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Contents

It's in the Fridge: The Practices of Older Adults in Managing Advanced Directives and Other Emergency Information

Anne M Turner, Katie Osterhage, Andrea Hartzler, George Demiris

ALTHOUGH there is a growing emphasis on the value of emergency planning through mechanisms such as advanced directives and standardized emergency forms, research has not examined how older adults gather and manage this information, or how they share this information within social support networks, retirement communities, EMS and clinical care systems. Research in this area would be particularly important for ensuring people's preferences are known to EMS at the end of their life. As part of our larger AHRQ funded SOARING (Studying Older Adults & Researching Information Needs & Goals) project, investigating the health information management practices of older adults, we explored the types and management of advanced directives and emergency information among older adults.

Methods: We conducted 60-90 minute in-depth interviews with 90 older adults (60 years and older). We recruited participants from retirement homes, senior centers and assisted living facilities. Participants were asked structured and open-ended questions about their needs and practices around managing personal health information. We recorded, transcribed, and coded interviews looking for themes using a Grounded Theory approach.

Results: Emergency planning materials were frequently mentioned by older adults in reference to managing personal health information. The most frequently occurring types of emergency planning materials included: advanced directives, medication lists, emergency contact information, and standardized POLST (Physician Orders for Life-Sustaining Treatment) forms. 71% (60 out of 84) of participants indicated that they have some type of emergency information in their place of residence. Of these people, 43% manage this emergency information independently, and 57% do so with varying levels of involvement from others, such as family, friends, and/or staff at a retirement community. Emergency planning materials were often initiated by retirement homes or assisted living facilities. Demographically, advanced planning increased with age (p=.05), and education level (p=.03). Many participants posted emergency planning materials in their living space; most commonly, this information was located on or in their refrigerator or on the back of the front door. A variety of reasons were given for why older adults don't have emergency planning materials. Many participants mentioned they simply don't keep emergency information updated. Some explained this was because they are currently healthy and do not anticipate emergencies. Other participants did not keep emergency information because such preparations make them feel "old". Others expressed uncertainty in their decisions regarding advanced directives.

Discussion: Emergency planning materials are an important aspect of health information management among older adults. Information systems designed to maintain health information should take into consideration the needs and practices of older adults to maintain advanced directives and other emergency information. Given that many of our participants managed emergency information collaboratively, an important function of these systems would be to allow older adults to update information easily as well as to grant viewing/editing capabilities to the person(s) of their choice. Because our participants primarily maintained emergency planning materials in a physical form, when designing digital systems, consideration must be given to how this information would be made available to first responders.

Conclusion: Our research indicates that use of emergency planning materials is an important, but understudied, activity of older adults. Taking into consideration the information management practices and needs of older adults, caregivers, emergency personnel, and other key stakeholders will be critical to designing clear and up-to-date emergency materials which meet the needs of older adults. Specifically, home care and hospice care providers will benefit from training that addresses how to acknowledge and integrate these information needs into the care plan. Furthermore, this information can be used to educate and support family members and other informal caregivers in their care of older adults.

Patient Health Goals Elicited During Home Care Admission: A Categorization

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Home care agencies (HCA) have numerous patient engagement opportunities to manage the patient's symptoms and provide much needed health services. Despite these services, HCA patient rehospitalization rates exceed 20% for numerous health conditions.[1] Patient engagement entails patient-clinician interaction and patient participation in managing his/her health to achieve desired health goals.[2] In home care, a program of patient self-management goal elicitation with behavioral change was shown to decrease hospital readmissions and improve health outcomes.[3] Our objective was to categorize elicited patient health goals and identify "clinically informative" goals at a community based HCA.

Methods: The research team with a HCA partner examined patient goals that admitting clinicians documented in the point-of-care electronic health record (EHR) during a 5-month pilot project in 2015. The closely-held for-profit HCA operates over 300 offices in 22 states. Admitting clinicians were employed by the HCA and were predominantly nurses (76%) and physical therapists (23%). Patient goals were available in a text string in a de-identified Excel file that the HCA extracted from their EHR. To develop a coding scheme, a researcher (PS) conducted content analysis on patient goal data: 1-assigned themes to the first 100 patient goals; 2-grouped themes into codes; and 3-specified code categories. A home care nurse (KR) reviewed the coding scheme. PS assigned a goal code to every 10th patient: Sampling was used due to resource constraints. Records without a patient goal were tabulated. PS added new codes that emerged to the coding scheme that KR reviewed. Subsequently, KR and the physician researcher (EC) reviewed the coding scheme independently to identify codes that were informative to their disciplines (clinically important).

