

Developing an Electronic Record Tool Representative of Primary Health Care in the Public Health Care System of Buenos Aires City

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Abstract

The Primary Health Care strategy is based on organization of interdisciplinary teams and comprehensive approach to health, disease and health care processes. To strengthen information systems so that they represent primary health care complexities, participatory meetings were held with primary care practitioners from the public health care system of Buenos Aires City. Terms for the record tool and its components were chosen using consensus methodologies. This process involved 300 practitioners from 49 centers, and submission of 21 proposals. It was decided to change the term "Electronic Medical Record" with "Comprehensive Health Record." It was also agreed that, apart from "Reason for Consultation," the field "Problem Situation" would be added, that "Care Service" would be replaced with "Care Act," and that a new module "Health Team Management and Education Activities" would be included to document practitioners team activities.

Keywords:

Public health informatics, primary health care, electronic health record

Introduction to this Article

Use of information technologies (IT) in complex adaptive health care systems remain a challenge for design, development, implementation, and evaluation of interventions. The comprehensive socio-technical model proposed by Dean F. Sittig [1] provides useful analysis framework for considering complex interaction between social and technical factors coming into play in any implementation.

An electronic record system was implemented following 2016-2019 Health Plan for the public health care system of Buenos Aires City, which included a digital health strategy. As the system failed to reflect specific characteristics of primary care work processes and primary health care (PHC) strategy [2,3], it encountered practitioners' resistance, dissatisfaction, and dissent.

It is well-known that users' involvement and engagement in design of health information systems is key to software adjustment to work processes, lower resistance to use, tool adoption, and successful implementation [4-6]. This approach proves to be even more significant with in-house development capabilities. However, achieving meaningful participatory processes in health care organizations remains a challenge. The case under study is molded by characteristics of work processes in the primary health care strategy, whose foundational principles include interdisciplinary teamwork and comprehensive community-based approach to health, disease, and health care processes [7-10].

In this context, the question is how to introduce adjustments into the record system in a participatory way, given characteristics of primary health care practice and PHC strategy in public health care system of Buenos Aires City. The objective of this paper is to present consensus-based experience and participatory decision-making employed to develop record tools representative of characteristics of primary health care.

Background

Primary health care professionals are responsible for all actions and services delivered in basic specialties and outpatient modalities. Primary health care centers are people's main entry point to and follow-up area in health care networks. Primary health care centers are organized around the PHC strategy. According to WHO, this strategy is based on certain essential elements, such as universal health care access and coverage, comprehensive and integrated care, emphasis on health promotion and disease prevention, family, and community guidance, active participation mechanisms, organization of multidisciplinary teamwork, territory-based approaches, among others [11].

Implementation of electronic information systems in Buenos Aires City started June 2016 in primary health care setting. Its first phase was completed in 2017. This implementation phase included system based on three modules: patient identification, appointments, and simple-format electronic medical record (EMR) for documenting health consultations between patients and practitioners. The EMR had two mandatory fields: free text progress report and reason for consultation using terminology service whereby list of patient problems is generated [2,12]. Figure 1 shows EMR components used to document a medical act.

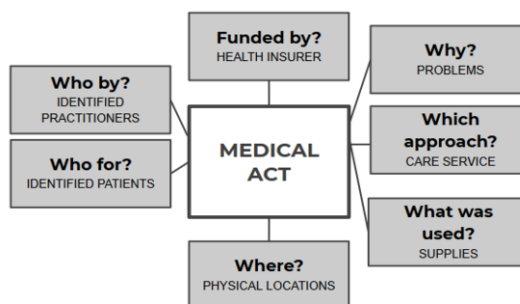


Figure 1-Medical Act Components in the EMR

Given that it is crucial to monitor how the system is used at early implementation stages in order to ensure immediate

response to users' comments and requests [9], in November and December 2017, a Health Information Systems Office team conducted a survey to make qualitative assessment of users' perceptions. Group interviews were carried out with 130 system users in 11 primary health care centers with at least a 6-month system implementation. Results concerning EMR design and format revealed difficulty in documenting some primary care practices, such as interdisciplinary health care and community activities. Some limitations were also observed in trying to represent complexity of health, disease, and health care processes with available terminology services, particularly in connection with social determinants of health as described in literature [13].

