Running Head: Duke CT Step-down eKardex

Revision of:

Duke Cardiothoracic Step-down eKardex: A Strategic Plan

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Background and Significance

With escalating complexities in patient care, nurses must have reliable, accessible, up-to-the-minute data to make appropriate health care decisions that lead to improved patient outcomes (McDaniel, 1997). Nurses traditionally document patient information in a medical record using pen and paper. With today's fast-paced environment, nurses' need more than traditional paper sources of information. Healthcare providers need information to accurately and decisively guide patient health management while administrators focus on investing in information technology (IT) concentrating on executive IT systems that supply "critical data of strategic and operational importance to management" (Boehm, p.24). Each respective stakeholder group demands quick access to information, efficient provision of services and resources, and ultimately decreased costs. To date, Pabst cites that most studies describing automated nursing documentation can attribute savings in cost as a result of less overtime by nurses (1997). Computers enable practitioners to process information that is accurate, unduplicated, error-free, and accessible from remote areas by multiple persons at the same time (Young, 2000).

Duke University Hospital (DUH) is a Level III Trauma Center, serving an occupancy of nearly 800 inpatients daily. The DUH Cardiothoracic (CT) Division has 20 ICU beds as well as 62 step-down beds. Charge nurses in the DUH CT step-down unit currently use a paper report sheet that is freshly printed at the beginning of each shift. This printout contains minimal information for each patient: name, medical record number, attending physician, date of admission, allergies, admitting diagnosis and room number. The off-going charge nurse provides an oral report to the on-coming charge nurse. The off-going charge nurse has obtained patient information from rounding on each patient and reviewing the care in process with the bedside nurse referring to a paper kardex. The process is cumbersome and fraught with errors of

omission and outdated information, as it requires the review of up to 62 patients each shift. Charge nurses are limited in space on their report paper and modifications to the data become difficult as patients are discharged and scratched through. Then, newly admitted patients have their information transcribed in the margins; it is impossible to rewrite the entire sheet after each admission or discharge. Charge nurses have expressed the desire to have more complete patient information but are limited by the traditional paper format.

Some advantages to converting to an electronic kardex (eKardex) with this patient population are a fairly consistent patient population and they're limited five to seven consistent diagnoses on any given day with fairly predictable nursing care. The average length of stay is around 4 days, providing an opportunity to reduce redundancy because the patient information is potentially rewritten each shift for 8 shifts before discharge. Providing an eKardex on a Palm Pilot would only require the charge nurses to update the information as the care of patients evolved during their stay. Discharges and admissions would no longer cause a "space" issue. Having the actual eKardex at the charge nurse's fingertips will support better decision making throughout the shift. Thus, this proposal outlines the strategic plan for the conversion of a paper kardex to an electronic Palm Pilot-based eKardex and its implementation.

Strategic plan components

I. Vision: DUH CT Step-down charge nurse communication is effective and efficient.

II. Mission: Develop and implement a pilot project using an automated electronic kardex (eKardex) on a hand-held Palm Pilot to facilitate accurate and timely communication between charge nurses during shift-to-shift report. Additionally, the eKardex will provide more detailed information about each patient than is traditionally available on a paper report sheet. Accessible and detailed patient

information will facilitate better decision making by the charge nurse during the course of the shift. Consider the future integration with Duke Information Services in order to contribute to the CT Database in the future.

III. Assumptions:

a. This will be a significant change in practice for the charge nurses, many of whom have minimal computer experience.
b. The charge nurses will expect the Palm Pilot to not work as well as paper but a successful implementation may pleasantly surprise them.
c. The hardware will be a Palm Pilot and the software platform will be Pendragon.
d. The Palm Pilot, when used as designed, will save time during shift-to-shift report and enable the charge nurses to sort and retrieve patient information more efficiently and more thoroughly than they can with paper.
e. Ongoing support and maintenance will be negotiated if pilot project is deemed a success.
f. Palm Pilot screen size will be smaller than ideal but must be balanced with the need to be easily carried around by the charge nurses.
g. Palm Pilot will not interface with DUH Health Information Services in this version.
h. Subsequent technical implementations will benefit from and build upon this implementation.

