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The Three Cardinal Sins of Clinical Workflow and Health IT Integration

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Clinical Workflow

At an elementary level, workflow in a healthcare setting describes an established medical business process that consists of a series of activities comprised of tasks, accomplished by specified people, in a known way and in a predictable sequence, at a rate determined by priority and the nature of the environment and tasks. Workflow, whether in a narrow clinical setting or a general medical environment, has a product, performance targets, clients, orders and triggers, organization, resources, and activities and tasks. (1)

All workflow is done according to some *assignment* or an *order* of some description, and follows a series of actions and decisions from a starting point to an eventual *goal* that satisfies an organizational *objective* (2)

Effective workflow has been found to reduce cost (3), be beneficial in waste reduction (4), increase patient safety (5), and improve quality (6).

According to the Clinical Decision Support (CDS) Reference Taxonomy of Clinical Workflows by HeathIT.Gov, workflow is “.. *one of the most important factors to consider during CDS implementation*”, and describes studies showing that differences in workflows can result in very different effects even when the CDS is identical (7).

The guide goes on to describe that systems that are “..*Intelligently-filtered to reach the right person at the right point in the workflow leads to more successful implementations and improves healthcare quality more than CDS tools that do not account for workflow.*”

There are many expectations regarding the purchase of Health IT applications, and one of them is that Health IT can help to improve the clinical workflow – from patient first encounter, through scheduling, consultation and medical intervention, to billing, accounts receivable, and follow-up. Indeed, EHR plus workflow is a potent combination that can improve efficiency, reduce waste, and increase patient care.

However, many facilities and healthcare systems consistently make one or more of the following mistakes that greatly reduce or even nullify the potential benefit of their Health IT acquisition, and can result in wasted effort through duplication, reduce efficiency, and even reduced patient safety. Examples include having to double chart between incompatible systems and between paper records and EHR, and having to copy and paste between systems. In an OIG report¹, copying and pasting between applications was cited as a safety concern, and a significant cause of inefficiency.

¹ OEI-01-11-00570 “*Not All Recommended Fraud Safeguards have been Implemented in Hospital EHR Technology*” <http://oig.hhs.gov/oei/reports/oei-01-11-00570.pdf> Accessed 12/16/2013

The three most prominent root causes in Health IT implementation problems are:

1. Expecting a Health IT purchase to fix broken clinical workflow
2. Not adapting the existing clinical workflow to take advantage of Health IT functionality
3. Not customizing Health IT applications to suit local workflow necessities.

The three root causes are not mutually exclusive, and cascade in sequence from #1 to #3. For maximum effect, remedial actions to improve workflow should be addressed in the same order.

Addressing the Problem

To have workflow that hums along efficiently and is effective at serving strategic objectives, the following steps are recommended:

1. Fix the underlying workflow; then
2. Make adjustments to incorporate industry best practices; and
3. Customize Health IT applications to fit in-house best practices.

The bulk of the effort should go into optimizing the workflow, since experience has shown that no amount of application software can correct ineffective and inefficient workflow. Once the workflow is optimized and faithfully reflects the business needs, it should be adjusted to take advantage of industry best practices. Only after both optimization and adjustment stages are completed, the remaining gaps between application software and desired workflow should be addressed by customization of the software.

Optimizing clinical workflow

In many healthcare facilities, significant parts of the underlying clinical workflow is sub-optimal and do not effectively harness resources and coordinate activities to achieve clinical objectives. The causes may originate from many sources, often forgotten – mergers or organizational changes that were never optimized, or workflow that evolved to suit technologies that no longer exist, or have become obsolete. In many cases, facilities have implemented new Health IT systems in the hope that the systems will drive better compliance with desired workflow, or will bridge gaps in existing workflow, and will shape user behavior in desired directions. Frequently this is underpinned by a desire to obtain more standardization across individuals, teams/shifts, facilities, and regions. However, experience has shown that addition of Health IT applications in and of themselves seldom improves ineffective workflow, and that improving the workflow prior to implementation of applications is the preferred option. Unfortunately, clinicians and hospital management are often unfamiliar with workflow assessment techniques, and the facility IT representatives are frequently

unable to definitively capture the business activities in workflow documentation.

