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Artificial intelligence for health security in Africa: Benefits, risks and opportunities

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ABSTRACT

Artificial intelligence (AI) provides paradigm-shifting opportunities to accelerate epidemic preparedness and response and ensure health security. Such benefits may be particularly applicable to countries in Africa, which have to date struggled to meet compliance obligations under international health security frameworks. Here, we build on discussions that took place at the March 2024 Health Security Partnership for Africa workshop in Addis Ababa, Ethiopia, to describe potential applications of AI-enabled approaches to accelerate activities throughout the preparedness ecosystem, with a particular focus on the rapid development and deployment of novel vaccines in support of the 100 Days Mission, focusing on Africa. We also consider the risks and barriers that may challenge successful deployment of AI for health security in African settings, and opportunities to elevate African leadership on governance and implementation.

1. Introduction

Artificial intelligence (AI) is emerging as a significant new tool in many contexts, not least in epidemic preparedness and response. AI can be defined as the field of study and application dedicated to building computers capable of performing tasks normally associated with human cognition (De Haro, 2024). Examples might include tasks related to perception, reasoning, interacting with a dynamic environment, creativity, and problem-solving. A plethora of AI-assisted technologies have already become embedded in the daily lives of many people worldwide – from predictive text in word processing systems to self-driving cars, voice-activated assistants on smartphones and tablets, and “next video” algorithms on social media. These examples represent different levels of AI sophistication. However, all forms of AI today require humans to initially define tasks and provide datasets for the algorithms to “learn” from. In the past decade, there have been enormous advances in the sophistication of this process of “machine learning”, with important implications for their application (Pan, 2016).

Current AI algorithms have become ever more adept at sifting through, categorizing, synthesizing, and extracting information from almost any data source. Some models have been trained on massive datasets to interpret and respond via text or language outputs. These “large language models” (LLMs) can understand text prompts given by a user and provide a response. Some LLMs are considered “generative AI”,

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meaning they can also generate complex text outputs in response to a prompt, drawing from information available on the internet and other inputs, as seen with chatbots such as ChatGPT (Ooi et al., 2023). These represent powerful tools for synthesizing and summarizing diverse, highly technical information. Other generative AI models also exist, resulting in different kinds of outputs. For example, AI-driven design tools can be trained to predict specific biological properties and functions. A well-known example is AlphaFold, a system developed by Google DeepMind to predict the three-dimensional folding structure of proteins from amino acid sequences (Jumper et al., 2021). More broadly, AI approaches are expanding rapidly in their application across the life sciences, including in many domains that directly benefit epidemic preparedness and response.

In March 2024, the Health Security Partnership for Africa—a joint initiative between the Africa Centres for Disease Control and Prevention (Africa CDC), World Health Organization (WHO), and the Robert Koch Institute (RKI) aimed at strengthening disease surveillance and epidemic intelligence across the continent—hosted a workshop in Addis Ababa, Ethiopia, on sustainable health security governance for African Union Member States. The workshop was supported through the Signature Initiative to Mitigate Biological Threats in Africa (SIMBA), a collaboration between the Africa CDC and the G7-led Global Partnership Against the Spread of Weapons and Materials of Mass Destruction, and included further non-governmental and multilateral institutions as contributors, including the African Society for Laboratory Medicine (ASLM), the Coalition for Epidemic Preparedness Innovations (CEPI), Exemplars in Global Health, the Pandemic Action Network (PAN), and the World Economic Forum (WEF). This paper, co-authored by the moderator, panelists, and other individuals involved in the workshop or related initiatives, summarizes perspectives elaborated at one of the panel discussions during this workshop, focused on the potential benefits and opportunities for leveraging AI to advance health security in Africa. Moderated by CEPI and platforming speakers representing Africa CDC, ASLM, RKI and Ginkgo Bioworks, the panel provided an opportunity to share information on the current state of AI engagement across Africa, benefits and risks related to deployment for health security ends, and opportunities for elevating African leadership in global dialogue on AI and health security.

2. Current AI capabilities in Africa

AI has been described as a core part of the fourth industrial revolution, driving new ways that people think, work, and live across all parts of the world. The world depends on Africa for AI, particularly in early parts of the global AI supply chain – approximately 30 % of the critical minerals required for AI-enabled processing come from African countries, though typically extracted through foreign companies and investment. From a use perspective, in Africa, similar to other Global South contexts, adoption of AI alongside other emerging technologies such as block chain, the Internet of Things, and big data is seen as integral to broader digital transformation goals (Lemma, 2025). However, Africa has the world's largest, and expanding, digital divide, with less than 40 % of the population regularly accessing the internet, compared to a global average of almost 70 % (Zavazava, 2024).

