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-R- Nursing Research: references that describe and/ or report on nursing related research projects/studies, references that recommend areas to be researched in computer technology, and Hospital Information Systems evaluation reports.

-E- Nursing Education: references specific to basic nursing education, inservice education/training and continuing education. References that discuss Hospital Information Systems requiring inservice education departments to provide major implementation support are included.

-G- General: references of general interest to all nurses, all references on Hospital Information Systems because of the broadness of the topic, references that are philosophical or historical in nature and finally those that discuss computer technology in general.

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listed first at the end of the reference is considered the primary classification for the reference and the following codes a secondary classification.

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C. HOW TO OBTAIN DOCUMENTS

All citations to documents, whether published or unpublished, contain source availability information. For each reference, the information is noted in the citation after the the document title.

The availability source for articles published in journals and other periodicals is the name of the journal noted after the statement "Pub. in ..." Issue information (volume, number, etc.) and page numbers are included. To obtain copies of the journal articles cited, consult a local university librarian or contact the librarian in your Regional Medical Library, where many of the journals can be found.

The availability source for nonperiodicals is the name of the individual, agency, or organization noted after the statement "Available from ...." Contact the specified source directly for additional information, such as the price of the document. For information on the price of a document listed as available from the National Technical Information Service (NTIS), write to the address listed below (please do not telephone). Include the order number of the

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ABSTRACT

This comprehensive annotated bibliography contains 220 references on computer technology in nursing. Selected articles on electronic devices are included if they contribute to the historical perspectives of this area. The bibliography contains all articles that have appeared in nursing journals published in the United States, Canada, and England up to the date of this publication as determined by searches using Medical Literature Analysis and Retrieval System On-Line and National Health Planning Information Center retrieval systems and manual searches of Cumulative Index to Nursing Literature, Cumulative Index Medicus, International Nursing Index, and Current Index of Medical Literature. The articles, books, and studies/reports are listed in alphabetical order by author and numbered. All citations give author, source availability information, and abstract/annotation. References are also classified (by code) as to their relevance to clinical practice, nursing administration, nursing research, nursing education, or general. A classification matrix in the appendix groups references by numbers and whether they are considered a primary or secondary reference under their appropriate classification. The author index is arranged alphabetically with the reference numbers following the author's name. (YLB)

Computer Technology in Nursing: A Comprehensive Bibliography

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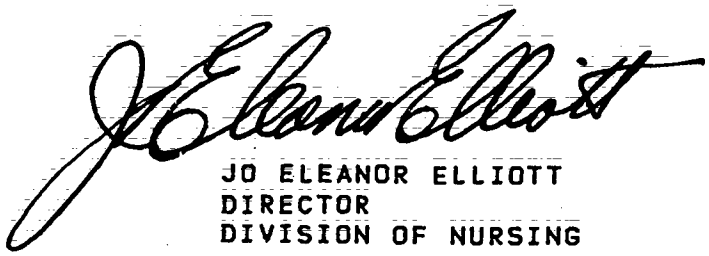
FOREWORD

The dynamics of health care requires the nursing profession to adjust to numerous new technologies. One of these, computer technology, has had a major impact on nursing and other health care services in the United States. This bibliography on computer technology is a comprehensive search of the literature, providing both historical and current references. It will provide a valuable tool to the nursing community.

This volume is the sixteenth in the Nurse Planning Information Series, which is composed of selected monographs and bibliographies relevant to health planning. Previously published volumes are listed on the inside of the front cover.

The nursing component of the National Health Planning Information Center provides health planners with a centralized, comprehensive source of information on nurse manpower planning to facilitate an improved health care delivery system in the United States. The component acquires, screens, synthesizes, disseminates, and makes available specialized documentary material on nursing, as well as methodological information on a wide variety of topics relevant to health planning and resources development.



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DOROTHY B. POCKLINGTON

LINDA GUTTMAN

PREFACE

Computer technology is just one of the many new innovations in the health care environment that health professionals are bombarded with today. It is not uncommon for nurses to be suddenly faced with a need to know the state-of-the-art of computer technology; hence time is usually of the essence. The degree and extent of this need to know varies depending on one's role(s) and involvement in this technology. There are no neatly packaged courses for health professionals in computer technology. Where then does one go for this information? There are two basic sources: literature and personal experiences of health care providers in computer technology. This publication addresses the literature source.

Each health professional requiring knowledge in computer technology has to repeat the same process: a slow, tedious search through the literature to develop his/her knowledge base. It was our intention when we started this review of literature and subsequent bibliography to provide for our fellow nurses in administration, clinical practice, education and research a reference which would allow them to move as quickly as possible into the computer technology arena.

While researching the literature, we developed an appreciation for our nursing colleagues who took the time to share via the professional journals their journeys through the maze of the early stages of a new technology which has had a large impact on the nursing profession and the delivery of health care services. We can use or abuse what computer technology offers to the nursing profession, but if we study our professional literature carefully, it can help us to move in the right direction. There is now enough information available to make it convenient for nurses to learn how to make computer technology work <u>for</u> them and <u>not against</u> them. We offer this bibliography as an aid to nurses, in expanding their knowledge and in using this information to reap the benefits of computer technology in the health care environment.

DOROTHY B. POCKLINGTON

LINDA GUTTMAN

CONTENTS

PART I : INTRODUCTION

PART 1: INTRODUCTION

The purpose of this publication is to provide a comprehensive annotated bibliography on computer technology in nursing and to provide for the nursing profession a rapid entry into a specialized knowledge base. The vastness of the topic precluded the inclusion of computer technology articles that involved all health professionals, hence the nursing profession was selected as it represents the largest group of health care professionals in the United States. Initially it was intended that an annotated bibliography of articles on "automation" would be developed. It became apparent early in the literature search that "automation" included many other areas besides computers, e.g., tape recording, paper handling, and electronic devices without computer back-up. It was then decided to select strictly computer oriented articles. However, selected articles on electronic devices were included if they contributed to the historical perspective of computer technology in nursing.

Included in this bibliography also are selected hospitals and technical journal articles written by nurses, having nursing in their titles, or subjects contributing to the general knowledge of computer technology in the nursing environment. There was no attempt to include articles whose sources were computer journals because of their limited accessibility to nurses. The authors of the early articles had no sources other than computer journals for their frame of reference when writing in the 1960's. The nurse who wishes to pursue a literature search in technical computer journals can look at the reference lists of the early nursing articles for names of many technical journals. Because computer technology in the health care field has been with us for only two decades, it has been possible to annotate all articles that have appeared in nursing journals published in the United States, Canada, and England up to the date of this publication. Therefore, this publication provides a historical perspective as well as the current status of computer technology in nursing today.

A. METHODOLOGY FOR THE LITERATURE REVIEW

Computerized searches were made using Medical Literature Analysis and Retrieval System On-Line (MEDLINE) and the National Health Planning Information Center (NHPIC) information retrieval systems. Manual searches were made of the following cumulative indexes for information that was not available via computer:

Cumulative Index to Nursing Literature
Cumulative Index Medicus
International Nursing Index
Current List of Medical Literature

The key words used in the search were nursing terms:

nurse(s)
nurse clinician
nurse practitioners
nursing
nursing service, hospital
nursing audit
nursing care
nursing records
nursing, team
nursing, staff
nursing, supervisory
primary nursing care
surgical nursing

in combination with automation terms:

automation
ADP
computers
data display
information centers
information retrieval systems
information services
online systems
systems analysis.

Other terms were used with nursing and automation terms to further delineate the search as follows:

computer assisted instruction
health education
inservice training
programmed instruction
diagnosis, computer assisted
medication systems, hospital
patient care planning
hospital administration
coronary care units
intensive care units
biomedical engineering
electronics, medical
human engineering.

In searching the computer data bases of MEDLINE and NHPIC we came across a number of abstracted articles on computer technology whose sources were studies and reports of government supported activities and a few selected abstracts of articles found in nursing and non-nursing journals. As a result of finding these abstracts and because most of these articles were readily available through government sources we expanded the bibliography to include these abstracted articles as well as the ones we had annotated. The resulting bibliography is one that includes all nursing journal sources, plus 30 government studies/reports, 10 journals outside the immediate realm of nursing, 4 hospital journals, and 3 books.

B. FORMAT AND ORGANIZATION

The annotated/abstracted articles, books and studies/reports are listed in alphabetical order by author and numbered. References are classified as to their relevance to nursing administration, education, research, and clinical practice, with the classifications appearing in code at the end of each reference. Abstracts found in the MEDLINE and NHPIC retrieval systems are indicated with an asterisk (*) prior to the author of each reference. Those references without an asterisk (*) were annotated by the authors of this publication. In the appendices

references are grouped according to author alphabet, and listed in a classification matrix to insure the reader will have a format that allows quick retrieval using a manual mode.

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reference document as indicated in its citation. Do not contact the National Health Planning Information Center or the Division of Nursing for a copy of the reference document, unless it is indicated in the availability statement.

Questions concerning the development of this bibliography should be addressed to:

Virginia K. Saba
Nurse Consultant
Division of Nursing
Bureau of Health Manpower
Health Resources Administration, PHS, DHEW
3700 East-West Highway
Hyattsville, Maryland 20782

Additional copies of this bibliography may be obtained from:

National Technical Information Services
US Department of Commerce
5285 Port Royal Road
Springfield, Virginia 22161

PART II : ANNOTATIONS / ABSTRACTS

PART 2: ANNOTATIONS / ABSTRACTS

* Indicates abstracts found in the MEDLINE and NHPIC retrieval systems.

1. Abdellah, Faye G. and Levine, Eugene.
Future Directions of Research in Nursing.
Pub. in American Journal of Nursing, January 1966, v.66, n.1, p.112-116.

One of the areas of possible research identified was the "adaptation of instrumental monitoring devices in furthering the analyses of patient care data important to predicting nurse actions." The authors envision computers as providing many changes in the area of organization and delivery of nursing service, and urge nurse educators to explore the use of automated devices as laboratory tools in both classrooms and clinical situations.
-R-

2. *Agbalajobi, F.
*Characteristics of The Software for Computer Applications in Medicine.
Pub. in Medical Information, April-June 1979, v.4, n.2, p.69-78.

The requirements of clinical medicine which have tended to make the design and implementation of software for hospital computer systems more difficult than that elsewhere, are discussed in this paper. Specific constraints on the software for selected computer-assisted activities in a hospital environment are examined in considerable depth. It is shown that since some of these activities have counterparts elsewhere, hospital computing can benefit from the accumulated experience in dealing with similiar problems in business and scientific environments. The argument is put forward that developing countries, with their characteristic problem of acute shortage of skilled manpower in both medicine and computing, should initially concentrate on applying computers to these activities alone. Furthermore, medical education in such countries should incorporate programs relating to computer

technology in general and the software aspects in particular.
-G-

3. *Ashcroft, J.M.
Readers' Forum: Experience With a System.
Pub. in Computers Programs Biomed, September 1978, v.8, n.3-4, p.311-314.

Wythenshawe Hospital is a large general district hospital with more than 1000 beds, situated approximately 9 miles south of Manchester. The Cardio-Thoracic department, housed in the new section of the hospital which was completed in 1973, is the major center for cardiothoracic surgery in the greater Manchester area. It also receives any major accident cases which require treatment within the Intensive Therapy Unit. This paper describes a Patient Data Display System and the methods used to introduce the concept of such a system to doctors, nurses, laboratory and paramedical staff, and the manner in which these staff were trained in the use of computer terminals. Principles underlying the need for and requirements of such a system are also discussed. Six months after hardware commissioning the system was fully operational throughout the whole department.
-G-
-C-
-A-

4. Ashcroft, J.M. and Berry, J.L.
"Computers or Nurses?
Pub. in Lancet, November 30, 1974, v.2, n.7892, p.1321.

This is a letter written by a nurse and ADP person in response to the editorial titled "Computers or Nurses?" (see Editorial in Lancet, October 12, 1974). The authors point out their observations of successful uses of computers to aid the nurse and particularly challenges the idea of doctors being involved in medical computing and not letting the computer experts solve their own problems.
-G-

5. Automation and Health Administration. (Reprint from Who Chronicle).
Pub. in International Nursing Review, January-

February, 1966, v.13, n.1., p.23-27.

Discusses development of digital computers and some of their applications to medicine. Defines the operation of programming in an easy to understand manner. Mentions ways to utilize applications such as in menu planning, staff allocatons, vaccination programs, and research. Realistically addresses down time.
-G-

6. Automation and the Nurse.
Pub. in Nursing Mirror, March 8, 1968, v.125, n.11., p.31.

A brief description of a computer system which leaves the staff of eleven American hospitals more time for patient care. The hospitals are spread over three states and account for 2,200 hospital beds. This is a good example of shared use of a central computer and the services it provides.
-G-

7. *Bahr, James; Badour, Geraldine; and Hill, Helen.
Innovative Methodology Enhances Nurse Deployment, Cuts Cost.
Pub. in Hospitals, JAHA, April 16, 1977, n.8, v.51, p.104-109.

A computerized system developed at St. Joseph Mercy Hospital, Ann Arbor, Mich., to allocate nursing personnel according to delineated areas of need is described. By September 1974, the system was fully implemented on four large surgical units. In fiscal 1974 - 1975, the system saved these units approximately $160,000 by reducing staffing requirements for registered nurses by 11 full-time equivalents. Development of the system began with the construction of a classification system for surgical patients based on the hospital's general method of classifying patients according to the level of care they require. For surgical patients, an additional classification - by type of surgery - was introduced, and standards of care for each type of surgery were developed. A staffing system designed to draw on a small pool of floating nurses operating only in the four surgical units emphasized reponsiveness to fluctuations in demand rather than to fluctuations in staff. A computerized application

of the nurse float and staffing program was then developed and implemented. Advantages of the staffing program include the improved quality of care due to the improved patient classification system, more efficient deployment of nursing staff and the dynamic nature of the system. Ways in which the industrial engineering and nursing departments cooperated in planning the system are noted.
-A-
-C-

8. *Bailey, Judith A.
Development of a Regional Trauma Center.
Pub. in Nursing Clinics of North America, June 1978, v.13, n.2, p.225-265.

The process of developing the Regional Trauma Center at the University of California at San Diego is outlined. Unit design involves head nurse and coordinator input establishment of self-contained facilities with a radiology room and angiography capabilities, a resuscitation-surgery room, and five beds with free space around them (one of them with isolation capacity), and an on-line computer monitoring system. The staff is a multidisciplinary group coordinated by a general surgeon which includes nursing assistants, secretaries, psychiatrists, and other support workers; nurses, who are highly motivated individuals, work in a one-to-one ratio with patients and require special inservice training. Special transport is provided by a mobile intensive care unit in a van with a constant communication system and special emergency apparatus or by helicopter if necessary. The inexpensive computerized trauma registry facilitates care assessment by the institution; injury severity, diagnosis, procedure, and complications can be monitored at any point. A system for extensive patient follow-up is being implemented. Six figures are furnished.
-C-

9. *Bailey, June T. and Claus, Karen E.
Preparing Nurse Leaders for the World of Tomorrow.
Pub. in Nursing Leadership, June 1978, v.1, n.1, p.19-28.

A three-course leadership series for nurses was developed in this project at the University of

California at San Francisco under a DHEW special training grant. With the overall goal of training nurse leaders, specific objectives were to define leadership, provide instruction in leadership processes to nurses enrolled in graduate programs, provide practice for the development of leadership skills in a controlled and risk-free situation, provide feedback to students regarding their leadership skills and to provide for the systematic evaluation of leadership techniques taught in the course series relative to performance in the work setting. The leadership curriculum focused on beliefs about teaching and learning, the definition of leadership, structural elements (skills in problem solving and decision making; in translating power and authority into influence; in managerial functions and human relations; in introspection and self-awareness; in conflict resolution; and in information processing), and grade contracts where students chose assignments to meet their learning needs. Numerous instructional aids were employed, including computers, decision making simulation programs, and standardized and other tests with feedback. Figures provide information on principles of learning and instructional experience, the leadership curriculum, grade contracts and course topics, and contain a grade contract form. A table summarizes computer programs developed and used in the project.
-E-
-A-

10. *Ballantyne, Donna J.
Pub. in Journal of Nursing Administration, March 1979, v.9, n.4, p.38-45.

The centralized staffing system at Fairview General Hospital in Cleveland, Ohio, is supported by computerized scheduling. Elements to consider in staffing any nursing service are: determination of the number and type of personnel needed to achieve designated nursing service standards; acquisition of budgetary resources; hiring of specified personnel and their appropriate placement; preparation of advance time schedules for personnel to meet required staff needs by unit; and replacing or supplementing staff on a daily and/or shift basis. After 3 years of operation, the centralized staffing system at the hospital was scheduling and managing staffing patterns for 18 of 23 nursing

units, based on the preceding elements of staffing. Because the effectiveness of centralized scheduling began to diminish, the decision was made to implement an on-line computer capability for the nursing department. The computerized scheduling technique adopted by the hospital facilitates precise staffing on nursing units, assures appropriate staffing, provides for employees' satisfaction, relieves professional nurses of staffing functions, provides for personnel efficiency and effectiveness, and facilitates budgetary control through efficient management reports. The computerized system and management reports generated by it are detailed. Sample reports accompany the text.
-A-

11. Banks, Ian.
Designing the Training Programs for Student Nurses.
Pub. in Nursing Times, November 27, 1968, v.64, n.48, p.186-187.

Though the majority of this article discusses the use of a successful manual system of student nurse allocation in hospitals, it initially discusses the attempt to write a computer program which would balance training and service requirements of student nurses allocation a year in advance. Interestingly, it was the limitations of this computer program which led to the discovery of a successful manual system to student allocation.
-E-
-A-

12. Barber, Barry and Scholes, Maureen.
Learning to Live with Computers.
Pub. in Nursing Mirror, July 5 1979, v.149, n.1, p.22-24.

Computers were first introduced into British hospitals in the early 1960's. Since then, there have been dramatic improvements in computing technology and more powerful computers in smaller boxes. The author describes the increasing involvement of nurses in the operation and development of hospital and community computer systems. An excellent reference list is included.
-G-

13. Barker, Marilyn.

The Era of the Computer and Its Impact on Nursing.
Pub. in Supervisor Nurse, August 1971, v.2, n.8, p.26-36.

This article written in 1971 shows both awareness and insight into the effect automation had and will have on the practice of nursing. The decisive factor for success will be whether nurses become and stay involved in planning for computerization. The nurse spokesperson must be able to relate to the computer technologists and must be creative in finding uses for the computer.
-G-
-A-

14. Barker, Veronica F.
I'd Like Some Information On....
Pub. in Journal of Advanced Nursing, 1978, v.3, p.328-330.

Describes six services available to British Nurses which provide library-type information services for training, research and development programs. One of the services available is MEDLARS which is a computerized search facility.
-G-

15. Barnett, Octo G. and Zielstorff, Rita D.
Data Systems Can Enhance or Hinder Medical, Nursing Activities.
Pub. in Information Systems, October 16, 1977, v.51, n.20, p.157-161.

The impact of automated hospital wide information systems on the functioning of physicians and nurses is investigated. It is felt that one rule must dominate the introduction of a hospital wide information system: professionals must participate in its design. Technical aspect of information and changes in interpersonal relations and in the organizational structure of the hospital, that result from the introduction of information systems, are detailed. Four generic forms of automated hospital wide information systems are identified: (1) a transactional system primarily concerned with financial management; (2) an ancillary support system aimed at improving information-related activities of individual service units; (3) a communication system focused on the transmission of data among various

personnel in different support units of a hospital without concern for the meaning or significance of data; and (4) a medical information system which, for the most part, is theoretical in application because of a lack of operational models. In computer-based systems, information must be entered by preformatted checklists or cards, special function keyboards, or sophisticated terminals. Professional interaction in the use of computerized technology design and implementation is discussed.
-G-

16. *Barrett, James P.
Evaluation of a Medical Information System in a Community Hospital. Final report 27 November 1972 to 30 April 1976.
September 1976, 27p.
Available from NTIS, U.S. Department of Commerce, Springfield, VA. 22161.
Order Number PB-264-353/4.

The Digest summarizes an evaluation report on impact of the Technicon Medical Information System (MIS) on El Camino Hospital (ECH) in Mountain View, California, 1971-75. The purpose of this research was to evaluate the impact of the Technicon MIS on the organization and administration of health care delivery at ECH. The Technicon MIS is a real time, computer-based system that nurses, physicians, other health care professionals, and the hospital administration interact with in the delivery of health care to patients. The system affects all facets of the highly complex hospital environment. Findings from this study are summarized.
-G-
-R-
-A-

17. *Barrett, James P., Barnum, Ronald A., Gordon, Benjamin B., and Pesut, Robert N.
Evaluation of the Implementation of a Medical Information System in a General Community Hospital. Final report 27 November 1972 to 30 April 1976.
December 19, 1975, 342p.
Available from NTIS, U.S. Department of Commerce, Springfield, VA 22161.
Order Number PB-248-340/2.

