

# Electronic Health Records and the Importance of How to Document

| DIGITAL TRANSFORMATION TOOLKIT  
*KNOWLEDGE TOOLS*

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**PAHO**



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## Introduction

With the rise in use of information technologies—in particular, the development of data science—information is clearly more essential today than ever before in the management of patient care. However, these advances have not been paralleled by major changes in the general process of health documentation.

Moreover, the primary clinical data generated during the care process is becoming increasingly relevant, and there are more and more actors/authors involved in the documentation process. Medical records long ago ceased to be an exclusively “medical” tool: they now involve the entire health team, including public health professionals. This has brought with it many challenges when responding to the different workflows in each discipline. In addition, there is a need to incorporate patient-generated data—whether automatic, from monitoring devices, wearables, etc.; or intentional, through information that patients generate personally, such as diaries, blogs, and questionnaires (1–3).

Problems with the workload involved in the clinical documentation process, difficulties in using different applications, and common errors related to incomplete information are increasingly common (4). An analysis of the literature shows that there has been a considerable increase in research associating the documentation process with burnout in health professionals (5, 6).

What should be done to advance more mature and effective documentation processes? To ensure quality data, the following aspects are crucial: defining the roles, functions, and responsibilities of actors/authors; understanding and adapting workflows; and implementing support tools to facilitate these tasks in electronic medical records. Likewise, it will be necessary to strengthen health documentation training (7–10).

## Why do we document?

The purpose of documentation is directly related to the activity itself, and how the records produced are going to be used. In the documentation process, we generate data that is then used in different ways (11), as summarized in table 1.

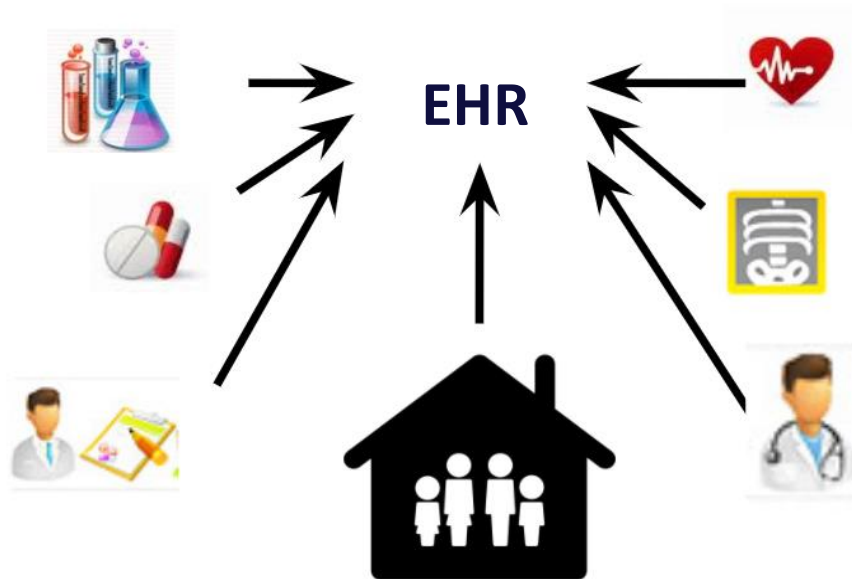
**Table 1. Functions of health records**

<b>FUNCTION</b>	<b>DESCRIPTION</b>
<b>Health care</b>	Acts as the main repository of information to ensure continuity in the process of patient care, recording all the actions of the health team.
<b>Teaching</b>	Serves as a source of information for learning from clinical cases.
<b>Legal</b>	Provides evidence of professional conduct and actions, and compliance with national or regional regulations (reports).
<b>Administrative</b>	Supports economic/financial management of health care, and its administrative management.
<b>Research</b>	Source of data for analysis and research studies.

## Where does health information come from?

Health data come from multiple sources. Health care providers generate all kinds of data, in different formats, that are entered in patient data repositories and are accessible to health personnel through electronic health records (EHR). In turn, these professionals generate other documents based on this data: analyzing, interpreting, and defining actions (12,13).

