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Technology in the Context of Public Health Emergencies of International Concern

and the Legal Limitations of the International Health Regulations

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Abstract

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By Sejal Waghray

The International Health Regulations were last updated in 2005. There have since been seven (7) declared Public Health Emergencies of International Concern all of which have exposed various failures and a dire need to strengthen health systems. As technology continues to rapidly innovate and evolve, it has become a critical part of health system strengthening. Despite this growth in the presence of various forms of technology, the International Health Regulations have barely acknowledged the role technology plays in preventing, detecting, and responding to public health threats. It is, therefore, necessary to review the International Health Regulations, understand the various forms of technology active in the public health sector, determine the gap in overall technology guidelines, and accept the limitations of such regulations. These factors will then be used to propose recommendations for how technology should be prioritized in the International Health Regulations and what conversations are imperative as the World Health Assembly continues amendment conversations.

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I. Introduction

A. Context

Public health surveillance is defined as “the ongoing systematic collection, analysis, interpretation and dissemination of health data for the planning, implementation and evaluation of public health action”. Since 3180 B.C., “the practice of collecting and recording data” has been utilized; however, “legislation for surveillance was first introduced [in Rhode Island] in 1741”. [1] As public health surveillance became a widespread practice, there was an increased interest in strengthening health systems globally. In an effort to build regulations and goals for health system strengthening, the World Health Organization (WHO) adopted a legally-binding document known as the International Health Regulations (IHR). [2]

B. Statement of the Problem

The Vanderbilt Journal of Transnational Law outlines how various outbreaks have indicated clear issues in international transparency, failures in international leadership, distribution inequities, and more. [3] As the use of technology (including, but not limited to, health informatics, surveillance, and intelligence) expands, it is imperative to strengthen global health security and have proper guidance under international law.

C. Statement of Purpose

This special studies project aims to identify the gaps and problems in current international legal infrastructure that need to be addressed to properly modernize global health surveillance. Given that the International Health Regulations (IHR) are "the only rules governing global health security", the scope of this project is narrowed to the IHR. [4] The ultimate purpose will be to evaluate the limitations of and propose potential recommendations for technology to be factored into the ongoing IHR amendments.

II. Background

A. World Health Organization and World Health Assembly

The World Health Organization (WHO) is an agency within the United Nations (UN), founded in 1948, with a goal to "[connect] nations, partners, and people to promote health, keep the world safe and serve the vulnerable - so everyone, everywhere can attain the highest level of health". [5] The World Health Assembly (WHA) is comprised of designated individuals from all WHO member states and is the internal decision-making body of the WHO. [6] The WHO and WHA play crucial roles in the coordination and implementation of the International Health Regulations (IHR) respectively.

B. International Health Regulations

Global public health crises are unpredictable and tend to require unique responses depending on the context. Given that each sovereign nation-state may

choose to respond according to differing priorities and abilities, it is imperative to have some infrastructure in place to facilitate communication on global issues that transcend nation-state borders. To address this concern, the International Health Regulations (IHR) were adopted in 1969 and revised in 2005. The IHR is a legally-binding document of collaboration in international law that "defines countries' rights and obligations in handling public health events and emergencies that have the potential to cross boundaries". More specifically, the IHR ensures that 196 countries (194 WHO member states and 2 other countries) are given clear criteria to determine if an event is a global public health emergency and how to meet standards for a response, surveillance, travel, trade, and more. [7]

While conversations overlapping with the IHR date back to 1851 with a Sanitary Conferences series, the WHA first implemented what is formally known as the IHR in 1969. [8] At this time the agreement was inclusive of six diseases. Because of the "increase in international travel and trade, and the emergency, re-emergence and international spread of disease and other threats…" the WHA amended the original IHR to include more diseases and to better account for global health risk mitigation measures that span across borders in 1973, 1981, 1995, and again in 2005. [9] "The IHR (2005) was endorsed in 2005 and [came] into legal force in 2007". [10] The IHR's main purpose is to provide a "legal framework…for the management of acute public health events of potential or actual national and international concern, as well as related administrative procedures". The overall goal of these regulations is to prevent

and control the “spread of disease” in a way that mitigates risk and reduces interference with day-to-day practices as much as possible. [11] To accomplish this, the IHR is divided into three categories: guidelines to detect public health events in a time-sensitive fashion, guidelines to assess and report the detection, and guidelines to respond. These categories are discussed across 68 articles which are divided into six parts as summarized in Table 1 below. [12]