In this way, AI is seen as a key opportunity area for accelerated development in Africa, boosting productivity and jobs – some estimates suggest that AI and similar emerging technologies could add as much as $1.5 trillion to Africa's continental GDP by 2030 (Moyo, 2023; Munyati, 2025). Certain sectors, such as communications, agriculture and healthcare, have already begun to leverage AI in support of specific services or programs (Schoeman, 2024); these pilot initiatives may provide useful lessons used for other sectors, including epidemic preparedness and response. However, while there is a strong and expanding curriculum on digital skills across many African universities and institutions, the real challenge lies in the limited resources to effectively implement and leverage these academic programs. There is a gap in access to the necessary infrastructure, funding, and practical opportunities to turn this theoretical knowledge into tangible outcomes. Identifying opportunities for moving beyond pilot initiatives to broader scale adoption and uptake of AI will be critical.

In the following section, we focus specifically on how AI could provide benefits for health security in African contexts, including examples of how these types of effort are already underway, leveraging African scientists, institutions, and expertise.

3. Benefits for epidemic preparedness and response

The power of AI and the diversity of its applications provide remarkable opportunities for improving many facets of epidemic preparedness and response, including compliance with international frameworks such as WHO's International Health Regulations and also initiatives such as the 100 Days Mission, pioneered by the Coalition for Epidemic Preparedness Innovations (CEPI) – a bold goal embraced by the G7 and G20, to develop safe and effective vaccines within one hundred days of a new viral threat first being identified (CEPI, 2024). The 100 Days Mission has equity at its core, and new technologies like AI have the potential to accelerate progress towards a more equitable and collaborative pandemic preparedness and response ecosystem, that can detect and respond to outbreaks wherever they are. In 2023, Africa experienced 180 public health emergencies, of which 90 % were infectious diseases and 75 % were zoonotic in nature (Fallah et al., 2024).

AI can help target interventions and channel resources across diverse health security technical areas. Specific areas of epidemic preparedness and response where AI may provide substantial advances in support of the 100 Days Mission include early warning of emerging infectious disease events, pathogen characterization and outbreak attribution, vaccine design, biomanufacturing, clinical trial design, and vaccine rollout, as summarized in Table 1. In addition, AI may play a powerful role in countering false and deliberately misleading information about disease risks, vaccines, or other countermeasures.

Further potential applications of AI for health security beyond the 100 Days Mission include supporting enhanced patient case management and prognosis; optimizing targeting and delivery of countermeasures; and analyzing uptake and compliance with non-pharmaceutical interventions. For example, AI capabilities were used to implement the 'Partnership for Evidence-Based Response to COVID-19 (PERC)' study, which integrated diverse data from 20 African Union Member States to assess the effectiveness and impact of COVID-19 public health measures (Resolve to Save Lives, 2021). Additionally, AI has been applied across the continent to enhance and strengthen healthcare and research systems, (Bockarie et al., 2024) in turn adding to the potential for AI applications to complementarily strengthen health security.

4. Barriers, risks, and governance considerations

Despite these advantages, there remain some barriers and risks related to the application of AI technologies in the life sciences, specifically in epidemic preparedness and response. Some of these challenges are universal, and at the forefront of dynamic and ongoing global discussions, related to the governance frameworks and regulations that may be required to allow for safe, secure, and responsible use of AI in biosciences. To date, African institutions and thought leaders have been underrepresented in global dialogue related to AI risks and governance considerations (Musoni, 2024). Other challenges posed by AI may be more localized to specific countries or regions, and require culturally-appropriate and contextually-relevant solutions.

First, some infrastructural constraints exist when using extensive AI approaches, which may pose particularly start-up challenges in resource-limited settings. As mentioned earlier, effective use of AI requires a workforce skilled in information technology and computer use, which still requires investment in an African context. Conversely, African labourers may be at risk of exploitation from AI companies, to meet

Table 1
Summary descriptions and example use cases of AI methods applied to different technical areas relevant to the 100 Days Mission.