Table. Patient Elicited Health Goals Themes

Categories	Occurrences/ Importance
Quality of Life	
Feel better	1 (0%)
Stay in home	5 (2%) ♣
Activities of Daily Living	
Ambulation	24 (9%) ♣♦
Transfer	5 (2%) ♣♦
Strength/endurance	12 (5%) ♣♦
Safety/falls	59 (18%) ♣♦
ADL activities; increase independence	22 (9%) ♣♦
Improve /communication	1 (0%) ♣
Health Management	
Manage disease process	23 (9%) ♣♦
Wound healing	17 (7%) ♣
Manage meds activities	12 (5%) ♣♦
Avoid re-hospitalization	3 (1%)
Mental health	2 (1%) ♣♦
Knowledge of disease process	26 (10%) ♣♦
Free of infection	19 (7%) ♣
Nutritional status	1 (0%) ♣♦
Pain control	15 (6%) ♣♦
Heal	3 (1%)
Have needed surgery	1 (0%)
Better cognitive function	1 (0%) ♣♦
Blank Patient Goal	(8%)

Identified as clinically important by: home care nurse expert♣; primary care physician expert ♦

Results: Of the 1,763 patient records, 8% had no recorded patient goal. After content analysis of 122 records, the coding scheme totaled 20 codes among 3 categories as shown in the table. In the sample of records with patient goals, there were 1 to 4 goals documented in each record, for a total corpus of 253 goals. Most goals were phrased in clinician vernacular (e.g., "increased ambulation") and 6 were in a patient's voice (e.g., "to be able to walk again"). Codes identified as clinically important to both the nurse and physician experts were equally distributed among the Activities of Daily Living (ADL) and the Health Management (HM) categories with no Quality of Life codes selected. There were 5 clinically important codes that also occurred most frequently: safety/falls (ADL, 18%); ambulation (ADL, 9%); ADL activities (ADL, 9%); manage disease process (HM, 9%); knowledge of disease process (HM, 10%).

Discussion: The absence of the patient's voice and less than universal recording of home care patients' goals indicated differential clinician documentation of elicited patient goals. Consistent communication of the intent and operationalization of patient goal elicitation by HCA leadership may address differential documentation. In addition, clinician training may be advisable to have clinicians understand why they are asking patients about their goals.[3] Findings also suggest that the most frequently occurring codes were codes identified as clinically important for both home care nurses and primary care physicians. These findings indicate a shared perspective about the importance of specific clinical information in the treatment of home care patients; however, a Norwegian study found differences in perspectives.[4] Future research should include perspectives from other disciplines, such as physical therapists.

Conclusion: Research is needed to identify the most effective approach to operationalize patient goal elicitation; clinically

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important goals using a larger group of clinicians; and optimal dissemination of this information in patient care. Useful research would also be to identify associations between elicited patient goals, nursing interventions, and outcomes.

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Natural Language Processing and Speech Recognition: Technology Overview and Potential Applications in Homecare

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THE presentation will discuss several emerging methodologies that have a potential to significantly enhance the meaningful use of clinical data. First, each technology (natural language processing and speech recognition) will be briefly introduced with conceptual and practical key concepts. Then, we will overview several recent projects that use natural language processing to extract meaning from free text clinical narratives, including depression detection, heart failure self-management status extraction, and using socio-behavioral characteristics to improve readmission predication models, among others. Applications and unexplored venues of natural language processing in homecare will be highlighted. We will also review the emerging field of speech recognition and discuss its various potential applications in homecare, including automated interaction with the patient or tools to facilitate workflows and make clinician's work more efficient. Examples throughout the presentation will use projects conducted by Drs. L. Zhou and M. Topaz with MTERMS- a natural language processing engine developed at the Harvard Medical School and Brigham Women's Health Hospital (Boston, USA).

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Engaging Home Care Patients And Caregivers For Better Fall Risk Management: Challenges, Opportunities, And Leveraging Information Technology

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EMERGENCY room visits due to falls constitute the largest group of potentially avoidable events in home care.[1] In addition to increasing healthcare costs,[2] all injuries can easily lead to further serious health problems and even death for home care patients who are often elderly and vulnerable.[3] Therefore, achieving better fall-risk management (FRM) becomes critical in improving the quality of care provided by home health agencies (HHAs).[4] In working towards this goal, better engaging home care patients and caregivers in FRM can be both effective and efficient because they are often the least utilized resources in healthcare.[5,6] Information technology (IT) can play a catalyst and even an enabler role in improving the quality of care.[7] Therefore, this qualitative research identified the prominent challenges and opportunities associated with engaging the patients and their caregivers in FRM during home care episodes, and it explored how IT solutions can be leveraged to positively impact their engagement in FRM. On these topics, there has been a lack of evidence prior to this study.

