

# Identifying Certification Criteria for Home Care EHR Meaningful Use

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Meaningful Use (MU) objectives require that electronic health records (EHR) are certified and meet a selected subset of Certification Commission for Health Information Technology (CCHIT)<sup>1</sup> criteria to qualify for financial incentives. These criteria have been developed for hospital and ambulatory settings, and recently finalized for long-term post-acute care (LTPAC).<sup>2</sup> MU is intended to achieve health and efficiency goals that include improved transitions in care between hospital, physician, and LTPAC settings, such as home care. Anticipating the imminent development of LTPAC MU objectives, the next step for informaticists, long term care organizations, and policy makers is to select MU objectives from LTPAC CCHIT criteria. The purpose of this study was to formulate recommendations regarding LTPAC CCHIT criteria for MU objectives based on observations of point-of-care EHR use by home care clinicians.

Home care is very different from hospital and ambulatory settings. Home care is an increasingly important and effective way of transitioning patients from hospital to home and of managing chronic illness using skilled clinical services (e.g., nurses, therapists, social workers) in the home. Over three million Medicare beneficiaries discharged from the hospital receive nearly 104 million home care visits annually.<sup>3</sup> To date, 29% of the 10,000 home care agencies in the United States report having implemented point-of-care EHR.<sup>4</sup> This home care EHR adoption rate translates into home care agencies' having made a large investment in EHRs. Furthermore, significant additional investment may be required for existing point-of-care EHRs to meet CCHIT standards and imminent MU objectives. This investment should enable home care agencies to benefit from financial incentives related to MU. However, we lack knowledge of the similarities and differences between home care point-of-care EHR characteristics and the certification criteria.

In addition, information management is different in home care than it is in hospital or ambulatory care. The challenges of team planning and communication, insufficient information, and computer use in the demanding home environment set home care apart. Home care clinicians have clinical practice needs and issues that differ markedly from those of clinicians in ambulatory or hospital settings. Home care engages multiple care providers (e.g., physicians, nurses, physical and occupational therapists, speech/language pathologists, social workers) to work together as a team in communicating and care planning as they provide care. However, unlike hospitals and ambulatory settings, each practitioner visits the patient in the home at different times independent of each other. Being in the patient's home creates a different clinician/patient relationship than that found in hospitals or physician practices. Patient contact by home care clinicians is intermittent (2-3 times per week initially, then 1-2 times per week for an average of 5-6 weeks). The information source at the start of care is limited to hospital discharge referral documentation, which is often inadequate.<sup>5,6</sup>

With independent behavior and lack of baseline information, communication is critical to the success of home care patient outcomes. Communication among clinicians is not face-to-face; instead it is achieved via telephone, voice mail, or electronic charting. In the patient's home, where physicians and other health professionals are not physically present, the clinician makes a telephone call if collaboration is needed. As in hospitals and ambulatory sites, point-of-care EHR in home care is intended to enable clinicians' access to the most current patient health information at the appropriate time in the clinical process. Furthermore, home care clinicians must be able to both set up and use the computer during each visit to patients' unpredictable and unique home environments.<sup>7</sup> In contrast, clinicians in hospital and ambulatory settings use the EHR in a relatively consistent and familiar controlled environment. As in any health care setting, good communication among clinicians in home care is essential for patient safety and quality of care.<sup>8</sup> The amount and quality of information available to health care professionals has an impact on patient outcomes and quality of care.<sup>8-10</sup> Multiple studies from acute care demonstrate the issues and consequences of impaired communication.<sup>11-14</sup> Community-based providers complain they do not receive sufficient information about patients' conditions,<sup>15,16</sup> and they do not receive hospital discharge summaries soon enough.<sup>5</sup> In one study, 28% of home care nurses felt they provided more care than was necessary.<sup>17</sup> It is critical, therefore, that MU objectives support team communication in home care and thus enable clinicians to provide the best quality of care for patients.

This study sought to apply a reduced set of LTPAC CCHIT criteria to a home care EHR to assess their

presence and make recommendations for home care EHR CCHIT criteria to be included in MU recommendations. LTPAC CCHIT criteria were developed for long term care settings such as nursing homes and includes home health settings such as hospice and home care. The published LTPAC CCHIT has 51 categories which contain 413 criteria. For example, the category (category code and title are provided), 'LT 01 Patient record and demographics' contains 23 criteria; one criteria is 'LT 01.13 Store directions to patient's home as free-text.'<sup>2</sup> The recommended criteria for home care were identified by comparing the home care point-of-care EHR to the LTPAC criteria.

