Report

Transformative role of technology in pandemic preparedness and response: Innovation and community needs

Tuesday 20 July 2021 | WP1958V

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In partnership with GBCHealth and the Friends of the Global Fight Against AIDS, Tuberculosis and Malaria

Executive summary

"*Scaling up pandemic preparedness cannot wait until COVID-19 is over. The threat of future pandemics is already with us. The world faces the clear and present danger of more frequent and more lethal infectious disease outbreaks… [But] the world does not lack the capacity to limit pandemic risks and to respond much more effectively than it has responded to COVID-19. We have the ideas, the scientific and technological resources, the corporate and civil society capabilities, and the finances needed.*" (Report of the Independent Panel on Pandemic Preparedness and Response, May 2021)

Friends of the Global Fight Against AIDS, Tuberculosis and Malaria, GBCHealth and Wilton Park brought together private sector technology and Artificial Intelligence (AI) and machine learning experts with civil society representatives to consider how innovative technology can support equitable outcomes to pandemic preparedness and response.

Whilst biomedical science has shone during the response to COVID-19, the pandemic has brought into stark relief the systemic neglect for public health systems maintenance and funding in both high- and low-income countries. COVID-19 has exposed the devastating impact of inequities in national health systems and in the global framework for supporting public health with uneven access to vaccinations, testing, therapeutic care, and other prevention tools an ongoing global challenge.

The technology and resources to develop innovative solutions often lies within the private sector which has demonstrated the key role it plays in supporting pandemic preparedness and health systems strengthening. At the same time, creating new innovations which authentically address different community needs,

consider different community contexts, and address inequities, requires the engagement of communities and civil society.

The private sector has the expertise and innovative know-how, the ability to scale and apply innovations in systems for efficiencies and, importantly, the investment to support R&D, manufacturing, capacity strengthening and development of technologies, including AI. Maintaining and increasing private sector engagement will be critical for improving pandemic preparedness, prevention, and response as well as to create the architecture needed to support resilient and equitable health systems globally. Civil society and communities can frame critical problems and develop solutions which lead to impactful transformative and equitable outcomes for all and should be integrated as equal partners in multi-stakeholder partnerships alongside the private sector and government.

This dialogue explored the opportunities for and challenges to co-creation by the private sector and civil society of technology solutions for pandemic preparedness and response.

Key messages from the event as follows

- Despite advances in technology, COVID-19 has reflected and exacerbated global inequalities and drawn attention to the crucial role of equity and human rights in healthcare. COVID-19 vaccines will not be available for everyone across the globe for at least another year and vulnerable populations will continue to be disproportionately affected by the virus. Nor will the testing, health system strengthening, and therapies which must accompany vaccines.

- Governments, civil society, and the private sector need to collaborate in new ways and with common purpose against the spread of global disease. New partnerships have already been seen in areas such as biotechnology.

- The private sector has a vital role to play in creating systems for pandemic preparedness and response; it is already leading innovation in fields such as surveillance, diagnostics, supply chain, and predictive analytics.

- Technology can exacerbate health inequalities; new technologies for pandemic preparedness are not yet available worldwide, when those most in need do not have access to life-saving technologies such as vaccines or disease surveillance systems, the most vulnerable populations suffer. Technology can be adversely or selectively applied to further disadvantage populations who are marginalized, out of favour with authorities, or stigmatized.

- Private sector and public organizations can combine their respective strengths to harness innovation and investment. New partnerships created during the pandemic have leveraged technology and AI for improved surveillance, medical countermeasure development, service delivery and infrastructure, as well as health workforce capacity building and data collection—all deserve scaling for onward pandemic preparedness and response.[1]

- Business and civil society can work closely together at all stages, from research to implementation and scaling, although potential challenges such as power-sharing dynamics and mutual accountability need to be addressed. This is linked to the importance of trust building within communities as new technologies are developed, and ensuring technologies solve the most pressing problems communities face.

- Implementers should be aware of the implications of integrating new technologies within communities and adopt a human-centred design approach where communities are involved from the start in the design, integration, and deployment of technologies. Building on and enlarging existing networks and focusing on local capacity strengthening through training and education will support meaningful engagement as new technologies are developed and implemented.

- Public-private sector engagement holds enormous potential for progress in pandemic preparedness technology. Working together, private companies and civil society organizations can understand the "lived" needs of communities from the last mile out, drive coordinated investment, and leverage technology to advance global healthcare and access to it. With equity at its core, pandemic preparedness technology can assist vulnerable populations and bring life-saving innovation to those most in need.

