See discussions, stats, and author profiles for this publication at: https://www.researchgate.net/publication/260255046

A Survey of Rural Hospitals' Perspectives on Health Information Technology Outsourcing

Article *in* AMIA ... Annual Symposium proceedings / AMIA Symposium. AMIA Symposium · November 2013

Source: PubMed

5 authors, including:

Nathan J. McNeese
Clemson University
64 PUBLICATIONS   **310** CITATIONS

SEE PROFILE

Madhu C. Reddy
Northwestern University
98 PUBLICATIONS   **2,527** CITATIONS

SEE PROFILE

Sandeep Purao
Bentley University
140 PUBLICATIONS   **2,333** CITATIONS

SEE PROFILE

Some of the authors of this publication are also working on these related projects:

Project   ADR practises View project

Project   IT Standardization Process View project

A Survey of Rural Hospitals' Perspectives on Health Information Technology Outsourcing

**Nicholas Johnson, BS, Alison Murphy, BS, Nathan McNeese, BS,
Madhu Reddy, PhD, Sandeep Purao, PhD
College of Information Sciences and Technology,
The Pennsylvania State University, University Park, PA**

Abstract

A survey of rural hospitals was conducted in the spring of 2012 to better understand their perspectives on health information technology (HIT) outsourcing and the role that hospital-to-hospital HIT partnerships (HHPs) can play as an outsourcing mechanism. The survey sought to understand how HHPs might be leveraged for HIT implementation, as well as the challenges with forming them. The results suggest that HHPs have the potential to address rural hospitals' slow rate of HIT adoption, but there are also challenges to creating these partnerships. These issues, as well as avenues for further research, are then discussed.

Introduction

Access to high quality healthcare is a key challenge for people living in rural areas around the country. Rural hospitals are often faced with the increased challenge of providing quality healthcare while staying financially viable. As healthcare costs continue to increase, rural hospitals are looking for ways to maintain financial stability while still providing the best care possible to their patients.

One proposed solution to this challenge is implementing a strong health information technology (HIT) infrastructure within these hospitals. Furthermore, there has been increased US government effort to make HIT a fundamental part of hospitals[7]. A hospital that can effectively utilize HIT can not only lower operating costs, but also reduce medical errors[1]. However, as seen in adoption rates of HIT, not all hospitals have the resources to take advantage of HIT. This is especially true of rural hospitals[5]. Often, smaller rural hospitals with limited resources lack the ability to invest the financial or human resources needed to build and maintain an effective HIT infrastructure. For this reason, it is important that rural hospitals explore innovative approaches to acquiring and maintaining HIT.

Outsourcing the design and maintenance of this infrastructure to traditional HIT vendors is problematic because of the significant differences in scale. Surveys of IT outsourcing activity by hospitals reveal that in 2005 fewer than 15% of the IT functions were outsourced[11]. Large HIT vendors find it difficult and unprofitable to engage in the myriad of relationships with small rural hospitals and small rural hospitals cannot afford the large contract fees nor do they have the expertise or resources needed to initiate and manage such relationships[12].

In response to this problem, an innovative approach to outsourcing was put forth by Reddy, et al.[10] who proposed that the smaller rural hospital outsources its HIT to a larger, more technologically advanced, regional hospital. This approach has been termed the *hospital-to-hospital HIT partnership (HHP)* model, and has been shown to be successful in a rural four-hospital setting. However, there is a need to further explore the perspectives of rural hospitals concerning their HIT issues and whether a model such as HHP would be beneficial to them. These needs have also been identified by US government agencies, who have put forth rural healthcare initiatives to better understand the the needs of rural hospitals and provide them with resources to help expand their IT infrastructures[13,14].

Therefore, in an attempt to further our understanding about rural hospitals' perspectives on HIT, we present survey results focused on identifying how rural hospitals view the benefits and challenges of HIT, the benefits and challenges of the HHP model, interest in outsourcing, and their awareness of resources available to them. We then discuss potential factors that are influencing the perception of challenges with HIT and HHP implementation. Finally, we conclude with future directions for further research on this topic.

Background

HIT can play an important role in a hospital's ability to care for its patients. HIT has been found to improve patient care, lower operating costs, and reduce medical errors[1]. However, not all hospitals have adopted HIT at the same rate[2,3]. Several factors have been identified that affect this rate of adoption. These factors include the size of the

hospital, whether it is for profit, membership in a larger system and its location in a rural or urban community, among others. Large hospitals have access to more resources, are often located in urban areas with better information technology infrastructure, and can share resources with other hospitals[1]. At the other end of the spectrum, small hospitals in rural areas, without access to the infrastructure or partnerships of their larger counterparts, were found to have the slowest rates of adoption.