## Methods

The study design was qualitative and descriptive using qualitative data collection and observation of clinician EHR users 19 months post implementation. The EHR selected for this study was that of a leading home care EHR vendor. The EHR was studied as it was used. The EHR was implemented in an agency that described itself as being similar to other home care agencies. The Institutional Review Boards of the researchers' academic organizations approved the study.

*Setting.* The study home care agency is a not-for-profit, freestanding and privately developed, governed, and owned home care agency. The agency is part of an academic, integrated health system. The agency is both Medicare and Medicaid certified and accredited by the Joint Commission on Accreditation of Healthcare Organizations. The agency provides home care services to 1200 patients monthly in a five county urban and suburban area including integrated services by: certified home health aides; medical social workers; nurses; enterostomal, speech, physical, and occupational therapists; and case managers. The agency specializes in care of patients who need cardiology, oncology, neurology, orthopedics, and diabetic services. National statistics specific to home care agencies (i.e., excluding hospice agencies) were not available for comparison. However, the agency reported that it is similar to other home care agencies (e.g., non-profit, size, services, use of EHR). Typical of home care operations, home care visits include developing and implementing care plans, and documenting interventions and outcomes against the care plans. Care is reimbursed by Medicare based on the Outcome and Assessment Information Set (OASIS) assessment instrument and congruence with documentation of the care.

The point-of-care EHR was implemented in 2009. It was a commercially available client-server application, and, as such, it was similar in architecture and functionality to other home care EHR software on the market. The EHR was not yet CCHIT certified, as no LTPAC EHR has been CCHIT certified. The EHR was configured to run on a laptop and to access the agency's server via a data card. Access to Internet email was via a cellular phone. The EHR was supported by in-house technical staff. The EHR supported home care organizational metrics for benchmarking (e.g., quality outcomes, reimbursement, and compliance with regulations). Home care services are provided as episodes of care that entail multiple visits and can extend past 60 days.

Home care clinicians used the EHR as a communication tool for all aspects of their work. The software ran on a laptop that the clinician synchronized with the centralized database to maintain a current snapshot of the patient record. The EHR clinical functionality included features that enabled clinicians to access clinical information at the point-of-care, share patient information among team members, and complete documentation by the end of the day. Clinicians who used the EHR started their day at their own home by connecting the laptop to the server to view the patient schedule for the day, access information about entering a patient's home or approaching a patient, and read messages from team members. The clinician traveled to the patient's home, found a space to set up the laptop, and accessed the EHR patient information. If the patient was new to the agency, the clinician conducted an initial assessment in preparation for creating a care plan. If the patient had an existing assessment, the clinician reviewed his/her prior notes and read notes from other clinicians who had seen the patient since the clinician's last visit. The clinician examined the patient. If the clinician was a nurse, he/she reconciled medications based on information in the EHR. If there were discrepancies, the nurse called the physician. The nurse recorded blood pressure and pulse readings. The nurse reviewed additional laboratory tests, other testing, and consults through the EHR. The clinician recorded a few notes either on the laptop or handwritten for later entry. The clinician ended the day at home by recording additional documentation on the laptop referring to the notes made in the home. The clinician connected the laptop to the server to upload the information and checked the next day's schedule and messages from the clinical care team. The point-of-care EHR replaced an office-based version that was updated via centralized input from paper records.

*Study population.* The study population was all clinicians (137) who provided direct patient care, documented in the EHR, and had completed their orientation period which tended to be about four months. The clinicians ranged in age from 21 to 70; most (90%) were women; and most (71%) were Caucasian, and a minority (20%) were African-American.

*Data collection.* The study involved comparing a reduced set of LTPAC CCHIT functionality criteria to data collected during observation of clinician use and analysis of software documentation from the EHR provider.

