

Challenges and Opportunities of Secondary Use of health Data in Developing Countries

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Abstract

Open and reliable health data platforms can assist developing countries in responding to the many pressing issues confronting their society and economy today. Many countries' cultural and economic structures have already been affected by the global pandemic, and data has played an important role in addressing these global challenges as well as cross-sector collaboration in public health response. Even before the pandemic, there was a pressing need to improve healthcare systems and better manage limited resources to meet the requirements of rising, and frequently aging, populations. We can boost the value of health data and assist to achieve these advancements by reusing it in diverse ways. Clinical data, such as healthcare incidents and clinical trial data, can be merged with information gathered from other sources, such as illness and insurance claims records, as well as gadgets and wearable technology. This data may then be anonymized and pooled to develop new insights and optimize population health, enhance the health and experiences of patients, build more efficient healthcare systems, and stimulate innovation. While many advanced countries have taken the advantage of secondary use of health data, developing countries like Nigeria are lagging behind due to challenges ranging from inadequate infrastructure, manual data collection and processing, siloed electronic health records, poor data quality, inefficient skills in data use core competencies, just to mention but few. This paper takes a deeper look at the inherent opportunities in the use of secondary health data and barriers toward its use in developing countries.

1.0 Introduction

Health information begins from the life of a child in a womb till death. Health data is any data that is related to health conditions, reproductive outcomes, causes of death, and quality of life for an individual or population. Such data includes Clinical indicators, as well as environmental, socioeconomic, and behavioral information relevant to health and wellness. Health data is critical in healthcare delivery, research, public health planning, and government (Razzak et al., 2020). It helps healthcare professionals to make informed decisions, facilitates population health monitoring, aids medical research, and promotes individualized healthcare methods (Zillner & Neururer, 2016). Data is becoming the most valuable resource available due to digitalization, the emergence of artificial intelligence, big data analytics, cloud storage, and machine learning, which have all altered the structure of the information sector (The Economist, 2017). Effective data storage in the healthcare industry may be utilized to save costs, boost treatment quality, predict epidemic breakouts, and aid in the prevention of avoidable diseases. The use of data-driven decision-making and policy implementation has become commonplace in industrialized nations, assisting in improving the quality of healthcare and research projects (Stey et al., 2015). Many developing countries have, however, failed to take advantage of secondary health data to improve their citizens' quality of life and health outcomes. This failure is not unconnected with different challenges ranging from inadequate infrastructure, manual data collection and processing, siloed electronic health records, poor data quality, inefficient skills in data use core competencies, just to mention but few.

2.0 Primary and Secondary Use of health Data

Health data refers to information related to an individual's health status, medical history, healthcare services received, and other relevant details. It encompasses a wide range of data points that provide insights into a person's physical and mental well-being, medical conditions, treatments, and healthcare outcomes. Health data is used for a variety of primary purposes, including:

1. **Clinical Decision Making:** Healthcare workers rely on health data, particularly electronic health records (EHRs), to make informed choices regarding patient treatment. Clinicians can use a patient's medical history, test findings,

prescription records, and diagnostic imaging to help with diagnosis, treatment planning, and health condition monitoring (Nøhr et al., 2017).

2. **Patient Care Coordination:** Health data allows healthcare practitioners involved in a patient's care to communicate and coordinate their efforts. It allows for the exchange of information such as test results and treatment plans, maintaining continuity and collaboration across various healthcare locations and specializations (Sutton et al., 2020)

3. **Health Education and Patient Empowerment:** When health data is shared with patients, it can empower them to take an active part in their health management. Individuals may make informed decisions, engage in preventative behaviors, and actively participate in their healthcare with access to personal health data, instructional materials, and health monitoring technologies. (Nøhr et al., 2017).

Secondary health data is information gathered from sources other than the original source for the purpose of study, analysis, or decision-making in the healthcare profession. It's derived from existing sources including medical records, health surveys, administrative databases, claims data, and registries. Secondary health data, as opposed to primary health data, which is acquired directly from individuals for research or clinical objectives, is frequently obtained for larger population-level studies, epidemiological research, health policy review, or retrospective analysis. Patient demographics, medical diagnoses, treatment histories, laboratory test results, prescription records, health habits, and healthcare use trends are all examples of secondary health data (Stallmann et al., 2015). These data sources may be kept by healthcare facilities, government agencies, insurance companies, research groups, and other organizations.

