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Change management for digital health

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Author: Analia Baum and María Victoria Giussi
Medical Doctors specialized in Information Systems
Health Informatics Department
Hospital Italiano de Buenos Aires
Coordinators: Luis Tejerina and Jennifer Nelson
Design: www.souvenirme.com

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Executive Summary

Health organizations are inherently complex because of the diversity of actors within a health facility, the power health professionals have over decision-making, and external governance and control factors, such as health laws or professional association regulations that govern professional practices. As a result, changing one process affects a range of professional practices.

Any project team in charge of implementing an electronic health record system or related system[1] must be aware of this complexity and be prepared with the specific tools necessary to facilitate the adoption of the new technology and processes. In other words, the team will need to be well versed in change management, which is a process that facilitates people's adaptation to change. Because it is ultimately people who enable transformative processes, such as those necessary for adopting health information systems, change cannot happen without the support of people in an organization.

This manual summarizes the principles, strategies, skills, and tools that decision makers need to ensure that all aspects of an EHR system implementation are a success.

EHR system implementations that succeed follow these key principles:

1. **Ensure governance.** This means guaranteeing that all of the economic, human, legislative, and political resources necessary to support an EHR system implementation will be available.

2. **Form interdisciplinary teams.** These teams need to have a broad range of expertise, with an understanding of a range of technologies, information systems, and service delivery processes and models, or the "business" of healthcare. Team members must also have a deep understanding of the intertwined public sector and civil society context where the change will be implemented. If such personnel are not available, training programs must be created to train people in these critical skills.

[1] An electronic health record system, or *historia clínica electrónica*, HCE in Spanish, is a unified, personal, and multimedia medical record that is contained in a database, managed by computer programs, and endorsed with digital signature of the treating professional. Its storage, updating, and use is carried out under strict conditions of security, integrity, authenticity, reliability, accuracy, intelligibility, conservation, availability, and access, in accordance with the regulations of the governing body implementing the law. HCE or EHR is synonymous with computerized medical history and digital medical history. Law 5669, Autonomous City of Buenos Aires. Available at: http://www2.cedom.gob.ar/es/legislacion/normas/leyes/ley5669.html

In this document we use the term *Electronic Health Record System* to encompass EHRs, EMRs and related clinical information systems given that all require a change management strategy. To learn more about these definitions see forthcoming document by Cafagna, Nelson and Tejerina (2019) published by the Inter-American Development Bank.

3. **Plan the change.** When planning an EHR system implementation, approximately 30 percent of human resources should be devoted to managing the change and cultural transformation processes. Change management begins before the information system is implemented—the software itself should not be the instrument of change.

4. **Support change management at the highest levels.** Governments, whether national, regional, or local, can provide tools or services that facilitate change management by strengthening communication, training, evaluation, and feedback. For example, they can disseminate documentation of good practices, train leaders to manage change, organize regional meetings where participants share experiences with EHR system implementation, and even provide access to consulting services.

5. **Use participatory management techniques.** Participatory management allows for all actors of the health system (including the community) to be involved, detect problems, prioritize steps, propose improvements, and monitor change throughout the process. This is a very valuable management tool that allows the recipients of the change to take ownership of it while reducing possible points of resistance.

Why EHR System Implementations Fail

Although it is becoming more common to hear about the failure of health technology projects, the bias toward publishing positive results and the frequent lack of description about the implementation context makes it difficult to fully understand the reasons why digital transformation projects fail (Anthopoulos et al., 2014). Of the health technology projects studied by Anthopoulos et al. (2014), between 60 and 85 percent either partially or totally failed to achieve their objectives. Heeks (2001) showed that 35 percent of technology projects in the public sector worldwide can be classified as failures, 50 percent as partial failures, and only 15 percent as successful. Goldfinch (2007) found that in New Zealand, 59 percent of public health-technology projects were partial failures and 3 percent were total failures. A World Bank study showed that most public sector technology applications in least developed countries were partial or total failures (Neto et al., 2005). Moreover, Hidding and Nicholas (2009) noted that 19 percent of health technology projects were abandoned before completion, while 46 percent had been completed and were operational, but had exceeded their budget, been delayed, and/or deviated from the initial standards. The partial or total failures were classified as such because they did not meet the businesses' and end users' needs (Heeks, 2001; Goldfinch, 2007; Neto et al., 2005).

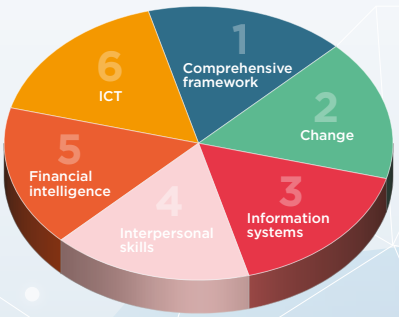
One of the most recent cases in the studies mentioned is the HealthCare.gov rollout in the United States. HealthCare.gov, which was central to the launch of Obamacare, is a website for Americans to determine whether they were eligible for government health insurance subsidies, find and compare health insurance plans and pricing within their state, and enroll in a plan. The site's development involved 55 contracting firms, 36 states, and 300 private insurers with more than 4,000 plans. In the week after the release, 9.47 million users tried and failed to register for plans. (Anthopoulos et al., 2014) Although this case was not an EHR system implementation, it is interesting to mention given that errors related to stakeholder management, communications, lack of adequate testing, and phased as opposed to full-volume deployment might have been mitigated with an adequate change management strategy, among other best practices.

England's failed EHR system implementation provides lessons as well. The project neglected to analyze user requirements or ensure patient confidentiality, and it set excessively ambitious deadlines and incurred huge cost overruns (Cresswell, Robertson and Sheikh, 2012). One reason for the failure was a lack of involvement by health professionals in defining and specifying needs for the software, which led to poor adoption of the EHR system and the project's failure.

However, successes also occur; the introduction of a new health information system that offers benefits such as reduced waiting time, simplified procedures, or qualitative improvement of care requires a serious change management effort at the organizational, technological, and individual levels.

Effective management of such efforts requires hybrid work teams composed of professionals who know about the various technologies and information systems involved in EHR systems and possess a deep understanding of the public sector and civil society context in which the change will be implemented (Figure 1) (Heeks, 2001; Margolis, 2009; Margolis, 2010; Bonomi, 2016).

