

# Happenings

## Nursing Informatics

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### Health Reform and Information

In the early 1990s most Canadian provinces initiated reviews of their health-care systems. A common theme of the resulting reports was recognition of information systems as a key enabler of health-sector reform — and lack of good information as a key barrier to such reform.

As a result, many provinces are allocating significant resources to the enhancement of the health-information systems in their jurisdictions. It is estimated that by the turn of the century \$300-750 million will have been spent on provincial health-network initiatives alone (CANARIE, 1996). For instance, significant resources have been committed to Alberta's Wellnet, Manitoba's Health Information Network, and Ontario's Smart Systems for Health. These projects, which are often undertaken in cooperation with the private sector, share many goals, such as:

- integration of information systems to achieve a client/patient-centred focus, with a view to improving information-sharing and facilitating integration of health services
- support of epidemiological research and improved management of the health-care system
- elimination of duplication and waste, thereby improving quality of care and saving money.

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Provincial regionalization initiatives are leading to the creation of integrated delivery systems (IDS). The use of informatics in the non-acute-care sector has increased substantially over the last 3 to 5 years. Restructuring has prompted extensive re-engineering and the development of community health-information networks (CHINs) to accommodate new information flows and patterns. For example, in the Toronto area HealthLink will connect authorized caregivers via a high-speed telecommunications network; seven hospitals, the Home Care Program for Metropolitan Toronto (HCPMT), and three private firms are involved in this initiative. In London, Ontario, a similar project, LARG\*net, focuses on interconnectivity issues, medical imaging, multimedia support, and outreach programs. Other trends include an increasing recognition of, and response to, consumer health-information needs and the establishment of pilot projects to evaluate new informatics/telematics technologies. Recently, for example, several relatively large-scale tests have been conducted on "smart card" and "telehealth" technology in Canada.

### **Developments in Health Informatics**

The year 1991, with the publication of the report of the National Task Force on Health Information (Wilk, 1991), marked the beginning of a period of considerable national activity in health informatics. The report fostered the establishment, in 1993, of the Canadian Institute for Health Information (CIHI), an independent not-for-profit organization mandated to develop and maintain a comprehensive and integrated health-information system for Canada. CIHI is responsible for providing the accurate and timely information needed to establish sound health policies, effectively manage the Canadian health system, and create public awareness about good health.

Several successful national initiatives to standardize health information include the Guidelines (CIHI, 1997) developed by CIHI to provide a common framework for the collection and analysis of data on the costs and performance of a health-care facility. The Guidelines are now in use across Canada. CIHI recently coordinated national efforts to develop and endorse standards for classifying health-service interventions, collecting and reporting ambulatory-care data, and several other areas. Building on this standards-development experience, in 1996 it formed Partnership for Health Informatics/Telematics to provide leadership in shaping the national agenda for information and technology standards in health care. The Canadian Nurses Association has been a member of the Partnership since its inception, and CNA representatives

have actively participated in the its Working Groups. The goals of the Partnership are to:

- define and adopt emerging standards for health informatics and telematics in order to ensure the evolution of a non-redundant, non-conflicting set of standards for Canada
- collaborate with other standards-setting organizations in Canada and internationally
- use the standards to foster the development of national longitudinal electronic health records, accessible to health providers, researchers, and policy-makers, as well as health monitoring and surveillance agencies (CIHI, 1997).

Members of the Partnership use current provincial/territorial, national, and international initiatives in defining and adopting standards for health informatics. Working Groups have been established to address the key standards domains of: health-information modelling; classifications, nomenclatures, and terming; privacy, confidentiality, data integrity, and system security; information-exchange protocols; and advanced health technologies.

Through the Partnership, key Canadian stakeholders work together to shape the national agenda for standards in health-information management and information technology. One of its Working Groups has been instrumental in developing the Canadian Classification of Health Interventions (CCI), which differs from classifications systems developed in the United States in that the same codes are applicable regardless of whether the intervention was performed by a physician, nurse, or respiratory technologist and whether it was performed in a clinic, operating room, emergency department, or the practitioner's office. Service-provider and service-setting information are captured as separate data elements in the client's record.