100 Days Mission Technical Areas	Description	Use Case
Pathogen Detection and Early Warning Systems	Natural language processing allows AI systems to search through text posted across the Web and identify new outbreaks in real time. Early signals of infectious disease events can be detected by analyzing large volumes of data, such as news articles, press releases, and social media data, for mentions of specific symptoms, and particularly those clustered in space and time. AI can also be used to anticipate risks of future outbreaks. Models can assess how variables such as climate change, land use and population mobility may affect the risk of emergence of particular pathogens, guiding enhanced surveillance in high-risk areas.	The African Centre of Excellence for Genomics of Infectious Diseases (ACEGID), based at Redeemer's University in Nigeria, exemplifies African-led AI initiatives in disease forecasting and early warning. Launched in 2020, the Sentinel initiative aims to seamlessly integrate diverse data streams as a cutting edge "pandemic preemption" system (Botti-Lodovico et al., 2021). Another important initiative is H3ABioNet (https://www.h3abionet.org/), the Pan African Bioinformatics Network for H3Africa, which brings together 28 partners across 16 African countries to strengthen bioinformatics capabilities, including advanced computing and analytics in support of pathogen detection, modeling, and forecasting. On a continental scale, Africa CDC has deployed AI-powered epidemic intelligence platforms, including its Event-Based Surveillance (EBS) system, which utilizes machine learning to analyze vast amounts of public health data and detect potential outbreaks in real time.
Outbreak Attribution and Pathogen Characterization	Once an outbreak has been identified, AI methods can help with rapid characterization based on genomic sequences, to assess the degree to which they may pose significant public health challenges. Integration of other data can forecast onward disease transmission risks. Other models use similar data to identify genetic variants, annotate genes, and identify anomalies in sequencing data, assisting in determining the likely source of emergence.	The Africa Pathogen Genomic Initiative (PGI) is an Africa CDC flagship effort to establish a network of advanced next generation sequencing capabilities across the continent, contributing to rapid pathogen detection and characterization. The second phase, Africa PGI 2.0, will shift focus away from emergency response towards sustainable capacity to sustain public health (Adepoju, 2024). Integrating AI into these initiatives could provide benefits in terms of speed of characterization of new threats, as well as more seamless integration of epidemiological and other relevant data to inform outbreak attribution and response measures (Tanui et al., 2024).
Vaccine Design	AI methods applied to prediction of protein structures or binding sites can help design better vaccines, such as those with greater potency, stability, or broader scope. Deep generative models have helped to improve our understanding of the structure of viruses, allowing us to identify likely viral protein targets for new vaccines, even for pathogens that have yet to be discovered. AI models can also be developed to forecast immune escape mutations before they are seen in the real world. Thanks to this knowledge, design of potential antigenic targets can be optimized, making future-proof vaccines.	In 2023, CEPI partnered with a consortium of research groups, led by the Houston Methodist Research Institute, to establish new AI-driven approaches to identifying new vaccine targets for unknown future disease threats, based on analysis of proteins from known epidemic-prone viral families (CEPI, 2023). The consortium will initially focus on paramyxoviruses and arenaviruses, the latter of which includes Lassa fever virus, endemic to western Africa. As another example, Apriori Bio, a start-up biotech company founded by Flagship Pioneering, is developing a novel AI-powered platform, Octavia, that can predict future escape mutations to proactively design broadly protective multi-seasonal vaccines (Flagship Pioneering, 2022).
Biomanufacturing	Development and integration of AI models into product and process design, equipment preventive maintenance and calibration, workforce training and analytics, as well as automation, promises enhancements in efficiency, productivity, and innovation. The resulting improvements in quality, lower costs, and shorter development cycles substantially contribute to the 100 Days Mission concerning vaccine manufacturing.	Adjuvants are compounds added to vaccines to increase or modulate the immune response produced by a vaccine. Siemens has partnered with ATOS and GSK to trial the use of "digital twins" to optimize adjuvant production (Phalak et al., 2023). A "digital twin" is an entirely virtual version of a physical manufacturing plant. Using AI, the digital twin can analyze manufacturing data to make predictions regarding quality, or even automatically update production parameters to better manage and control the final product. In this way, digital twins can contribute to automation, standardization, and optimization of manufacturing vaccines and vaccine components. Multiple companies provide digital twinning services across Africa, including for water management, mining, and energy consumption; these capabilities could be leveraged to support more effective vaccine development.
Clinical Trial Design	AI and machine learning, when trained on sufficient and appropriate real-world and clinical data, can make it possible to generate novel insights to help design and execute more efficient, targeted, equitable, and inclusive clinical trials. AI can be	While there are insufficient examples of the use of AI for vaccine clinical trial design and implementation in African contexts, researchers on the continent are using AI to "ethnobridge" drug design. The Project Africa GRADIENT initiative, led