Figure 1. Competency Areas of an EHR System Change Management Leadership Team



1. Context and culture, knowledge, vision/strategy/policies.
2. Change management, project management, learning systems.
3. Data, information and knowledge management.
4. Leadership/communication and negotiation skills.
5. Financing, contracts, relationship with providers.
6. ICT skills.

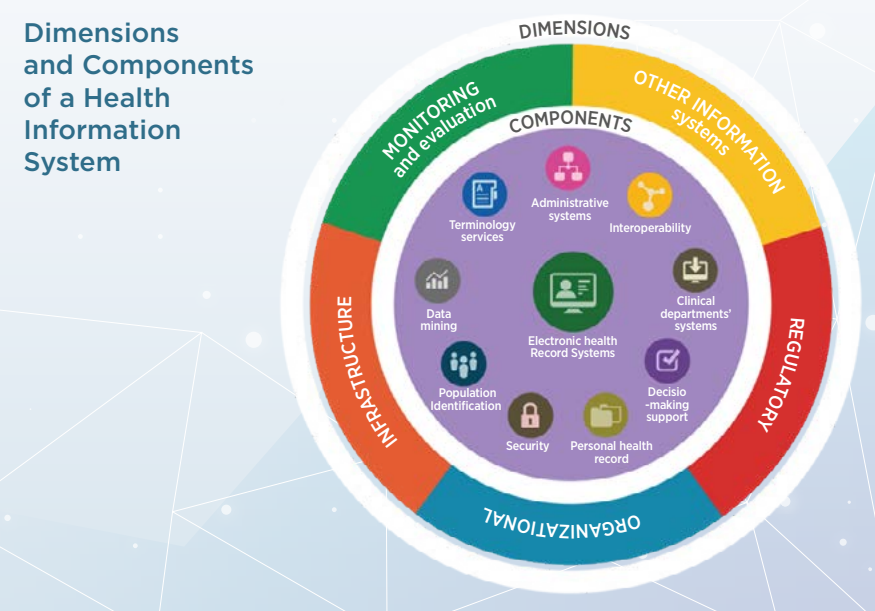
Source: Heeks, R. (2001)

Even with the right team in place, managing change requires strategies, methods and tools that integrate all phases of the design and implementation of an EHR system. The absence of integrated change management at any point in the process increases the likelihood that the project will fail.

>> Why Do People Resist Change?

When people are designing and implementing an EHR system, they frequently prioritize issues related to the system's infrastructure, or the software to be used (and whether it will be developed or purchased), and information security concerns and who will have access to the data. Rarely, however, does their strategic plan consider the equally important component of change management within the affected organization or organizations. Figure 2 shows that **the organizational component is as important as any other component**, so properly managing organizational change is as crucial as managing information security concerns or changes in any of the other dimensions.

Figure 2. The Components of a Health Information System[2]



This component is as important as the others because implementing an EHR system means more than computerizing clinical processes to obtain health indicators and manage efficiency. An implementation also **involves a profound change in the way services are offered, data are managed, and information and knowledge are accessed**. This democratization of information means the culture has to shift. Some people may see the shift as an opportunity to improve decision-making in service provision, teaching, or research, while others may perceive it as a loss of power. When the divergent interests of these varied perceptions clash, conflicts arise. It is therefore necessary to properly manage change.

Implementing an EHR or any other information system that is part of the HIS—a system to schedule hospital shifts, for example—involves modifying the staff's usual tasks and introducing

[2] Source: Image from the book Health Information Systems (Spanish Edition) Available at: https://www.amazon.com/Sistemas-Informaci%C3%B3n-para-Salud-Spanish-ebook/dp/B07BFPM81D/ref=sr_1_1?ie=UTF8&qid=1546547907&sr=8-1&keywords=daniel+luna

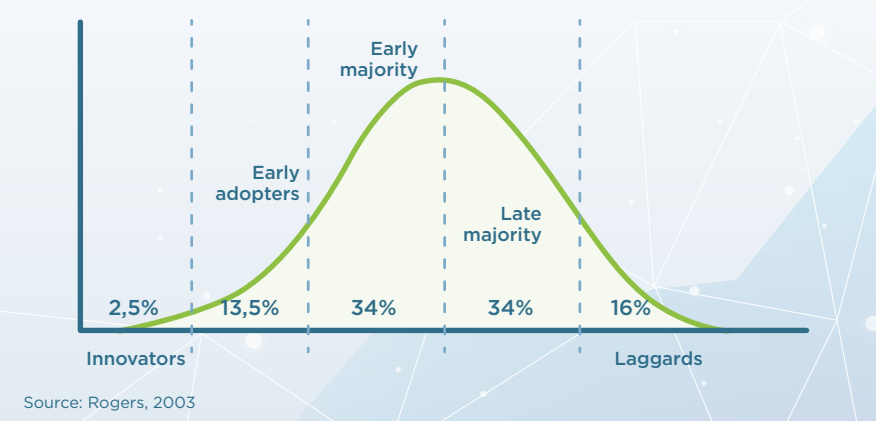
new processes, roles, and actors. Such changes reveal people's motivations, bonds, and relationships within the organization, as well as their identification with and degree of commitment to it. Sometimes the emotions regarding the change generate positive behaviors, particularly when people perceive the transformation as beneficial and see it as a possibility to change their routine, learn a new tool, grow professionally, or ascend to a new position. Others, though, will see the change as threatening to their jobs, autonomy, or power, or perhaps even as a complete transition that renders them unnecessary to the organization. Because these different perceptions can generate new conflicts within the organization, the reactions must be anticipated and managed. If negative reactions and behaviors go unaddressed, they can thwart the implementation and cause it to fail.

To add to this complexity, it is important to remember that each organization involved in the change has its own culture, and there are microcultures—including within health organizations—that are determined by the profession, degree of specialization, area of professional performance, and/or role and function of people within the organization. A surgical department does not have the same culture as a nursing department, for example. So **the organizational culture**, or subculture, refers to the set of everyday ways of interpreting, acting, and behaving. Any implementation of an information system will alter this culture by modifying the way people work, prompting a reevaluation of the values and principles of individuals or groups of individuals, transforming their links and relationships, and even modifying what people talk about (e.g., some indicators become visible to everyone, and services might start to be compared according to agendas or bed occupancy); that is, a cultural micro-change begins at the point of intervention.