The report evaluates the impact of the Technicon

Medical Information System (TMIS) on El Camino Hospital (ECH) in Mountain View, California, over a three year period. A comprehensive report of the cost-benefits of the system at ECH will be available in mid 1976. The major objectives was to evaluate the impact of TMIS on the organization and administration of health care delivery at ECH. An analysis of staffing patterns is presented first followed by nursing activity analysis and studied on direct use of the system by the medical staff. Finally, special studies consider the performance of TMIS and its impact on ancillary and support services. Appendices present background information, including a description of the system, various questionnaires used on the ECH staff, a discussion of the background, and a description of the implementation process of the system at ECH.
-G-
-R-
-A-

18. Bean, Margaret A., Krahn, Frances A., Anderson, Barbara L., and Yoshida, Mabel T.
Montoring Patients Through Electronics.
Pub. in American Journal of Nursing, April 1963, v.63, n.4, p.65-69.

Describes the experiences of a team of nurses on an intensive care unit who were responsible for using two different patient monitoring devices (for vital signs) on an experimental basis. The nurses expectations, experiences, and problems are very well expressed. The three main area of attention were on patient response, nurse activities, and monitor reliability.
-C-
-R-

19. *Benford, Linda H., Floyd, Ronald F., and Stansel, Edward H.
UR/PSRO Long Term Care Data System.
Pub. in Medical Record News, June 1976, v.47, n.3, p.22-31.

Forms and procedures designed to gather and process data on long-term care facility patients in the Jacksonville, Fla. area are described. The area's long-term care data system provides data for utilization review and medical care evaluation

studies conducted by the skilled Nursing Facility Utilization Review Committee of the Duval County Foundation for Medical Care under the requirements of professional standards review organization legislation. Data are gathered primarily from nurses on long-term care wards and from patients' medical records. The completed utilization review history form, designed to summarize the complete history of a patient's stay in a skilled nursing facility, is coded and entered into a computer when the patient is discharged from the facility. The computerized system provides patient listing reports, patient summaries (by facility and by attending physician), and special reports (e.g., nursing care received by level of care paid for, therapies by payment source). A flow diagram illustrates the utilization review and data collection process from admission of a patient to a skilled nursing facility through discharge. A copy of the nine-part utilization review history form is provided. The role of the medical record practitioner in implementing the system is noted.
-A-

20. Bennett, Leland R.
This I Believe...That Nurses May Become Extinct. Pub. in Nursing Outlook, January 1970, v.18, n.1, p.28-32.

This a challenging philosopic article that warns nurses "to find new and better ways of giving patient-centered care" before someone or something takes their place. The author uses computers as examples of the rapidity of changes that are associated with the new technology. A very interesting patient situation is presented to illustrate futuristic patient care that is controlled by automation, particularly computers.
-G-

21. Bernhardt, Judy H.
Record Keeping - Key to Professional Accountability. Pub. in Occupational Health Nurse, August 1978, v.26, n.8, p.22-28.

The bulk of this article does not deal with computers at all. However, a small section of this publication does address computerized medical records. The author briefly discusses basic functions served by automated records and the necessity for completed

records for professional accountability. One rule to always remember is stated, "that computerized records are only as accurate as the information fed into the system."
-A-

22. Birckhead, Loretta M.
Nursing and the Technitronic Age.
Pub. in Journal of Nursing Administration, February 1978, v.8, n.2, p.16-19.

Challenges nurses "to monitor the effects of technology on nursing practice and patient welfare" with the end result of controlling their own practice. States that the roles of the nurse is being affected by various elements of the technitronic age and illustrates this by presenting the results of a study of nursing activities in a metropolitan medical center which utilized an automated information system. The author points out various reasons why the nurse may have difficulty controlling and/or manipulating nursing practice relative to technology. (See Zielstorff, "Nurses Can Affect Computer Systems" in the March, 1978 issue of the Journal of Nursing Administration for a rebuttal to this article.)
-G-
-A-

23. Birckhead, Loretta M.
The Need for Nurse Support Systems in Affecting Computer Systems.
Pub. in Journal of Nursing Administration, March 1978, v.8, n.3, p.51-53.

This article is a response to Zielstorff's rebuttal in the March, 1978 issue of the Journal of Nursing Administration "Nurses Can Affect Computer Systems." The main thrust of this response is that Zielstorff's remedy failed to consider the initial consciousness raising of the nurses that is necessary to understand how technology affects care. The author advocates "a grass-roots movement that would center on the concept of nurse support systems."
-G-
-A-

24. Bitzer, Maryann.
Clinical Nursing Instruction Via the Plato Simulated Laboratory.

Pub. in Nursing Research, Spring 1966, v.15, n.2, p.144-150.

Describes how a medical-surgical study unit was programmed for use on a computerized teaching system called PLATO. The study unit was presented to a group of nursing students, half were in a control group attending regular classes and half used the computer-controlled teaching system. This article provides some interesting alternatives in traditional nursing education and should be of interest to nurse educators.
-R-
-E-

25. Bitzer, Maryann D. and Boudreaux, Martha C.
Using a Computer to Teach Nursing.
Pub. in Nursing Forum, 1969, v.8, n.3, p.234-254.

Detailed, step by step, description of students' interactions with a computer-based course in Maternity Nursing via PLATO. Nursing educators should find the comparison of PLATO students to classroom students relative to learning and time sequence very interesting. Student reactions, application of computer-based instruction to other programs, and contribution to nursing education was also discussed quite well.
-E-

26. Bolte, Irma M. and Denman, Loretta M.
We Are Ready for ANA's Continuing Education Data Bank!
Pub. in The Journal of Continuing Education in Nursing, September-October 1977, v.8, n.5, p.29-31.

Reports on the use of the computer as a record keeper relative to the participation in and reaction of nurses attending continuing education program conducted by the University of Kentucky College of Nursing. A summary of one academic year of continuing education which was developed from two computer printouts in fifteen minutes was presented for demonstration purposes. Useful for an agency that is contemplating the computerization of their education records.
-E-
-A-

27. *Brim, Earl; Winston, David; Hardy, Dorcas; and Gibbens, Stephen.
Cost Benefit Analysis of Installation of a SPECTRA System at Santa Monica Hospital.
January 1976, 156p.
Available from the University of Southern California, Center for Health Services Research, 2025 Zonal Ave., Los Angeles, CA. 90033.

A cost-benefit analysis of a Spectra 2000 Medical Information System installed at a 350-bed acute care Community Hospital in Santa Monica, California, is documented. The Spectra 2000 System is an online information transmitting and processing system using a dedicated minicomputer. Information input and output are accomplished through data stations located at each nursing station and ancillary department and in the admitting office. Among system functions are admitting, discharge and transfer, entry of medical orders, medication programs, and charge capture. Forty-three charts containing 4,433 distinct charge opportunities were extracted, each charge opportunity was priced out, and the totals were compared to actual patient billings. An undercharge error rate of 3.83 percent for all ancillary services was determined, translating to first-year revenues of $458,151 that would be automatically captured with the Spectra System. Projected savings from forms replacement were derived by estimating the total forms that would be displaced or replaced annually and multiplying these estimates by the amount to be saved per form. First-year saving from forms replacement would be $30,261 under the Spectra System; 5-year annual average savings are projected at $45,037. Total personnel savings for the first year are estimated at $206,534 (10 percent night shift work-load); 5-year average annual savings are projected at $326,346. The overall first-year benefit-cost ratio for the system is estimated at 1.4:1. Supporting data are included.
-G-
-A-

28. *Bronzino, Joseph D.
Technology for Patient Care - Applications for Today, Implications for Tomorrow.
1977, 225p.
Available from the C.V. Mosby Company, 11830

Westline Industrial Drive, St. Louis, MO. 63141.

For the last century, the impact of technology has been profound. This is especially true for the delivery of health care and as a result, the roles of physicians and nurses have been drastically altered. In an earlier age, the student interested in a career in the health care field could neglect the study of technology. But this is no longer possible. It is necessary to have at least an introduction to the new technologies and their capabilities for an impact on patient care. The purpose of this book is to provide such an introduction. The book is meant to serve as a textbook in an introductory course on the application of technology in the delivery of health care. The book is divided into seven sections: 1) Biomedical engineering and medicine -- an emerging discipline; 2) Technology utilization to assist patients in cardiac or pulmonary distress; 3) Computers and patient care; 4) Noninvasive testing; 5) Biofeedback; 6) Using technology to protect the patient in a health care environment; and 7) Moral and ethical aspects of technology in medicine.
-G-

29. Brown, P.T.S.
Computers and the Nurse.
Pub. in International Journal of Nursing Studies, 1978, v.7, p.91-97.

Explains the relationship of the computer to the decision making process using the medical environment as a reference point. Example of projects and systems that can be found in England are mentioned, but probably would not be of current interest to the reader. The author does make an important point in his summary that is, "if computers are introduced into hospitals through administrative channels the resultant hospital systems will be created without adequate contribution by clinicians and nurses."
-G-
-A-

30. Brown, Raymond L.
Computerized Nursing.
Pub. in Nursing Mirror, February 12, 1976, v.88, n.6, p.56.

The author writes that nursing welcomes advances in

practice as long as work efficiency is maintained and patients receive the best care possible. Most of this brief article deals with the computer system at the El Camino Hospital in Mountain View, California. It is the Technician Medical Information System (TMIS). Of interest is the author addressing responsibility shifts between physician and nurse.
-G-
-A-

31. Brown, Virginia, Mason, Wlliam B., and Kalzmarski, Michael.
A Computerized Health Information Service.
Pub. in Nursing Outlook, March 1971, v.19, n.3, p.158-161.

Describes how the Indian Health Service (IHS) enlisted the aid of computers to help bridge the communication gap between team members and team member and clients. The authors point out the need for continuous evaluation and user input for system design. Includes sample summary of a patient health history.
-C-

32. Buchholz, Linda M.
Computer-Assisted Instruction for the Self-Directed Professional Learner?
Pub. in The Journal of Continuing Education in Nursing, January-February 1979, v.10, n.1, p.12-14.

The author supports the thesis chat computer-assisted instruction (CAI) has merit in the non-traditional study for self directed learning. A succinct overview of CAI's effect on the learner, the educational system, and education is given. Several issues concerning the usage of CAI that must be resolved are presented.
-E-

33. Bushor, William E.
Nursing's Electronic Lamp.
Pub. in Nursing Forum, Spring 1962, v.1, n.2, p.23-37.

This is the second article to appear in a U.S. Nursing Journal on medical electronics. Reference is made at intervals regarding how this will affect the nurse. The majority of this article identifies

specific hospitals, companies, and organizations which have contributed to the field of medical electronics with monitoring systems and diagnostic computers. Describes their particular contributions to the health care field.
-G-

34. Butler, Elizabeth A.
An Automated Hospital Information System.
Pub. in Nursing Times, February 9, 1978, v.74. n.6, p.245-247.

This article describes the author's impressions of the impact of the Technician Medical Information System on the Department of Nursing at El Camino Hospital, Mountview, California. The system has reduced the amount of time spent on clerical tasks and allowed nurses more time with patients. System development is well covered.
-A-
-G-

35. Butler, Elizabeth A. and Hay, B.J.
The Passionate Statistician: Computerized Record of Nursing Sickness and Absence.
Pub. in Nursing Times, December 1, 1977, v.73, n.48, p.153-156.

This article describes the utilization of a computer system to analyze sickness/absence episodes of the nursing staff. This particular study demonstrated trends/indicators for managers in staff utilization. The paper was presented at the International Congress on Computing in Medicine in Berlin in February 1977.
-A-

36. Caliandro, Gloria.
Programmed Instruction and Its Use in Nursing Education: A Review of Literature.
Pub. in Nursing Research, September-October 1968, v.17, n.5, p.450-454.

This article reviews and analyzes selected published literature on research related to programmed instruction. Reference to programmed instruction using automation/computer is made basically from Bitzer's article in Nursing Research which is annotated in this bibliography.
-E-
-R-

37. Callahan, Barbara.
A Computer World.
Pub. in Hospital Progress, November 1965, v.46, n.11, p.73-82.

This article although written 15 years ago, gives an accurate description of the potential of computerization offered hospitals as well as industry. Detailed benefits which computerization offers to clerical medicince and patient care are described. A brief description of nursing services is also addressed. Large sections of this article are indeed industry oriented - but can be related to the health care field. The author cleverly lists factors which he perceives that has hindered computer applications.
-G-

38. Campbell, Charles M.
Akron Speeds Information System Slowly.
Pub. in Modern Hospital, April 1965, v.104, n.4, p.118-122.

This is an early article describing the development of a computerized hospital information system. Problem areas are honestly addresssed with some discussion of problem resolution. The development of this system was extremely costly. Today the system is not operational, yet the initial step taken was necessary for as hospital compexity increases so must the administrative and professional capabilities increase. This can be accomplished through a hospital information system.
-G-

39. Cheung, Philip.
Put Test Questions on A Computer.
Pub. in Nursing Mirror, November 1, 1979, v.146, n.5, p.27-29.

The author describes how to set up a computerized objective test bank that enables an instructor, at the touch of a button, to produce test papers to suit learner's needs. This article lists several excellent advantages to this type of learning and gives real examples of questions and other relevant information.
-E-

40. Chow, Rita.
Intensive Cardiac Care: A Study of Professional Nursing Practice.
Pub. in Military Medicine, December 1969, v.134, n.12, p.1488-1496.

This is a detailed report on a 3 year research study whose purpose was "to identify the nursing content given to patients who have had open heart surgery." The focus of the study is not on computer technology, but the author addresses use of the physiological instrumentation system which provides computerized data resulting in the nursse receiving increased amounts of information. There is a diagram which shows the relationship to the measurement of patient parameters for clinical inference.
-R-
-C-

41. Chow, Rita.
Patient Monitoring is More Than Just a Dream.
Pub. in American Journal of Nursing, November 1961, v.61, n.11, p.60-62.

Article is of historical significance as it is the first one on patient monitoring to appear in a U.S. nursing journal. Content is very limited due to the fact that "the machines, as yet, have not been tested rigorously within many hospital settings." Contains illustrations and descriptions of patient monitoring devices, including cost, and manufacturer. Other examples of the application of electronics to medicine and nursing are given. Ms. Chow points out that "perhaps, being electronically monitored, the patient will need a different type of nursing care.....yet, some of his needs will be unchanged."
-G-
-C-

42. Collart, Marie E.
Computer Assisted Instruction and the Teaching-Learning Process.
Pub. in Nursing Outlook, August 1973, v.21, n.8, p.527-532.

Comprehensive, well written article that focuses "on computer assisted instruction (CAI) from the faculty

member's viewpoint, its uses, advantages, and limitations, and the strategies available through CAI for the nurse educator."
-E-

43. Computer Techniques in the Hospital Field.
Pub. in Nursing Mirror, November 26, 1965, v.120, n.22, p.315-316, 322.

This article was a report published in the WHO Chronical October 1965. It gives a very general description of the capabilities of the digital computer and its application to the hospital/medical environment via specific examples.
-G-

44. Computers and Speech Changes; Electronics Aid in Detection of Neurological Diseases.
Pub. in Nursing Mirror, August 16, 1968, v.126, n.7, p.25.

This is a report on a new computer system being developed by the U.S. Public Health Service's National Center for Chronic Disease Control which picks up inaudible speech changes in persons with early neurological diseases and gives an immediate warning of their condition. Its major benefits will be to "spot neurological disorders before other symptoms are evident."
-C-

45. Cook, Margo and McDowell, Wanda.
Changing to an Automated Information System.
Pub. in American Journal of Nursing, January 1975, v.75, n.1, p.46-51.

Discusses implementation of a medical information system at one hospital. Gives good overview of nursing functions with emphasis on nurse acceptance of change from manual to computerized handling of paperwork.
-A-
-G-

46. Cornell, Sudie A. and Brush, Francis.
Systems Approach to Nursing Care Plans.
Pub. in American Journal of Nursing, July 1971, v.71, n.7, p.1376-1378.

This article deals with a systems approach to problem solving utilizing a computer. Using the computer may facilitate some solutions. One such problem was that of patient care plans. The effort to computerize care plans was undertaken because the manual system did not allow for regular, reliable adjustments. Computer handling of the nursing care plan has reduced omissions and other errors. As with nearly all the articles on automation this article states that planning must be comprehensive and evaluation continuous.
-C-
-A-

47. *Creighton, Helen.
Diminishing Right of Privacy - Computerized Medical Records.
Pub. in Supervisor Nurse, February 1978, v.9, n.2. p.58-61.

The growing use of computerized medical records and legislative controls on records abuse in federal information systems are reviewed. Medical records are computerized for medical use because patient mobility and the specialist treatment system require a comprehensive, available, geographically wide-ranging information system for monitoring patient condition, verifying medication dosages, reminding nurses of medication schedules, and scanning populations for illnesses. Because single-purpose systems are expensive, computer files are also frequently used for policy analysis, financial accounting, and biomedical systems. Information systems may pose a threat to individuals for several reasons, e.g., questionable practices in collecting information, and inaccurate information obtained through third-party payers from central data banks. The information systems of medicare and the Social Security Administration contain master earning, beneficiary, and supplemental income files. The Privacy Act of 1974 regulates government-connected information systems with regard to public accountability, access limits, data accuracy, and fairness. The act requires Federal Register publication of notices on characteristics of covered data systems; notice to data subjects; information release without subject consent only to specified agencies; procurement of possibly detrimental information directly from the subject;

and fairness and accuracy safeguards calling for only relevant information and providing for subject access. Civil remedies for abuse, such as action to compel record production and damage claims are discussed.
-G-
-A-

48. *CSF Ltd. and Public Health Service, Division of Nursing.
Nursing Manpower Prediction System - User Manual. Available from NTIS, U.S. Department of Commerce, Springfield, VA. 22161.
Order Number HRP-0023540.

The operation of the Computerized Nursing Manpower Prediction System is described from a user's perspective. The nursing manpower prediction system is a collection of Fortran IV program modules written and developed under the National CSS System using the IBM OS Fortran (G) compiler. Demand models have been developed for four types of provided settings: acute care, ambulatory care, long-term care, and community and public health care. The Nursing Manpower Prediction System is capable of predicting demand and supply for nursing manpower at county and state levels. Development of these models has focused on the incorporation of utilization, demand, and supply factors into a framework for determing nursing manpower needs. The models are capable of annual demand and supply projections and care forecast trends over a 10-year planning period. Demand is estimated for three types of nursing personnel: registered nurses, licensed practical nurses, and nursing assistants. The supply sub-models provide estimates of the future supply and availability of nurses by particular skill level. Initial testing indicates that optimal application of the model is at the standard metropolitan statistical area, multiple county, or state planning area levels. Potential users of the system include hospital associations, health services agencies, nursing associations, high school guidance counselors, health maintenance organizations, professional organizations for nursing specialties, professional standards review organizations, and colleges and universities. The system commands are discussed and the required formats and examples of usage are presented. Input data requirements are discussed. Actual input data

files and output reports are included.
-A-

49. Davis, Katherine G.
Give Nurses the Chance to Explore These Twelve Routes to Better Care.
Pub. in Modern Hospital, October 1968, v.3, n.4, p.82-85.

This is both a philosophic and practical article which was adapted from the author's speech at the 1968 ANA convention. Computerization is identified as one of the twelve areas in which research can improve patient care. The author urges nurses to become involved in computer technology to ensure that nursing functions are enhanced. She then provides examples and makes recommendations as to how computers can be used to nursings' advantage. The remaining part of the article discusses the remaining eleven areas in which research can improve patient care. Nurses looking for research topics might find one of these twelve areas interesting enough to pursue.
-G-
-R-

50. Davis, M. and Saunders, R.
Allocating Student Nurses by Computer.
Pub. in Nursing Times, April 8, 1966, v.62, n.14, p.467-469.

The author describes the use of computers to schedule student nurses in a teaching hospital. The type of preparatory information required by the computer is discussed and future value of student information based upon use of the data obtained was pointed out. Samples of computer outputs were displayed.
-E-

51. DeMarco, James P.
Automating Nursing's Paper Work.
Pub in American Journal of Nursing, September 1965, v.65, n.9, p.74-77.

Discusses approach to automating the clinical tasks of the nurse through a Hospital Information System. Also describes future applications for automation that are presently realized. One area that most articles written in this time frame do is to place

the responsibility on the nurse for all data entry - rather than clerk or physician. This could prove to be a problem and should be a concern for nursing.
-A-
-C-

52. DeMarco, James P. and Snavely, Shirley A.
Nurse Staffing with a Data Processing System.
Pub. in American Journal of Nursing, October 1963, v.63, n.10, p.122-125.

Describes an early project in nurse staffing with a data processing system. Of importance were the tools used for patient categorization and nurses' capabilities. Author has good insight into needs of this type of system.
-A-

53. Dingwall, Robert.
Are You Ready for the Microship?
Pub. in Nursing Times, June 7, 1979, v.75, n.23, p.975-976.

This article may ruffle your feathers! The first few paragraphs deal with technical terms. Following this the effects of computers on nursing care are addressed. Many of the issues mentioned could well occur. The options for nurses are still available - if nurses don't take them, others will make the decisions for them.
-G-
-A-

54. *Dixon, Jon M., Gouyd, Nancy and Varricchio, Domincio T.
Computerized Education and Training Record.
Pub. in The Journal of Continuing Education in Nursing, July - August 1975, v.6, n.4, p.20-23.

