Data rules summary

Data Rules Summary Data Rules Summary Decisions are made through a process of information gathering, synthesizing and then validating that information so that it becomes intelligence to be applied to action. Unfortunately, this process is much easier to entertain from behind a desk than in clinical practice. Nurses, especially novice nurses, often rely upon what they remember from nursing school or the protocols that can be read prior to an intervention. Indecision that arises from critical situations can be compounded by lack of experience, the unavailability of a protocol for reference, an immediacy of need, insecurity, and simply emotional stress and pressure of the moment. The more experienced nurse has internal decision making resources provided by past experiences and a better ability to recognize patterns based on those experiences. Additionally, the experienced nurse may not experience the emotional barriers arising from fear of making the wrong decision. Fear prevents creative and clear problem solving abilities. One way to hasten the pattern recognition skills that are critical in the clinical decision making process of a novice nurse is to create rules that provide a process of intervention through modeling the situation and potential actions that are best suited to accurately resolve health problems. This modeling is based upon a hypothesis and then a listing of rules that lead to a sequence of decisions to be made accordingly. The model and rules naturally also promote the novice nurse to anticipate potential corollary problems and prepare by mentally exploring solutions—proactively avoiding or at least mitigating problems. The best nurse is not the one who is good at ACLS, but rather the nurse who never has had a patient code in the first place. The perfect ability for computerized information management to use a set of rules to determine errors or inappropriate events makes many of

our everyday tasks simpler. For example, if you are entering a medication order for levothyroxine 125mg the computer refers to a set of rules that when translated into English says something like this, “ if someone enters an order called levothyroxine 0. 125mg or 0. 250mg then write this into another box called a MAR. If someone enters an order called levothyroxine anything other than 0. 125mg or 0. 250mg then create an error message saying that this dosage is not acceptable.” By using this rule the nurse can be alerted to a risk for a poor decision and avoid serious problems that can occur when stressed or not entirely focused on the task at hand. Rules can and do prevent accidents. Data rules, and in this case a computerized series of rules that guide the novice or even expert nurse in decision making is much more effective than paper rules that are in the form of standards, policies and procedures as the computer can follow nearly an infinite set of rules and offer direction without the exhaustive process of a person searching through reams of paper and notebooks or even trying to find a human resource for reference. This article describes a complete consideration in defining rules based upon problems and interventions to solve those problems using nationally accepted standards (O’Neill, Dluhy, Fortier, & Michel, 2004). The authors premise that their prototype will consider the decision making process in how a nurse might “ uncover, evaluate and assimilate information“ and develop a computer model based on rules that account for a clinical thinking process which refers the nurse to potential solutions that use best practice as the rules. They prudently used clinicians as well as scientists to develop this system rather than limiting input to only the clinicians or only the coders. Combining potentially “ perfect” solutions to problems by using a perfect tool (a computer that is never wrong) poses a

perfect resolution to the challenges that a novice nurse faces during the learning period. In fact, this computerized approach to clinical decision making can relieve some of the mental stressors that accompany decision making for all levels of expertise and allowing more mental energy to be directed to personal interaction with patients and peers rather than the unnecessary nuts and bolts of mundane decisions. These rules still need to be evaluated as it may be impossible to create a set of rules which address every possible problem. Another challenge is in making the interface easily and readily accessible and usable by the clinician. The complexity of an interface between user and tool has always been and always will be an issue that needs continual consideration. I recently developed a paper check off list (a set of rules) to ensure than every required documentation is completed when we have secluded a patient. We experienced a situation where the nurse did not complete the flow sheet in the two hours allotted time, the doctor did not write an order within the four hours allotted time and some other missing pieces. So, in order to engage our perfect tool, we have to perfectly enter data. " A data rule is an IF…THEN…statement that contains biophysical and/or psychosocial information" (O'Neill, Dluhy, Fortier, & Michel, 2004, p. 139). These rules comprise the basic knowledge that nurses use to observe a disease process in a patient, care for a patient during the progression or regression of that disease process, and evaluate a patient's response to specific therapeutic interventions. An example of an individual rule would be: If the patient has impaired vision, then risk for falls. The data rule would then lead the nurse to perform a falls risk assessment and implement appropriate fall prevention guidelines for that patient. The Nurse Computer Decision Support Project (N-Codes) is a clinical decision