Methods: After obtaining the ethics approval, four focus groups were conducted to elicit the perspectives of a professionally diverse group of home care professionals in Maryland. Twenty participants were recruited based on maximum variation sampling[8] strategy by considering the participants' professional background as well the characteristics of their organization (e.g., size, business model, geographical areas served). The discussion was audio-recorded and run by an experienced facilitator assisted by a scribe. Each participant reflected his or her notes individually on the provided handout sheets before discussing within their focus group. Each focus group summarized their ideas on a flip chart. Raw data were collected from the participants' individual handouts, group flip charts, transcripts of the audio recordings, and the scribe notes. The Framework[9,10] method was used to analyze the raw data resulting in a number of recurring themes.

Results: **Challenges and Opportunities** – The participants noted that while physiological problems such as gait and balance issues increased fall risks, some patients with such problems also had cognitive issues preventing them from fully comprehending the FRM advice. This combination requires an even higher degree of caregiver involvement in home care. Additionally, the participants noted that some of the caregivers did not fully understand their role in FRM or what was required of them to keep the patients safe either. Among the challenges for FRM was the lack of physical presence of caregivers with the patient most of the time. The participants also noted that some patients fall because they are in denial of their physical abilities and limitations. Additionally, cultural differences and language barriers hindered the clinicians from providing effective FRM advice to both the patients and their caregivers. The participants also reported that the lack of knowledge and literacy among some patients and caregivers increased fall risks due to their inability to understand and follow directions. Some home environments did not support effective FRM; these homes had uneven surfaces, poor lighting, and no hand-rails. **Leveraging IT** – The participants noted that making patient portals available to patients and caregivers on mobile devices, such as smart-phones, can increase their engagement in FRM. Patient portals have the potential to make the FRM information easily available as well as keep the patients and their caregivers informed of the care plan and progress. However, the acquisition, maintenance, and training costs limited the adoption of portals. Cellular network coverage limitations and the Internet affordability were also mentioned as barriers to patient portal use. Sensors, such as those installed in the home or integrated into devices, can possibly increase engagement by providing the patients and caregivers with data about activity levels as well as movement and gait patterns. However, cost and privacy issues still impede their adoption to reduce fall risks. The participants believed that if telehealth solutions can be economically feasible and adopted widely, they can help clinicians address FRM-related questions in a timely manner, such as those about durable medical equipment use.

Discussion: Similar to other studies,[11–13] the results indicate that for effective engagement in FRM using IT, clinicians must consider the literacy and comprehension levels of patients and caregivers. HHAs should consider involving the motivated patients and caregivers more directly in some of the FRM-related quality improvement discussions and meetings. As the IT adoption for FRM increases, it will be important to provide patients and caregivers proper training and continuous support to use the adopted solutions.

Conclusion: This study provided evidence about the issues related to effectively engaging patients and caregivers in FRM during home care episodes. It also identified patient portals, sensors, and telehealth as the most promising solutions to

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increase patient and caregiver engagement in FRM.

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Measure, Share, Improve: Using Performance Dashboards to Impact Home Health Documentation Times and Quality

Juanita Gross, Cheryl Adams, Mark A Bassett

I N the fall of 2014 a pilot project was initiated at Sparta Community Hospital (Sparta, IL) to study the impact of a new clinical dashboard that displays timely performance measurements for its field clinicians. Recognizing that "you can't improve what you don't measure" the organization worked with its home care software vendor to develop a new tool for capturing and displaying key performance indicators, like the percentage of TP9 (discharge) visit notes as well as regular visits notes completed during the visit. The results were dramatic: Sparta's home health agency increased the rate of in-home completion of regular visit notes by more than 35% (from 60% to over 95%). Moreover, they reported a marked improvement in documentation quality, including a significantly lower error rate during the plan of care process. And these were not short-lived gains. Sparta's improvements in the timeliness and accuracy of their home health documentation have been lasting (> 2 years). In essence, they have set a "new normal" and established a significantly higher baseline for quality, accuracy, and timeliness that has made them one of the top-performing agencies in their region. Upon learning about these results, SwedishAmerican (Rockford, IL) agreed to participate in a follow-up study to validate the impact of real-time clinical dashboards on clinician performance. This expanded study focuses on an agency with more than 5,000 regular visits per quarter, with a current completion rate of end-of-day-shift documentation near 68%.

Methods: Swedish-American will discuss with its staff its desire to improve in-shift visit note documentation rates as a means of improving quality and clinician job satisfaction. Four pairs of clinicians, each with similar documentation completion rates, will participate in a blind study with a control group. Under the guise that they are testing a software update, one clinician from each pair will have access to a web-based dashboard displaying their current performance results. The rates of in-shift documentation completion will be calculated on a weekly basis through the acquisition and analysis of visit metadata, and transferred to a dashboard that renders overall agency results as well as individual performance results for the four clinician test subjects. The results will be compared between the partners in each cohort/pair to determine if the mere presence of a performance dashboard improves their in-shift documentation completion rate.