Computer capabilities at the Bronson Methodist Hospital in Kalamazoo, Michigan, for continuing education and training programs are described. The computerized staff development system is intended to serve as a quantitative record of the hospital's education and training activities. It is recognized that qualitative data are necessary to record information such as course objectives, outlines, evaluations of courses and participants, and followup actions. Data are obtained through inhouse

attendance records and continuing education credit sheets for outside activities. A sample of each form is included, and procedures for completion are detailed. The staff development file of the hospital contains data processed on cards. Data elements include Social Security number, class number, class name, instructor or sponsor, starting date of a class or program, ending date of a class or program, length of a class or program in hours and tenths of hours, and continuing education units awarded (to be added when such information is ready for practical use). Three different formats can be used to obtain information from the staff development file: (1) alphabetical list of all employees grouped by department; (2) straight alphabetical listing of all employees in the hospital; and (3) breakdown of attendance for a particular class or program. Potential applications for the computerized staff development program are delineated. A visual summary of the computerized recordkeeping system is provided.
-E-

55. Dominick, Virginia M.
Automation of Nursing Staff Allocation.
Pub. in Supervisor Nurse, November 1970, v.43, n.11, p.20-23, 27-29.

This is an early article that addresses a system utilized for personnnel staffing to meet current needs. According to this author, the system avoids the inefficient use of personnel, reduces paperwork and considers substitutability when deficiences are evident. Personnel are assigned objectively and consistently so that quality and quantity of patient care are enhanced.
-A-

56. Donabedian, Dorothy.
Computer-Taught Epidemiology.
Pub. in Nursing Outlook, December 1976, v.24, n.12, p.749-751.

Describes very clearly an educational exercise whereby students use a computer to respond to an epidemiology public health problem. The exercise was programmed to give "instant feedback tailored to their individual learning needs." This article should give nurse educators ideas that could be used in the development of similar computerized

educational programs.
-E-

57. Dwyer, Joyce M. and Schmidtt, John A.
Using the Computer to Evaluate Clinical Performance.
Pub. in Nursing Forum, 1969, v.8, n.3, p.267-275.

Describes "the development of an evaluation method which utilizes the time-saving device of a computer." The instrument for clinical evaluation was a behavior rating scale which was constructed by the nursing faculty over a two year period. It consisted of 132 items consistent with the objectives of a maternal and infant nursing course. A computer program totaled the numerical values for the rated behavior and calculated the student's performance in T-scores. The author concluded that there were two significant contributions of the system: time was saved and writing anecdotal records was eliminated.
-E-

58. Editorial.
From Blinking to Thinking.
Pub. in American Journal of Nursing, November 1961, v.61, n.11, p.55.

This editorial is a lead-in to the first article to appear in a nursing journal on the use of machines for patient monitoring (Patient Monitoring is More Than Just a Dream by Chow). It challenges nurses to "see the advent of patient-monitoring machines as an opportunity to reverse what has become a serious threat to nursing: the absorption of an increasing percentage of the nurse's time in performing dependent and supplementary medical duties."
-G-

59. Editorial.
Untouched by Human Hands.
Pub. in Nursing Forum, Spring 1962, v.1, n.2, p.12-20.

Of historical interest as this is the second editorial to appear in a U.S. nursing journal on automation, and the most articulate in its farsightedness and forewarning of what impact automation can have on nursing. There is a brief discussion on the history of the term and concept of automation. The rest of the article gives a

philosophical overview of "what will automation mean for nursing and nurses." The editorial ends with a plea for nurses not to adopt nursing's historic weapon against change, passive resistance, which "could lead us tc professional suicide", but to think positively and plan now for "the automated world we are destined to live in."
-G-

60. Editorial.
RB No 7008A A90L1.
Pub. in Nursing Outlook, November 1967, v.15, n.11, p.27.

The strange title of this editorial is the "match code" for the computer subscriptions service of this magazine. This editorial exhorts nurses to learn all they can about computers, to teach what they learn to nursing students and staff, not after they are involved, but before, and to be ready to accept the computer as a helping tool and not a threat.
-G-

61. Editorial.
Computers or Nursing?
Pub. in Lancet, October 12, 1974, v.2, n.7885, p.877-888.

Effectively challenges the two principle reasons for the predicted superiority of modern computers - assisted technology over traditional nursing observation - "greater accuracy of measurement and prediction, and a saving in terms of cost-effectiveness." Provides references to support their opinions. Ends with a statement that "medical computing should eventually be removed from the computer experts and placed where it rightly belongs - with the doctors and nurses." (see Aschcraft and Berry in Lancet, November 30, 1974 for a response to this editorial)
-G-

62. Eisler, Jeanne; Goering, Paula and Turney, Judy.
Strangers in Computer Land.
Pub. in American Journal of Nursing, June 1972, p.1120-1123.

Describes the parallel between a patient's encounter in a hospital and student nurses encounter with a

computer center. In both situations the jargon can be frightening and confusing. Provides an excellent look at "computer land."
-G-

63. Electronic Monitors Pace Cardiac Care.
Pub. in The Modern Hospital, January 1965, v.104, n.1, p.96-100.

Describes several coronary care units and discusses their development, problems, and methods of functioning with emphasis on monitoring systems. The article in selected parts goes beyond monitoring and briefly alludes to the added dimension of computers used with monitors to provide the integration of variables that would provide upgrading of monitor information. Of interest to nursing is the final conclusion that "it is the trained and motivated nursing staff which, ultimately, will make such units work."
-C-

64. *Ethridge, Phyllis E. and Packard, Robert W.
Innovative Approach to Measurement of Quality Through Utilization of Nursing Care Plans.
Pub. in Journal of Nursing Administration, January 1976, v.6, n.1, p.25-31.

The use of nursing care plans as the basis of a system for documenting the performance of nursing processes is described. The system, developed at St. Mary's Hospital and Health Center in Tucson, Ariz., can be manual or computerized. Each nursing care plan itemizes anticipated patient problems, expected outcome, and nursing processes for each disease or condition. The supplemental performance documentation form provides for 4 days of care documentation, by shift, and for the incorporation of the nursing process or 'directions' from the care plans. Space is also provided to record the achievement of expected outcomes for each patient problem as defined in the care plans. The documentation system was designed originally for manual recording of total scores for the performance of nursing processes, i.e., the number of times each process or task was performed versus the number of times it should have been performed. All members of the nursing staff were given an intensive orientation in the charting process, and the system was pilot

tested on two units before it was implemented throughout the hospital. Results obtained from the system may be used to select patient charts for audit under the nursing quality control program. At the time of writing, the system had been implemented throughout the hospital, and a sample computer output on 100 care plan records had been produced. Examples of patient care plans and progress records are provided.
-C-

65. Farlee, Coralie.
The Computer as a Focus of Organizational Change in the Hospital.
Pub. in Journal of Nursing Administration, February 1978, v.8, n.2, p.20-26.

"Designed to help nursing administration and others assess the potential impact of technological innovations introduced in health care organizations." The organizational changes that often accompany the introduction of hospital information systems is discussed in detail. This article should be of interest to those persons responsible for planning and directing the implementation of an automated hospital information system.
-A-
-G-

66. Farlee, Coralie and Goldstein, Bernard.
A Role for Nurses in Implementing Computerized Hospital Information Systems.
Pub. in Nursing Forum 1971, v.10, n.4., p.339-357.

Nurses have significant contributions to make toward implementation long before the system reaches a single nursing station. Nurses are going to decide - will they accept a passive role and permit the system and its consequences to be imposed on them, or are they prepared to take an active, responsive role at crucial early stages? This article describes several points critical to HIS selection, implementation and nurse involvement. The authors also address attitudinal data collected from nurses. This is a very thorough, easy to read article.
-A-
-G-

67. *Felker, Daniel B., Shettel, Harris and Hukill, Elizabeth.
Evaluation of the Application of Instructional Technology in Selected Basic Nursing Educations.
Final report.
August 1975, 172p.
Available from NTIS, U.S. Department of Commerce, Springfield, VA. 22161.
Order Number PB-256-288/2.

Findings of a study to evaluate the application of instructional technology in basic nursing education are presented. The evaluation is selective in that it: (1) focused on nursing education programs using instructional technology effectively, and (2) included nursing education programs funded by Division of Nursing, Public Health Service, DHEW through special project grants. Terms are defined and a literature review is described. Programs that used television, programmed instruction, films, computers, multimedia and audiotutorial methods are discussed, and an assessment of the literature and its implications are presented. The methodology is described as being designed around a descriptive, rather than an experimental paradigm. A panel was selected to provide guidance throughout the project, a sample of nursing education programs was identified, and data collection instruments and procedures were documented. Both validations of the findings and limitations of the study are discussed. An IT Model was developed and a questionnaire was constructed.
-E-
-R-

68. Filosa, Lawrence T.
Automated Communication Saves Time, Money.
Pub. in Hospital Progress, March 1968, v.49, n.3, p.115-118.

This article describes the computerized data communication system at St. John's Hospital in Joplin, Missouri. This system has freed nurses of many chores and eliminated the possibility of late charges, or not charging accurately. This system has improved communication within the hospital so that

everyone is posted on the location and needs of every patient.
-G-

69. *Finlayson, Hal.
Numbers Approach to Nursing Management.
Pub. in Dimensions in Health Service, May 1976, v.53, n.5, p.39-44.

An innovative management and reporting system for nurses at the Kingston General Hospital in Ontario, Canada, is detailed. Major components of the system include scheduling, patient classification (workload determination and variable staffing), quality assurance, and budgeting for nursing service. The computerizd system, implemented in August 1974, is designed to be more flexible and offer more features than manual systems. Ten aspects of flexibility are built into the system: (1) the hospital can specify 4 to 6 weeks of scheduling; (2) the system can generate cyclical or flexible schedules simultaneously for different units; (3) fixed patterns and nurses on permanent shifts can be integrated with flexible schedules; (4) nurses can specify days off, including weekends; (5) nurses can specify shift preferences; (6) nurses can specify tradeoff or work stretch versus split days; (7) the system software can schedule part-time staff; (8) the hospital can specify variable coverage by shift and day of the week; (9) the hospital can specify variable weekend off ratios; and (10) the hospital can specify, on a gross basis, the weighting on nursing coverage relative to individual patterns. The system is based on the Medicus approach to patient classification and workload determination, as developed by the Medicus Corporation in Chicago, Ill. It incorporates a patient classification sheet a patient care index, patient care monitoring, personnel budgeting, and management reporting.
-A-

70. Fisher, Linda A., Johnson, T. Scott; Porter, Douglas; Bleich, Howard L., and Slach, Warner, V.
Collection of a Clean, Voided Urine Specimen: A Comparison Among Spoken, Written and Computer - Based Instruction.
Pub. in American Journal of Public Health, July 1977, v.67, n.7., p.640-644.

In an effort to compare different methods of instructing patients 99 women were given computer, spoken, written or no instructions for the collection of a clean voided urine specimen. The study showed the group who received computer instructions was the most uniform in performance and reported fewest problems. In addition this group had fewer contaminating bacteria in their specimen. The effectiveness of the computer instruction was probably related to quality of dialogue, self-pacing, self-testing and privacy.
-R-
-C-

71. Francis, Huw W.S.
The Family Doctor, the Health Visitor and the Computer.
Pub. in Nursing Times, February 23, 1968, v.64, n.8, p.252-254.

Describes handling of vaccination and immunization records by computer. States that with the use of the computer for record keeping, immunizations should rise at least by 10 per cent. Much interaction was required initially with the system for success, but should allow use of health providers' skills for more difficult problems. Points out positive outcomes.
-G-
-A-

72. Frank, Sr. Charles, Marie.
The Spirit of Nursing in a Scientific Age.
Pub. in Hospital Progress, March 1964, v.45, n.3, p.130-138.

Philosophical article on nursing which addresses "the dangers to be eliminated or avoided which threaten the spirit of nursing in our scientific age." Depersonalization of patients, students, and personel are identified as the greatest danger. The Computers are identified as one of the tools which will give nurses more valid and reliable information, however, the author points out that machines cannot do the work of human beings, only help to make their services more effective if they're used correctly.
-G-

73. Freed, Roy N.
Written Signature Block the Computer Revolution.

Pub. in Modern Hospital, July 1968, v.111, n.1, p.103-105.

This article addresses a subject that remains an issue today - that of hard copy signature and automation of patient records. Both weaknesses and strengths are described along with government and JCAH regulations.
-G-

74. *Freund, Louis E. and Mauksch, Ingeborg G.
Optimal Nursing Assignments Based on Difficulty.
Final project report.
June 30, 1975, 309p.
Available from NTIS, U.S. Department of Commerce, Springfield, VA. 22161.
Order Number HRP-0011346.

The measurement and structuring of patient care assignments for nursing personnel working during the day shift on acute medical and surgical hospital units are discussed. Nine research objectives were formulated: (1) analyze the functional relationship between the difficulty of assignment elements in an assignment and the judged difficulty of hypothetical assignments; (2) develop a method for the allocation of nursing personnel based on a measure of assignment difficulty; (3) evaluate alternative patterns of assignment for varying levels of patient load size and staff mix and develop recommended assignment regimens; (4) test the effectiveness of allocation procedures; (5) evaluate the effect of alternative staff mix policies on the average difficulty of nursing assignments; (6) investigate the area of maximum allowable difficulty for any single assignment; (7) determine a methodology for finding out when and how difficulty scale values should be reviewed to detect significant changes in personnel attitudes toward the difficulty of assignment elements; (8) evaluate the acceptability of the method on the part of nursing personnel by evaluating attitudes toward assignment policies previous and subsequent to the implementation of the allocation method based on assignment difficulty and (9) develop a method for determining the cost-effectiveness of implementing allocation methods in a given health care environment. Personnel assignments are structured based on required patient care activities, continuity constraints, and other factors. Staffing

needs are derived from an examination of optimal solutions to the problem of structuring individual patient care assignments. Assignment elements are defined for each nursing unit. Using constant sum paired comparisons, a ratio scale reflecting difficulty of each defined assignment element is obtained in relation to all other elements for each persons or personnel type on a nursing unit. The difficulty of any proposed assignment is computed by the addition of difficulties associated with included assignment elements. Research results document the dependence of t time spent in patient care activities on the difficulty of registered nurse, licensed practical nurse, and technician assignments. These results support the relation of a new process known as quality index to the average difficulty of personnel assignments. A computer model and supporting information system are described, and model solutions to the assignment problem are compared to head nurse solutions.
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-A-

75. *Froment, A., Michaud, P., Milon, H., DeChanoz, G., Dupuy, M., Magnon, R., Melinon, S., Bouveret, C., Chorobik, T., and Falcoz, H.
Computer-Assisted Patient Care Management.
Pub. in Medical Information, April-June 1979, v.4, n.2, p.119-125.

A computer-assisted patient-care management system is currently operating in two patient-care units as part of a pilot project at the Hospital Cardiologique, a member institution of the Hospices Civils de Lyon. The system includes the management of administrative records (notice of admission sent to the patient-care unit, appointment for admission sent to the patient, notice of admission sent to the physician requesting hospitalization, admissions and discharges; patient census) and of patient-care records (orders, examinations, laboratory tests, medications, injections and treatments, a summary list or orders to be carried out during the day, labels for laboratory specimens and requisitions for the tests and examinations to be performed); and the medical management of the patient (clinical summary of patient status at admission, results of tests and examinations, summary of hospitalization, data for research and statistics). Computerization was begun

in 1977, following the implementation of individualized patient-care records in 1976. The system will be evaluated in 1978 and extended to the remainder of the hospital (18 patient-care units) by the end of 1979.
-G-

76. Fuld, M.
Swollen Legs: Causes Diagnosed by Computer and Conventionally.
Pub. in Nurses Times, April 15, 1966, v.62, n.15, p.511-513.

The author presents a patient situation by which the physician diagnoses the patient using traditional methods. One of the presenting signs (swollen legs) in then used as a basis for developing a chart which could be programmed into a computer resulting in the same diagnosis as the one made by the physician. The author contends that such mechanized diagnoses could very well lead to the nurse as a monitor located away from the patient's bed.
-C-

77. *Gabbert, Charles C.; Kuykendall, LuVerne; Swanke, Ferne and Simpkins, Don.
Nursing Utilization Management Information System.
June 9, 1975, 21p.
Available from CSF, Ltd., 3001 South State Street, Suite 707, Ann Arbor, MI. 48104.

A management information system designed to predict staff needs, to determine trends in patients' nursing care needs, and to monitor budgetary compliance in the nursing division at Fairview Hospital, Minneapolis, Minn., is described. The system consists of the following biweekly reports: average number of patients per category; total earned nursing hours; nursing unit hours worked; nursing service report of performance by skill level; nursing service report of performance; graphic report of nursing performance; report of budget staff utilization; and report of nursing hours per patient day. In addition, the system provides cumulative reports on the average number of patients per category and on utilization and performance. Th; uses and content of each report are described briefly. Each description is accompanied by an illustration of the format of the report. The system develope- to predict nursing

care requirements for nursing units prior to the beginning of each shift is described. The system, which is based on data obtained through the management information system, provides for the objective assignment of nursing float personnel and the exchange of personnel between units. Implementation of the retrospective and predictive components of the management information system is described, as is the data-processing equipment used by the system.
-A-

78. *Gall, John E. Jr.
Demonstration and Evaluation of a Total Hospital Information System. Report. for 1971 - 1976. March 1977, 44p.
Available from NTIS, U.S. Department of Commerce, Springfield, VA. 21161.
Order Number PB-271-079/6.

The report contains findings from the demonstration and evaluation of a comprehensive hospital information system at a general community hospital over a four-year period. The system is used in routine service and it is designed to handle patient records, bed census lists, drug files, employee records, purchase order forms and medical records. It also provides a means for ordering medications, nursing services, and all other routine and special patient services, and controlled access to various records and ordering routines to prevent unauthorized use. At this hospital the system has proven to be cost-effective with labor savings accounting for 95 percent of the total savings derived. Other benefits include reduced errors, improved timeliness, and enhanced availability of medical information. The report also contains major sections on system implementation, validation, extension, and how economic benefits were realized.
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79. George, Joyce H.

Machines in Perspective: Electronic Monitoring of Vital Signs.
Pub. in American Journal of Nursing, February 1965, v.65, n.2, p.68-71.

The author compares the accuracy of manual methods and equip- ment to that of electronic monitoring equipment in the taking of vital signs. The techniques used to validate results are interesting and informative. The most significant results of this study was in regard to the misconceptions textbooks and nurses have about vital sign variations within individuals. This article should be a required reading for nurses working with electronic monitoring of vital signs.
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80. *Gluck, J.
The Computerized Medical Record System: Meeting the Challenges for Nursing.
Pub. in Journal of Nursing Administration, December 1979, v.9, n.12, p.17-24.

A system of computerized medical record-keeping in a health maintenance organization is described. Some problems arising in the shift from manual to computerized recording keeping are discussed. Perhaps the most important for nursing is the increase in the nursing staff's responsibility for complete, consistent documentation of patient care concomitant with the shift to a computerized system. Nurses must be comfortable with patient assessment, patient management and documentation in order to utilize the system effectively.
-A-
-C-

81. Goldstein, Bernard and Farlee, Coralie.
Characteristics of Nursing Units and Accommodation to Technological Change.
Pub. in Nursing Research, January-February 1972, v.21, n.1, p.63-68.

A very research oriented article discussing the adaptations to technological change by staff at nursing stations. These findings can be used as a basis to determine characteristics of nursing stations, particularly differences between medical and surgical units, and finally the ability to allow change.
-R-
-C-

82. *Goodwin, Judy O. and Edwards, Bernadine S.
Developing a Computer Program to Assist the Nursing Process: Phase I - From System Analysis to an Expandable Program.
Pub. in Nursing Research, July-August 1975, v.24, n.4, p.229-305.

The development of a computer program to formulate nursing diagnoses in a limited area of patient functioning is traced. In the first stage of the development, a definition of nursing was established upon which a system model of the nursing process was constructed. The operational definition of nursing used was: "a problem-solving process consisting of an orderly series of steps designed and interrelated to assist clients to achieve and maintain optimal functional abilities." In the second stage, a computer program was written for use in collecting patient data and in formulating nursing diagnoses related to functions of the skin, mucous membranes, nails, and hair. The program was designed to serve as a model for the development of a more comprehensive program that would include other functional areas, suggest patient objectives and nurse interventions, and aid in evaluation of nursing care. In the third stage of development, trials were conducted with the program to obtain feedback from nurses. Participants in the trial were given a list of functional areas to include in data collection and were asked to examine and interview patients of their choice. After entering the patient data requested by the program and receiving a list of nursing diagnoses, the nurses responded to a short questionnaire eliciting their thoughts and feelings about the program. Nurses found that implementation of the program required too much time but agreed that with modification, it could help them give better care. Directions for development of the program are outlined. Flow charts and excerpts from the data collection instrument and the computer-generated nursing diagnosis are included.
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83. Gosben, Charles E.
Your Automated Future.
Pub. in American Journal of Nursing, January 1972, v.72, n.1, p.62-67.

