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Estimating Sustainability for a Rural Health Information Exchange

Will Ross[1], Lori Hack, MBA[2], Tait Barnette[3], Eric Follis[4]

[1]Mendocino Informatics, Ukiah, CA, [2]ObjectHealth, LLC, Walnut Creek, CA, [3]California State University, Chico, CA, [4]University of California, Berkeley, CA

Background

Studies show American patients "are constantly at risk of being harmed by the healthcare system because critical information on their health status is not easily accessible."[1] The inaccessibility of patient health data is a feature of American health care businesses, which are individually isolated by reimbursement constraints that impede the facile sharing of patient records.[2] As patients circulate among health care providers, clinical data is stranded in paper charts or electronic systems at each facility. This data hoarding institutionalizes health information asymmetries between healthcare facilities, and contributes directly to unacceptably high rates of preventable medical errors.[3] Health Information Exchanges (HIE) have been proposed as a community solution to mobilize patient health data between health care facilities. Hundreds of HIEs have formed since 2003, yet most have yet to identify a sustainable business model. Some HIEs have ceased development due to a failure to discover a sustainable strategy.[4]

Objective

To explore the dynamic relationship between the costs of building and operating an HIE service and the potential revenue generating activities of the service. In particular, to identify a quantitative break even point expressed as a minimum volume of health data transactions necessary to establish a sustainable HIE service in a rural region.

Approach

Build an HIE capacity planning model based on the following:

- Use known operating costs to estimate future operating costs
- Use known staff capacity and work flow metrics to estimate future staff time and task throughput metrics
- Test a five year expansion of the HIE service in a geographically contiguous rural region
- Test HIE revenue assumptions to seek an optimal sustainability configuration for the HIE service

Using Microsoft Excel, four worksheets were created to articulate the Redwood MedNet capapcity planning model.

- Implementation Forecast -- estimates deployment roles and individual tasks to establish participation by a single site in the HIE
- Calculate Upper Limit -- create a cohort of 23 rural hospitals and utilize individual facility metrics to estimate the upper limit of HIE traffic from each facility
- Capacity Planning -- establish a monthly HIE deployment plan across the 23 hospitals over a five year cycle
- Expenses -- estimate expenses for the five year HIE build out

Study Area

A 16,000 square mile, nine county rural region on the north coast of California with a population of 1,000,000. The region features 23 hospitals, 3 regional laboratory corporations, and 1,000 primary care healthcare providers (physicians + midlevels).

Discussion

Four revenue streams were investigated

- Participation revenue -- a monthly fee charged per provider ($12) or per facility ($96) to participate in the HIE service
- Laboratory result transactional revenue -- a per unit fee ($0.04) for each clinical result delivered by the HIE
- Radiology report transactional revenue -- a per unit fee ($1.00) for each clinical report delivered by the HIE
- Emergency Department revenue -- a per patient encounter fee ($1.00) for each Emergency Department accessing the HIE

Four revenue scenarios were tested over 16 iterations of the model

- (Participation Revenue) *[25%]*
- (Participation Revenue) + (Lab Result Revenue) *[18%]*
- (Participation Revenue) + (Lab Result Revenue) + (Radiology Report Revenue) *[23%]*
- (Participation Revenue) + (Lab Result Revenue) + (Radiology Report Revenue) + (Emergency Department Revenue) *[33%]*

Conclusion

The study area was twice as large as needed to establish a sustainable HIE service in a rural region.

Based on the current model parameters, 500 participating healthcare providers is the minimum size for a sustainable HIE in a rural region

The capacity planning model has limitations that can be corrected with further study and improved reference data collection

References

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