

**Title: Sociotechnical Probabilistic Risk Assessment in Home Health Care**

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## 1. Structured Abstract

**Purpose:** To identify causes of preventable hospitalizations among patients receiving home health services. Results can inform efforts to improve care processes and more effectively support independent living for home care patients.

**Scope:** The study involved eight Utah home health agencies; home care treatment records for 195 patients who experienced an unplanned hospital admission; interviews with home health visit staff, supervisors, and leadership; and agency training materials, policies, and quality management processes.

**Methods:** A study team that included an experienced home health nurse, home health quality professional, and expert in process reliability and root cause analysis reviewed treatment records to identify preventable hospitalizations and associated care process failures. Follow-up interviews with home health staff and managers, combined with review of agency management practices were used to identify root causes of avoidable hospitalizations.

**Results:** In total, 68.7% of the hospitalizations reviewed were assessed as appropriate and not preventable, and 1.5% were inappropriate hospital admissions; in 2.1%, the referring physician would not authorize needed care, 4.1% followed an inappropriate admission to home health, and 23.6% resulted from care process failures. Home health management practices and staff training were identified as root causes in the majority of preventable hospitalizations.

**Key words:** home health, acute care hospitalization, root cause analysis, care planning.

## 2. Purpose, Study Objectives

The goal of this study was to reduce avoidable hospitalizations in the home health setting through improved understanding of the sources and nature of systems and process risks. The study produced a comprehensive model of risk for unplanned hospitalization for home health patients using a sociotechnical probabilistic risk assessment (ST-PRA) model. The risk model was developed using process mapping, input from home health subject matter experts (SME), and structured review of 195 home healthcare episodes that resulted in unplanned hospitalizations. Findings from this study can be used to inform efforts to improve home healthcare processes and management practices, transitions in care settings, and coordination between providers. The objectives for this study were to:

- Develop, test, and calibrate a ST-PRA risk model for unplanned hospitalization from the home health setting;
- Identify home health agency organizational conditions that contribute to potentially avoidable unplanned hospitalizations;
- Evaluate risk model development activities and review of unplanned hospitalizations as facilitators for learning by home health providers; and
- Develop recommendations for improvement strategies to reduce avoidable hospitalization among home health patients.

### 3. Scope (Background and Significance)

In the United States today, more than 1.4 million patients are under the care of a home health agency (HHA). Each year, in over 7 million home care episodes,<sup>1</sup> approximately 20,000 HHAs<sup>2</sup> provide care to a population at risk due to post-acute care or post-surgical clinical needs, diminished capacity for self-care, elderly and frail status, multiple chronic medical conditions, and complex at-home treatment regimens.<sup>3</sup> Home health providers face significant challenges in ensuring a safe and effective care experience for their patients:

- successful initiation of home care often depends on the quality of the hospital discharge process,
- determining patient needs and developing an appropriate care plan requires subtle expert judgment,
- a wide range of services are provided,
- the care environment is completely unstandardized and relatively uncontrolled and may represent a hazard in itself,
- care plan implementation relies on the active participation of the patient and (often) untrained and unpaid care givers,
- efforts must be coordinated between multiple disciplines within an agency,
- monitoring for and responding to changes in status relies on patients and unpaid caregivers,
- HHAs rely upon external providers and in turn are relied upon by those same providers for communication and coordination of effort,
- staff training and skills are highly variable,
- monitoring staff performance is complicated by the distributed nature of the work, and
- extensive field work can present barriers to establishing and maintaining a shared culture of quality, safety, and learning.

The extent to which HHAs in the United States have designed systems and processes of care that reliably meet these challenges is not precisely known. No comprehensive studies of home health safety in the US are reported in the current literature (although a Canadian study reported a 4% rate of preventable or ameliorable adverse events among home health clients).<sup>4</sup> Among US all home health episodes, 11% end with hospitalization,<sup>5</sup> and approximately 28% of home health episodes among Medicare beneficiaries result in hospitalization.<sup>6</sup> Not all of these outcomes can be considered to be avoidable or even undesirable (for example, elective admissions are included in these statistics). However, examination of the national acute care hospitalization (ACH) experience for Medicare beneficiaries demonstrates substantial variation in risk-adjusted outcomes that suggests systems and process failures as contributors. Top-performing (benchmark) HHAs have risk-adjusted ACH rates less than 20%, whereas the median HHA rate is 30% (50% higher), and 20% of HHAs have risk-adjusted ACH rates more than two times the benchmark rate.<sup>7</sup> Similar variation is observed for other clinical and functional outcomes. In 1999 Gray et al, using patient self-report, estimated a 20% adverse drug event rate among home health patients discharged from the hospital, with patients initiating new medications and those with lower cognitive function found to be at greater risk. In an observation study, Tucker reported frequent home health operational failures.<sup>8</sup> These studies, and other studies of healthcare system performance and the impact of care fragmentation,<sup>9 10</sup> suggest the real potential of significant and preventable patient harm in the home health setting and inefficient use of healthcare resources.

ACH is a key outcome in home healthcare. It is profiled in public reporting of HHA performance<sup>11</sup> and is the target of the Home Health Quality Improvement National Campaign.<sup>12</sup> Safe, timely, and effective care, coordinated and delivered with seamless reliability, centered upon and engaging the patient, is expected to maintain or improve clinical status and patient functioning and thereby reduce the need for hospital-based care. The use of ACH as a care outcome measure presents some particular difficulties for home health providers. For example, hospitalization is a resource utilization decision – not a clinical outcome. Not all hospitalizations can be considered avoidable.

Significant sources of risk lie beyond the direct control or influence of the care participants. Moreover, the sources of risk controlled or influenced by the HHA are subtle and myriad. HHA rates are sensitive to, for example:

- failures in admission/intake processes,
- start of care assessment and care plan development,
- application of available clinical science,
- patient and caregiver education,
- patient monitoring,
- coordination of effort and communication between providers,
- timely detection of complications and emerging changes in patient status,
- monitoring care plan implementation and patient progress,
- adaptation of care processes to the patient and support systems capacities,
- anticipation of problems, and
- management of disruptions to the functioning of the HHA team.

