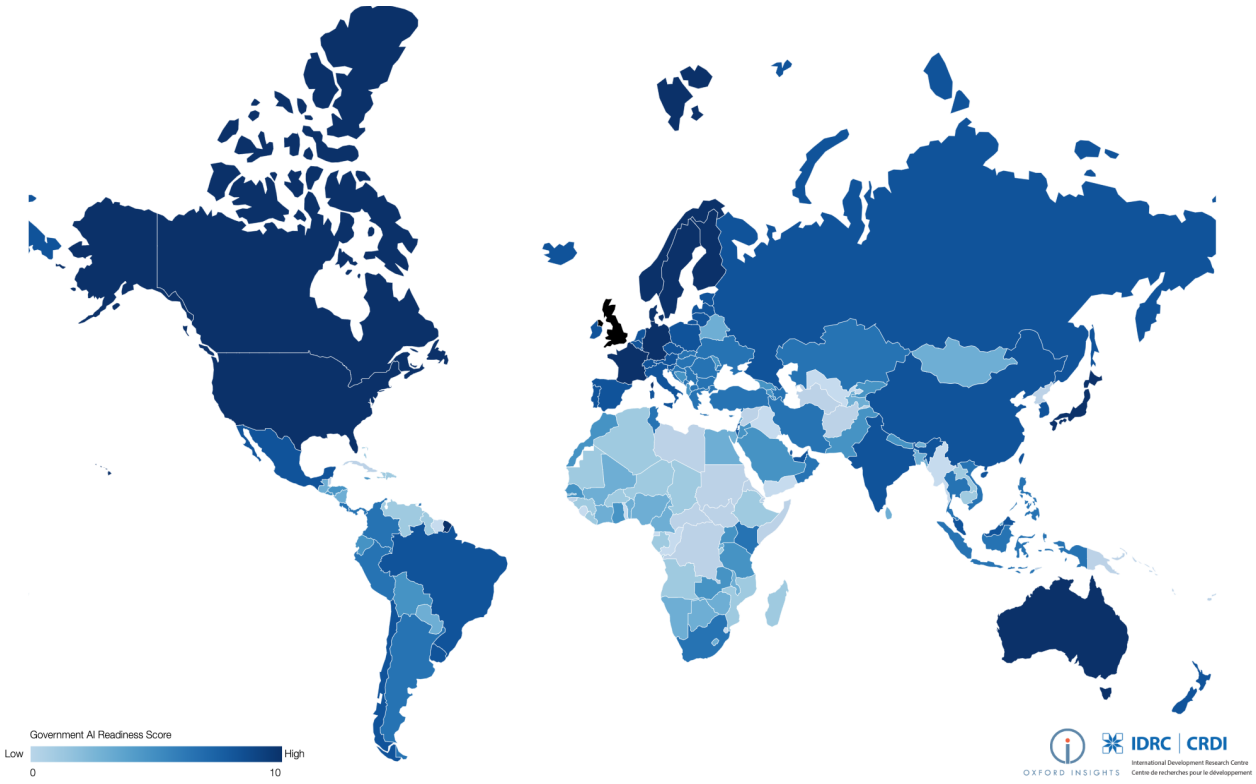


39. Cornell University, INSEAD, and WIPO (2019). The Global Innovation Index 2019: Creating Healthy Lives—The Future of Medical Innovation [online]. Ithaca, Fontainebleau, and Geneva. [Accessed 25 January 2020]. Available from: https://www.globalinnovationindex.org/userfiles/file/reportpdf/gii-full-report-2019.pdf

Switzerland earns the top position in Europe and in the world for the ninth consecutive year. It ranks first in Innovation Output, second in Innovation Input, and remains a world leader in various IP-related indicators.

Government Artificial Intelligence (AI) Readiness Index 2019

The Government AI Readiness Index provides an overall estimate for how prepared each country's national government is for implementing AI in public service delivery. The 2019 Index comprises 11 input metrics, grouped under four clusters: governance; infrastructure and data; skills and education; and government and public services.[40] In this ranking, Singapore holds the 1st position, followed by the United Kingdom, Germany and the United States of America.