The author is an engineer and MD who describes the concept of systems design and how it applies to hospital operations. The last part of the article predicts what advances will characterize the automated hospital of the future and the nurse's projected role in this future.
-G-

84. Green, Joan L.
Computer-Scheduled Nursing Labs.
Pub. in Nursing Outlook, December 1970, v.18, n.12, p.38.41.

Interesting and complete description of how the University of San Francisco School of Nursing used the computer for scheduling nursing labs and eliminated "65-75 faculty manpower hours each semester in planning, preparing, and reproducing laboratory schedules." An unexpected outcome of this scheduling was the need for faculty to establish priorities and re-evaluate objectives related to clinical experience. Nursing faculty should be able to easily identify with the advantages, disadvantages, and implications for such a scheduling system.
-E-

85. *Griffith, John R. and Hancock, Walton M.
Hospital Management Systems Demonstration: Final Report and Executive Summary.
Final Rept. 1 December 1969 to 31 May 1977.
May 1977, 12p.
Available from NTIS, U.S. Department of Commerce, Springfield, VA. 22161.
Order Number PB-280-633/9.

The documentation of this project consists of the final report, a magnetic tape and other appendices through S. The tape contains the computer programs for the Admission Scheduling and Control System: A comprehensive Hospital Admissions Modeling and Simulation System II, (Appendix A). A brief description of the contents of Appendices A through K is given in the final report that primarily relates to products of the last two years of this project. Most of the material throughout this final report is related to the use of management monitoring and control systems to reduce hospital costs. The

systems are based on quantitative analytic methods which supply the hospital refined data on productivity and efficiency. The documents include reports on systems for hospital admissions scheduling and control, nurse allocation and scheduling, hospital manpower budgeting, ancillary department scheduling, preadmission testing, and forecasting hospital bed needs.
-A-

86. *Hagan, Dan E.
Cluster Analysis - An Empirical Methodology for Developing Homogeneous Patient Subjects for Research Purposes.
Pub. in Nursing Research, April 1977, v.9, n.2, p.395-407.

Targeted research directed toward the development of knowledge in the area of quality nursing care was derived from the results of the "Delphi Survey of Priorities in Clinical Nursing Research." Fifteen research worksh.ps were involved in an empirical study to define quality nursing care. Two approaches were used. The first aimed at developing valid, reliable measures, using indicators of health status, was directed at six different patient populations. The second was a correlational study with nine work groups. Data was collected on quantity and type of care and on the health status of the care recipients. Correlational analysis was conducted to determine which components are related to various measures of patient health status. This type of descriptive research was then analyzed on a BC-TRY computer program using cluster analysis to determine which sub-sets of patients can be created that are homogeneous with respect to nursing care required or actually being delivered. However, the data generated were not sufficient for concrete results, though tentatively the conclusion is that, with a broader data base, cluster analysis would yield information on the quality of nursing care.
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-C-

87. *Hanchett, Effie S.
The Problem Oriented System: A Literature Review.
Available from ERIC Document Reproduction Service, Arlington, VA. 22210.

This literature review and bibliography resulted from a study to design a method for determining the impact of the computerized problem-oriented medical record (POMR) on the nursing components of patient care. The POMR is a system for the documentation of patient care consisting of four related components: a data base, problem list, initial plans for each problem, and progress notes, including information assessment and any revisions of the plan. The bibliography is designed to assist in determining the areas in which the problem-oriented record can assist, and the areas in which further development is required. The literature is reviewed in five categories: (1) the nursing process; (2) the POMR; (3) nursing and the POMR; (4) the computerized POMR; and (5) nursing and the computerized POMR. The bibliography of 680 items is divided into two sections: the nursing process and the problem oriented record and/or system. Access is provided by content area and an author index.
-C-
-R-

88. *Hannah, Kathryn J.
Computer and Nursing Practice.
Pub. in Nursing Outlook, September 1976, v.24, n.9, p.555-558.

The application of automation in promoting improvements in patient care and nursing practice are discussed. A brief review of the history of automation in the health care industry opens the discussion. Two general approaches to the automated recording of nursing observations are described -- the use of a computer-readable form containing frequently used statements about patient conditions or behavior, and the use of a branching questionaire via a cathode ray terminal. The advantages of automated recording include increased numbers of observations, greater accuracy and reliability of observations, more legible notes, less time spent in recording notes, and availability of observations for use in statistical analysis and in teaching. Two general approaches to the automation of nursing care plans are also described. The first involves the development of computer-readable forms on which nursing actions are noted. The forms are then processed by a computer, and printouts of the nursing care plan are produced. The second approach involves designing basic care plans for meeting patient needs,

storing the plans in computer memory banks, and then adapting the plans to individual patients. Such approaches are said to save time, increase accountability, and reduce errors and omissions. Other applications of computers include automated monitoring of patients, hospital information systems, and staff scheduling. Potential pitfalls in the application of automation in nursing practice include the tendency of people to over estimate the capabilities of the computer and the inflexibility that can characterize computer systems.
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89. Harris, Ruby M.
Laying the Right Lines for Electronic Monitoring. Pub. in Nursing Outlook, August 1963, v.11; n.8; p.573-576.

This article describes the initiation of an intensive care unit in "The first General Community Hospital in the U.S. to plan to monitor routinely all acute coronary care patients and to coordinate a separate cardiac nursing unit with an intensive care unit." This is an excellent presentation on the preliminary preparation of these nurses based on the underlying philosophy that preparation of the staff is as vital as the proper wiring of the electronic equipment. Interestingly, the author refers to electronic physiologic monitoring as "body-function recording equipment" which reflects the "early date" that this article was written.
-G-

90. *Harrison, Elizabeth A.
Hospital Information Systems (A Bibliography with Abstracts) Report for December 1968 - November 1978. March 1979, 101p.
Available from NTIS, U.S. Department of Commerce, Springfield, VA. 22161.
Order Number NTIS/PS-79/0122/6.

The selected abstracts of research reports cover development, implementation, and evaluation of hospital information systems. Some specific areas covered are medical records, effects on nursing, benefit cost analysis, blood banks, feasibility studies, and management information systems. (This

updated bibliography contains 94 abstracts, 45 of which are new entries to the previous edition.)
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91. Harvey, James D.
This I believe....About the Health Crisis.
Pub. in Nursing Outlook, January 1968, v.16, n.1, p.53-56.

This article is adopted from a speech the author presented to the Oaklahoma League for Nursing. Four crises relative to health are identified and analyzed: improved medical care, population growth, unwillingness to change, and gaps in care, research, and application. Based upon these stated crises the author suggests that the three solutions to the health crises are: self-care, disposables, and automation. He very briefly covers the effects of automation relative to patient care, specifically as they relate to transmittal and response of information, and support in the laboratory, laundry, and food services areas.
-G-

92. *Hastings, G.E. and Whitcher, C.
Automated Medical Screening in an Urban County Jail.
Pub. in Medical Care, December 1979, v.17, n.12, p.1238-1246.

A machine-administered, branch-chain automated medical history (AMH) was evaluated as a medical intake screening tool for inmates of a large metropolitan county jail. The reproducibility, validity, sensitivity and specificity of the AHM were measured and found comparable to other previously reported AMH systems. The AMH did not produce intake screening data comparable to that obtained by trained face to face medical interviewers. This, in addition to the time and personnel effort required for administering the AMH while preventing vandalization of the equipment, made the AMH impractical for use in the county jail setting. Physicians used only 21 per cent of the positive AMH responses when they were asked to formulate problem lists from the AMH data. Physicians who used the AMH in clinical settings complained that "the AMH data seem as often wrong as

right." The authors observed that the number of true-positive AMH responses was matched by an almost equal number of false-positive and false-negative responses. This may account for the physician's subjective response. If so, this represents a problem to be addressed by future AMH systems. Physicians used only 55.8 per cent of the intake screening information obtained by nurse practitioners. This was also somewhat lower than expected. For this reason, medical historical information in the county jail setting might be most efficiently obtained by the provider who has clinical responsibility for prescribing treatment.
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-G-

93. Hershey, Nathan.
Automation in Patinet Care, The Legal Perspective.
Pub. in American Journal of Nursing, May 1967, v.67, n.5, p.1037-1039.

This is one of the first articles found in a nursing journal that addresses automation from a legal perspective. It's examples are not reflective of the sophistication of the technology today, but it does give a rather well rounded view based upon legal principles related to automation available in the 1960's. The author does point out that "there is no reason for nurses who have ministered to patients effectively in the past to expect greatly increased liability in the future..."
-G-
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-A-

94. *Hilberman, Mark; Kamm, Barbara; Tarter, Michael and Osborn, John J.
Evaluation of Computer-Based Patient Monitoring at Pacific Medical Center.
Pub. in Computers and Biomedical Research, October 1975, v.8, n.5, p.447-460.

The use of a computer-based patient monitoring system in the cardiopulmonary unit of the Pacific Medical Center in San Francisco, Calif., is detailed. The computerized system is used to assist in the care of patients who have undergone cardiac surgery or who have some disturbance of cardiac or pulmonary function. The total system includes bedside

personnel, stand-alone and computer-based electronic monitoring equipment, and other biochemical and radiological equipment. Studies were conducted to evaluate the effectiveness of the system through an examination of its utilization and its impact on patient care. Bedside stations were observed for 158 hours during which 2,043 interactions with the total monitoring system occured. Of these interactions, 704 involved a study of the EKG (electrocardiogram) or arterial pressure waveforms and 1,339 involved direct interaction with the computer. Data were also obtained on computer usage by postoperative hour of a cardiac surgical patient, type of information requested, and user identity. Principal users of the system were nurses at patient bedsides. Statistical information was obtained to investigate the impact of the system on morbidity and mortality in the cardiopulmo ary intensive care unit. Outcome variables consisted of death rates, length of stay in the unit, days on respirator, days with arterial line, the number of arterial blood gases, and nurse to patient ratio per day. Essentially no differences were found between monitored and control patient groups. Suggestions are offered for the evaluation of monitoring and measurement systems in a productive manner.
-C-
-R-

95. *Hodge, Melville H.
Medical Information Systems. A Resource for Hospitals.
1977, 201p.
Available from Aspen Systems Corporation, 20010 Century Blvd., Germantown, MD. 20767.

The importance of information handling and processing in hospitals is discussed. Medical information systems affect almost all aspects of hospital operation since they must be integrated throughout the institution to provide maximum benefits. Primary and secondary economic benefits to be derived from the use of medical information systems are examined. Consideration is given to the labor-intensive hospital, data handling and labor costs, patient care benefits and the measurement of patient care by outcome versus process, and research and education benefits. Critical issues in the selection of an appropriate medical information system are

identified. They involve departmental versus hospital wide systems, information transport versus information retrieval, clerical input or professional use, do-it-yourself versus development systems, and inhouse operations versus computer services. A representative medical information system is detailed. The impact of systems on physicians, nurses, and hospital departments is assessed. An index is included.
-G-

96. *Hoffer, Edward P., Barnett, G.O., Mathewson, Herbert O. and Loughrey, Alyce.
Use of Computer-Aided Instruction in Graduate Nursing Education: A Controlled Trial.
Pub. in Journal of Emergency Nursing, March-April 1975, v.1, n.2, p.27-29.

A controlled study was conducted to evaluate the effectiveness of computer-aided instruction (CAI) in the education of nurses. A control group of 12 nurses and a user group of 22 nurses at the Cape Cod Hospital in Hyannis, Mass., were included in the study. The control group did not have access to the computer but participated in a traditional inservice program on cardiopulmonary resuscitation (CPR). The user group was taught how to use a computer terminal and was involved in a CPR computer exercise. Over a 3-month period, the computer was used nearly 90 hours. Most of the computer time involved the CPR program. Nurses who used the computer increased their test scores in the CPR program; nurses in the control group did not. Nurses in the intensive and coronary care units of the hospital had higher initial test scores than nurses in other departments. These nurses also improved their scores to a greater extent than nurses on general floors. Satisfaction with CAI was generally high, although it was found that initial assistance was necessary in familiarizing nurses with the computer. It is recommended that the use of CAI be expanded.
-R-
-E-

97. *Holbrook, Fred K.
Computerization Aids Utilization Review.
Pub. in Hospitals, JAHA, September 1, 1975, v.49, n.17, p.53-55.

The use of computerized data in utilization review by the Montana Deaconess Hospital in Great Falls, Montana, is described. The hospital initiated its data processing utilization review program approximately three years prior to the time that this article was written. In the process of admission, a utilization review form is filled out and is then sent to a utilization review nurse coordinator for admission review. If the admission is certified, the patient's diagnosis data are entered into the computer, which then selects the regional 50th percentile length of stay for the patient's diagnosis and age category and retains it for a daily follow-up file for timely notification to the attending physician for extended stay review. The computerized system makes it possible to identify patients by case number, age, primary and secondary diagnosis, and primary and secondary operating diagnosis. It is then possible to relate each of these factors to length of stay by physicians. The hospital can recall these data in a physician profile that shows the number and percentage of patients days over the 50th, 75th, and 90th percentile for each physician, and the number and percentages of patient admissions over these percentiles. Data accumulated are beginning to show patterns of individual physician practice that may prove helpful in establishing future utilization review guidelines. The hospital believes that registered nurses are essential for fulfilling the duties of the utilization review coordinators. Sample utilization review forms and physician's profile are included.
-A-

98. Holdich, R.J.
Patient Records: The Importance of Patient Care Records.
Pub. in Nursing Times, July 13, 1978, v.74, n.28 p.1156-1160.

Discusses the belief that computers will eventually provide a full integrated patient record - a complete history from the "womb to the tomb." The author writes that computers will help eliminate the drudgery from the day-to-day clerical tasks. This article points out that computers have indeed made their entrance onto the "medical records stage."
-G-

99. Howland, Daniel.
Approach to Nurse-Monitor Research.
Pub. in American Journal of Nursing, March 1966, v.66, n.3, p.556-558.

The author describes a rather sophisticated research study conducted at Ohio State University that attempts to develop a mathematical model that will "help" to define monitoring tasks and learn what patient variables must be monitored in various settings. This article should be of interest to nurse researchers who are interested in studying the relationship that exists between nurses, patients, and electronic monitors.
-R-
-C-

100. *Huckabay, Loucine M., Anderson, Nancy; Holm, Doris M., and Lee, Juanita.
Cognitive, Affective and Transfer of Learning Consequences of Computer-Assisted Instruction.
Pub. in Nursing Research, July-August 1979, v.28, n.4, p.228-233.

The effect of computer-assisted instruction (CAI) versus lecture-discussion (LD) on cognitive learning, transfer of learning, and affective behaviors of nurse practitioner students was tested by the following hypotheses: The experimental (E) group will learn, transfer, and demonstrate affective behaviors significantly more than the control (C) group. Subjects were 31 nurse practitioner students at the graduate level. Content taught was the nursing and medical management of hypertensive patients. The 14 E group subjects were taught by means of CAI. The 17 C group subjects were taught by means of LD. Pre-tests and post-tests were done to obtain measures on cognitive learning and transfer of learning. Demographic data and affective measures were obtained only at the post-test. The hypotheses were tested by means of a t-test. Pearson's r and MCNemar's Test for symmetry were done to test the relationship between the variables. Results showed no significant differences between the groups in cognitive learning, transfer of learning, or affective behaviors. There were, however, significant differences between the groups in three post-test scores on cognitive learning and transfer

of learning, with the E group scoring better. Both groups learned significantly, but only the E group transferred significantly. Implications were made for education of nurse practitioners and staff.
-R-
-E-

101. Hughes, Shirley J.
Installing a Computer-Based Patient Information System.
Pub. in Journal of Nursing Adminstration, May 1980, v.10, n.5, p.7-10.

The author gives a very detailed description of the planning, coordination and training for the successful implementation of a hospital-wide, computer-based patient information system. Problems and benefits were both discussed. This article would be of value to anyone who anticipates being involved in a computer-based patient information system.
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102. Hurd, Waltraut M.
Using Computers for Patient Care.
Southern Hospital, May 1[illegible], v.40, n.5, p.10-11.

This research nurse discusses the computer support in a military psychiatric project (COMPSY) as a pilot program in 1968 which examined ways to use the power of computer technology to support a hospital as it provides care. The system allows for input of behavioral observations. This system is not presently used by nursing personnel.
-C-
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103. *Information and Communication Applications, Inc. and Public Health Service, Division of Nursing.
Resource Data Dictionary for the Nursing Environment Information System.
April 11, 1975, 1250p.
Available from NTIS, U.S. Dept. of Commerce, Springfield, VA. 22161.
Order Number HRP-003180

A Resource Data Dictionary on the nursing environment information system (NEIS) prepared for the divison of

nursing, Public Health Service, DHEW is presented. Information was derived from individual surveys collected by a variety of organizations and entered in NEIS. Survey data were obtained from a number of sources, including files on registered nurses and licensed practical nurses of the American Nurses Association, educational institution information files of the National League for Nursing, hospital master facilities inventory files of the National Center for Health Statistics, and the 1970 national census. The dictionary is intended to be both a reference and a guide for the eventual computer interface of all data elements contained in NEIS. It is composed of three major sections: data element glossary, file layout, and index. Of these three sections, the data element glossary is the keystone of the reference guide. The glossary has a hierarchical structure to aid NEIS users, and each level of the hierarchy corresponds to an increasingly refined level of information. The file layout section presents the proper location of each segment of NEIS and refers to its definition within the glossary. The index contains precise topics with listings of page numbers in the data element glossary.
-G-
-R-

104. *Information and Communication Applications, Inc. and Public Health Service Division of Nursing.
Nurse Resource Service Distribution Assessment Model (NRSDAM), Online Model System (OMS); User's Guide.
June 14, 1978, 8p.
Available from NTIS, U.S. Dept. of Commerce, Springfield, VA. 22161.
Order Number HRP-0900564.

A user's guide to the nurse resource service distribution assessment online model system (OMS) of the National Institutes of Health's Department of Research and Technology is provided. The time sharing option system allows the user to manipulate all data elements to change the absolute value of the data elements to change them also by a given percentage, and to move before and after values of items changed, and to save user titles of output reports and selection run parameters. To begin the session, the user signs on, with a computer response

for each step. Appropriate five-digit data element codes are then selected. In changing absolute data values, new values must have leading zeros indicated by prompts; after changes, both old and new values are displayed. Changes in State data elements require the user first to enter the two-digit State code, then to select the data elements to be changed, and to state a percentage value for the change. The next step is to choose the report parameter setting and a county range (numbers of first and last counties), county, or state, if desired. A title of up to 132 characters, to appear on each report p. is then supplied and the session is ended. procedure for recreating the original data base described.
-A-
-R-

105. Jackson, Bettie S.
The Biomedical Engineer, a New Member of the Health Team.
Pub. in Supervisor Nurse, May 1974, v.5, n.5, p.36-43.

Introduces the biomedical engineer as a new member of the health team whose role has been necessitated as a result of the increasing complexity of medical diagnosis and treatment. Computers and automation are some of the factors presented that have contributed to this complexity. The role of the biomedical engineer, education, and standards are briefly presented. The author presents a rather lengthy description of nurse activities on a research unit which is poorly related to the subject of this article.
-G-
-C-

106. Jackson, Richard M. and Kortge, Carolyn.
Automated Proficiency Reports.
Pub. in Hospitals, JAHA, January 1, 1971, v.45, n.1, p.76-78.

This article brings home the importance of determining your requirements prior to automating a specific system - in this case nursing requirements for patient care. A team effort spanning three years of planning, research and revision was necessary for system success. Data was manually tested for nearly

a year before the system was automated. The article discusses the benefits of the report and future plans for this system. A very interesting, well written article.
-C-
-A-

107. *Jacobs, Angeline M.; Fivars, Grace; Edwards, Dorothy S. and Fitzpatrick, Robert.
Critical Requirements for Safe/Effective Nursing Practice.
1978, 54p.
Available from American Nurses' Association, 2420 Pershing Road, Kansas City, MO. 64108.

A study was conducted to provide empirical performance data to be used by the National League for Nursing in the development of measurements of performance to be used in the validation of the State Board Test Pool Examination. The data collection phase of the research was designed to obtain data from nurses to serve as the basis for a comprehensive behavioral definition of the work of the nurse in providing safe and effective patient care. About 14,000 critical incidents of nursing behavior were collected from 2,795 nurses at all levels of experience and responsibility in five clinical specialties: medical-surgical, maternal-newborn, pediatrics, community health, and psychiatric nursing. Over 11,000 incidents, with at least 2,000 from each clinical specialty, were analyzed. Considerations in the sampling plan design included geographic diversity, diversity of institutions, progressiveness of nursing practice, teaching versus nonteaching agencies, economy of data collection visits, and the inclusion of both governmental and private nonprofit institutions. The inductive classification procedure used to analyze the data resulted in the identification of 49 categories of critical behavior. The data bank established as a result of this study consists of the critical incidents, typed on 5 x 8 inch cards, and a computer tape of all the subsidiary information collected about the incidents, along with the computer documentation. Printouts can be obtained of incident card numbers corresponding to desired variables. This classification structure and the pool of critical incidents can be used in the development of future State Board Test Pool Examinations, the

development of professional nursing standards, the definition of behavioral objectives, the preparation of courses of study and educational materials, the writing of specific job objectives, the development of certification programs, and the development of behaviorally based selection devices.
-R-
-G-

108. *Janik, P.S., Swarner, O.W., Henriksen, K.M., and Wyman, M.L.
A Computerized Single Entry System for Recording and Reporting Data on High-Risk Newborn Infants.
Pub. in Journal of Pediatrics, September 1978, v.93, n.3, p.519-523.