Secondary use of health data refers to the processing of health data for reasons other than those for which the data were originally gathered. When researchers re-process clinical and health insurance data to evaluate the cost-effectiveness of a service or product, is an example of secondary use of health data. Such use, particularly information on multiple health factors, is a valuable resource for decision-making, health system administration and improvement, and research. Secondary health data is used by researchers and analysts to analyze health trends, study illness patterns, assess healthcare treatments, identify risk factors, monitor population health, and support evidence-based decision-making (Näher et al., 2023). Secondary data analysis, by exploiting existing data, can be more cost-effective and efficient than acquiring new data

through primary research methods. However, while dealing with secondary health data, it is critical to ensure that adequate privacy and ethical issues are considered in order to maintain individuals' anonymity and comply with any data protection legislation (WHO, 2021). With the expanding importance of artificial intelligence (AI) and big data in health care, as well as the adoption of AI-powered solutions, there is a greater need for primary and secondary health data from conventional sources such as electronic health records, as well as non-traditional sources such as social media. In summary, secondary health data is used for research, planning, management, education, evaluation of resources.

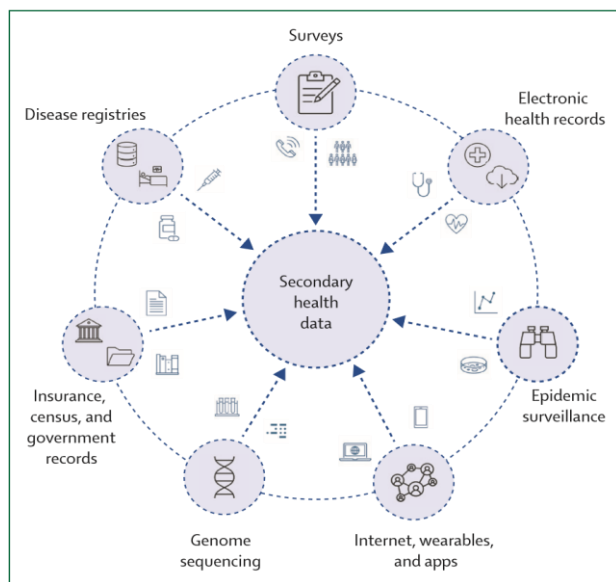


Figure 1: Real-world sources of a possible ecosystem for secondary health data (Näher et al., 2023)

3.0 Opportunities in Secondary Use of Health Data

The secondary use of health data presents numerous opportunities across various domains. Some key opportunities include

1. **Clinical Research and Evidence Generation.** Secondary health data may be used to conduct clinical research studies and generate evidence. Large datasets may be analyzed by researchers to investigate illness trends, treatment results, and potential risk factors. This might result in the development of novel medicines, better clinical guidelines, and better patient care (Kumar et al. 2017)
2. **Epidemiological investigations and Public Health:** Secondary health data allows for population-level

investigations and public health surveillance. It assists in disease outbreak monitoring, following trends in health problems, and detecting risk factors. This data can help with public health initiatives, policy development, and budget allocation (Aiello et al., 2020).

3. **Health Services Research and Quality Improvement:** Secondary health data enables the evaluation and enhancement of healthcare services. It may be used to evaluate healthcare use, examine patient outcomes, and identify quality improvement opportunities. These findings may be used to improve healthcare delivery techniques, optimize resource allocation, and improve patient safety and satisfaction (Fennelly et al, 2020)

4. **Health Economics and Policy Analysis:** Secondary health data aids in the study of health economics and policy analysis. It permits the evaluation of healthcare expenses, intervention cost-effectiveness, and the influence of health policy. This data helps government make informed decisions, shape healthcare systems, and optimize resource allocation (Akhlaq et al, 2016).

