

# Value Propositions for Health Information Exchange Toward Improving Nursing Home Hospital Readmission Rates

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## ABSTRACT

The importance of health information technology use in nursing home (NH) care delivery is a major topic in research exploring methods to improve resident care. Topics of interest include how technology investments, infrastructure, and workforce development lead to better methods of nursing care delivery and outcomes. Value propositions, including perceived benefits, incentives, and system changes recognized by end-users, are important resources to inform NH leaders, policymakers, and stakeholders about technology. The purpose of the current research was to identify and disseminate value propositions from a community of stakeholders using a health information exchange (HIE). Researchers used a nominal group process, including 49 individual stakeholders participating in a national demonstration project to reduce avoidable hospitalizations in NHs. Stakeholders identified 41 total anticipated changes from using HIE. Ten stakeholder types were perceived to have experienced the highest impact from HIE in areas related to resident admissions, communication, and efficiency of care delivery. [*Journal of Gerontological Nursing*, 48(1), 15-20.]

The world increasingly shares information via electronic and automated mechanisms; however, many nursing homes (NHs) and health care professionals in these settings are not part of this trend. Inefficient paper-based sources con-

tinue to be used to exchange health care-related data, leading some to suggest that an assertive national approach is needed to address this issue (Hochman et al., 2019). The urgent need for modern, up-to-date information systems in NHs has never

been more apparent as the coronavirus disease 2019 (COVID-19) pandemic persists. NH leaders at the epicenter of the pandemic attempted to respond to national policy that encouraged broad telehealth implementation. The implementation of such policies occurred at a time when facilities were attempting to develop care practices that minimized exposure to COVID-19 while providing high-quality care (Centers for Medicare & Medicaid Services [CMS], 2020). This rapid cycle change occurred amidst unprecedented facility lockdowns, staff shortages, infrastructure challenges, and poor access to personal protective equipment, adding higher risk for vulnerable residents (Tumlinson et al., 2020; Wong et al., 2020; Xu et al., 2020).

There is a persistent lack of investment in information technology, infrastructure, and workforce training contributing to the difficulty of adjusting to these new demands in U.S. NHs (Ko et al., 2018). These factors have contributed to lower trends in information technology adoption and less electronic data exchange, adding to the problem of low electronic health information exchange (HIE) adoption. In 2017, of the 66% of U.S. NHs that adopted electronic health records, only 18% had the ability to integrate patient health information

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from outside facilities (Henry et al., 2018), potentially creating information gaps. Furthermore, some rural NHs are at a disadvantage where, due to location, there is lack of infrastructure to support technology, leading to lower technology use (Alexander et al., 2017). In addition, when technology is used, data are less integrated with other systems of care, making real-time exchanges about patient care difficult (Powell & Alexander, 2021).

Fortunately, there are NHs that have managed to adopt sophisticated information technology systems, which support electronic HIE (Adler-Milstein et al., 2021; Alexander et al., 2019). Characteristics of NHs having higher adoption include larger urban facilities with more beds (100+), facilities that have higher proportions of licensed staff, facilities with high occupancy rates, and those with chain affiliation (Zhang et al., 2016).

The importance of health information technology adoption in NHs was recognized as a major component of the Missouri Quality Initiative (MOQI), an 8-year (2012–2020) demonstration project funded by the CMS Innovations Center, Initiative to Reduce Avoidable Hospitalizations among Nursing Facility Residents. The MOQI resulted in 40% reduction in all-cause hospitalizations and 58% reduction in potentially avoidable hospitalizations ( $p < 0.001$ ) and their associated cost savings (Ingber et al., 2017; Rantz et al., 2017). There were three primary components of the MOQI: advanced practice RNs (APRNs) embedded full-time in 16 participating facilities, a clinical focus on early illness recognition and end-of-life care, and implementation and use of HIE to improve and support communication and care delivery within and outside the NH.

