As hospitals move away from paper documentation toward totally electronic documentation of patient care, nurses are struggling in their efforts to document how they provide safe, effective and efficient care. Although some outdated practices are being discarded, the nursing Kardex continues to be a valued source of information and communication.

Shriners Hospitals for Children in Lexington, KY, provides orthopedic and physical rehabilitation care for children. Children may be admitted to the inpatient unit for evaluation, surgery, treatment, rehabilitation or infusion therapy. This type of setting requires current accurate documentation in order for nurses on each shift to know a patient’s status of care.

The ongoing electronic healthcare record implementation project, guided by multi-disciplinary teams, impacts every department of the hospital. Teams use Care and Outcomes Management Plans (COMPlan) for details of critical pathways from outpatient visit through inpatient care and outpatient follow-up visit. The COMPlan documentation is multi-disciplinary, covering not only outpatient, inpatient and perioperative nursing, but also interventions provided by physicians, graphic arts, prosthetics, orthotics, radiology, motion laboratory, research and physical, occupational and recreational therapy departments. COMPlans have been in use for several years as a paper-based document outlining specific clinical measures for care planning. COMPlans are stored in the paper chart, which is seldom accessed now that nurses’

**KEYWORDS**
Kardex, clinical pathway, care plan automation, nursing care plan, electronic documentation.

**ABSTRACT**
The gradual transition from paper records to electronic records presents challenges for nurses. In particular, split paper/electronic records can interfere with staff communication during shift change reports. A project was implemented to facilitate documentation of individualized care plans and improve staff communication during shift change report. The hospital’s critical pathway was incorporated into Kardex to create a single electronic medical record for use during shift change report. This combined electronic outcomes plan and Kardex improved access to patient information during shift report and facilitated nurses’ ability to update the care plan with the most current patient information. Future strategies will include collaboration with the hospital’s information systems staff to make the COMPdex compatible with the hospital’s electronic documentation system, so that pertinent patient data will populate from the current electronic chart into the COMPdex forms for printing and to include patient outcome data in the electronic medical record.

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clinical flow sheets, CPOE and medication administration record are electronic. The traditional Kardex is stored in a multi-patient binder for access during shift change report. Long range plans for the electronic record include provision for clinical pathways, but in the interim, nurses have found that the split paper/electronic record has created gaps which interfere with communication, especially during shift change report. Failure to record individual plans of care when documenting on the COMPlan has resulted in pertinent information being omitted from shift change report. The purpose of this paper is to describe an effort to bridge a gap in nursing communication created by the staged implementation of clinical documentation.

CONCEPTUAL FRAMEWORK: PARETO THEORY
Pareto analysis facilitates decision-making when a number of disparate factors contribute to a problem. Eighty percent of a problem can be resolved by the correction of 20 percent of the causes. The analyst identifies causative factors and groups them into relevant categories with logical units of measurement, such as frequency or cost. The analyst then constructs a bar chart with categories ranked in descending value with cumulative percentages of the overall total, identifying the point at which the cumulative percentage equals 80 percent. Correcting the majority of causes for the documentation failures should result in near perfect resolution of the problem according to Pareto theory.

In this project, a Pareto analysis of causes for incomplete documentation on the COMPlan revealed that the major impediments to completeness were location of the document and the lack of blank spaces for data entry. Combining the Kardex and COMPlan into a single document not only improved the efficiency of the nurse when accessing the documents, it also reduced the chance for error because the nurse had the COMPlan at every shift change. This access provided staff with the opportunity to update changes in the patient status or needs. In addition, it reduced reliance on memory, thereby increasing accuracy and efficiency of shift change report.

OVERVIEW OF THE LITERATURE
The word Kardex, although used universally in healthcare, is not a PubMed MeSH term. Rather, the name refers to a visible index card data filing system created in 1898 by James H. Rand, Sr. Kardex has become a generic term for the patient care information sheet used by nurses and pharmacies. A search of the PubMed database using the combined terms “Outcome Assessment (Health Care)”[Mesh] and “Critical Pathways”[Mesh] and “Kardex” found no results. Articles dating back to 1970 about combining Kardex with care plan were found using Google Scholar.

Searches in PubMed and Google Scholar using the term “Kardex” alone yielded two types of articles: those published in nursing journals about discontinuing use of the Kardex during the
The COMPdex for “Surgery with Cast” was piloted for twelve patients and evaluated for effectiveness in improving documentation and more complete shift change report. The COMPlan documents were developed through the collaborative efforts of a multi-disciplinary committee. Suggested revisions were made and the pilot COMPdex was submitted to nursing administration for final approval. The remaining COMPlan were converted to the new format and added to the computer. Information Systems staff was consulted to make the COMPdex interface with the hospital’s electronic documentation system so that pertinent patient data populated from the current electronic chart into the COMPdex forms before printing. Patient demographic data from the electronic patient record was fed to a separate database used by patient registration. This database will be tapped to feed patient information into the COMPdex.