A computer-assisted system for data collection in an intensive care nursery is described. Maternal history, infant history, diagnoses, and treatment are sequentially identified on a single form and then entered in batches into a computer at the time of patient discharge. Computer production of a discharge summary and letters to referring and follow-up physicians from a single data-entry form account for an approximately 80% savings in physician record-keeping time per patient. Accuracy of the data is approximately two and one-half times greater than with existing methods of data gathering. Survey of disease occurence and case fatality rates are rapidly available.
-C-

109. Jelinek, Richard C., Zinn, Tim K. and Brya, James R.
Tell the Computer How Sick the Patients Are and It Will Tell How Many Nurses They Need.
Pub. in Modern Hospital, December 1973, p.81-85.

This article deals with the critical problem of nurse staffing. The authors discuss elements of staffing and look at one system in particular - the Personnel Allocation and Scheduling System (PASS). PASS is designed to provide timely information to managers utilizing: (1) a comprehensive methodology, (2) computerized scheduling of patient unit personnel by day and shift, (3) forecast workload demands and (4)

management reports. This article also discusses the implementation of this process.
-A-

110. *Johansen, Sonja and Orthoefer, Joseph E.
Development of a School Health Information Systems.
Pub. in American Journal of Public Health, November 1975, v.65, n.77, p.1203-1027.

The computer control of school nursing records for the purposes of health planning and followup is described and evaluated. The 1972 American Association for Health, Physical Education, and Recreation's position statement on school health services describes three direct and three indirect services that belong in a school health program. Direct services include health appraisal, counseling and interpretation, and emergency care. Indirect services are related to communicable disease prevention and control, services for exceptional children, and the health of school personnel. The constraints on and the components of an information system for a school health program are discussed. System components include resources, input mechanisms, output, and interfaces. Outputs are of three kinds: lists, letters, and statistical reports. These outputs are concerned with baseline data on every child, service programs in schools, communicable diseases, and incidents involving accidents. The implementation of a computerized system for school health planning and followup are reviewed. Information is appended on a computerized screening program, although no data are provided on the effect of the information system upon the efficiency or effectiveness of the school health service itself.
-C-

111. Johnson, Dickey; Kanzenberger, Jane; Herbert, Ruth; Gardner, Reed, M. and Clemmer, Terry P.
A Computerized Alert Program for Acutely Ill Patients.
Pub. in Journal of Nursing Administration, June 1980, v.10, n.6, p.26-35.

"The program described here is not specifically a nursing application, though the article does include a discussion of how the patients primary nurses are being incorporated into the system. The major reason

for presenting this article is to acquaint...(nurses) with a recognized model of computer assisted impact decision making, as well as the impact of the system on clinical, fiscal and personnel issues." (Zielstorff) The program described is located at the LDH Hospital in Salt Lake City and is called HELP (Health Evaluation through Logical Processing) and its most recent addition, the ALERT program which "provides a real-time corrective mechanism through which life-threatening abnormalitlies can be treated promptly and correctly." The nurse reader should pay particular attention to the use of the nurses with this program as this area needs to be addressed critically.
-C-

112. *Johnston, S.V.; Henney, C.R.; Bosworth, R.; Brown, N. and Crooks, J.
Doctor, the Pharmacist, the Computer and the Nurse -- the Prescription, Supply, Distribution and Administration of Drugs in Hospital.
Pub. in Medical Information, June 1976, v.1, n.2, p.133-144.

The results of a project undertaken to study methods of using a computer system to facilitate drug-handling within an acute medical ward are presented. The prescription's path through the computer system is as follows: the physician precribes a drug for the patient using a system manual; the ward pharmacist enters the prescription by responding to a set of standard questions and checks the prescription for pharmaceutical validity; the computer produces tabulations at the pharmacy which permit the preparation of a trolley of drugs packed in unit doses in a separate box for each patient and produces tabulations on the ward prior to each drug round; and the nurse administers the drugs using the tabulation printout and records the administration. One of the main problems in the system is the fact that physicians fail to comply with the prescribing rules. Another problem is that errors are arising in the transcription of data. The on-line computerized drug system is said to be a practical method of handling drugs in a ward environment.
-C-

113. Kamp, Martin and Burnside, Irene M.

Computer-Assisted Learning in Graduate Psychiatric Nursing.
Pub. in Journal of Nursing Education, November 1974, v.13, n.4, p.18-25.

The author descibes step by step the use of a computer for an experimental course in psychotherapeutic nursing. Benefits, problems, and techniques were well covered and should be of interest to faculty who might consider developing computer assisted courses.
-E-

114. *Keliher, Patricia.
Standardized Form.
Pub. in Supervisor Nurse, November 1975, v.6, n.11, p.40-41, 44-45.

A seven-part, computer-prepared form used by nurses at Mercy Medical Center, Oshkosh, Wis., to eliminate repetitive hand listing of patient names and data is described. The form was designed by nursing administrators with the technical assistance of a health care systems specialist. Each day the form is prepared by the data processing department from patient census data received from a central computer, and a copy is sent to each nursing team on each shift. Each unit's form contains the name, room and bed number, religious affiliation, age, and physician's initials for all patients on the unit. The components of the form include a diet sheet section, with separate copies for the nursing unit and the dietary department; a form listing food items contained as floor stock; the basic patient census report (new admissions, discharges, and deaths); a treatment sheet; staff and student assignment sheets; a sheet for recording patients' vital signs; a transfer time sheet, for use in recording patient's absence from their rooms; and a 24-hour condition and summary report. The summary report provides for the entry of information concerning each patient on the unit during a specific shift. The summary is brought to the supervisor at the end of each shift and left for the following shift's supervisor to review. The advantages of using the preprinted form are noted. A copy of the form is not provided, but photographs showing the form in use accompany the text.
-C-
-A-

115. *Kennedy, B.M. and Vader, C.G.
A Computerized Form for the Cardiac Intensive Care Unit.
Pub. in Intensive Care Medicine, 1980, v.6, n.1, p.9-17.

A report form is described which has been designed to cover the likely diagnoses of patients admitted to a cardiac intensive care unit. The information entered can readily be stored for computer retrieval and includes biographical and clinical data. Information pertaining to medications, procedures, complications, arrhythmias, and electrocardiographic and serum enzyme values, with special reference to patients with acute myocardial infarction. The data is entered by the medical, nursing and secretarial staff prior to encoding and computer storage. The report from which has evolved from its prototype 7 years ago, is described in the hope that it may be a basis for modification to the needs of other cardiac intensive care units presently without a data retrieval system.
-C-

116. Kirchhoff, Karin T. and Holzemer, William L.
Student Learning and a Computer-Assisted Instructional Program.
Pub. in Journal of Nursing Education, March 1979, v.18, n.3, p.22-30.

Detailed report of a research study which "examined the effectiveness of a computer-assisted instructional program in postoperative nursing care." Future research and implications for nursing education and practice were presented.
-R-
-E-

117. *Kuramoto, Alice M.
Computer-Assisted Instruction -- Will It Be Used?
Pub. in Nursing Leadership, June 1978, v.1, n.1, p.10-13.

The uses and limitations of computer-assisted instruction (CAI) in the educational system are explored. Five appropriate functions of CAI are to: (1) secure and process information about students' performance before and/or during instruction to

specify subsequent activities in the learning process; (2) store large amounts of information, available to learners in a rapid manner; (3) provide programmed control of several media, such as slides, television, and equipment; (4) give teachers a convenient tool for designing and developing a course of instruction; and (5) provide a dynamic interaction between students and instructional programs not possible with most other techniques. Assistance to learners, teachers, administrators, and educational technologists represents the most visible use of computers in instruction. Computers can aid in the review and practice of basic concepts and skills, but tutorial use of computers is more complex. In nursing education, CAI can be employed in all modes: drills and practice exercises, tutorial mode, dialog, and games and simulations. Patients' decision making situations can be simulated; this is beneficial in that students do not have to worry about harming the actual patient. The limitation of CAI pertain to: cost; the fact that some forms of computer programs are not compatible with other computer systems; the problem of socialization with a machine-oriented learning situation; and skepticism about the role of computers in instruction.
-E-

118. Lagin , Suzanne Marek.
A Computer Program To Diagnose Anxiety Levels.
Pub. in Nursing Research, November-December 1971, v.20, n.6 p.484-492.

Discusses a study that was undertaken to develop and investigate a computer diagnostic system designed to help distinguish mild, moderate and severe levels of anxiety among hospitalized patients. Addresses detailed development of the computer program used for this study as it provided a prompt diagnosis of the anxiety level of hospitalized adult patients.
-R-
-C-

119. Lambertsen, Eleanor C.
Nurses Have Been Trained to Nurse People, Not Machines.
Pub. in The Modern Hospital, October 1965, v.104, in.10, p.144.

Very short succinct article challenging nurses "to keep the benefits of automation in appropriate

balance with the skills of professional workers." Points out that direct nursing service to patients is not synonymous with caring for the increasing variety of technical devices employed for diagnostic and therapeutic measures. This article could assist nurses as a basis for developing an individual philosophy relative to automation and technology in nursing.
-G-

120. Lambertsen, Eleanor C.
Changes in Practice Require Changes in Education.
Pub. in American Journal of Nursing, August 1966, v.66, n.8, p.1784-1787.

The author identifies the technologic advances and significant social developments which can affect health care and predicts their influence on nursing. The last part of the article discusses automation, electronic monitoring, computers and their impact on nursing service and nursing education.
-G-

121. *Laurent, D., Mashrunala, M.D., and Lucas, C.P.
A Computerized Data-Handling System in Hypertensive Management.
Pub. in Archives of Internal Medicine, March 1979, v.140, n.3, p.345-350.

A computerized data-handling system in hypertension management. An inexpensive, easy to use, computerized data-handling system is described for managing patients with hypertension. It has been in operation for 2 1/2 years in a clinic that functions with nurse specialists and physicians working as a team. Data entry and retrieval are performed by nurse specialists. Computer entries have been made for over 1,030 new patients who had 5,873 clinic revisits and 1,800 laboratory visits. Several kinds of outputs are generated that assist physicians in patient management. Most useful are those on the laboratory flow sheet, which itemizes all or selected laboratory results by data, and the blood pressure and selected laboratory data flow sheets, which chronologically list pertinent patient data necessary for management.
-C-

122. *Lehman, Merrill W. and Friesen, Quinton J.

Centralized Control System Cuts Costs, Boosts Morale.
Pub. in Hospitals, JAHA, May 16, 1977, v.51, n.10, p.75-76, 78-80.

When labor expenditures exceeded 60 percent of the entire operating budget at Methodist Hospital, St. Louis Park, Minn., the institution started an inhouse management engineering program. A staffing coordinator, who had a business background rather than a nursing background, was assigned to integrate the staffing program with recruitment, personnel, and admitting department functions. The staffing program was to be carried out in three distinct phases: long range planning, daily staffing planning, and evaluation reports. The long range planning process entails trend analysis, development of standards for each nurse's station, budgeting, recruitment, and monitoring the position control. Daily staffing requires a complex routine to ensure that adequate personnel have been assigned to meet patient care requirements. Centralizing control of and responsibility for the entire staffing function in the hands of the staffing coordinator resulted in better coordination and high morale for the nursing staff. Quality of patient care also improved when head nurses were relieved of staffing and scheduling problems and could devote more time to patients. Engineering work studies furnished a measurable basis for evaluating patient care requirements. Approximately $220,000 in nursing salaries was saved during the first year by making more effective use of staff through guidelines provided by management engineering. Administration found the resulting management information system to be of value.
-A-

123. *Levine, Daniel and Wiener, Earl.
Let the Computer Teach It.
Pub. in American Journal of Nursing, August 1975, v.75, n.8, p.1300-1302.

The advantages of computer-assisted instruction in educational programs and refresher courses for nurses are illustrated. The greatest advantage of computer-assisted instruction is said to be its ability to furnish immediate results to the student and to simulate human dialogue in emulation of a tutor. The computer is particularly useful in

conveying the large volume of factual material that nursing students must absorb early in their training. Computers are also useful in refresher courses that meet at hours when faculty members are not available. A computer program designed to teach first-year nursing students information on measurement systems is described. The outstanding feature of the program is its ability to simulate one-to-one human dialogue with the student, even referring to the student by name. Another feature of the program is the number of options it allows the student in completing the course materials. It is pointed out that computer-assisted instruction appeals to human beings' cultural compulsion to `beat the machine,' a phenomenon known as the `pinball machine effect.' Cost factors limiting the growth of computer-assisted instruction in nursing schools are noted.
-E-

124. McDonald, Clement J. Murray, Raymond; Jeris, David; Bhargava, Bharat; Seeger, Jay; and Blevins, Lonnie.
A Computer Based Record and Clinical Monitoring System for Ambulatory Care.
Pub. in American Journal of Public Health, March 1977, v.67, n.3, p.240-245.

The article describes a computer based medical record system for ambulatory care. It supports the care of patients by presenting the clinical data in clear and compact reports and by alerting care providers about clinical conditions that need corrective action. This system represents a different approach to the difficult problems of efficiently using and maintaining patient records.
-C-

125. McNeill, Donna Gane.
Developing the Complete Computer-Based Information System.
Pub. in Journal of Nursing Administration, November 1979, v.9, n.11, p.34-46.

This is a very detailed article on the development of the Problem Oriented Medical Information SYstems (PROMIS) at the Medical Center Hospital of Vermont under the direction of Dr. Lawrence Weed. The philosophy, goals and implementations are fully discussed. The remaining part of the article takes the reader step by step through the experiences of

the staff in using the system. There are many figures to illustrate the frames with which the user interacts. There are many lessons to be learned from reading this article, particularly for nurses who are involved in comuter technology in the clinical setting.
-C-

126. Meadows, ynda S.
Nursing Education in Crisis: A Computer Alternative.
Pub. in Journal of Nursing Education, May 1977, v.16, n.5, p.13-21.

The author discusses the significance of computer technology on nursing relative to the role of the teacher, instructional goals, approaches to learning, and accountability. There is a detailed presentation on the management of the educational environment, evaluation, instruction, research, and administrative support. Included is an excellent chart summarizing computer teaching strategies. This is a comprehensive article which should be of value to nurse educators who are looking to the future.
-E-

127. *Medicus Systems Corp., Chicago, Illinois.
Review and Evaluation of Nursing Productivity.
Volume III: Literature and Research Review.
November 1975. 435p.
Available from NTIS, U.S. Department of Commerce, Springfield, VA. 22161.
Order Number HRP-0015468.

Selected papers, books, monographs, and dissertations relevant to productivity in nursing are reviewed. Encompassing approximately 600 items screened from some 3,300 titles, the review is structured within a conceptual framework that models nursing productivity as consisting of input, technology, environment, and output components. Within the input component, the review touches on education, attitudes toward patient care and patient care personnel, role, health manpower, emergency room nursing, intensive care and cardiovascular nursing, maternal and child health care nursing, occupational health nursing, operating room nursing, public health nursing, psychiatric nursing, clinical specialists, nurse practitioners, physician assistants, and geriatric care systems.

The review of studies on technology discusses employment inducements, organization, administration, nursing leadership, unit management, team/primary nursing, nursing care and methods studies, patient classification systems, workload methodologies, staffing, scheduling utilization, modeling, technical improvements, computer systems, systems analysis, drugs, nursing care plans and records, task performance and analysis, ambulatory care systems, and health maintenance organizations. Within the environment component, the review covers collective bargaining, motivation, research, interprofessional relations, nursing as a profession and a philosophy, health care delivery, and economics. Output studies reviewed address absenteeism, turnover, job satisfaction, patient relations, quality of care, effectiveness, and cost analysis. A bibliography is included.
-S-

128. *Mellner, Christian; Selander, Hans and Wolodarski, Jurek.
Computerized Problem-Oriented Medical Record at Karolinska Hospital - Format and Function, Users' Acceptance and Patient Attitudes to Questionnaire. Pub. in Methods of Information on Medicine, January 1976, v.15, n.1, p.11-20.

The format and function of a computerized medical record system in operation for 5 years in a Swedish hospital are described, and the response of staff and patients to the system is assessed. The system, which is used for both outpatients and inpatients, consists of the patient's identification and administrative, clinical, and laboratory reports. A distinction is made between data about the patient, which is recorded in the traditional source-oriented manner, and interpretations of data, or information, which is recorded in a problem-oriented manner. Administrative data, basic medical history, physical examination findings, and laboratory test results are presented with reference to the source, whereas the problem list, problem description, progress notes, specialist consultants' notes, and discharge summaries are presented in a problem-oriented format. A survey of physicians, nurses, and secretaries who use the system revealed that a majority (26 out of 29) preferred the system to the traditional source-oriented medical record. A survey of 67

patients revealed that they require 25 to 45 minutes to answer the 326 questions included in the system's medical history form. The majority of patients accepted the self-administered questionnaire, but 18 percent felt it was too impersonal. The advantages of the system's partially problem-oriented approach are emphasized. Supporting data and sample forms are included.
-C-

129. *Meyer, Diane.
GRASP -- A Patient Information and Workload Management System.
Available from MCS, Route Five, Box 326A, Morgantown, N.C. 28655.

The patient information and workload management system known as GRASP -- Grace-Reynolds Application and Study of PETO (Poland, English, Thornton and Owens) -- is described in terms of development, operation, implementation, and adaptation. The basic objective of the GRASP study was to develop, test, and publish a workload management system based on measurement of the quantity of individual patient care required. The system as constructed provides admission criteria based on care available, an effective means of distributing patient workload and determining nurse staffing requirements, a method of assigning nursing staff to ensure both patient and job satisfaction, an ongoing quality care assurance program, projections for nurse staffing and budgeting data for annual and long-range planning, and a cost accounting and reimbursement procedure based on care received. A procedural guide is provided for installation or adaptation of the GRASP system in existing hospital facilities. The implementation process is described as a review of GRASP procedures, modification per individual facility, staff orientation, pilot testing, and expansion to an entire system. The appendix contains information on staffing criteria, a nurse clinician job description, information on the PETO system and a computer printout of a frequency study to establish significant elements of hospital care. The GRASP system is recommended as a means of providing more humanistic hospital care to satisfy both provider and consumer.
-A-

130. *Miller, Holmes E., Pierce, Frank A. and Pierskalla, William P.
Implementation of Nurse Scheduling Using Mathematical Programming.
1975, 19p.
Available from NTIS, U.S. Department of Commerce, Springfiled, VA. 22161.
Order Number HRP-0010314.

A computerized nurse scheduling system that was developed and implemented by the Medicus Corporation is described. The system uses mathematical programming to select a configuration of nurse schedules that minimize an objective function. This function balances the trade off between staffing coverage and schedule preferences of individual nurses, subject to certain feasibility contraints on nurse schedules. The solution to scheduling is obtained by a cycle coordinate descent algorithm. Although the Medicus nurse scheduling system has been implemented at several sites, the main study described in the report involves experience at the Rush-Presbyterian-St. Luke Medical Center in Chicago, Illinois. Four-week schedules are produced for 40 nursing units, with over 900 full-time and part-time nursing personnel. The system handles nurse preferences, rotation, weekends off, week days off, requests, nursing groups and subgroups, arbitrary starting days, Friday-Saturday and/or Saturday-Sunday weekends, as well as many aspects of and constraints on the system. Factors that must be considered in any comprehensive, efffective, and equitable nurse scheduling system are noted. A list of references is provided.
-A-

131. Miller, Judith; Preston, T.D., Dann, P.E., Bailey, J.S., and Tobin, G.
Charting Via Computers in a Post-Operative Cardio-Thoracic ICU.
Pub. in Nursing Times, August 24 1978, v.74, n.23, p.1423-1425.

Describes the monitoring of postoperative patients in a three-bed cardiothoracic intensive care unit. Included in the discussion are (1) types of equipment, and (2) parameters to be monitored to include storage and hard copy of this information. Evaluation of this system was done by utilizing

manual and automated systems. Good grafts are shown.
-C-
-R-

132. *Minnetti, Robert and Hutchinson, Joseph.
Systems Achieves Optimal Staffing.
Pub. in Hospitals, JAHA, May 1, 1975, v.49, n.9, p.1-62, 64.

Performance analysis and review (PAR) is a staff leveling system developed by Blue Cross of Western Pennsylvania's management engineers and used by 20 acute care general hospitals. The PAR staff leveling system achieves optimum staffing on every floor for every shift. PAR consultants prepare a table of organization for every floor of a hospital, including registered nurses, licensed practical nurses, nursing aides, ward clerks, and orderlies. Personnel needs are projected on the basis of an average patient census, and relief personnel are factored into the table on a ratio that approaches three full-time employees for each two positions that must be staffed daily. The patient classification system measures the degree of dependency of each patient according to the following four categories: ambulatory, partial, complete, and special/constant. Head nurses classify all patients on a continuing basis and the number of patients in each class are calculated before each shift change. Once optimal staffing per shift is achieved, the system is monitored by submitting monthly data to the Blue Cross of Western Pennsylvania's computer center. A report is returned to the administrator and director of nursing service showing the number of patient days, number of hours required to meet effective census needs, and number of hours actually used, the relationship between hours used and hours budgeted, the utilization of personnel, and the shift utilization. Without staff leveling, many hospitals waste up to 25 percent of medical-surgical nursing costs.
-A-
-C-

133. Morse, Gerry E.
A Fresh Look at Medical Electronics.
Pub. in American Association of Industrial Nurses Journal, June 1965, v.13, p.6-9.