Table 1: Structural Overview of the International Health Regulations

Part	**Article Number**	**Brief Summary**
Part I: Introduction and Scope	Articles 1-3	Part I introduces the IHR and explains its scope in preventing, protecting, controlling, and responding transnationally without interfering internationally. It also defined key terms.
Part II: Surveillance, Notification, and Verification	Articles 4-17	Part II outlines the different requirements and responsibilities of member-states, explains the criteria and process to determine a PHEIC, and clarifies information-sharing rights in the context of PHEICs.
Part III: Response	Articles 18-28	Part III provides guidelines to member-states for actions to take in PHEICs, especially in the context of trade and travel.
Part IV: Provision of Public Health Information	Articles 29-38	Part IV clarifies the process and obligations of

		member-states to share information on potential PHEICs with the WHO and other countries. It also discusses regulations around confidentiality and the use of personal data.
Part V: Health Measures at Points of Entry	Articles 39-49	Part V discusses the requirements of member-states to take precautions at points of entry such as airports, borders, or ports.
Part VI: Final Provisions	Articles 50-68	Part VI focuses on administrative items such as the amendment process, the process to resolve disputes, financial structures, and how the IHR aligns with other international agreements.

C. Public Health Emergencies of International Concern

Along with guidelines to detect, assess, and respond, “declaring public health emergencies of international concern (PHEIC) is a cornerstone of the IHR”. [13] The WHO defines PHEIC in the IHR as “an extraordinary event which is determined to constitute a public health risk to other States through the international spread of disease and to potentially require a coordinated international response”. [14] The IHR assists with helping member states decide if they should notify the WHO (within 24 hours) about any potential PHEIC through a specific algorithm and series of questions. [15] Criteria considered when evaluating past events as potential PHEICs include if the

event can be considered extraordinary, if spread to other nation-states is a potential risk, if a transnational response is needed, and if there are gaps in understanding the event due to it being unknown or unfamiliar. [16] It is important to note that "PHEIC declarations are often controversial" because "decisions…consider a range of factors that go beyond the legal criteria". [17] Ultimately, whether or not an event is considered a PHEIC is determined by the WHO Director-General with technical advice from the IHR Emergency Committee. The IHR Emergency Committee is made up of selected international experts who advise on whether an event should be considered a PHEIC, the temporary recommendations for countries experiencing PHEIC in an effort to reduce international spread or disruption, and when an event should no longer be considered a PHEIC [18]. Historically, the WHO "has been accused of being too cautious", too late, or inactive when declaring a PHEIC. [19] Once declared, the status of a PHEIC is reviewed by the IHR Emergency Committee every three months because the IHR states temporary recommendations are only valid for three-month periods. [20] Since the most recently revised IHR was legally enforced in 2007, there have been seven (7) PHEICs declared: Swine Flu (2009), Polio (2014-present), Ebola (2014-2016), Zika Virus (2016), Kivu Ebola (2019-2020), COVID-19 (2020-present), and Monkeypox (2022-present).

III. The Problem

A. Understanding Technology in the Context of Public Health Emergencies of International Concern

1. Health Informatics

Public Health Informatics "is the science of how to use data, information and knowledge to improve human health and the delivery of health care services". [21] The goal is to improve health outcomes using information and communication technologies (ICT). ICT is inclusive of, but not limited to, a variety of colloquially familiar technologies as listed in Table 2 below.