Results: As in the pilot study, we expect to see measurable, statistically-significant improvements in performance even amongst the clinicians without dashboards, as a result of the Hawthorne Effect (also known as the "observer effect") wherein improvements in performance result simply because the individuals know their performance is being observed. We will also compare performance improvements between those with access to performance dashboards and those without access to this data. The study duration will be one calendar quarter (three months), after which time the dashboards will be adopted by all clinicians. Improvements in documentation timeliness and quality will continue to be measured after completion of the official study.

Conclusion: Improving quality and efficiency requires first measuring what you wish to improve, then sharing the data with those in a position to affect the improvement. This study aims to validate positive preliminary findings that suggest significant quality and efficiency gains are possible when home care field clinicians' have access to timely personal and organizational performance data. Data from both studies will be presented along with conclusions about the value and impact of real-time performance feedback on performance improvement.

Understanding Information Exchange between Home Care Clients and Aides: Opportunities for Informatics

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I N 2014 it was estimated that over 2 million individuals in the United States used formal personal care services provided by paid, non-skilled care providers such as home care aides.[1] Although some individuals pay out of pocket for these services, Medicaid in many states, including Washington State, provide home care aides for older adults or disabled individuals who need support to stay in their homes. Home care aides in Washington State support consumers with meal preparation, personal care activities, and light housekeeping.[2] Traditionally, due to their scope of work, home care aides have not been required to complete comprehensive training; however, in 2011 Washington State passed a law that required all home care aides to take standardized training courses and pass a certification test. The purpose of this training is to ensure that all home care aides meet the basic qualifications necessary to carry out their tasks.[3] Despite the routine nature of the services that they provide, home care aides are considered a significant resource for individuals that utilize their services.[4]

Methods: We performed a secondary data analysis on transcripts from home care client and aide interviews that were conducted between October 2014 and March 2015. The initial interviews gathered home care client and aide opinions on the new Washington State home care aide training program. During the initial data collection, the interviews were audio taped and transcribed. For the secondary data analysis, we identified excerpts from the interviews that discussed technology use and/or information exchange between home care clients and aides. Each excerpt was coded along a number of salient dimensions, such as topic, thematic content, and general sentiment.

Results: Twenty-seven participants (17 clients and 10 home care aides) were interviewed. The average age of the home care aides was 45 years (range 26 to 64 years), and the average age of the home care clients was 53 years (range 31 to 71 years). Independent and agency-affiliated home care aides were equally represented. Both home care aides and clients considered communication key to a successful client-aide relationship. Clients and aides regularly exchanged information about home care schedules, the work of caregiving, and a range of interpersonal topics including family and hobbies. Most of the communication was conducted face to face. Telephones and paper were used to communicate daily schedules, appointments, and schedule changes. Other forms of technology were not used in information exchange between aides and clients even though mobile telephones and computers were mentioned as potentially useful tools to support caregiving tasks. Participants also discussed the challenges with communication and information exchange. Clients expressed frustration with several aspects of care including having to continually train new home care aides on personal preferences and care needs, and the lack of notification for last minute service disruptions that can be particularly challenging for clients that relied on aides to support important activities such as food preparation and grocery shopping. In addition, home care aides also expressed frustration with the clients' lack of communication about their individual care needs, and often felt unprepared when arriving at a new client's home.

Discussion: Information exchange is critical for the success of the client-aide relationship in home care. Face to face communication is most often used, however, our findings show that there may be additional opportunities for technology interventions to increase the efficiency and reach of the information exchange. Informatics could help aides with communication, documentation, and with tasks related to care facilitating continuity of care and improving patient safety. For example, technology could be used to help clients clearly express their individual needs and preferences, and communicate these needs to aides prior to service. This may reduce the uncertainty from both the client's and the aide's perspective when starting a new relationship. In addition, aides could use technology resources to support caregiving tasks such as foot exams for clients with diabetes.

Conclusion: Technology interventions in home and hospice care have often focused on skilled care providers such as home health nurses, physicians, and therapists. Our findings indicate that home care aides, due to the increasingly important role that they play in care in the home, could potentially benefit from informatics tools to increase the efficiency and effectiveness of their services. More research is needed to better understand the current use of technology in home care encounters, to specify the needs of home care aides and clients and to identify how technology can support care coordination, continuity of

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care and increase home health aides' confidence. Furthermore, we need to explore how technology can be integrated into the home health aide training program.