**Figure 1. Sources for electronic health records**



Ideally, health information systems, and the EHR at the heart of these systems, should follow international standards for data entry, so that these systems can “understand” the data and enable them to be shared among different institutions—what we call *interoperability* (13).

Such data, which were traditionally generated only by doctor-patient interactions, should now be considered more broadly. In addition to the data usually generated in a health care encounter, today we must also add emotional and socio-environmental considerations. Large-scale data sets must also be included, such as continuous records of biological signals or genetic information.

The clinical record, therefore, comprises three dimensions of information that must coexist (14):

- Health care provider
- Personal health
- Public health

Documentation processes must support these three dimensions, and EHRs must facilitate these processes so that this large amount of data is available in an appropriate time and format for health professionals to analyze.

Health information systems and EHRs must be able to manage data of all kinds, which is another aspect of these documentation systems' complexity. These range from text data (narrative or structured) to images (including diagnostic radiological studies, but also photographs, or computational planning for surgeries, among others), to numerical data, videos, sound recording, biological signs, and more. As we can see, the diversity of types of information is enormous, and systems must respond to this demand.

## New perspectives on documentation

Until not long ago, a “progress report” or “clinical note” was considered correct if it described a patient’s clinical status, physical examinations, and therapeutic plan. Today we know that these data do not entirely represent the state of an individual’s health, and that they only consider the viewpoint of the health provider.

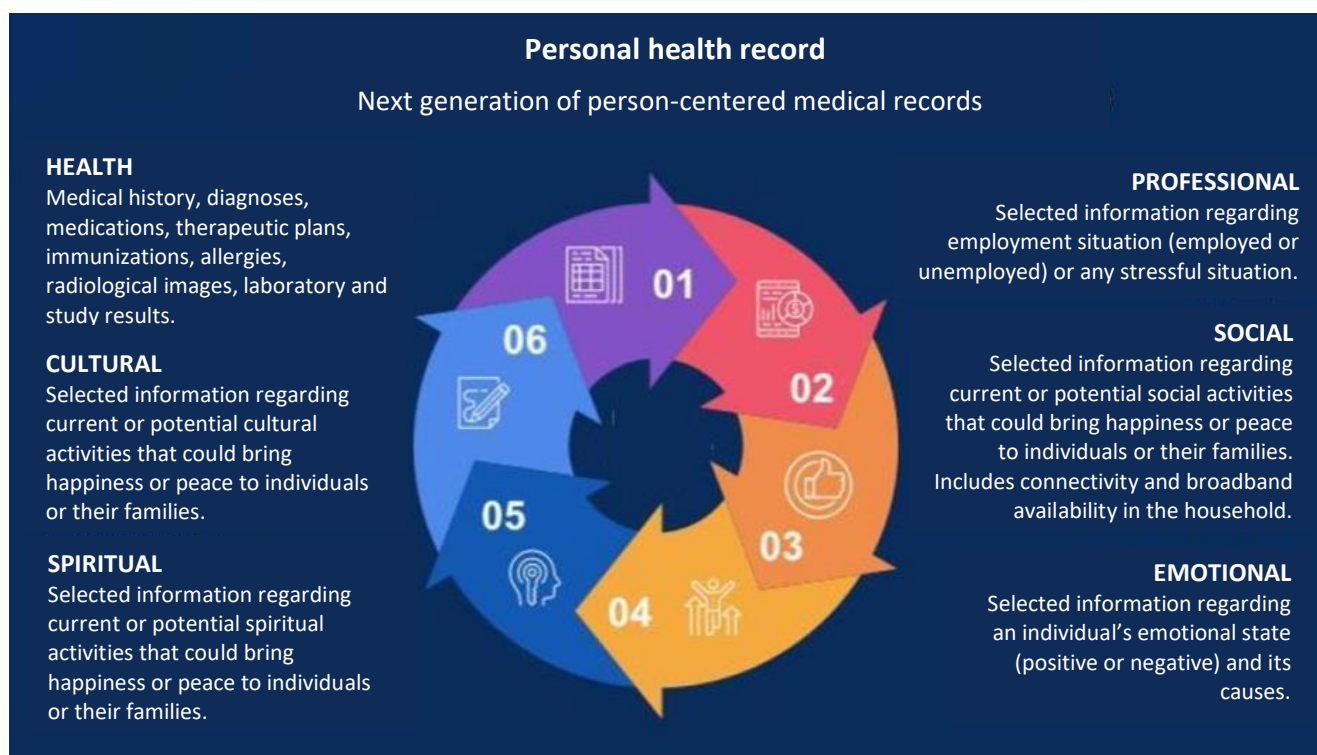
A comprehensive, person-centered perspective must incorporate other data sources into its documentation.