Human rights and equity

1. COVID-19 has exposed and exacerbated the many inequities that exist in public health. Individuals have suffered from the health and economic impact of the pandemic, with already vulnerable populations disproportionately affected. Children have been taken out of school (and/or schools have closed), there has been a rise in domestic violence, and in many low- and middle-income countries whole swathes of populations still have little or no access to vaccines, nor to other essential tools for testing, treatment, and prevention.

2. The economic impacts of the virus have increased violence, poverty, and corruption, while already-fragile health systems have suffered from an increased burden. Globally, race and class have been intrinsically linked to healthcare access, including to vaccines, adding to existing calls for a "decolonization" of public health.

3. While technologies have been deployed to slow the spread of COVID-19, many of the most vulnerable populations do not have access to these technologies, from personal protective equipment to treatments and vaccines.

4. Technology has played a role in many countries responses, yet millions of people do not have access to computers, smartphones, or telephones to

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[1] Noting that surveillance can also be used for oppressive purposes

use digital tracking systems and other applications. Uneven access to or misuse of technology will exacerbate rather than address current inequities. Technology must be accountably deployed in a fashion empowering communities' knowledge, agency, and role in implementation of health services, rather than limiting the same. Tackling this will be vital to ensure no person is left behind.

Public-private partnerships

5.   Health is increasingly considered a 'global public good.' While international actors such as the World Health Organization (WHO) and United Nations entities can drive global action through policy frameworks, the private sector has an important role to play in leading more agile innovation and deployment. Proven and agile multi-stakeholder partnerships for AIDS, tuberculosis and malaria have shown this over the past 20 years, while in the past 18 months the speed in which vaccines have been developed and tests produced has been a significant success to counter pandemic. Businesses have also used advances in technology for more accurate predictive modelling to track COVID-19, to improve diagnostic tools and to make a powerful contribution to precision global surveillance capabilities.

6.   Astute leverage of global networks between private and public sector partners can enhance the likelihood of better and more equitable outcomes for all populations. Public organizations are critical to ensuring the development of relevant technologies that can be deployed locally and can also play a role in organizing convenings to scale up private sector response and increase the impact of investment. These partnerships will benefit from integrating the voice, lived experience, networks and community caregiving of civil society.

Technology and pandemic preparedness

7.   Technology, AI, and data have been central in pandemic responses. In South Asia, mobile applications have been used to track COVID-19 cases while predictive technologies have been used to slow the spread of the virus. Simple technologies have also been applied to health workforce capacity building and vaccine management. Across sub-Saharan Africa, technology has played an important role in connecting communities within countries and across borders. It was noted, however, that for communities without access to new technologies this represents a barrier to progress and exacerbates inequalities.

8.   Many countries are still in need of access to basic technologies for pandemic preparedness – such as alert systems and communications measures – yet lack the capacity and investment to develop and integrate innovations in a sustainable way.

Surveillance technologies

9.   Deploying technology and AI for pandemic surveillance demands careful engagement between communities, civil society, and the private sector. Expanding traditional public health surveillance using technologies such as GPS tracking apps and facial recognition to control the spread of the virus have surfaced tensions in many countries and raised concerns that some governments are using the pandemic to extend political control over

civil society space, communities, and individuals.

10. Achieving optimal returns on investment in surveillance and other technologies requires multi-stakeholder partnerships which identify their common purpose and create clear, shared goals. Given the imbalance of power between parties in multi-stakeholder partnerships, organizations such as the Global Fund to Fight AIDS, Tuberculosis and Malaria have created models for negotiations that create frameworks for dialogue and discussion between government agencies, private companies and implementing communities. Incorporating community feedback can be challenging but is essential. It is important to invest in efforts to ensure communities are included in development, deployment and evaluation of interventions. Meaningful engagement requires creating the right platforms for all parties' needs as well as a commitment to open dialogue, honesty, and respect for different views, rather than window-dressing forums.

Medical countermeasures

11. Technology, AI, and machine learning can greatly contribute to the development of diagnostics, therapeutics, and vaccines. Deploying these technologies, however, requires building trust in communities for them to be accepted, integrated into health service delivery, and used effectively. Over the last 18 months it has been clear – on a global scale – that disinformation and misinformation disseminated via social media have fuelled a lack of trust in vaccines, resulting in less-than-optimal uptake in countries where vaccines are widely available. Multiple efforts have been deployed by UN and other entities, working closely with global and local communication experts, academic researchers, intelligence, and other sectors, using technology such as AI conversational chatbots to better understand individual and community fears.

