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Original Study

# Investigating the Challenges and Opportunities in Home Care to Facilitate Effective Information Technology Adoption

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A B S T R A C T

*Background:* As home care utilization increases, information technology (IT) becomes a critical tool for providing quality home care. However, most home health agencies (HHAs) in the United States are in a position to adopt and leverage IT solutions in budget-constrained settings, where it is crucial to address important and pressing challenges and opportunities for achieving effectiveness in IT adoption.
*Objectives:* (1) Explore HHAs' challenges and opportunities related to delivering home care as well as performing administrative functions and conducting business, (2) learn about current IT implementation levels and activities in home care, and (3) make recommendations to facilitate efforts and initiatives designed for adopting IT in home care effectively.
*Methods:* Semistructured interviews were conducted to elicit rich contextual information from the participants recruited from 13 local HHAs in one of the states in the United States. Established systems analysis techniques were used to ask questions during the interviews. Framework, a qualitative research method, was used to analyze the qualitative data obtained from the interviews.
*Results:* Coordinating clinical and administrative workflows was an important challenge. Inadequate access to patients' medical history and difficulties with medication reconciliation detracted from the quality of care. Hiring, training, scheduling, and retaining qualified personnel constituted another important challenge. Training and educating patients, caregivers, and families hold important opportunities for improving the quality of care. All except one HHA adopted electronic health records (EHR) but many continued to struggle considerably in their day-to-day functions. Health information exchange (HIE) seems to be the most needed technology. Telehealth solutions were perceived to be promising but their added value and financial viability in the long run were questioned.
*Conclusions:* The recommendations for effective IT adoption include keeping a quality improvement focus, keeping a holistic organizational perspective, considering potential information exchange problems, addressing education and training needs, experimentation with telehealth if resources permit, considering organization size, and reducing lengthy procedures and excessive documentation requirements. The relevant stakeholders, such as home care professionals, IT vendors, and policy makers, should consider the recommendations from this study to facilitate success in future IT efforts and initiatives in home care.



Home health care, also called *home care*, refers to episodic and intermittent post-acute care services delivered to *homebound* patients at their homes. Skilled nursing care, physical therapy, occupational therapy, speech therapy, medical-social services, and assistance from a home aide fall under home care.[1] By receiving home care, patients can gain strength, recover, and become independent more quickly.[2] Quality home care can help reduce hospital readmissions and avoidable emergency room visits.

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In the United States, home care touches the lives of a large number of Americans, mostly vulnerable elderly patients as well as their caregivers and families. In 2012, Medicare reimbursed home care for 3.46 million beneficiaries, 93 per 1000 enrolled; those 65 and older constituted 86% of the home care beneficiaries.[3] As the elderly population grows, home care utilization and expenditures are projected to increase.[4] Therefore, higher quality of care, improved outcomes, and cost-effectiveness become important targets in home care.[5] To achieve those targets, it becomes critical that home health agencies (HHAs) adopt relevant information technology (IT) solutions (eg, electronic health records [EHRs], health information exchange [HIE], and telemedicine).[6,7]

HHAs can easily acknowledge the role and importance of IT by considering how it transformed other industries. However, IT adoption often requires a considerable investment of organizational resources at various stages.[8] Unfortunately, HHAs typically have few resources to support successful IT adoption.[9] Various eligibility issues prevented HHAs from receiving financial incentives for EHR purchases under the Health Information Technology for Economic and Clinical Health (HITECH) Act.[10] In the current status quo, HHAs are often occupied with delivering care and running a business on a day-to-day basis.[11] Therefore, effective IT adoption in home care requires an optimal use of available resources to create the maximum value possible.[12]

For effective IT adoption, it is important to ensure that IT will address the correct, important, and high-priority challenges and opportunities in delivering home care and performing various administrative and business functions. Such challenges and opportunities were systematically investigated in this research along with the current IT implementation levels. The empirical evidence obtained and the recommendations made can support future IT adoption efforts and initiatives in home care.