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A Feasibility Study Examining Older Adult Needs within Smart Home Sensor Deployments

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As older adults age, they are faced with numerous challenges that hinder their independent living such as symptoms resulting from chronic health conditions, reduced mobility, social isolation and cognitive decline.[1] Recent developments in smart home technology designed to detect and record individuals' activities and status within their living spaces present a unique opportunity to improve their health and wellness.[2] Although there have been reported benefits resulting from the use of smart home technology,[3,4] the deployment of sensor systems has often been limited to laboratory settings due to practical challenges such as managing multiple sensor installations. Furthermore, it becomes challenging for these new technologies to generate data that can be presented and visualized in a comprehensible and efficient manner so that older adults themselves can access and interpret information about their activities of daily living. In this study, we deployed commercially available sensors to community-dwelling older adults' residences using the Lab of Things platform for connected devices.[5,6] The primary goal of this study was to understand the information and visualization needs and preferences of older adults when presented with actual sensor data collected from a 2-month deployment within the home.

Methods: We are recruiting older adult (65 and older) participants through collaboration with local retirement facilities in Seattle to take part in a 2-month deployment study. Eligible participants have to be community dwelling older adults (including residing in an independent living facility), able to give informed consent, and able to read and write English. The participants are given a choice to choose the sensors they would like to have installed within their home. The sensors are commercially available and consist of a Door/window sensor and a Multi-sensor (collects data on motion, temperature, luminosity, and humidity), and a Foscam IP camera. Participants have to select at least one sensor to be eligible for the study. We use a secure platform, Microsoft's Lab of Things,[5,6] for collecting and managing data from the sensors. We conduct three interview sessions one at baseline, one at 1 month, and another at exit. During the interviews we engage participants within the design of data visualizations derived from the sensor data through a participatory design approach. This involves asking participants to provide feedback on iterations of the design and also to generate ideas for alternatives to the visualization. The interviews also seek to gather participant perspectives on sensor use within the home, in particular addressing issues of intrusiveness, perceived value, and information needs from the visualization. All interviews are audio-recorded and transcribed for content analysis. We also gather demographics and collect participants' self- reported daily activities (IADL), the participant's perceived health and well-being (SF-12), and life-space mobility (LSA), and e-health literacy (eHeals) during baseline and exit interviews. The University Institutional Review Board approved all study procedures.

Results: The study is currently ongoing. To date five older adults have been recruited and have finished mid-point interviews. The mean age (SD) of the participants is 91 (4.9) years old. All of our participants have a Bachelor's degree or higher. Our findings so far demonstrate the need to develop interfaces that truly match users' needs and expectations. Furthermore, as participants have commented, the processing of visualized information requires that users understand the context of this assessment (e.g., when data were collected, how they can be used to inform decisions, what the clinical implications of patterns changes may be). We will present recommendations for the design of user interfaces and visualization prototypes based on the iterative feedback provided by our participants.

Discussion: The innovation brought by the smart home technologies can significantly impact the future of home healthcare. With more and more older adults showing interest in smart home technologies,[4] the home healthcare industry needs to think about integrating smart home sensors in their care plan. In order for smart homes to become widely used, we need to ensure that the information generated by such passive monitoring systems is easily accessible and understood by all stakeholders, especially older adults, if the use of technology aims to empower them rather than simply monitor every one of their movements.

Conclusion: Despite the potential of smart home technology, there remains a challenge in increasing acceptance and usage of these technologies particularly among older adults. Our work highlights that the effective visualization of smart home data is key to the success and ultimate adoption of smart home applications to support aging in place.

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Accessibility and Beyond: Designing Consumer Health IT for Individuals with Disabilities

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As health care shifts to home- and community-based settings[1,2] the roles of both providers and patients are transforming.[3,4] There has been an increasing focus on consumer health IT (CHIT) (i.e., electronic technology used by laypeople to support health and health care management) to address this shift in health care.[5–7] People living with physical, cognitive, and/or sensory disabilities face challenges engaging in CHIT and have not been a demographic focus of developers.[8–10] Approximately one-fifth of the non-institutionalized U.S. population self-identifies as disabled.[11] With such a large portion of the population identifying as disabled it will be necessary to develop CHIT with this demographic in mind. This study aims to assess the needs of individuals with disabilities for CHIT focused on one technology platform (mHealth) and one self-management task (health information communication with social network members). This will be accomplished through a multi-method study that explicates individuals with disabilities' existing health information communication practices and the accessibility, usability, and usefulness of three existing mHealth solutions incorporating health information communication functionalities.