(continued on next page)

Table 1 (*continued*)

100 Days Mission Technical Areas	Description	Use Case
	used to identify optimal trial sites, target the right patient populations and develop more precise endpoints. AI-driven dose optimization may result in the option to bypass conventional Phase 2 dose optimization studies.	by the University of Cape Town, seeks to use AI for precision medicine, prediction of efficacy, and more effective drug design in Africans-the world's most genetically diverse population. Similar initiatives could be applied to vaccine clinical trial design to improve inclusivity and better inform end points.
Forecasting Epidemic Trajectories and Vaccine Demand	AI methods can be used to assimilate large amounts of disparate data streams, including input data (such as syndromic surveillance, pathogen genomic monitoring, dynamic human mobility, and mitigation measures), along with outcome measures (such as cases, hospitalizations, and deaths) to develop forecasts of potential epidemic trajectories for emergent epidemic events, which can inform the required levels of vaccines and highest-risk, impacted locations for initial and ongoing vaccine roll-out, as well as supply chain considerations.	During the COVID−19 pandemic, researchers implemented numerous examples of AI-based forecasting approaches for COVID−19 to inform decision-making, (Comito and Pizzuti, 2022) including in African settings (Busari and Samson, 2022). One example is the EU-funded STAMINA project, employing sophisticated data integration approaches to predict pandemic trajectories; the Institut Pasteur in Tunis, Tunisia is one of the collaborating partners (Bakalos et al., 2022). Specific to vaccine demand, the Connected Health AI Network (CHAIN) tool was developed to forecast vaccine demand and reduce wastage in Tanzania, Mozambique, and India (Winn, 2020). Numerous examples exist of AI-enabled technologies being leveraged to improve vaccine supply chains for routine vaccinations, which could be leveraged for epidemic response efforts (Muhammad Musa et al., 2025).
Countering Mis-/ Disinformation	The rapid spread of false health information is a major challenge in public health. A scoping review, covering data collected in 16 African countries, showed that media misinformation was a key contributing factor to COVID−19 vaccine hesitancy (Ackah et al., 2022), highlighting the risk of mis- and disinformation in thwarting effective public health action during future health emergencies. AI-based models can be utilized to automate fact-checking and predict the probability that text in information, news or social media posts is false, and flag this content for users and health officials.	The United Nations Development Programme (UNDP) has developed the iVerify initiative to counter the spread of misinformation during electoral campaigns, and piloted it ahead of Zambia's 2021 national elections. iVerify combines AI with in-person fact-checking. For example, it uses the Detoxify machine learning algorithm to identify hate speech on social media (UNDP, 2021).

the enormous workforce demand of menial, low-paid tasks such as data labelling, which moreover can come at substantial psychological cost (Perrigo, 2023). Many AI models are computationally intensive, requiring hardware that is difficult and expensive to maintain, and the models moreover routinely require skilled AI professionals who can develop, deploy and maintain AI systems, electricity, internet access, and cooling. Interruptions to connectivity can limit the efficiency of AI algorithms, reducing their comparative utility. Moreover, AI approaches' enormous data input and output require substantial computing power, including equipment, software, and continuous training. Ensuring these requirements may come at a considerable cost, which must be accounted for long-term when considering investments in AI. Another important consideration is that large AI models may also have substantial carbon footprint and water requirements for cooling computers, due to the energy requirements during both the training phases and execution of tasks (Crawford, 2024). Efforts are currently underway to develop more energy-efficient and "sparse" technologies and processes to reduce climate impacts of AI, and may moreover be more feasible to implement in resource-constrained settings, but are still in their infancy (Kaack et al., 2022).