Evidence-based best practice resources for reducing ACH have been developed and actively disseminated to the home health community.<sup>13</sup> CMS has funded extensive training programs for HHAs through the Quality Improvement Organization program<sup>14</sup>; as of 2007, over 100 recommended practices were documented in CMS home health quality improvement materials.<sup>15</sup> The training and resources form the basis for disciplined HHA assessment of care practices and application of quality improvement methods to home healthcare processes. They are important, well-designed, and valuable resources and are likely contributors to recent national improvement trends observed in more narrowly focused measures of home health quality – but not in ACH rates.<sup>16</sup> Meaningful and sustained improvement in ACH may require, as a supplement to these resources, tools and resources that can support decision making based upon rigorous assessment of the risks designed into care systems and process. That is, the systems design challenges inherent in ACH risk reduction is likely to be more complex than the tools and analytic methods currently being applied to the problem. Proactive risk assessment, including reliability engineering tools, offers analytic methods that can address this gap. These methods can be applied to provide a perspective on risk that complements clinical perspectives, effectively isolates sources of risk and resiliency in care delivery systems and processes, and informs the development of redesign and intervention approaches. Some particular challenges have been noted<sup>17,18</sup> in applying reliability engineering approaches to sociotechnical systems and processes, especially when attempting to quantify risk. These include (potentially system induced) human performance failures (slips/lapses, mistakes, and procedural violations)<sup>19</sup> as the dominant source of risk and the difficulty in capturing the influence of organizational performance-shaping factors. To address these challenges, proactive risk assessment initiatives in healthcare must be informed by the disciplines of human factors engineering and psychology,<sup>20,21,22</sup> behavioral psychology,<sup>23</sup> and organizational risk management.<sup>24</sup>

#### 4. Methods

This study was a collaboration between the Medicare Quality Improvement Organization for the States of Nevada and Utah, a clinical consultant in home health practice and science, and four Utah home health agencies. It built upon earlier work in characterizing systems and process failures that can lead to ACH in home health. This used process mapping and input from SME collaborators to develop a fault tree model representation of the types of failures, and combinations of failures, required for the occurrence of ACH. In this study, failure rate estimates were added to the fault tree analysis to produce a comprehensive and quantified risk model. Data sources for failure rate estimates were derived from SME and human factors/human reliability analysis and calibrated through structured review of 195 unplanned hospital admissions from home health patients. Study activities were evaluated for their potential in promoting effective sensemaking and organizational learning. Study findings are being communicated through a peer-reviewed publication focused on the needs of home health providers and through other channels. Patient HHA staff confidentiality was protected under a study protocol approved by an independent Institutional Review Board.

##### *Collaborators/Study Sites*

HealthInsight, the non-profit Medicare Quality Improvement Organization (QIO) for the States of Nevada and Utah, was responsible for the design, conduct, and administration of the study. The HealthInsight study team consisted of the Principal Investigator and Study Director, Study Coordinator, Data Analyst, Medical Advisor, and Administrative Support. The study team also included an expert home health nurse consultant.

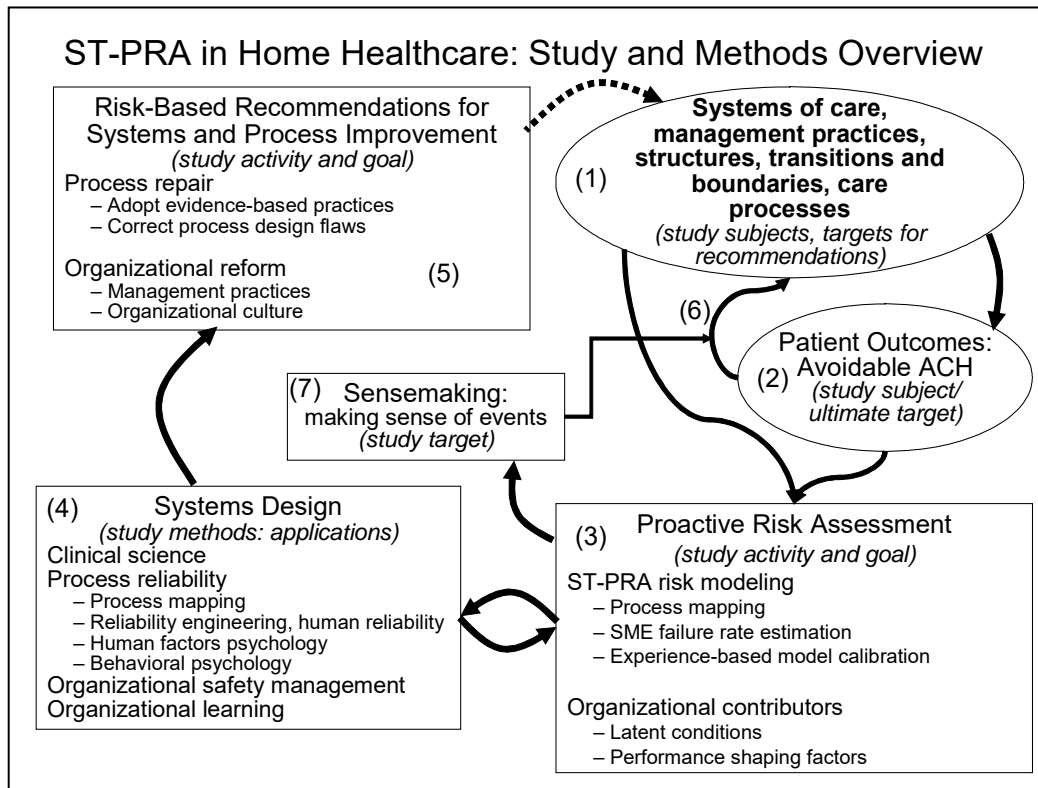
Five of Utah's 53 Medicare-certified HHAs partnered on this study. Four branches of one of these agencies participated, each of which was treated as a separate analysis unit, resulting in a total of eight participating agencies. These partners served both rural and urban areas and a diverse patient population. As is typical for Utah HHAs, participating HHAs had ACH rates somewhat lower than the national average. Collaborating HHAs committed to:

- Participating in a 1-day orientation and training session;
- Identifying episodes of care that resulted in unplanned hospital admissions, provide access to patient records to the study team;
- Participating in structured reviews of identified episodes of care (review to include study team, agency management or quality management staff, and direct patient care staff);
- Using findings from the structured reviews only for systems improvement purposes;
- Participating in a review of process failure patterns identified in reviews of identified episodes; and
- Providing feedback on study methods, materials, and findings.