Duke CT Step-down eKardex SWOT Analysis

Strengths	**Weaknesses**
• Vision of Nurse Manager (NM) to incorporate Kardex into electronic format • NM assumes on site Project Manager (PM) role for pilot implementation period • Request of charge nurses (end-users) to simplify current reporting system • "Buy-In" from end-users • Standardizes Kardex system and omits rewriting on paper for each shift • Promotes function of charge nurse as a reliable reporter • Facilitates charge nurse to have additional clinical time dedicated to patient care and reduce overtime • Prototype evolution of product promotes super-user, end-user and developer interaction • May be interfaced with current DUH HIS in the future • Low number of Palm Pilot units required for project (n=2); Budget already approved • IT support available for entire project • Project lends itself to CQI/TQM	• Program does not interface with DUH HIS • Pendragon formatting may not be ideal for automating eKardex • End-user flexibility for pilot rollout • End-user dedication to pilot • Data entry time requirement lengthy at pilot phase • Incomplete data entry when paper copy incomplete/unavailable • Incomplete data entry when bedside nurse unavailable for verbal reporting to charge nurse • Screen on Palm Pilot may violate OSHA ergonomic standards • Potential HIPAA violations if Palm missing/stolen • Future support and maintenance uncommitted pending pilot evaluation and recruitment of project champion • End user may find Palm Pilot cumbersome compared to paper
Threats	**Opportunities**
• Budgetary constraints with acquisition of hardware/software and training by CT Service Line • Nursing Administration denial • Risk Management denial • Nursing Policy and Procedure denial • Pending implementation of CPOE may overshadow ongoing support • Super-user/end-user lose interest due to data entry time requirement during pilot • End users may pour coke on hardware if they don't like it • Future and ongoing IT support not guaranteed	• Improves communication among charge nurses • Saves time in reporting • Data concise, complete & legible • Ultimately improves patient care and supports improved decision-making • eKardex is valued by end-user • eKardex gains second favor for retrial • eKardex may become permanent part of record with future EHR • Future trials of eKardex that may be modified to meet specific patient populations • eKardex is interfaced with Duke HIS • Palm Pilot/software is acquired for additional clinical nursing applications

	• Data mining of CT patients for analysis at hospital, regional, and national level • Project to be made available for free viewing on website (DUH & DUSON)

Feasibility analysis

Operational Feasibility	• *Intended for Charge Nurse(n=2) reporting each shift change* • *Charge nurses will be trained as a super-user group and ultimately will become the end-user group* • *Long term goal of future intention for bedside nurse clinicians if pilot successful* • *Potential for eKardex to become permanent part of record (potentially contributes to an EHR)*
Economical Feasibility ***Economic Feasibility***	• *ROI can be demonstrated with proficient use of nursing time for data entry* • *Software can be formatted/utilized for multiple patient populations* • *Palm Pilot in-services estimated at 2 hours for Super-user/end-user group* • ***Direct costs**: (1) Pendragon software; (2) user training (20 charge nurses) allotted for one 2 hour (hr) inservice during work hrs (40 hrs total for 2 shifts); (3)Interim on premise (IOP) nursing staff to fill gaps during each 2 hr inservice; (4)current NM to act as PM during pilot phase (no direct cost);(5) preexisting supply of 2 Palm Pilots (no direct cost); (6) IS inservice training for 2 hours; (7) NIS inservice training for 2 hrs; (8) NIS training of super-users/end-users x 2 sessions; DUH IS support for super-user/end-user 24/7/365 (no direct cost beyond inservice);(10) Pendragon software support 24/7/365 (at rate = $ 85 /hr); (11) Travel expenses of Hardware/software vendors* • ***Indirect Costs:** (1) Increased report time as end users learn technology; (2) Office materials; (3) DUH non-nursing employee benefits*

	Feasibility Analysis (continued)
Time Feasibility	• *eKardex can be planned, designed, and prototype piloted within 8 weeks by DUHSON group* • *Relatively short(2 hours) inservice programming of Super-user/end-user group* • *eKardex testing by end users relegated to 2 week initial test*
Technical Feasibility	• *eKardex will be supported on Palm m130 using Pendragon forms* • *Each Palm m130 will be password protected* • *DUH HIS not amenable to interface with Pendragon software* • *Duke IT support available 24/7* • *On-site Project Manager* • *Super-user group selected* • *Screen size smaller than desired but device easily carried around by the charge nurse.*
Legal Feasibility	• *eKardex will be published in an open source on the web, bypassing legal implications of ownership by the DUHSON graduate students developing the program, DUHSON, and DUH.* • *HIPAA violations potentiate malpractice claims (civil/criminal)* • *A disclaimer will be added to the Palm m 130 initial screen*

Goals

By overcoming the limitations of a paper report sheet as described in the introduction, we hope to (a) develop an eKardex PDA application that improves nurse communication and patient care, (b) create a change process that encourages user suggestions for improvement and finds them both competent and satisfied when using the eKardex PDA application, and (c) provide support that will minimize gaps in data collection and management during the change process.

In an effort to reach these goals, development of the eKardex tool will require attention to detail in both tool design and implementation to meet user needs. To facilitate this time "of change" reference cheat sheets will be available in pocket size format for easy review.