CCHIT criteria reduction. In order to collect the first set of EHR functionality data related to CCHIT criteria, the lead author developed a list of possible CCHIT criteria applicable to home care. The author used as a model the CCHIT ambulatory EHR criteria reduction to create the ambulatory MU objectives. Published hospital and ambulatory care MU criteria each incorporate approximately 20 CCHIT criteria.<sup>18</sup> This number was doubled to assure reaching a target number of at least 20 criteria in the set of reduced criteria. The intent was to select criteria that were likely to be universally available in commercial home care EHRs based on the author's preliminary observations of home care clinicians. The set of criteria was selected using the following procedure. First, the author identified CCHIT categories for inclusion and exclusion. Included categories were those related to functionality likely to be used by clinicians at the point-of-care (e.g., patient record and demographics, problem list, patient history). Excluded categories were those not likely to be used at the point-of-care (e.g., patient views, clinical research, administrative, backup/recovery). Second, within the retained categories, the author identified criteria for inclusion or exclusion. Included criteria were: (i) more relevant to clinicians; (ii) more general and inclusive; and (iii) simpler functionality and therefore more likely to be attained. For example, the criterion more relevant to clinicians was 'identify certain information as confidential and only make that accessible by appropriately authorized users' which was selected instead of 'document a patient's dispute with information currently in their chart.' An example of criterion that was more general and inclusive was 'capture, maintain, and display, as discrete data elements, all problems/diagnoses associated with a patient,' which was selected instead of 'maintain the onset date of a problem/diagnosis.' Lastly, an example criterion related to simpler functionality was 'access/display,' which was selected instead of 'query.'

Available and observed EHR functionality. The set of documented and observed EHR functionality was generated by developing a list of home care EHR functionality used by clinicians. We began by identifying 'available' EHR functionality and then identifying 'observed' functionality. Available functionality was already specified in the EHR software documentation or identified by the agency's EHR experts (a clinician [CB-see acknowledgements] and an administrator [MA]). Observed functionality was that which the researcher (PS) saw being used as a clinician documented patient care during a patient visit.

The observation approach was designed to account for differences in role and team. The agency grouped clinicians in four teams. Three teams were organized geographically and were predominantly nurses; the fourth team was predominantly therapists (i.e., speech pathologists, physical and occupational therapists). Each team had a shared social worker; one social worker covered two teams. The reasoning for assigning a clinician to a clinical role was based on the clinician's licensure. Clinicians were asked to provide consent during staff meetings and via Internet survey e-mail. Staff meetings took place monthly for the three nursing teams and quarterly for the therapy team. E-mails containing consent forms (and surveys for subsequent research) were sent to clinicians using popular Internet survey software. Consented clinicians selected to be observed were chosen by work sampling<sup>19</sup> to cover each role (i.e., nurse, social worker, speech pathologist, physical therapist, occupational therapist) from each team. Clinicians were asked at least a day in advance whether they could be observed. Clinicians were also asked to obtain oral consent from their patients to be observed. Clinicians on the geographically dispersed teams that covered distant counties were asked for their coverage area; where possible, clinicians covering areas closer to the researchers were selected. The researcher (PS) observed a clinician during one workday. Observations took place during a multi-week period. Clinicians in each role were observed until saturation; that is, observations offered no new information or a functionality was seen at least three times.<sup>20,21</sup> The researcher documented in field notes what information and where in the EHR the clinician recorded information.

*Data analysis.* Software documentation and observations were analyzed inductively using principles of thematic content analysis to identify descriptive or topical categories related to EHR functionality. All the data were summarized and discussed with experts as the basis for recommending LTPAC CCHIT criteria to be included in home care MU objectives.

Available and observed EHR functionality. Coding categories and themes were obtained from the reduced CCHIT criteria. EHR functionalities related to CCHIT criteria that were not identified in the software documentation were reviewed with the agency EHR experts (i.e., nurse educator, two administrators who produce reports with clinical data). If the expert verified the functionality was in the software, the functionality was added to the list of available functionality.

Observed EHR functionality was elicited from the data through a process of constant comparative analysis, a technique in which the investigator (PS) simultaneously collected information through observation, read observation field notes as individual cases, disassembled observation field notes through coding categories, rearranged coding categories into patterns, and reintegrated the patterned categories into a conceptualization that encompassed the experiences of all subjects.<sup>22</sup> Elicited EHR functionality that did not fit the CCHIT coding categories were assigned to new coding categories.

Comparison of CCHIT criteria and EHR functionality. The data was summarized in a matrix with EHR functionality (noted as available and/or observed) on one axis and the reduced list of CCHIT criteria on the second axis. Each new coding category elicited from observed EHR functionality was compared to the published LTPAC CCHIT criteria. A match indicated the reduced criterion had been identified in the documentation and/or observed, and the absence of a match indicated the criterion was not in the published list. Lastly, meetings of the investigator (PS) and home care agency's clinical EHR expert (CB) verified point-of-care EHR functionality and differences between EHR functionality and CCHIT criteria. Attendees also considered whether there was agreement between the researcher and the home care expert, and whether there were plausible explanations for identified differences in functionality. The researchers summarized findings as policy recommendations for home care EHR MU objectives and documented rationale for recommended functionality that differed from CCHIT criteria.