Data biases and limitations, as well as data protection and access considerations, are other major factors of concern with respect to application of AI. AI models learn through consumption of enormous datasets, guided by human instructions. In many cases, sparsity of diverse and high-quality input data may hinder the ability to train AI models. Cultural, visual, linguistic or other biases in the datasets used for training, or implicitly in the instructions, can lead to similarly biased outcomes, with negative repercussions; local expertise and knowledge is too infrequently sought when building datasets (Musoni, 2024). This can have particular ramifications in African settings, including related to health and healthcare. For example, studies have shown that image databases used to train machine learning algorithms for automated diagnoses, including for skin cancer, underrepresent darker skin tones; (Wen et al., 2022) dermatologists, who provide data labelling for training algorithms, also performed less well on images representing non-white skin (Daneshjou et al., 2022). These biases lead to reduced effectiveness of the resultant algorithms in detecting disease in darker-skinner patients, with negative repercussions for use in African settings. The need for large training datasets has also raised privacy and data protection concerns. For example, Europe's General Data Protection Regulation (GDPR) contains several provisions related to data use consent, minimization, use and storage, which create complications for AI training and application. The African Union's Data Policy Framework encourages research, development and innovation in artificial intelligence, but also provides a cautionary note on safeguarding rights through data protection, and assuring data justice (African Union, 2022). It is also important to recognize that certain data types may require specialized storage, and cannot be stored in cloud platforms. In the context of epidemic preparedness, genomic data will increasingly be leveraged in machine learning and other AI-enabled modeling; lessons from the agriculture sector may be relevant to consider, where Digital Sequence Information governance became a point of contention in European and African collaboration (Gwagwa et al., 2021). Overall, ethical considerations are paramount when applying AI, particularly with regard to ensuring AI systems align with established medical and public health standards. AI systems in all aspects of healthcare must prioritize patient safety, privacy, and equity while preventing unintended harm.

Google Flu Trends (GFT), established in 2008 as an internet-based service to analyze web search patterns and predict influenza outbreaks, represents a useful lesson concerning data limitations in AI applications. Despite initial success, GFT faltered in accuracy, overestimating flu cases in some seasons and failing to predict the 2009 H1N1 pandemic. For this reason, it was abandoned in 2015. GFT's downfall highlights the complexities of interpreting digital footprints and the need for rigorous validation against traditional epidemiological methods (Kandula and Shaman, 2019; Stromberg, 2014). Recent work from scientists in South Africa has further underscored the delicacy of using machine learning algorithms on Google search data to predict flu epidemics, although their models outperformed other predictive approaches (Olukanmi et al., 2021).

Finally, some of the capabilities that make AI such a powerful potential tool for improving epidemic preparedness and response could also have dual-use applications, with potential to be used for harm either accidentally or deliberately. The misuse of LLM-based chatbots can lower knowledge barriers and broaden the pool of those with dual-use expertise. However, it remains debatable whether tangibly dangerous outcomes could truly result from this knowledge (OpenAI, 2024). Perhaps more directly, there are concerns that the increasing sophistication of biodesign tools could be exploited to engineer harmful biomolecules or pathogens or modify existing ones in ways that could increase their pandemic potential. These potential harms, however, should always be balanced against the missed opportunities of beneficial applications.

Most AI users and developers do not have malicious intent. It is therefore important to consider both the potential danger of the capability of the system, describing what the AI model can do, as well as alignment, which considers whether the model could apply that capability in a harmful way, when evaluating the inherent or potential risk of an AI model. It is also important to note that the end-product of an AI model is typical not a tangible item in itself, but the design of a product or the instructions to make it. Therefore, a critical opportunity to introduce safeguards is the stage at which the outcomes of AI models can be turned into a physical product, in other words bridging the digital to physical design gap (Hunter, 2024). This can be, for example, through regulations around equipment and material procurement.

These considerations have created the foundation for on-going AI technology regulation and oversight deliberations, though as of yet rarely specifically in the context of Africa. Several key areas have been proposed as starting points for regulatory efforts related to mitigating AI risks on a global level. These include responsible training of models, responsible deployment, transparency in development and use, and ensuring appropriate security, per Fig. 1 (Shevlane et al., 2023).

