Prepare for a Computer-Based Patient Record That Makes a Difference

By Charles Webster, M.D., M.S.I.E., M.S.I.S.

The "computer-based patient record" (CPR) will not save money while maintaining or increasing quality without dramatic, traumatic, and necessary change in the flow and purpose of healthcare information. Detailed documentation of current information flows is a prerequisite for any form of the CPR that materializes. Healthcare organizations can and should start now to untangle years of ad hoc information flows by documenting them in a systematic fashion. Such an effort has aspects of both industrial and information engineering but stops short of expensive investments in technology. Symbols (and their application) are illustrated, which can be used to represent the document "conveyor belts" of healthcare organizations. Doing so serves the multiple purposes of preparing to reengineer and preparing to migrate to a paperless medical record.

Introduction

The "computer-based patient record" (CPR) will not save money while maintaining or increasing quality without dramatic, traumatic, and necessary change in the flow and purpose of healthcare information. However, some of the trauma is due more to the uncertainty of the enterprise than its requirements or consequences. Part of the reason is disagreement about what the CPR "is." A recent survey of health information managers revealed that while 65 percent thought it will be some form of national central or distributed database linking hospital information systems, 28 percent thought of the CPR in more limited terms such as one or more clinical applications within a hospital or office practice information system.1 This has not stopped many organizations from aggressive development and experimentation. For example, the National Institute of Standards and Technology has committed itself to spending 185 million dollars, over the next five years, on funding the development of CPR infrastructure and development tools in healthcare.

In the midst of uncertainty and confusion, what are the prudent steps any healthcare organization should take which can achieve expedient short-term results, minimize risk associated with untried technologies, and preserve the option of whole-hearted commitment to new and progressive uses of information technology when the smoke and mirrors disappear? Detailed documentation of current information flows is a prerequisite for any form of the CPR that materializes. Such an effort has aspects of both industrial and information engineering but stops short of expensive investments in technology.

Some Historical Context

Compare the following popular definition of reengineering with statements about the systematic and scientific management movement early this century.

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Charles Webster, M.D., M.S.I.E., M.S.I.S.
Assistant Professor
Department of Health Information Sciences
Duquesne University
Pittsburgh, Pennsylvania

Dr. Webster has degrees in Accountancy and Industrial Engineering (B.S. and M.S., University of Illinois, Champaign-Urbana), Intelligent Systems (M.S., University of Pittsburgh) and Medicine (University of Chicago). He researches, writes about, and speaks upon medical informatics, health systems engineering, and individual and organizational change.

Reengineering is the “fundamental rethinking and radical redesign of business to achieve dramatic improvements in... cost, quality, service, and speed.” Systematic and scientific management “sought to reduce the delays and bottlenecks and increase throughput,” “their objective was the unimpeded flow of materials and information,” “a complete mental revolution on the part of the workingman,” and “a complete mental revolution on the part of management.” Just as reengineering success can be elusive (30 to 50 percent of attempts), scientific management was often viewed with suspicion by fearful workers, and most efforts succeeded only partially, if at all (and, like today, scientific management fueled a consulting boom as well). Not until World War II was scientific management to achieve its maximum impact: mass production.

The reengineering of healthcare through application of information technology—as contemporary a product of our age as it may seem—has roots in the scientific approaches to management pioneered early this century. Consider a list of reengineering strategies: eliminating bureaucracy, eliminating redundancy, finding value-added activities, simplifying processes, simplifying language, reducing cycle-times, mistake proofing, upgrading equipment, standardizing, improving input, and automating. Many of these would be viewed as applications or extensions of scientific management principles.

Current efforts at scientific management, aside from the new technology, are leavened by a variety of theories of human individual and interpersonal behavior in the work place. In contrast to scientific management’s hierarchical direction and control are participatory management’s emphases on individual motivation and social integration. Designed correctly, work systems in which organizational goals and individual goals coincide can rely on individual initiative to accomplish work.

**Groupware, Reengineering, and the CPR**

While these accounts of participatory and scientific management are caricatures, they usefully bracket a spectrum of approaches to the use of information technology to reengineer work processes: from workgroup systems that facilitate access to information and ability to easily transfer it among process workers, to workflow systems that go beyond facilitation to enforcement of specific work procedures. Both fall into the general category of “groupware” (of which Lotus Notes is currently the best known example).