There are many conflicting views on where to start and what to give priority when renovating or implementing workflow. The variance in perspective is perhaps so because development of workflow is an inherently recursive and iterative process rather than a linear task. Workflow documentation may be generated as part of direct efforts to improve business operations, such as business process reengineering (BPR), or may be the result of allied programs such as Knowledge Audits (8)

At the heart of the problem is the conundrum that to select requirements for Health IT applications one must know what the workflow is, but at the same time workflow must incorporate the functionality provided by the applications. In order to describe the requirements for an application it is necessary to know how it will be used and what workflow activities it supports, but in order to create the workflow, one needs to know what functionality the applications provide and how they are used. One cannot achieve the one without the other because how a desired outcome is reached depends on both the actions that have to be taken as well as the resources that will be available.

- Actions – if you tell me what resources I have, I can determine the activities that will achieve the desired outcome. From the universe of possible actions, the available resources will determine those actions that are available
- Resources – If you tell me the activities that are needed to achieve the objective, I can select the right resources. From the universe of possible resources, the activities envisaged dictate the applicable resources.

Experience has shown that building application requirements without exploring the workflow creates significant program risks in two cascading areas:

Undiscovered requirements

Since requirements are outcome and scenario dependent, any unexplored components of workflow can result in undiscovered requirements. What functionality is required depends on who is asked, what other systems are involved, and what metrics are to be met. Failure to itemize requirements by traversing the full end-to-end workflow will under-sample needs and as a result, the application will be sub-optimal. Often taken as the sole source of requirements, the functional needs are affected by which stakeholders are considered, the upstream and downstream needs, and clinical measures and reporting.

- Missed stakeholders – In several Health IT projects, some stakeholders were not discovered until after the applications had gone live, and the execution of the workflow led to situations in which the stakeholders became visible – often due to resulting issues. Because of late discovery, post-deployment modifications were made in some cases, requiring a degree of re-design and increased cost.
- Upstream and downstream dependencies – In many healthcare environments, the various facets of healthcare delivery are supported by discrete Health IT applications. Bed management is often a separate application to surgical bookings and tracking, which is again often a separate application to ED management, and utilization management. As such, there may be integration and interoperability needs that are only discovered by looking at the full span of the workflow involved in each clinical pathway. In many cases, there was poor integration, requiring data to be manually copied and pasted or transformed between applications, resulting in increased risk of errors, wasted time, and user fatigue.
- Clinical measures and reporting needs – In many Health IT implementations, the full requirements for effects on existing local and mandated reporting were not discovered until after the application was live and mandated metrics and reports were found to have issues. The effects on measures such as Surgical Care Improvement Project (SCIP) are easily missed unless the workflow is viewed from end to end, rather than as discrete and independent activities. In a clinical implementation, SCIP measures related to pre-surgical hair removal were missed as a result of ineffective integration between the Health IT application and the workflow reporting mandates, and were not noticed until several months had passed.

Testing issues

Test plans are created to exercise application scenarios that adequately verify required functionality. Incomplete requirements result in workflow needs that are not represented in the test plan, and issues or defects may not be discovered until after the application is live.

An effective approach to avoid issues is to run repeated simulations of the critical workflow components until a satisfactory solution is achieved, and requirements discovery is exhausted.

Incorporating industry best practices

A second major cause of not realizing the benefits of Health IT implementation is a failure to modify the workflow to incorporate industry best practices. These best practices are available from several sources:

Academic and governmental research

Academia and governments often provide research results that identify broad trends and outcomes, or provide guidelines or standards that can be used to significantly improve effectiveness and efficiency of workflow. Some bodies such as the World Health Organization (WHO), Agency for Healthcare Research and Quality (AHRQ), Institute of Medicine (IOM), and National Research Council (NRC) publish technical briefs and best practices derived from global trends.

Industry publications

Industry groups such as the American Medical Association (AMA) and the Institute for Healthcare Improvement (IHI), vendors, and trade groups regularly publish expert white papers, case studies, and host seminars that make vicarious learning possible from the experiences of others. This aggregated experience of practitioners in the field and research programs are rich sources of knowledge that can be put to use in improving clinical and administrative workflow.