The research into rural hospitals' adoption of HIT seeks to understand the specific challenges these organizations face[4]. Many are stand-alone providers without a larger hospital network to support them. They also tend to be smaller, with less staff that focuses on issues such as HIT. While those at rural hospitals understood the benefits of HIT, they have also identified several challenges that have hindered adoption[4]. Several studies have looked at HIT adoption in these rural hospitals[5,7,8]. These studies suggest that rural hospitals understand the importance of these technologies and motivation is not an issue in their adoption[7]. Many administrative tasks are regularly handled using HIT, including patient registration, admission and scheduling, as well as billing and financial management[5,7]. However, more recent HIT advancements, such as electronic medical records (EMR) and computerized provider order entry (CPOE) systems have not been widely adopted[8]. While financial incentives have been provided for these applications, it is not believed that these alone will be enough to increase the rate of adoption[5,8]. For many hospitals the cost is too high to support on their own for both initial implementation and long term maintenance of these systems[1,5].

One question often raised by the slow adoption of HIT by rural hospitals is whether or not these technologies will be of particular benefit to those hospitals. Surveys of rural hospitals suggest that these new technologies are seen as being potentially beneficial[7,8,9]. Those surveyed largely agreed that advances in HIT would enable them to provide better care for their patients. However several key challenges to adoption were identified, relating to the disruption caused by implementing a new system[9]. Rural hospitals often lack trained IT professionals who are able to maintain new systems and train others to use them. The concerns about breaches in confidentiality and the creation of new standards were also identified as factors limiting adoption[9].

While the challenges to HIT adoption at rural hospitals have been widely studied, less work has been done to identify potential solutions to these challenges. While public funding is available to these hospitals for HIT, they still lag behind their urban counterparts, suggesting that funding alone will not solve the problem[4,7]. One way rural hospitals can leverage this funding to address these challenges is through HIT outsourcing. However, potential partners for outsourcing are limited[12]. In the case of rural hospitals, non-traditional models for outsourcing may need to be considered.

One case study investigated how three rural hospitals and one larger regional hospital formed a hospital-to-hospital HIT outsourcing partnership (HHP)[10]. In these hospitals, it was found that sharing resources reduced the financial burden of HIT for the rural hospitals and also gave them access to the trained IT staff of the larger regional hospital. While the participants largely found the arrangement to be favorable, challenges did arise both in the complexity of the relationship and in issues of autonomy for the rural hospitals.

Methodology

Survey Instrument
In order to assess the current status of rural hospital HIT and the hospitals' perspectives on HIT partnerships, we developed a survey instrument that was based on prior HIT literature (Table 1). This literature informed our survey by providing relevant options for participants to rate within each survey question. For example, the options for challenges of HIT implementation were previously identified in prior studies and included lack of support from hospital management, security concerns related to data, and unavailability of well-trained IT staff.

The survey was created in both paper and online form. The paper survey was sent to the hospitals with a cover letter explaining the purpose of the research and asking the participants to either complete the enclosed paper survey or visit the link to the online web survey. The Penn State Survey Center hosted the online web survey and assigned each participant a unique survey number. The survey center also handled the distribution and collection of the data. To try to improve the response rate, a reminder postcard was sent to participants. This was followed by a phone reminder to the participants that we had phone contact information for. The survey was approved by the Penn State University Institutional Review Board.

Survey Topic	Related Research
Hospital characteristics	Burke et al., 2002; AHA, 2005; Casey et al., 2005; Ward et al., 2006; AHA, 2007; Schoenman, 2007
Types of hospital IT tasks	Burke et al., 2002; AHA, 2005; Casey et al., 2005; Ward et al., 2006; AHA, 2007; Schoenman, 2007; Bahensky et al., 2011
Benefits of hospital HIT implementation	Fonkych & Taylor, 2005; Gans et al., 2005; Schoenman, 2007
Challenges/barriers of hospital HIT implementation	AHA, 2005; Fonkych & Taylor, 2005; Gans et al., 2005; Menachemi et al., 2005; AHA, 2007; Schoenman, 2007; Bahensky et al., 2008; Hook et al., 2010
Funding opportunities for HIT or rural hospitals	Schoenman, 2007
Federal programs for HIT or rural hospitals	Schoenman, 2007
Potential HHP benefits	Reddy et al., 2008
Potential HHP challenges	Earl, 1996; Reddy et al., 2008
Types of components for hospitals to outsource	Lorence and Spink, 2004; Menachemi et al., 2007; Diana, 2009
Types of applications for hospitals to outsource	Lorence and Spink, 2004; Menachemi et al., 2005; Menachemi et al., 2007; Diana, 2009
Predictors of hospital HIT outsourcing	Nam et al., 1996; Ang & Straub, 1998; Aubert et al., 2002; Tiwana et al., 2007

Table 1: Prior research informing survey questions

Participants

Since there is no standard definition for "rural hospitals" in current research, hospitals were selected for participation based on Schoenman's research on rural hospitals[4]. This research used the non-metropolitan classification within the US Census. Any hospital whose county was classified as "non-metropolitan" was considered a rural hospital for this study.

The Critical Access Hospital Coordinator at the Pennsylvania Office of Rural Health provided a recent report of rural hospital information, which was cross-referenced against the American Hospital Associations' 2011 Hospital Guide. In order to scope our study, we identified 8 northeastern US states to include in the study: Pennsylvania, New York, Maine, New Hampshire, Vermont, Rhode Island, Connecticut, and Massachusetts. Within these states, any hospital located in a non-metropolitan county was included in the study. The name of the CIO or CEO and the mailing address for each hospital was recorded to mail the survey to each hospital. The hospital's demographic information (e.g., number of beds) was also recorded.