Table 2: Examples and Explanations of Information Communication Technologies

ICT Example	**Brief Explanation** [22]
Electronic Medical Records	Automated systems to store and collect health information
Health Information Exchange Systems	Networks and agreements that allow for electronic health data exchange between organizations
Telehealth and Telemedicine	The use of technology to deliver health services remotely
mHealth	Mobile technologies such as applications or wearable devices that monitor and communicate health information
Virtual Reality and Augmented Reality	Computer-based technologies that simulate immersive experiences or allow immersive experiences to interact with reality

Health Analytics Systems	Data analytics or visualization tools such for evidence-based decision making - i.e. PowerBI
Digital Communication Platforms	Social media, health education communication campaigns, etc.

2. Surveillance and Intelligence

Public Health Surveillance (PHS) is defined as “the ongoing, systematic collection, analysis, and interpretation of health-related data essential to planning, implementation, and evaluation of public health practice”. [23] Public Health Intelligence (PHI) is defined as “the process of monitoring global health threats by gathering and monitoring information on public health events via open source, governmental, and other domains of intelligence”. [24] By definition, and in practice, PHS and PHI work together to consistently collect, analyze, interpret, and communicate health-related information to guide public health decision-making. PHS and PHI are collectively inclusive, but not limited to, of a variety of colloquially familiar technologies as listed in Table 3 below.

Table 3: Examples and Explanations of Public Health Surveillance and Public Health Intelligence Technologies

PHS and PHI Example	Brief Explanation
Artificial Intelligence Systems	A form of intelligence that replicates the human brain and assists with logical reasoning, decision-making, and more [25]
Syndromic Surveillance Systems	Systems that collect and analyze

	symptoms to identify patterns or trends to detect and warn about potential PHEICs [26]
Geographic Information Systems	Computer-based technology that uses geospatial data to build maps for health trend analysis [27]
Remote Sensing Technologies	Technologies such as drones or satellites that are usually used to track environmental factors impacting health outcomes [28]

3. Information Sharing and Data Security

Many of the technologies listed above collectively make up the Internet of Things (IoT). IoT is an interconnected system of a variety of these technologies that allow for rapid information sharing. Research on how to use IoT in public health surveillance is ongoing but the "potential advantages of IoT data include high-frequency, high volume, zero effort data collection methods". [29] Each of the examples listed above can be used independently or as a network to share important public health information. In order to make sure information sharing transnationally is accurate and comparable, there are procedures in place for the standardization of data.

Furthermore, there are several technologies in place to allow for data security such as encryption (encoding data to limit unauthorized access), access controls (adding permissions and privileges to restrict access), multi-factor authentication (added verification beyond login information), firewalls (protection for networks to limit unauthorized access), anonymization and de-identification of data, and more.

B. Technology in the International Health Regulations

The IHR generally recognizes the use of technology in preventing, detecting, and responding to global health threats. Specific areas where technology is acknowledged in its regulations include, but are not limited to, disease surveillance, risk assessment, laboratory testing, travel and transport, information sharing, and capacity building. [30]

As briefly introduced previously, disease surveillance "is an information-based activity involving the collection, analysis and interpretation of large volumes of data originating from a variety of sources". [31] By nature of having to analyze 'large volumes of data' from 'a variety of sources', manual disease surveillance is a very time-consuming process. Given how quickly PHEICs can spread, it is imperative to recognize that a manual approach to surveillance is no longer feasible or necessary. The IHR recognizes that modern technology, such as electronic reporting and exchanging of health information, has expedited the process of disease surveillance significantly and allows the world to detect and report outbreaks at a faster rate.

The IHR also mentions technology in the context of risk assessment. Similar to disease surveillance, technology is mentioned in the IHR to the extent of using technological tools to analyze large volumes of data at a rapid pace. The regulations specifically discuss the value of using an evidence-based approach and technology to predict and assess the risks in relation to PHEICs. In an effort to guide decision-making in relatively unpredictable and time-sensitive emergencies, the use of technology can be extended from data analysis to modeling and impact predictions.

In order to declare a PHEIC, one must detect the disease through laboratory testing. The IHR mentions the role of technology in laboratory settings mostly for the use of updated and advanced techniques.