This paradigm shift involves treating patients as individuals with specific characteristics, at all levels (from the molecular to the population level), such as their genome (epigenome) and proteomic activity; their exposure history; their social history and social, cultural and economic determinants of health; their personal preferences and emotional health; and possible situations of vulnerability (e.g., unemployment, poverty, family violence, minority status).

Advancing digital health poses a challenge to documentation: managing new, large-scale data sets that must be analyzed using new analytical data visualization techniques and clinical decision support methods.

Figure 2 depicts this new paradigm in health records, organizing information into an interconnected cycle of data on people's health, culture, and spirituality, and their emotional, professional, and social lives.

**Figure 2: New perspectives in documentation (by the authors)**



Source: By the authors

## Narrative data vs structured data

One of the most frequent discussions regarding the documentation process is whether it is advisable for the health record to be structured. The answer is not simple. Both kinds of recording processes—narrative and structured—have advantages and disadvantages, which depend in part on the documentation policies adopted by each institution (15). Table 2 summarizes the characteristics of these two models.

**Table 2. Characteristics of narrative vs. structured documentation**

	<b>NARRATIVE TEXT</b>	<b>STRUCTURED TEXT</b>
<b>USABILITY</b>	Easy to use, requires minimal training, is intuitive.	Easy to use, although certain more complex forms may require training.
<b>DATA CONTROL</b>	Controlling the data can be complicated.	Easy to incorporate parameters for data control.
<b>CODING</b>	More difficult to code with semantic interoperability standards, requiring natural language processing (NLP) tools.	Easy to code.
<b>CONTEXTUAL REPRESENTATION</b>	More faithfully represents the care process context.	Often difficult to represent the context.
<b>FLEXIBILITY</b>	Flexible, with minimal limitations that generally only involve the number of characters per text box.	Rigid, only allows the use of pre-set variables.
<b>CLINICAL ABSTRACTION</b>	Facilitates the process of abstracting health information.	Usually does not provide space for clinical abstraction processes.
<b>USEFULNESS</b>	Maximum usefulness occurs when the document must express the reasoning of professionals, their decisions, or the justifications for or against an action (e.g., daily clinical notes, discharge letter, medical report for the insurer).	Useful when the variables to be recorded are few, of low variability (not needing frequent updating), and are often repeated (e.g., lists of antecedents, epidemiological reports, safety or quality checklists).

## Who does the documenting, and who accesses the records?

In the past, the classical model of documentation comprised a limited number of actors/authors who did not go beyond members of the “classical” health professions. Today it is clear that the concept of health care has expanded, and that each health professional who provides support for or has an encounter with a patient can and should have access to record these actions. Therefore, documentation processes, and consequently EHRs, should be adapted to this new approach and all possible types of information should be considered, (for example, to avoid the need for transcription processes), including documentation that occurs in the field. EHRs must also be able to operate offline and on mobile devices (16, 17).

