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Estimated financial savings associated with health information exchange and ambulatory care referral

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Abstract

Data and financial models based on an operational health information exchange suggest that health care delivery costs can be reduced by making clinical data available at the time of care in urban emergency departments. Reductions are the result of decreases in laboratory and radiographic tests, fewer admissions for observation, and lower overall emergency department costs. The likelihood of reducing these costs depends on the extent to which clinicians alter their workflow and take into account information available through the exchange from other institutions prior to initiating a treatment plan.

Far greater savings can be realized in theory by identifying individuals presenting to emergency departments whose acute and long-term care needs are more suitably addressed at lower costs in ambulatory settings or medical homes. These alternative ambulatory settings can more effectively address the chronic care needs of those who receive most of their care in emergency departments.

To support a shift from emergency room care to clinic care, health care information available through the health information exchange must be made available in both emergency department and ambulatory care settings. If practice workflow and patient behavior can be changed, a more effective and efficient care delivery system will be made possible through the secure exchange of clinical information across regional settings.

These projections support the case for the financial viability of regional health information exchanges and motivate participation of hospitals and ambulatory care organizations—particularly in urban settings.

Keywords: Health information exchange; Emergency department; Financial impact; Economic model; Medical home

1. Background

In June of 2004, the Governor of Tennessee initiated an effort to improve the quality and cost-effectiveness of health care delivery for approximately one million people receiving care in Memphis, Tennessee and the surrounding three-county region. Memphis, like many other communities, had made unsuccessful attempts to exchange information through a community health information network [1]. The Governor's effort in 2004 differed in that it was part of a broader response to a heightened awareness of a serious crisis in regional health care financing and delivery [2]. With funding and support from the Agency for Healthcare Research and Quality, the State of Tennessee, Vanderbilt University and a broad array of leaders from the Memphis Community, the Governor's initiative created a health information exchange that was operational in a test setting within one year and in emergency department settings within two years [3,4].

The health information exchange is governed by the MidSouth eHealth Alliance, a non-profit corporation that includes representatives from health care delivery organizations, state government, local government, and public health [5]. The Alliance and its health information exchange initial participants include state and regional government, all four major hospital systems, two of the largest ambulatory clinics, a faith-based safety net clinic, and a large Medicaid managed care organization. All care

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delivery organizations publish data into a logically separate database (or vault) in the health information exchange. These data are under control of the publishing organization until they are used by others in the delivery of care (No secondary use of data or population queries are permitted at the present time). Data from all organizations are linked in the health information exchange through a record linking and locator service and presented to emergency department clinicians through a secure web browser requiring two-factor authentication. A comprehensive set of data-sharing agreements bind the organizations and allow individuals to ''opt out'' at the institutional level [6]. Within one year of operation, the health information exchange had approximately 1 million records on over 800,000 individuals and was receiving on a daily basis approximately 33,000 records, 3700 encounter data items, 1000 ICD-9 admission chief complaints, 4000 ''reason for visit'' messages, 12,000 discharge codes, 200 procedures codes, 80,000 laboratory values, 1200 chest X-ray reports and a wide range of other items.

To maintain the voluntary participation of all major health care delivery systems during the critical formative months in 2004, a pro forma economic impact model was developed to demonstrate the financial impact of the health information exchange on emergency room operation costs among participating hospitals. The initial model did not estimate the financial impact of reduced medication errors, efficiencies for reporting public health or quality metrics, or the economic impact of alternative care delivery options made possible through the health information exchange. In 2006, the model was expanded to reflect the potential value of using the health information exchange to coordinate care among emergency departments and ambulatory care facilities to support better means of addressing non-urgent acute and chronic health conditions.

2. Emergency departments

Emergency department care is in crisis [7–9]. A disproportionate percentage of individuals seek care in emergency departments for disorders best treated in ambulatory clinics. Because individuals often seek care in multiple emergency departments for the same complaints, health care leaders in the Memphis area hypothesized that a regional data exchange would allow clinicians to provide better care to individuals without repeating costly, inconvenient, and possibly harmful tests.

The initial evaluation examined the extent to which regional data exchanges could demonstrate or propose savings or quality improvements in emergency department settings. The approach consisted of a review of the literature, emphasis on factors deemed most easily demonstrated, and attenuation of financial impacts based on the experience and views of participants. Particular attention was paid to data supporting lower ED expenditures, reduced duplicate laboratory and radiology tests, reduced hospitalizations for observations, and lower communication costs.

The models did not include adverse drug event or other patient safety factors that could have financial impact. Estimation of such avoidance costs is problematic. The financial impact of medication history services—vital to safety and effective care—also were not included since such services can be provided through commercial systems and in principle do not require a health information exchange. Similarly, the model did not include benefits accrued by producing more accurate metrics for assessing quality of care across delivery settings, reporting data to public health, or enhancing the ability to provide differential incentives based on quality (e.g., pay-for-performance). Each of these services may impact the long-term operations of a health information exchange, but early emphasis was placed on measurable, short-term benefits accrued by early participants.

3. Baseline data

Five-year financial estimates were based on a static emergency department visit rate of 460,000 per year. The model assumed a static total of 924,000 laboratory tests per year in the emergency departments and 1.3 million radiology tests performed from the emergency departments or from admissions where outside information was not available. The estimated use of the health information exchange to support the care of eligible emergency department patients was estimated to be zero in the first year, 5% in the second year, 5% in the third year, 75% in the fourth year, and 90% in the fifth year. This impact factor was modified further for some interventions.

4. Emergency department expenditures

Health information exchanges may reduce overall emergency department costs but data supporting this claim are not conclusive. A randomized trial conducted by Overhage and colleagues in 2000 suggested that under certain assumptions the reduction in ED charges in one of two hospitals studied was $26 per visit. No reduction in emergency department charges was found in the second institution and this finding was hypothesized to be due to lower use of the clinical information exchange in this hospital. In contrast to previous work conducted in their own facility, the investigators in this study did not find a statistically significant reduction in laboratory tests [10,11]. These discrepancies may be due to workflow difference outside of the single institution in which earlier studies were performed.

The Memphis financial model made a conservative estimate and assumed that only 50% of the visits in which the system was used would impact overall costs. Assuming a $10 savings per impacted patient, the total decrease in emergency department expenditures under these conservative estimates was still over $4 million.