People facing a cultural change show **different emotional responses**. The literature describes the spectrum of recipients' reactions to change as a bell curve (Rogers, 2003), as shown in Figure 3. It is important to identify which people are on the innovative end of the curve because they are likely to adapt to the change early on. It is important to empower them so they can help show everyone else the benefits of the change.

But some people will react negatively to the change, which can be called **resistance to change** (Kubler-Ross, 1969). People who adopt a change later than others, or laggards, are the most likely to feel and react negatively, although some people may adopt one change early and then fall behind on another. For example, a surgeon may quickly adopt a surgical technique that brings prestige, improves revenue, or diminishes patient morbidity, but that surgeon may also lag on digital technology or EHR system use. Therefore, we advise against labeling people as "resistant to change."

Figure 3. Change Adoption Curve



Resistance is said to be a natural phenomenon in all human beings, and we have all shown resistance to change at one time or another. Changes may cause feelings of loss of control, insecurity, or fear of an uncertain future—all of which may cause some level of resistance. Recognizing that this is a natural occurrence is essential to making the transition to adopting change in individuals, groups, and organizations.

People go through four sequential emotional stages, according to Scott and Jaffe (1988), when resisting a change:

Denial: constitutes a defense against change. Fear of change has not surfaced, and people appear calm. For example, people may experience denial when they hear a rumor or an unexpected official statement about an initiative for change in the organization. People in this stage react by ignoring the change.

Resistance: is the perception of loss of power or status or a feeling of discomfort. Before established relationships and links change, people may feel drawn to their old ways and experiences, which means that they are not confirming to the change. Displeasure is evident at this stage, and people take a defensive stance.

Exploration: is when people recognize and accept that change is necessary and important. People at this stage are prepared to carry out personal initiatives that help in the transition, do their best, and learn new skills. People are excited by this possibility but overwhelmed by all there is to learn.

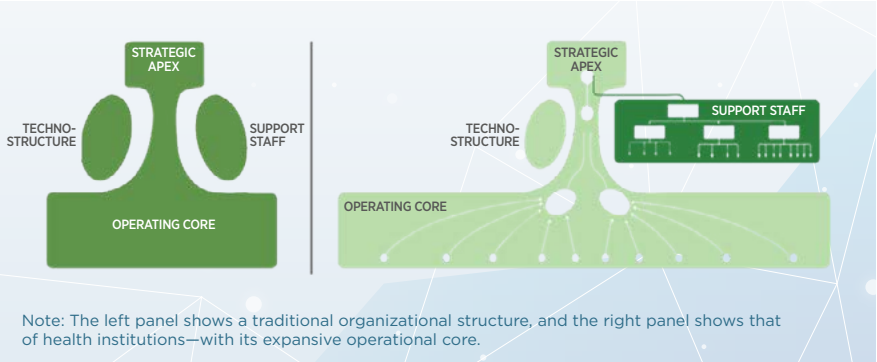
Commitment: indicates that people have decided to accept change and have adopted new attitudes. People have learned based on experimentation and are able to work efficiently in the new environment. When people's productivity increases, they feel more in control and are experiencing relief, achievement, and growth from going through the change. Their new status quo is established.

Managing change requires implementing **strategies to guide people's behavior** through the shift from the current culture to the desired culture. Resistance, stemming from real or imaginary threats, will always exist and can be minimized with the change management strategies and tools discussed in this text. It is important to know that it is easier to negotiate with people who are at the exploration stage and strengthen change while people are at the commitment stage, because there is no argument that can change the mind of someone in the middle of the denial and resistance stages. Understanding people's emotions and acting accordingly will facilitate the process of change.

>> Health System Features That Complicate Change Management

The implementation of IT systems and the management of change within the health sector require a deep understanding of the particularities that characterize its institutions. Health systems are defined as complex adaptive systems. They are labeled as adaptive because of their ability to change and learn from experience, and they are highly complex because of the diverse number of actors—each with their own interests—converging on multiple, interconnected issues (Begun, Zimmerman and Dooley (2003). The various actors form relationships and networks that entail varying degrees of cooperation and conflict. These networks are woven into an organizational structure design that concentrates a great deal of power at the base, or operational core, as defined by Henry Mintzberg (Figure 4).[3]

Figure 4. Differences in Organizational Structures in Traditional and Healthcare Settings



Note: The left panel shows a traditional organizational structure, and the right panel shows that of health institutions—with its expansive operational core.

Health organizations often have an organizational structure that Henry Mintzberg calls **professional bureaucracy**. These organizations prioritize skill standardization and knowledge, and their operating core comprises trained specialists who have considerable autonomy. These professionals work relatively independently of one another and in close contact with their patients.

Professional bureaucracy emphasizes the authority of professionals, the power of experts, and a high degree of autonomy of workers within the organization. For this reason, there are some intangibles involved in the organizational structure—health institutions usually have a formal organizational chart as well as an unofficial organizational structure that delineates the actual distribution of power. The unofficial structure must be identified to effect change. Furthermore, the technostructure and middle management practices are loosely developed because standards and processes are generated outside the organization. For example, professional associations ensure that these standards are properly taught in training programs in universities. So, although health systems are adaptive, their personnel are strongly influenced by

[3] Henry Mintzberg is a writer and educator with experience in managing organizations. He has written 20 books and 180 articles related to his area of expertise, and he cofounded the International Masters Program for Managers and the International Masters for Health Leadership, among other initiatives. More information on Mintzberg can be found at http://www.mintzberg.org

external factors that must be considered to effectively manage change. Moreover, the health sector's objectives are multifaceted and involve a variety of actors who face ongoing and daily issues of great social sensitivity, such as illness, death, life, and personhood. Therefore, workers in these organizations also confront symbolic and psychological burdens that will influence the change management process.

Successful EHR system implementation further requires that those managing the implementation thoroughly understand the role of the healthcare level where the implementation will occur. It is critical to understand its tasks, as well as how they are documented, and decide on the implementation's economic and governance performance indicators accordingly. Public health initiatives have sometimes run afoul of this principle, with decision makers defining the indicators or creating some stipulation on a health issue that has forced health professionals to jump through hoops to meet new requirements to do their existing jobs, filling out multiple forms with the same information. When information systems disrupt workflows or challenge professionals' knowledge, the validity of the system is called into question.

