

A.3. Organizational Environment and Content Requirements for Health Promotion and Care Information

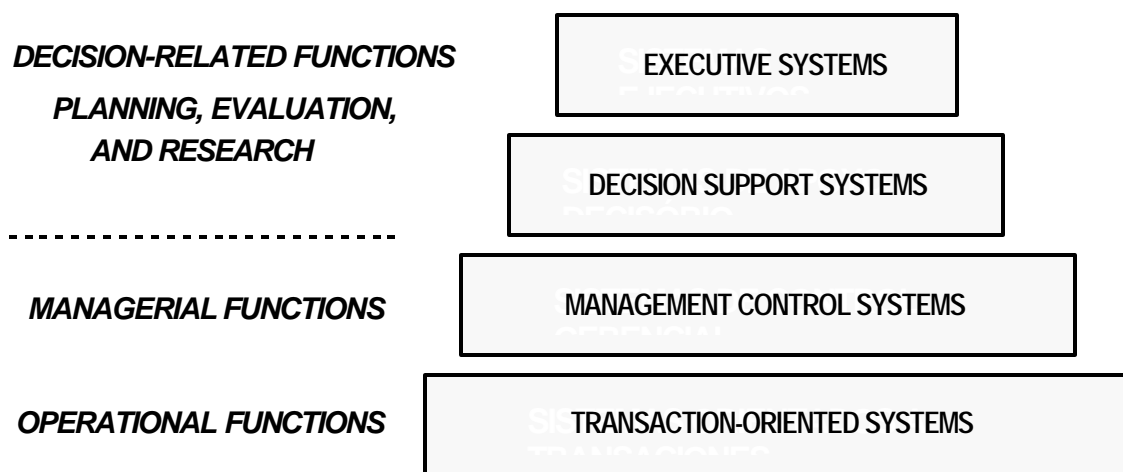
Health promotion and care information systems and technology adopt different roles and characteristics, depending on multiple determinants, such as: the goals pursued by the healthcare delivery systems, particular day-to-day clinical, educational, and managerial needs, and the level of development and integration reached by single healthcare organizations. This chapter focuses on the variety of implementation environments at different levels of decision and action, and the content of required information for each level of management and data aggregation.

A.3.1. Information and Healthcare Services

The importance of information in health services relates to its support to the aspects of management and operation:

- Sustaining the day-to-day operation and management of health services and healthcare network, and support of diagnostic and therapeutic functions.
- Facilitate the clinical and administrative decision making at various levels of action and decision.
- Support the monitoring and evaluation of healthcare interventions; the health status of populations and the conditions of the environment; the production and utilization of the health care services; and the impact attributable to the action of the health services and other health-related interventions.

Figure 4. Functions and Information Systems in Health Services



In health services, information systems and their associated technological infrastructure are oriented to the support of two functional levels (Figure 4):

[a] *Systems for the support to the operational and management functions:*

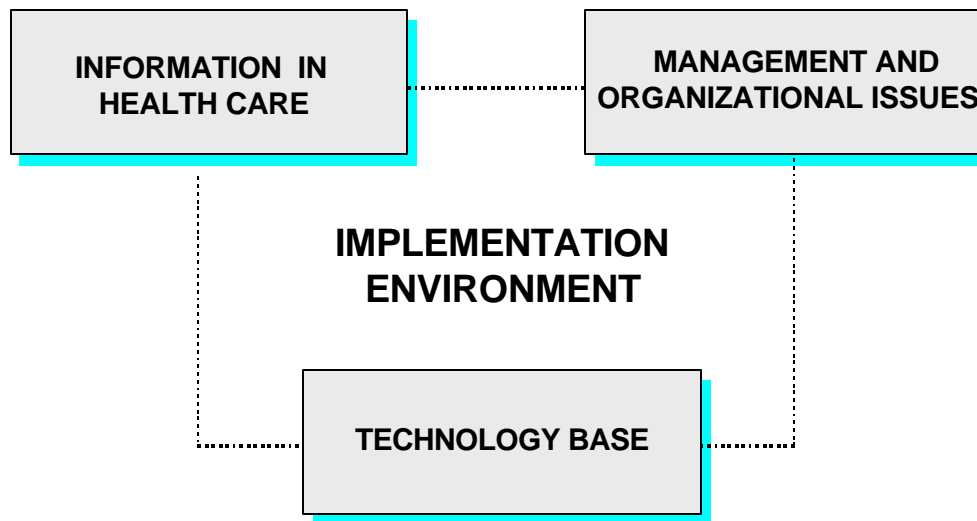
- Management of Transactions - logistics of healthcare; flow, registry, processing, and recovery of clinical and administrative data; operation of diagnostic and therapeutic support services.
- Managerial Control - administrative operation, accounting, financing, and human and physical resources management.