support system (CDSS) prototype for knowledge development. In order to develop data “ rules” for this project, the creators first needed to understand the conceptual framework for novice nurse decision-making in practice. This conceptual framework was used to plan the direction and sequence of decision-making events for the data rules. It was also used to anticipate the decision points that occur in actual practice. Once the decision points were established, the developers were able to establish domain categories for knowledge development, then a typology of the major problems for specific symptoms which could be narrowed down to a specific focus. The creators used CINAHL, PUBMED, and OVID databases to find the best available evidence. They also used resources and evidence-based reports from the web. The evidence collected was appraised for internal validity and quality. In addition, clinician input was also used to resolve conflicts in the literature review. After each piece of evidence was evaluated, the data rules were developed for each domain category. The cumulative strength of all the evidence determined the rating of the data rule (e. g., strong, sufficient, and marginal). After the data rules were rated, the developers categorized them according to the decision points identified in the conceptual framework stage. Finally, practice maps (or templates) for each clinical condition were created using the data rules. These are laid out to resemble the thought process used by a nurse to arrive at a decision. Procedural rules are used to link data rules and connect domains of knowledge. O'Neill, E., Dluhy, N., Fortier, P., & Michel, H. (2004). Knowledge acquisition, synthesis, and validation: a model for decisions support systems. Journal of Advanced Nursing, 47(2), 134-142. Retrieved from EBSCOhost. O'Neill, Dluhy, Fortier, and Michel (2004) made an interesting observation regarding new graduate

nurses, which is that the new graduates when faced with clinical problems they could not differentiate between problems that were less acute and those that required immediate attention, therefore incrementing errors, especially in decision making. O'Neill et al. (2004) explicated that because current strategies don’t contain enough knowledge sources to bring about the best evidence, a firm base in nursing knowledge needs to be built with decision tools of a similar sort as clinical decision support systems. O'Neill et al. (2004) mentioned that a prototype for a likely candidate for decision support is under development by the Nurse Computer Decision Support Project (N-CODES). The best evidence on hand produces rules and cases to build this prototype, because room needs to be made in order to organize the disparate evidences for decisions made in practice. Once the quality of evidence was rated, then the strength of each data rule could be evaluated and developed and organized for each domain category; O'Neill, Dluhy, Fortier, and Michel (2004) explained, “ a data rule is an IF…THEN… statement that contains biophysical and/or psychosocial information. This is the knowledge that nurses use to monitor disease processes, evaluate therapeutic responses, and care for patients as they experience threatening and uncertain situations” (p. 139). Then after the data rules are connected a procedural rule will conform to a model: If stipulation X, is evident, then do Y. The ‘ IF’ part of the rule relates to the domain knowledge in the data rules. The ‘ THEN’ part brings about some other task. O’Neill et al. (2004) gave us an example of risk category questions: Who is at risk for X? Then the intervention category question would be: If I suspect X, what do I do? They added that so far, there are 15 categories of grouped rules, which include: emotional responses (What are the emotional responses that one needs to

be aware of?) and the ‘ living with’ category (What are the issues of that person living with X?). The majority of expert systems (ES) possess hard coded situation-specific knowledge inside rules that are within the knowledge base, thereby generating difficulties in system updates (Murthy & Swanson, 1992). Many ES have suchlike features, where the knowledge is typically depicted as IF-THEN rules. The reasoning techniques comprise forward chaining and backward chaining and are capable of generating explanations of the application programs' reasoning (" Expert Systems Building," 1993). References WETC Hyper-Librarian. (May, 1993). Expert Systems Building Tools: Definitions. Retrieved on 6th June 2011 from http://www. wtec. org/loyola/kb/c3_s2. htm Murthy, U. S., & Swanson, J. A. (1992). Integrating Expert Systems and Database Technologies: An Intelligent Decision Support System for Investigating Cost Variances. Journal of Information Systems 6 (2). 127-148. Retrieved from EBSCOhost. O'Neill, E. S., Dluhy, N. M., Fortier, P. J., & Michel, H. E. (2004). Knowledge acquisition, synthesis, and validation: a model for decision support systems. Journal of Advanced Nursing 47 (2), 134-142. Summary The Nurse Computer Decision Support Project (N-CODES) utilized a set of data rules based on best practice evidence in order to develop a decision support system (DSS) (O'Neill, Dluhy, Fortier, & Michel, 2004). The authors describe data rules as an " IF... THEN... statement that contains biophysical and/or psychosocial information" (O'Neill et al., 2004, p. 139). As the team evaluated the evidence used to support each rule, they rated the level of the evidence to determine the strength of that evidence. Once they determined the level of evidence, they were able to begin to build practice maps using the " if... then..." (O'Neill et al., p. 139) statements to outline the knowledge set (the " if") and the related task (the "

then"). In their practice map, they were able to draw out a map that shows how the data rules then interface with procedural rules that mimic the way a nurse would react in a given clinical situation. The act of creating data rules and drawing practice maps seems like an act of deconstruction. In nursing, experienced nurses draw upon years of clinical experiences as well as their study of best practices and evidence based literature to react on behalf of their patients. If one asks experienced nurses how they knew to act so instinctively and fluidly in response to a clinical event, they may not be able to give an answer other than " I just know." Deconstructing how they know to respond is an important step in helping novice nurses understand how and why to react (O'Neill, Dluhy, & Chin, 2005).