##### *Study Procedures*

This study was an active collaboration across disciplines and perspectives. The ST-PRA model provided a representation of the challenges and complexity of AHC that could be shared among collaborators. As elaborate as that model was, at best, it could be no more than a useful simplification of the home health provider's (and patient's) reality. To ensure that it was useful, study methods emphasized interactions between collaborators to promote a shared appreciation for the demands and challenges of patient care in the home setting. Although study activities centered on the development and calibration of a ST-PRA model for ACH, it was anticipated that these activities themselves might provide opportunities for learning and insights into organizational functioning that are difficult to capture through risk modeling. These outcomes were also documented and assessed. Figure 1 provides an overview.

Figure 1. Study Overview



*The subjects of this study were (1) systems, structures, and processes associated with home healthcare and (2) the resulting patient outcome of avoidable ACH. Our examination employed (3) proactive risk assessment methods: we used ST-PRA risk modeling to represent the relationships between process failures and avoidable ACH and assessed organizational contributors to ACH risk. Lessons learned through proactive risk assessment were used to develop (5) risk-based recommendations for improvement. All study activities applied (4) the scientific disciplines of clinical systems design, including clinical science, human factors, and organizational safety management. Finally, the impact of study activities on (7) home health sensemaking about (6) the relationship between avoidable ACH and systems of care were assessed. The impact of implementing recommendations (5) on (1) system and (2) patient outcomes is beyond the scope of this study.*

**ST-PRA risk modeling** The ST-PRA risk model was based on earlier fault tree analysis work that categorized the types and causes of ACH in home health. Development followed these phases:

- Fault tree introduction and review. To initiate the study, all collaborators convened for a 1-day orientation and review of the fault tree. This orientation included an introduction to fault tree analysis principles, fault tree model structure and logic, and failure rate estimation using treatment record review. The initial fault tree categorized hospital admissions as:
  - unavoidable hospitalizations
  - inappropriate admission to home care
  - unnecessary hospital admissions
  - avoidable admissions (due to)
    - care plan development failures
    - care plan execution failures
    - patient monitoring failures

- Structured review of unplanned hospitalizations. Risk data and process failure rates were derived from structured review of 195 unplanned hospitalizations from collaborating home health agencies. Review procedures and data collection forms were developed by the study team, with the structure for the review following the logic of the fault tree. The review itself depended on expert clinical judgment – for example, to ascertain the preventability of hospitalization, adequacy of care planning, and appropriateness of monitoring. It used a systems perspective to classify the nature of failures identified. It required the active participation of home health visit staff to provide insights not captured in treatment records. Reviews were conducted onsite (when possible) at the offices of collaborating HHAs using the following procedures:
  - Review sessions were scheduled to examine the most recent 15 unplanned hospital admissions. The Study Coordinator assisted participating HHAs in selecting appropriate cases for review.
  - Treatment record review was conducted under a protocol approved by an independent Institutional Review Board. The protocol included provisions to protect patient, provider, and caregiver confidentiality. In addition, under the study protocol, collaborating HHAs were required to agree not to use information gathered in the course of review for disciplinary actions (except for circumstances of reckless provider behavior).
  - Full-day review sessions were conducted two times at each participating HHA\* (about 4 months apart). These sessions generally followed this procedure:
- 9AM to 1PM: Clinical and systems review – Clinical Consultant, Study Coordinator, and Principle Investigator review HHA treatment records for patients who experienced an unplanned hospital admission. The review process considered:
  1. Time (in days) from start of care to hospitalization
  2. From transfer form, re-certification, and other available documentation: hospital admitting diagnosis/reason for hospitalization
  3. From HCFA 485 form:
    - a. Diagnoses – to identify active patient issues, assess frailty/potential for change in condition
    - b. Medications – including number of medications, medications potentially indicative of active diagnoses that were not listed
    - c. Care plan – disciplines, skills, activities, and scheduled visit frequency
  4. From OASIS (start of care or recertification):
    - a. Admission and living circumstances – especially: where admitted from, place of residence, family/caregiver support
    - b. Clinical assessment – especially, but not limited to:
      - i. Dyspnea
      - ii. Cognitive and behavioral functioning
      - iii. Activities of daily living and instrumental activities of daily living functioning
  5. Visit notes:

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\* For one agency, only one onsite visit could be scheduled. The remaining reviews were conducted offsite.

- a. Timing of visits – days from hospital discharge to first visit, visits conducted in accordance with care plan, use of “as needed” visits
  - b. Care documentation and monitoring
  - c. Changes in condition and response noted
6. Physician orders (especially):
- a. Nature of referral

Not all elements were considered in every review. For example, if a hospital admission followed a brief home health episode and was for a new diagnosis, the OASIS was typically not reviewed in detail. Similarly, a clinical review that did not include review of visit notes could often identify hospital admissions as resulting from complications from a previous care setting. On the other hand, we found that sometimes services were provided in excess of the care plan and therefore reviewed the visit notes to ascertain the actual care provided when care planning failures were suspected.