Healthcare issues are frequently addressed in information silos on government agendas, but this approach is problematic. it is very common to see separate programs for vaccinations, traffic accidents, communicable disease reporting, controlled substances and medications, or birth and death record requirements, for example. These vertically oriented programs typically arise from a need of the moment, are therefore driven by legislation, or by external financing, they are stand-alone systems with cause fragmentation within the overall public health and surveillance information system. — These siloed programs fragment national public health information by replicating data in each system's records and distorting the picture of the population's state of health. In addition, the replication of efforts means that resources are not being used as efficiently as possible.

To overcome this challenge, it is necessary to understand how health professionals work in their day to day environment and capture the information required in the moment it is created (during a medical consult) to avoid duplication and disrupting the provider's workflow. From that point, ensure that the information is shared according to the government's statistical requirements. It is critical that those who design change strategies for health organizations must understand the organizations' business very well, recognize all the internal and external stakeholders, understand the internal hierarchies and power structures, and be familiar with the philosophical, emotional, and psychological burdens associated with public health and workers in health fields. All of these issues must be known and understood to adequately address the multitude of factors at work when attempting to shift a health organizations' culture.

Steps to Managing Change in the Health Setting

This section provides a methodological framework for building a change management strategy that addresses the intrinsic challenges of the health sector. This specificity is important because of the extensive knowledge of health organizations and IT required to direct EHR system implementation and corresponding change management efforts in these organizations. The need for professionals with both areas of expertise has driven countries to train more health professionals in EHR system implementation and change management processes.

The framework proposed here is an adaptation of John P. Kotter's change management model (1996)[4]. Kotter points to the need for an organization to think of the process of change as a journey, which will be more enjoyable if everyone involved in the change understands the following:

- Why they need to leave the current state and move to the desired state
- Why the desired state is better for patients and the workers' respective professional practices
- What changes will be required in the daily workflow
- What technologies and new skills will need to be incorporated
- How staff will learn these new skills and assimilate the technology in their work

Kotter (1996) proposes eight steps for change management processes, which have been modified somewhat for an EHR system implementation process:

1. **Create a sense of urgency** that responds to the institution's purpose
2. **Assemble an interdisciplinary team** of professionals
3. **Develop a master plan** for the information systems
4. **Formalize communication** processes
5. **Train** on new skills and ensure buy-in
6. **Make information available to everyone quickly** and visualize the success of the implementation
7. **Sustain the change** and establish a cycle of continuous improvement

[4] John Paul Kotter is a well-known thought leader in the fields of business, leadership, and change management. He is the Konosuke Matsushita Professor of Leadership, Emeritus at Harvard Business School, author of numerous books, and founder of Kotter International. More information can be found at: https://www.kotterinc.com/team/john-kotter/

8. **Evaluate** results, review processes, document new standards and procedures

Each of the steps is further explained in the eight sections that follow.

1. Create a Sense of Urgency

The first step is to **create a sense of urgency**. Each organization needs to think through and declare its purpose. This may mean having accessible and timely information for patient care, promoting research, strengthening education, or facilitating the management of the institution. These are just some of the internal motivations or "driving forces"[5] that could lead to the implementation of an EHR system. The sense of urgency could also come from external forces, such as a change in a law or regulations. It is necessary to address and communicate this first step so that the team driving the change and implementation do not lose sight of the purpose.

2. Assemble an Interdisciplinary Team

The second step is to **assemble an interdisciplinary team**, as in Figure 1. The profiles of some roles required on the team are described here.

The role of clinical information specialist (Mantas et al., 2010) is becoming very common in the health sector and is increasingly taking on the role of EHR system coordinator or implementation leader. This person is a health professional who has the ability to understand the field of health, information and communication technologies, and health organizations' culture and organizational change. In developing countries (Hersh, 2006), the number of clinical information specialists is growing, but there are still not enough of them to manage the recent explosion of public and private implementations. Investing in the training of this specialized resource adds value to organizations by allowing them to improve their ability to interpret user needs and transmit them to the technology teams that develop the system. It is essential that staff with this profile also develop socioemotional competencies (Quiros, Baum and Lira, 2006) such as the ability to effectively bond with others and develop empathy, since most of their will be done through conversations with stakeholders in diverse contexts, as described in first part of this document.

In addition to the health professionals and IT department staff, experts with these abilities round out the team:

- Project management.
- Communications.
- New technologies.

[5] Lewin´s Force Field Analysis Model. Available at: https://www.change-management-coach.com/force-field-analysis.html

- Conflict management skills.
- Soft skills, including the ability to accompany the team and provide them with the tools to control people's emotions as well as negotiate and manage conflict.

In the new management models, the activities are decentralized, and the teams operate in a horizontal collaboration rather than a top-down leadership model. The more interdisciplinary, diverse, and complementary the team, the greater its problem-solving abilities, which will better drive change.

3. Develop a Master Plan for Information Systems

Having created a collective sense of urgency, it is necessary to define the projects, the objectives and milestones, and the time frame. In general, operational timelines correspond to priorities and should be modified every 4 or 5 years as part of a continuous improvement process. That said, the timelines may change since the number of external and internal factors in each organization will require that the projects are flexible. This step also involves defining whether the project requires the development of a legal framework and establishes monitoring and evaluation indicators.

Part of planning the information systems involves delineating the human resources, equipment and infrastructure, and budget needs. The Department of Information Systems of the Italian Hospital of Buenos Aires, for example, allocates approximately half of its budget to infrastructure need (*software, hardware*, and connectivity) and half to human resource needs. Thirty percent of the human resources will manage the change and must comply with the interdisciplinary team profile (referred to in the previous point).

4. Communicate, Communicate, and Communicate

Communication is a key aspect in transforming an organization. It is necessary to communicate the vision for change and all progress on the operational plan to all levels and functional areas of the organization. It is also important to gradually establish a common language for informatics (for example, the set of functionalities that the term "EHR system" encompasses within the organization) and communicate a set of realistic expectations about implementation. The communication plan should cover the content, the audience, formal and informal communication channels, materials, and deadlines for meeting the objectives of the implementation.

