Editorial

Vulnerabilities and Visions: SWOT Analysis of Pakistan's Health Surveillance Landscape

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Surveillance systems are a critical component of public health. The primary goal of public health surveillance is to monitor the health status of a population, detect disease outbreaks, track long-term trends, and make public health policies and actions. Pakistan has a structured surveillance system in place, led by the Ministry of National Health Services, Regulations & Coordination in collaboration with various international organizations like the World Health Organization **(WHO), Gavi** the Vaccine Alliance and Centers for Disease Control and Prevention (**CDC).** Pakistan has a vast population that stands at 241.49 million according to 2023 census.[1] The country faces diverse health challenges but has made strides in developing a national public health surveillance system. This expert opinion on **SWOT**(strengths, weaknesses, opportunities, and threats), analysis for surveillance systems implemented in Pakistan reveals crucial insights into its potential for growth, revealing areas of strength in community engagement but also exposing gaps in long-term sustainability and scalability.

The **strengths** of our surveillance system is development of a basic infrastructure for disease surveillance through various health departments and organizations. This includes the National Institute of Health (NIH) and provincial health departments that monitor disease outbreaks and health trends. **DEWS** was initiated in response to various health emergencies, including natural disasters like the 2005 earthquake and 2010 floods. It was designed to provide timely alerts about potential disease outbreaks, enabling rapid response measures. As of now, DEWS covers approximately 107 million people, which is about 57% of Pakistan's population. It operates through a network of over 3,000 health facilities across five provinces.[2] The increasing trends of using digital tools, such as mobile phones, AI use in medical education, electronic reporting system that bridges the gap between remote areas helping in real-time data collection, reporting, and mapping outbreaks. Shifa4U, Dawaai, Findmy Doctor, oladoc are the popular applications being used in the country and are transforming healthcare delivery by enhancing access, improving patient engagement, and streamlining services.

The **weakness** of Pakistan's surveillance systems is fragmentation of data as there is no integrated, unified national surveillance system making it difficult to consolidate information for comprehensive analysis and timely response. Data from the **Global Health Security Index** ranks Pakistan's preparedness for disease outbreaks lower than many regional counterparts, underscoring the need for a more integrated and technologically advanced system.[3] Along with that lack of services and infrastructure in remote, underprivileged areas there is also a shortage of skilled epidemiologists, data analysts, and public health professionals limiting the system's capacity to manage and interpret collected data effectively.

The **opportunities** from which maximum benefits can be achieved are Integration of Surveillance Systems unifying it under one national command like The National Command and Operation Center (**NCOC)** which was a key institution in Pakistan's response to the COVID-19 pandemic established in April 2020.It was created to manage the national COVID-19 effort, including data collection, analysis, and policy implementation which collected and analyzed information from all provinces and territories. It made recommendations to the National Coordination Committee (NCC). Pakistan received praise for its COVID-19 response, being recognized as one of the most successful in the world.[4]

The **threats** to our surveillance systems are conflict of interest among stakeholders, political instability,

resources constraints. As of 2023, Pakistan's government spends approximately 1.0% of its GDP on healthcare, which is a slight decrease from 1.4% in 2022 and significantly lower than the 2.62% average for lower-middle-income countries.[5]Pakistan spends about $37 per capita on health, which is below the World Health Organization's (WHO) recommended minimum of $44 per capita for essential health services.[6]This underfunding contributes to poor health outcomes and limited access to healthcare facilities. Vaccination rates remain low in many areas, increasing vulnerability to outbreaks of vaccine-preventable diseases. This situation complicates efforts to maintain public health surveillance as more cases arise from preventable illnesses. The country ranks third among LMICs in terms of total antimicrobial consumption by humans, which increased by 65% between 2000 and 2015.[7] As of recent assessments, there is no national antimicrobial resistance(AMR)surveillance system in place, with existing efforts primarily focused on tuberculosis (TB) and malaria. The lack of a unified approach hampers the ability to monitor resistance patterns effectively across various pathogen. Pakistan developed a National Action Plan (NAP) on AMR in 2017, which aims to establish an integrated national AMR surveillance system. However, implementation has been slow, and many objectives outlined in the plan remain unfulfilled.[8]

To achieve a more resilient and effective public health surveillance system, I recommend that Pakistan should make robust efforts like

   Expand integrated disease surveillance and reporting across all the country for a more unified and integrated data surveillance

 Increase GDP % spent on healthcare ,investing in digital infrastructure and allocating more resources to support real-time data collection.

   Encourage international partnerships, creating training programs for healthcare professionals in surveillance and maintaining the high standards

   Encourage public-private partnerships to fill data gaps and expand surveillance networks.

By adopting these measures, Pakistan can significantly improve its ability to detect, prevent, and respond to public health emergencies in future.

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