HEALTH INFORMATION TECHNOLOGY

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Abstract

The broad term for the complete management of health information is health information technology, or HIT. Health information technology (HIT) refers to the systems, hardware, and software that are used in the healthcare industry for information input, transfer, utilization, extraction, and analysis. In addition to patients, doctors, and other primary healthcare providers, the technology's end users also include medical researchers, insurance companies, public health organizations, regulatory and quality assurance bodies, pharmaceutical and medical device companies, and different governmental levels. The systems and technologies that underpin HIT are essential to the delivery and improvement of healthcare at the societal scale because these entities take on such a wide range of functions and have such a diverse range of requirements and aims. Opportunities for the future and present include creating real-world data, investing in health data science research, developing robotics and artificial intelligence, fostering public-private collaborations, and integrating electronic health records among health and care providers. There are numerous moral dilemmas and unexpected repercussions from the use of health information technology. To solve these, public-private partnerships must be established, regulatory frameworks for the creation, administration, and acquisition of Artificial Intelligence (AI) and health IT systems must be developed, and AI must be used in the National Health Service in a way that is both morally and securely acceptable.

Keywords: Public health, healthcare, health information technology.

PUBLIC HEALTH AND TECHNOLOGY

Public health is the science and art of disease prevention, life extension and promotion through the organized work and informed choices of society, organizations and the public and private individuals, communities and individuals. The goal is to prevent disease, not cure it through case tracking and promotion of healthy behaviours (1). This can only be achieved if the information is relevant to the health of the community to reach health professionals, planners, decision makers and managers at the right time where and when needed. The adoption of health information technology (HIT) has been in recent decades becoming increasingly common in healthcare. (2), (3), (4).

At first, they were mostly used for administrative and financial purposes, but in today's ambitious and challenging healthcare in this scenario, healthcare providers are completely dependent on healthcare information technology (HIT) for timely and immediate access to health information. Every time During or after a patient encounter, HIT allows the provider to collect, store, retrieve and deliver information about and between health facilities. The health sector has always been supportive technologies. According to WHO (2004), they form the backbone of preventive services diagnose and treat illnesses and diseases (5).

Health information technology has the potential to improve significantly the availability and quality of health services and at the same time keep costs low. HIT contributed publicly health is invaluable in the delivery of elective, urgent and long-term clinical care; educate the community; improvement of nutrition and hygiene; and a healthier lifestyle to the conditions. These, in turn, eventually involve major social and economic changes, as many do health issues extend far beyond the health sector, (6) Public health information Figure 1 describes the public health information needed for health care professionals, managers and decision makers at every level of the health system. The Information is needed not only to understand the health status of the population, but also to understand it knows that the population needs to live in a certain geographical area. to recognize use of primary, secondary and tertiary health services, health care managers need information about health care use, health coverage, etc.

HEALTH INFORMATION NEEDS AND LEVELS OF INFORMATION PRODUCTION

A key component of implementing health information technology (HIT) understands what to collect, where to collect it, to whom to report it, and how and by whom this data is used as it is used to provide curative, preventive, rehabilitative and palliative care. concern. of the population. With this in mind, data needs, data collection tools and data output levels must be determined. Once defined and defined, it is easy for managers and service providers to move forward better in the implementation process.

Figure 2 shows that data collection for the home visit begins at the patient, institution, regional, country and global levels, where the amount of data produced is more at the lower level than at the higher level [7].

To make an evidence-based decision, health care providers, managers, and decision makers must understand the health status of the population, the burden of disease, the types of health services needed at each level, and the progress of activities/programs. at every level of the health system. If this complete, accurate and sufficient health information does not reach users in time, the goal of "health for all" will be impossible.

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GENERAL HEALTH SERVICES AND HEALTH INFORMATION

Many health-related problems arise because health information support and prompt reporting are not available (Table 1). These issues must be addressed before implementing health information technology.

Health information technology has all the potential to solve the problems that healthcare providers face when managing public health information. The health system of the country should look forward to the introduction of this technology into the quality health care of the individual and the community, but before that, an understanding of health information technology, its implementation, the reason for its use and its impact is needed.