Some good practices in communication are:

- **Before making changes, inform and contain.**
  It is important to adapt communications to the intended recipients so that they understand what the desired change is

and can respond appropriately with concerns and objections. In discussions and communications, it is necessary to clarify the differences between the previous and new ways of performing tasks, and people must be allowed to discuss their fears and concerns. Anything that people cannot communicate will be bottled up and may resurface as resistance.

- **During planning, form a consensus.**
  It is critical to listen to the concerns and needs of everyone affected by the implementation so that they can fully understand and internalize the process of change and get on board with it. Gaining people's consent is critical, as consensus is the most appropriate method for making decisions that require adherence and general support.

- **During implementation, commit.**
  Doing and learning are simultaneous actions, so end users must be involved in the implementation. They must be able to demonstrate their ability to listen and organize and give and receive feedback. Different techniques can be used to involve end users, such as participant observation, in-depth interviews, focus groups, operational groups, and/or roundtables.

5. Train and Ensure Buy-In

Organizations that adopt new technologies must create a learning culture to make sure everyone who will be affected by the new technology is sufficiently trained in it. Designing a comprehensive training plan for everyone in the organization is a challenge in any information systems project, but it is central to making sure a change is successfully adopted.

One means of ensuring buy-in is to make sure that people have time for their newly acquired knowledge to become second nature. The need for training is commonly recognized late in the change process or considered as only a low-priority activity that pertains only to people who will work directly with the new technology and processes. As a result, supervisors and managers are often not included in training, which then leads to misunderstandings about the quality and capabilities of the new system.

In addition, training for new systems is frequently superficial. When training focuses on only the steps required to do certain tasks rather than how to thoroughly understand the ins and outs of the system and troubleshoot problems, the depth of users' needs are overlooked. This insufficient training diminishes professional capabilities and disturbs the organizational culture, potentially affecting even patient care and services. It is also important to note that training needs to be offered at the optimal time. If training is delivered too early, people may forget what they have learned by the time the new system is in place. Conversely,

if training occurs just before implementation, some people may not yet be fully trained, which will lead to decreased uptake and increased resistance issues.

While designing and developing the *software* and software-related parts of new processes, the more end users who participate and the greater the consensus reached about the new functionality, the easier and more beneficial the training and adoption will be.

Designing a comprehensive training plan for actors with different roles is a challenge in any health information system project. Therefore, the way training is conducted can be a key factor for adoption.

End-user training

When designing the training plan, it is necessary to keep in mind that trainings must be tailored to the recipients' learning needs and level of digital literacy, and some end users may need more training than others. It is also important to build a flexible training schedule that can accommodate users' varied learning paces and scheduling restrictions. Structured, formal training can be done in person in a classroom-type setting where end users are the students or in a train-the-trainer setting. Alternatively, online training courses using the existing intranet or internal communication systems can be self-paced to allow for individual learning curves. Online courses can be designed to accommodate team activities, videos, and other training tools.

To maximize knowledge uptake, in is important to include on-the-job experience in addition to classroom training so that the training addresses their real-world work situations. It is also a good idea to offer a practice space that everyone can access, preferably within the workplace, until everyone is fully trained and comfortable with the new system.

- **Contents.**
  To define training content and understand what is needed, the training courses it is important to distinguish the functions and roles of different actors. It is always appropriate to begin training by stressing the value that the computer system adds to the operations and purpose of the institution.

- **Accreditations.**
  It is important that the trainings have the support of the respective certifying entities for each group of professionals trained, and the training hours spent must be formally accredited. Accreditation can help reduce resistance to change and earn greater buy-in for the operational plan.

- **Continuous training.**

Information systems are not static and will evolve to meet organizational goals and be updated regularly. Updates may require additional training, and a new plan to train all uers may be needed at times. This plan will be tailored to the complexity of change made. For example, a system upgrade that adds functionality, such as electronic prescribing in an EHR system, could require face-to-face, hands-on training, but a minor change might require only an onscreen notification when the user is in the application.

- **User Support.**
  It is advisable to establish contact channels so users can reach out for assistance when doubts or problems arise while using the system. A good practice is to consider two types of support: support for using the system and *hardware* and/or *software* support. Since providing the correct support depends on which service is contacted, it is a good practice to design the lines of support, designate a team to be responsible for each type of support, and establish procedures and response times for any problem that may arise (Alassia et al., 2017; Baum et al., 2004).

Implementation team training

Training the implementation team is essential to making sure end users successfully adopt the new system. The implementation team must be trained not only on technical aspects of software use, but also on managing users' emotions, expectations, and reactions to the new system.

The following points are useful for designing the implementation team's training:

- Consider the legal framework of the various tasks that end users perform to address any overarching needs.

- Be sure to let users know that all of their questions will be answered. If the team does not know the answer to a question, it should tell the user that they will follow up with them to get them the answer. No questions should go unanswered just because the team doesn't know the response at the time of the training.

- Listen with empathy to users' concerns and remember that any anger expressed is in response to multiple factors, most or all of which are not due to the implementation team.

- Show empathy by using icebreaker questions such as, How did you feel about using the system? What difficulties did you encounter?, and Should we look at it together?

- It is always better to ask question than oppose arguments from the user. Ask questions to help the users find the answer to their own question. For example, if a user asks how to do something in the new system, ask the person how they did it in the old system. This usually helps the person figure out the answer to the question.

- Recognize when a user becomes stressed or uncomfortable with the training and give that person space and time to adapt.

- Emphasize how well users are progressing with the training and highlight their progress.

- Repeat the organization's vision for the future so users recognize the importance of the change.

- Accept that users will need to be told how computer applications add value to new processes and the new system.

- Explain to users that their participation in the training and change process is important because they are the ones who have the frontline knowledge of the organization's business operations and tasks.

- Recognize which people will not listen to the message that the change is good and learn when to stop insisting on it. It is common for a small percentage of people (see Figure 3) to resist all change strategies. These people often adopt the change once they feel they have been left out of the new work dynamics.

6. Plan Small Victories

Implementing an information system is a continuous process, and monitoring and evaluation is used in the cycle of continuous improvement to keep the system updated and relevant once the system is in place. The ongoing planning and evaluation inform the organization's understanding of progress and setbacks, and intermediate results can be publicized as small victories while allowing for corrections for deviations from the original plan. In addition, unforeseen improvements may need to be implemented periodically in response to needs that emerge once the system is in use.