## Methods

This qualitative research obtained rich contextual information via semistructured interviews. The research study was reviewed for the protection of human subjects and approved by the institutional review board (IRB) of the University of Maryland, Baltimore County. The IRB protocol number is Y12GK12106. The IRB approval was obtained before any data collection. The unit of observation was a single HHA. Maximum variation sampling[13] was adopted as a purposeful sampling strategy. With help from local home care experts and leaders, a representative sample of 13 HHAs located in 1 state in the United States was recruited to participate in the study. Certain HHA attributes, which can be related to HHAs' challenges and opportunities, were used in characterizing HHAs to achieve the greatest diversity in sampling; thus, a comprehensive understanding of the research topic. Table 1 shows the HHA attributes used in sampling in its columns.

The questions for the semistructured interviews were based on a number of well-established systems analysis concepts and techniques, which were problem analysis,[14–18] activity duration analysis,[19,20] activity- based costing,[21–25] outcome analysis,[26–28] and technology analysis.[29] The protocol was revised according to feedback received from our colleagues at the home care association in our state and at the state government.

Each interview involved 2 participants, 1 home care director, and 1 IT director, or a single participant serving in both capacities. Participation in the study was voluntary and involved no incentives. The interviews were conducted over the phone, recorded, and transcribed verbatim to ensure accuracy. On average, each interview lasted for an hour; the resulting transcripts included more than 200 pages of text. The semistructured nature of the interviews allowed further probing and deviations when appropriate, thus eliciting different views and obtaining clarifications easily.

For qualitative data analysis, this study followed the Framework[30–33] method, which has been used in many areas, including health research.[34–37] The analysis steps were as follows: (1) constructing an index; (2) labeling data according to the index; (3) sorting, summarizing, and synthesizing the data; (4) creating descriptive accounts; and (5) generating explanatory accounts. As commonly performed, the analysis of qualitative data took place concurrently with the interviews. In this phase, the researchers met regularly to discuss the results and findings. A saturation of findings was observed after the 11th interview; however, the researchers proceeded to complete all interviews as initially scheduled.

To ensure validity, each interview was followed up by a shorter second interview, called *member check interview* during which researchers made sure that their understanding was correct by asking any clarification or further questions. Before a member check interview, the transcript of the interview was sent to the interviewee to allow time for review. Additionally, data labeling of interview transcripts was completed by two researchers who first independently labeled their code and achieved 85% consistency before reconciling the labels assigned.

## Results

### *Care Coordination and Information Needs*

Home care requires the collaboration of an interdisciplinary team whose members often work remotely at different sites and organizations (see Q1 in Table 2). Successfully coordinating and executing the clinical and administrative workflows was a core challenge expressed by all participants (Q2). HHAs' tasks are highly dependent on external entities (Q3). To provide timely care, HHAs struggle with obtaining physician approvals and orders, which are obtained mostly via fax or phone. One HHA adopted an online portal for approvals, but physicians still did not use it.

Effective care coordination requires capturing and sharing of necessary and accurate information (Q4). During patient admissions, HHAs strongly rely on telephone and fax as the primary tools for HIE for receiving patient history, conditions, medication history, and treatment plans. The admission process typically takes a long time

**Table 1**
HHA Attributes Used in Maximum Variation Sampling

| Size* | Organization Size | Business Model | Areas Served† | Age |
|---|---|---|---|---|
| Small: <1000 admissions (7) | Branch (6) | For-profit (8) | Urban (6) | Young: <20 y (6) |
| Medium: 1000–3000 admissions (4) | Standalone (4) | Nonprofit (4) | Suburban (9) | Established: 20–40 y (5) |
| Large: >3000 admissions (2) | Hospital-based (1) | Governmental (1) | Rural (5) | Mature: >40 y (2) |
| | State Organization (1) | | | |
| | Franchise (1) | | | |

Numbers in parentheses represent the HHA counts in the sample.
*Using admissions per year as proxy.
†Mutually inclusive.