HEALTH INFORMATION TECHNOLOGY

Health Information Technology (HIT) provides an umbrella framework that describes the end-to-end management and secure exchange of health information between consumers, providers, government and quality entities, and insurance companies. Health information technology (HIT) is generally recognized as an increasingly promising tool to improve the overall quality, safety and efficiency of the health care system (9).

REASON TO USE HEALTH INFORMATION TECHNOLOGY

Wilson and Smith argued that the creative use of information technology is one of the most promising ways to improve the quality, timeliness, clarity, presentation, and use of information for public health management.

The ultimate goal of health information technology in health care is to provide health workers, managers and decision-makers with optimal information support for high-quality decision-making, treatment and care. HIT offers a very safe, cost-effective, easy-to-use and always available maintenance application [8] [10]:

- Improve the effectiveness of programs by quickly collecting, processing and analysing large amounts of data. Due to the paper-heavy nature of manual systems, managers are often buried under a mountain of information and unable to navigate the information to make quality decisions.
- A wide range of outputs and feedback reports targeting multiple levels of the healthcare system from a single dataset or combining datasets.
- Duplicated work is reduced, where information can be entered only once and is available at any time to maintenance service providers, supervisors and decision makers.

- Automatic validation helps caregivers improve the quality of data collection with automatic validation during data entry and automatic immediate reporting of errors in individual healthcare settings.
- Improve data analysis and presentation for data interpretation and use in decision making.
- Decentralization of data analysis and use to reduce data entry bottlenecks at the central level and provide timely management information to the district manager.
- Training of health workers using a computer-based interactive guide for self-learning and continuing education.
- Data management to track achievement of health program goals and objectives.
- Collaboration in analysis, discussion and interpretation of networks of providers and researchers for continuous improvement of treatment process and results.
- Integration of service statistics data with already computerized population data, health infrastructure and/or financial management data.
- Using the Internet to search for information about new products and service delivery methods and to exchange information with other health professionals around the world.
- Improving the dissemination of information by providing public access to information through the Internet.
- Development of decision support tools for wider service coverage and logistics planning (e.g. target cost of future group)
- Modelling and simulation to facilitate design by analysing predicted outcomes for given input and conditions.
- Assist primary health centres, district and national health team in allocation of health resources.
- Enables consumers, buyers and payers to get the information they need to make decisions
- Provides alerts and reminders to help avoid errors and omissions
- Manages a maintenance implementation plan to ensure orders are completed with minimal disruption
- Coordinate care across the health care continuum
- Speeds up workflow by simplifying tasks such as planning, ordering, data entry, and creating forms and reports.

As the above is the rationale for using HIT in healthcare settings, it is also necessary to understand what types of applications are needed for various clinical and administrative operations at each level of healthcare.

COMMON HIT APPLICATION AND THEIR ROLE IN ACHIEVING QUALITY HEALTHCARE

There are many applications related to health information management and healthcare. The most common are:

Health Management Information System

A health information system is an information system specifically designed to assist in the management and planning of health programs rather than the delivery of care (11). The health information system contains all the information that decision makers, doctors and users of health services need to improve and protect the health of the population.

According to the World Health Organization (WHO), investing in health information systems (HMIS) now can have many benefits, including:

- ✓ help policymakers identify and manage emerging and endemic health problems, monitor progress toward health goals, and promote equity
- ✓ provide individuals and communities with timely and understandable health information and contribute to improving the quality of services
- ✓ strengthen the evidence base for effective health policy, evaluating extensions and enabling innovation through research;
- ✓ Improve the management method, mobilizing new resources and ensuring responsibility for their use (12).

Electronic health records

An electronic health record (EHR) is a longitudinal electronic record of a patient's health information generated during one or more encounters in any care setting [13]. It supports healthcare providers with optimal, continuous, efficient and high-quality integrated information health care It includes a problem list that clearly defines the patient's clinical problems and the current status of each problem. It broadly addresses the confidentiality of patient data and local and remote data, and can be linked to literature, bibliographic or administrative databases. It is flexible and extensible to support not only today's basic information needs, but also the evolving needs of each clinical specialty and subfield.

