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Electronic Nursing Documentation: Patient Care Continuity Using the Clinical Care Classification System (CCC)

Luann WHITTENBURG, PhD, RN BC, FNP BC, CPHIMS, FHIMSS, PMP, FAAN [a 1]
Aunchisa MEETIM, RN, Senior Nurse Manager, Nursing Informatics[b]

[a] *Medicomp Systems, Chantilly, VA*
[b] *Bumrungrad International Hospital, Bangkok, Thailand*

Abstract. An innovative nursing documentation project conducted at Bumrungrad International Hospital in Bangkok, Thailand demonstrated patient care continuity between nursing patient assessments and nursing Plans of Care using the Clinical Care Classification System (CCC). The project developed a new generation of interactive nursing Plans of Care using the six steps of the American Nurses Association (ANA) Nursing process and the MEDCIN® clinical knowledgebase to present CCC coded concepts as a natural by-product of a nurse's documentation process. The MEDCIN® clinical knowledgebase is a standardized point-of-care terminology intended for use in electronic health record systems. The CCC is an ANA recognized nursing terminology

Keywords. Continuity Care, Nursing Informatics, Electronic Documentation, Clinical Care Classification System, CCC

1. Introduction

Nursing informaticians are increasing the visibility of professional nursing through the implementation of coded Nursing Plans of Care in the Electronic Health Record (EHR) [1]. A new generation of Nursing Plans of Care reuses patient data from the nurses' patient admission or shift assessments, deploys the professional framework of the American Nurses Association (ANA), the full six steps of the nursing process, to prompt individualized, customized, Nursing Plans of Care using structured, coded nursing concepts for enhanced continuity of care documentation. In most EHRs, nurses autonomously assess patients and their psychological, functional, physiological, and health behavioral needs that may be unrelated to a medical diagnosis. This nursing assessment is critical to achieving improved patient outcomes. Nursing Plans of Care frequently identify patient concerns that may not be identified when treating a patient's medical diagnosis alone. This patient assessment and 'needs analysis' is a function of the nursing diagnosis and provides the rationale for 'why' a Nursing Plan of Care is essential for patient care coordination. This new design of Nursing Plans of Care has

[1] Dr. Luann Whittenburg, Medicomp Systems, 14500 Avion Parkway, Suite 175, Chantilly, VA 20151; lwhittenburg@medicomp.com; +01 1 703 803 8080

been implemented at Bumrungrad International Hospital to promote continuity of care through the integration of nursing patient assessment data coded in MEDCIN® clinical concepts and nursing documentation for individualized, coded Nursing Plans of Care using the Clinical Care Classification System (CCC), the United States first national nursing terminology standard [2]. Bumrungrad International, one of the largest private medical facilities in Southeast Asia, is a 580-bed Joint Commission International accredited hospital that provides care for more than 1.1 million patients annually including over 520,000 patients from more than 190 countries. The project objective was to create the next generation of interactive and individualized Plans of Care to provide more personalized nursing care and enhance patient care continuity.

MEDCIN® is a renowned clinical knowledgebase which includes a hierarchy of nearly 400,000 clinical terms in six data domains: symptoms, history, physical exam, tests, diagnoses, and therapies [3]. In MEDCIN® the information structures and concepts of the CCC System use Hyper Text Markup Language (HTML) [4] and JavaScript [5], a scripting programming language that runs on a web browser. JavaScript allows web pages to function for specific purposes and is supported by a variety of web browsers such as Internet Explorer, Safari, Firefox, and others.

The CCC System [6] is the nursing terminology for MEDCIN® to achieve a sustainable approach for the documentation of patient care. The CCC System consists of a four level framework. The first level consists of 21 Care Components used to link the six standards of the Nursing Process as well as the two terminologies (CCC of Nursing Diagnoses and Outcomes) and (CCC of Nursing Interventions /Actions) to each other. The CCC framework is illustrated at: www.clinicalcareclassification.com. The CCC System framework makes it possible to document nursing care based on the six standards of the Nursing Process: Assessments, Diagnoses, Outcome Identification, Planning, Implementation, and Evaluation (outcome of nursing care) for professional practice. The CCC has a five-character alpha-numeric structure to code the nursing concepts of the two CCC System terminologies making standardized, coded nursing documentation able to link and track the patient care process for an episode of illness. The CCC can also be used for linkages with its two interrelated terminologies as well as other EHR systems (interoperable), such as SNOMED CT or Logical Observation Identifiers Names and Codes (LOINC).The CCC System is indexed in MEDCIN® to CPT®, DSM, ICD, LOINC®, RxNorm, SNOMED CT® and others for the prompting of CCC concepts for virtually any clinical condition.