The reviews produced tentative findings on preventability of hospitalizations and, for those considered to be preventable, the nature of the associated process failure(s). The reviews did not include an explicit algorithm to determine preventability. Instead, assessment of preventability was based on clinical judgment using the following criteria (all had to be met):

- The reason for the hospitalization was sensitive to care practices.
  - Care records reflected a deviation from the standard of practice related to the reason for hospitalization. That is, the criterion was not “something else or something more could have been done” but rather, “practice standards required different actions.”
  - The deviation from the standard of practice was likely to be causally associated with the clinical deterioration and hospitalization the patient experienced.
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- 1PM-2PM: findings review and planning. The entire study team, including HHA collaborators, reviewed initial findings, clarified questions unresolved in clinical and systems review, and identified requirements for additional input from front-line staff.
  - 2PM-4PM: visit staff perspectives. The study team met with visit staff to gather additional information on causes and contributors to avoidable hospitalizations.
  - 4PM-5PM: systems review and de-brief. Following a model outlined by Reason,<sup>25</sup> root cause analysis (RCA) of preventable hospital admissions was conducted. This analysis sought to identify organizational causes of the actions and decisions of visit staff that may have contributed to preventable ACH. For example, if problems were identified in care planning for a patient or for multiple patients at an agency, RCA would review expected systemic determinants of care planning performance.<sup>26</sup> Data sources included interviews with visit staff and management, training and orientation materials, quality management processes, policies and procedures, and quality assurance processes.



Findings from this review were used to refine the fault tree structure, derive failure rate estimates, and identify the major sources of risk for unplanned and/or avoidable hospitalization.

***ST-PRA development and systems-based review of unplanned hospitalizations as sensemaking facilitators.***

Sensemaking or “making sense of events,”<sup>27,28</sup> within HHAs may follow when patients experience unplanned hospitalizations. The nature and processes of sensemaking, the sense that is made of these events, and the contribution of sensemaking to improved patient care, is not known with any certainty and was not the primary focus of this study. Previous HHA interactions suggest, however, that the sense made of such events is that they are either inevitable, caused by others and outside the control and influence of the HHA, the exasperating product of failures of individual front-line staff, or the result of a set of circumstances that is unforeseeable in the course of HHA care planning. This sense may be so pronounced that unplanned hospitalizations occasion little surprise, causal investigation, or organizational learning. We hypothesized that participation in study activities may serve as a facilitator to effective sensemaking and would modify the sense that participating agencies make of the events reviewed (and, indeed, the sense made of a wide range of organizational practices). Near the close of the study, collaborating HHA leads were interviewed by the Principal Investigator about the impact of study activities on their capacity for organizational learning.

***Risk-based recommendations for systems and process improvement to reduce avoidable hospitalization among home health patients.*** The ST-PRA modeling process used in this study, one that combines probabilistic risk assessment, human performance/reliability analysis, and identification of organizational contributors, provided information on the source and nature of risk for ACH in the home health setting. This process isolated the processes, tasks, and organizational practices that represent key leverage points for improvement initiatives. From this, improvement strategies were developed that matched the nature of the process failures observed and anticipated the challenges of implementing these strategies. The study team developed and reviewed with collaborating HHAs a set of improvement recommendations.

***Limitations***

Key challenges in merging clinical and reliability engineering perspectives include the perceived applicability and validity of the engineering approach by clinicians and the lack of appreciation for the complexity of clinical work from the engineering side. This study anticipated these challenges in its structures and processes. The study team included a depth of clinical expertise and a Principal Investigator with technical skills and experience translating technical approaches and concepts for use in healthcare settings and by healthcare professionals. Study procedures, including focused dialogue between investigators and providers, provided the basis for a rich exploration of the context of care.

There are important study limitations that merit note, these are primarily related to the scope of the study and include:

- A calibration sample of 195 unplanned hospitalizations provides limited precision in failure rates estimates, particularly for less frequently observed process failure pathways.
- As this study selected review cases based on unplanned hospitalizations, it provided limited information on the effectiveness of failure recovery and harm mitigation processes – including management oversight, case conference, and other mechanisms.
- This study involved HHAs from only one state: Utah. Utah HHAs consistently achieve some of the lowest (and, often, the lowest) risk-adjusted ACH rates in the nation for the Medicare population. Reasons for low ACH rates are not completely known but are likely to include both factors within and beyond of the direct control or influence of home health providers. Higher rates of preventable or unnecessary hospitalizations might be observed in a similar study conducted in a state with higher ACH rates.

- Though it is recognized that significant risks for ACH in home health originate outside HHA processes, this study only directly involved HHAs. Study methods allowed assignment of cause to these outside sources but did not support in-depth analysis of system causes across transitions of care or between providers.
- Acute care hospitalization is an important, but limited, patient outcome. This study did not examine patient mortality, satisfaction with the experience of care, other adverse outcomes, or functional status at discharge.
- This study provided an incomplete view of organizational resiliency; that is, it focused analysis on unwanted outcomes, not on unexpected successes.
- Data sources did not include patients' perspectives or direct observation of care provided.
- The treatment record review team did not include a physician or a clinical pharmacist. Both would be expected to have provided complementary insights during treatment record review.
- Patients were not followed post-discharge from home health services. Hospitalizations arising from inappropriate home health discharge or failures in preparing for the transition to self care were not included in our study.

## 5. Results

Every collaborating HHA participated in all study activities, including the orientation meeting, treatment record reviews, management interviews, staff focus group feedback sessions on study findings, systems review, and a findings review meeting at the conclusion of the study. More than 90% of the 195 home care treatment record reviews completed were conducted, according to plan, onsite at participating HHAs. A branch of one HHA canceled a site visit. Half of the reviews for that agency were conducted offsite with no opportunity for direct feedback from agency staff.