## Results

Findings from reducing the published LTPAC CCHIT criteria, analyzing the set of available and observed EHR functionality, and comparing these data are presented. Finally, home care MU policy recommendations are offered.

*Study sample.* Of the 137 clinicians, 57 clinicians (42%) consented to participate in the study. Five of the 57 consents were obtained from the Internet survey e-mail solicitation and 52 consents were obtained from staff meetings. Of the clinicians who consented and were randomly selected within team and role, six were observed before reaching saturation. Eight clinicians actively or passively refused to be observed citing they were too busy, were concerned about the employment and social risks, or did not reply to the email request to participate. Clinicians on each of the four teams and in the clinical roles of nursing (4) and physical therapy (2) were observed. Clinicians who were observed ranged from clinicians with one year or less of healthcare experience to clinicians with many years of experience.

*CCHIT criteria reduction.* The LTPAC CCHIT criteria<sup>2</sup> were organized into 51 categories containing a total of 413 criteria. The reduced criteria represented 32 categories (63% of CCHIT categories) containing 40 criteria (10% of CCHIT criteria) (see Appendix Table 1). Most (57%) of the resulting categories had 1 criterion; 1 category (2%) had 3 criteria; 2 categories (4%) had 4 criteria; and 19 categories (37%) had no criterion. Categories with 3 or 4 criteria were: 'LT 01 Patient record and demographics'<sup>2</sup>; 'LT 08 Clinical documents and notes'<sup>2</sup>; and 'LT 31 Assessment instrument.'<sup>2</sup> Categories which lacked criterion included those related to physician ordering (5 criteria) (as physicians do not order in the home care EHR at present) and technical functions not apparent to the point-of-care clinician (8 criteria).

*Available and observed EHR functionality.* Findings from analysis of the documentation and observation data increased our understanding of the EHR functionality actually used by clinicians at the point-of-care. First, results from investigating the available functionality are presented, followed by results from exploring the observed functionality.

Available EHR functionality. Of the 40 selected CCHIT criteria, 29 criteria (72%) were expected to be available in the agency's EHR based on the documentation and input of the agency's EHR experts. The EHR supported functionality related to: documentation, medication management, privacy, and reporting. The criteria not expected to be available were:

- 'LT 01.12 Store multiple, date-sensitive, temporary patient addresses and phone numbers'
- 'LT 08.21 Capture and store discrete data...from a clinical encounter and to associate that data with codes from standardized nomenclatures'
- 'LT 10.02 Produce patient instructions and patient educational materials which may reside within the system or be provided through links to external source'
- 'LT 12.01 Create prescription or other medication orders with sufficient information for correct filling and dispensing by a pharmacy including entering dosing instructions in free text'
- Two aspects of clinical decision support
  - 'LT 36.01 Update the clinical content or rules utilized to generate clinical decision support reminders and alerts'
  - 'LT 16.05 Present recommendations for potential referrals based on patient condition'
- Three aspects of interoperability
  - 'LT 19.01 Indicate normal and abnormal results based on data provided from the original data source'
  - 'IO-LT 07.01 Receive and store general laboratory results'
  - 'IO-LT 10.10 Display and generate HITSP C32/CCD documents and file them as intact documents in the EHR'

- ‘LT 37.02 Identify certain information as confidential and only make that accessible by appropriately authorized users’
- ‘LT 18.01 Present information necessary to correctly identify the patient and accurately identify the specimen to be collected...’<sup>22</sup>

Observed EHR functionality. Findings related to clinician use of the available functionality were obtained from the lead author who observed clinicians who were recording assessments, care plans, interventions, outcomes, and discharges. During 2 weeks, 24 visits were observed: 2 home care start-of-care and 20 re-visits including 2 discharges. While shadowing clinicians, 25 pages of field notes were taken.