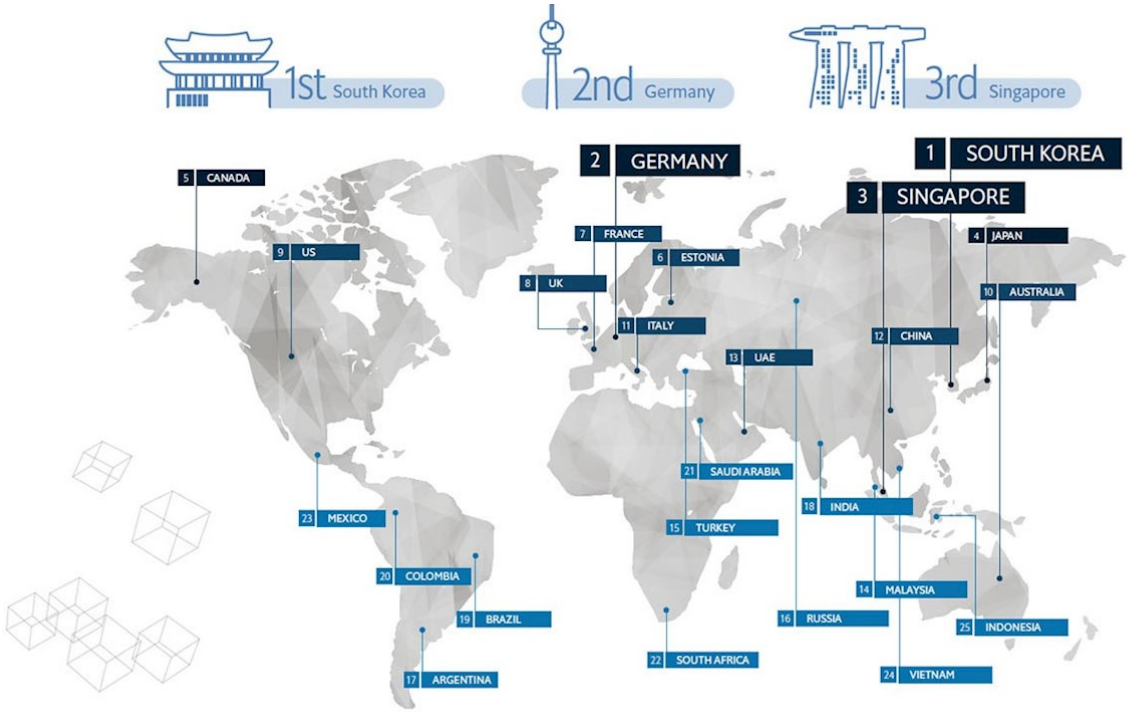


According to the Index, countries in the Global North are better placed to take advantage of the economic gains from AI technologies than those in the Global South, thus rendering them to be at risks of being left behind in the fourth industrial revolution. This unequal AI development and implementation also contributes to the widening global inequalities.

40. Miller, H. and Stirling, R., (2019). Government Artificial Intelligence Readiness Index 2019 [online]. Artificial Intelligence for Development. [Viewed 25 January 2020]. Available from: https://ai4d.ai/wp-content/uploads/2019/05/ai-gov-readiness-report_v08.pdf

The Automation Readiness Index 2018

The Automation Readiness Index 2018 ranks 25 countries according to their readiness for intelligent automation.[41] The overall index leaders are South Korea, Germany and Singapore with leading initiatives in areas such as curriculum reform and lifelong learning, occupational training and workplace flexibility.



The study also finds that most countries have very few policies in place to address the challenges of AI- and robotics-based automation. Indeed, these indicators prove that the readiness at incorporating technologies in general and AI technologies in particular in healthcare facilities is still a far cry in most developing countries. In a case study in Uganda, for example, Kiberu, Scott, and Mars (2019) conduct a study in Uganda to assess eHealth readiness across four domains which might hamper the adoption and integration of telemedicine. They find that over 40 percent of healthcare workers at different levels of health centres and Regional Referral Hospitals were unaware of telemedicine, while those who were aware of telemedicine were impressed with it.[42]

With many indicators listed, this section serves as a reference for technology readiness among Member States that delegates should bear in mind during their discussions.

41. ABB., (2018). The Automation Readiness Index: Who Is Ready For The Coming Wave Of Automation? [online]. Economist Intelligence Unit. [Viewed 25 January 2020] <https://www.automationreadiness.eiu.com/whitepaper>
42. Kiberu, V. M., Scott, R. E. and Mars, M., (2019). Assessing core, e-learning, clinical and technology readiness to integrate telemedicine at public health facilities in Uganda: A health facility - Based survey', BMC Health Services Research [online], 19(1), pp. 1–11. <doi: 10.1186/s12913-019-4057-6.>

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Risks and challenges of technology to healthcare

About 50% of the world is accessing the internet,[43] and growth in access is slowing down.[44] These statistics, already unpromising, are further compromised by the knowledge that access is counted as being able to access the internet once in the last three months.[37] While not all healthcare advancements discussed require internet access, it is often a baseline necessity. Internet access allows data to be stored in a shareable manner, allows for telemedicine and health apps, and provides a means of communicating. Recognizing the significant disadvantage that half the population is therefore facing in terms of reaping the benefits of health digitisation is a necessary component of understanding the digitisation process. Disproportionate access to digital health opportunities will also skew the validity of these services, which will be created primarily by and for those who have access.