### *Treatment Record Review – Causes of Unplanned Hospitalizations (see Figure 2)*

Panel A (upper left) shows the overall findings of the treatment record review. The categories shown are mutually exclusive. The majority of unplanned hospitalizations reviewed (134 of 195; 68.7%) were assessed as necessary and unavoidable – indicating no exception to recommended home health practice or other failure in clinical process was identified as a cause of the hospitalization. We observed three cases (1.5%) wherein we assessed the hospitalization to have been unnecessary given the patient’s condition and the treatment provided in the hospital. In four cases (2.1%), the referring physician would not authorize needed home care services.\* Eight unplanned hospital admissions (4.1%) resulted from inappropriate admission to home healthcare. Finally, in 46 cases (23.6%) the unplanned hospitalization was determined to be the result of care process failures.

Panel B (lower left) details the nature of the hospitalizations assessed to be necessary and unavoidable. Of the 134 necessary and unavoidable hospitalizations reviewed, 105 (78.4%) could be traced directly to the patient’s recognized underlying condition. In eight cases (6.0%), the hospitalization resulted from complications of care provided in a previous setting. In 19 cases (14.2%), hospitalization resulted from a new or previously unrecognized diagnosis. Two hospitalizations (1.5%) were the result of injuries that were unrelated to home care.

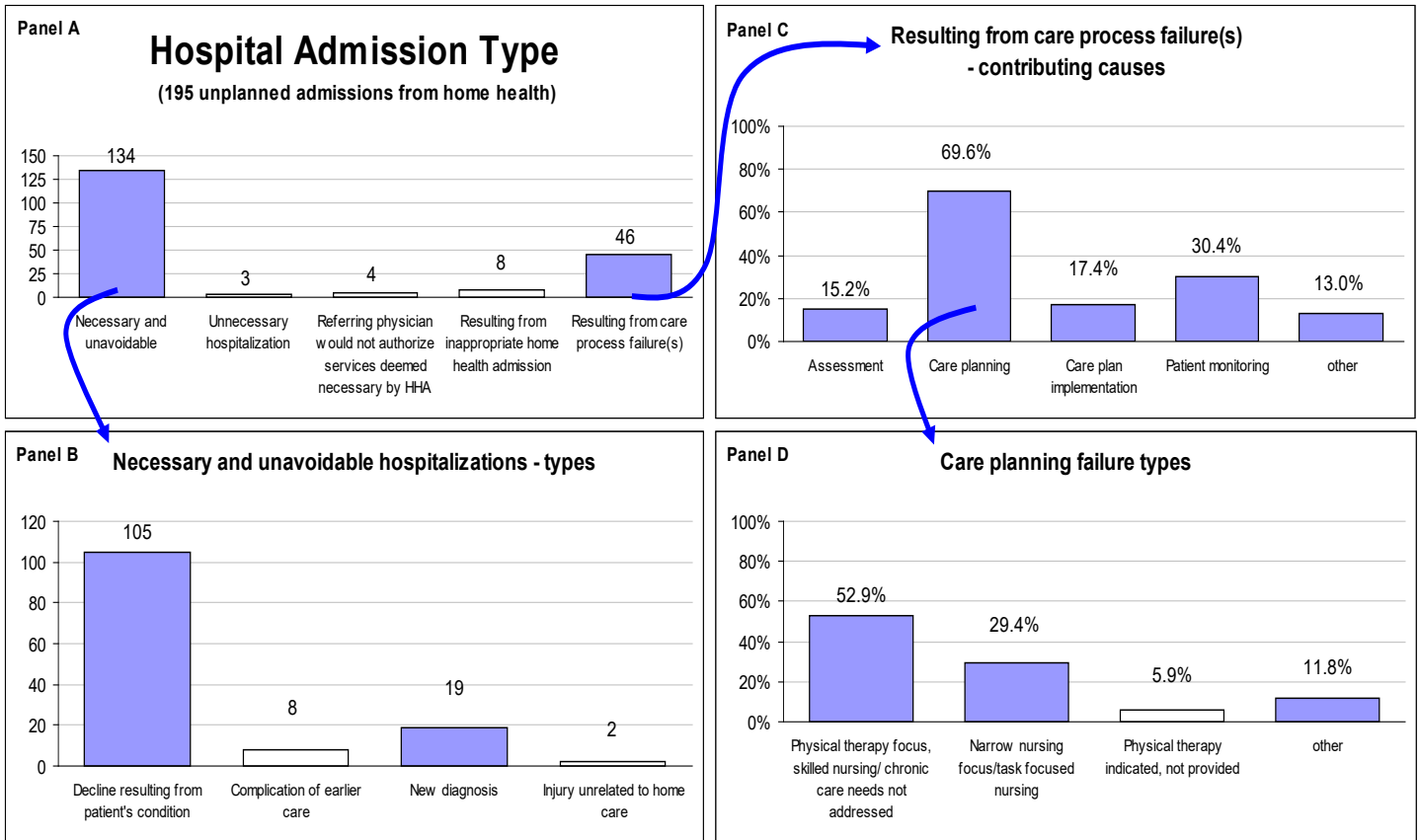
Panel C (upper right) details the care process step(s) that contributed to the preventable hospitalizations. Review methods allowed assignment of multiple contributors. The dominant failure mode identified was care planning, implicated in 69.6% of cases, followed by failures in patient monitoring (30.4%), care plan implementation (17.4%), start of care assessment (15.2%), and other processes (13.0%).

Detail on care planning failures that contributed to preventable hospitalizations is provided in Panel D (lower right). These failures represent a mismatch between the patient’s needs and the skills included in the care plan. In more than half of these cases (52.9%), the care plan focused on physical therapy, with less than adequate response to the patient’s need for skilled nursing (especially for chronic conditions and complex care management). About a quarter (29.4%) employed care plans with a narrow, task-focused, nursing approach. In two cases (5.9%) physical therapy skills were indicated but not included in the care plan, and the patient experienced a preventable decline and hospitalization as a result.

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\* This category was added during the course of review.