In early 2018, based on results of this assessment, the entire terminology used in the EMR was examined. It was observed that over 50% of total documented terms ($n=39,492$) were not health-related problems, but referred to other components and processes that the system was not adequately capturing. Furthermore, medical act structure was duly adjusted to primary care documentation needs. Figure 2 shows results of this analysis. The care act, not only medical act is central, and components that need to be represented in the system have been added. These components include different care modalities, other physical locations, other types of care provision, and terminology for comprehensive health care.

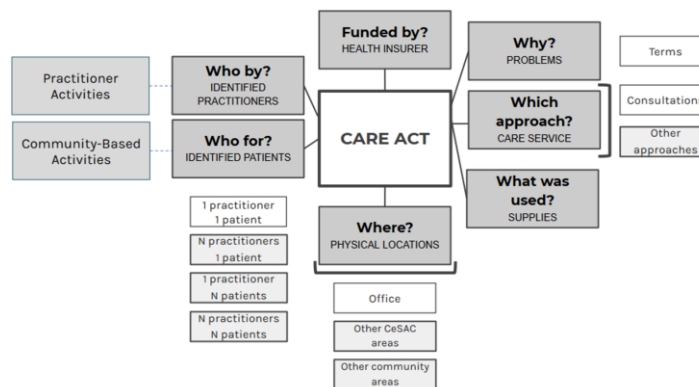


Figure 2-Care Act Components in Primary Health Care

Methods

Setting

Buenos Aires City healthcare network is composed of Ministry of Health, 35 Hospitals, 74 Primary Care Centers (CESAC, CMB), 1 Ambulatory Reference Medical Facility (CEMAR), 2 children's dental centers, and 2 mental health centers. It is structured into 12 geographical areas to organize health care delivery. The health system employs a total of 41,000 people. Since June 2016, Electronic Medical Record (EMR) has been gradually implemented in outpatient settings [2]. By October 2018, 60 healthcare facilities were using EMRs, over 1 million EMRs had been opened, and 2.5 million clinical notes registered.

Experience Systematization

An interdisciplinary team of medical practitioners, psychologists, educators, anthropologists, and communicators was created in order to plan the strategy. Starting point was a number of meetings convened by the organizing team. It was decided that the objective of systematization was to document the process of reaching participatory consensus and its ensuing agreements. All records and documents produced during planning and development were collected and analyzed, their history being traced (see *Meeting Methodology*). Results were systematized, and subsequently all information was examined and organized according to predetermined structuring component, to eventually arrive at critical interpretation of the whole process (see *Discussion*). Finally, *conclusions* and lessons were drawn and documented in writing.

Meeting Methodology

Design of system evincing complexity of PHC strategy, as in care act structure, required thorough reflection by its users. First, organizing team reached their own conceptual agreements, consulted literature on consensus methodologies [10], and decided to hold participatory meetings with end users for tool design as first step in a series of iterative cycles of interaction and agreements. Agenda of these first sessions was to find: a) most appropriate denomination for patients' individual health record tool, commonly referred to as Electronic Medical Record, b) appropriate denomination for each of the care services provided, c) how to organize and denominate problems and reasons for consultation, and d) how to organize and denominate professionals' activities which do not entail direct contact with patients. Four activities were planned, and work proposals were pilot tested before implementation with a team consisting of 6 primary care practitioners. Meeting development was supported by active strategy of communication with end-users.

First On-Site Meeting

Primary health care centers' heads and practitioners comprising maximum 4 people per institution were invited. It was suggested attendees should represent different disciplines. Invitation was made via official communication, e-mail, and telephone calls. Previous registration was also requested using structured form with mandatory fields including institution, full name, discipline, contact information, and available time for attendance. The first meeting aimed at introducing some concepts about information systems based on care act structure and work on components that needed to be represented. Work was organized in small groups of about 6 people from different

disciplines and institutions. These groups were previously formed by the organizing team. Each group was given a list of 100 terms frequently used in the EMR. These terms had been previously selected out of the total terminology ($n=39,492$) to collect a purposive sample representing term heterogeneity. Sample was made of 300 terms divided in 3 groups of 100 terms. Each team was asked to analyze and divide terms into categories, choosing a name for each of them and determining their scope. These ideas were visually represented in a map and shared among all attendees. Findings were pooled, similarities and differences identified. At end of the meeting, working materials were handed over to each institution, so that activities be replicated locally with rest of the team and new proposals generated. A virtual semi-structured template was developed for motions to be submitted. Structured fields had to contain suggested terms for each component, and free text fields for rationale, comments, and so on.