12. Other challenges associated with medical countermeasures include quality assurance, monitoring and surveillance, regulation, strategy, and advocacy. Potential responses to address some of these challenges could include blockchain for quality assurance, support from Global Fund interventions based on proven comparative advantages, data sharing, and creating the infrastructures to incentivize investment. Ultimately, further solutions are needed to share information about new technologies with affected communities. As referenced above, it is critical that communities are engaged in knowledge sharing, innovation, and co-creation, and from the start, before action is taken to develop and deploy new technologies.

Delivery and infrastructure

13. Whilst advances in science, technology and vaccine development have accelerated exponentially over the last 18 months, delivery systems to get vaccines and other vital medical commodities to communities has, arguably, not developed as quickly. Further investment for innovation is urgently required in supply chain and other tracking and delivery systems along the full value chain that accelerates access to life-saving medicines through to the last mile.

14. National government – including health ministries – and civil society organizations who are familiar with community needs could work with the

private sector to determine relevant innovations and to unlock investments to develop interoperable logistics and improved supply chain systems. Infrastructure improvements may be either physical and/or not, for instance investing in more robust financial systems. Public-private-civil society co-creation should focus on establishing clear investment opportunities, defining individual roles, managing data, and identifying specific needs and solutions.

Health workforce capacity building

15. Health workforces largely represent the communities they serve. It is critical, therefore, that technology developers work with communities and are aware of community stigmas or resistance to using technology. Investment and design should reach the community-level, with the long-term goal of ensuring that communities have the capacity to fully engage with new technology. This could include funding training to build local capacity in technology design and development. The more typical and sub-optimal model is to spend significant investment to engage 'expert' NGOs to take the lead in early technology development, with input from communities coming only at the later stages of deployment.

16. An example of local capacity strengthening was provided by the Global Fund which worked directly with indigenous communities, providing them with both smartphones and training on how to use the phones in a way that would meet their communities' needs. Engaging with the communities directly increased trust and made it more likely that the technologies would be used.

Data and artificial intelligence

17. Surveillance data has been used worldwide to track COVID-19, but there is a need to accelerate data availability to inform faster and more accurate decision-making. The private sector has significant expertise in this area. Once again, however, data driven interventions and technologies powered by AI must be developed and deployed responsibly to meet the needs of communities. AI and technology companies should include social scientists, non-profit workers and policy makers in their teams, and make ethics a central component of strategy in the design and application of the technologies. The 'global health goods' versus the 'for-profit' debate at times obscures how more equitable access to healthcare can, and should, co-exist with the reality of the massive investment in data systems and AI require a return on investment for companies who are at the leading edge of innovation.

18. Companies working in AI could engage in multi-stakeholder partnerships to evaluate sustainable investments and market placement. Currently, AI development is largely targeted at consumers with high levels of disposable income. There is a need to shift AI investment toward developing interventions for public good, such as working to avoid or predict the spread of COVID-19 and other pandemic diseases. Markets may be under-mature for incentivizing this investment at present, and this potential needs to be unlocked in order to drive innovation. Private companies need to see the benefits to them and communities in innovating with community engagement and the longer-term gains in market shaping and prototype testing to be able to scale where there is a

market. Partnerships like the Global Fund have and can shift incentives and shape markets.

Challenges to collaboration

19. Possible barriers to public-private collaboration to develop technology could include determining intellectual property rights, establishing mutual accountability and liability, and determining ownership of the technology. Putting principles into practice can also prove challenging, as actors move from patents and concepts toward testing, piloting, and scaling.

20. Finally, public, private, and civil society actors will need to strike a balance of power-sharing and co-creation by sharing their respective strengths and knowledge. By overcoming these challenges, multi-stakeholder partnerships can make meaningful investments for the public good.

Conclusion

21. Technology holds enormous potential in the realm of pandemic preparedness and response. By working together, public institutions, the private sector and communities as partners can unlock this potential, leveraging their strengths and knowledge and working toward the common good.

22. As technology advances, it will be crucial to place equity at the core of achieving progress. Public and private actors must move forward with an awareness of the inequities that technology can amplify, balancing innovation with a focus on equity and building trust with communities.

23. Private companies and multi-stakeholder institutions such as the Global Fund have a role to play in simultaneously addressing human rights and engaging in market-shaping to drive investment. Public, private, and civil society sectors must move forward with a focus on co-creation, identifying common goals and the benefits of investment. Ultimately, by working together, these sectors can mobilize a powerful force for good in the fight against devastating infectious diseases and equitable access to health.

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