The incorporation of new approaches to recording data generates a new dilemma, that of access: Who has access to the records? When? How? This must be resolved through access policies that each institution must agree on, respecting established privacy and confidentiality rules and striking the right balance between accessibility and restrictions to prevent misuse. One of the main values of information is its availability; however, not everyone should have access to everything. Particular care must be taken so that documentation processes consider access profiles and define data privacy situations, both general and particular: for example, access to mental health records. The design and implementation of documentation technologies should include a clearly defined privacy and accessibility policy that includes the management and definition of these access profiles (18, 19).

Profiles go beyond accessibility control. The profile policy must also include controlling registration functionalities. For example, a physician's profile may prescribe medicines and complementary studies, whereas the profiles of other team members will not have these functions. Ideally, profiles should also control the different privileges: for example, a senior surgeon would have the authority to fill in and sign a surgical protocol, whereas a resident or surgical practitioner would not be able to author or sign such a document.

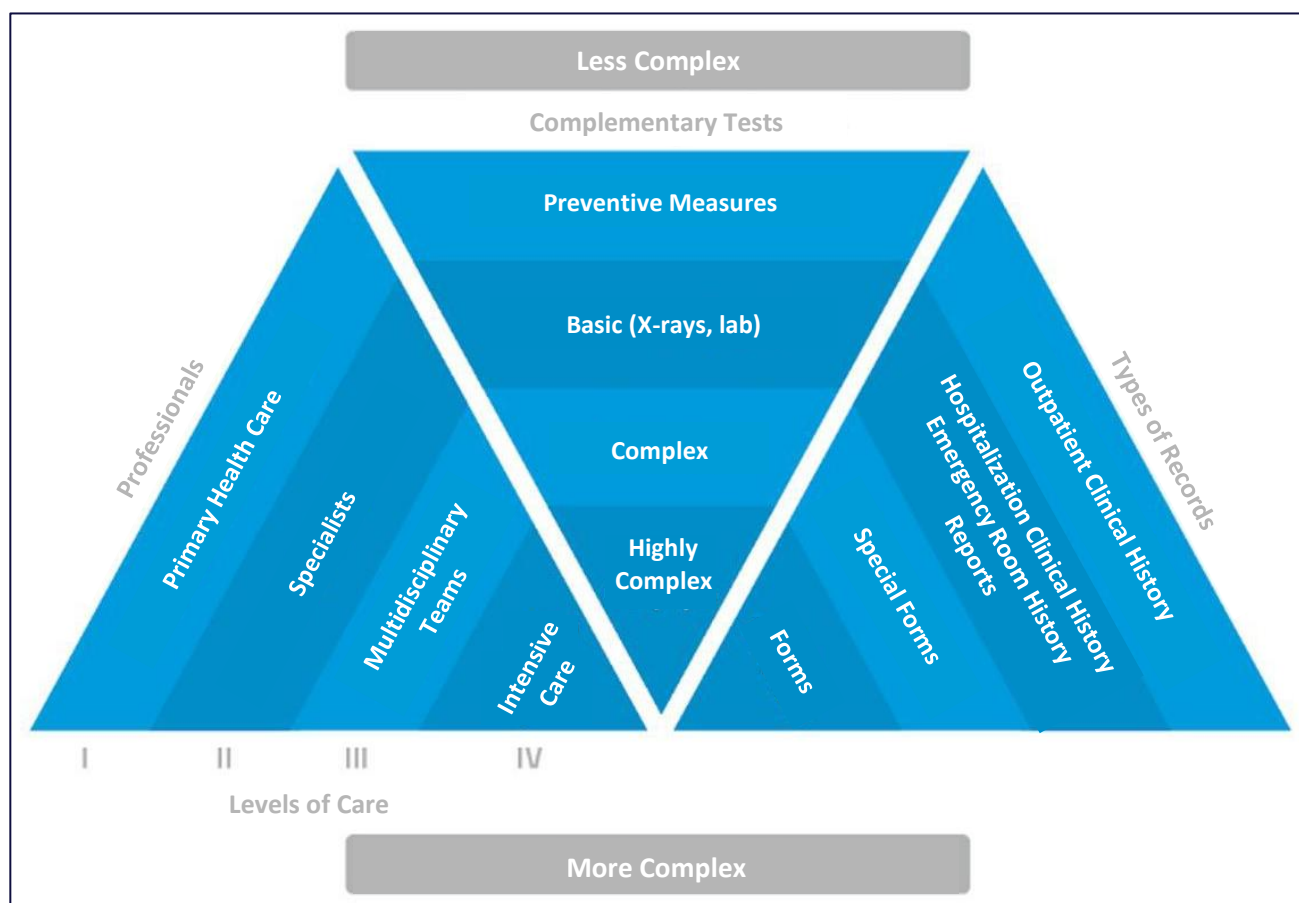
### **Documentation models**

There is a variety of documentation models, ranging from the narrative description of an encounter to problem-oriented EHRs. There is also a wide variety of options that can coexist and even complement each other.

What is relevant here is to make available the documentation model that is most appropriate to the corresponding care flow. The primary care process must have documentation systems in accordance with its dynamics, while intensive care must have systems enabling it to describe the complexity of its actions, from requests for studies to therapeutic indications.

Although records must be adapted to the workflow and needs of each care area and each professional, we must not lose sight of the concept of *document integrity*. Document integrity means that regardless of where and how a piece of data is obtained, it is always stored in the same place and in the same way. For example, if we record a diagnosis of high blood pressure during an outpatient encounter, in a history taken before hospitalization or as a comorbidity in a structured research record, we always do so in the same way, and the data is stored in the same place in the patient's clinical data repository. Another example: No matter where or how we record a patient's weight, we always store it as a numerical figure, expressed in kilograms, in the same place in the repository. What we adapt are the ways to access the record or to visualize the data, not the way in which we store it. This guarantees the data's quality.