Some of these efforts will be implemented at the level of individuals, companies or communities of practice - a notable example, led by the University of Washington Institute for Protein Design in partnership with CEPI and other scientific stakeholders, is the publication of community principles for responsible AI use in biodesign in March 2024 (Wen et al., 2022). Of note, almost a year after publication there are no Africa-based signatories, although several have signed on as supporters, reflecting perhaps insufficient engagement with African scientists or a disconnect with their priorities. Of course, global and regional governance institutions, as well as national authorities, will also play a key role. At the time of the panel discussion, the African Union (AU) was in the final stages of validating a draft Continental Strategy on AI; the strategy was formally endorsed shortly thereafter and published in July 2024 (African Union, 2024). The Strategy creates a framework and starting point for strategic engagement on AI-related topics across all sectors, with a strong emphasis on African-led risk identification and mitigation, counterbalancing most global dialogue on these topics, which have to date been dominated by the Global North. Any global guidelines or regulations that are developed will also need to be implemented effectively at country levels, potentially involving further adaptation or integration into national legislation, and ideally based on prior dialogue on localized risks and benefits. The Continental Strategy also includes high-level recommendations for greater engagement with AI across diverse aspects of health and healthcare, but with little detail on specific opportunities, challenges, or potential barriers. These considerations will be crucial to ensure alignment of continental approaches with global governance frameworks, and also to ensure equitable outcomes and shared benefits, to maximize the positive impacts of these technologies.

African opportunities for AI-enabled health security sovereignty and leadership

AI may represent not only a paradigm shift in advancing health security, but potentially more broadly as a development imperative for African countries and facilitate bridging the digital divide between the Global North and Global South. Africa's population is among the youngest in the world, presenting a unique opportunity for young people to harness these technologies and address pressing challenges across the continent, particularly if the benefits can be well articulated to national leaders and decision-makers. For example, many African countries face resource constraints with respect to balancing the need to tackle urgent health issues, such as endemic or non-communicable disease threats, against the unknown risk of emergence of an epidemic threat (World Economic Forum, 2023; Chattu et al., 2021). AI tools could help strategically with balancing and maximizing the effective use of resources in these settings, for example by predicting risks and using the outputs to

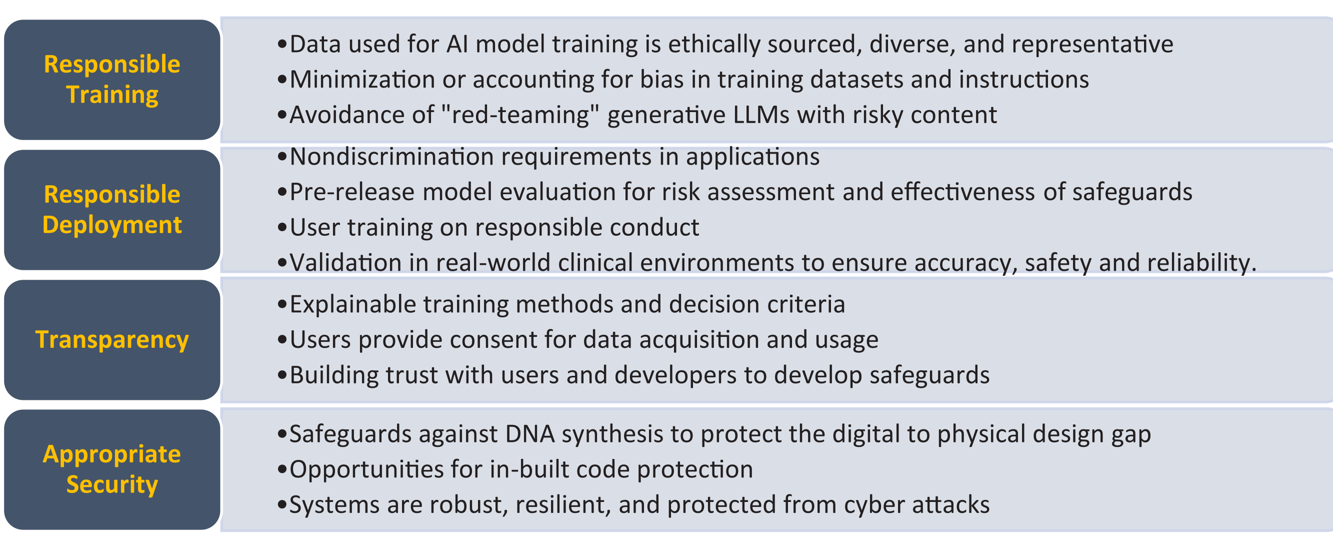

Fig. 1. Opportunities for multi-faceted oversight of responsible AI deployment to support health security.

