Nursing Information Systems

Selim Toromanovic[1], Evlijana Hasanovic[2], Izet Masic[3]
Health Center Cazin, Cazin, Bosnia and Herzegovina[1]
Clinical center of University of Sarajevo, Sarajevo, Bosnia and Herzegovina[2]
Academy of Medical Sciences, Sarajevo, Bosnia and Herzegovina[3]

REVIEW

SUMMARY

Computer technology is a reality of our modern world. It gives us a tool which can be used to help us cope with the complexity and efficiency which is often required in many areas of work. It is an erroneous assumption that it robs a situation of its human qualities. No one would deny that the use of a word processor denies the possibility of highly creative writing being produced or that computerized checkouts make the interaction skills of the checkout person irrelevant to the process of struggling with the week's shopping once more. In many ways, the use of the computer frees the person from the drudgery of repetitive labour to allow more time and effort to be available for the more personal skills to find expression. Recording assessment data using a computer keyboard allows just as much caring communication between nurse and clients as writing it down on a form. The critical factor is not the method of recording but the interpersonal skills and motivation of the nurse. The nursing profession is at last beginning to appreciate the role which the new technology can have in improving the service provided to patients. Only by taking an active role now in the implementation of computers to clinical practice can nurses maintain control of their own professional contribution to the large complex systems at present being implemented in many health care settings. Knowledge based systems are set to become a major component in the nurse's ability to take on this role.

Key words: Primary Health Care System, Information system, Nursing.

1. INTRODUCTION

Over the last few years we have seen major changes in the way health care is delivered. There has been and will be in the future a need for nursing informatics to evolve to meet the changing requirements of our health care system so as to serve our patients needs. With the implementation of the Government's White Paper, Working for Patients, we have introduced a competitive approach to service delivery (1,2,3,4). The Health of the Nation White Paper dearly adds tire dimension of better health to what previously was a focus on the better management of the health care services. We have also seen the development of resource management, the introduction of The Patients' Charter and an increasing professional focus on quality, outcomes and audits. All of these developments occurring within our health care system require comprehensive, accurate and timely patient related information which must be supported by the use of information technology (5,6,7,8).

2. HOSPITAL SYSTEMS

Recent attention has focused on the procurement and implementation of nursing information systems within the acute sector. The Resource Management programme allowed hospitals to consider how best to use information and information technology (IT) to support nursing. Nurses had to respond quickly in articulating their information needs. The choice of a computer system requires many decisions and the pace of change inevitably caused its own problems.

An adequate level of information needs analysis; benefits analysis and staff training has been difficult to deliver but major steps forward have been achieved. A key success criteria has been the ability to plan nursing systems in the context of the overall development of patient services within a hospital. In the procurement of Nursing Systems, problems have arisen where there is either a lack of, or little reference made to, local Information and IT Strategies (1,3,5).

The main functions that can be found in current ward nursing information systems are:

-Care planning
- Nursing Clinical Record
- Care evaluation
- Discharge planning
- Workload assessment (prospective and or retrospective)
- Personnel management
- Staff rostering
- Attendance recording
- Skill mix management
- Costing
- Budget management

These functions are typically grouped into three main modules:

- Patient care
- Workload assessment
- Rostering with associated personnel functionality

There has been considerable variation in how hospitals

have assessed their need for these modules. Some have concentrated on single modules whilst others have looked for integrated solutions containing elements of all three. The current trend is towards integrated systems and suppliers have responded accordingly. However the requirement to integrate nursing systems with other hospital systems has been less easily achieved. There is demand for:

- Ward ordering/results reporting
- Stores functions and stock control
- Patient aclministration (admission, discharge, appointments)
- Analysis of patient satisfaction, complaints and accidents
- The ability to receive and transfer patient information between organizations (e.g. hospital and community)

Most hospitals are some way off the situation where data will need to be entered on a computer only once and subsequently be available to other hospital systems. One of the many challenges facing us is to bring together the learning that has gone on in the development of nursing information systems and the experience gained through the Hospital Information Support Systems (HISS) project.