It is very important to share the small interim achievements with everyone in the organization to bolster support for the new system. The early victories can center on implementation figures (e.g., number of equipped offices or trained professionals), then production figures (e.g., number of shifts or consultations and diagnostics recorded), and, ultimately, adoption successes (e.g., female population with cervical cancer screening).

Just as it is important to share achievements, it is vitally important not to use the data as a mechanism for monitoring professional performance. It is also necessary to remember that observed results are defined by what has been documented and not necessarily the full scope of what actually happened. It is therefore essential to perform evaluations and use information from all sources to understand the variables that impact users' work, introducing improvement processes as necessary.

7. Sustain the Change

The key to sustaining change is having as many users as possible participate throughout the process of designing, selecting, and implementing the information system. It is a common mistake to finish the implementation then send out a satisfaction survey that gets only negative feedback on the new system. The better practice is to communicate the vision for the new system and information about the new processes, which allows staff to take ownership of the project by contributing to the transformation of the organization's culture.

Participation means having a voice in the development of the change. Users' comments should be addressed, recorded, and taken into account (Lawrence, 1969). Involving users in defining the functionalities of the information system achieves a better product, by capturing the users' frontline knowledge, saves time in training, and improves adoption times. An increasingly common method for the development or modification of functionalities in an information system is user-centered design (Interaction Design Foundation, 2016).

The key points to consider at this stage of change management are:

- All personnel involved in any task to be modified must participate in the evaluation of the related policies, procedures, and workflows.
- Those same individuals should be the ones who implement the changes, as they are the experts in identifying what is not working and what technology would achieve the desired result.
- Innovative solutions must be rewarded, and quality improvements must be taken into account to promote new changes.

- Patients should be informed of the changes and their implications to get their buy-in for the cultural transformation.

8. Evaluate

Evaluating the new system involves a continuous examination of whether the implementation goals are being achieved. As with any monitoring and evaluation effort, the monitoring process should take effect when the implementation is launched, and information gathered is to be used to redesign any part of the project that is not achieving the intended goals. In addition, information gleaned may reveal unexpected issues or unintended consequences, which will allow those issues to be addressed before they threaten the success of the change.

The evaluation requires quantitative and qualitative indicators. Quantitative indicators are geared toward measuring time, costs, savings, or the adoption of computer tools or new processes. Qualitative indicators focus on users' perceptions of the change implemented though measurement tools such as written or oral surveys, individual interviews, or focus groups.

Questions for qualitative information gathering may include the following examples:

- How satisfied are users with the change? What about other people in the organization?
- What suggestions or comments have been made?
- To what extent has the information system and the new task structure been adopted?

Since change management is a dynamic and responsive process, the incorporation of monitoring and evaluation allows problems to be diagnosed as they happen. In the context of an implementation, it is important to evaluate the adequacy of the technology, the impact of the change on the processes and the actors involved, and the ability to identify and resolve emerging problems. The evaluation results should be followed by planning that corects or prevents problems from happening again and moves the new system toward maximizing stakeholders' satisfaction with the change process and the new system itself.

Tools to Manage Change

Given the importance of good change management when undergoing a change that affects everyone in an organization—as an information system implementation does—and the complexity of health organization structures, it is necessary to have a solid toolkit to manage the EHR system implementation process.

As discussed earlier, the Rogers affinity curve of behavior when a change is adopted and the Kubler-Ross framework on emotional stages and resistance offer tools for assessing individual behaviors toward change and identify what is needed to encourage buy-in. These tools can improve the efficiency of processes within the Kotter model.

The following sections elaborate on these tools for managing change:

- The Kotter **eight-step** model, discussed earlier, allows you to consider everything necessary to bring about a change (more information on applying it follows in the Cases Studies section).
- **Participatory management** (see Figure 5) allows actors to work on problems through a process of self-reflection, prioritizing problems and defining actions to improve them (Kushniriuk and Nøhr, 2009).
- Two worksheets included below, negotiating tools (see the tool sheet on page 26) and difficult conversations (see the Difficult Conversations: Language Metamodels section), increase productivity in change management meetings.

>> Participatory Management

The participatory management tool is used to systematize and manage improvements in the problems detected by the actors involved in a process. The tool is used during the entire dynamic process and involves diverse, interdisciplinary groups. Note that for the groups to work together effectively, they must identify and agree on the problems they want to work on. The tool leads the groups through four phases: (i) define the problem, (ii) analyze the problem to identify and prioritize key issues, (iii) institute an improvement, and (iv) measure and monitor.

Phase 1

Define the problem that requires improvement. This phase should answer the question "Why is this a problem?" and define the problem's impacts.

Phase 2

Analyze the problem to identify and prioritize key issues within it. Each key issue can generate an improvement action. Choose a key issue to work with in a continuous improvement cycle and assess whether managing is within the scope of the team's capabilities.

Phase 3

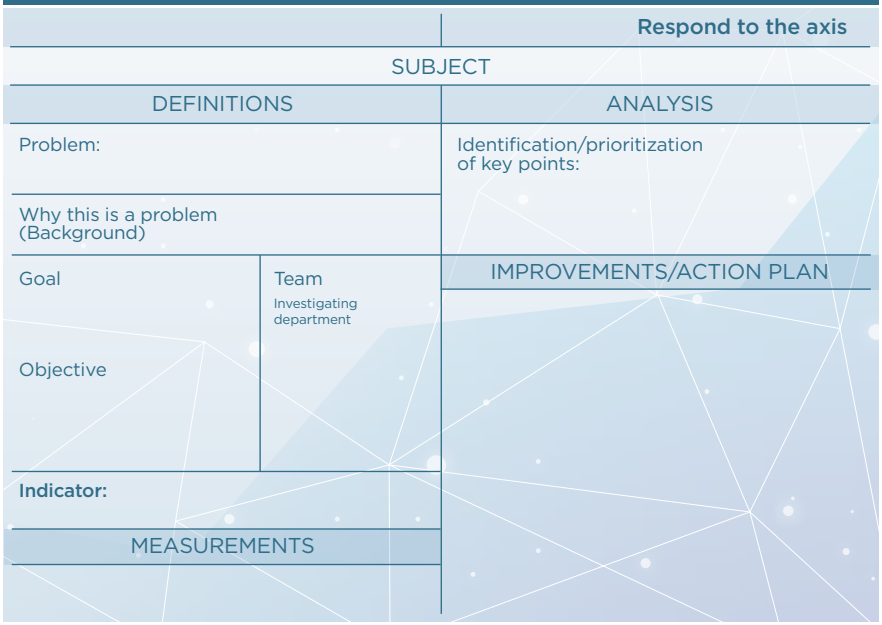
Test an improvement by defining the concrete actions that will be taken to improve the problem and the plan to carry out the change. Each management cycle can include one or more specific actions aimed at **improving the problem**. It must be understood that because one concrete action cannot solve the problem, it is important to form a team that can develop various actions toward solving the problem. The **action plan** details how the concrete action will be carried out and who is responsible for each action.