Local Work

Each institution was allowed to work on its own or with the organizing team. New proposals were presented within 3 weeks, as established. Organizing team systematized information in a comparative chart. Structured data were collected, eliminating duplicates. Data in free text format were examined based upon conceptual recurrence.

Second On-Site Meeting – Panel of Representatives

Two representatives of each institution were invited. Proposals resulting from local work instances and their analysis were shared. By means of scoring system, all attendees on one hand agreed on alternatives to be excluded and, on the other, accepted those to be submitted to open voting. Conceptual definitions were discussed, agreed on, and put in writing. In addition, lists of practitioners willing to participate in later work cycles were drafted.

Open Virtual Voting

The consensus-based options were submitted to voting using web platform known as *Portal APS en Red*, used by primary health care institutions for news, instructions, and system access. Voting was open for 3 weeks.

Results

First On-Site Meeting

Meeting was attended by 120 users from different disciplines (see Table 1), representing 49 primary health care institutions. At debriefing, following initial consensus was made:

1. Having common information system helps institutions perceive themselves as part of an integrated network.
2. The way of representing population's health problems is heterogeneous across institutions.
3. It is necessary to work together in order to enrich terminology services, particularly in connection with social determinants of health.
4. It is vital for the system to represent interdisciplinary activities.
5. Care acts may be health care-related, disease preventive, health promotional, or educational. They may also be individual or group/community-based.
6. Care acts may take place either in health care institutions or outside them, that is, in community institutions.
7. Reasons for consultations are not always health-related problems.
8. Information documented in the system may be epidemiological or administrative, for planning and management purposes.

9. The EMR is a tool for documenting people's health. It is necessary to count on other tools to document practitioner education and management activities.

Local Work

Twenty-one proposals were received. The organizing team was called in by 3 institutions. Structured data systematization resulted in following alternative names for each component: a) EMR: Single Comprehensive Health Record, Comprehensive Health Record, Health Care Electronic Record Instrument (IRES, by its Spanish acronym), Health Record, Electronic Health Record, Diagnostic Summary, Medical Practice Record, Health Practice Record, Personal Health Record, and Comprehensive Health Record. b) Care service: Provision, Intervention, Approach, Care Act, Team Practice and Response. c) Problems: Problems, Problem Situation, and Reason for Consultation. d) Practitioner activities: Special Practitioner Activities, Professional Interventions, Health Team Management and Education Activities, Practitioner Activities, PHC Team Professional Activity.

Analysis of free text showed no new findings and reinforced some of the initial agreements reached during first on-site meeting, particularly need to differentiate reasons for consultations from health problems, and existence of different types of care acts.

Second On-Site Meeting – Panel of Representatives

Meeting was attended by 32 practitioners from 21 institutions and different disciplines (see Table 1). The consensus-based voting options were: a) EMR: Comprehensive Health Record and Health Record; b) Care Service: Care Act and Intervention; c) Problems: it was unanimously decided not to submit it to voting and resort to a different record for Reasons for Consultation and Problem Situations; and d) Practitioner Activities: Health Team Management and Education Activities and Practitioner Activities. The definitions for each component were agreed in writing (see Table 2).

Table 1-Disciplines of On-Site Meeting Attendees

Discipline	Meeting 1	Meeting 2
Medicine/Dentistry	55%	43.74%
Social work	10%	21.87%
Psychology/Educational Psychology	6.66%	15.72%
Speech therapy	2.5%	-
Administration	4.17%	-
Nutrition	4.17%	9.37%
Nursing	1.67%	-
Obstetrics	1.67%	-
Anthropology	0.83%	-
Unspecified	11.67%	9.37%

Open Virtual Voting

Total of 153 voters participated. Results were as follows: a) EMR: Comprehensive Health Record (81.05%), b) Care Service: Care Act (52.24%), c) Reason for Consultation and Problem Situation was unanimously agreed on during on-site meetings and, d) Practitioner Activities: Health Team Management and Education Activities (79.58%).

Discussion

The complexity of primary health care in public health care system of Buenos Aires City was evidenced in the number of health care centers participating in the meetings, multiplicity of disciplines involved, and heterogeneity of terms used to refer to the population's health problems. In this context, reflecting

upon design of information systems which capture this complexity turned out to be quite challenging [8].