The IHR mentions technology in a very similar manner when addressing travel/transport and information sharing. It is important to note that both are all means by which human interaction has increased significantly in recent history. Given that PHEICs recognize no nation-state border and have the ability to spread rapidly, the IHR recognizes the value of technological applications. In fact, the IHR promotes the use of technology transnationally with health screenings at entry points, consistent communication between the various global health stakeholders, timeliness of data sharing between organizations and nation-states, and more.

Finally, the IHR recognizes technology in the context of capacity building. For nation-states to effectively prevent, detect, and respond to PHEICs. In other words, the IHR recognizes that for each individual nation-state to effectively implement IHR guidelines domestically and meet international standards, they have to integrate modernized approaches that include technology in addition to training for technology use. [32]

C. The Gap

Despite the fact that the IHR mentioned technology as summarized in this section, it is imperative to recognize that the IHR provides no clear guidelines on specific technologies or technology use. The IHR merely recognizes the merit of

technology in preventing, detecting, and responding to emergencies and then solely provides guidance on preventing, detecting, and responding.

IV. Discussion

A. Limitations

1. Nation-State Sovereignty and Collaboration

Although the IHR is a global treaty, its ability to enforce regulations is greatly restricted by nation-state sovereignty. The Council on Foreign Relations describes the concept of sovereignty as “the bedrock of international relations”. [33] The International Encyclopedia of Political Science defines nation-state sovereignty as the “legal and political authority of a sovereign state to exercise governance over its territory and population without interference from external entities” with the “recognition of [a nation-state’s] independence and autonomy in making decisions within its borders”. [34]

Given that the IHR’s goal is to prevent, detect, and respond to PHEICs, it is important to achieve transnational collaboration for transnational PHEICs. However, nation-state sovereignty makes compliance with IHR regulations voluntary for all countries. As a result, countries may be implementing regulations at various levels while prioritizing action that is in their own national interest rather than global interests. The idea of nation-states acting in their own interest and enforcing sovereign rights has been presented before. One of the most controversial examples was that of Indonesia. Indonesia had the highest number of H5N1 (Influenza A) cases from July 2005 to

December 2007. After initially sharing samples with various laboratories, the Indonesian government stopped sharing all samples in 2007 upon learning that some of their samples were shared with additional laboratories without consent). With countries that had limited capacity domestically, such as Indonesia, providing information and samples to “industrialized countries”, it was easy for wealthier countries to “develop treatment and vaccines which developing countries cannot afford”. [35] The idea of ‘viral sovereignty’ was then developed where viruses found in a certain nation-state are their own sovereign property. Eventually, Indonesia agreed to share again with an “agreement that granted it access to antivirals and vaccines” and the promise for guidelines on international influenza pathogen sharing”. [36] Inconsistencies in a nation-state’s sovereignty force many nation-states, such as Indonesia, to act in their own interest. Indonesia is just one example of many but such issues are detrimental to effective collaboration in a global response against PHEICs.

Furthermore, the guidelines and expectations in the IHR do not always align with existing laws, especially at the national level. Each sovereign nation-state has its own laws or systems in place and the IHR’s guidelines were not made to consider these differences which limits its ability significantly. In fact, in the context of the United States, “emergency powers laws underwent a profound stress test during the COVID-19 pandemic” because they were “designed primarily with bioterrorism in mind, they proved to be ill suited” in the pandemic. The United States national emergency laws did not provide clear PHEIC guidance and the federalism system in the United

States places emergency orders mostly in state law. [37] As a result, not only did United States emergency law not align with the IHR's guidelines but the variation within the United States alone across all 50 states is an indication of how many conflicting differences can exist across sovereign lines. Matters such as data security, privacy and confidentiality, information sharing, and more are regulated at the national level. Thus, any guidelines by the IHR that overlap in this sector may face barriers in implementation because national policies may not align and would outweigh the IHR's unenforceable recommendations.

2. IHR Systemic Limitations

The IHR as a treaty has some systemic limitations. More specifically, the way the IHR functions as an agreement is restricted by its inability to directly finance its requirements and the lengthy process to make any amendments.