A rather superficial article written by a

Vice-President at Honeywell, Inc. A very cursory desciption is given of an electronic medical system. Four examples are presented by the author which he contends are highlights of current developments in the use of medical electronics/computer systems. Only two of the examples have any relevance to industrial nursing.
-C-

134. *Moscovice, Ira.
A method for Analyzing Resource Use in Ambulatory Care Settings.
Pub. in Medical Care, December 1977, v.15, n.12, p.1024-1044.

Research was performed to develop a methodological framework for analyzing the use of resources in ambulatory care environments. The Frontier Nursing Service (FNS) was the study setting. The FNS is a primary health care service and training center in rural Kentucky, serving 15,000 people populating 1,000 square miles. Important methodological considerations were the selection of a set of medical problems appropriate for evaluating the interaction effects of the variables being considered, the development of problem-specific computerized routines for defining episodes of care based on patient visit information, and the selection of appropriate measures of utilization. The use of resources at the FNS indicated that for common primary care problems, the level of provider training and accessibility of services significantly influence patterns of care. In analyzing services provided for otitis media and tonsillitis pharyngitis at the FNS, the study showed that patterns of care for infectious respiratory problems are influenced by such interrelated factors as site of treatment, use of drugs, type of case, use of laboratory test, composition of provider team and frequency of followup. It is concluded that a decentralized primary care system such as the FNS increases the accessibility of health care services to the residents of a rural area, with cost savings evidenced in reduced salaries and slightly reduced treatment costs. A FNS encounter form and sample medical directives are appended.
-R-
-C-

135. Murphy,

Preparing Research Data for Computerization.
Pub. in American Journal of Nursing, May 1979, v.79, n.5, p.954-956.

The author gives a very brief overview of how a computer uses numbers and symbols as information. The majority of the article details the principles to be followed in organizing your research data so that it can be entered easily into a computer file via a keypunched card. The final part of the article covers the factors which influence the cost of computerizing data. There is an addendum to this article which lists hints on how to use a statistical consultant.
-R-

136. Murray, Donald J.
Computer Makes the Schedules for Nurses.
Pub. in Modern Hospital, December 1971, v.117, n.6, p.104-105.

Discusses computerized time schedules for nursing personnel. Notes time saving capabilities and other benefits. Mentions several rules that need to be considered.
-A-

137. *Nabor, Sarah.
Creative Approaches to Nurse-Midwifery Education. Computerized Nurse-Midwifery Management: Its Usefulness as a Learning-Teaching Tool.
Pub. in Journal of Nurse-Midwifery, Fall 1975, v.20, n.3, p.26-28.

The applications of a computer-based teaching system for graduate nurse-midwifery programs are described. The Programmed Logic for Automatic Teaching Operations (PLATO) System consists of a large computer connected to many keyboard-screen terminals by means of telephone channels. The computer can keep track of a number of students at the same time. Plato can display graphic material, present color slides, play audio material, and accept keyboard or touch messages. Its capabilities can be used in a variety of combinations. For example, the terminal can display a slide of a pregnant woman's abdomen. The student can be directed or can request to examine a certain area of the abdomen. When the student touches the area on the screen, computer-generated

graphics illustrate the area contacted. Similarly, an audio device can be activated to play fetal heart tones when the student describes or touches a particular area. Plato also provides instructors with a record of how students are using instructional materials. The ongoing development of a Plato case simulation for nurse-midwife students is described. Advantages and drawbacks of computerized simulations in nursing education are discussed. A diagram of Plato system hardware is included.
-E-

138. *National Center for Health Services Research, Rockville, Maryland.
luation of a Medical Information System in a
mmunity Hospital.
1976, 25p.
Available from NTIS, U.S. Department of Commerce, Springfield, VA. 22161.

A study of the impact of a computerized medical information system on El Camino Hospital in Mountain View, California is summarized. The evaluation concerns the impact of the system on the organization and administration of health care delivery at the hospital. The Technicon System is a real time, computer-based system that interacts with nurses, physicians, other health care professionals, and hospital administrators in the delivery of care to patients. The system affects all facets of the hospital environment. The summary includes a brief background description of the hospital and of the Technicon System, plus the major findings, conclusions, and recommendations of the evaluation. Findings concern changes in staffing levels after introduction of the Technicon System; effects of the system on nursing activities, evaluation of the system by nursing and medical staff members, the physician's use of hospital services, comparative analysis of medical use of hospital services, comparative analysis of medical records for accuracy and completeness, impact of the system on hospital performance, and qualitative impact in ancillary and support areas. The system is shown to have had a favorable impact on the organization and administration of El Camino Hospital. It is anticipated that such systems will expand in scope and use in the future as significant aids to utilization review and patient care audit, in on-line

intervention to prevent diagnostic and treatment errors, and as information sources. Supporting data and a photograph of the 'Video-Matrix-Terminal' used in the system are included.
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139. *National League for Nursing, Inc., New York.
Selected Management Information Systems for Public Health/Community Health Agencies.
1978, 238p.
Available from National League for Nursing, 10 Columbus Circle, New York, NY. 10019
Pub. No. 21-1683.

Detailed descriptions of 13 management information systems and brief summaries of 27 management information systems being used by public health/community health agencies are provided in this report. Types of information processed by these computerized systems are categorized as service statistics, accounts receivable, automated billing, and automated payroll. The 13 detailed descriptions include information on primary system objectives, system flow, input forms, system hardware, system software, output reports, system status, cost, system availability, and system ownership. Eight five systems are being applied by state, county, or city health departments. The 27 brief summaries include 11 visiting nurse associations, 1 private agency, 2 combination agencies, 9 state agencies, and 4 county agencies. Characteristics of all 40 systems are described in matrix form. A review of management information system objectives stated by agencies revealed the following objectives as most frequent: collect and report uniform information, provide more detailed information for accountability, improve agency operations and productivity, reduce turnaround time, improve cash flow, provide computerized Medicare billing, provide bad debt information, provide billing and statistical information, and improve program planning for community needs. An appendix contains a glossary and a list of references.
-A-

140. Newman, Margaret A. and O'Brien, Ruth A.
Experiencing the Research Process via Computer

Simulation.
Pub. in Image, February 1978, v.10, n.1, p.5-9.

Very readable article which presents an intriguing alternative teaching-learning method for teaching research to graduate students. The authors describe how they introduced the student to computer-simulated research. The benefit to this method is the greater understanding on the student's part of interpretation of findings in relation to hypotheses posed. This article should be read by all graduate faculty as the implications for improved research courses using such a method are very apparent.
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-R-

141. *Norby, Ronald B. and Freund, Louis E.
Model for Nurse Staffing and Organizational Analysis.
Pub. in Nursing Administration Quarterly, Summer 1977, v.1, n.4, p.1-15.

A comprehensive model for nurse staffing and organizational analysis is presented which enables those in leadership positions to document, analyze, and problem-solve in the area of personnel utilization with full knowledge of how staffing decisions are affected by and impact other aspects of the department. In this at the unit level by unit leadership personnel, are used to determine the number and types of staff needed. The workload is assessed through use of a psychometric technique called constant-sum paired comparisons, which determines the difficulty of various assignment elements. A plan for the utilization of personnel is then developed based on the assignment of staff to each of these assignment elements. The deviation of individual units and shifts from these desired goals for care assignments to various personnel levels can be monitored easily. Methods for daily data collection in relation to workload requirements and staffing adjustments are needed in order to structure variable staffing. Multiple options are available for processing data. A programmable calculator may be used when computer capabilities are not available. Programs have been developed for this calculator to compute staffing, allocate available staff, construct the management report, and create quality of care scores. The management report produced in this model

provides a one-source document which creates a unit profile enabling comparisons of care quality, unit workload, census, staffing requirements adjustments, actual staffing, illness/absence rates, overtime, and other desired data.
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142. *Norwood, Donald D.; Hawkins, R. Ed. ; Gall, John E.; Watson, Ralph L.; and Cook, Margo.
Information Systems Benefits Hospital, Improves Patient Care.
Pub. in Hospitals, JAHA, September 16, 1976, v.50, n.18, p.79-83.

The impact of a computerized medical information system on the operations of El Camino Hospital, a 464-bed general hospital in Mountain View, California, is discussed. In 1965, El Camino Hospital became the development facility for the Technicon Medical Information System. At that time, the system represented a level of computerization unprecedented in hospitals. The system includes communication terminals located at nursing stations and in ancillary and support areas. The terminals are linked to a large central computer that can serve several hospitals in a region. The computer assists the delivery of patient care in three principal ways: (1) as a custodian of medical and nonmedical patient data that are readily accessible and current at all times; (2) as an accurate communications device for transmitting orders or retrieving current information; and (3) as an organizer of the computerized patient data base, able to produce such tools as a cumulative laboratory report and 7-day medications summaries. The impact of the system on hospital medical and nursing staff and on support areas (the pharmacy, laboratory, radiology department, admitting and business offices) is reviewed. The sector of the hospital most profoundly affected by the system has been the nursing staff. The system relieves the nurse of a large portion of her clerical duties and provides substantial assistance in the planning and management of nursing care. After 2 years of operation of the system, 94 percent of the nursing staff reported that they favored the system. The nurses cited increased time for activities involving professional skills and enhanced quality of patient care as reasons for their acceptance of the system. The system has advantages

for the physician in that it expedites the execution of medical orders and provides assistance to ensure that the orders are carried out. In addition, turnaround time for laboratory and radiology results has been reduced substantially. System cost benefits are estimated to range from $23,668 to $43,088 per month, with over 90 percent of the total economic impact resulting from reduced labor costs. It is concluded that the system is cost-effective and valuable in enhancing the quality of patient care.
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143. Nurses Planners Meet.
Pub. in Nursing Times, July 15, 1966, v.62, n.28, p. 37-938.

This articles is a report of a meeting held by nurse planners which discusses a variety of subjects, however a good part of this report is dedicated to information given to them on computers and their use in medicine.
-G-

144. O'Donohue, Nancy.
Care Plan - A Computerized Audit and Record Evaluation System for Quality Assurance.
Pub. in QRB, August 1977, p.27-31.

Detailed description of a computerized audit system used at King's County Hospital Center in Brooklyn, New York. The entire process from writing criteria through analysis of computer printouts is discussed. There are appropriate illustrations of the worksheets used and the resulting reports. There are interesting projections for the utilization of the system relative to how the system can be expanded.
-A-

145. *Oldfield, Norma.
The LP/VN and the Computer.
Pub. in Nursing Care, April 31, 1977, v.10, n.4, p.18-19.
International Health Evaluation Association, Chicago, IL.

The use of automated multiphasic health testing, which utilizes a computer to compile information and

identify abnormal findings, can be expected to have the effect of expanding the role of the licensed practical/vocational nurse (LP/VN). The automated testing system involves a battery of tests and examinations used to determine an individual's state of health; the resulting computer printout serves as a data base for the physician's interpretation. The patient, in his first encounter with a physician or medical center, is first identified to a computer. The patient then self-administers a medical history by answering questions appearing on a terminal screen, possibly assisted by the LP/VN. The vision and hearing tests administered next utilize highly refined automated testing equipment which permits the LP/VN to complete this sequence in 15 minutes or less. The LP/VN then conducts the patient through a series of tests and measurements ranging from routine measurements of height, weight, skinfold thickness, blood pressure, and pulse rate to tonometry, EKG, and pulmonary function evaluation. These measurements can be taken in 15 minutes by a skilled LP/VN. At the conclusion of this test cycle, samples will be taken and the patient will probably be directed through appropriate radiological and pathology procedures. The resultant computer-generated patient profile, verified by the [illegible], nurse practitioner, and supervising physician, represents a complete personal and family medical review of the patient. The automated multiphasic health testing process is the most efficient system available for the gathering, correlation, and reporting of essential medical data. While a registered nurse may be the supervisor of a multitest center staffed mostly with [illegible]/VN's, other centers may employ LP/VN's as supervisors with staff they have trained, thus offering unique opportunities.
-C-

146. Payne, L.C.
Medical Automation: A Professional Necessity.
Pub. in Nursing Mirror, May 14, 1965, v.119, n.19, p.v-vii.

The author presents a futuristic view of what is possible is medical automation. He views automation as a means of "extending our eyeball-cerebral facilities" and then goes on to discuss the various areas that automation/computers can support in medical activities. Of particular interest to nurses

are his comments on automatic sub-pharmacies and patient monitoring devices and the conclusion that automation will result in nurses spending a greater amount of time nursing and that the technical aids offered by automation will help to improve the effectiveness of nursing care.
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147. Payne, L.C.
Computers and Patient Management.
Pub. in Nursing Times, October 1, 1965, v.61, n.40, p.1339-1341.

This is an excellent article which supports the thesis that "the computer-aided nurse of tommorrow is going to be a better nurse." The author supports this thesis with examples of various ways that computers can make patient management more efficient. There is a brief discussion on the use of computers in student nurse allocat'
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148. Piankian, Robert A.
Computer Hardware: Operation, Applications, and Problems.
Pub. in Journal of Nursing Administration, February 1978, v.8, n.2, p.8-15.

"This article is really a mi -course on how computers and their peripherals f ctions to process information. It includes a discus ion of relative advantages and disadvantages of certain hardware configurations and outlines some of the problems associated with using these machines. For nurses at the decision-making level, this article is an essential reference." (Zielstorff). The reader, however, is bombarded with computer terminology, while though defined, is almost impossible to keep in mind before other terms are presented.
-G-

149. *Plummer, Johanna.
Patient Classification Proves Staffing Needs.
Pub. in Dimensions in Health Service, May 1976, v.53, n.5, p.36-38.

Kingston General Hospital (Ontario, Canada) has implemented a patient classification scheme that has facilitated the staffing of units and has eliminated many frustrations for the supervisory staff. Motivated by economics, the hospital signed a 1-year contract with the Medicus Corporation of Chicago to develop classification of patients by need, computerized preferential scheduling for staff, monitoring of quality patient care and management reporting. A team moved into the hospital and spent 3 months getting to know the staff and assessing the situation. Each staff member was interviewed regarding preferences in scheduling, and nursing staff participated in the committee work involved in patient classification. The nursing staff was educated to the system before the first two nursing units were used in a pilot project. The system calls for part-time or full-time floating staff either in or out of wards, according to the needs. There are four classification categories based on number of hours of care per 24 hours: (1) patients requiring 0-2 hours of direct care; (2) patients requiring 2-4 hours of direct care; (3) patients requiring 4-10 hours of direct care; and (4) patients requiring more than 10 hours of direct care (usually an intensive care patient). The system involves classification of the patients by the types indicated and other information regarding special need; the staffing coordinator has a single workload index for each unit by 8:30 a.m. daily. Initial implementation and orientation took approximately 2 weeks. A sample classification sheet is provided.
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150. Porter, Sharon F.
Application of Computer-Assisted Instruction to Continuing Education in Nursing - a Review of Literature.
Pub. in The Journal of Continuing Education in Nursing, November-December 1978, v.9: n.6, p.5-9.

The author advocates a regional system of computer-assisted instruction (CAI) for continuing education for nurses. A review of literature on CAI is used as the basis for presenting the potential, capabilities, and limitation of using CAI for nursing continuing education. There is a lengthy reference list at the end of this article.

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151. *Prendergast, Judith A.
Implementing Problem-Oriented Records in a Primary Nursing System.
Pub. in Nursing Clinics of North America, June 1977, v.12, n.2, p.235-246.

To support a primary nursing environment, a system of problem oriented rather than source-oriented records has been developed. Problem-oriented records (POR) have six general objectives: 1) to provide more clear, focused, and accurate documentation with accountability defined; 2) to allow for more effective and meaningful audits; 3) to stimulate an atmosphere wherein questioning is a positive encounter for all members of a health team; 4) to complement and reinforce primary care assignments; 5) to promote the computerized development of a medical record through a scientifically oriented system; and 6) to better correlate subjective and objective information, assessments, plans and patient teaching for the evaluation of the quality of care rendered. When this system was instituted at Rush Presbyterian - St. Luke's Medical Center, Chicago, it was found that POR better facilitated primary nurses' visibility and credibility in coordinating patient care. Nurses became more confident in their ability to utilize POR and inquire about the rationale behind their actions. Thus POR enhanced primary nursing both philosophically and in practice.
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-A-

152. Price, Elmina.
Data Processing, Present and Potent al.
Pub. in American Journal of Nursing, December 1967, v.67, n.12, p.2558-2564.

Extremely comprehensive article on what is possible from computers in the 60's and what their potential is to the health care system, especially in the hospital setting. The author emphasizes and describes in detail where and how nurses must participate in developing and using automated systems. Lengthy reference list given to support the data presented.
-G-

153. Price, Elmina M.
Data Processing and the Operating Room Nurse.
Pub. in AORN Journal, Ma[illegible]; v.7; n.5; p.35-37.

Speculates how automation will effect the operating room nurse and what her responsibilities will be. Discusses patient monitoring and hospital communication with enthusiam and includes possible alterations of nursing's role. Relative for all nurses
-C-

154. *Public Health Service, Bethesda, MD., Division of Nursing.
Management Information Systems for Public Health/Community Health Agencies.
1975, 69p.
Available from National League for Nursing, Ten Columbus Circle, New York, N.Y. 10019.

Papers resulting from four workshops on the development, planning, testing, implementation, and management of management information systems in community health agencies are presented. The workshops were conducted during the winter of 1974-1975 under contract with the Division of Nursing of the U.S. Public Health Service. The participants included 350 nurses, other health practitioners, administrators, educators, consultants, accountants, health planners, and researchers from 40 States and Canada. Represented were visiting nurse associations, state and local health departments, private nonprofit home health agencies, hospital-based programs, state associations, and university programs. The workshops' objectives placed an emphasis on the need (1) to identify the information required for the program objectives of the community health agency, (2) to review the specific problems in selecting a management information system, (3) to identify the steps in testing and implementing a system and to develop a time and cost schedule, and (4) to use output reports from a system as a tool for arriving at program decisions and administrative decisions.
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155. *Public Health Service, Bethesda, MD., Division of Nursing.
State of the Art in Management Information Systems

for Public Health/Community Health Agencies.
Report of the Conference.
1976, 166p.
Available from National League for Nursing, Inc., Ten Columbus Circle, New York, N.Y. 10019.

The proceedings of a 1976 conference on the use of computerized reporting techniques in public and community health agencies are presented. The 25 conference presentations are grouped according to 10 major categories. Management control systems in health care organizations are discussed. Grants and funding in health services are examined. Interfaces between health agencies and the library profession are explored. Use of data in planning and evaluating health care are identified, including administrative evaluation and the planning of community nursing services, the administration of public health agencies, and the development of data management sophistication in home health agencies. Five conference presentations are concerned with the state of the art in management information systems for public and community health agencies. Consideration is given in these papers to management information techniques in federal health programs, trends in health management information system development, the use of management information systems to evaluate community health services, analysis and planning for the improved distribution of personnel and services, and data management in long-term and home health care. An introduction to management information systems is provided. Billing and cash flow concepts are addressed, as well as quality control, systems management, and data interpretation.
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156. *Public Health Service, Hyattsville, MD., Division of Nursing.
Methods for Studying Nurse Staffing in a Patient Unit - A Manual to Aid Hospitals in Making Use of Personnel.
May 1978, 238p.
Available from NTIS, U.S. Department of Commerce, Springfield, VA 22161.

Methods for studying staff needs and adequacy in inpatient units developed at San Joaquin General Hospital in Stockton, Calif., and funded by the Division of Nursing are presented for the use of

nursing staff planners. Preparation for the study requires appointment of a study committee, designation and training of a study team consisting of a study team coordinator, head nurses, and observers, a study plan addressing the kind and amount of data to be collected, the units to be studied and the participating nursing staff, and implementation procedures. Methodologically, the amount of care currently provided is measured by work sampling and direct care sampling. Staffing needs are established by comparing the service level with care estimates based on patient classification and with head nurse perception of care adequacy. From the data gathered staffing tables can be developed and a report can be prepared for evaluation of personnel skills for reference in experimentation with new staffing patterns. A bibliography, 23 figures, 35 data tables, and four appendixes outlining the conceptual framework, manual data tabulation methods, a user's guide, and computer procedures are furnished.
-A-

157. Rankin, John W.
Four Carolina Hospitals Go On Line with Computers.
Pub. in Modern Hospital, October 1968, v.111, n.4, p.86-89.

Discusses how four hospitals worked together to have a hospital informaiton system developed for them using a shared data processing capability. Details of how the system works and especially how it is used in the nursing area is presented very well. The reader ends up with a clear picture of the capability of a computerized system to reduce the time professional staffs spends on paperwork and how it can improve treatement through more efficient staff scheduling and communication.
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-C-

158. Reed, Fay C., Collart, Marie E., and Ertel, Paul Y.
"Computer Assisted Instruction for Continued Learning".
Pub. in American Journal of Nursing, November 1972, v.72, n.11, p.2035-2039.

Focuses on the potential of computer assisted instruction (CAI). Discusses limitations, advantages, disadvantages, and how it is responsive

to the major trends which influence nursing. Article is very thorough and easy to read.
-E-

159. Rees, Robert L.
Understanding Computers.
Pub. in Journal of Nursing Administration, February 1978, v. [illegible] p.4-7.