Table 2-Consensus-based Definitions for Voting

Component	Consensus-based Definitions
Electronic Medical Record	Mandatory, unified, personal, electronic record, documenting all actions performed on individuals by health care professionals and teams (Law 26.529/09 and Law 5.669/16). It was agreed that the denomination of Health Record to be used across whole network should be representative of complexity of the health, disease and health care processes.
Care Service	Every act performed by health care professionals or teams (Law 5.669/16). This refers to every contact between the health care team and individuals in the community, be it individually or in groups, and for care, prevention, or promotion purposes. It may adopt different modalities, such as consultation, advice, recreation, workshops, talks, and so on.
Problems	Reason for consultation: Everything patients express as reasons for presenting to, visiting or contacting a health care professional, this being their subjective perception and including the way they express themselves. Problem situation: Everything that triggers action by the health care professional, both in terms of education, promotion, and prevention, as well as for diagnosis, treatment, and rehabilitation purposes. These are assessments and findings based on professional expertise and knowledge of patients. It may be individual or family-related, and it may be a social or environmental determinant.
Practitioner Activities	Individual or group activities carried out by health care professionals without direct contact with community or patients including education, planning, evaluation, team meetings, case reviews, supervisions, and so on.

Design and implementation of information systems are impacted by technical aspects. However, social and cultural dimensions within institutions play fundamental role [1]. In primary health care, it was necessary to engage in in-depth discussion as to how health, disease, and health care processes are understood and how work processes are represented within the framework of PHC strategy. The consensus methodology used during meetings paved way to conceptual agreements, which are necessary starting points. These overall agreements were attained owing to the fact that participants got involved in the process and effort was made to set transparent rules [6,10].

At onset of implementation in primary health care, the information system was resisted by users. With time, different opportunities for interaction and joint work facilitated progressive appropriation of the tools by users, which was apparent in increased meeting participation. Once certain degree of system maturity was gained, it was a paramount goal to convene meetings to enable users make thorough assessment which might lead to ideas for real improvement.

Considering characteristics of health care organizations, two fundamental challenges arise when trying to manage change:

striking adequate balance between practitioners' autonomy and clear definition of responsibilities; and at same time, implement change smoothly and strategically whilst coping with resistance [14,15]. Thus, it was key to promote opportunities for practitioners to work autonomously, with probable support of organizing team, open communication and interaction channels, clear goals and scope when managing meetings, and to underscore shared responsibility for introducing tool improvement motions as well.

The blended on-site and virtual strategy was instrumental in offering participation opportunities flexible enough for virtual participation of all practitioners, which allowed for organized work in smaller groups at on-site meetings.

Proposal to reflect on design of record tool shared by all institutions and practitioners helped show that information is crosscutting and also to envisage prospect of integrated health network favoring continuity of care.

Among conceptual agreements resulting from meetings, mention should be made of comprehensive view of health embodied in replacement of electronic medical record with comprehensive electronic health record; interdisciplinary approach and different types of care provision, reflected in substitution of care act for medical act; complex representation of multiple situations that may result in contact between practitioners and people in the community, captured by agreement to distinguish between reasons for consultation and problem situations; and significance of documenting practitioner activities that add quality to care act, such as education, team meetings, and activity planning.

The magnitude of these agreements is not only seen in change of terms used in the system, as with the EMR, a main tool in health information systems. Agreements also exhibit perspective which is not only medical/clinical and focused on health problems, but also comprehensive, interdisciplinary, and care-oriented.

Even though meetings aimed at defining terms for some of the record tool components, process complexity showed that, beyond terms, the way things are named bears highly symbolical and conceptual impact.

Based on achievement of conceptual agreements and term changes, in future, specific working groups will have to be organized for participatory design of functionalities representing primary care work flows.

As to limitations of these meetings, even when call was open and there was active participation, few practitioners were not challenged by the agenda and did not attend.

Conclusions

The experience derived from our meetings unambiguously stresses user participation in design of representative information tools as well as reaching conceptual agreements conducive to denominating health, disease, and health care processes recorded in the information system.

Implementation of these results will be carried out throughout 2018 and 2019, starting with change of term "Electronic Medical Record" to "Comprehensive Health Record," since other components demand software engineering.

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