[b] *Systems that utilize operational data arising from the operation of health systems and services in support of decision functions — planning and evaluation — and for research.*

- Support for decision making - support for the administrative and clinical decision making based on evidence.
- Executive Systems - support to the tasks of planning, evaluation, and research.

The operational and managerial control data, isolated or in combination with other organizational data or originating from external sources, constitute the basis of the systems for the managerial support and for high-level decisions.

Figure 5. Integrated Components of Health Information Systems



Three IS&T components (Figure 5) are required:

- [a] *Information* - needs assessment, definitions of data, production of information (flow; processing; analysis, products or outputs), and adequate contents;
- [b] *Management and organizational* - including pertinent resources that are necessary for the implementation and operation of applications (organizational infrastructure); and
- [c] *Technological infrastructure* - processing and communication.

The operationalization of the three components is achieved in a different manner in each implementation environment, in accordance with the characteristics, needs, and local resources. When we colloquially speak about “information systems”, actually we refer to the integration of the three aspects described above: systems as such, the management of the information function in the organization, and the technological infrastructure for data capture, processing, and communication. This concept orients the functional and strategic perspective of the present document.

A.3.1.1. Health Services as Object of Investigation and Evaluation

Information systems are strategic components of the health services and contribute to informed action on:

- planning, supervision, and control of care
- evaluation and monitoring of the state of health of populations
- evidence-based clinical and administrative decision making
- assessment of outcomes
- education and health promotion
- research

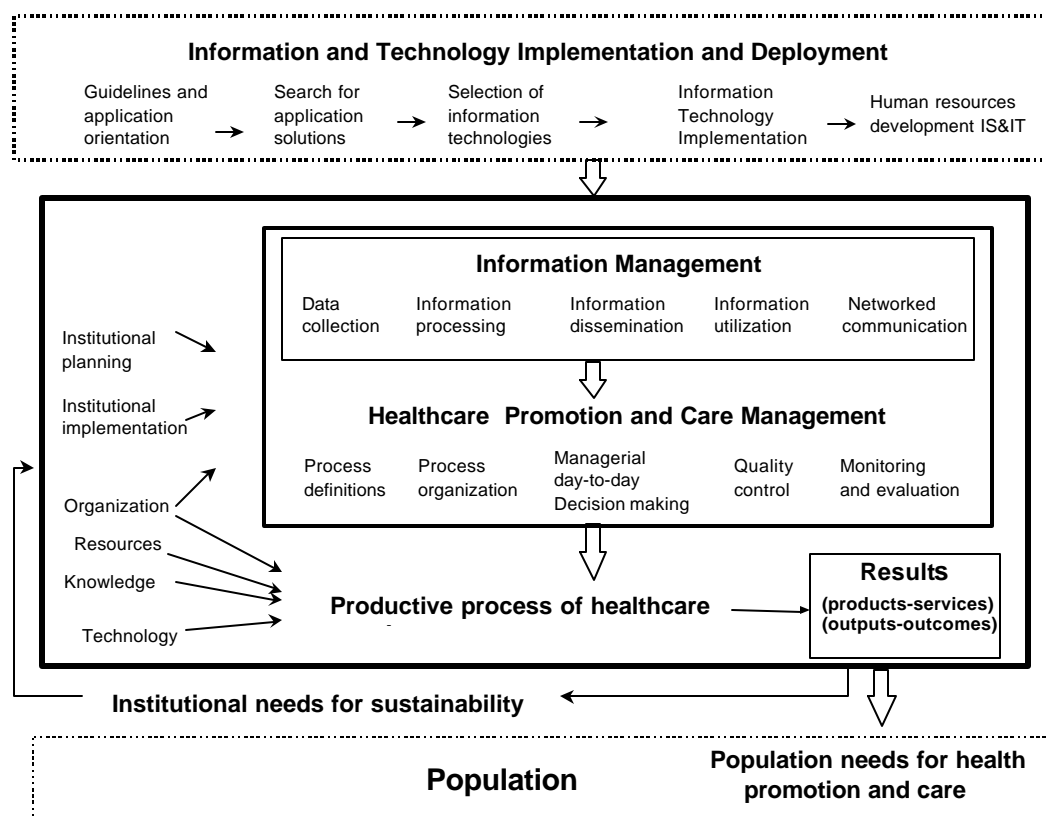
A.3.1.2. Healthcare and Health Promotion Productive Processes and Indicators

Healthcare organizations determine the particular environment for the possible purposes and implementation strategies of information systems. This is summarized in Figure 6.

