EMR Benefits: In Spite of the NBER Study, There’s Hope for Rural Hospitals

A new study finds that EMR-related cost savings take years to realize, and are much more difficult to achieve in rural hospitals. According to the authors, this is due to rural hospitals’ less favorable access to experienced IT resources that can drive business process innovations. We agree that complex process innovations are required for success in realizing EMR benefits, but we believe that visionary leadership and commitment can overcome an initial lack of IT resources to drive those innovations.

A New EMR Benefits Study

Recently the National Bureau of Economic Research (NBER) released a working paper titled The Trillion Dollar Conundrum: Complementarities and Health Information Technology. Like many recent studies, the NBER paper looked at large numbers of hospitals with electronic medical record (EMR) systems and attempted to determine the economic impact of the EMR on hospital costs. Unlike most of those other studies, NBER examined the impact of two additional variables: the duration for which the EMR had been operational, and whether the hospital had favorable access to IT expertise.

NBER’s major findings:

- Hospitals that implement an EMR experience an initial increase in overall costs.
- Hospitals that implement an EMR under “favorable conditions,” such as those in urban locations, see a subsequent reduction in costs below original levels after three years.
- Hospitals that implement an EMR under “unfavorable conditions,” such as those in rural areas, experience an increase in costs over pre-EMR baselines, even after six years.
- Hospitals with basic EMRs see greater cost savings than those with advanced EMRs.

The NBER analysis is an important contribution to the literature, and we agree with many of the authors’ conclusions. Because of the study’s findings that rural hospitals have a harder time realizing cost savings from their EMR investments, and the authors’ theories about how EMR benefits are realized, CIOs will be asked about this study. Here, we summarize the study’s findings and conclusions, propose several other explanations for their results, and suggest a more hopeful outlook for the leaders of rural hospitals regarding their chances of realizing EMR value.

Summary of NBER Working Paper

The NBER study authors view an EMR as an example of a business process innovation, or a change in the operating practices of the adopting organization. They propose that realizing the benefits of an EMR is dependent upon “complementary assets” that help adapt the EMR’s business process innovations to the unique circumstances of the organization. These complementary assets include expert staff inside the organization and external expertise that can be purchased in the marketplace.

They define internal expertise as the number of computer programmers and the numbers of business and clinical software applications in use at the hospital. External expertise (“local complementary factors”) includes the percentage of local firms that are in IT-using and IT producing industries; county-level income, education, population, and IT intensity; and whether the hospital is located in a metropolitan statistical area (MSA).

They find that cost savings after EMR implementation are more strongly related to the availability of external expertise than to internal expertise, and theorize this is because it is not difficult to hire missing expertise from outside hospitals and put it to productive use.
The study also looks at differences in the amount and timing of cost savings between “basic” and “advanced” EMRs, and finds, rather surprisingly, that hospitals with advanced EMRs gain smaller cost savings. According to their definitions (using HIMSS Analytics™ data), a hospital has a basic EMR if it has adopted either a clinical data repository (CDR), clinical decision support systems (CDSS), or order entry/communication capabilities. A hospital has an advanced EMR if it has adopted either computerized practitioner order entry (CPOE) or physician documentation applications.

The study attempts to dispel four “myths” associated with business process innovations:

1. **Hardware and Software Yield Productivity Gains by Themselves**—In fact, these investments often do not yield gains until after complementary investments, adaptations, and organizational changes.

2. **Planning Ends the Administrative Work Required to Generate Productivity Gains**—In fact, substantial administrative effort is required during and after implementation.

3. **Business Process Innovations Work Like “Shrink Wrap” Software That Generates Gains Instantly or after Staff Training**—In fact, these gains depend on co-invention of complementary business processes and adaptations to make the software useful.

4. **The Entire Cost of Investment Is a Monetary Expense**—In fact, non-monetary costs, such as delays, interruptions in operations, organizational conflicts, staff turnover, etc., from installing a business process innovation are substantial.

The study’s authors see their findings as evidence that an EMR is like other business process innovations, in that its benefits take time to realize, require great effort beyond technical implementation, and are affected by the availability of qualified IT resources in the local marketplace. They do not offer specific solutions to the lack of such resources.

We agree with and have written about the idea of an EMR as business process innovation (see Two Keys to Realizing Clinical EMR Benefits, IT Strategy Council, 2010). It is clear that realizing the clinical and financial benefits of an EMR requires more than just hardware and software, and that this effort extends beyond pre-implementation planning to ongoing adjustment of process and technology until desired results are achieved. The costs of succeeding with an EMR include substantial work to adapt new technical capabilities and modify operational workflows to improve operations. The authors’ inclusion of the time element in EMR cost effects is an important addition to the literature, as is their finding that rural hospitals lag behind urban hospitals in realizing these effects.

The Advisory Board Company’s own research supports the assumption that rural hospitals may have difficulty attracting top-notch IT talent; however, we believe that there are other explanations for the study’s findings regarding EMR-related cost increases in rural hospitals, in addition to their correlation with poorer availability of IT expertise in the local marketplace. For example, while rural hospitals’ profit margins are now comparable to urban hospitals, rural hospitals still have more difficult access to capital, which may lead them to delay EMR purchases, select less costly/less functional EMRs, and use more

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2 The Opportunities and Challenges for Rural Hospitals in an Era of Health Reform, American Hospital Association.
basic EMR implementation approaches that do not include funding for extensive business process innovations.

We also take issue with the study’s analysis of differences in cost savings between users of basic and advanced EMRs. A more accurate term than “advanced” EMR would be “mid-range” or “moderate” EMR, since an EMR at Stage Four of the HIMSS Analytics EMR Adoption Model™ (EMRAM) would qualify as “advanced” for the NBER study. We believe that the most valuable EMR-related business process innovations are not achievable until several years after hospitals reach Stages 6 and 7 of the EMRAM. The key functionality added in those stages and not part of the NBER study’s "advanced EMR" definition includes advanced CDSS that can drive greater practice changes, data continuity with the ambulatory environment, and data warehousing. The cost impact of truly advanced (Stage 6 and 7) EMRs is not examined in the NBER study since they looked at data only through 2009; in that last year only 2.3% of U.S. hospital EMRs were at Stage 6 or Stage 7, and most of those had just reached that level. We believe that the differences in potential cost savings between the basic and advanced categories defined in this study are not substantial.

Finally, we believe that there is hope for rural hospitals beyond what is suggested by this study. The study’s own data shows that there is substantial variation in cost savings within the two groups, with and without favorable access to IT resources. Many hospitals in urban areas fail to achieve cost savings and other EMR benefits, while some rural hospitals are quite successful. Several well known healthcare providers, with substantial reported EMR benefits (e.g., Geisinger Medical System, Citizens Memorial Hospital, and Marshfield Clinic) are located in rural areas that apparently did not have favorable access to IT resources when they began their EMR investments.

We propose that the vision, the understanding, and the commitment of the leaders of rural organizations can lead to success in spite of their locations—the vision of what is possible with EMR technology, the understanding of the need for business process innovation to realize that vision, and the sustained commitment to investment in both technology and innovation.

- Business and clinical leaders of both rural and urban hospitals implementing EMRs must work to develop a vision, understanding, and commitment to business process innovation in their organizations.
- CIOs can help by educating their management teams about the need for business process innovation in EMR implementations and providing specific methodologies for managing those innovations. This includes Lean or other formal process improvement methods to drive business process innovation, relying on the methods that are most familiar to, and widely used in the rest of the organization.
- Sufficient resources and time after technical implementation should be budgeted for business process innovations to be fully developed and adopted; this includes process improvement and change management resources.

**Action Items**