The IHR lists many requirements and guidelines for capacity-building so that nation-states have strong public health systems in place to manage PHEICs. However, in the midst of these requirements, "the IHR (2005) created no formal finance mechanism to support implementation" and Article 44 of the IHR encourages "sharing technical, logistical, financial, and legal support". [38] However, making requirements and relying on sharing of resources for implementation is unpredictable and unsustainable. The Journal of Global Health Science also highlights this limitation by stating that "effective IHR implementation requires predictable and sustainable financing at both national and international levels". [39]

Furthermore, although there is a clear administrative roadmap for amending the IHR in Article 55, the process is time-consuming. [40] The main stakeholder would be the World Health Assembly since this is the main decision-making body of the WHO. That being said, the World Health Assembly is made up of representatives of all member-states and a designated UN executive board for agenda-setting purposes. Given that the approach would involve standardizing expectations, definitions, and systems for assessing and reporting across all nation-states, there would need to be extensive deliberation across each individual member within the World Health Assembly and amongst the 196 nation-states currently in agreement with the treaty. Ultimately, given the numerous parties that would be involved in the decision-making process and agreements on any amendments, the methods of going about feasible IHR reform would be time-consuming.

3. Global Digital Divide and Technology Gaps

Even though technology continues to develop and innovate at a rapid pace, a 2021 UN report found that “almost half of the world’s population, 3.7 billion people, the majority of them women, and most in developing countries, are still offline” which means that “as the world becomes more digitally dependent, it threatens to exclude” almost half the world’s civilians “who remain disconnected”. [41] This particular issue has been growing for some time but became very clear during the COVID-19 crisis as individuals in some of the least developed countries (LDCs) could not “benefit from e-commerce on both the supply and demand ends”, were “unable to access essential

health care information during the pandemic", "did not have access to a computer" for online learning to offset disrupted education, and more. [42] It is important to note that this gap is "not because LDCs lack the determination or the will to catch up with the rest of the world". On the other hand, this gap exists (and continues to grow) because LDCs have historically faced structural limitations in science, technology, and innovation while the rest of the world benefits from "this Fourth Industrial Revolution". [43] As the world becomes dependent on digital tools for all aspects of life ranging from health to communication and banking, the digital divide and technological gaps must be addressed. [44] Limitations in the ability to adapt technology must be addressed to ensure that any technology-based guidelines considered for the IHR can feasibly be implemented. If these limitations are not addressed, wealthier countries, which are more technologically advanced, will continue to meet IHR standards and effectively combat PHEICs while other countries continue to struggle.

B. Considering Colonialism and Inequity

Modernization through technological advancements has increased the "spread of interconnectivity" and, as a result, has allowed for the faster spread of health-related content. Moreover, the ability for people to cross nation-state borders more efficiently has "accelerated [the] flow of traded goods" and allowed for more foreign direct investments through outsourcing labor. It is important to note that globalization has been rooted in "innovations [that have] originated in wealthy countries". Thus, higher-income countries have been the main sources of medical research resulting in

public health advancements. While these developments have been shared universally and “everyone has benefited, in poor and now-rich countries alike….this [is a] transfer of power”. [45] The IHR has not been forced to adopt new guidelines that are inclusive of recent technology developments because wealthier nations have been ‘sharing’ these resources universally. In fact, the British Medical Journal finds that global health security “is built around an implicit assumption that pandemics emanate from poorer regions of the world, threatening the health and well-being of people in more prosperous areas” which is why the IHR is in place to establish a system to “protect the public health and economic interests (especially through trade) of the Global North from the diseases presumed to rage uncontrolled in the Global South”. [46] The lack of regulations and domination from wealthier nations is the power struggle that further enhances colonialism. “Colonialism is a…system that relies on the principles of…supremacy justification for the multifaceted domination of the ‘other’”. Moreover, colonialism emphasizes “superiority as [a tool] for economic exploitation”. [47] Years of colonialism practices in global health have valued the ‘scientific superiority’ of wealthier nations and left other nations to the mercy of aid and support for their own healthcare system’s modernization. The IHR currently does not address common results of globalization such as data advancement in communication, rapid human transportation, mass gatherings of individuals, the immediacy of interactions, and more. Along the same lines, the IHR fails to protect countries that are victims of continued colonialism practices and exploited for their dependency on wealthier

countries' advancements. Data, technology, trade, and other sources of globalization will inevitably continue to grow. Thus, the IHR must regulate technology use in PHEICs and adjust for the inequities that have been exacerbated by modernization.