**Figure 2. Treatment Record Review Findings**



**Agency/Visit Staff Response to Review Findings**

Study methods allowed for clarification and direct feedback on review findings in focus groups with home health staff, supervisors, and managers involved in these cases. In about 7% of all cases reported above, the findings reported above were revised based on additional information provided by HHA staff. One participating HHA disputed our findings and interpretations of applicable care standards related to hospitalizations resulting from care process failures at their agency. The figures reported above include these disputed findings.

Appropriate and unavoidable hospitalizations – We had no cases wherein agency staff disagreed with a determination that a hospitalization was unavoidable, although this was not a focus area for our feedback sessions. There were a few cases that, based on treatment records alone, were originally classified as preventable but were re-classified as appropriate and unavoidable based upon feedback from agency staff.

Inappropriate admission to home healthcare – These cases often resulted in hospitalization within a few days. When we reviewed them with agency staff, in every case there was agreement that accepting the admission was inappropriate or at least questionable. Our review clearly identified tension between the role of home health and the duty nurses feel toward their patients. Some focus group participants characterized refusing such admissions as being akin to “abandoning” patients or noted that patients have the right to refuse transfer to skilled nursing. Our clinical co-investigator noted that the actions of field staff effectively accommodated an unsafe patient care choice. These are clearly difficult situations for field staff. This was not found to be a focus area in agency training and orientation, ongoing peer review, or quality management.

Less than adequate scope or intensity of care plan – This was a key finding from this investigation.

In these cases, we observed a mismatch between the patient's condition – with multiple chronic conditions, complex medication regimen, and/or uncertain stability in clinical status – and the services ordered in the care plan. Specific care plan patterns observed in this category included:

- Physical therapy (with or without home health aides) with insufficient skilled nursing visits.
- Task-based nursing skills ordered and provided – without “observation and assessment of the patient's condition when only the specialized skills of a medical professional can determine patient's status” or “management and evaluation of patient care plan” (although these nursing services were indicated).
- No physical therapy ordered for a fall risk patient.

Observations and insights from feedback focus groups included recognition and agreement that a broader scope or greater intensity of services was indicated in these cases. It was not provided because:

- Home health field staff, supervisors, and/or managers did not have advanced knowledge of relevant Medicare coverage guidelines. Management and care planning practices were driven by incomplete or inaccurate mental models of Medicare coverage and, to some extent, the specialized professional discipline of home health nursing. These practices and mental models were formed and are maintained as organizational characteristics without reference to (and, in some cases, knowledge of) the original source documents (that is, the Federal Register and/or published nursing standards). OASIS training programs are often the key information source. Assessment of organizational practices, including review of training and orientation materials, confirmed this finding.
- Agency cost-management practices – that is, a deliberate and strategic approach. It is important to note that, in all cases, this approach was thought to be necessary for the continued viability of the agency. These practices appear to have been adopted without working and practical knowledge of Medicare coverage guidelines or in response to concerns about claims denials by Medicare's fiscal agents applying different standards to home health coverage.

In the focus group reviews, reaction to these findings was mixed and in some cases there was sharp disagreement. Many participants were surprised to learn of Medicare home health coverage guideline details and that this information was readily accessible. Physician practice regarding home health services was a frequently mentioned barrier to more comprehensive care planning. The key concern voiced, however, was that the care standard implied by our review was inappropriate, impractical given resource constraints, incompatible with Medicare home healthcare coverage policies as implemented, and/or would place the long-term viability of the agency at risk.

Start of care assessment less than adequate – These are cases wherein important aspects of the patient's condition were not identified and/or appreciated during the assessment. The most typical form of this care process failure was a physical therapy admission of a post-surgical patient with skilled nursing needs stemming from multiple chronic conditions and a complex medication regimen. The physician referral is usually for physical therapy (only) and these aspects of the case are handled appropriately. Agency policy and usual practices didn't require or promote a nurse assessment in these situations. The patient's skilled nursing needs were not fully appreciated in an assessment using this process and the patient experiences preventable decline. (We noted cases, however, wherein nursing was called in following start of care.) These cases appear to be somewhat specific to practices, case mix, and policies at particular agencies.

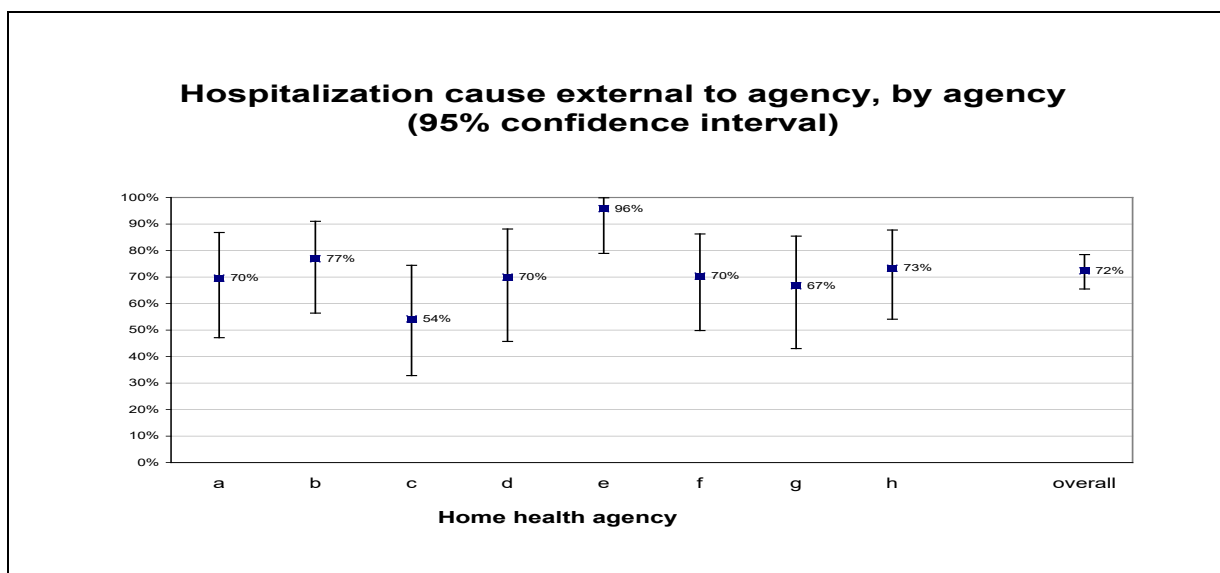
Patient monitoring less than adequate – As primary causes, these care process failures typically were of the form of an inadequate response to observed changes in the patient's clinical status. The change was noted by visit staff, but the physician (or nurse) was not notified. Focus group participants generally agreed with these findings. As secondary causes, these care process failures resulted from infrequent skilled nursing visits.

