International Journal for Multidisciplinary Research (IJFMR)
E-ISSN: 2582-2160 ● Website: www.ijfmr.com ● Email: editor@ijfmr.com

Achieving Health Equity and Resilience: Leveraging Information for Sustainable Global Health Solutions

Sriram Subramani[1], Apoorva Mahajan[2], Saksham Parolia[3], Nupur Lilaramani[4], Nameeda Khaiser Syeda[5]

[1]Chief Strategy and Innovation Officer, Solutionec Pvt Ltd
[2]Global Health Specialist – Manager, Solutionec Pvt Ltd
[3]Senior Analyst, Solutionec Pvt Ltd
[4]Analyst, Solutionec Pvt Ltd
[5]Senior Analyst, Solutionec Pvt Ltd

Abstract

This report explores the transformative potential of data-driven approaches in achieving global health equity and resilience, aligned with the 2030 Agenda for Sustainable Development. The paper emphasizes the interconnections between social, economic, and environmental dimensions in addressing health challenges and advancing the Sustainable Development Goals (SDGs). Leveraging evidence-based research and real-world data, the paper advocates for innovations like Big Data, Artificial Intelligence (AI), and Machine Learning (ML) to inform health policies and strengthen global health systems.

Case studies such as Ethiopia's Health Management Information System (HMIS) and Nigeria's SORMAS (Surveillance Outbreak Response Management and Analysis System) illustrate how timely, reliable health data enhances decision-making, resource allocation, and crisis response. The commentary underscores the importance of equity in healthcare access, highlighting initiatives that reduce disparities in underserved populations while addressing systemic barriers, such as the digital divide and privacy concerns.

The analysis also discusses partnerships and collaborations, advocating for public-private synergies to mobilize resources and foster innovation. Examples like the International AIDS Vaccine Initiative underscore the impact of multi-sectoral cooperation in tackling complex health issues. By prioritizing holistic, integrated healthcare systems, the commentary calls for policies that balance immediate needs with sustainability goals, ensuring adaptability and resilience in the face of evolving global challenges.

Ultimately, the report outlines a pathway for inclusive, technology-driven, and equitable health solutions that advance SDG targets while fostering a healthier, more sustainable world.

Keywords: Sustainable Development Goals, Public Health, Private Public Partnership, Global Health

Introduction

In 2015, all UN member states endorsed the 2030 Agenda for Sustainable Development, adopting 17 Sustainable Development Goals (SDGs) as a universal call to end poverty, hunger and to achieve global peace, prosperity, health and well-being.[1] These goals provide a framework that addresses interconnected

health challenges recognizing that action in one area can spur improvements across others.
Key aspects like poverty, nutrition, good health and wellbeing, crisis response, and clean water directly impact global goals, underscoring the need for a balanced approach that addresses social, economic, and environmental dimensions. Achieving them requires a commitment to scaling evidence-based research, driven by real world data. Strategies based on data makes for holistic solutions that promote sustainable and balanced growth, enabling health systems to adapt and thrive amid evolving global challenges. In this context, information becomes more than just data; it becomes a catalyst for global change.

Data for Sustainable Global Health Progress

Nations have always used scientific evidence to formulate their health policies. One example is USA, where prior to 1997, only the oral poliovirus vaccine (OPV) was used. From 1997 to 1999, the schedule shifted to inactivated poliovirus vaccine (IPV) followed by OPV after relying on clinicians investigating suspected poliomyelitis cases and notifying the local or state health department resulting in 54% decline in vaccine-associated paralytic poliomyelitis (VAPP). Since amending the policy and adopting an all-IPV schedule in 2000, no VAPP cases have been reported in the country.[2] In the digital age, how we collect, manage, and utilize data has undergone a cataclysmic progress. Big Data, for example, a spectrum of information sources, such as electronic health records (EHRs), diagnostic imaging, genomic information, data from wearable devices and others hold significant implications for health research and surveillance, potentially driving changes in global policies, laws, and regulations.[3] Today's interconnected health challenges call for solutions that generate actionable evidence-based insights, ensuring that every decision contributes to a sustainable future.
This shift is reshaping how data is managed, creating new opportunities in preparing nations to respond swiftly and efficiently to increasing global threats. Here, data becomes indispensable. By streamlining healthcare information processes, nations can significantly enhance system efficiency. In Ethiopia, during the COVID-19 pandemic, the Health Ministry prioritized using Health Management Information System (HMIS) data to monitor key trends throughout the pandemic which successfully assisted in addressing key challenges like service disruptions, shortages, and healthcare worker burnout.[4] Timely and reliable population health data – from its collection to its analysis and application – is essential at every decision-making level. Key pillars like health determinants, performance, and overall status, are essential for resilient, adaptable systems. These systems are the backbone of development, ensuring that nations can maintain and improve public health even in the face of evolving challenges.[5]