A decision support system

A decision support system (DSS) is an interactive, flexible and adaptable computer-based information system developed to support decision-making related to solving certain management functions. It helps doctors find patient health information needed to diagnose a patient's condition and ensure continuity of care. Although a large amount of patient information is stored on the computer, it helps healthcare providers access patient information without additional effort. Because patient care involved professionals such as doctors, nurses, pharmacists and other support personnel, and everyone wants to have patient information at their fingertips when needed. A decision support system provides an easy flow of information between these professionals to ensure the best care. As a paperless system, DSS provides readability of data, which helps healthcare professionals avoid the complexity of finding different results.

Hospital information system

Hospital Information System (HIS) is an open system that aims to integrate and communicate the internal and external information flow of a hospital and provide common functionality to all applications. It supports real-time access of health care providers to patient information, creation of operation records, tracking of patient movement history at different locations, multiple access to data, reduction of transcription work, data collection in multiple formats, etc. A well-designed integrated hospital information system adapted to the specific needs of a particular hospital can improve the productivity of hospital staff, allow each department and service centre to manage its own data processing and improve the quality of patient care.

Computerized physician order

Computerized Physician Order Entry (CPOE) is the process of electronically entering a physician's instructions for the care of patients under his or her care. These orders are transmitted via a computer network to the nursing staff or the departments responsible for filling the order (pharmacy, laboratory or radiology). CPOE reduces delay in order fulfilment, reduces handwriting or transcription errors, enables ordering at or outside the point of care, enables error checking for duplicate or incorrect doses or tests, and simplifies inventory and

payment recording. Entering the order is the responsibility of the pharmacist, as the pharmacist is responsible for checking all entries in the system related to the use of drugs in a hospital or health system. Requests for order clarification are more effective, improving collaboration among the healthcare team (14).

Regional Health Information System

The District Health Information System (DHIS) is a highly flexible open-source health information system and data repository. Its role is to include aggregate data, database patient data, disease surveillance, research or audit data, etc. The system is used to transfer valuable information from a lower level to a higher level for health care reporting and planning [15].

Overall Impact of Health Information Technology

Health information technology has a greater impact on health services as well as science and education. The section mentioned below addresses the impact of health information technology on the patient, service providers, management, researcher and academic.

The patient's perspective

Health information technologies (HIT) are an enabling element for the remote delivery of health services by providing the basic tools and systems [16]. The development and introduction of electronic health records and computerized health information systems have also improved the sharing and real-time availability of patient information at a given point in time. It also supports ongoing geriatric home care and chronically ill patients. The technology can be integrated with telemedicine, and patient data resides in transmission areas.

A clinicians' perspective

HIT provides reliable, relevant, up-to-date, sufficient, timely and reasonably comprehensive information to health managers at all levels (e.g. central, intermediate and local levels) to improve health care delivery and achieve the national goal. Applications such as EHR, DSS, CPOE, HIS help clinicians instantly access patient data and support quality decision making. Using these applications, doctors can also evaluate their own activities and monitor the patient's health status during treatment. This will not only help doctors in care planning, but also in their continuing education if these applications are integrated into online education systems. HIT also helps doctors reduce and prevent medical errors by providing alerts and reminders about a patient's health status.

A manager's perspective

HIT provides healthcare managers with a tool for data collection (both routine and non-routine), processing, analysis and timely reporting to their immediate level and others. The information generated can be used to understand the health needs of the society and also to implement various community health programs. At the district level, HIS provides information to improve various community programs. If it is endemic during outbreaks and disasters, HIT integrates with other applications such as telemedicine and Telehealth to help healthcare providers deliver high-quality services to a large patient population in and out of coverage.

It provided health managers and administrators with tools to monitor and evaluate health care operations as well as the health status of the community. At the primary and secondary levels, HIT provides information on family planning, vaccination and various other programs to identify the need for community-based programs. It also provides information on health indicators and trends that can be used to identify inequalities in the delivery of health services and develop strategies to achieve a fair distribution of resources

Research and education

The success of health research largely depends on the availability of health and medical information. Health information technology with its versatile capabilities provides information on the demographic, clinical, and administrative and health status of the population. The above information is helpful to the health scientist to improve the health of the population, drug safety monitoring, comparative effectiveness studies, clinical trials, etc.