3. OTHER SYSTEMS

Some of the available hospital nursing information systems have been adapted for maternity and mental health. However, community nursing information has been largely provided for by management systems developed and purchased to meet Kôrner information requirements. It has been difficult to find computer solutions that offer benefit to operational nurses, midwives and health visitors. Solutions are required that support patient-orientated developments in practice. The trend towards greater patient involvement in the planning of their own care requires solutions that support patient held records and allows professionals to have instant access to information away from their base of work. Current community systems often concentrate on service activity. It has been identified, within an Information Management and Technology (IM&T) Strategy for the NHS in England, that in the future, community information systems must be able to:

- Provide a clinically useful person-based record
- Track people across providers
- Support contracting for packages of care
- Support quality monitoring
- Support the evaluation of outcomes
- Support the sharing of information between community service providers and other organizations, subject to security and confidentiality safeguards.

The Community Information Systems for Providers (CISP) project has been established to examine the use of information management technology in the community health environment. The NHS Management Executive expects that all community services units will have moved to integrated person-based operational systems by April 1997.

4. REALIZING THE BENEFITS

If computerized nursing information systems are to meet their full potential then the processes involved in benefits analysis and benefits realization must become more fully established. Identifying the type of information and level

of detail required to support nurses at all levels in an organization represents a considerable challenge. We must be able to identify when it is appropriate to computerize, at what cost and to what benefit. When implementing systems we must both train staff to use the technology and provide appropriate support to enable them to make best use of the information produced. Getting the wrong answers or not asking the right questions can be costly. A recipe for disaster might read as follows:

- Inappropriate manual processes computerized
- Incomplete functionality to deliver identified benefits
- Poorly designed user interface
- Lack of required interfaces with other systems
- Too few or inappropriately located computers/terminals
- Insufficient staff training
- Lack of management commitment

Considerable guidance is now available to support the procurement and implementation of nursing information systems1-6 and many lessons have been learned.

5. THE FUTURE

At the 1992 annual conference of the British Computer Society — Nurse Specialist Group, Mrs Moores, the Chief Nursing Officer and Director of Nursing for England, gave a keynote address in which she said:

'Nursing informatics is evolving to meet the changing requirements of our health care system so as to serve our patients' and clients' needs. This momentum must be sustained as nursing informatics is fundamental to the practice of nursing, midwifery and health visiting.'

Two important events occurred between December 1991 and December 1992 which have given a strategic lead to the future development of information management and technology in support of patient care. December 1991 saw the establishment of The Strategic Advisory Group on Nursing Information Systems (SAGNIS) and December 1992 saw the launch of an IM&T Strategy for the NHS in England.7

SAGNIS was established to advise the Information Management Group of the NHS Management Executive on the pace and direction of Information Systems to support patient care. It quickly identified the following three areas of priority which could significantly affect the future development of nursing systems:

- The development of person-centred NHS information systems capable of electronicsharing of data. And in due course integration of records within and between primary,community and hospital services. The vision must be of a nursing record that is an integral part of a person-based record supporting multidisciplinary care planning and shared care.
- The agreement of common terms and definitions to be used in an agreed nursinglanguage. And the continued development of classifications and data sets to supportshared records, casemix management and clinical audit.

The future development of patient based health care computer systems will be underpinned by an agreed health care terminology. The likely development of the Read codes to incorporate terms used by the nursing professions, para-

medics and patients would significantly assist the development of such a terminology (9,10,11,12).

- The inclusion of informatics in the mainstream of education for the nursing professions. We require a nursing workforce capable of using information to manage both clinical care and the nursing resource. The development of an IM&T Strategy for the NHS in England was the result of extensive discussions with representatives of the NHS and in professional working groups such as SAGNIS.