Administrative support will obtained by the nurse manager to encourage and support this initiative through completion. The final goal outcomes will improve nurse communication regarding patient care thus reducing data collection and management gaps. The graduate student palm pilot team, including the nurse manager, will be responsible for all aspects of this project up to evaluation and maintenance.

Evaluation of goal outcomes will be measured by user satisfaction and review of data for completeness and integrity (all fields answered and directions followed) and will be completed by the nurse manager. Revisions of eKardex will be based upon "lessons learned" during pilot and evaluation information before "go live date". In the event that numerous changes beyond the scope of the nurse manager are needed, the graduate student palm pilot team will be available for support and assistance. HIPAA requirements will be maintained during all aspects of this project. Attention to the actual location of PDA synching area and printer will be monitored on a regular basis by NM.

Finally, maintenance of the eKardex software and hardware along with data collection and collation will be negotiated with Duke IT by the nurse manager and the select charge nurses assigned to this project. In the event of hardware failure, an additional PDA will be on loan from the school of nursing (one of the team members') during the pilot. At all times, back up paper tools will be available to maintain data and process integrity. The nurse manager will maintain contact with the Duke IT team for current and future planning of this project. Though it is unlikely at this time, perhaps experience with the tool and future Duke IT system changes would facilitate an interface (or even negate the need for one).

Benchmarks

A literature search revealed the latest article on kardex was dated 1995 (Escaf). Escaf describes a paper kardex that facilitates health care team communication. Silva, et al, describe an electronic kardex integrated with the nursing plan of care which "significantly reduced required nursing paperwork" (1992, p. 232). Incidentally, this electronic kardex produced a piece of paper for the medical record printed from a desktop computer (Hinson, 1984). A study in 1990 demonstrated that an electronic kardex could save time during shift to shift report (Hendrickson). Simpson documents that using a paper kardex sufficiently demonstrated to Joint Commission surveyors an increase in quality of nursing care (1985).

An assessment of nursing's use of Palm Pilots in the literature revealed several examples. A recent program in Alabama has RNs functioning as case managers collect patient data into a Palm Pilot for submission into institutional and national databases (Robertson, 2003). A workgroup report from the American Academy of Nursing Technology describes an automatically generated electronic kardex derived from the nursing assessment (2002). The report describes the ideal nursing care-delivery system as one that "….replaces paper-based, administrative tasks with a paperless, point of care, computer-based patient record embedded with intelligent, rules-based capabilities that automate the manual workflow processes, policies and procedures, and that support the nurses' critical thinking" (p. 6). This report further states that hand-held devices and electronic kardex would be part of an ideal nursing care-delivery system.

Clinical Nurse Specialists at Moses Cone Hospital use Palm Pilots to search existing electronic patient records for patients with signs and symptoms of diabetes (Advisory.com, 2002).

Columbia University's school of nursing has implemented a patient care data base which students use to log patient interactions (Bakken, 2004). The students use a handheld device to enter patient information which they then retrieve to build a portfolio documenting their patient care experience.

Duke CT Step-down eKardex Lifecycle Management Matrix

Lifecycle Phase	***Technology***	***People***	***Organization***	***(Change) Strategy***
Analysis & Planning	*Determine number of Palm Pilots/computers needed and obtain budgetary support*	*Secure upper management buy-in, involve charge nurses (end users) in all phases*	*Identify any organization-specific requirements/ barriers*	*Ask if aware of any desired features that could be added to report sheets*
Design	*Pendragon forms to convert paper report to eKardex*	*Solicit input from all stakeholders*	*Meet or exceed organizational/ compliance requirements*	*Reinforce similarities to paper form with extra features to make more effective*
Implementation	*Ensure eKardex form debugged and reliable, make sure backup Palm Pilot is available*	*Train in use of palm, charging units, provide eKardex documentation*	*Inform of "go live" time and expect a learning curve during report time (extra time budgeted)*	*Provide early subjective/objective data of improved report process to all stakeholders, provide visible support/ encouragement*

Evaluation	*Any software/ hardware defects?, Do they meet needs of our project?*	*Using as designed?, Is work flow positively/ negatively impacted?*	*CBA, CQI/TQM, ROI*	*Adopted by target audience, able to verbalize benefits, Further suggestions for improvement?, ID any advocates who can be superusers/promoter*
Support	*Forms tool documentation, back up paper documentation available, reset Palm Pilot's after data uploaded on periodic basis*	*Follow on training, superusers trained, IT help line , cheat sheets on unit*	*Ongoing review to ensure compliance met, system policies not violated (HIPAA, etc.), larger scale info on benefits/potential improvements that have been identified through the data collected*	*Continue to seek feedback from users, support staff, and other stakeholders as to impact of eKardex and areas for ongoing improvements, praise for all their hard work in implementing eKardex*

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