One goal for implementation and use of the health information technology component in the MOQI included building sustainable HIE systems that NHs would continue to use once the project was completed (Alexander et al., 2015). In the context of this

project, sustainability meant that affiliations created among the MOQI network stakeholders would be important in the ongoing daily care of NH residents who were actively pursuing services in networked health care facilities. Another goal was that network affiliations, developed during the MOQI, would be synergistic and interdependent, which is crucial for NH resident care and sustainability (Popejoy et al., 2019; Rantz et al., 2018; Rantz et al., in press).

The purpose of the current article is to identify and disseminate high value propositions from end users who were sharing electronic data in a community that successfully adopted HIE in NH care delivery systems. In the context of this study, high value proposition statements included perceived benefits, incentives, and changes to the health ecosystem necessary to inform a successful HIE implementation and reduce hospitalizations (Fennelly et al., 2020). Specific aims of this research were to: (1) express the value propositions for each partner involved in HIE, and (2) describe how HIE contributed to the value propositions.

## METHOD

This research was approved by the University of Missouri Institutional Review Board.

### Convening Stakeholders

To build stakeholder commitment and engagement, the MOQI team organized three health information technology summits (October 10, 2017; January 16, 2018; and January 16, 2020), which were held in the St. Louis, Missouri region. The goals of the summits were to explore perceptions of the value of HIE and arrive at value propositions among MOQI stakeholders who were supporting the use of technology to securely share personal health information and reduce avoidable hospitalizations.

A nominal group process method provides an effective structure to help groups of people discuss and generate

important conclusions on challenging topics (Van De Ven & Delbecq, 1974). Nominal group processes facilitate broader communication with input from all group members, preventing dominant vocalization from a few vocal members. To achieve equal input from all members of the interdisciplinary health care network participating in the MOQI and each health information technology summit, stakeholders were divided into six groups with six to eight stakeholders per group. Summit organizers took care to have a variety of roles in each small discussion group to facilitate interdisciplinary discussions.

### Nominal Group Process

Our nominal group process included four recommended stages: silent generation, round robin, clarification, and ranking (McMillan et al., 2016). During the silent generation phase, we asked stakeholders to reflect on anticipated changes expected and actual changes experienced from using HIE in the MOQI. During the round robin phase, each group discussed their anticipated changes followed by actual changes experienced. After stakeholders identified actual changes experienced, stakeholders were asked to rank order their responses by high, medium, and low impact of HIE (i.e., ability to reduce avoidable hospitalizations) on the actual changes.

To meet our objectives, an expert moderator was hired to lead the process. The moderator had >20 years' experience as a NH administrator and worked with health information technology, including HIE systems, in a large U.S. NH corporation. The moderator led discussions for all summits for consistency. The moderator participated in clarifying responses and probing deeper into reflections provided after each round robin phase.

To support documentation of group process results, each small group identified a scribe who was the recorder for the sessions, and a reporter who relayed the small group's discussion to the larger group. Group

input was recorded on large Post-it® note sheets throughout the discussion process. Each group was asked to first identify and document expected then actual system changes resulting from HIE that contributed toward reducing avoidable hospitalizations. In addition, groups were asked to document which stakeholder was impacted by the expected or actual change. Changes were then categorized by stakeholder type. After each group session, the group reporter shared their group results with other stakeholders. Intergroup input was encouraged to clarify information. Finally, through an iterative consensus building process, each group ranked actual changes by high, medium, and low impact on reducing avoidable hospitalizations (McMillan et al., 2016).

To standardize documentation of these activities, each group was provided a From – To Matrix stakeholder analysis tool (access <https://uihc.org/quality-improvement-program-tools>), which supports each stage of the nominal group process. The From – To Matrix tool is designed to capture key anticipated elements of change occurring from a project and critical issues by those most likely to be affected by these changes (University of Iowa Hospitals & Clinics, 2006). Following the summit, documentation from Post-it® notes and the From – To Matrix tools were collected from each group and data were collated by members of the research team.