Explains the basic elements that make up the compu[illegible] The major architecture of digital computers and how they operate is covered. This provides beginning information and vocabulary for the novice though they might need additional explanation and clarification after reading this article. The author makes a very important point when he says that "one's understanding of the capabilities and limitations of computers can determine whether the computer will be an asset or a liability."
-G-

160. Richman, Alex.
Nursing; Knobs; and Know-How: The Impact of Hospital Automation.
Pub. in International Journal of Nursing Studies, 1965, v.2, p.145-148.

This author intended to write an article that outlined "the impact of some aspects of automation for nursing education." He has done this in a very superficial way though some of the points presented could well be expanded in follow-up articles by nurse educators. Some of these points are: (1) helping the future nurse adapt to complex devices used in patient care, (2) [illegible] associated with the interposition of [illegible] mechanisms in the nurse-patient relation[illegible] (3) who can nurse the patient within the nurse[illegible]-patient trial.
-E-

161. *Robertson, Louise H., McDonnell, Kathleen and Scott, Jean.
Nursing Health Assessment of Preschool Children in Perth County.
Pub. in Canadian Journal of Public Health, July - August 1976, v.67, p.300-304.

The steps taken in the gradual development of a nursing physical assessment program in an urban-rural

health unit in Ontario, Canada, are described. Beginning in 1970, the computer-assisted school health program was implemented. The health records for elementary school children were recorded on a computer instead of on traditional forms. Children proceeded through five stations where the different parts of the assessment (audiovisual testing, health appraisal by the public health nurse, immunization, and a dental examination with a fluoride brush-in) were carried out. The parental responses was said to be very encouraging. The service was acceptable to parents and family physicians and helped to reduce the escalating costs of medical care. The cost per child was $7.39, which is considerably less than the $15 that could be charged by family physicians. The The $15 fee did not include a dental checkup or a brush-in. The role is shown. It is pointed financial benefit and staff satifaction of extending the nurses'out, however, that while medicine and nursing services are complementary, they are not interchangeable.
-C-

162. Ronald, Judith Schneider.
Computers and Undergraduates Nursing Education: A Report On An Experimental Introductory Course.
Pub. in Journal of Nursing Education, November 1979, v.18, n.9., p.4-9.

In spite of the many articles by nursing authors on computer applications, the development of automated systems in nursing has progressed very slowly. The Anderson Study suggested that nursing students be provided with the opportunity to develop a basic understanding of the computer and its application to nursing. This article describes an elective course entitled Implications of Computer Technology for Nursing. The author writes that nurses need a basic understanding of the computer, what it is, what it is not, what it can to, and what it cannot do. There is an excellent reference list.
-E-

163. Rosenberg, Mervin and Carriker, Delores.
Automating Nurses' Notes.
Pub. in American Journal of Nursing, May 1966, v.66, n.5, p.1021-1023.

Describes an early article on automation of nurses

notes. Stresses positive results such as better observations of patients and rapid, accurate transmission of observations. These benefits aid in the treatment of patients for optimum care.
-C-

164. Rosenberg, Mervin; Glueck, Bernard C.; Stroebel, Charles F.; Reznikoff, Marvin and Ericson, R. Peter.
Comparison of Automated Nursing Notes as Recorded by Psychiatrists and Nursing Service Personnel.
Pub. in Nursing Research, July-August 1969, v.18, n.4, p.350-357.

Decribes a well documented study on benefits of utilizing automated nurses notes as a valuable instrument for statistical data collection. Demonstrates differences between documentation of physician to nurse; and also student to graduate. Pictorial forms good. Study conducted by five persons - none of whc were nurses!
-R-
-C-

165. Rosenberg, Mervin; Reznikoff, Marvin; Stroebel, Charles F. and Ericson, R. Peter.
Attitudes of Student Nurses Toward Computers.
Pub. in Nursing Outlook, July 1967, v.15, n.7, p.44-46.

Describes a study done on nursing studen'; from five diploma programs during a three month psychiatric affiliation at a hospital that had certain nursing units which made use of automated nursing notes. A total of 54 junior and senior nursing students were included in this study. The results indicated that exposure of nursing students to automated nursing notes led to a favorable change in their attitude toward the use of computers in patient care.
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166. *Ross, Robert G. and Ross, Mary C.
Using the Computer to Prepare Multiple-Choice Examinations: A Simplified System.
Pub. in Journal of Nursing Education, May 1977, p.32-39.

Program test offers a quick, easy, and efficient way to produce objectively-scored exams from an

established item bank. It is especially useful in situations where frequent testing is utilized and secretarial help is scarce. The capability of constructing a customized exam the day before its administration should make the exam more reflective of the instruction. The provision for keyed copies has been found to be a useful tool for feedback to the student after the exam. Lastly, use of the program requires little computer assistance.
-E-

167. Rowan, Robert L.
Automation Its Effect on the Hospital.
Pub. in American Journal of Nursing, October 1966, v.66, n.10, p.2199.

States the "entire picture of patient care may be affected by automation." Author unrealistically places "success" of automation on the nurse. Attitude of author is that success just occurs. Totally ignores total health care team.
-G-

168. *Saba, Virginia K. and Levine, Eugene.
Management Information Systems for Public Health/ Community Health Agencies: An Outline of the Objectives, Basic Types, Factors at Play and State of the Art.
1976, 26p.
Available from National League for Nursing, Inc., Ten Columbus Circle, New York, N.Y. 10019.

Applications of management information systems in public health community health agencies are examined. The function of a management information system is to assist in the planning, process, control, and operation of an agency or organization. In public health community health agencies, management information systems have the following uses: reducing clerical manpower needed to prepare reports and billings; improving cash flow; reducing the use of professional staff to perform clerical duties; identifying trends in the use of services; program planning and budgeting; testing the validity of ongoing programs; identifying community needs; and evaluating the impact of nursing practices. Four basic components, or modules, of management information systems -- statistical information, billing, patient assessment, and evaluation -- have

evolved. The choice of modules depends on an agency's goals and management objectives. The operational status of management information systems in 25 state health departments, 25 visiting nurse associations, and 8 local or county health departments is analyzed, and management information system research projects supported by the Division of Nursing, Public Health Service, DHEW, are described. Legislation affecting data requirements for public health/community health agencies is noted. Factors to be considered in implementing a management information system in such agencies are enumerated. A list of references and supporting documentation are provided.
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169. *Saba, Virginia K. and Levine, Eugene.
Management Information Systems for Public Health Nursing Services.
Pub. in Public Health Reports, January-February 1978, v.93, n.1, p.79-83.

Management information systems are contributing significantly to public health nursing, a field which traditionally provided little systematic documentation of its services. Federal legislation since 1965 and the Medicare/Medicaid programs have provided the impetus for a more systematic collection of data. Four basic components, called 'modules', of management information services have been devised, encompassing (1) statistical information on patients and visits, (2) billing information, (3) patient assessment from diagnosis through treatment to postdischarge followup and (4) community health service evaluation, including cost effectiveness, equity in distribution of services, and long and short-term outcome of services. The article also includes the results of a study of such systems operating in state and county health departments and descriptions of related projects, ranging from a patient progress methodology to a systematic program for nursing assessment. A 21-item bibliography is provided. The need for such systems is underscored, not only in programs like Medicare/Medicaid, but also by the possibility of national health insurance, which undoubtedly will mean additional demands for information. This paper is a modified version of one presented at the annual meeting of the American

Public Health Association, Miami Beach, Florida on 19 Oct 1976.
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170. *Saba, Virginia K. and Skapik, Kathleen A.
Nursing Information Center.
Pub. in American Journal of Nursing, January 1979, v.79, n.1, p.86-87.

The nursing information center is a computerized information retrieval system operated by the National Health Planning Information Center. It has three major features: (1) a computerized, on-line searchable information file of abstracts of the literature on nursing services, nursing resources, and nursing planning and resources development practice and methodology; (2) a reference service that provide information responses to specific inquiries, including an annotated bibliography; and (3) access to reports of the referenced literature in paper copy and microfiche. The center also provides access to 'fugitive' literature, originally unpublished or distributed to only a very limited audience, such as doctoral dissertations, reports from federally funded projects and studies, state and local government and nursing association studies and plans, etc. The information base can be searched using any word or sequence of words; the vocabulary is not limited to certain key terms. The system also provides full-text searches for that word or word sequence, searching the title of documents, the bylines, and the abstracts. Documents input into the system include journal articles, bibliographies, books, and documents submitted by the Division of Nursing of the U.S. Public Health Service.
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171. Schmitz, Homer, H.
The Anatomy of a Successful System Implementation.
Pub. in Hospitals, JAHA, October 16, 1977, v.51, n.20, p.105-106, 110-115.

An information system can be implemented successfully by planning to minimize those problems that can be

controlled and by preparing for the unexpected. The implementation of a system encompasses four main areas: (1) hardware considerations, (2) training, (3) implementation and (4) post-implementation evaluation. The section on hardware considerations is especially beneficial for the `functional' person - i.e., nurse.
-G-

172. *Schmitz, Homer H., Ellerbrake, Richard P. and Williams, Thomas M.
Study Evaluates Effects of New Communication System. Pub. in Hospitals, JAHA, November 1, 1976, v.50, n.21, p.129-130,132,134.

The effects of a computerized information system on work patterns at Deaconess Hospital, St. Louis, MO., are assessed. Data were gathered on the activities of registered nurses (RN's) and division secretaries before and after installation of the system. Activities observed for both categories of workers included telephoning, idle time, talking to patients or patients' relatives, talking to other personnel, and writing or processing requisitions. For RN's, data were also gathered on time spent in charting nurses' notes, preparing and giving medication, performing other patient care activities, and transporting patients or items. For secretaries, data were also gathered on clerical activities, handling supplies, and distributing items to patients. Installation of the computerized system resulted in considerable changes in the daily activities of RN's. For example, time spent in telephone conversations was reduced considerably, because information once transmitted by telephone (e.g., dietary requirements for specific laboratory and radiology procedures) is transmitted automatically by the computerized system as a byproduct of original requistions. Time spent in requisitioning also decreased significantly for RN's, while time spent in conversation with other personnel increased. Telephone time was also decreased significantly for division secretaries. Supporting data are included. Details about the information system are not provided.
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173. Scholes, Maureen.

Nursing and The Computer.
Pub. in Nursing Times, January 1979, v.140, n.5, p.17-18.

This article deals with the nurse and computer systems in London. Automation relieves nurses of many repetitive tasks so that her skills can be utilized at the bedside, for teaching learners and for research. These machines must be used as a method of communication to make up-to-date information available to appropriate persons. Several specific examples are given as to what the computer output is and its impact.
-G-

174. Scholes, Maureen and Barber, Barry.
The Role of Computers in Nursing.
Pub. in Nursing Mirror, September 23, 1976, v.143, n.13, p.46-48.

Describes very carefully the pros/cons of automation. Gives excellent definitions of automated data processing terms. Article further discusses the steering committee for computer development as a multi-disciplinary group. Note of interest is that this use of automation is in London.
-G-

175. Schutt, Barbara C.
Mastering the Mysteries (Editorial).
Pub. in American Journal of Nursing, February 1965, v.65, n.2, p.417.

This editorial is the lead-in to four articles on "machines in perspective." It stresses that "today's machines, especially the electronic ones, are forcing us to see machines in a new perspective." Accompanying these machines seem to be vast opportunities to extend nursing practice, knowledge, and research.
-G-
-C-

176. Shaffert, Thomas K. and McDowell, Constane, E.
Hospital Information Systems: An Overview.
Pub. in Health Care Finance 1978, v.4, n.4, p.1-8.

An ideal Hospital Information System (HIS) is one that provides the right information to the right

person at the right time. Information systems are not an end in themselves, but a means of helping managers make better decisions. The authors of this article discuss four major topics (1) history, (2) three information systems, (3) communication system development and (4) categories of Hospital Information Systems. This is a very informative article and includes an excellent reference list.
-G-

177. Shannon, Brunjes.
What is a Computer?
Pub. in Journal of Medical Systems 1977, v.1, n.1, p.79-85.

Author presents an excellent background to computers and terms relative to automation. The description of a computer is described in terms of its function rather than in terms of hardware. Touches on hobby computers and their required programs. This is an outstanding article in basic understanding of computers.
-G-

178. *Shinnik, James; Shirley, Gail; Shirley, Daniel and Johnston, Robert.
An Educational Program for Early Recognition and Treatment of Acute Respiratory Insufficiency - Workshop in Acute Respiratory Care. Final Report, July 74 - June 77.
June 1977, 567p.
Available from NTIS, U.S. Department of Commerce, Springfield, VA. 22161.

Workshops were completed in 12 hospitals. A total of 399 students (physicians, nurses, respiratory therapists and first responders) were trained. Nine to fourteen months following the presentation a Review Session was held at each institution. Knowledge and skill goals were reached in 11/12 hospitals. In general, knowledge and skills were retained at the Review Session at a level above the pre-workshop level but below posttesting. Medical audit analysis demonstrated variable to no changes in behavior. Some indicators improved, others declined and the majority showed no change. The workshop had other positive influences such as initiating in-hospital programs, implementing a medical audit and obtaining respiratory therapy services. Other

educational and evaluation tools were developed during the project such as computer assisted instruction, a Manual for Chart Review, Handbook and slide-tapes. (Portions of this document are not fully legible)
-E-

179. Silva, Mary C.
Nursing Education in the Computer Age.
Pub. in Nursing Outlook, February 1973, v.21, n.2, p.94-98.

Philosophically discusses the potential of computers in "helping students to learn and freeing teachers to teach." Challenges nurse educators to use computers "prudently and intelligently so that the profession of nursing is enhanced and human dignity and autonomy are not sacrificed." Nurse educators should read this article for a futuristic view of the place and impact of computers in nursing education.
-E-

180. *Simborg, Donald W.
Rational Staffing of Hospital Nursing Service by Functional Activity Budgeting.
Pub. in Public Health Reports, March-April 1976, v.91, n.2, p.118-121.

The measurement of the utilization of nursing service and the justification for monies spent on nursing services is discussed. It is concluded that the need for nursing services varies significantly from day to day in a hospital providing care for the acutely ill, and that nursing need does not necessarily correlate with the hospital's patient census. It is felt that a patient care classification system cannot determine nursing workload. A group of physicians and nurses at John Hopkins Hospital in Baltimore, Maryland, proposed a list of nursing activities that should be considered in budgeting for nursing staffing. The measurement of these activities was computerized based on standard times needed to perform the various tasks. This approach separates quantifiable components of nursing care from arbitrary or nonquantifiable components. A dollar value is placed on each component of nursing services, and these sums can become the basis for budget justification. Functional activity budgeting also enables the utilization review of physicians' use of nursing

services. This form of budgeting is only applicable if the major time components of nursing care -- those reflected in phys[illegible]ans' and nurses' orders -- are easily quantified, using a computer system.
-A-

181. Slack, Patricia A.
Data Protection.
Pub. in Nursing Times, August 2, 1979, v.75, n.31, p.1328.

Computerization has added to the problem of confidentiality of personal records, not only in the United States, but countries such as Sweden, W. Germany, Norway and Denmark. This article describes the way the British legislation dealt with the problem of record confidentiality.
-G-

182. *Smith, Douglas L. and Wiggins, A.
Computer-Based Nurse Scheduling System.
Pub. in Computer and Operations Review, 1977, v.4, p.195-212.

A computer-based centralized nurse-scheduling system introduced at Jewish Hospital in St. Louis, MO., to relieve individual head nurses and staffing clerks of complex scheduling tasks is discussed. The system's attributes are that it requires modest computational capacity, incorporates individual shift preferences, has the ability to coordinate part-time and float staff with full-time personnel, incorporates vacations, holidays, and special requests, and has the ability to co[illegible]sider special unit circumstances, e.g., practical nurse utilization. Three directions of shift schedule gene[illegible]ation (cyclical scheduling, interactive terminals in the timesharing approach, and mathematical program models) are outlined. The approach adopted utilizes list processing and problem-oriented data structures to supplement the judgment of the scheduling clerk. Skill categories included are head nurse, assistant head nurse, registered nurse, licensed practical nurse, nurses' aide or orderly, and unit secretary. Individual schedules are generated dynamically week by week and shift preferences are considered through use of a shift aversion index. The scheduling algorithm operates in batch mode in three phases: production of a weekly staffing status summary, generation of

tentative shift schedules indicating shortages or surpluses and violated constraints, and manual adjustment processing. The shift pattern information used is illustrated in six figures, while detailed lists of data structures, lists utilized for scheduling algorithm modules, processing for schedules generated, a staffing summary sample, and a final schedule excerpt are shown in three tables and four figures. Considerable care and counseling are required in gathering initial employee data. The system has produced scheduling time reductions and further reductions are anticipated from introduction of a smoothing routine to reduce adjustment needs.
-A-

183. Smith, Eugene J.
The Computer and Nursing Practice.
Pub. in Supervisor Nurse, September 1974, v.5, n.9, p.55-62.

Tells how a nursing department was involved in the design and implementation of a computerized hospital information system and and the ultimate success of the project. Nurses who anticipate computerization of any sort being initiated in their agencies would be wise to use this article as a guide to the role and responsibility they should assume in this area.
-A-

184. *Smith, L.D. and Bird, D.A.
Designing Computer Support for Daily Hospital Staffing Decisions.
Pub. in Medical Information, April-June 1979, v.4, n.2, p.69-78.

This paper relates issues encountered in extending a centralized computer-based nurse scheduling system to support daily staffing decisions in a hospital environment when calculating the daily staffing needs on each nursing unit. The conceptually simple interactive staffing system incurred considerable costs in categorizing patients according to level of care required. Two years of historical data collected daily in a 568 bed St. Louis Hospital were used to test the sensitivity of relative staffing requirements to daily fluctuations in patient-care distributions. A periodic sampling plan appears adequate for updating distributions which can then be applied to current census in estimating daily

staffing needs. Recommendations for implementing such a system are offered.
-A-

185. *Smoller-Wassertheil, Sylvia; Bell, Bertrand and Blaufox, M. Donald.
Computer-Aided Management of Hypertensive Patients.
Pub. in Medical Care, December 1975, v.13, n.12, p.1044-1054.

A computer system is described which is designed to help physicians provide supervision for nurse physician surrogates responsible for the care and followup of hypertensive patients. The basic aim of the computer methodology was to develop an information system aid in the ongoing management of patients in a hypertension clinic. This system allows a single hypertension specialist to monitor several clinics in distant locations. The hypertension clinic at the Albert Einstein Medical School in New York City is responsible for the treatment of about 400 patients and is staffed by one physician working half-time and six nurses. Prior to initiation of antihypertensive therapy, a complete history is taken and a complete physical examination is undergone. Patient data are logged into the computer through a terminal located at the clinic; subsequent data are entered after each clinic visit. The terminal at the clinic is used to generate on-line reports to be used in various ways. Through these reports the physician can maintain ongoing knowledge of the overall working of the clinic, uncover additional problems not brought up by the nurses, monitor a large number of patients, and followup on the results of therapy.
-C-

186. Solman, Fiona.
The Next 90 Years of Nursing.
Pub. in Nursing Mirror, April 20, 1978, v.146, n.16, p.10-11.

A very futuristic discussion regarding the next 90 years of nursing. The author states that the computer is obviously going to influence our lives in the years to come. Aside from administrative duties, the computer will assume a greater role in patient care. The article allows you to imagine a patient in the year 2068 being cared for in a clinic setting by

computer. As exciting as some aspects of this
e are, many are frightening. The author's
roach makes this article good reading.

mers, June B.
Information Systems-The Process of Development.
Pub. in Journal of Nursing Administration, January
1979, v.9, n.1, p.53-59.

ormation system development in the field of
sing and system use by nurses are addressed. Two
ses in the process of developing information
tems are noted: (1) to strategic level of system
elopment when hospitalwide long-range planning
isions are made; and (2) detailed planning for and
lementation of the system. It is essential that
sing administration be involved in both phases if
a are to be defined, processed, and utilized in a
t-effective manner. A nursing information system
defined as a system through which goals of nursing
ctice are specified and in which human elements
ng the system's functions are primarily nursing
sonnel. Planning for a nursing information system
ompasses analysis of the existing organization,
mulation of objectives in anticipation of future
ds, assessment of existing capabilities, design
evaluation of alternative courses of action, and
lementation and control of a particular plan.
le the implementation phase of information system
elopment focuses on the allocation of resources,
delegation of responsibility, and the
ablishment of accountability, the management
trol function is the best tool for evaluating the
cess of a plan. Important points in the
luation process are identification of the
ective or hypothesis of a study, definition of
ms, statement of expected findings, and
ineation of the study methodology.

rks, Susan M.
Letting the Computer Do the Work.
Pub. in American Journal of Nursing, April 1978,
v.78, n.4, p.645-647.

sents information on computerized systems
ntained and operated by the National Library of

Medicine. Provides needed knowledge base for health professionals - to include students. Lists of regional medical libraries are included. Very well done.
-G-

189. Speed, Eunice L. and Young, Nancy A.
Scan: Data Processed Printouts of a Patient's Basic Care Needs.
Pub. in American Journal of Nursing, January 1969, v.69, n.1., p.108-110.

Describes SCAN (Scheduled Activities of Nursing) at Highland View Hospital in Cleveland, Ohio. SCAN communicates information to personnel regarding patient care. It is divided into twelve sections with frequent updating of information required. The article concludes with plans to improve system utilization.
-C-
-A-

190. Tarrant, Betty J.
Automation: Its Effect on the Patient.
Pub. in American Journal of Nursing, October 1966, v.66, n.10, p.2190-2194.