Methods: There are three phases in this two-year longitudinal study: (1) interview-based exploration of existing health information communication practices, (2) task analysis and journal-based exploration of challenges to using existing consumer health IT incorporating health information communication functionalities, and (3) design session-based exploration of potential design solutions. The study will involve 60 participants living with physical (n=20), sensory (n=20), and cognitive (n=20) disabilities. In Phase 1 participants are involved in a semi-structured interview about their personal network and health information sharing—including use of CHIT for health information communication. In Phase 2 participants interact with three existing mHealth apps focused on health information communication on either an iPad or iPhone: (1) Microsoft HealthVault (non-tethered PHR), (2) Epic's MyChart (tethered PHR), and (3) CaringBridge (social support). In Phase 3 participants attend group design sessions to discuss mHealth app design focused on health information communication as well as accessibility challenges of mHealth apps and how to overcome them in future design.

Results: To date we have screened 29 individuals, interviewed XX, and conducted task analysis with 4. Initial analysis of interviews has shown that most participants rarely use CHIT to communicate health information. Instead, they mainly use the telephone or communicate in person. Their networks tend to be small (range: n=3-47, mean: n=11, median: n=8). Many participants are not opposed to using CHIT, but have never learned how or do not have access. The pilot data from Phase 2 led to initial findings about the usability and accessibility of the three mHealth apps. HealthVault and MyChart do not have iPad versions. It is not possible to click the sign up button in HealthVault on the iPad, making it non-functional on the iPad. Additionally, there are limitations with the voiceover function's interface with the apps. For example, the terms and conditions text was not read out on the CaringBridge app, there was no voiceover indication when a pop-up appeared, and it was difficult for the user to tell what she had entered into the email text field. By the symposium we will have a more robust dataset and more results to present.

Discussion: The initial results show that there are still large gaps between CHIT developers and the needs of individuals with physical, cognitive, and/or sensory disabilities. After collecting and analyzing data from all 60 participants we will develop guidelines for app development that address this population's needs. Simple modifications, such as ensuring that alt text is available for photos and that the screen flips orientation to landscape, could reduce user burden. A limitation of the study is that the design guidance to be generated is anchored in one technology platform and three specific mHealth apps.

Conclusion: Engaging with people living with physical, cognitive, and/or sensory disabilities will allow us insight into user needs and preferences for CHIT. Through mixed methods we hope to use existing mHealth apps to inform design guidance and increase the accessibility and usability of future mHealth apps as health care shifts to home- and community-based settings.

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Improving Patient Prioritization during Homecare Admission: A Pilot Study

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U P to half of hospitalizations happen within the first two weeks of homecare services [e.g.,[1,2]]. Early targeted allocation of services for high risk patients has been shown to significantly reduce 30-day readmissions for heart failure patients.[3] Recently, we developed a tool called PREVENT to facilitate decision making on patient prioritization for the first homecare visit during homecare admission. This pilot study aimed to test the PREVENT tool and determine its effect on the timing of the first nursing visit from hospital discharge (i.e. whether high risk patients were prioritized for care) and on average readmissions rates and time to readmission.

Methods: This pre-post, quasi-experimental, pilot study was conducted at a large, homecare agency in NewYork (NY, USA) with 176 patients admitted to homecare after a hospital stay. In the pre-experimental phase, we calculated the PREVENT priority score on 90 randomly selected patients but did not share the scores with the intake nurses. Prior to the post phase, we educated the intake nurses and regional teams about the PREVENT tool and asked them to prioritize the first visit for patients who scored high risk on the PREVENT tool. The PREVENT score was then computed by intake nurses for 86 randomly selected patients and visit priority (high or medium/low) was communicated to the regional teams responsible for patient admission. Timing of the first homecare visit and hospital admission information were extracted from the homecare administrative records. This study received IRB approval from the homecare organization.

Results: On average, patients in both phases were seen within two days of hospital discharge. In the pre-experimental phase, 72% of patients were high priority compared to 78% patients in the experimental phase (p =.35). During the pre-experimental phase, both high and medium/low priority patients were admitted to homecare on average 2.2 days after hospital discharge whereas in the experimental phase, high risk patients were admitted one-half day sooner (1.8 days) and medium/low priority patients within 2.6 days. Thirty-four percent of patients were readmitted within an average of 21.9 days (SD = 15) in the pre-experimental phase versus 30% of patients in the experimental phase within an average of 26.5 days (SD =18.8). Further, hospital admission rates decreased in both high risk (32.8% vs. 36.9%) and medium/low risk patients (21% versus 28%) between the pre and post experimental phases. Although none of the outcomes were statistically significantly different, all outcomes trended in the expected direction.

Discussion: In the experimental phase, high risk patients were admitted to homecare almost one day sooner than medium/low risk patients, reflecting changes in nurses' admission practices and almost one half a day was shaved off the wait time for high risk patients. The study successfully tested the feasibility and workflow for administering and delivering the PREVENT decision support intervention. Hospitalization outcomes all trend toward a positive effect of the PREVENT tool, however further study is needed with a larger sample under randomized conditions to eliminate confounders.