## RESULTS

**Table 1** provides results of our stakeholder analysis, including participating stakeholder type(s), anticipated changes from HIE, and actual changes experienced from using HIE by stakeholder type(s) in the MOQL. There were 49 individual stakeholders representing seven categories of stakeholders who participated in the nominal group process and evaluation. Stakeholder groups included: HIE staff and vendors; health care facility leaders and staff members from a variety of organizations, including NHs,

Participating Stakeholder Type(s)	Anticipated Change(s) From HIE
HIE	Quality improvement
Training	Increase information technology (IT) use
Project management	Connectivity
Provide feedback reports	Secure managing system
HIE vendors	Manage platforms
	Develop feedback reports
Health Care Facilities	Greater access to information
Nursing homes	Addressing errors
Administrators	More timeliness
Nursing staff	Improved accuracy
Social workers	Build network/partner opportunities
Patients	Transfer of information
Caregivers	Better quality of information
EMR vendors	Increased patient satisfaction
Hospitals	Increased family satisfaction
Administrators	Correct patient information
Nursing staff	Seamless patient transitions
Patients	Reduced stress and harm to client
Caregivers	Problem solving
EMR vendors	Legal and fiscal activities
	Collaboration
	Early identification condition change
	Greater care involvement
	Identification of care improvements
	Effectiveness of care
	Regulatory compliance
	Comprehensive record available
	Keep residents healthy
	Navigating health care processes
	Increased accountability

hospitals, and home health agencies; representatives from mobile service organizations providing clinical sup-

port services (e.g., hospice, wound management, radiology); emergency management personnel; technology

TABLE 1 (CONTINUED)

**Anticipated Changes From Using Health Information Exchange (HIE) By Stakeholder Type(s)**

Participating Stakeholder Type(s)	Anticipated Change(s) From HIE
Mobile Services	Provides excellent support
Hospice	Increase knowledge base
Wound	Thinking out of the box
Radiology	Reduced medication use
Laboratory	Partnership and collaboration
Pharmacy	Appropriate care
EMT and Paramedics	Follow-up
Nursing Home Technology Consultants	Blueprint for IT
Professional Organizations and Societies	Better documentation
Alzheimer's Association	Evaluation
Quality improvement organizations	Collaboration
Research team	Follow-up
Policy Advocates and Evaluation	Use of SBAR tools
CMS	
RTI International	
ONC	

*Note.* EMR = electronic medical records; EMT = emergency medical technician; SBAR = situation, background, assessment, recommendation; CMS = Centers for Medicare & Medicaid Services; ONC = Office of the National Coordinator for Health Information Technology.

consultants; professional organizations and societies; and policy advocates and evaluators. Stakeholders identified 41 total anticipated changes from using HIE in the MOQI. Seventeen stakeholder types were identified that experienced actual change from using HIE during the MOQI.

During the ranking stage of the process, 10 stakeholder types were identified as having experienced the highest impact from HIE to reduce avoidable hospitalizations, including their ability to perform admission assessments, communicate findings, timely data entry and documentation, fact finding, accurate evaluation, and immediate care delivery. Seven stakeholder types experienced medium-level impacts and six experienced low-

level impacts from using HIE in the MOQI to reduce avoidable hospitalizations (Table 2).

## DISCUSSION

High impact changes contributed to the effectiveness of the MOQI multidimensional intervention, including health information technology, advance directives, and APRNs working in NHs to improve care and help staff better manage resident change in condition. These impactful changes contributed to achieving significant reductions in avoidable hospitalizations over the course of the national demonstration project (Vogelsmeier et al., 2021). Stakeholders identified many health information technology value propositions that they believed

made a difference in their ability to better detect and reduce avoidable hospitalizations in their facilities along with other key parts of MOQI interventions (Galambos et al., 2021; Popejoy et al., 2017).