**Physician plan** – When this care process failure was noted as a secondary or contributing cause, it was usually based on a narrow scope of services ordered by the physician (generally physical therapy only). We considered this to be a secondary or contributing cause based on the premise that it is the responsibility of the agency to effectively communicate patient assessments and needs to avoid these situations. Focus group participants noted that some physicians insist that only a narrow range of services should be provided by home health.

*Agency-Specific Results*

We prepared agency-specific performance profiles defined as the proportion of unplanned hospitalizations with identified causes within the direct control of the agency. Unavoidable hospitalizations, unnecessary hospital admissions, and hospitalizations associated with physician refusal to authorize needed services were considered to be outside the direct control of the agency. Figure 3 shows the distribution of hospitalizations with causes external to the agency. Overall, we assessed 72.3% (95% confidence interval: 65.4% to 78.5%) of the unplanned hospitalizations reviewed as having causes external to the HHA. By agency, point estimates ranged from a high of 95.8% (agency “e”) to 54.2% (agency “c”).

**Figure 3. External Causes of Unplanned Hospitalizations**



*Study Activities as Sensemaking Facilitators*

At the conclusion of the study, all collaborating HHAs participated in a 6-hour meeting, at which we reviewed findings and gathered feedback on study activities. The consensus of the participants was that the study activities – especially the feedback sessions with visit staff following structured treatment record reviews – were, in themselves, valuable learning experiences for staff and management. Participants described a change in their appreciation for the potential for learning from unplanned hospitalizations; some had expanded ongoing quality management activities to include structured review of these events. Agencies noted the value of this process in highlighting recognized issues. Most reported having re-evaluated organizational practices and implemented process changes as a result of participation in the study.

*Recommendations*

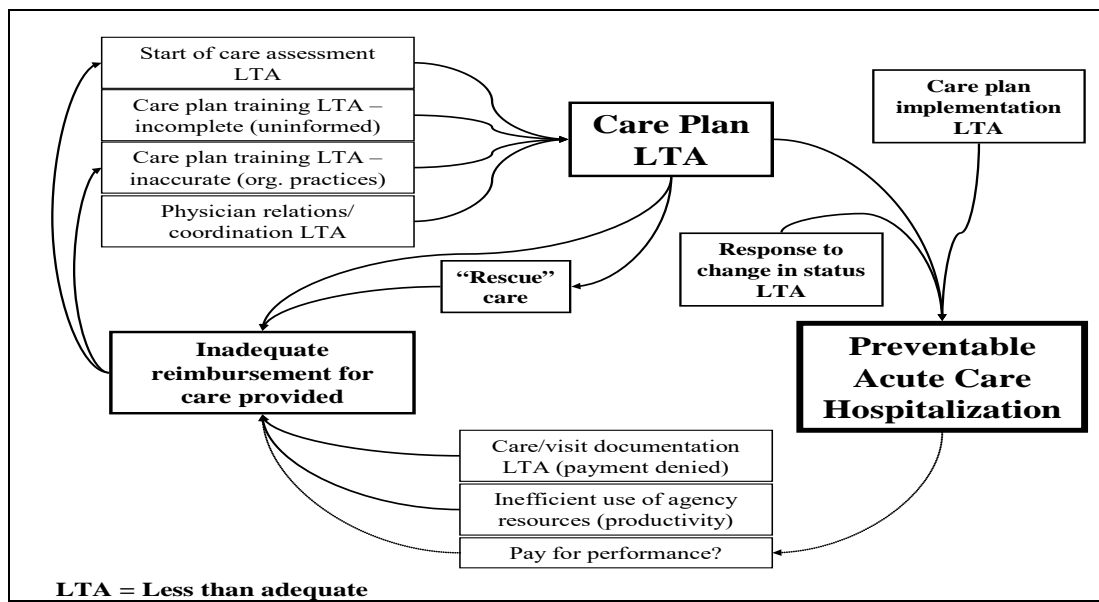
The key findings from this study suggest a particular pathway that may place home health patients at elevated risk for preventable hospitalization. It begins with a patient who has complex or comprehensive care needs but is referred for narrow, simple, or task-focused home care services. The patient continues on this pathway if their complex or comprehensive needs are not identified and addressed through assessment and care plan development.

This can happen when:

- There is no assessment by the appropriate discipline (typically nursing),
- The assessment is focused too narrowly on the referred-for care, or
- Care planning is not responsive to problems identified through patient assessment, because
  - Visit staff do not know how to develop comprehensive care plans consistent with benefits policy, or
  - Agencies avoid the use of more comprehensive services in these circumstances out of fear of payment denials.