**Figure 3. Documentation models: Adaptation according to complexity (20)**



*Source:* Luna D, Otero C, Plazzotta F, Campos F. *Sistemas de información para la salud*. Buenos Aires: Departamento de Informática en Salud, Hospital Italiano de Buenos Aires; 2018.

## Documentation and burnout

The documentation process is not without complications. How health professionals relate to the documentation process is still a challenge when implementing health information systems. Perhaps the most relevant issue regarding this point is the association between clinical documentation and professional burnout (7).

EHRs are often viewed as a hurdle or a cumbersome process; this has major implications for health professionals' well-being. Many of these difficulties are related to organizational factors and to the use of information and communication technologies (ICT), both in terms of the shift from paper to computerized systems, and changes in technologies or platforms.

If we examine which factors increase the burnout associated with the documentation process, we find the following predictors (6): 1) time spent using EHR; 2) EHR use outside of care hours (business hours); 3) support received for EHR use, or for troubleshooting; 4) perceived user-friendliness, i.e., whether it is difficult to use the EHR system; and 5) workload generated by duplicated or unnecessary tasks. Undoubtedly, there are many complex factors at play, but all of them are susceptible to intervention. These interventions range from in-house organizational policies to national regulations. Adaptive modifications to the software are also crucial. Ideally, such modifications will be multidimensional,

involving the professionals using the system in their planning and implementation, to ensure their compatibility with information needs and workflows. EHR use should be evaluated regularly to alert whether further changes are necessary, or there are deviations in the correct use of the tool (5).

**How does this relate to the IS4H initiative?**

The documentation process, focused on electronic clinical records, falls under the area of data management and information technology. Mechanisms and technologies for compiling information may contain either structured data—meaning data that consist of content with a predefined structure, normally classified and stored in a traditional relational database—or unstructured data, which represent different types of primarily narrative content, not classified or encoded in a standard way. The maximum maturity level involves compiling data from different types of sources (structured and unstructured), using different types of devices or tools in health analyses.

It is also expected that data will be compiled systematically, integrating data sets from various sources (data from different sources or institutions, or at the subnational and national levels). At the model's highest maturity level, all relevant data should be available in real time or near real time to facilitate decision-making (e.g., dashboards).