The survey was sent to 308 hospitals. We incentivized participants to respond by adding them into a drawing for one of twenty-five $100 Visa/Mastercard gift cards. Follow-up phone calls were made to any hospitals that did not respond within two months. We received a total of 69 surveys. Of those surveys, there were 8 returned stating that the hospital did not consider themselves "rural". Consequently, the total number of completed surveys was 61 hospitals, a 20% response rate.

Data Analysis

The Penn State Survey Center compiled the responses into an Excel spreadsheet. The related questions were grouped by topic. The responses regarding HIT attitudes were then compared to the current literature to identify whether the results confirmed or contradicted what was in the literature. Since there was little information about HIT outsourcing for rural hospitals, the questions related to outsourcing and HHPs were analyzed to find new insights. The results were also divided based on respondent and hospital characteristics to identify whether different groups had different perspectives. In particular, we looked for instances of consensus across groups, and where expectations

did not match the responses. We identified several themes based on the responses and discussed their implications within the context of the HHP model.

Results

Hospital Characteristics and Participant Information

While all the respondents came from rural hospitals, there was some variety among those hospitals. The majority (97%) of hospitals were non-for-profit. 72% were standalone hospitals, 23% were part of a multi-hospital system with the remaining 5% having some other formal relationship with other hospitals. All of the standalone or semi-independent hospitals reported having their own Chief Information Officer (CIO) or another individual in a full-time IT position, while none of the hospitals that were part of larger systems had someone in this role. 92% of hospitals had an individual who spearheaded IT initiatives, with only 8% lacking anyone in an IT leadership position. The respondents themselves held a variety of positions (Figure 1).
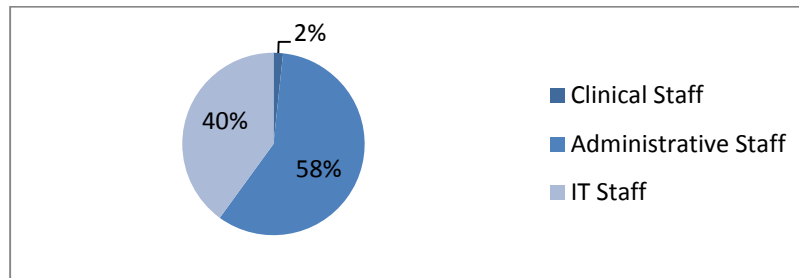

Figure 1: Positions held by respondents

Current Hospital IT Infrastructure

A majority of respondents reported that their hospital performed basic IT tasks, with a smaller majority performing business process analysis tasks. Most respondents agreed that HIT implementation could increase compliance with regulatory/accrediting bodies (98%), reduce medical errors (93%), improve patient satisfaction (76%), increase productivity (68%), and increase patient care revenue (60%). However, only a small percentage of hospitals agree that HIT implementation can reduce hospital staff (22%).

Most respondents agreed that lack of acceptance from end-users (72%), unavailability of well-trained IT staff (68%), privacy (62%), loss of productivity during transition period (62%), data security (60%), difficulty in qualifying IT benefits (60%), and lack of interoperability (53%) and were challenges to HIT implementation. Only a small percentage of respondents believed that lack of management support (15%) and difficulty in identifying technology that meet hospital needs (27%) were challenges. Our findings were consistent with those in previous studies[4,5,7,8] regarding attitudes towards HIT.

Perspectives on Hospital-to-Hospital Information Technology Partnerships (HHP)

The respondents had mixed experience with outsourcing HIT services. Just over a third of respondents (37%) said their hospitals outsourced for HIT needs, while the remaining 63% did not. The different services which they outsourced can be seen in Figure 2.
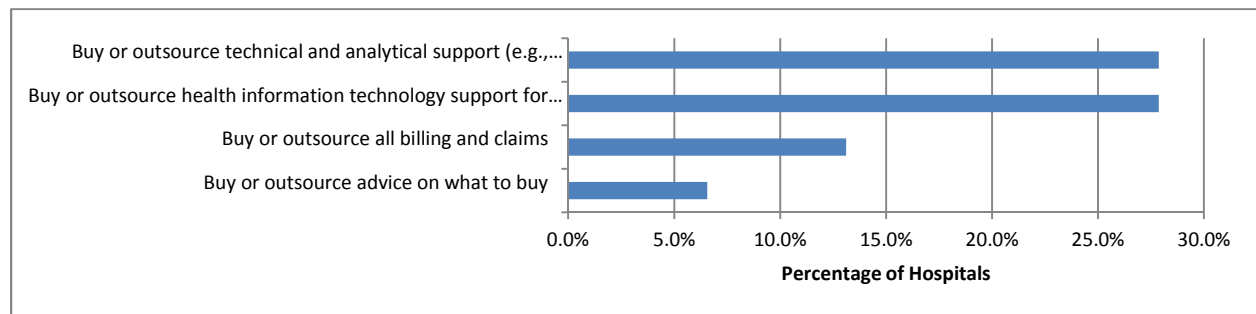