Paving the Way for Inclusive Global Health

It is known that around 2.7 billion or 36% of the global population, people lack internet access.[6] Although digital transformation is an enabler for inclusivity for digital solutions to be truly effective, technology must be accessible to vulnerable and underserved populations. Additionally, privacy and data security are paramount as systems become increasingly digital. Implementing stringent data privacy regulations can safeguard personal information and foster public trust in digital solutions, ensuring that advancements benefit everyone and do not exacerbate existing inequities.
While digital transformation is reshaping the healthcare landscape, the true potential lies in how this data enables nations to analyse and enhance surveillance capabilities through evidence-based strategies. Innovations like Artificial Intelligence (AI) and Machine Learning (ML) are unlocking deeper insights. Proposed centralized AI and ML-powered applications can support government officials by providing

continuously updated epidemiological data, including geographic risk assessments and hospital occupancy rates. Integrated with a patient registration database, this enables data-driven decisions on targeted service upgradation and resource allocation.[7]

As technology gets more integral to healthcare, they will break down silos, creating efficiencies, optimizing decision-making processes, especially in times of public health crisis. Effective healthcare relies on timely, accurate information to guide decision-making, resource allocation, risk assessment, and intervention effectiveness.

Scaling Up Evidence Based Global Health

Data is central to evidence-based global health strategies. Its true impact is realized when health systems are strengthened. By monitoring disease spread, healthcare usage, and vulnerable populations, stakeholders can make informed choices, efficiently allocate resources, and implement targeted measures to lessen the impact on public health and safety.

SORMAS (Surveillance Outbreak Response Management and Analysis System), developed by Nigerian and German partners in response to the 2014-15 Ebola outbreak in West Africa is a mobile and web application which enables healthcare workers to report infectious disease cases and manage outbreak responses. Covering 43 diseases, with specific process models, following WHO guidelines, it offers interfaces for clinicians and epidemiologists. Deployed in Nigeria in 2017, SORMAS aided responses to concurrent outbreaks of monkeypox, Lassa fever, and bacterial meningitis. It is now widely used by healthcare professionals in Nigeria, Ghana, Germany, and Luxembourg, with subnational use during the COVID-19 pandemic in Cameroon, France, and Switzerland while being piloted in Côte d'Ivoire, Nepal, Tanzania, and Tunisia.[8]

Tools like HMIS have made pivotal contributions to healthcare, shaping its transformation and progression whenever nations have adopted them. This underscores the system's powerful influence from the outset and throughout its ongoing evolution. Stakeholders, healthcare workers and researchers together need to leverage invaluable real-world insights and findings to inform and strengthen future HMIS-focused studies and initiatives.

Transforming Towards Resilient Health Systems

To drive meaningful change, systems must implement programs that deliver measurable improvements in health outcomes and resilience. The focus should be on programs that make a tangible impact across key areas, including health equity, disease management, resilient health systems, sustainability, and capacity building. Each of these areas addresses specific health challenges while also contributing to the long-term adaptability of global health systems.

A cornerstone of this approach is health equity, which ensures that individuals have access to quality healthcare services regardless of their socioeconomic status. Equitable access to affordable healthcare has the potential to improve outcomes by providing better quality of life, easing reliance on late-stage interventions, and reducing mortality. [9] This commitment to equity tackles the root causes of health disparities, ultimately fostering a more inclusive healthcare landscape.

Building resilient health systems involves strengthening infrastructure, enhancing emergency preparedness, and fostering adaptive capacity. These aspects help systems stay operational during crises, ensuring access to essential services when they are most needed. Sustainability is integral to this approach; by embedding holistic processes while constructing systems, they meet immediate needs while also

contributing to broader environmental goals. This approach establishes a foundation for self-sustaining systems that are responsive to local needs and challenges.

Need for Rethinking Health Systems for Equity

Achieving the SDGs requires a fundamental shift in health systems. Unlike traditional systems that focus on the specific areas of health, a goal-aligned system must provide comprehensive, patient-centred services, tracking interventions, outcomes, and costs. This approach would allow governments to measure prevalence, service quality, and outcomes, while enabling secure information flows between primary and secondary care. Such an integrated system is essential for data-driven, sustainable, and equitable healthcare advancements.