5. **Personalized Medicine and Precision Healthcare:** Secondary health data advances customized medicine and precision healthcare techniques. It is now feasible to discover patient-specific characteristics, predict unique reactions to medicines, and adapt treatment regimens by evaluating varied datasets such as genetic information, clinical records, and treatment results (Lehne et al, 2019)

6. **Secondary Health Data Empowers Healthcare Administrators and management to Make Data-Driven choices and Manage Health:** Secondary health data enables healthcare administrators and management to make data-driven choices. Healthcare companies may increase operational efficiency, improve patient care coordination, and improve healthcare delivery procedures by examining data on patient flow, resource use, and results (Zillner & Neururer, 2016).

7. **Secondary Health Data Aids in Health Education and Disease Prevention:** Secondary health data aids in health education initiatives and disease prevention strategies. By analyzing health behavior data, risk factors, and population-level trends, targeted educational programs can be developed to promote healthier lifestyles, raise awareness about diseases, and prevent the onset of certain conditions. (Custer & Sethi, 2017)

8. **Innovation in Health Technology:** Secondary health data is critical in the creation and assessment of health technology. It allows researchers and engineers to study real-world data, test new technologies' performance, and assess their influence on patient outcomes. This promotes

medical device, digital health, and telemedicine platform innovation (Aiello et al., 2020).

4.0 Challenges facing Secondary Use of Health Data in Developing Countries

The secondary use of health data in developing countries faces several challenges, including:

Data Availability and Quality: In developing nations, complete and standardized health data systems are frequently lacking. Data gathering procedures may be fragmented, inconsistent, or incomplete, making it difficult to get trustworthy and comprehensive datasets for secondary use. Inadequate data quality, such as missing or incorrect information, impedes efficient analysis and interpretation (Althouse et al, 2015).

Data Security and Privacy: Protecting patient privacy and maintaining data security are significant considerations in the use of secondary health data. Because developing nations may have insufficient resources and capacities to establish effective data protection measures, the danger of data breaches, illegal access, and potential abuse of sensitive health information is increased. Creating robust data governance structures and maintaining compliance with privacy standards are becoming increasingly important (WHO, 2021).

Inadequate Health Information Technology Infrastructure: Inadequate infrastructure, such as limited internet connectivity, inadequate electronic health record (EHR) systems, and obsolete technology, hamper effective health data collection, storage, and exchange. In many developing countries, like Nigeria, India and Ethiopia, Interoperability across multiple health information systems also impedes the integration, interoperability, and usage of fragmented data that resides in silos (Avan et al, 2016).

Capacity and expertise in human resources: Developing nations frequently experience a dearth of qualified professional in health data administration, analysis, and research. This inhibits the ability to draw insights from existing data and use sophisticated analytical approaches efficiently. To improve the abilities of healthcare professionals and data analysts, capacity development efforts and training programs are necessary (Ali & Osman, 2016)

Ethical and Legal Considerations: Ethical issues surrounding the use of health data, such as informed permission, privacy protection, and data sharing agreements, must be handled properly. Many developing nations lack clear legal frameworks and standards relevant to health data hence, navigating the ethical and legal complications connected with data sharing and secondary usage are very

difficult. (WHO, 2022). Financial and resource constraints: Investment in health information systems and infrastructure development is complicated by limited financial resources and conflicting agendas. Acquiring and maintaining the requisite technology, software, and technical skills for successful data management can be prohibitively expensive. Inadequate financing may also restrict the availability of resources for data analysis and research projects (Kumar et al, 2017)

Factors of Culture and Awareness: Individuals' desire to engage in data collecting and secondary use activities might be influenced by cultural views, inadequate health literacy, and skepticism about data sharing. Lack of information about the benefits and protections of using health data may lead to resistance or reluctance, impacting data availability and representativeness (Kawonga et al, 2016). **Inequities and Bias in Data:** There may be disparities in the availability and representation of health data among different demographic groups, geographic locations, or socioeconomic strata. This might result in skewed analysis and results, impeding the establishment of equitable health policies and treatments (Uneke et al, 2017).

Addressing these challenges requires a multi-faceted approach, involving investments in health information infrastructure, capacity building, data governance frameworks, stakeholder engagement, and policy development. Collaborations with international partners and leveraging innovative technologies can also support the secondary use of health data in developing countries.

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