Figure 2: Current outsourcing for HIT Services

Respondents were also asked about the impact of various policy and funding options when it came to their consideration of adopting an HHP model, seen in Figure 3. Non-loan funding and measures for ensuring the quality of HIT services provided were the most agreed upon factors in this decision-making process.
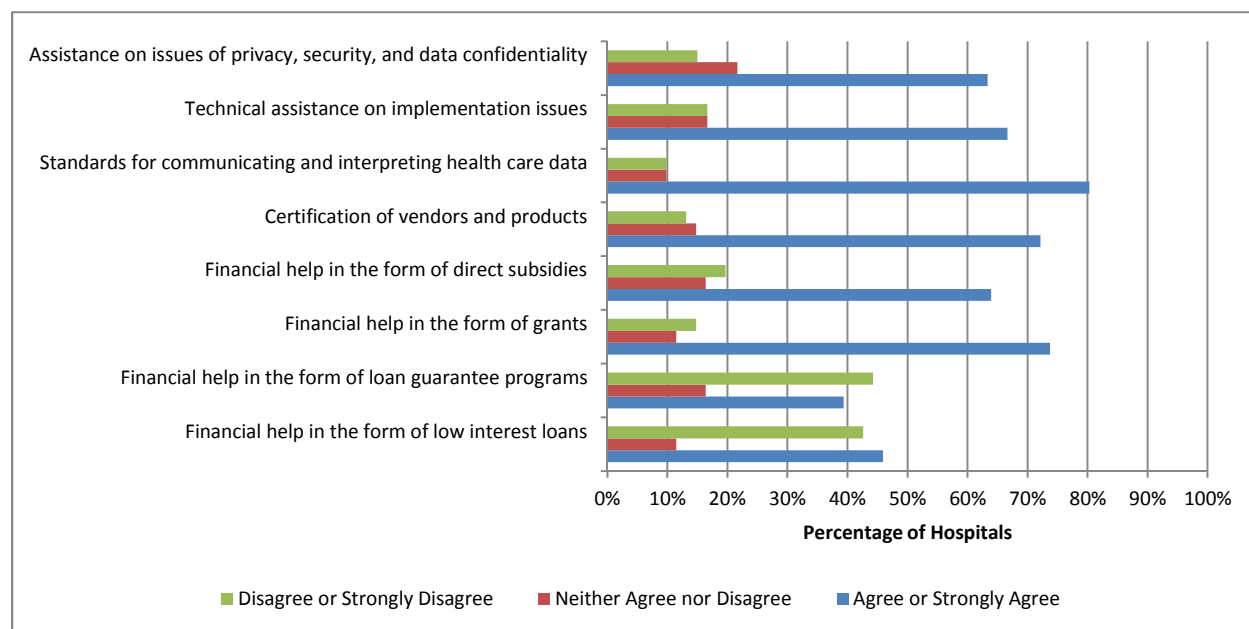

Figure 3: Impact of policy and funding on HHPs

When asked about federal programs that might influence the formation of an HHP (Figure 4), respondents identified programs such as the HITECH Act as being important to their decision-making process. Not all programs were seen as equally valuable.
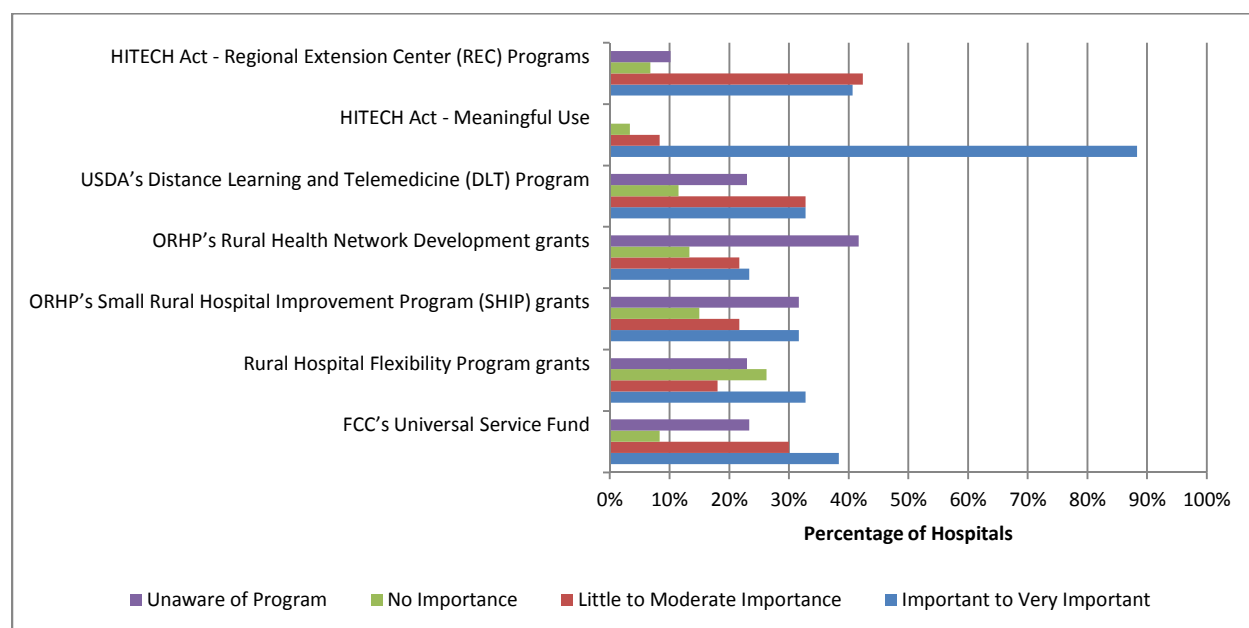