The following key principles guiding the strategy reflect this high level of consultation:

- Information will be person-based
- Systems may be integrated
- Information will be derived from operational systems
- Information will be secure and confidential
- Information will be shared across the NHS

These principles are an encouraging basis for the future development of computer systems that will support nurses in their many and varied roles.

6. NURSING INFORMATION

6.1. Inroduction

Nursing information includes data collected by nurses; data used by nurses; data about nursing activity; and data about the nursing resource. This section describes the recent developments towards improving clinical nursing terminology; changes to the NHS minimum data set that reflect nursing autonomy; and some good practice issues in the collection of data, and the availability of information to the profession (1,5,9,10).

6.2. Background

Traditionally the nursing professions have often perceived themselves to be data gatherers rather than data users. The traditional training of nurses did not prepare the profession well for data analysis and using quantitative methods to present the case for change. Much of nursing decision making was characterized by professional judgement based on observation with the reporting systems based on the traditional nursing hierarchy. The lack of supporting quantifiable data often meant that the nursing view was not supported in the competition for scarce resources. This led to much frustration, as the nursing view often reflected the complex realities of health care.

6.3. Nursing terminology

There was another serious problem: the nursing professions did not have an agreed language, supported by nationally (or internationally) agreed codes. To enable nurses to transfer care plans with the patient, evaluate their care, and deploy the nursing resource nurses need their own agreed terminology. This should be set within the context of an agreed language of health care.

The relative importance of nursing and other clinical information to the functioning of health services has now been recognized. The Strategic Advisory Group for Nursing Information Systems has been set up to advise the Information Management Group of the NHS Management Executive on nursing information and information technology.

At the strategic level, health care information is now focusing on the patient record and the support of clinicians in their work.

The interest in a person-centred record for the NHS, with a common clinical language for the health professions is growing. The Chief Executive of the NHS Management Executive, Duncan Nichol, spoke at the Healthcare Computing '92 Conference about establishing a co-ordinated programme for dealing with all the elements of a language for health together with its terms, its codes, its groupings. As part of this activity the nursing professions will be developing their own clinical language and rninimum data sets. Much of the terminology will be common to other clinicians so that shared person-centred records can be developed.

6.4. Issues for nursing information
Ownership

One of the most important issues is that of ownership. An information system, whether it uses pen and paper or the highest sophistication in technology, will only give valid information if the nurses providing the data feel that it reflects their own reality. They need access to the data that they provide, with user friendly standard and ad hoc reports.

Access

Unfortunately some of the early systems implemented to provide Korner information for central requirements to the Department of Health did not have user friendly reporting systems. Some health service managers of nurses still find difficulty gaining appropriate access to the data that nurses provide. The validation opportunity that this feedback (and the possibility of feedback to the staff themselves) could give is lost, as is the added value of local use of the data for operational requirements as envisaged in the Korner Reports.

Some national data systems are not made available to nurses. Health Service indicators are widely distributed in the NHS, but are often not held in places where nurses can have easy access.

6.5. Transferability of nursing care plans

One of the challenges for nursing information and information technology is the goal of achieving seamless care across the different locations where patients receive nursing care. The ultimate in ownership of the data recorded is complete freedom of choice of terminology, coding, and structure. This could mean that a nursing care plan could not be transferable within a hospital using the same IT system. Mapping local data to nationally agreed codes with standard definitions will enable care plans to be transferred between different locations.

How often should nursing information be collected?

Once the strategic goal of health service information being derived from the clinical record has been reached, data should be collected only once. Meanwhile the frequency that data needs to be collected to provide useful information will vary.

The Silver Chain Nursing Association, the organization that provides much of the district nursing and home care service in Western Australia counts the planned visits and audits one in twenty of the actual visits. This enables a weighting of the planned visits to estimate the actual visits. The work of the field staff and information staff is more efficient and less computer capacity is required.