Beyond inequality in access, digital health poses many legal and ethical questions. Personal data privacy is crucial, both to gain the trust of populations and to maintain the integrity of the data collected. Cybercrime is common for health

43. The World Bank, 'Individuals using the Internet (% of population)' <data.worldbank.org/indicator/IT.NET.USER.ZS>
44. Emily Dreyfuss, 'Global Internet Access Is Even Worse Than Dire Reports Suggest', *Wired*, 2018, <wired.com/story/global-internet-access-dire-reports/>
45. Koppel R, Kuziemsky C, 'Healthcare Data Are Remarkably Vulnerable to Hacking: Connected Healthcare Delivery Increases the Risks', *Studies in Health Technology and Informatics*, 257(2019), 218-222 <ncbi.nlm.nih.gov/pubmed/30741199>

information, and could result in frightening security breaches. Digitisation of healthcare also increases the amount of potential weaknesses in the cybersecurity of health information.[45] A very attractive target because of the amount of information that can be gleaned from it — beyond just health predictors, there is also likely to be financial and billing information — health information is often passed through several sources and, to accomplish the digitalisation discussed throughout, it needs to be shareable to a certain extent.[38] This creates an inherent vulnerability. The threat of these breaches could include more than just fraudulent billing. It could lead to incredibly targeted and precise biological warfare, and provide insights into the health weaknesses of populations.

The inherent risks associated with technology are equally as relevant to health technology, including impacts on physical and mental health, fear and uncertainty about automation, and lack of ability to control content. The amount of false and misleading information about health, both with malicious intent and accidental, pose a significant threat to the fidelity of online health services and information. Addressing all of the above risks and additional ones will prove a unique challenge for the WHO.

45. Koppel R, Kuziemsky C, 'Healthcare Data Are Remarkably Vulnerable to Hacking: Connected Healthcare Delivery Increases the Risks', Studies in Health Technology and Informatics, 257(2019), 218-222 <ncbi.nlm.nih.gov/pubmed/30741199>

QUESTIONS TO CONSIDER

The quest for faster economic growth had led to the adoption of disruptive technologies envisaged to not only bring about efficiency but also economic prosperity.[46] This adventure has led to the application of technology such as Artificial Intelligence in bridging the gap of access to equitable healthcare despite geographical, time, cultural and social barriers, human resources and infrastructural inadequacies. However, as illustrated above, technology and its applications also present legal and ethical questions that undermine its advantages if used inappropriately. Thus, to fully deliver a comprehensive resolution to the application of technology in healthcare, delegates should address the following questions:

- What is your country's capacity and capability of applying (advanced) technology in the healthcare industry, in relations with the topics discussed above?
- How will you overcome the challenges of technology applications to healthcare in your country (issues such as medical data ownership, data distribution, citizen's privacy and cyber-attacks, ethical issues of responsibility and accountability)?
- How will you collaborate with other stakeholders (non-governmental organizations, the media, pharmaceutical companies) to incorporate technology into heathcare?

46. Lee, J.-W. (2001) 'Education for Technology Readiness: Prospects for Developing Countries', Journal of Human Development, 2(1), pp. 115–151. doi: 10.1080/14649880123896.

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The Cathedral Archer Project

Charity Reg. no. 1064818

Homelessness is one of the most acute social and economic problems in our society, effecting individuals both physically and mentally. At the Cathedral Archer Project (CAP) we help homeless and vulnerable adults from sleeping bag to employment supporting them to lead fulfilling and enjoyable lives.

We believe that every person who comes through our doors is an individual with talents, the ability to live a healthy, enjoyable life, and who, in time and with support will have aspirations they want to achieve.

FACT BOX: 2019

On average we saw 75 people a day

1,300 people walked through our door

We served over 17,235 breakfasts

We handed out in excess of 1000 food parcels

The nurse held 214 appointments from our medical room

For 30 years we have been supporting homeless people and other vulnerable and marginalised groups, providing a place where they can find a warm, safe and welcoming environment.

We provide a range of services including breakfast and lunch, food parcels, access to showers, laundry facilities, telephones, computers, use of the project as a postal address, and in house medical and dental clinics, a volunteering programme, activities ranging from English and Maths classes to cookery and yoga, and employment opportunities through our Just Works initiative.

Matt* had been sleeping on a chair in a disused office space for over four months when he came to the Project. He initially came to us because he needed help for his dog. But when he talked to us we realised that he needed support with his depression and accommodation.

Alongside finding Matt a home we supported him to attend GP appointments regularly, open a bank account, sort his benefits and begin to look for work. From Matt's view he now has his own home for him and his dog: "I am so thankful it is so much more than I expected."

***Name changed to protect identity**

It is our experience, supported by research, that through building positive relationships, we can help people change their lives for the better.

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