Phase 4

The **measurement and monitoring** phase consists of identifying measurable objectives and choosing the measures to monitor the change after the implementation of the improvement. The beginning and end of this stage must be clearly defined as well as the times when measurements will be made.

The change management team can use the participatory management sheet in Figure 5 to direct the phases of this process.

Figure 5. Participatory Management Worksheet



>> Negotiating Tools

Being prepared to negotiate increases the opportunity for success and prevents opposing interests and objectives from entering a conflict. Learning to negotiate requires training, so the following guide provides a few points to consider before starting a negotiation. Directions on using the worksheet and understanding its terminology follow.

Figure 6. Difficult Conversations Tool

My position	Your position
My interests	Your interests
My perceptions and values at stake	Your perceptions and values at stake
Mutually beneficial options	
My best alternative to a negotiated agreement (BATNA)	Your best alternative to a negotiated agreement (BATNA)
What outcome would be satisfactory?	
What outcome would be acceptable?	

When entering a discussion, each participant brings their own perception of the facts, called a **position**, to present and defend to the other party. A participant's **interests** are the wishes, concerns, and needs for that negotiation. The interests are what define the conflict and its possible solutions.

The **perceptions and values at stake** are those of the outside actors and staff in relation to the situation. By considering this aspect during a negotiation, there is an external reference point for measuring against the emotions of both participants. The **mutually beneficial** options are the different alternatives that could satisfy the interests of both participants involved, and the points where they converge offer a solution that solves both of their needs. If any of the options are agreeable to both participants, a part of the negotiation is settled.

Each participant also brings their **best alternative to a negotiated agreement** (BATNA), which is the result each participant is happy with in the event an agreement is not reached. In terms of the **results** of the negotiation, it is important to stipulate what would be a satisfactory outcome and what would be an acceptable outcome.

>> Difficult Conversations: Language Metamodels

In general, conflicts occur because of the difficulty of understanding what another party is saying. Misinterpretations arise from a lack of context or the assumption that the other party thinks just like we do. Neurolinguistic programming has been used to detect patterns in language, namely **generalizations, elimination or omission**, and **distortions**, which all people use and, accordingly, communication suffers.

To correct these issues, use the systematized questions shown below:

Generalizations:

A generalization occurs when limited data or facts are used to infer a general principle or issue. When stating a generalization, the verb appears without a clearly defined subject, and words such as *all, always, never, some, someone, none, and another* are used. Accordingly, the metamodel question will be aimed at clarifying what has been left out.

For example:

- *Participant: "Computers are needed." Implementation team: "In what area do you need computers?"*
- *"No one understands the new system." Question: "Who does not understand the new system?"*
- *"People are complaining about how slow the system is." Question: "Who has difficulties with the system's speed?"*

Elimination or omission:

A person uses elimination or omission by telling a version of events that leaves out a piece of what actually happened, frequently in order to reduce the situation to easier-to-manage dimensions. There is often a conflict of reality and perception occurring, and the perception has left out a fact. Words such as know, must, and have to as well as incomplete verbs are often used. The metamodel question should be aimed at finding the term of the missing comparison. For example:

- *"Why should I register in the electronic register if total..." Question: "If total what?" or "Why do you think it does not make sense to register?" or "What if you did?".*
- *"I know this is going to be a failure." Question: "A failure for whom?" or "Why do you think so?" or "What would make it successful?".*

Distortion:

When a distortion of the facts or in a person's perception occurs, the data on an experience are changed. Data are instead replaced by data that distort the meaning and transform dynamic processes into something static. Distortions are frequently communicated by using abstract nouns to refer to actions that are expressed with verbs. For example: decision becomes decide, confidence becomes confide, communication becomes communicate. The question of the metamodel should be directed to the specific action (the verb) that shows what it is like for that person to decide, confide, or communicate. For example:

- *"The thing is, I don't have confidence in the system." Question: "What would make you trust the system?".*
- *"This is total confusion." Question: "What confuses you?" or "What would allow you to clarify the situation?".*

Case Studies

The case studies that follow are based on the authors' experience with change management in EHR system implementations. The cases illustrate resistance to change in the areas of organizational culture, professional bureaucracy, workflow, and governance. Each case study ends with suggestions on how the implementation could have gone better if change management principles had been applied.

>> Organizational culture

Case 1

Hospital board members decided to buy a computer system to update their paper recordkeeping system, and they start the system implementation immediately. The board emailed everyone affected by the change and told them what would be changing, when the implementation would be done, and when the new processes would take effect. The chief administrator—in charge of patient IDs, shift management, social work assessments, and other duties—complains that administrative staff are too old to use computers and will not be able to adapt. The doctors also resist because they will have to enter their work hours in the new system, and they think the system is an excuse by management to monitor when they start and end work. In addition, the personnel who work with the paper medical records files think this means they will lose their jobs once the computerization is complete, as does the person who codes patient charts and compiles hospital statistics.

In this example the entire hospital is upset with the proposed changes, so workers meet and agree to a strike if the board does not stop the implementation.

Aspects to consider:

- Developing a comprehensive communications plan to convey a sense of urgency could have helped minimize the resistance from people in the organization.

- Communicating separately with each area of staff (administrators, medical records, and statistical workers) would have been beneficial, as each had different concerns.
- Attempting to reach a consensus before making decisions is advisable. For example, create work groups so those concerned become part of the planning process. This would have allowed the various groups to understand the board's expectations and facilitate the implementation while understanding the benefits of the change and having trust in both the system and the implementation team.