As in other commercial and industrial areas of application, information on the productive process of a particular health service is related to *input* such as resources, organization, knowledge, and technology and to *outputs*, such as products and effects. Monitoring and evaluation of the *outputs* of the productive processes of healthcare is a useful tool, but it depends on opportune and dynamic information generated from the capture and processing of quantitative and qualitative data. Health services information data capture and processing are, however, extremely more challenging. The content of information of healthcare activities being mainly obtained by ongoing measurement of performance, fulfillment of tasks, and quality of the process, deals with the delivery of heterogeneous

and complex health products and services. The goals of healthcare being well beyond simple *outputs* (products and services) involve outcomes and effects, on individual and group health, which are of difficult measurement.

Figure 6. The Organizational Health Promotion and Care Environment of Information Systems and Technology



As an illustration of the issues involved, the quantity of vaccine applications is the routine measurable output of an immunization drive, but the number of vaccinated individuals who were effectively immunized, i.e., acquired an appropriate level of antibodies and the concomitant reduction of infections, should be the real measurable effect (outcome) of the initiative. Further difficulties in establishing measurable outputs are related to the fact that there are outcome measurements of quality of care and health promotion that involve judgmental criteria. Satisfaction of users, understanding of drug utilization, how to prevent infirmities, perception of health improvement, prevention of avoidable events (avoidable deaths and hospital infections), and fulfillment of quality norms and guidelines constitute variables difficult to categorize and quantify.

The variety of implementation environments of the sector also poses many problems to information systems developers. Information for management must be applicable to different definitions of "local" level: primary health care centers, hospital internal productive (intermediate or final) services, and

health care delivery networks (health services organized in a multi-centered pattern), and information must support the different specific functions related to decision making in each level.

Different levels of care and management require distinct aggregation and display of processed data. Health information at the “local” level uses an amalgam of detailed mixed data from patients, local resources, and procedures, with the objective of providing more exact parameters of administrative or clinical details, whereas aggregated data from groups of patients or institutions are many times adequate only to the macro levels (district, region, province, state, national). Macro-level aggregated data, with few exceptions, consist of both simple and compound collective indicators.

The overall information resulting from compound indicators, although of common use, is in general not sufficient to provide a true vision of the reality of the health status and appropriateness of healthcare of a population group. An example of this problem is the case of child health status, which usually is approached through a set of indicators such as infant mortality, incidence of transmissible diseases, and anthropometric parameters. Such a set of indicators provides just a simplistic and incomplete knowledge of the real world.

Despite the limitations of information in representing the realities of health and healthcare, the information needs for research, planning, and decision making justifies the use of diagnostic approaches based on sets of simple and compound indicators.

A.3.1.3. Healthcare Networks

Healthcare delivery systems, mainly in the public sector, tend to be organized in a multilevel basis according to technical complexity and degree of specialization. As long as referral from one level to another is based on needs, this can provide appropriate access to primary healthcare and to more complex technological levels of care.

Within the healthcare network model (Figure 7), primary healthcare (PHC) is the normal gate to the system. Primary healthcare has great importance and a priority role in promotion and prevention, with emphasis in prevention-oriented services, although it also provides simple cure-oriented services and refers those patients that are beyond local solving capability to higher complexity levels of care, including curative, rehabilitative, and palliative care.

Organized PHC is found more frequently in the public sector, because private healthcare tends to be concentrated in specialties that deal with complex medical conditions, using modern and high-cost care technologies. They are located in large cities and are mostly hospital centered. The higher organizational care levels (secondary, tertiary) have reduced population coverage and are usually concentrated in larger urban areas.

Complex hospitals and clinical specialties, as well as more sophisticated equipment used to support medical specialties, are at the top level of the referral hierarchy. In this situation, the patient referral system and coordination between levels are key issues.

Figure 7. The Healthcare “Complexity/Coverage” Organized Delivery Network