highlight surveillance priorities. However, as discussed earlier, most current AI models are biased based on the sources of their training data, and so may be less accurate with respect to "data deserts" of the world, including parts of Africa. Regional efforts, such as those led by the Africa CDC, to encourage collection, collation, and sharing of data across the continent in pursuit of health and development objectives can contribute to overcoming these barriers (Africa CDC, 2023). Expanding access to data in this way will require that all countries in Africa have integrated or at least compatible data protection regimes in place, implying a certain level of consistency across what is a highly diverse continent. The African Union's Data Policy Framework takes important steps in this direction (African Union, 2022), with opportunities for alignment with other regional strategies for health and biosecurity, such as the Africa CDC's Biosafety and Biosecurity Initiative 2021–2025 Strategic Plan, (Africa CDC, 2021), and which may be able to be accelerated yet further under the auspices of implementing the African Union's Continental Strategy on AI.

As of mid-2024, fewer than a quarter of African countries have national AI strategies, (Musoni, 2024) let alone regulations specific to AI use for health security-relevant research or implementation. National Action Plans for Health Security, which countries across Africa have developed in response to external evaluations of compliance with the International Health Regulations, may provide another opportunity area for identifying where AI could advance implementation, and also provide momentum towards broader strategic thinking on AI regulation and oversight with respect to health security.

Finally, efforts to expand the application of AI in health security will need to take into account public perceptions of the technology and make efforts to better understand knowledge and acceptance across diverse African contexts and demographic groups. The heterogeneous cultural contexts across the African context may result in a mixed landscape of AI understanding, acceptance and adoption, requiring locally-adapted and multidisciplinary sensitization and uptake approaches. This can be achieved through involving local communities in the development and implementation of AI solutions, particularly when applied to public health or healthcare, and addressing their specific concerns and needs. In this way, there may even be opportunities to integrate local belief and value systems more explicitly into national or continental AI governance frameworks, ensuring AI technologies are applied ethically in specific relation to African settings (Gwagwa et al., 2022). Close alignment with community priorities, perceptions and experiences may prove particularly valuable with respect to leveraging AI to counter mis- and disinformation related to emerging or re-emerging infectious diseases and associated public health control measures. Finally, public-private partnerships may be a useful avenue for accelerating AI adoption, given the private sector's experience in advertising and promoting new technologies in other contexts. Africa's nascent digital and biotechnology sectors are likely to be important partners, linking AI adoption to economic and social development goals (Digital technologies open vast business opportunities in {Africa}, 2024).

5. Conclusion

While AI increasingly plays a role across a latitude of ecosystems, ranging from health, manufacturing and the supply chain to research and infrastructure, the African continent is particularly well-positioned to adopt applications and harness the benefits of AI in the health security space, as well as contribute more actively to global governance dialogue. These opportunities are due both to the critical role in advancing preparedness and response infrastructure on the continent, but also in enabling the rapid growth of capabilities across both health and security in pursuit of development objectives.

CRediT authorship contribution statement

Sana Masmoudi: Validation, Writing – review & editing. **Sabrina Chwalek:** Writing – review & editing, Validation. **Geoffrey Otim:** Validation, Writing – review & editing. **Franz Schnetzinger:** Writing – review & editing, Validation. **Amol Chaudhari:** Writing – review & editing. **Lora du Moulin:** Writing – review & editing, Conceptualization. **Arminder Deol:** Writing – review & editing. **Nqobile Ndlovu:** Writing – review & editing, Conceptualization, Validation. **Nicaise Ndembi:** Writing – review & editing, Validation, Conceptualization. **Neil Cherian:** Writing – review & editing, Conceptualization, Investigation, Writing – original draft. **Molly Shapiro:** Conceptualization, Validation, Writing – review & editing. **J. Gabrielle Breugelmans:** Writing – review & editing. **Danny Scarponi:** Validation, Writing – review & editing. **Stefan Kloth:** Conceptualization, Writing – review & editing, Validation. **Wilmot James:** Writing – original draft, Writing – review & editing, Conceptualization, Validation. **Andrew Hebbeler:** Writing – review & editing, Validation, Supervision, Writing – original draft, Conceptualization. **Janan Dietrich:** Validation, Writing – review & editing. **Standley Claire J:** Writing – review & editing, Visualization, Writing – original draft, Conceptualization, Investigation.

Declaration of Competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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