Figure 4: Importance of Federal Programs on the formation of HHPs

When it came to the perceived benefits of HHPs (Figure 5), respondents broadly felt that they would enable better service through increased access to new HIT and more efficient implementation of existing services.
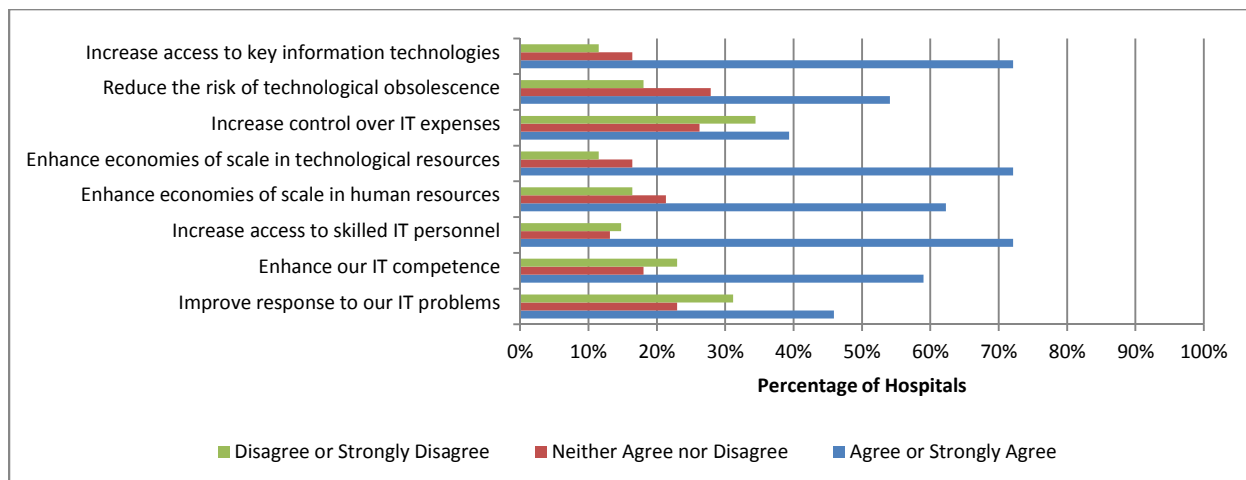
Figure 5: Potential Benefits of HHPs

Despite these benefits, respondents felt there were many challenges to HHPs that needed to be addressed (Figure 6). In particular, the challenges regarding integrating systems were of concern to a majority of respondents, with issues of planning and implementation being identified as the most common challenges. It is important to note that a minority of respondents identified a lack of internal support from hospital management as being a challenge, suggesting that there would not be resistance to these partnerships at an administrative level if these other challenges could be addressed.
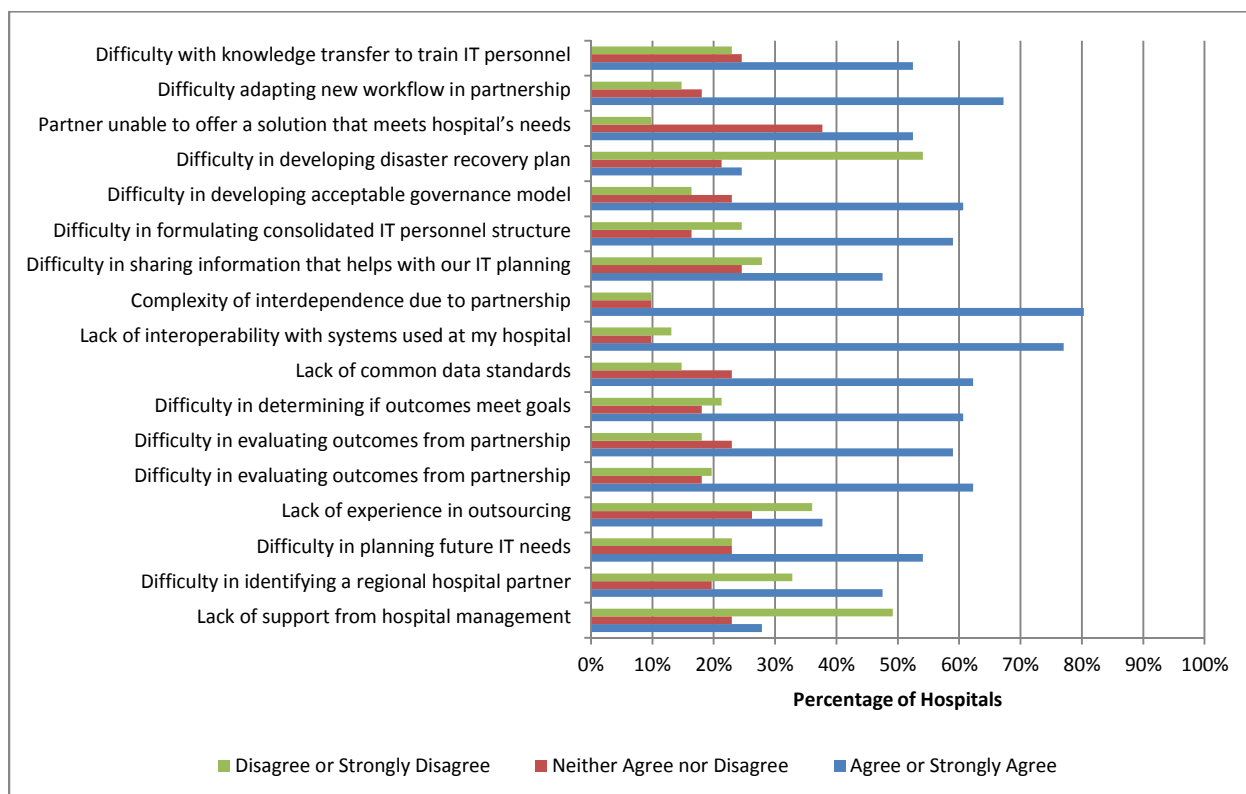