More recently, several major national reports have stressed the importance of informatics in the health sector. For instance, the Information Highway Advisory Council (1995) has recommended that a national health-information infrastructure be developed; an investment fund to support trials and demonstrations of networking technology be created; and national standards be established for data access, data protection, and operative procedures. Similarly, the Prime Minister's National Forum on Health (1997) has called for the provision of improved tools for assessing the health of populations and an improved information-technology infrastructure to support the development and application of evidence-based decision-making.

In response, the federal Minister of Health has agreed to develop a national strategy for an integrated health-information network. The announcement of a \$50-million Canada Health Information System is tangible evidence of this commitment (Health Canada, 1997). The program will fund the development of a national health-surveillance network, a population-health clearinghouse, a First Nations Health Information System, and several other initiatives.

In February 1998 a National Conference on Health Info-Structure was held in Edmonton for the purpose of sharing information, establishing common priorities, and working towards the establishment of a national health-information infrastructure. The report of this conference is expected shortly.

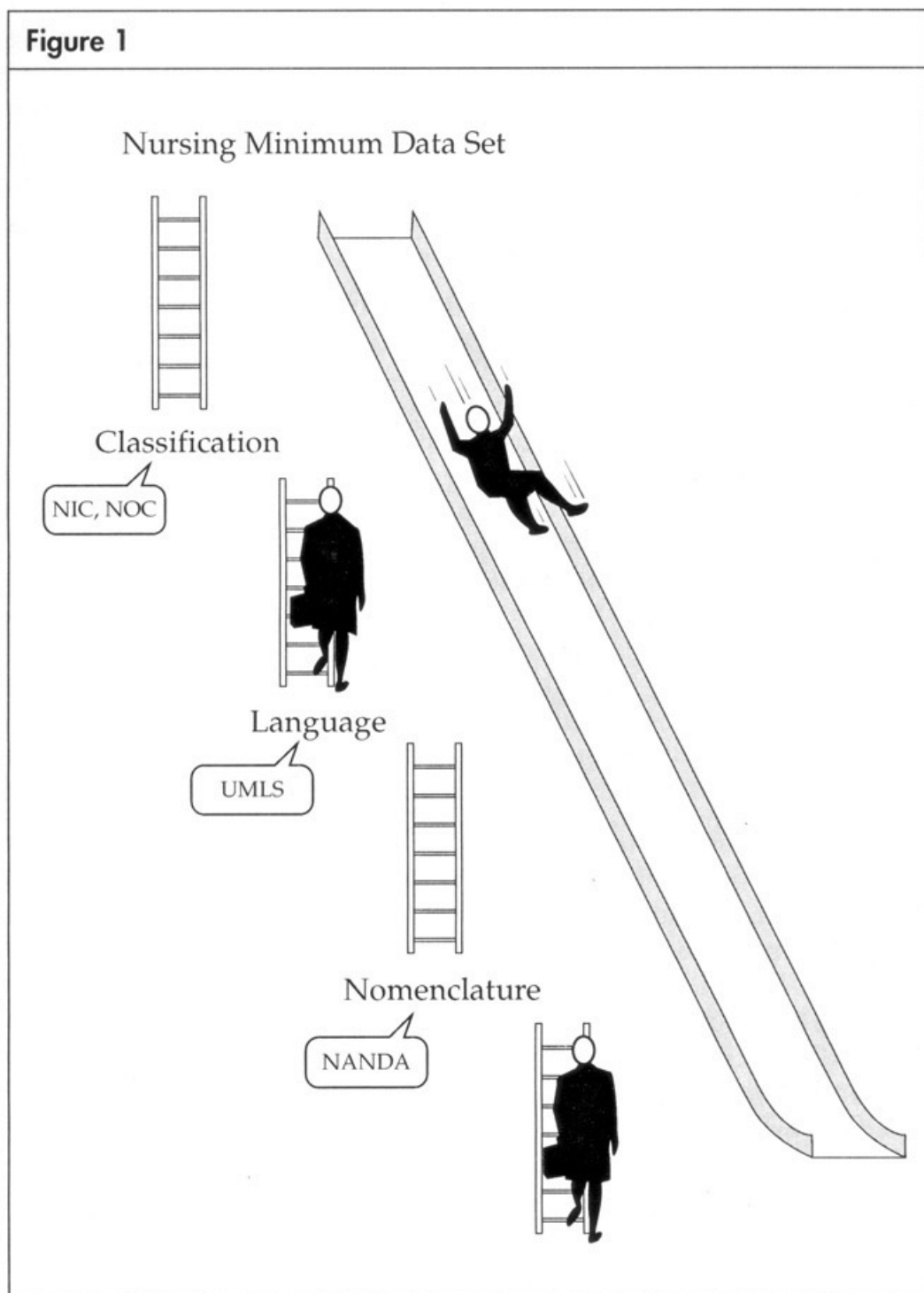
### *Nursing Informatics*

Nurses continually process and organize information systematically by grouping data according to common features. They often do this unconsciously, to make sense of the great amounts of information with which they are bombarded daily. However, nurses have no common language to facilitate precise communication, even among themselves, and, according to Lang, "If we cannot name it, we cannot control it, finance it, teach it, search it or put it into public policy" (Lang, 1992, p. 109).

Because nursing has not had universally accepted methods for defining and collecting nursing data, the data have not been collected. For example, the discharge summaries prepared by hospital medical records departments contain no nursing information, and therefore fail to acknowledge the contribution of nurses during the patient's stay in hospital. Discharge summaries are used by many agencies, for a variety of statistical and funding purposes. They should include, as well as the substance of care, the nursing-workload data that reflect the personnel providing the care — that is, the components, type, and outcome of nursing care.

Much valuable information is being lost, and this information is essential if nurses are to develop evidence-based clinical practice. Data to support such practice are also required to inform evidence-based decision-making by nurse managers as well as by health-system managers, policy-makers, and legislators. Therefore, as national health databases are developed it is vital that a minimum number of essential nursing elements be included in them.