Best of Breed application functionality

In a very real sense, some of the features and functionality embodied in commercial off the shelf (COTS) products are a distillation of “wisdom of the crowd”. To a degree, applications acquire tacit embedded knowledge through the rigors of the vendor’s R&D process, and selected in a Darwinian fashion through the vote of numerous purchases by clients who did their homework and listened to others before making a purchase. While certainly by no means a foolproof mechanism for finding what is best, there is an effect and buying a popular product is to some degree the best guess that the market can make.

Customizing to fit

The final and usually smallest component of making clinical workflow effective is tailoring the applications to fit the small number of necessary practices that are special or unique regarding the facility – unique patient care modalities or techniques, unusual patient demographics, or other scenarios in which the way you do things really is better than how the industry does it.

This may result from the facility or clinical team encountering unique patient populations, unique local industries, or uncommon modality of injury. For example, the VA is likely to encounter higher incidence of Posttraumatic stress disorder (PTSD) in its patient population, while facilities serving coal-mining areas are likely to find almost unique levels of lung disease related to particulate inhalation.

Other sources of uniqueness at a facility or healthcare system level might include local legislation or

organizational vision and policies. For example, a Catholic healthcare system or facility may have unique workflow adaptations regarding approach to reproductive health, while for-profit facilities have specific needs to meet revenue and EBITDA guidance that are very different to non-profit healthcare systems such as Kaiser Permanente.

Putting it together

The steps outlined above are not “rocket science”, as the saying goes, but yet many healthcare systems and facilities continue to experience significant issues because of programmatic weaknesses in one or more of the steps. Often this is because hospital administrators and clinical staff are already more than fully burdened and as simple as the steps are, there just are not enough people or hours in the day to take on any additional guidance.

To make headway, the following recommendations are offered:

Get help

One of the prime reasons workflow is not optimized, industry best practices are not adopted, and Health IT applications are not customized to fit special needs, is that existing resources are already doing other necessary work, and improving workflow is not something that can be taken on as a hobby. There is a need to analyze end-to-end workflow, identify requirements, detail use cases, and collect and analyze scenarios and user stories. In addition, there may be a need to create simulations of workflow, perform repeated walkthrough by all stakeholders, and creation of tests of unit scenarios and end-to-end workflow. Professional resources that specialize in workflow should be utilized to focus on workflow analysis, documentation, and improvement until the ongoing maintenance can be handled by the permanent staff.

Appoint workflow owners

In several Health IT implementations, it was found that there was a lack of basic clerical support to document workflows and make notes of requirements and objectives. As a result, clinician subject matter experts attempted to document processes in what little “spare” time they had. As a result, the workflows documentation reflected a lack of completeness, insufficient standardization, and low congruence to how things actually worked.

To avoid components and threads of workflow from becoming obsolete or lacking ongoing maintenance, appoint members of staff who will act as the

owner for each workflow thread, and task them with the ongoing maintenance of their workflow.

Add local champions and provide administrative support for documentation, archival, and publication.

Budget for workflow improvement

The steps outlined in this whitepaper reflect a considerable investment of time and expertise, especially where obtaining external help is needed. For this to occur, a budgetary commitment must be made to ensure that there are funds available to acquire external help both for expertise and to support members of staff whose time must be allocated to workflow improvement projects. While staff in clinical settings are almost invariably willing to sacrifice their own time to worthwhile process improvement, this should not be seen as a long-term approach.

Epilogue

At this point in the discussion of workflow and Health IT applications, the reader can see that following the three stages of workflow optimization and integration will lead to superior outcomes. It is also at this point that someone in a live presentation of this material will ask if they will see optimal performance. The answer is no – following these steps leads to superior, but not optimal performance, and the distinction is important.

Very often new technologies are forced into the role of mimicking a prior paradigm – ED planning boards tend to look just like an electronic grease board or whiteboard that preceded computers, and the very design of ED workflow tends to push the new technologies into this role. It usually takes several generations of product (or people) to imagine a way to use the technology in a different and better way, and to restructure the workflow or even the objectives to suit the capabilities of the technology.

For this reason, achieving optimal workflow requires ongoing effort and use of both internal and external resources to stay current with best practice trends.

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