Conclusion: This pilot study of patient prioritization for the first homecare nursing visit showed promising results. After applying and sharing the PREVENT tool with the nurses, high priory patients were seen sooner and overall hospital admission rates decreased. Future work is necessary to validate these results using a larger sample in a randomized controlled trial. Combining home visit prioritization with other early interventions such as early followup doctor visits should be further explored.

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Supporting Home Care Nurse Decision Making at the Point of Care Through Clinical Dashboard Design

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FEEDBACK provided to clinicians on their performance is important for improving health care quality[1] and is a key component of the IHI triple aim initiative.[2] Dashboards are a form of Health Information Technology (HIT) that display information in a visualized format which can be used to help provide feedback on quality performance measures. In this presentation we will present the preliminary results from the first phase of our study, which is focused on (a) identifying existing quality measures related to the care of patients with congestive heart failure (CHF) that are relevant to home care nurses and that are under their control (actionable) and (b) to explore if and how nurses' numeracy and graph literacy impact their ability to comprehend data presented in a visualized format. The results of this phase will be used to develop a prototype dashboard for home care nurses at the point of care to help implement evidence based guidelines for the care of CHF patients.

Methods: To identify existing quality indicators that were meaningful and actionable by home care nurses, 6 focus groups were conducted with 61 nurses working in a large not for profit home care agency in the Northeast region of the United States between November 2015 and February 2016. Focus group participants were provided with a list of 23 statements derived from evidence based practice guidelines on the management of patients with heart failure and asked to identify the top 5 statements that they felt were a priority in terms of receiving feedback and rank them from 1 (top priority) to 5 (least priority). The focus group discussion then explored the rationale for priority rankings and how a dashboard could be designed to provide that feedback. Data was analyzed using thematic analysis.

To explore nurses' numeracy and graph literacy and their ability to comprehend visualized data a multi-factorial experimental research design using an online survey was used. Graph literacy was measured using the graph literacy scale[3] which was developed specifically for the health domain and measures graph reading skills and comprehension across different types of graphs. Numeracy was measured using the expanded numeracy scale.[4] 196 nurses from two home care agencies located in the North East region of the USA were randomly allocated to 1 of 4 experimental conditions. Outcomes include knowledge and understanding of the information presented in the visualized dashboard.

Results: Quality indicators related to the tracking of vital signs, symptoms and weight changes were ranked the highest by nurses (e.g. identification of weight gain). The second highest ranked quality indicator related to ensuring a patient had received education to support self-management. Themes arising from the discussions included how feedback could improve workflow and communication between visits.

Nurses answered approximately 10 of 13 graph literacy items and 7 of 8 numeracy items correctly-slightly higher than average scores for the U.S. population. Across the whole sample, nurses most easily understood information presented in the format of a bar graph. There was an interaction between numeracy, graph literacy and comprehension. Nurses with low numeracy were less able to interpret line graphs, those with low graph literacy were less able to interpret spider graphs, and those with low literacy and numeracy were less able to understand information presented as a table.

Discussion: This study has identified specific elements of feedback on the care of CHF patients that home care nurses would find valuable for improving care. These elements of care are exclusively at individual patient level, and are required by nurses in real time. The findings demonstrated that nurses' numeracy and graph literacy have a significant impact on their comprehension of information presented in visual formats.

Conclusion: The results will be used to develop dashboards that provide feedback on quality indicators to home care nurses, in real time, at the point of care. The dashboards will be dynamic; presenting the same information in different formats, to enable nurses' to comprehend the data effectively. Future research will evaluate the effectiveness of the dashboards in improving care processes and patient outcomes.

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Current Roles and Applications of Electronic Health Record in the Healthcare System

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ELECTRONIC health record (EHR) has been shown to play major roles in the healthcare system. The main drivers for the increasing roles and applications of EHR in healthcare systems include the need to improve efficiency in healthcare service delivery, patient safety, access to health care services, and more importantly, the need to reduce the costs of medical expenditures. The main goal of this paper is to review current trends in the roles and applications of EHR in the healthcare system.

Methods: A literature search was conducted on the PubMed and OvidSP electronic databases. The Google scholar search engine was also utilized. Relevant books were also employed. In order to facilitate the search, the following keywords were adopted: clinical application of electronic health record, uses/roles/applications of electronic medical record, and administrative applications of electronic health record. Original papers, review articles, and articles available in full text published in English in the last twelve years were included. Sixtyseven papers were initially retrieved. However, only 13 met the inclusion criteria and were finally reviewed.