>> Professional bureaucracy

Case 2

A malpractice case strains the finances of a health institution. The owner, trying to save the clinic, moves to control the costs by implementing an electronic system to assist in clinical decision-making. The system forces doctors to prescribe the least expensive drug available for a condition. This implementation angers doctors, who choose not to use the new system and instead decide to write paper prescriptions. Additionally, it is important to note that digital prescriptions are not yet legally valid.

Aspects to consider:

- It would have been better to transmit a sense of urgency and involve doctors in the decision-making to mitigate the problem, as they would understood that the financial burden meant hard choices for the institution. Faced with a more critical outcome, such as losing their jobs, or adopting the new system, the doctors would better understand the rationale for the system.
- The staff and owner could have jointly developed clinical practice guidelines and algorithms that would make more cost-effective use of medicines without neglecting patient care.
- Legality cannot be ignored, so getting buy-in on legal changes is particularly important. Otherwise, people's resistance to the change can permanently hinder implementation.

Case 3

A hospital implements an EHR system that does not account for the structured protocol some specialists in the institution use to conduct research, which forces these professionals to keep a double registry. A prestigious health professional and opinion leader informs hospital leadership that until the EHR system incorporates all the necessary functionalities for their professional practice, the EHR system will go unused and registration will instead be done on paper. This causes other medical services to adopt the same attitude and maintain a parallel record of information.

Aspects to consider:

- Understand the needs of different groups of professionals before choosing the tool to implement.
- Form working groups where professionals are invited to co-llaborate in the design or evaluation of the computer tool.
- Identify key players in the health system who may become promoters or detractors of implementation.

Case 4

A city health secretary wants to integrate primary -level health care facilities with networked hospitals, through the implementation of a single EHR system, with the aim of overcoming the usual fragmentation generated by each doctor having their own paper records and processes. The implementation starts gradually, first through a big investment in network cabling and servers and then by installing computers in offices. When the planning process for the EHR system implementation occurs, there is a change in local government and a new health secretary takes office. This person determines that a separate system should be implemented to improve billing, resulting in a loss in value added to the EHR system planned by the previous health secretary.

Aspects to consider:

- If the hospitals had been part of the planning process, they would have better understood the benefits of implementing an EHR system, which would have helped them defend its value and quickly adopt it, so the new city leaders would have had a harder time rolling back the tool.
- Had small victories been shared, such as data on improvements in health management for patients, primary care professionals might have appreciated the access to information on hospital visits, or hospital doctors might have appreciated the easier patient registration process that would free up time for outpatient follow-up.
- If professionals had collaborated on the design of these systems for the implementation plan from the outset, the change at the secretariat would not have been reason enough to stop the project.

>> Workflow

Case 5

A jurisdiction has a law stipulates that software designed at the national level for vaccine registration be implemented in health system vaccination centers. Registration in this system keeps track of the vaccine inventory for each health center in the network and determines the vaccine coverage rate for the local population. Nurses have used this system for a long time. In this same jurisdiction, an EHR system implementation is planned without considering that the immunization registry does not integrate with the new system. This means that nurses do not use the EHR system to register vaccines because it replicates the work they do in the national system, which leads to fragmentation of health information.

Aspects to consider:

- Engage nurses in the design of the EHR system vaccine module and explain the benefits of electronic registration, which will generate the necessary sense of urgency to initiate change adoption. One advantage is to avoid possible loss of paper registration, which could lead to re-administration of the vaccines, increases costs in the health system, and inconveniences the patients.
- Foresee and plan for the need for integration of both systems, develop a plan and communicate it.
- Train nurses well in the correct use of the system and, if necessary, train staff in digital capabilities.

Case 6

A hospital's intensive care unit implements an electronic prescription system in which the doctor orders the drug through the system, the pharmacy receives the order in its own system and fills the prescription, and the nurse administers the medication to the patient and records that it was administered. The only ones with access to the electronic prescription system are doctors. In the previous paper process, nurses with extensive experience and knowledge in intensive care often requested prescriptions, and the doctor signed off on the prescriptions when doing the rounds. The implementation of the prescription system altered this working system (Cheng et al., n.d.).

Aspects to consider:

- A health care professional trained in information systems would have incorporated nurses into the medication cycle so as not to alter the daily working routines and not to cause resentment in the team.

>> Governance

Case 7

In a city, the health secretary drives the process of implementing a single EHR system for all health facilities in the public system. Each establishment works on redesigning its processes, one of which is correctly identifying and assigning patient identity to open patients' EHRs. In some establishments, the management brings together doctors and administrators to explain the importance of this process and involves everyone in the implementation. The EHR system is increasingly adopted by all departments. In other establishments, the management ignores the health secretary and leaves the institution out of the implementation preparation process. Some services eager to use the EHR system get administrative staff to adopt the new processes, while other services with no power over the administrative structure are left out. This is a clear example of a lack of governance at the management level.

Aspects to consider:

- When there is not enough governance from senior management, the implementation and change management teams must make greater efforts to negotiate with the staff and convince as many people as possible to adopt the change.
- Using the negotiating tools with different actors will be indispensable in advancing the change.

Conclusion

The development of information systems in the health sector, especially in Latin America the Caribbean, begins with evaluating implementations using a scientifically valid model that reveals the successes and failures and the impacts of complex IT projects. The absence of change management efforts in the implementation of digital strategies is not caused by the lack of tools or knowledge on how to carry them out, but rather by an asymmetry in the importance given to organizational culture relative to the purchase of *software* or *hardware*.

There are numerous examples of solutions to *hardware* and *software* problems in international literature, but the problems of "peopleware," or the people who are part of the process of change, are highly dependent on the local context and culture. To carry out such a cultural transformation, one must not convince others but help them understand what is happening in the organization, understand the culture, and accept it. This is what sparks change management.

Implementing an EHR system is not synonymous with automating existing paper processes. It is not simply a question of applying pieces of *software*. It is about instruments of cultural transformation that modify how information is accessed and how knowledge is managed. In other words, it is not a question of digitalization, but of transforming the organizational culture to adopt integrated processes that truly change professional practices, providing new knowledge and meaning to healthcare.

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