Figure 6: Challenges to HHPs

When looking at specific IT infrastructure and HIT applications to be outsourced as part of an HHP, respondents favored outsourcing data infrastructure and electronic record applications (Figures 7 & 8). Respondents seemed willing to have data stored at external locations, which would be necessary in an HHP.
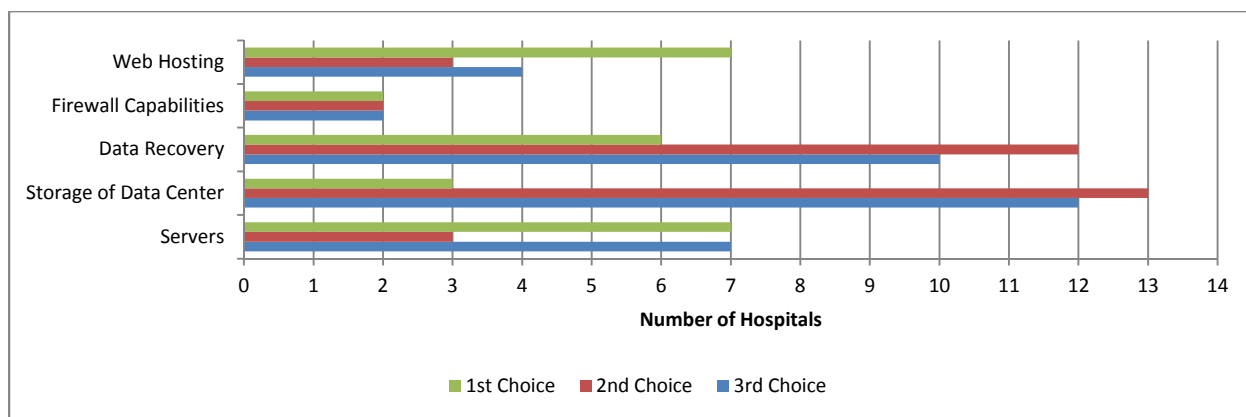
Figure 7: Potential Infrastructure Outsourcing using a HHP

A majority of respondents also picked more recent technologies such as electronic medical records (EMRs) and telemedicine as their top choices for application outsourcing (Figure 8). With the use of EMRs and related technologies being identified as one area where rural hospitals lag behind in HIT[2,7], this suggests that an HHP could be used to address this issue.
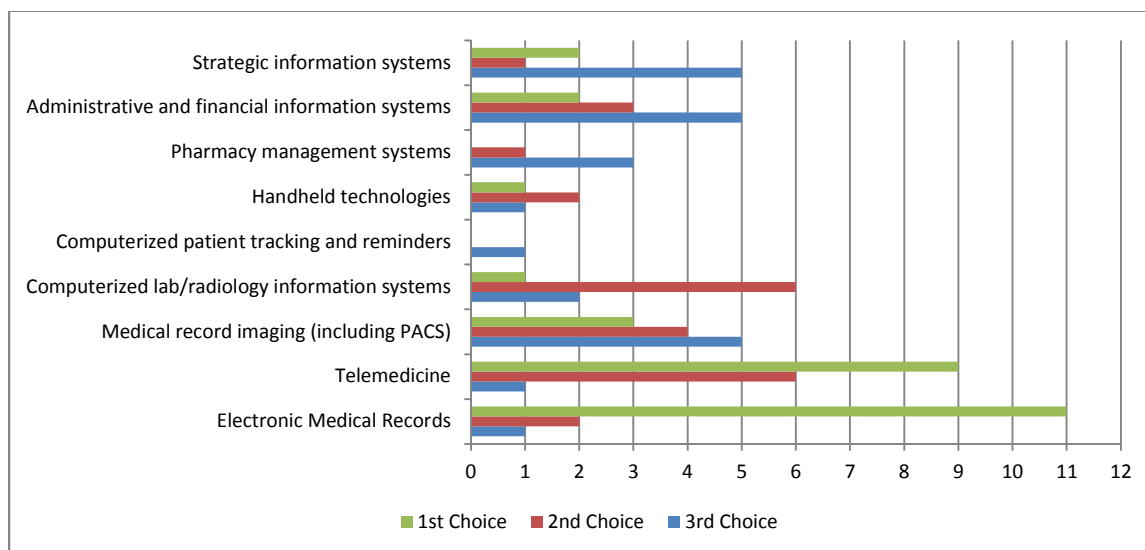