Many management and clinical decisions can be made on data collected much less frequently. Vari Drennan6 de-

scribes the district nursing group that decided what data items should be collected on their caseloads and workloads. Each nurse completed her own profile in about half a day. Their nurse team manager providing a bank nurse or other cover. The group decided the relative weighting that each item should be given. This detailed data was analyzed by locality and neighbourhood nursing teams, giving a comprehensive picture for managers and clinicians. The profiles were repeated about a year later in a different season.

7. CONCLUSION

There is a challenging time ahead. Patients, nurses, midwives and health visitors can all benefit from the lessons learned during the early development of nursing information systems and from the strategic approach now being taken. The realization of these benefits will be dependent on continued collaboration between health care professionals, the Department of Health and the IT suppliers.

The need for nurses to develop skills in handling information; deciding what information they need to collect to do their jobs; how to analyze it, present written reports well supported by both quantifiable and qualitative data is now well recognized. Every three years nurses with a special interest in information and information technology get together at the triennial Nursing Informatics Conference.

Computer technology is a reality of our modern world. It gives us a tool which can be used to help us cope with the complexity and efficiency which is often required in many areas of work. It is an erroneous assumption that it robs a situation of its human qualities. No one would deny that the use of a word processor denies the possibility of highly creative writing being produced or that computerized checkouts make the interaction skills of the checkout person irrelevant to the process of struggling with the week's shopping once more. In many ways, the use of the computer frees the person from the drudgery of repetitive labour to allow more time and effort to be available for the more personal skills to find expression. Recording assessment data using a computer keyboard allows just as much caring communication between nurse and clients as writing it down on a form. The critical factor is not the method of recording but the interpersonal skills and motivation of the nurse.

The nursing profession is at last beginning to appreciate the role which the new technology can have in improving the service provided to patients. Only by taking an active role now in the implementation of computers to clinical practice can nurses maintain control of their own professional contribution to the large complex systems at present being implemented in many health care settings. Knowledge based systems are set to become a major component in the nurse's ability to take on this role.

REFERENCES

1. NHSME Resource Management Unit. Nursing Information Requirements: Identification and Computerization. Health Publications Unit, 1990.
2. Greenhalgh & Co/King's Fund. Step by Step Guide to the Selection of a Hospital Nurse Management System, 1990.
3. Greenhalgh & Co (last updated August 1992). Nurse Management Systems - A Guide tc Existing and Potential Systems.
4. NHS Training Directorate. Guide to the Implementation of Nursing Information Systems, 1990.
5. Audit Commission. Caring Systems: A Handbook for Managers of Nursing and Project Managers, 1992.
6. Developed by a five regional consortium in conjunction with Greenhalgh & Co (1991) Using Information in Managing the Nursing Resource, 1991.
7. NHSME. An Information Management and Technology Strategy for the NHS in England has been published as a series of booklets. The two most relevant booklets for nurses are: - A View for Community Nurses, Getting Better with Information. - A View for Hospital Nurses, Getting Better with Information, 1992.
8. Australian Council of Community Nursing Services Special Project. Final report community nursing minimum data set - Australia available from RDNS, 452 St Kilda Road, Melbourne, VIC 3004, Australia, 1994.
9. Werley HH, Leske JS. Use and implementation of the nursing minimum data set. In Hovenga, E.J.S. et al (eds) Lecture notes in medical informatics, Nursing Informatics 42, Springer-Verlag Country, 1991.
10. McCormick KA. The urgency of establishing international uniformity of data. In Hovenga, E.J.S. et al (eds) Lecture notes in medical informatics, Nursing Informatics 42, Springer-Verlag Country, 1991.
11. Adlassnig KP, Blebel B, Mantas J, Masic I. eds. Medical Informatics in a United and Healthy Europe. Proceedings of MIE 2009 Conference, Sarajevo, 2009.
12. Masic I, Ridjanovic Z. Medical Informatics. Avicena, Sarajevo, 2009.

Corresponding author: Ass prof Selim Toromanovic, MD, PhD. Faculty of Health Sciences. University of Bihac, Bosnia and Herzegovina. E-mail: selim.toromanovic@bih.net.ba