## How does this relate to PAHO's eight principles for the digital transformation of public health?

In mid-2020, the United Nations presented eight areas of collaboration based on recommendations from a high-level task force on technical cooperation in the age of digital interdependence. PAHO has adopted and adapted these areas into eight guiding principles to reflect the imperatives of the digital transformation of the health sector: 1) universal connectivity, 2) digital public goods, 3) inclusive digital health, 4) interoperability, 5) human rights, 6) artificial intelligence, 7) information security, and 8) public health architecture.

1	Universal connectivity		Ensure universal connectivity in the health sector by 2030
2	Digital public goods		Co-create digital public health goods for a more equitable world
3	Inclusive digital health		Accelerate towards inclusive digital health with an emphasis on the most vulnerable
4	Interoperability		Implement interoperable, open, and sustainable digital health and information systems
5	Human rights		Mainstream human rights in all areas of digital transformation in health
6	Artificial intelligence		Participate in global cooperation on artificial intelligence and any emerging technology
7	Information security		Establish mechanisms for trust and information security in the digital environment of public health
8	Public health architecture		Design public healthcare architecture in the era of digital interdependence

## Principle 4: Interoperability

Health information systems—including timely and open access to properly disaggregated data, integration of national and local systems, digital health, and ICT—facilitate the effective identification, reporting and analysis of cases and contacts, the early tracing and detection of cases, and the definition and monitoring of the population at risk, in a secure, interoperable manner that is as personalized as possible. The health documentation process is key to the management and governance of information systems, management of data and information technologies, and knowledge and innovation management. This point is key to achieving access to reliable data and knowledge at the right time, in the right place, and in the right format. It is crucial for digital literacy programs to include the use of EHRs and clinical documentation processes as a basic aspect of digital transformation. Any process that increases the quality of documentation undoubtedly favors the quality of care and management, generating information that will improve and facilitate decision-making.



Information systems for health - timely and open access to properly disaggregated data, integration of national and local systems, digital health, and ICT - facilitate effective identification, notification, and analysis of cases and contacts, early search and detection of cases, and the definition and monitoring of the population at risk, in a safe, interoperable and as personalized as possible.

## Interoperability

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### Implement interoperable, open, and sustainable digital health and information systems

- Incorporate the following four dimensions in national plans and public policies of information systems and digital health: 1) management and governance of information systems; 2) data management and information technology; 3) information and knowledge management and innovation, and 4) integration and digital convergence, that is, the possibility of accessing the same content from different devices.
- Ensure the implementation of information systems and digital health strategies under governance that guarantees the convergence of investments and actions, as well as the interconnection and interoperability of databases and applications, to facilitate access to data and knowledge trustworthy at the right time, in the right place and the right format.
- Consolidate an infrastructure for the exchange of open data and critical information focused on ethical and cybersecurity criteria in information flows.
- Adopt a digital literacy program based on the needs detected and considering the different contexts, to reduce inequalities.
- Provide the conditions and the necessary support to strengthen existing initiatives and build a “multi-stakeholder network that promotes comprehensive and inclusive approaches to building digital capacity for sustainable development”.
- Define the governance schemes for the data generated by the interoperability of health systems, to promote the secondary use of information, which generates data for tactical and operational decision-making.
- Articulate secure mechanisms that allow the exchange of clinical documentation (syntactic interoperability) through existing standards.

of Social Protection and Health of the Inter-American Development Bank (IDB), the Department of Health Information of the Italian Hospital of Buenos Aires (PAHO/WHO Collaborating Center for Knowledge Management), the Open University of Catalonia (PAHO/WHO Collaborating Center for e-Health), the Center for Health Informatics of the University of Illinois (PAHO/WHO Collaborating Center for Health Information Systems), the Central American Network of Health Informatics (RECAINSA), and the PAHO Network of Experts in Health Information Systems (IS4H).

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