V. Policy and Strategy Recommendations for the IHR

A. Enhancing Global Health Governance and Collaboration for Technology Access

As technology risks increasing the divide between countries and their access to varied resources, it is imperative that the IHR fosters a sense of collaboration. The IHR's policies on trade and travel are necessary for the containment of PHEICs; however, they have also been detrimental to promoting collaboration and transparency within the international community. A recent example of this dilemma is that of South Africa. When South Africa introduced the Omicron variant of COVID-19, "countries around the world threw up travel bans, decimating flight schedules and isolating nations across southern Africa". Despite warnings of harsh economic impacts, the international community continued to withdraw vaccine shipments and other forms of humanitarian aid. [48] Ultimately, South Africa was being punished for following IHR guidelines on reporting. As aforementioned research has indicated, technology has the potential to exacerbate these inequities and problems as it improves early warning systems, makes information sharing faster, and increases access disparities. The WHA must ensure that technology does not become a source that divides the international

community in PHEIC response by enhancing collaboration in technology use and access.

B. Establishing Ethical Guidelines for Technology Usage in Pandemic Response

Currently, the IHR only indirectly mentions ethics in its coverage of information sharing, treatment of travelers across borders, consent for biological samples, and respecting sovereignty. [49] However, there is no clear ethical framework or guide to ethical decision-making. In fact, the word 'ethics' is not even mentioned in the current version of the IHR. However, the WHO published a report titled 'Ethics and Governance of Artificial Intelligence for Health' in 2021 which established ethical guidelines for AI use including, "avoid harming others", "risks of harm should be minimized", "ensure that all persons are treated fairly", and more. [50] The WHO clearly already has a framework for ethical guidelines and technology. It is imperative that these guidelines are not restricted to AI but are expanded to the IHR and inclusive of all technology in the context of PHEICs as well. The book *Emergency Ethics: Public Health Preparedness and Response* explains that PHEICs often involve "decisions that require balancing many diverse and sometimes conflicting values" which makes an ethical framework or a set of ethical guidelines imperative. [51] These guidelines should expand to include transnational ethics, data and information sharing, and transparency, amongst other topics that are imperative for global health security. Moreover, one single set of guidelines in the IHR should be established with the consideration of a

variety of stakeholders spanning several member-states. This process will assist with adding a more equitable approach to the ethical guidelines surrounding technology to ensure historic elements of colonialism are adjusted for in some capacity.

C. Addressing Technology for Migrant Populations Impacted by PHEICs

The IHR is not intended to be a document that focuses on migrant populations and there are separate agencies and organizations to prioritize these populations. However, it is important to acknowledge that PHEICs may force populations to migrate or existing migrant populations could be impacted by PHEICs. Currently, articles 14 and 43 would be the main parts of the IHR that reference this population. Article 14 discusses guidelines for precautions at ports of entry for all populations, including migrants, traveling. Article 43 states the importance of respecting the rights and freedoms of all individuals throughout PHEICs. [52] Neither of these articles discuss technology in any capacity.

Given that migrant populations are likely not located at their point of origin, it is important to recognize that “migrants are a diverse group and have a variety of health needs, which may differ from those of the host populations”. [53] Moreover, “information on [migrant] patients’ history, their test results, vaccinations, diagnoses, and medications are often dispersed across health care providers and health information systems in different countries”. Thus, recent research has considered the potential for EMRs for this population. While there are barriers such as variations in technology capacity in different countries or diverse EMR systems in different

countries, ongoing research indicates that there is a significant investment in this space. While the United States implemented a national requirement for EMR systems in 2009, many countries have not established such a system. Thus, research finds that EMRs "might be a feasible and appropriate solution for migrants and refugees". [54] This is especially the case because EMRs would reduce variation in healthcare systems and duplication of testing or diagnoses for the migrant population.