Figure 1 illustrates the derivation from nursing practice of nomenclature, language, classification systems, and minimum data set, and the resulting feedback loop.



### *Canadian Developments*

The Alberta Association of Registered Nurses (AARN) has shown that it recognizes the importance of developing a Nursing Minimum Data Set (NMDS), by taking the following initiatives:

- setting the definition of an NMDS as a priority for 1991–92
- submitting a resolution to the CNA in June 1990 (adopted) calling for a national conference “to develop in Canada a standardized format (Nursing Minimum Data Set) for purposes of ensuring entry, accessibility, and retrievability of nursing data”
- submitting a resolution to the CNA in 1993 recommending that NMDS be changed to Health Information: Nursing Components (HI:NC)
- establishing an Ad Hoc Committee on HI:NC
- endorsing the ICNP for testing in Canada.

The CNA responded to the resolution by holding an invitational national conference in Alberta in the fall of 1992, focused on the content for and issues related to the development of an NMDS. This was the first Canadian conference devoted solely to discussion of this important topic. The CNA has since developed a strategy for promoting HI:NC and has actively participated with CIHI in the Partnership for Health Informatics/Telematics.

### *International Developments*

Nurses in other countries also have been working to develop, adopt, and adapt an international standard for classifying nursing data.

*In the United States*, a conference was held in 1969 to develop a minimum basic set of data elements to be collected from all hospital records at the point of discharge. However, this data set failed to include elements of nursing data. In response to the information gap resulting from the exclusion of such elements from the Uniform Hospital Discharge Data Set, in 1985 Werley and colleagues developed an NMDS, building on their own initial work carried out in 1977. Achieved through consensus at a conference held at the University of Wisconsin-Milwaukee School of Nursing, the NMDS comprised nursing-care elements, patient demographic elements, and service elements. The nursing-care elements of diagnosis, intervention, outcome, and intensity of care drew on the process used by the nurse in planning and providing care in any setting. The patient demographic and service



elements, except health-record and nurse-provider numbers, are data elements in the Uniform Hospital Discharge Data Set, accessible through linkage with this data set.

The North American Nursing Diagnosis Association (NANDA) has provided a formal structure for the development and testing of nursing-diagnosis terms and concepts. It has 104 diagnostic labels.