If the aim is to “program” the process, with people present at points that require intellect beyond the capacity of automation, then workflow information systems are appropriate. Many document image processing systems fall into this category. If the aim is to train, motivate, and then trust people to access, manipulate, and exchange information in the service of organization goals, then a workgroup system is more appropriate.

A third option that combines the workgroup and workflow philosophies is beginning to become available. These systems resemble graphical flowcharting tools; however, the selection and linking of flowchart icons create and modify software code that implements a workflow information system. As yet these systems suffer the disadvantage of requiring the end user to become something of a programmer, albeit in a high level and graphical environment. However, as these tools become more intuitive, they represent one way to engage the most immediately affected and usefully knowledgeable process workers in the reengineering of their own work processes and information systems.

In any of these approaches—workgroup, workflow, or hybrid—someone (a designer, end-user, or in-between) needs a representation of a business process. Healthcare organizations can and should start now to untangle years of ad hoc information flows by documenting them in a systematic fashion.

**Documenting Document Process Flow**

Early in this century saw the creation of an army of clerks who processed a rising volume of retail and office documents. Industrial engineering (an offspring of scientific management) adapted
methods and symbols pioneered in factories to the then "modern" office. These symbols are still useful today as we get ready to exchange paper for electronic documents. Here are some examples of symbols that can be used to represent operations along the many "conveyor belts" that move documents through healthcare organizations. Along with each symbol is a brief explanation of its intended meaning.

- Movement of a record. Movement between departments or work centers.
- Inspection of a record. The record is inspected for accuracy and corrected, accepted, rejected, or reprocessed.
- Storage of a record. Identifies a point at which the record is in an inactive status, for example, when it is filed, held in a desk, or awaiting mail pickup.
- Cause an event involving a record. For example, the inspection of a record can cause the addition of information, or the creation of another record.

To provide a flavor of the kinds of process flow descriptions that result, consider a description of medical chart flow through an actual medical record department.

1. Chart arrives.
2. Enters check-in queue.
3, 8. Analyzed for deficiencies.
4, 7. Placed on day shelf.
5, 6. Coded.
9. Generate information for billing.
10. Send to billing.
11. Undocumented output.
12. Place on filing carts.
13. Remain on filing carts.
15. Incomplete file storage.
16, 19. Abstract chart for correspondence or information for study.
17. Assemble new chart.
18. Remedial action on chart deficiency.
20, 23. Generate correspondence or information for study.
21, 24. Send correspondence or information for study.
22. Send old or new charts to floor.
For the purpose of exposition, this document process flow diagram abstracts away from several particulars that should be represented in a less simplified diagram. A finer and more useful degree of detail would involve a separate path for each document. Additions to the chart, or inspection that generates other documents (not placed back into the chart), converge and diverge from this sheaf of lines like on-ramps and off-ramps to a document turnpike.

Documents also have a logical structure that consists of the types of and relations between information, as well as its presentation (what appears where). This information, in addition to representation of document flow, is invaluable for judgments of whether the information serves a value-added purpose or whether to represent it in an information system. A step in this direction is the “document document,” a form which describes each form in use (document designer, intended purpose, intended audience, intended authors, etc.). The medical record committee may already have this information, and it should be cross-indexed with document process flow diagrams.

Conclusion

What does one do with such representations of document process flow? If created for similar processes within a managed care system, they can be compared to determine which ways of “doing things” affect which performance variables (cycle time, error rate, etc.) and then used as part of reengineering efforts to reduce duplication. If document operations are classified as to whether or not they “add value” (that is, whether some customer would pay for them) and a document is hand carried from start to finish, stopping only for value-added steps, then one can estimate the theoretical minimum cycle time, after reengineering. If inputs and outputs are matched to other document process flow diagrams (say, that of billing) a larger and more coherent picture appears of information flow through the organization (or consortium of organizations). If a large investment in information technology is about to be undertaken that interacts with a document process flow, then its representation will be valuable in facilitating communication among process workers, management information systems staff, software vendors, and management.

Individuals who have flowcharting skills can be found throughout healthcare organizations. Many departments will already have products of past flowcharting efforts. However, these flowcharts are often too generic for use in benchmarking or systems analysis or are not compatible when combined into larger diagrams of document flow throughout the organization. Just as a representation of biochemical pathways in the human body—individually and within the context of each other—serves diagnosis and therapy, healthcare organizations must begin to document their critical document pathways, individually and within the context of each other. Understanding these flows will be critical for preparing for a computer-based patient record that makes a difference.

REFERENCES