Clinicians were observed opening the patient record, documenting the visit, checking the scheduling, documenting the patient discharge, conducting the assessment, and updating the diagnoses in the start of care. When the clinician opened the patient record, the start time was documented. The nursing visit documentation included recording vital signs, reviewing body systems, reconciling medication at start of care or discharge, updating wound management, documenting against the care plan, and documenting the type of teaching performed. Physical therapy visit documentation included recording blood pressure and reviewing joints. Clinicians were observed referring to vital signs recorded during previous visits by other clinicians. The EHR presented this data in a section of the screen as the clinician entered data from the current visit. Care plan information was displayed to the nurse while the nurse documented wound care. To view care plan information while not in the wound care screen, the clinician navigated to the care plan screens. Clinicians checked the scheduled number of visits and the number of visits allowable by the patient’s insurance. If insurance authorization issues needed to be addressed, a warning box popped up. The majority of the EHR data was recorded in pull-down menus and entry of numbers (e.g., blood pressure). Free text input tended to be limited to the narrative visit note, except when the clinician articulated that there were inadequate choices in a pull-down menu and typed in text instead.

Of the 29 available reduced CCHIT criteria, content analysis of field notes from observations identified 25 observed functionalities which fit the reduced CCHIT criteria (86%). These observed functionalities included, for example: (1) displaying patient demographics and allergies; (2) documenting patient clinical information such as problems, history, medications, vital signs; (3) documenting against the care plan (care plans were developed as clinical guidelines); (4) messaging between users; (5) capture Outcome and Assessment Information Set data elements; and (6) implement privacy and confidentiality safeguards. The four functionalities not observed are discussed below.

*Comparison of CCHIT criteria and EHR functionality.* Review of the available and observed EHR functionality with the home care agency’s EHR experts (CB, MA) further refined the CCHIT reduced criteria. Table 1 shows the number of reduced criteria that were available and/or observed. Of the 4 reduced CCHIT criteria that were available and not observed, one was identified as functionality that should be available to the clinician as he/she documented patient care: ‘LT 21.01 Indicate that a patient has completed advance directive(s).’<sup>2</sup> Three reduced criteria were not available at the point-of-care but were available to the administrative staff: (1) ‘LT 31.19 Flag potential LUPA and PEP situations’<sup>2</sup> (i.e., related to reduced reimbursement: Low Utilization Payment [LUPA], Partial Episode Payment [PEP]); (2) ‘LT 32.01 Generate reports of clinical and administrative data using either internal or external reporting tools;’<sup>2</sup> and (3) ‘LT 33.01 Define one or more reports as the formal health record for disclosure purposes.’<sup>2</sup> The last criterion was not viewable and the expert did not know if this criterion was available: ‘LT 08.21 Capture and store discrete data...from a clinical encounter and to associate that data with codes from standardized nomenclatures.’<sup>2</sup>

In addition, three observed functionalities did not appear in the reduced CCHIT criteria and were sought in the published CCHIT criteria. One functionality was clinician input of the date and time of the start of the visit, which was not explicitly stated in the published CCHIT criteria. According to an agency expert (MA), this information is required for Medicare reimbursement. A second functionality was clinician documentation of a patient visit in formatted data entry fields as they navigated the screens of the routine visit. This functionality appeared in the published CCHIT criteria as ‘LT 08.11 ...templates for inputting data in a structured format as part of clinical documentation.’<sup>2</sup> A third functionality was also found in the published CCHIT criteria – supporting multi-user access to the EHR to enable clinicians to share information about a patient’s care. This functionality was in the published CCHIT criteria ‘LT 39.01 ...the ability for multiple users to interact concurrently with the EHR application.’<sup>2</sup>

**Table 1 Number of Reduced CCHIT Criteria Available and Observed as Home Care EHR Functionality**

|              | Available | Not available | TOTAL |
|--------------|-----------|---------------|-------|
| Observed     | 25        | 0             | 25    |
| Not observed | 4         | 11            | 15    |
| TOTAL        | 29        | 11            | 40    |

## Discussion

This study is the first known assessment of a home care point-of-care EHR compared to CCHIT criteria. Home care is an increasingly important setting in transitions in care, where information management is very different from hospital or ambulatory care settings. This study sheds light on EHR functionality interdisciplinary home care clinicians actually use. Prior knowledge of home care EHR functionality was from a survey that suggested home care nurses wanted access to a shared EHR and e-mail.<sup>17</sup> This assessment was undertaken to produce recommendations for MU objectives for home care, a transitions-in-care setting.