For the distribution of medical, dental, nursing, first aid and public health education and continuing education, an academic must obtain complete, accurate, appropriate and timely reports of data related to the population of a given geographic location. EHR, DSS, HIS and other applications provide healthcare professionals with easy access to patient data that can be used to improve teaching and learning. Students also have access to real patient data to discover clinical outcomes, interpretations and results. The above not only improved their clinical effectiveness but also equipped them in a wide field.

Several benefits of HIT have been well documented in several clinical trials. Although the benefits of HIT for administrative tasks are clear, such as reduced paperwork and healthcare worker workload, administrative efficiency, and increased access to affordable care (17), (18).

Research by Choudhary and others (19) also shows that HIT has improved effectiveness in improving the quality of health care. A study conducted by Hunt et al [20], Steele [21] showed that HIT implementation significantly improved physician performance, with Delipierre et al [22] EHR implementation reporting the highest levels of physician satisfaction. Kucher et al [23] reported a reduction in medical errors after the implementation of a HIT application, while this had a significant impact on medical education (24).

CONCLUSION

Health Information technology is always considered a promising tool to improve the health of both individuals and the population. Applications such as EHR, CPOE, HMIS, HIS, and others provide healthcare professionals, planners, managers, policy makers and public health authorities with easy and immediate access to health information and domain-specific information for quality healthcare delivery and informed decision-making.