Figure 8: Potential Application Outsourcing using a HHP

Discussion

Experience with HIT Outsourcing

	Outsources HIT	*Does not outsource HIT*
Interest in HHPs	37%	29%
No interest or Unsure about HHPs	0%	34%

Table 2: Relationship between HIT outsourcing experience and interest in HHPs

We observed a direct relationship between the use of HIT outsourcing and willingness to form HHPs. There were three distinct groups when it came to hospitals' experiences with HIT outsourcing and their interest in forming partnerships (Table 2). The first were those that already outsourced some HIT services. This group expressed the

greatest interest in forming HHPs. Of those that did not outsource, some were interested in HHPs while others were not. This final group was the most strong in their opinions about the challenges to HHPs, particularly those relating to the logistics of integrating systems and changing procedures. One respondent said that any consideration of the benefits of and challenges to HHPs had no bearing on their hospital's decision-making process, as a desire to keep services "in-house" overrode any other consideration.

For hospitals willing to outsource HIT, the HHP model may be a viable solution. Those who expressed a disinterest in HHPs may be doing so due to a more general resistance to HIT outsourcing. Our findings also suggest that rural hospitals that already engage in HIT outsourcing should be considered as primary candidates for new HHPs.

Benefits and Challenges of HHP

The development of successful HHPs will require first and foremost participation. With nearly a third of respondents in our survey being either unsure or having no interest in forming partnerships of any kind, this could be problematic if these attitudes are more widespread. The issues of lack of interoperability and the complexity of the relationship were identified as the most important factors that are keeping these hospitals from forming partnerships. However, hospitals that had experience with outsourcing seemed much more receptive to the idea of HHPs. As often is the case in organizations with limited resources, the long-term benefits have to be balanced with the short-term challenges that might arise.

Looking at the funding options available to these hospitals, many respondents said they were unaware of many of the programs, though all of those that identified themselves as administrators were aware of all the programs. With funding being identified as playing a key role in HIT adoption, more may need to be done to increase the awareness of funding options.

When it came to identifying specific benefits to HHPs, once again the respondents were split based on their desire to form HHPs. Those with an interest agreed with many of the identified benefits, while those without an interest disagreed with the benefits. We cannot conclude from this study whether this is a result of previously held opinions about outsourcing having an effect on perceived benefits, or if these are only in relation to the HHP model specifically. Further research into hospital's attitudes towards outsourcing would be useful in understanding this issue better.

Awareness of Funding Opportunities

Encouraging HHPs or outsourcing in general may be challenging based on our findings. However, funding initiatives may be useful in this regard. One of the few responses that was not divided between the groups was the importance of funding options, such as the HITECH Act, in the decision to form HHPs. Only two respondents identified this act as unimportant in their decision to form partnerships, one of them was the respondent from the previous section who categorically denied interest in any form of outsourcing. Having access to additional funding may allay some of the perceptions of risk in forming partnerships. Rural hospitals could use these funding opportunities to upgrade infrastructure to better integrate with other hospitals' systems, hire more IT professionals to ensure a smooth transition and provide HIT training to hospital staff. As previous studies identified[4,7], funding was not enough on its own to increase and accelerate rural HIT adoption. Solutions such as HHPs may be a useful way to leverage that funding.

If HHPs were to be implemented, respondents said they would use them to implement key HIT technologies that rural hospitals have been slow to adopt. This is the most promising finding for the potential for HHPs to address the issues of HIT adoption in these hospitals. If they can be put in place, these systems would greatly increase rural hospitals' ability to provide effective care to their patients.

Limitations

Due to the limited number of respondents, significant statistical conclusions could not be drawn from the data. Though a relationship was found between the desire to form HHPs and previous outsourcing experience, no significant relationships could be established relating attitudes to HIT to those regarding HHPs. This may suggest that these two issues are independent, or that we do not yet have enough information to form a full picture of the broader relationship. Further research will be necessary to address these questions. . However, the collected responses were able to provide us important descriptive insights into the views of the rural hospitals about HIT outsourcing that have not been reported in previous literature. We plan to conduct future rounds of surveys based on the findings from this survey with follow-up phone interviews to help increase the response rates.

Conclusion

This study suggests that rural hospitals have differing attitudes towards HIT outsourcing, and that HHPs were an appealing solution to those willing to outsource. However, there are still many challenges that respondents said they must overcome to implement these partnerships. Further studies of rural hospitals that have overcome these challenges will be useful in understanding how HHPs can be developed. In addition, a comparative study of rural hospitals' attitudes towards outsourcing could help us understand why some hospitals are more willing than others to seek outside assistance in regards to their HIT needs.