The 413 published LTPAC CCHIT criteria<sup>2</sup> in 51 categories are relevant to settings in long-term post-acute care, such as nursing homes and hospice, in addition to home care. The reduced list of 40 criteria in 32 categories was intended to represent functionality more likely to be universally present in point-of-care EHRs. Most (75%) of the reduced criteria were identified in software documentation as available functionality. This finding suggests the reduced list adequately represented commercial EHR functionality in a representative home care agency. Due to characteristics of home care, some criteria may be more relevant to other long-term care settings. For example, producing patient instructional material is not applicable to home care because clinicians tend not to be able to carry, set up, and use a printer in a patient home. Also, clinicians are unlikely to find and email this information to their patients at the end of the patient-care day. This would be another task added to the hours clinicians typically spend at home documenting patient care and preparing for the next day's visits. However, the reduced criteria related to EHR functionality unavailable in the home care EHR should be considered for MU criteria across LTPAC settings. For instance, the function – associating clinical data with codes from standardized nomenclature – is important for the interchange of data and should be retained. Similarly, criteria that were not expected to be available in an EHR in a stand-alone home care agency, such as interoperability or physician access to the EHR, may be available to a home care agency or other long-term care setting in an integrated health system. Additional criteria (e.g., clinical decision support functionality) may be available after advanced functionality is incorporated into the EHR. If these criteria are desired objectives for LTPAC MU, they should be considered for inclusion in the reduced criteria list. Alternatively, criteria available in the EHR that were studied may not be universally available in other commercial home care EHRs. Assessment of other vendors' EHRs should help further identify criteria that are universally available in commercial home care EHRs. Similarly, assessment of EHRs in other LTPAC care settings would inform recommendations for MU objectives.

Most (86%) of the available functionality were observed, suggesting available criteria are applicable to clinicians documenting in the point-of-care EHR. These functionalities include clinician documentation capabilities that facilitate team communication, for example, by enabling a clinician at the point-of-care to access patient information documented by other clinicians. The four criteria not observed were confirmed to be available by the agency EHR expert and should be retained in the reduced list. Three functionalities (i.e., reporting and warning about situations with lower reimbursement) were available to administrative staff and not available to point-of-care clinicians. The fourth function, documenting presence of an advanced directive, occurs during admission and was not observed. The three functions not in the reduced criteria list and observed (e.g., date/time of visit, documentation templates, and multi-user access) should be added to the reduced list.

The resulting list of 43 home care point-of-care EHR CCHIT criteria is recommended for inclusion in MU LTPAC objectives. These finalized list objectives should accommodate the diverse organizational characteristics and EHR characteristics of LTPAC settings. Organizational characteristics that may be reflected in available or utilized EHR functionality include: (1) the setting (e.g., home care or other LTPAC setting); (2) administrative characteristics of the organization (e.g., responsibility for management of data needed for reimbursement may reside with clinicians or administrators); and (3) whether the organization is in an integrated health care system (e.g., physician access to EHR, interoperability). EHRs in LTPAC settings may also vary in the advanced functionality implemented. For example, clinical decision support may be more likely to be implemented in settings where medications are ordered in the EHR or adherence to guidelines is monitored. Furthermore, the finalized list of LTPAC MU objectives should be compared to hospital and ambulatory MU objectives with the goal of supporting data consistency across the transitions-in-care. We also recommend that MU objectives include usability considerations, as has been recommended in other settings.<sup>23</sup> Examples include the number of screen changes required to access or document patient information, and efficient navigation (e.g., displaying care plan information in the documentation screen rather than requiring clinicians to navigate to the care plan screen while documenting care). Usability should not be an additional barrier to clinicians using the EHR at the point-of-care in the challenging patient home environment where clinicians operate independently and team communication is so important.

There are strengths and limitations to this study. A strength is the research examined use of a point-of-care EHR in the home care setting. Additionally, this study contributes to the literature on the use of EHRs in long term care. In terms of limitations, given that the study was limited to a single home care agency, the study should be

considered exploratory. The clinical services and workflow of this agency are reflected in the findings and may limit generalizability. Agencies that offer a different range of services or differ in workflow may have different results. Observed functionality may have been biased by the selection of clinicians to be observed; however, observed functionality was reviewed with agency EHR experts in an effort to reduce bias. Clinicians selected to be observed may not have been representative of the clinicians at the agency due to a number of reasons. First, response to the Internet survey emails requesting consent was low; 30 of 137 clinicians (22%) responded and the survey did not return usable results for 25 of the 30 responses as the software did not work as advertised. Based on the literature, the expected return rates with nurses (who were the majority of the clinicians at this agency) range from 42%-90%.<sup>17,24-26</sup> Therefore we expected a conservative estimate of 82 clinicians (60%). Second, the pool of clinicians was limited due to the geographically dispersed clinicians; approximately one-quarter to one-third of clinicians per team attended the monthly staff meetings at the agency's offices. Third, clinicians who agreed to be observed may have been those who use the EHR in the patient home as intended, and clinicians who chose not to be observed may use the EHR differently in the home or not use the EHR in the home at all. Additionally, the lead author solely conducted the selection of CCHIT criteria, observation, elicitation of themes, and summarization of findings which may have introduced bias. However, the subsequent analysis involved the agency EHR experts in an effort to reduce possible bias.