Overall, migrant populations frequently travel internationally and are a risk as their health record retention is limited. As research grows on using EMRs with this population, it would be critical for the IHR to address migrant populations and the overlap with technology developments directly.

D. Prioritizing the Role of Technology in Capacity-Building

The IHR has a plethora of suggestions to improve global health surveillance internationally. However, in order to implement these suggestions, capacity-building is crucial. According to the UN, "capacity-building is defined as the process of developing and strengthening skills, instincts, abilities, processes, and resources that organizations and communities need to survive, adapt, and thrive in a fast-changing world". [55] The WHO refers to the different aspects of capacity-building as health system building blocks which "include service delivery, financing, governance, the health workforce, information systems, and supply management systems". There is a great deal of awareness that the health system building blocks need to be prioritized to strengthen "health systems for developing countries" and to make sure that these

countries can even achieve the goals outlined in the IHR. [56] The clear gap in allowing countries to reach their potential in capacity-building is accessibility to technology. The Global Forum for Health Research report stated that “strengthening research capacity in developing countries is one of the most effective and sustainable ways of advancing health development in these countries” and “technology is the bedrock of scientific investigation” or research capacity. [57] Thus, it is crucial that the IHR be more intentional in discussing technology access in the context of capacity-building. It is not possible for all countries to achieve the same IHR goals when they have inequitable access to scientific advancement. By focusing on the building blocks, the IHR can help resource-low nation-states prioritize their capacity-building efforts and build sustainable infrastructure to support the technology they need to successfully meet IHR goals. Without prioritizing technology as a part of capacity-building, nation-states will continue to struggle to meet IHR goals and global health surveillance systems will never meet their fullest potential.

E. Acknowledging Technology’s Impact on Health Behavior

It is critical for the IHR to acknowledge technology’s impact on health behavior. Health behaviors are the “actions that can directly affect health outcomes”. [58] While technology in general has impacted health behavior significantly, one of the most apparent sources of technology having this impact is social media. The affordability of social media as a source of public health technology is key as “Twitter, Facebook, YouTube, and Instagram” all “cost users nothing more than their attention” and are

"highly effective means of disseminating key public health information" [59]. Social media has also significantly increased the speed of communication and information sharing. At the same time, "the unfolding of the COVID-19 pandemic has demonstrated how the spread of misinformation, amplified on social media and other digital platforms, is proving to be as much a threat to global public health as the virus itself". [60] Given that one of the IHR's goals is to increase transparency, information sharing, and collaboration, it is imperative that the IHR acknowledges such a significant form of communication. Given that the last revision of the IHR was in 2005, there is no mention of social media. However, "media engagement increased 61 percent during the first wave of the [COVID-19] pandemic" alone and digital technology is only continuing to grow. [61] As social media continues to innovate and the influence of social media during PHEICs is supported by evidence-based research, it would be beneficial for the IHR to acknowledge social media as a form of public health communication and a source of health behavior influence.

VI. Conclusion

In conclusion, technology is advancing, evolving, and innovating at a rapid pace. The IHR is outdated given that it has not been amended since 2005 and technology has developed significantly since then. The WHA has already started conversations on how to amend the IHR so it is imperative that they update the regulations to reflect the role of technology in PHEICs. This will help improve transparency and collaboration through information sharing with guidelines that reflect modern-day practices.

Furthermore, the inclusion of technology guidelines will acknowledge the clear inequities across countries with regard to the accessibility of technology. It is important to note that one of the permanent limitations of the IHR will be that it cannot fully enforce any regulations out of respect for nation-state sovereignty. Thus, IHR updates will serve as guidelines but any actionable next steps must focus on the national and local levels.

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