Policymakers use these instruments for guiding strategic health policies and actions, as insights to design effective strategies that strengthens systems which in turn improves health outcomes, enhance equity, and ensure sustainability.[10] Policies that support health services expand access to care, especially in marginalized populations. Socio-economic disparities result in health inequities, with underserved groups often experiencing higher morbidity and mortality rates due to limited access to quality care.

Policies should encourage collaborations between public and private sectors to mobilize additional resources and expertise. Promoting synergy between governments, private sectors, and civil organizations is vital for scaling impactful public-private partnership (PPP) models.[11] The International AIDS Vaccine Initiative was created to speed up HIV vaccine development, support prevention programs, and address HIV policy issues. Similarly, the Special Program for Research and Training in Tropical Diseases, backed by multiple collaborators, aims to advance biotechnology, drug discovery, and prevention of tropical diseases worldwide. The rise of these PPPs reflects organizations' desires to share risks and benefits, pursue shared goals, or act on political or ideological motives.

Push for Global Commitment to Inclusive, Technology-Driven and Sustainable Progress

The SDGs underscore the importance of technology in accelerating healthcare development, bridging the digital divide, and empowering communities. Achieving SDGs and transforming healthcare systems is a shared responsibility that demands global collaboration and unwavering commitment from individual stakeholders.

As nations work towards SDG targets, the focus remains on inclusivity, equity, and resilience. Addressing challenges requires policy interventions, increased healthcare funding, and targeted health equity initiatives. Reducing health disparities, strengthening systems, and leveraging technology responsibly, can improve health outcomes and create a more equitable healthcare landscape globally.

Linking these thoughts to the philosophy that gave rise to the SDGs in the first hand, nations need to balance their social, economic, and environmental sustainability objectives in the quest for a healthier, more equitable world. By prioritizing access to essential resources like digital tools and addressing systemic barriers, nations can bridge gaps and progress toward a more sustainable and equitable future.

References:

1. Halisçelik E, *Soytas MA. Sustainable development from millennium 2015 to Sustainable Development Goals 2030. Sustainable Development. 2019; 27: 545–572. https://doi.org/10.1002/sd.1921*
2. Alexander LN, Seward JF, Santibanez TA, et al. Vaccine policy changes and epidemiology of poliomyelitis in the United States. JAMA. 2004;292:1696– 1701.

3. Hoffman, S., & Podgurski, A. (2013). Big Bad Data: Law, Public Health, and Biomedical Databases. The Journal of Law, Medicine & Ethics, 41(1_suppl), 56–60. doi:10.1111/jlme.12040
4. Qian, J., Shiferaw, S., Seme, A., Esmale, O. E., Denboba, W., Stierman, E., ... & Creanga, A. A. (2023). Data for local decision-making, not a mere reporting requirement: development of an index to measure facility-level use of HMIS data. *Journal of Global Health Reports*, *7*, e2023011.
5. Debie A, Nigusie A, Gedle D, Khatri RB, Assefa Y. Building a resilient health system for universal health coverage and health security: a systematic review. Global Health Research and Policy. 2024;9(1). doi:10.1186/s41256-023-00340-z
6. United Nations. With 2.7 billion people still left offline, UN Forum to find solutions for creating a human-centred and resilient digital future | United Nations. United Nations. https://www.un.org/en/desa/27-billion-people-still-left-offline
7. van der Schaar, M., Alaa, A.M., Floto, A. *et al.* How artificial intelligence and machine learning can help healthcare systems respond to COVID-19. *Mach Learn* **110**, 1–14 (2021). https://doi.org/10.1007/s10994-020-05928-x
8. Barth-Jaeggi, T., Houngbedji, C.A., Palmeirim, M.S. *et al.* Introduction and acceptability of the Surveillance Outbreak Response Management and Analysis System (SORMAS) during the COVID-19 pandemic in Côte d'Ivoire. *BMC Public Health* **23**, 2189 (2023). https://doi.org/10.1186/s12889-023-17026-3
9. Psotka MA, Fiuzat M, Solomon SD, et al. Challenges and potential improvements to patient access to pharmaceuticals. Circulation. 2020;142(8):790-798. doi:10.1161/circulationaha.119.044976
10. Kruk ME, Gage AD, Arsenault C, et al. High-quality health systems in the Sustainable Development Goals era: time for a revolution. The Lancet Global Health. 2018;6(11):e1196-e1252. doi:10.1016/s2214-109x(18)30386-3
11. WHO's 7 policy recommendations on building resilient health systems | Universal Health Coverage Partnership. Published October 19, 2021. https://www.who.int/news/item/19-10-2021-who-s-7-policy-recommendations-on-building-resilient-health-systems