The impact areas are also identified in other research that explored the value of technology. For instance, Adler-Milstein et al. (2021) reported that hospital and skilled nursing facilities with well-developed HIE systems have stronger partnerships in care delivery and higher quality of care for residents who are transitioning between settings. Burke et al. (2021) discovered that improved formal integration activities lead to shared safety activities, specifically citing reduced hospital admissions as a source of improvement for higher levels of integrated information use in NHs. Finally, integration of information resources, such as palliative care and infection control practices at the end of life, have been shown to reduce hospitalizations and promote goal concordant care (Harrison et al., 2021). Using HIE in the MOQI enhanced fact finding and allowed staff to dive deeper into information retrieval, which reduced avoidable hospitalizations overall. This finding is supported by an increasing number of proprietary products that use admission, discharge, transfer, and Minimum Data Set sources, incorporating real-time information to guide patient progress and set up alerts for possible hospitalizations.

Active HIE should be considered a requirement for all practice settings, including NHs. Leaders across the care continuum should be involved in assimilating networks of stakeholders, who are expected to use the HIE, to dialogue about the anticipated system changes to achieve more robust HIE processes, which will lead to higher levels of quality. In this study, we identified stakeholders impacted and had them dialogue about the actual change they experienced to understand the importance of HIE in maintaining safe clinical practice,



timeliness, and efficiency of accessing accurate clinical data, and to assure that a higher level of quality of care is achieved. These steps are necessary to illuminate to all stakeholders the intrinsic value that a HIE system has on clinical practice and quality of care.

## LIMITATIONS

There are limitations to the current study. First, use of HIE by facilities was low in some facilities, but higher in others. Staff in low performing facilities may not have realized the true benefits of HIE use compared with staff from other facilities. Moreover, low performing facilities possibly experienced staffing and time constraints, which reduced their use of HIE overall.

## CONCLUSION

Identifying key stakeholder values for health information technology uptake is a critical area of need to improve resident care and reduce unnecessary hospitalizations. Identifying areas of expected and actual value of HIE from stakeholder groups can lead to broader dissemination of digital health tools (Lyles et al., 2021). Major policy shifts will likely continue to occur in the NH sector, either due to the current pandemic (e.g., use of telehealth) or for other quality control reasons, which will influence health information technology uptake. Optimization and uptake will depend greatly on the perceived value that digital tools provide to many stakeholders, not just in NHs, but across the care continuum.

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TABLE 2

### Stakeholder Rankings of High, Medium, and Low Impact of Actual HIE Change Experienced

Impact/Stakeholder	Actual Change Experienced Using HIE
<b>High</b>	
Director of Nursing	Deep dive for each admission; true picture of admission; communicate findings with nurses and providers; allows input of orders ahead of time; able to review orders for correctness
Administrator	Fact finding (e.g., diagnosis, equipment needed); first contact (e.g., hospital, families)
Executive Director	Document accurate resident evaluations
Physician	Faster feedback, clarification, authorization; greater involvement in challenging cases
Charge Nurse	Provide immediate care; ensure patient information, orders, and medications input accurately
Advanced Practice Nurse	Sounding board for clinical questions; change agent for HIE; holistic view of patient information
IT/Vendor Specialist	Assure information transfer to facility
Admissions Coordinator	Gather, disperse information to correct areas; provide nursing with needed information
Social Services/Social Worker	Evaluation, care planning and advanced directives; communication with family and hospital
Care Consultants	Consultations with patients, families, physicians
<b>Medium</b>	
Unit Nurse	SBAR tool use to communicate findings; greater stability in the unit
Charge Nurse	Coordinates care with admissions coordinator
Nurse Manager	Double check admission data for proper coding and audit
Administrator	Access to referral data
Social Services/Social Worker	Support, buffer, comfort when family drama occurs; identify solutions to problems
IT/Vendor Specialist	Process to assure data quality
Quality Improvement Staff	Review resident risks, prevent illness
<b>Low</b>	
Home Health Aide	Identify chore duties for client
Social Services/Social Worker	Identify equipment needs; notary work
Physician	Better understanding of hospice services
Restorative Aide	Consultations
Director of Education	Increased knowledge and professionalism; appropriate care
Medical Advisor	Connections between physicians and staff

Note. HIE = health information exchange; SBAR = situation, background, assessment, recommendation.

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