This study also suggests another patient population at risk: patients denied access to home health services entirely because of misapplication of Medicare coverage guidelines. A causal model for preventable home health hospitalizations, drawn from our study findings, is shown in Figure 4. The interactions between management systems and clinical processes can be characterized as an “engine” that produces preventable acute care hospitalizations. This is a characterization that applies only to the at-risk minority of home health episodes; the majority of home health episodes do not include hospitalization at all and most hospitalizations that do occur are not thought to be preventable. The key elements are:

**Figure 4. Preventable Hospitalization “Engine”**



1. Care Plan Less Than Adequate (LTA) – The dominant proximal cause of preventable hospitalization was found in care planning. Because the scope and/or intensity of the services ordered did not meet the needs of patients, they experienced avoidable decline in status such that hospitalization was required. We hypothesize that inadequate care planning has a negative impact on agency functioning and financial viability. When shortcomings in the original plan are recognized, the agency provides additional (unplanned or rescue) monitoring and care services. This effect would be expected regardless of whether the patient was ultimately hospitalized. These factors feed into the “inadequate reimbursement for care provided” model element. In almost every case, the performance of front-line staff charged with care planning was consistent with their agency’s standard practices. Because of this, the results (patient decline, rescue care, preventable hospitalization) were not identified as failures or opportunities for learning by the agency.

We identified the following as causes of inadequate care planning:

- Start of care assessment LTA. These included (1) assessments of patients with complex care needs (e.g., multiple chronic conditions, polypharmacy) preformed and consistent with agency policies, by physical therapists and (2) nursing assessments that fail to fully capture the patient’s condition and care needs.

- Care plan training LTA – incomplete (uninformed). In these cases, the training and orientation provided to staff charged with developing care plans was incomplete. For example, training did not include detailed review of the Medicare home care coverage guidelines for “observation and assessment of the patient's condition when only the specialized skills of a medical professional can determine patient's status” or “management and evaluation of patient care plan.” Frequently, staff recognize the patient’s need for these skilled services but believe that they are not covered.
  - Care plan training LTA – inaccurate (organizational practices). In these cases, the training and orientation provided to staff charged with developing care plans was inaccurate regarding Medicare home care coverage guidelines and focuses on agency cost management strategies (especially limiting skilled nursing visits).
  - Physician relations/coordination LTA. In these cases, care plans were developed in accordance with the orders of the treating physician although in the opinion of the agency staff involved, additional skills or care services were indicated. Agencies had not established procedures to ensure patients’ needs were fully addressed in the care plans in these circumstances.
2. Care plan implementation LTA and Response to change in status LTA – These proximal causes of preventable ACH were less frequently observed. They represent breakdowns in performance reliability and coordination of effort. No agencies employ processes for detecting and correcting these breakdowns such that the impact on the patient could be mitigated. None have processes for systematically identifying and learning from such failures.
3. Inadequate reimbursement for care provided – Maladaptive organizational responses to this condition are hypothesized to be a major latent cause for preventable hospitalization. Management efforts to reduce costs of providing care distort clinical practice. Skilled nursing visits are a typical target. Cost-cutting strategies appear to have been pursued with limited understanding of the Medicare coverage guidelines and appreciation for the impact that factors within the control of the agency have on reimbursement levels. Beyond the effects of inadequate care planning, his condition is exacerbated by:
- Care/visit documentation LTA. When field staff have not been trained in the Medicare coverage guidelines, they do not have the knowledge and skills to plan, conduct, and document patient care that it is consistent with those guidelines. This leads to coverage and payment denials.
  - Inefficient use of agency resources (productivity). We hypothesize that this latent cause stems from misaligned incentives and inefficient process design.
  - In the future, pay-for-performance initiatives may create additional problems in this area.

The implications of this study diverge from approaches that feature prominently in the home health quality improvement field: the CMS Home Health Quality Improvement National Campaign and the Briggs® National Quality Improvement/Hospitalization Reduction Study. Although these approaches employ the best thinking of clinical experts and provide sound advice on practices home health agencies can consider for preventable hospitalization reduction, they do not fully articulate or address the organizational drivers of current practice and lack the precision that is provided by this risk-informed strategy. For example, both approaches promote a strategy of “front-loading” visits – that is, scheduling more frequent home care visits early in an episode of care. Neither approach articulates which skilled services covered by the Medicare benefit will be provided in those visits (e.g., an agency cannot simply increase the frequency of wound care), how to document the need for those services and the care provided, or the reasons that agencies have adopted their current practices. 16



## ST-PRA IN HOME HEALTH CARE

Both approaches assume a solid foundation of basics, which our results suggest may be lacking, and give high priority to what appear – from this study’s risk perspective – to be low-yield improvement strategies.

### *Conclusions*

The findings on preventability of hospitalizations, with perhaps 65-70% being unavoidable and appropriate, increases the precision of our understanding of the performance gap in this setting and outcome. A 30% estimate for ACH preventability translates to over 135 hospitalizations and \$685,000 annually in avoidable hospital costs to Medicare Part A for just the five Utah HHAs participating in this study.

The nature of the performance failures provides even greater insights. These findings suggest that most preventable hospitalizations are not surprises resulting from occasional disturbances in what are otherwise sound processes; rather, they are the inevitable product of inadequacies in fundamental approaches to clinical and agency management practices. This pattern was observed at seven of the eight sites studied; it suggests interventions that target organizational and practice reform rather than clinical process repair.

## **5. Publications and Products**

A manuscript describing this study has been accepted for publication in a peer reviewed home healthcare journal – citation:

Silver MP, Ferry RJ, & Edmonds CE. Causes of Unplanned Hospital Admissions – Implications for Practice and Policy (in press).

Findings from this study have been presented at three conferences:

Silver MP, Ferry RJ, & Hartman A. *Socio-Technical Probabilistic Risk Assessment in Home Health Care*. National Association for Home Care & Hospice Annual Conference. October 13th, 2008; Ft. Lauderdale, FL.

Silver MP, Edmonds CE, & Ferry RJ. *Socio-Technical Probabilistic Risk Assessment (ST-PRA) in Home Health Care* (poster). 2008 Agency for Healthcare Research and Quality Annual Conference. September 8<sup>th</sup>, 2008; Bethesda, MD.

Silver MP. *Causes of Avoidable Hospitalization in Home Health – Preliminary Results from a Field Study*. American Healthcare Quality Association's Annual Meeting. February 28, 2008; San Francisco, CA.

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