Care was provided by nursing and other departments, but documentation on the COMPlan was entered by the patient’s primary nurse as coordinator of care. The existing COMPlan were

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**Development of COMPdex**

The COMPdex for “Surgery with Cast” was piloted for twelve 1980s or 1990s; and those published in medical journals listing the nursing Kardex as a source of patient data for research studies as recently as 2004.4-6 It is interesting to note that medical researchers viewed the Kardex as a valuable source of patient information, confirming the belief that it should be brought into the age of technology instead of being discarded. However, care plans are generally viewed by bedside nurses as holding little or no relevance to direct patient care.7 Indeed, if the care plan is going to be useful, it must follow patient care processes closely and require a minimum of documentation. Moreover, use should foster and facilitate practice and not be an additional task. It is also critical for the care plan to reflect the actual processes in place across the patient encounter or illness episode.8 The care plan outlines the expectations for a typical patient, while the Kardex supplies specific data about the individual patient. Essential to the shift change report is the declaration of where the patient is along the clinical pathway.

Changes in nursing shift change process resulted in increased analysis and interpretation of patient care plan and an improvement in the documentation of evaluation of patient responses to the plan of care.9 Shift change report was viewed as ritualistic, though necessary for communicating about patient conditions.10 Pertinent commentary supplied in the verbal report may be omitted from a rigidly structured historical report. This inclusion of relevant, anecdotal information requires critical judgment by the experienced nurse, and could never be programmed into an automated report generator software program.

A primary purpose of shift change report is to communicate vital information, but other objectives include time for social interaction, support and education of novice staff.11 Interestingly, shift report is also a source of dissatisfaction for nurses.12 The most commonly cited reason for dissatisfaction was the insufficient amount of information exchanged during report. Therefore, a printed sheet of handover information along with the verbal report resulted in the least amount of data lost during shift change report and reduced sources of irritation.13 Efforts to streamline the handover process resulted in improved quality and reduced amount of time spent in report. Written handover report also improved accuracy and inclusion of vital information by reducing dependency on memory alone.14

The Joint Commission on Accreditation of Healthcare Organizations was a source of information required for a complete handoff report.15 An automated report would improve inclusion of lab and other test results, medications, and relevant demographic data. An electronic system should be utilized to maximum capacity possible to facilitate nursing processes. A low-tech solution should be considered when a full enterprise installation is not feasible.16 An electronic Kardex in use by Taiwanese nurses utilizes commercially available office software that gathers information from a mainframe database and applies that data into a usable document.17

**Development of COMPdex**

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revealed that the unauthorized forms contained vital information which was not written on the patient's record.

To eliminate these problems, sections of the COMPlan Interventions that duplicated information were eliminated from the Kardex. (Fig. 2a, b, c) Then patient data was organized for report purposes into four columns. The first column specifies information related to diagnosis and reason for admission; information is retrieved from the admission scheduling information form completed by the admitting physician, and the patient's electronic record. The second column contains basic history relevant to the admission, transcribed from the admission scheduling information form. The third column focuses on parents, custody and discharge planning, and also specifies the primary nurse and care coordinator, since those are relevant in discharge planning. The fourth column contains a minimal amount of physician order information that is passed along in report, but not found in the COMPlan interventions. This data will come from the orders matrix of the electronic patient record. The Kardex area is printed in a medium gray to provide visual contrast to the handwritten information which is read quickly during shift change report.

Workflow process changes incurred by the new documentation were minimal. The advantage to combining the documents was that the plan would be used at with every shift change. A disadvantage was that the Kardex became a part of the permanent record. Therefore, entries could no longer be written in pencil or erased. In the change, all handwritten entries would be recorded using black ink and a yellow highlighter was used to emphasize outdated information or completed tasks. The primary nurse starts a new, updated copy when the first form is full of handwritten entries and the original form is filed in the paper chart with a notation that a revised copy is now in use. The highlighter use will provide focus on incomplete tasks or current status, enabling more rapid shift change report.

**EVALUATION**

Nursing staff first to use the new COMPdex were introduced to
the grassroots project through group and individual in-service sessions. The importance of staff input and feedback was emphasized as a "by us, for us" process improvement. The Surgery with Cast COMPdex forms were placed in the charts of patients scheduled for admission along with evaluation forms. The idea was well-received and staff commented that the change was important.

Nursing staff were encouraged to give feedback and they were given progress reports as revisions were made and when use of the COMPdex forms was implemented. Formative evaluation will continue after the project is fully implemented through chart audit. Summative evaluation will be anticipated with the next Joint Commission survey with the expectation that content will satisfy the recommendations for documentation and hand-off report completeness and accuracy.

CONCLUSION

Evaluation feedback was organized around three categories. Unit secretaries commented that information was missing from the Kardex section, but when it was explained that data spaces were removed if they were duplicated in the COMPlan sections, they were pleased at the reduction in their transcription process. With the pilot study limited to only one care management plan, nurses giving report from a mixture of old Kardex forms and the new COMPdex commented that switching back and forth between the two slowed down their shift report by breaking their focus and concentration.

This should be resolved when all patients are on the new forms. A third category was a finding from the pilot study that nurses seemed reluctant to use the highlighter on the COMPlan sections to cross off completed tasks. This reluctance should resolve with time, problem solving, and increased familiarity with the change.

As clinical use of electronic documentation evolves, further study is needed to evaluate and measure the impact on nursing workflow processes and the impact on patient care. Nurse informaticists are uniquely qualified to ensure that the electronic patient care record is not just a data input-only burden for bedside nurses, but a source of information on clinical trends and pathway progression. Information output can enhance nursing care when cognitively processed through the expert nurse’s knowledge and wisdom.

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### REFERENCES