Results: Currently, the roles and applications of EHR in the healthcare system include clinical care application/functions,[1–3] financial function,[4] clinical research function,[4] reporting,[5] and administrative function.[2,3,6] EHR provides clinical functions which are health information and data, test results management.[4,5,7,8] order entry and support, and decision supports.[5,9–15] It has also played a significant role in the healthcare system in the aspect of clinical research using the query and surveillance facilities in the computer stored records. The query systems can be used to identify patients who meet the eligibility requirements for prospective clinical trials.[4] Administratively, EHR can be used to schedule hospital admissions, in-patient, and outpatient procedures, and visits which, therefore, improves the efficiency of healthcare systems and also offers better and more timely service to patients.[2–7] The application of EHR in health care financing is an important area to discuss especially during this period of federal healthcare reform with the goals of maintaining balance among access, costs, and quality of care. Based on cost-accounting applications in other industries, health care cost-accounting systems, adapted from cost-accounting applications in other industries, have been adopted widely.[4] EHR has also been very useful in disease reporting and population health management.[4,5]

Discussion: EHR is not just a digital form of a paper medical record, but it provides the following clinical functions: physician order entry, integrated view of patient information and data, access to knowledge resources, clinical decision supports, and integrated communication. However, in hospices, the use of EHR has been limited to administrative and clinical functions. In the reviewed article, there was no mention of the use of EHR in regards to clinical research and reporting.

Conclusion: EHR has been very useful in various ways in the healthcare system ranging from clinical care application to the administrative function to clinical research function, to financial application, and reporting in the healthcare system. Further research is needed on the clinical research use of EHR at home health and/or hospice care.

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Life and Death in a Prescription Bottle: Design of Mobile Health Education to Transform Self-care in Cancer Medication Regimens

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POWERFUL medications used to treat cancer are increasingly available in oral formulations (i.e., tablets and capsules). Shifting cancer care away from infused therapies in physician offices and hospitals into residential settings with oral therapies offers convenience, but increases patient responsibility for managing complex therapy and monitoring adverse effects. Medication adherence is the extent to which patient behavior corresponds with the prescribed regimen. Adherence to oral anticancer medications (OAMs) can lead to improved outcomes, while non-adherence (typically up to 40%) can result in accelerated disease progression or death. Novel communication methods are needed as patients are distanced from their healthcare providers when taking OAM regimens that are often complex, often adjusted, and may produce strong to unbearable side effects. Adequate opportunity is needed for patients to receive and process information, reflect upon therapy, and actively engage in transformative processes following diagnosis of cancer. We will describe development and feasibility testing of a customized mobile health education technology platform designed to facilitate better patient-provider communication, greater adherence, and improved outcomes for patients with cancer.

Methods: With input from patient advocates, an interdisciplinary team developed a tablet-based application (app) called Mobilizing for Patient Adherence to Cancer Therapies (mPACT) that targets 12 oral anticancer medications with education and text messaging. The program focuses on 3 to 4 common barriers to medication use [dosage change, timely refills, side effects, complex schedule for on-off medication schedule (as applicable)]. Nineteen interviews were conducted with research participants in the outpatient oncology pharmacy and oncology clinic at the study setting, which is located in an urban academic health center. In addition to animations on common barriers, each participant was shown app content for two different OAMs, one with a continuous medication cycle and a second with an on-off medication cycle. Qualitative data were collected in August 2016 and analyzed on app feasibility and preferences of participants.

Results: Eleven participants were men and 8 were women. The racial and ethnic breakdown was Asian-American 1, African-American 8, Hispanic 3, and Caucasian 7. Responses ranged from a simple nod of the head throughout the entire patient education program, to laughter, and agreement and explanation of how they have lived through the side effects or barriers to adherence. Participants differed in desired frequency for text messages. Two participants mentioned only having a landline and were unable to receive text messages. The usability of the program was demonstrated when users tapped through the program. The responses from the patients went from excitement and wanting to know when this would be deployed to one tech-savvy participant who said this needs to be more advanced. Concern from multiple participants was their perception older patients would not want to interact with the application due to a technology generational divide. One participant described the desire for comfort from the doctor and pharmacists when hearing the information instead of the information from a tablet. Patients discussed how the patient stories were relatable about challenges to medication adherence.

Discussion: Bringing the tablet to a patient's home via nurse or home aide is another method to reinforce the OAM education on the complex medication schedule, the information and technology would be similar. All participants were able to navigate the program and were able to discussion the content. Transforming OAM medication instructions to patient stories and animations delivered on a tablet was received well by participants in this new method.

Conclusion: Feedback from the multiple interviews will be used to improve the mPACT program before the future randomized control trial to measure medication adherence and satisfaction with patient care. The challenge with developing tablet applications is to meet the needs of the novice user as well as the digital natives. Delivering tailored health information to a patient's mobile phone (enabling in-home provider communication) to increase OAM medication adherence is a novel challenge, and meeting the challenge requires a multifaceted approach.

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