These recommendations are intended to benefit home care agencies by informing future development of point-of-care EHRs. The resulting home care EHR CCHIT criteria recommendations from this study will be communicated to DHHS, which issues the next round of MU standards in 2012. The MU recommendations based on findings from this study will be communicated to DHHS: (1) during the public comment period; (2) during a requested audience with the National Coordinator; and/or (3) in a consortium of national organizations supporting EHR for home care (e.g., AAHSA, CAST, AHIMA, NAHC, AHCA, NCAL, NASL). Discussions with these stakeholder organizations would be an initial step in developing a white paper on MU in home care for DHHS. Timely development of home care EHR MU policy recommendations will benefit DHHS which is anticipated to issue LTPAC EHR Meaningful Use objectives.

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**Appendix Table 1 Reduced CCHIT Criteria Available and Observed as Home Care EHR Functionality**

|     | <b>CCHIT Category</b>             | <b>CCHIT Certified 2011 LTPAC Criteria<sup>2</sup></b>   | <b>Available</b>    | <b>Observed</b> |
|-----|-----------------------------------|--|---------------------|-----------------|
| 1.  | Patient record and demographics   | LT 01.08 Access and display demographic information such as name, date of birth, and gender needed for patient care functions as discrete data element                                   | Yes                 | Yes             |
| 2.  | Patient record and demographics   | LT 01.12 Store multiple, date-sensitive, temporary patient addresses and phone numbers   | No                  | No              |
| 3.  | Patient record and demographics   | LT 01.13 Store directions to patient's home as free-text   | Yes                 | Yes             |
| 4.  | Patient record and demographics   | LT 01.14 Capture, present, maintain, and make available for clinical decisions patient preferences such as language, religion, and spiritual and cultural practices                      | Yes except cultural | Yes             |
| 5.  | Patient list                      | LT 02.02 Identify patients with specific problems/diagnoses  | Yes                 | Yes             |
| 6.  | Problem list                      | LT 03.01 Capture, maintain, and display, as discrete data elements, all problems/diagnoses associated with a patient   | Yes                 | Yes             |
| 7.  | Medication list                   | LT 04.12 Update and display a patient-specific medication list based on current medication orders or prescription  | Yes                 | Yes             |
| 8.  | Allergy and adverse reaction list | LT 05.06 Display the allergy list, including date of entry   | Yes                 | Yes             |
| 9.  | Patient history                   | LT 06.01 Capture, store, display, and manage patient history.  | Yes                 | Yes             |
| 10. | Clinical documents and notes      | LT08.10 Document multi-disciplinary care or case conferences   | Yes                 | Yes             |
| 11. | Clinical documents and notes      | LT 08.16 Capture patient vital signs, including blood pressure, heart rate, respiratory rate, height, and weight, as discrete data   | Yes                 | Yes             |
| 12. | Clinical documents and notes      | LT 08.21 Capture and store discrete data regarding symptoms, signs and clinical history, from a clinical encounter and to associate that data with codes from standardized nomenclatures | No                  | No              |