Our findings support the existing understanding of rural hospitals' attitudes to HIT and suggest that new solutions for outsourcing, such as HHPs, could be used to promote adoption. Potential barriers include concerns over complexity and disruptiveness, which require further study to fully understand.

Acknowledgements

References

1. AHA. (2007). Continued Progress: Hospital Use of Information Technology, American Health Association. 2007.

2. Burke, D., Wang, B., Wan, T., Diana, M. (2002). Exploring hospitals' adoption of information technology. *Journal of Medical Systems, 26*(4), 349-355.

3. American Hospital Association (AHA). (2005). Forward momentum: Hospital use of Information Technology, American Health Association.

4. Schoenman, J. (2007). Small, Stand-alone, and struggling: The adoption of health information technology by rural hospitals. *The University of Chicago Press*.

5. Bahensky, J., Ward, M., Nyarko, K., Li, P. (2011). HIT implementation in critical access hospitals: Extent of implementation and business strategies supporting IT use. *Journal of Medical Systems, 35*, 599-607.

6. Medicare Payment Advisory Commission, Report to the Congress: Issues in a modernized Medicare program. MedPAC, Washington (DC), 2005.

7. Office of the National Coordinator for Health Information Technology (ONC HIT). (2011). Electronic health records and meaningful use. Accessed from: http://www.healthit.gov/policy-researchers-implementers/meaningful-use.

8. McCullough, J., Casey. M., Moscovice, I. (2010). Critical access hospitals and meaningful use of health information technology, Accessed from: http://www.flexmonitoring.org/documents/PolicyBrief14-HIT-Meaningful-Use-CAHs.pdf.

9. Bahensky, J., Jaana, M., Ward, M. (2008). Health care information technology in rural america: Electronic medical record adoption status in meeting the national agenda. *The Journal of Rural Health, 24*(2), 101-105.

10. Reddy, M., Purao, S., & Kelly, M. (2008). Developing IT infrastructure for rural hospitals: A case study of benefits and challenges of hospital-to-hospital partnerships. *Journal of American Medical Informatics, 15*, 554-558.

11. Menachemi, N., D. Burke, M. Diana Brooks, R. (2005). Characteristics of hospitals that outsource information system functions. *Journal of Healthcare Information Management, 19*(1), 63-69.

12. Menachemi, N., Langley, Brooks, R. (2007). The use of information technologies among rural and urban physicians in Florida. *Journal of Medical Systems, 31*, 483-488.

13. The White House Office of the Press Secretary. (2011). President announces new jobs initiatives for rural America. Accessed from: http://www.whitehouse.gov/the-press-office/2011/08/16/president-announces-new-jobs-initiatives-rural-america.

14. U.S. Department of Health and Human Services, Health Resources and Services Administration. (2012). Rural health IT adoption toolbox. Accessed from: http://www.hrsa.gov/healthit/toolbox/RuralHealthITtoolbox.

15. Ang, S. & D.W. Straub (1998). Production and transaction economies and IS outsourcing: A study of the U.S. banking industry. MIS Quarterly, 22(4), 535-552.

16. Aubert, B., Rivard, S., Patry, M. (2002). A transaction cost model of IT outsourcing. *Information & Management, 41*(7), 921-932.

17. Burke, D., Wang, B., Wan, T., Diana, M. (2002). Exploring hospitals' adoption of information technology. *Journal of Medical Systems, 26*(4), 349-355.

18. Casey, M., Moscovice, I., Davidson, G. (2005). Pharmacist staffing and the use of technology in small rural hospitals: Implications for medication safety. Upper Midwest Rural Health Research Center.

19. Diana, M. (2009). Exploring information systems outsourcing in U.S. hospital-based health care delivery systems. *Health Care Management Science, 12*, 434-450.

20. Earl. M.J. (1996). The risks of outsourcing IT. *Sloan Management Review, 37*(3), 26-32.

21. Fonkych, K. & R. Taylor, The state and pattern of health information technology adoption. Accessed from: http://www.rand.org/pubs/monographs/2005/RAND_MG409.pdf.

22. Gans, D., Kralewski, J., Hammons, T., Dowd, B. (2005). Medical groups' adoption of electronic health records and information systems. *Health Affairs, 24*(5), 1323-1333.

23. Hook, J., Grant E., Samarth, A. (2010). Health information technology and health information exchange implementation in rural and underserved areas: Findings from the AHRQ health IT portfolio. Agency for Healthcare Research and Quality.

24. Lorence, D., & A. Spink (2004). Healthcare information systems outsourcing. *International Journal of Information Management*, *24*(2), 131-145.

25. Nam, K., Rajagopalan, S., Raghav Rao, H., Chaudhury, A. (1996). A two-level investigation of information systems outsourcing. *Communications of the ACM, 39*(7), 36-44.

26. Tiwana, A. & A.A. Bush (2007). A comparison of transaction cost, agency, and knowledge-based predictors of IT outsourcing decisions: A U.S.-Japan cross-cultural field study. *Journal of Management Information Systems, 24*(1), 259-300.

27. Ward, M., Jaana, M., Bahensky, J., Vartak, S., Wakefield, D. (2006). Clinical information system availability and use in urban and rural hospitals. *Journal of Medical Systems, 30*, 429-438.