2. Methods

In this applied research, the data layout of existing nursing assessment documentation currently in use the Computerized Provider Order Entry (CPOE) system was replicated in HTML, codes in a file intended for display on a web browser page, and JavaScript, both content components of the World Wide Web Consortium (W3C) and was used to create structured, standardized, coded CCC Nursing Plans of Care based on existing nursing assessment which were a priori supporting the Bumrungrad nursing workflow and evidence-based practice. In using MEDCIN® within HTML layout, the patient's signs and symptoms documented in the assessment automatically presented relevant CCC concepts within the Nursing Process format [7]. This method, known as the Integrated Method™ carries a CCC code to the Nursing Plan of Care based on a coded MEDCIN® term that allows data aggregation for future nursing care research and

analysis. The CCC System Information Model guided the integration of nursing data in the Nursing Plan of Care to optimized care continuity using the Nursing Process.

3. Results

MEDCIN® allowed Nursing Plans of Care for a single patient to be individualized based on nursing assessed signs and symptoms and for documentation to flow directly from point-of-care assessments to the Nursing Plan of Care [Figures 1, 2]. In 2014, 50 nursing assessment documentation layouts were in HTML. Of these, 18 were selected for Phase #1 use of the HTML layouts in the Integrated Method™. There were two phases of the Integrated Method™: Phase #1 was from Feb.-Mar. 2014 and involved 75 patients. Phase #2 from May to July 2014 and involved 82 patients. During each Phase, paper and electronic nursing assessment documentation was done concurrently (in parallel) for each patient to avoid any loss of data integrity or effect on patient care:

- Phase #1: February – March 2014: 75 patients
- Phase #2: May – July 2014: 82 patients

In the Integrated Method™ CCC codes were carried from the nursing assessment documentation to the Nursing Plan of Care. A retrospective review of the first 24 hours of admission documentation found the completeness of nursing assessments was higher with the Integrated Method™ than CPOE documentation (compared with average 2013 scores) [Figure 3]. In the Phase #2, Integrated Method™ completeness was higher than Phase #1. Currently, the Integrated Method ™ has been used to prompt individualized Nursing Plans of Care for 1,755 new admissions. The Integrated Method™ is now hospital-wide with MEDCIN® and the CCC used for 97% of new inpatient admission documentations.

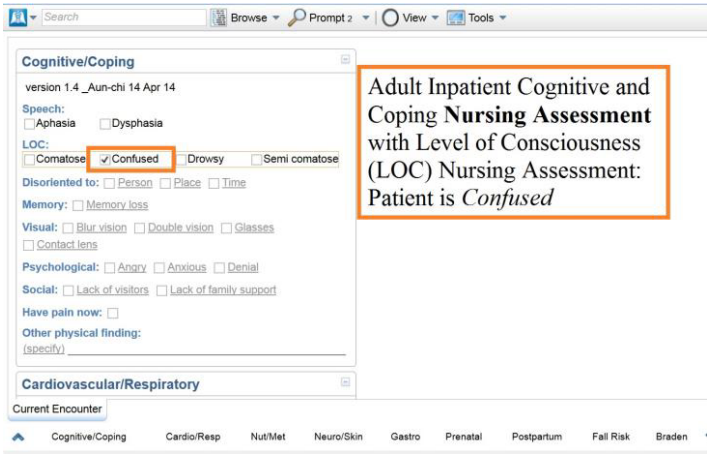

Figure 1: Nursing Assessment documentation [© 2014 Medicomp].

Figure 2: Sample Nursing Plan of Care **[**© 2014 Medicomp].

The HTML layouts using MEDCIN® and CCC demonstrated data continuity between the nursing assessments of patient sign and symptoms and individualized Plans of Care. The new Nursing Plans of Care enabled the re-use patient data to offer new insight into the complexity of care performed by nurses. The Integrated Method™ with HTML and CCC contributed to patient care continuity between the nursing assessment and documentation of patient sign and symptoms and Nursing Plans of Care.

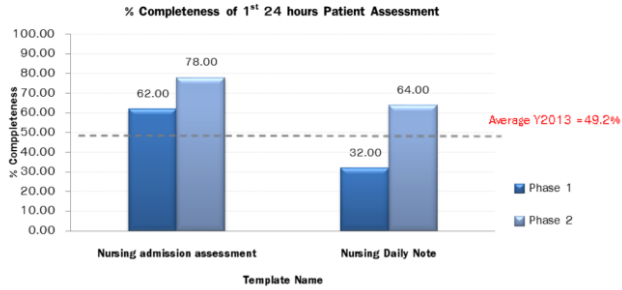

Figure 3: Electronic Documentation Completeness

4. Discussion

The benefit of applied research is validation that the partnership of nursing and technology is vital for designing nursing practice environments. A clear and robust nursing terminology standard identifying each of the six steps of the Nursing Process supports the documentation patient care continuity. The exchange of nursing data using the Nursing Process facilitates the provision of patient-centric care for the entire healthcare team. The research recommendation is to include standardized, coded, nursing terminology in EHR nursing documentation modules. The replication of this

study is feasible; the CCC System is available in the public domain and can be used in further research studies with copyright permission.

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