|     | <b>CCHIT Category</b>                                | <b>CCHIT Certified 2011 LTPAC Criteria<sup>2</sup></b>  | <b>Available</b>                                      | <b>Observed</b> |
|-----|--|---|---|-----------------|
| 13. | External clinical documents                          | LT 09.01 Capture and store external documents.  | Yes: referral forms                                   | Yes             |
| 14. | Patient-specific instructions                        | LT 10.02 Produce patient instructions and patient educational materials which may reside within the system or be provided through links to external source  | No  | No              |
| 15. | General ordering requirements                        | LT 11.03 Enter all patient care orders electronically, including, but not limited to nursing care, medications/ immunizations, diagnostic testing, nutrition and food service, consultation, and blood products                                     | Yes   | Yes             |
| 16. | Medication prescribing and ordering                  | LT 12.01 Create prescription or other medication orders with sufficient information for correct filling and dispensing by a pharmacy including entering dosing instructions in free text  | No  | No              |
| 17. | Drug interaction                                     | LT 13.09 Display, on demand, potential drug-allergy interactions, drug-drug interactions, and drug-diagnosis interactions based on current medications, active allergies, and active problems   | Yes: drug-drug, drug-allergy                          | Yes             |
| 18. | Medication reconciliation                            | LT 14.02 At admission, discharge, and each change in level of care during the facility stay, the system shall provide the ability to capture a signature or the user ID and date stamp indicating that medication reconciliation has been completed | Yes   | Yes             |
| 19. | Referral management                                  | LT 16.05 Present recommendations for potential referrals based on patient condition (e.g., conditions triggered from MDS such as declining ADL's, vision or hearing problems, abnormal lab values, recommendation for medication evaluation, etc)   | No  | No              |
| 20. | Specimen collection                                  | LT 18.01 Present information necessary to correctly identify the patient and accurately identify the specimen to be collected including, but not limited to, patient name, specimen type, specimen source, means of collection, date, and time      | No  | No              |
| 21. | Results  | LT 19.01 indicate normal and abnormal results based on data provided from the original data source  | No  | No              |
| 22. | Documentation  | LT 21.01 Indicate that a patient has completed advance directive(s)   | Yes   | No              |
| 23. | Care plans, guidelines, protocols                    | LT 22.01 Provide access to standard care plan, protocol and guideline documents when requested at the time of the clinical encounter. These documents may reside within the system or be provided through links to external sources                 | Yes   | Yes             |
| 24. | Medication administration                            | LT 23.01 Present the list of medications that are to be administered  | Yes   | Yes             |
| 25. | Immunization administration                          | LT 24.01 Ability to document clinical assessment pertinent to immunization administration   | Yes: influenza, pneumonia                             | Yes             |
| 26. | Disease management, preventive services and wellness | LT 26.04 Document that adherence to an established treatment guideline was performed based on activities documented in the record (e.g., vitals signs taken)  | Yes: care plans were developed as clinical guidelines | Yes             |
| 27. | Inter-provider communication                         | LT 28.02 Messaging between users  | Yes   | Yes             |
| 28. | Medical Equipment                                    | LT 30.01 Capture a list of the patient's specialized medical equipment and each prosthetic, orthotic, or implantable device   | Yes   | Yes             |
| 29. | Assessment Instrument                                | LT 31.01 Capture all data elements as defined in the most recent federally mandated assessment data specifications  | Yes   | Yes             |
| 30. | Assessment Instrument                                | LT 31.11 Generate a Home Health Certification and Plan of Care with all the required elements (e.g., CMS 485 form)  | Yes   | Yes             |
| 31. | Assessment Instrument                                | LT 31.18 Flag for inconsistencies between OASIS, Plan of Care, and treatment performed by providers   | Yes   | Yes             |
| 32. | Assessment Instrument                                | LT 31.19 Flag potential LUPA and PEP situations   | Yes   | No              |
| 33. | Report generation                                    | LT 32.01 Generate reports of clinical and administrative data using either internal or external reporting tools   | Yes   | No              |



|     | <b>CCHIT Category</b>                    | <b>CCHIT Certified 2011 LTPAC Criteria<sup>2</sup></b>   | <b>Available</b> | <b>Observed</b> |
|-----|--|--|------------------|-----------------|
| 34. | Health record output                     | LT 33.01 Define one or more reports as the formal health record for disclosure purposes  | Yes              | No              |
| 35. | Clinical decision support administration | LT 36.01 Update the clinical content or rules utilized to generate clinical decision support reminders and alerts  | No               | No              |
| 36. | Confidentiality                          | LT 37.02 Identify certain information as confidential and only make that accessible by appropriately authorized users  | No               | No              |
| 37. | Laboratory                               | IO-LT 07.01 Receive and store general laboratory results (including the ability to differentiate preliminary results and final results and the ability to process a corrected result) using the HL7 v.2.5.1 ORU message standard   | No               | No              |
| 38. | Clinical documentation                   | IO-LT 10.10 Display and generate HITSP C32/CCD documents and file them as intact documents in the EHR. Summary patient record content information will include: patient demographics, medication list, and medication allergy list | No               | No              |
| 39. | Privacy                                  | SC 03.01 Authenticate user   | Yes              | Yes             |
| 40. | Privacy                                  | SC 06.01 Confidentiality of PHI delivered over Internet  | Yes: encryption  | Yes             |

### References

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