The Omaha System was developed in the period 1975 to 1993 during a series of four research contracts between the Visiting Nurses Association (VNA) of Omaha and the Division of Nursing, Public Health Service, US Department of Health and Human Services. A client-focused management-information system based on the nursing process, it includes a Problem Classification Scheme, Intervention Scheme, and Problem Rating Scale for Outcomes (Martin & Scheet, 1992).

Home Health Care Classification (HHCC) was developed at the Georgetown University School of Nursing between 1988 and 1991. It provides standards for classifying assessment data for home-care Medicare clients, outcomes measures, and resources employed (Saba, 1992, p. 50).

A research team led by McCloskey and Bulechek at the University of Iowa has developed the Nursing Interventions Classification (NIC), which includes "both direct and indirect care; both nurse-initiated, physician initiated and other-provider-initiated treatments" (McCloskey & Bulechek, 1996, p. xvii). The Nursing Outcomes Classification System (NOC) has been developed in conjunction with the NIC through the Iowa Intervention Project (Johnson, Maas, & Moorhead, 1997). Its links to NIC and thus NANDA I and Omaha hold promise for a consolidated system.

NANDA, the Omaha System, HHCC, and NIC are all included in the Unified Medical Language System (UMLS), a long-term research project of the US National Library of Medicine to integrate clinical vocabularies from various sources so that data from each can be cross-referenced when needed.

*In the United Kingdom*, a major review of the National Health Service information system was undertaken in 1979. This review revealed problems with the collection, processing, timeliness, accuracy, and comparability of data. These findings gave rise to the Steering Group on Health Services Information, whose major aim was the production of relevant, timely, accurate information to assist health-service

managers. The Group also attended to the need for consistency in definitions, and aggregation and linkage of data sources (NHS, 1982). It identified, defined, and tested those data elements to be included in a national health-services data set and developed strategies for the collection of these data. The Steering Group documented its conclusions in the seven-volume Körner Report.

The Körner data set focuses on physician-derived clinical data, through the use of codes for tracking the general practitioner, medical diagnosis, and operations. Again, this data set is devoid of nursing clinical data. However, Wheeler (1991) indicates that it has evolved to include nursing elements, a step that reflects the changing role of nurses in the UK. The specific nursing elements of the Körner data set are:

- "nursing episode," which reflects episodes for which nurses are totally responsible for care
- "right of admission," which defines who admits the patient (nurses now have admitting privileges)
- "nursing home operational plan," which reflects the planning intent and focuses on facilities offered by nurses in units run by nurses (Wheeler).

Despite this progress, these nursing data elements focus only on facilities, not on nursing activities.

*International initiatives.* The International Classification of Nursing Practice (ICNP) project of the International Council of Nurses was established in 1990 to develop a standardized vocabulary and classification of nursing phenomena (nursing diagnosis), interventions, and outcomes that could be used in both electronic and paper records to describe and compare practice across clinical settings. An Alpha version of Classification of Nursing Phenomena and Nursing Interventions was released for further development and testing in 1996, an outline for Classification of Nursing Outcomes in 1997 (Clark, 1997). A Beta version will be available in 1999. The Alpha version has been circulated to all national nurses' associations for their feedback. In Europe, the TELENURSE project was established in 1996 to develop and implement a strategy to promote the use of common information structures and processes among nurses across Europe. Participants have translated the Alpha version into several languages and are testing aspects of the use of the ICNP in electronic patient records (Clark; Mortensen & Nielsen, 1997; Yensen, 1996).



### **Implications for Nursing Research**

As health-service delivery across Canada is restructured, there is increasing awareness of the importance of data and information in supporting evidence-based patient care and evidence-based management of the health-care system. Nurses must ensure that nursing data and information are integral components of health information. They must embark on research to support the development and testing of nursing data standards. They must direct their attention to the coordination and linkage of nursing data with other patient data. The content of nursing data standards must be developed in a way that lends itself to integration with other information; integration will be a key consideration as the developments in various countries converge.

Once standards are developed and used, the wealth of patient/client-related information that nurses generate in the course of providing care becomes accessible for nursing research. These data facilitate the study of nursing interventions across populations, geography, and time. Study of the effectiveness and efficiency of nursing practice, and its contribution to patient outcomes, will provide an evidence base for future practice. Such research is essential to the evolution of the profession.

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