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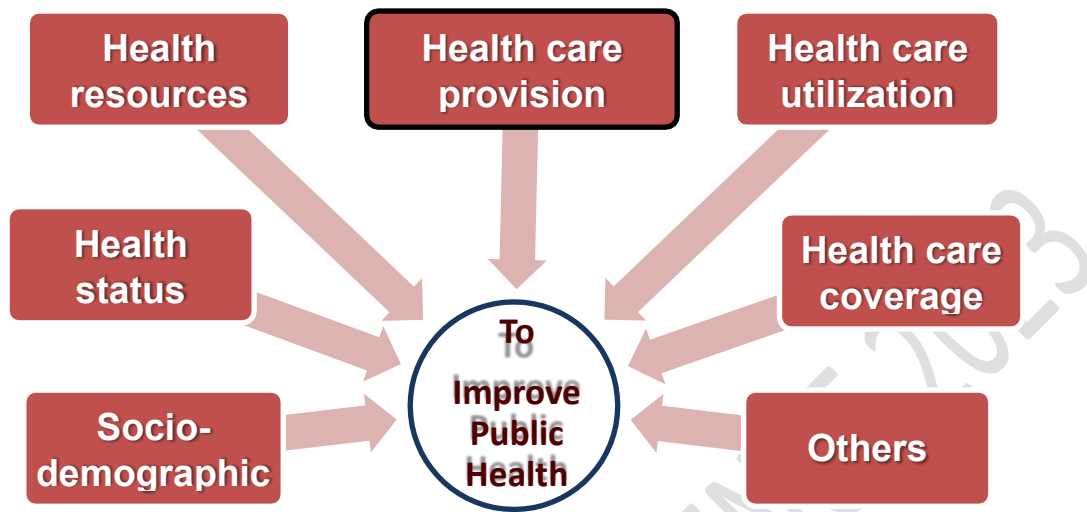
Fig 1: Types of public health information needed by health professionals, managers and policy makers at all levels of the health system.
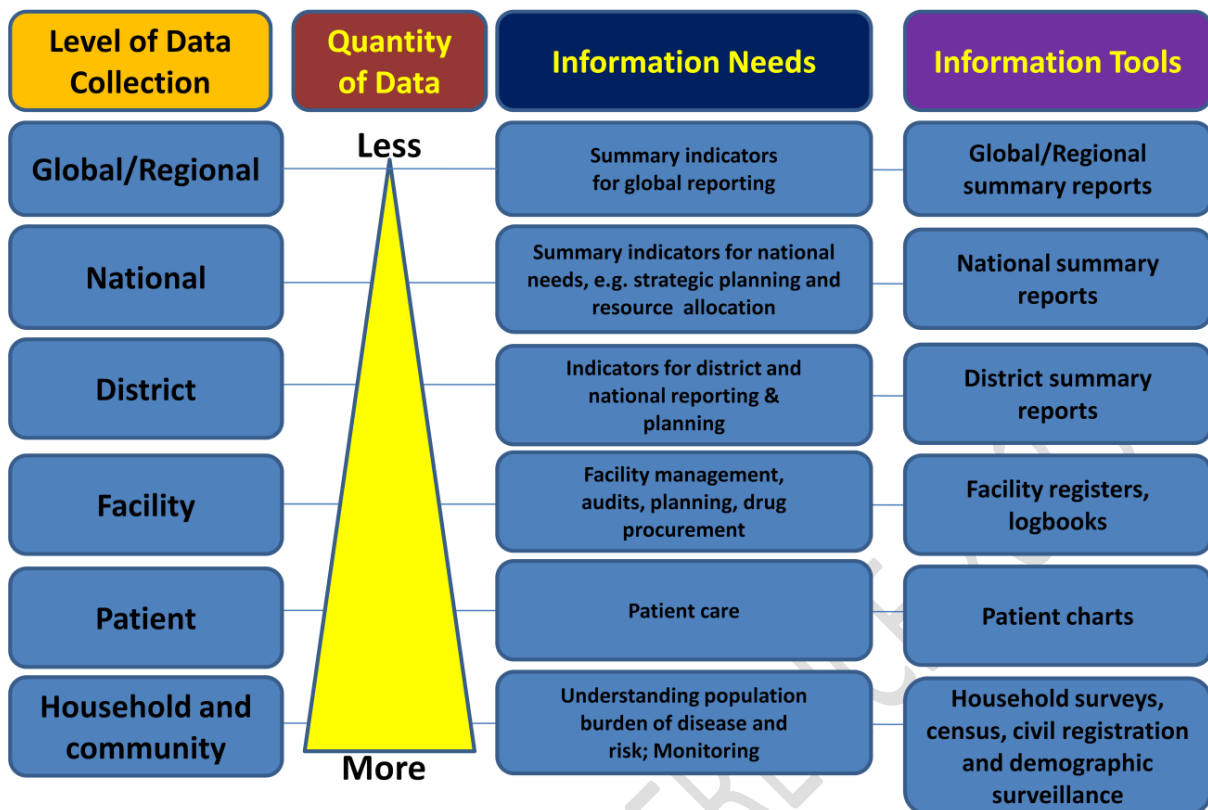
Level of Data Collection	Quantity of Data	Information Needs	Information Tools
Global/Regional	Less	Summary indicators for global reporting	Global/Regional summary reports
National		Summary indicators for national needs, e.g. strategic planning and resource allocation	National summary reports
District		Indicators for district and national reporting & planning	District summary reports
Facility		Facility management, audits, planning, drug procurement	Facility registers, logbooks
Patient		Patient care	Patient charts
Household and community	More	Understanding population burden of disease and risk; Monitoring	Household surveys, census, civil registration and demographic surveillance

Fig. 2: Levels of Data Collection

Common Health Service Issue	Corresponding HIS Issue
Problems in providing critical supply continuously.	Lack of accurate and timely stock inventoryreport.
Inadequate detection and control of communicable diseases.	Failure to receive reports of notifiable communicable diseases from Govt. services.
Inadequate planning and scheduling of critical activities and services at facility and district level.	Certain facility types or service levels not regularly submitting routine operation plansand monitoring reports.
Inadequate attention is given to finding and serving high risk and underserved populations	Patient and clinic records fail to identify high-risk patients, families and communities.
Inadequate health protection and service provided to poor populations	Lack of up-to-date population data which identifies less advantaged population groups.
Inadequate action by health staff at facility and district level to monitor and correct deficiencies in service coverage and quality.	Staff at facility and district level do not maintain records and present data in a manner which enable monitoring of coverage and quality
High staff turnover	Lack of clear job descriptions and career development opportunities