Demonstrates automation and its effect by discussing one patient's care/interactions in a shock unit. Mentions that mechanical devices along with electronic clarifications should be made. Lists several uses of automated systems that increase benefits for patient care. Examples: Lab measurements, pressure measurements and cardiac patterns. Stresses importance of not forgetting that there is a patient among the machines. Summarizes wisely with "machines are useful only to the extent of our knowledge and ability to utilize them", and that human observation and judge- ment must continue.
-C-

191. *Tate, Sylvia P.
Automation of the Health Care System: Implications for Nursing. Part 2 - Strategies for Nurses.
Pub. in International Nursing Review, 1975, v.22, n.2, p.39-42.

In the second part of an analysis of the implications of automation for nursing, the concept of conflict

within the health care delivery system is considered, and tactics that the nurse can use in affecting appropriate change within that system are identified. The importance of a cognitive understanding of the different levels of human conflict is stressed. Several types of conflict are identified: (1) the conflict stemming from differing and incompatible goals held by various parties within the same situation (e.g., hospital administrators attracted by the efficiency offered by the computer, versus professional nurses who question the effects of the pervasive use of the computer on patient care); (2) conflict reflecting struggles over the allocation of commonly prized, but scarce, money, material goods, power, prestige, or status; and (3) conflict stemming from a perceived threat to one's identity as an individual or as part of a group. The nurse, as a change agent, must learn to sort out the various types of conflict found in the health care delivery setting so that she can determine what tactics are most appropriate. Trends are identified which point to a growing awareness among women and within society concerning the reluctance of many women to initiate or accept interpersonal conflict, a reluctance which often prevents them from taking stances and expressing their true feelings and opinions. As nurses begin to develop assertive skills, they may consider the following strategies for affecting changes and influencing the system (1) collection of facts, (2) understanding the system's character, (3) assertive training workshops, (4) confrontation, (5) quid pro quo negotiations, and (6) refreezing -- the period of adjustment to change, during which the change agent should attempt to deal with those relationships that were strained in the course of confrontation and change.
-G-

192. *Taylor, Sam; Senn, Stephen and Potton, Ralph.
Patient-Nurse Dependency.
Pub. in Nursing Times, May 4, 1978, v.74, n.18, p.755-758.

A study conducted at Leybourne Grange Hospital for the Mentally Handicapped in Great Britain attempted to measure the nursing requirements of different types of patients. Patients at the hospital, who range from predischarge patients in hostel accommodation to the severely physically and mentally

handicapped, are cared for in wards which are generally homogenous with regard to sex, age, and degree of handicap. Direct nurse-patient contact was observed on a continuous basis for at least 10 patients in each of 8 wards. The care groups applied in this study were: Group 1, patients requiring no assistance with dressing; Group 2, patients not included in groups 1, 3, or 4; Group 3, patients requiring complete assistance with dressing who are not classified in group 4; and Group 4, bedfast patients. The two major factors determining how much attention a patient received were the patient's own dependency and the number of nursing hours available to that patient. The number of nursing hours available depends on the total nursing hours available on a ward and the dependency states of other patients on the ward. The care group status of every patient on the wards studied was established, and a computer program was used to analyze every possible weighting value that could be assigned to each care group. For each set of weightings, a ward Workload Index was calculated. Staff can be allocated between units in the same proportion as the units' Workload Index. The level of nurse-patient contact is not constant throughout the day, especially since many patients leave the wards during the day for therapy or work. Greater flexibility of staff is required to meet these changing needs.
-C-

193. *Techniques of Nursing Management. Volume II. 1976, 46.
Available from Contemporary Publishing, Inc., 12 Lakeshore Park, Wakefield, MA. 01880.

Eleven papers about various aspects of nursing management are presented in the second part of a 2-volume series. Among the subjects covered are an approach to giving and receiving feedback and the benefits and costs involved in this activity; the matrix organization and its application to nursing; the basic elements of automated systems and the nurse's involvement in their use; a model for managing complexity; approaches to structuring an organization; the steps in the promotion process (with particular emphasis on the idea that the nursing director can select candidates from applications submitted in response to a posted notice); theories of leadership; and the nursing

budget and involvement of the staff in the budgeting procedure. The papers also cover the administrative evaluation of the effectiveness of an ambulatory program and the development of a program structure; approaches to making full use of human resources; and the purposes, benefits, historical development, and elements of performance appraisal, as well as obstacles and approaches to effectively carrying out this activity. A discussion of the development of two appraisal forms is accompanied by sample forms.
-A-

194. Television Computers for Identifying Bacteria.
Pub. in Nursing Mirror, July 8, 1966,v.122, n.2, p.x.

This article reports on a project that took place at the University of California. It involved the use of a high speed electronic-scanner computer that will identify the causative organism and determine its drug sensitivity or resistance at a much faster rate and higher reliability then was possible prior to 1966.
-C-

195. *Texas Nurses Association, Austin.
Research and Evaluation Report on the Continuing Education Recognition Program.
September 1975, 198p.
Available from NTIS, U.S. Department of Commerce, Springfield, VA. 22161.
Order Number HRP-0018193.

The attainment of goals by the Continuing Education Recognition Program (CERP) of the Texas Nurses Association is assessed. Stated goals of CERP are to provide uniform standards and guidelines for continuing education in professional nursing, to provide a system of learning experiences, to increase the participation of registered nurses in continuing education activities through a system of recognition, and to improve health care services by achieving the preceding goals. CERP is a voluntary enrollment program open to all registered nurses in the state of Texas. Each participant must enroll in the program for a 2-year period and must accumulate 140 points within that period in order to fulfull program requirements and receive a certificate of recognition. Questionnaires were developed to

evaluate CERP and were mailed to 1,044 registered nurses. Only 144 of the questionaires were received in time for analysis. A survey was also made of nursing service directors and program sponsors. An examination was made of the program approval process and internal management audit procedures. Internal management audit for CERP was concerned with fiscal management, recordkeeping, and computer utilization. It was determined that a significant number of CERP participants and nursing service directors felt that the program does create incentive for greater participation in continuing education activities and that it results in improved nursing competence. Marketing aspects of CERP are examined. Additional information on the evaluation of CERP is appended. A glossary, bibliography, supporting tabular data, and the evaluation forms are included.
-E-
-R-

196. Thueson, Judy.
On-Line Searches Net Data for Administrators.
Pub. in Hospitals, JAHA, June 16, 1979, v.53, n.12, p.103-110.

Describes a new data base of reference on health care administration and planning that is available through an on-line computerized communications network and can be used even if your institution does not have a computer terminal or library. Cost to use the system and procedures to follow in using the system is covered very well. Nursing Administrators and nurses who are involved with special projects will find this article a valuable resource in how to use this computerized information tool.
-A-
-G-

197. Tobin, G.
The Computer-an Aid to Intensive Therapy Nursing.
Pub. in Nursing Mirror, January 1975, v.140, n.5, p.72-73.

Discusses the computer as an aid to intensive therapy nursing. Allows the staff to spend more time observing and caring for the patient. Various parameters are mentioned and stated to be more accurate. "Staff members have no doubts about the amount of time saved with the computer-assisted

system."
-C-

198. Tolbert, Samuel H. and Pertuz, Alvaro E.
Study Shows How Computerization Affects Nursing Activities in ICU.
Pub. in Hospitals, JAHA, September 1, 1977, v.51, n.17, p.79-84.

Compares observations made of nursing activities on a conventional cardiac postoperative recovery unit (CPOR) and a computerized CPOR unit located in the same hospital and having a nursing staff which rotated through both units. The results indicated "that the computer had no discernable effect on the relative time spent in the measured activities." The study was repeated three months later showing that (1) "automation apparently had no effect on repetitive measuring or information handling tasks" and (2) "there is a 95% probability that nurses spend 17-21% less time in direct patient care in the computerized CPOR unit." A table is available to illustrate the activities evaluated in the conventional and computerized CPOR units and the percentage of time spent in each activity.
-R-
-C-

199. Tomosovic, Elizabeth R.
Turning Nurses on to Automation.
Pub. in Hospitals, JAHA, May 1, 1972, v.46, n.9, p.80; 84-86.

"A nursing systems analyst speaks frankly about nurses' reluctance to adopt data processing techniques." The author developed guidelines to encourage involvement in automated systems. Several mentioned are: 1) multidiscipline approach, 2) goals/ objectives developed by medical community, not programmers, 3) total environment considered, and 4) orientation and training.
-G-
-A-

200. *Traska, Maria R.
Methodist of Indiana Tailors Patient Computer System to Hospital Routine.
Pub. in Modern Health Care, October 1978, v.8, n.10, p.34-35, 38-39.

The medical information system computer system installed at Methodist Hospital of Indianapolis, Indiana, is described. System users type patient information on a video display matrix terminal. They may add, delete, or change information by using the keyboard or a pen attached to the keyboard. Computer uses for physicians, nurses, admissions clerks, and pharmacy and laboratory personnel are outlined. The system is very flexible, allowing approximately 2,000 of the more than 2,500 requested systems changes to be made within a 4-month period. The elements which have helped to make the system at Methodist Hospital a success are: comprehensive planning by each department before installation; an 18-month implementation schedule; intensive training and testing programs for all potential system users; and the dedication of the people involved in the program. The different types of users at Methodist, the different tests administered, and patients' benefits from the system, including a reduction in nursing errors are described.
-G-
-A-

201. *Trites, David K.
Hospital Management System Demonstration.
Model-Simulation.
Available from NTIS, U.S. Department of Commerce, November 30, 1976.
Springfield, VA. 22161.
Order Number PB-252 536/8.

Nine documents, a magnetic tape with 26 separate files, and hard copy output (printout) describe 5 broad program areas. These areas are: (1) admission game; (2) admissions simulator system; (a) PAS data conversion; (b) simulator data preparation from PAS converted data; (c) admission simulator; (3) manpower budget system; (4) nurse scheduling system; and (5) nurse allocation system. Specifications and documentations of these systems are addressed in the document entitled 'Hospital Management Systems Demonstration Computer Program Specifications.' The preceding document (NCHSR 76-314) details the formats for the 26 files and describes the hard-copy output and the other 8 documents (NCHSR 76-307 through NCHSR 76-313, NCHSR 76-15 and NCHSR 76-16) comprise the title of this tape. Specifications were prepared to

minimize problems with operationalizing these programs under different computer-system environments. These programs were developed for IBM 360-370 compatible machines and rely upon certain Michigan Terminal System (MTS) specific subroutines as currently programmed.
-G-

202. Valish, Aurora U. and Boyd, N. Jean.
The Role of Computer Assisted Instruction in Continuing Education of Registered Nurses: An Experimental Study.
Pub. in The Journal of Continuing Education in Nursing, v.6, n.1, p.13-32.

Very detailed presentation of a research study whose purpose was "to determine whether computer-assisted intruction programs as an innovative method of educational technology would be a source of verifying and augmenting clinical knowledge in nursing." Many tables are presented for review. "The study demonstrated verification but not augmentation of clinical knowledge in nursing." It is highly probable that the courses used as a treatment variable and the use of only a post-test design limited the value of this study.
-R-
-E-

203. Vallabona, Carlos.
Electronics Automation in Medicine: Its Moral Implications. (reprinted from the Linacre Quarterly, May 1961)
Pub. in the Catholic Nurse, December 1961, v.10, p.24-31, 70-72.

The author proposes the question, "Can moral problems arise from the widerspread appplication of electronic computation?" He then proceeds to hypothesize situations where the moral issue can be raised relative to (1) information produced at such a rapid speed that human intervention may become impossible, (2) the human incapability of defining accurately the work of the computer (3) the morality of automatic diagnosis and therapy, and (4) the right of privacy versus automatic medical information. Some of the situations seem rather farfetched, but are probably reflective of the early date of this article and the many unknowns of that time compared

to what we know about the use of computer technology in medicine today.
-G-

204. *Vermont University, Burlington Lab.
Automation of a Problem Oriented Medical Record. Final Report. May 31, 1976, 187p.
Available from NTIS, U.S. Department of Commerce, Springfield, VA. 22161.
Order Number PB-263 578/7.

The Problem Oriented Medical Information System was used for initial testing on over one hundred patients. The PROMIS system supported medical activities of the gynecology ward at the Medical Center Hospital of Vermont and many of the associated supporting services. The only medical record in the initial system was an electronic one and all functions normally associated with a paper record were done with the terminal via touch screen and structured displays or keyboard input. The technological base of the system was two Control Data Corp.(CDC) 1700's with touch sensitive cathode ray tube(CRT) terminals operating at 500,000 bps over dedicated coaxial cables. Terminals were located in the following units: gynecology ward, radiology, surgery, pharmacy, laboratory, library, and maintenance and development. Nursing use was also described. Descriptions of the system from both medical and computer points of view have been published.
-C-

205. Walleck, Constance.
The Neurosurgical Nurse and Computer Work Together. Pub. in Journal of Neurosurgical Nursing, December 1975, v.7, n.2, p.102-106.

As early as 1965, articles were written about computers in critical care units suggesting that nurses would be replaced by computers and their technicians. The question was raised, "what is the future of nursing?" This article shows how a critical care area utilized a monitoring system enabling nurses to provide better care. The author writes that although staff has grown to depend on the computer-monitor system, it does not replace the nurse.
-C-

206. *Walter, Judith B.; Pardee, Geraldine P. and Molbo, Doris M.
Dynamics of Problem-Oriented Approaches: Patient Care and Documentation.
1976, 266p.
Available from J.B. Lippincott Co., 521 5th Ave., New York, N.Y. 10017.

The concepts, theories, and implementation of the problem oriented approach to patient care are reviewed in a collection of writings aimed at assisting nurses in adapting the problem-oriented approach to the nursing process. The opening section covers the concepts and theories related to problem-oriented recording and the problem-oriented approach. Included are discussions of the nursing process as a problem-oriented system, problem definition in the diagnostic statement, and development of a taxonomy of nursing diagnosis. The section on implementation covers the various aspects of putting a problem-oriented charting system into operation, including preparation, education, implementation, charting, and evaluation. Papers on holistic implementation, implementation of the problem-oriented process in home health care, integrating the nursing process with other disciplines, the problem-oriented approach and the clinical nurse specialist, systems/computer applications, and expanded roles in nursing are included. The closing section is concerned with the effects of the problem-oriented approach on nursing practice. Discussions touch on: the adaptation and integration of the problem-oriented approach to the patient documentation system; participative health care; integration of the problem-oriented approach with concepts of nursing; legal implications of the problem-oriented approach for nursing care; and creating a professional climate for nursing practice.
-C-
-A-

207. *Walters, Shirley; Barker, Doris and Wilkens, CeCe.
Joint Nursing-Pharmacy Program Helps Reduce Medication Errors.
Pub. in Hospitals, JAHA, March 16, 1979, v.53, n.6, p.141,143-144.

Nursing and pharmacy department staff members at Bay

General Community Hospital in Chula Vista, Calif., collaborated in a program to reduce medication errors. The cooperative program was implemented after primary nursing had been established throughout the hospital in 1977. With primary nursing, the probability that errors will occur is increased and more nurses notice and report errors. The first step taken in developing the program to minimize medication errors was to revise written procedures for handling such errors through corrective action. Corrective action is initiated for the nurse who made the error. A medication error report is completed by the responsible nurse and supervisor within 24 hours after an error occurs. The supervisor counsels the nurse and makes appropriate recommendations for action. Corrective action may include, in addition to counseling, remedial action by the inservice education department, monitoring, or dismissal. Medication reminder cards are employed to help eliminate errors of omission. A computer system has been implemented by the hospital that links nursing units and ancillary services. The pharmacy computer can thus provide a complete medication profile for each patient. The results of monthly audits of medication and other treatment errors demonstrate the program's success in reducing medication errors. A sample nursing medication error interview and medication reminder card forms are included.
-C-
-A-

208. *Warner, D. Michael and Wellman, William L.
Hospital Management Systems Demonstration: Instructions for Computer Aided Nurse Scheduling. Interim report.
March 17, 1976, 53p.
Available from NTIS, U.S. Department of Commerce, Springfield, VA. 22161.
Order Number PB-252 529/3.

Scheduling nurses is a time consuming and frustrating task--time consuming because of the almost infinite number of ways a group of nurses can be scheduled for a 4 or 6 week period and the numerous constraints that a schedule must satisfy, and frustrating because of the same reasons, plus the fact that the whole process begins from `scratch' each month. Much of the logic of the search for a good schedule is quite complex; the rest is not complex, but frustratingly

repetitive, and this simpler logic represents the bulk of the scheduling effort. The underlying philosophy of the computer-aided system is that the computer (which handles simple logic very quickly and without frustration) can aid the scheduler by allowing him to concentrate on the more complex and subtle aspects of the scheduling decision. The system counts on two-way help, however, there are many ways that the scheduler can improve the computer's performance. (Portions of this document are not fully legible.)
-A-

209. Watkins, Brian.
A Black Future.
Pub. in Nursing Mirror, August 5, 1966, v.122, n.6, p.421-422, 426.

This is predominantly a look at technology of the future with social changes as the emphasis. The computer is recognized as the dominating influence in future technology. Though nursing is not the focus of the article the computer's affect on the work setting should be relevant to nurses are look to the future.
-G-

210. Watkins, Carolyn.
Student Evaluation by Computer.
Pub. in Nursing Outlook, July 1975, v.23, n.7, p.449-452.

Describes very clearly how the Aultman Hospital School of Nursing developed a computerized system for preparing evaluations of students' clinical performances. This was initially done to lessen faculty time in writing evaluations but several other advantages resulted from this project. Would recommend that faculty read this article in its entirity as it has implications for improvement of evaluation of student clinical performance.
-E-

211. *Weed, Lawrence L.
Your Health Care and How to Manage It.
1975, 194p.
Available From University of Vermont, Promis Laboratory, Adams Residence, Burlington, VT. 05401.

The development, maintenance, application, and uses of the problem-oriented medical record (POMR) system are delineated. Discussions of the requirements and organization of the data base, the methods used with the problem list, the orientation of treatment plans, and the styles and uses of progress notes are accompanied by illustrations of the forms as they might be completed. The questions of whether the patient should have a copy of his own record and when and how to choose a general practitioner, a specialist, or a family physician are addressed. The patient's expectations for quality care are examined in regard to the POMR and the medical unit. The difficulties encountered in incorporating the POMR into the medical college's curricula are discussed, and distribution and utilization are determined as being affected by the use of the POMR. Other topics considered in relation to the POMR include confidentiality, the use of manpower other than physicians, research, the computer, and the priorities in medical service. An example of the effects of computer use on nursing practice is provided. The appendixes are composed of the patient questionnaire, the emergency room questionnaire, the pediatric questionnaire, a life problems flow sheet, and acute illness forms. Additional reading matter is suggested, and a bibliography is included.
-C-
-A-

212. Weil, Thomas P. and Whalen, Janet W.
The Use of Computer Systems in Patient Care.
Pub. in Nursing Forum, Spring 1967, v.6, n.2, p.207-217.

The authors discuss the possible use of electronic processing equipment at the nurses station based upon information they have gathered in the year this article was written (1967). They give a very brief history of computers in hospitals, the status and capabilities of medical information systems as of 1967, and attempt to predict the possible EDP applications that directly relate to nursing care. This is an interesting article as it allows comparison by the reader of the state of the art relative to the use of computers in nursing today with what it was anticipated it would be in 1967.
-G-

213. Wesseling, Elizabeth.
Automating the Nursing History and Care Plan.
Pub. in Journal of Nursing Administration, May - June 1972, v.2, n.3, p.34-38.

Discusses computerization of an admission questionaire in order to assist the professional nurse with the nursing history and care plan. Did not deal with actual use/problems, queing, or patient/staff acceptance.
-C-

214. Wheway, I.
The Computer - Servant or Master?
Pub. in Health Visitor, September 1979, v.52, p.364-366.

The author writes of his concerns of record automation, stressing the ethical issue of confidentiality of patient records. Several disadvantages listed are questionable as to their validity. The article discusses what can be done to make the user and client more comfortable with the system described. The computer can only become our master if we allow it to. Let use make sure it is our servant.
-G-

215. Wolfe, Harvey and Young, John P.
Staffing the Nursing Unit: Part II - The Multiple Assignment Technique.
Pub. in Nursing Research, Fall 1965, v.14, n.4, p.299-301.

Provided is a supplementary technique, linear programming- more specifically a multiple assignment model. This was developed with the assistance of the Johns Hopkins Hospital nursing staff and could be used "for obtaining staffing needs that would reflect both the qualitative and the quantitative aspects of specific assignments of personnel." A table is used to illustrate the multiple assignment model. The model is further explained in the text of this article. The data needed for the model is fed into the computer which results in "the best staffing compliment for the day" which then becomes available to nursing service administration.
-A-

216. *Zielstorff, Rita D.
Planning and Evaluation of Automated Systems: A Nurse's Point of View.
Pub. in Journal of Nursing Administration, July - August 1975, v.5, n.6, p.22-25.

The basic components of automated information systems in clinical settings are reviewed, with a view to the need for nurses to participate in the design and implementation of such systems. The objectives of automation -- cost reduction, better patient care, education or research -- are noted. Options in computer hardware and software available to hospitals are noted. Methods of entering data into automated systems are discussed, with emphasis on the observation that nurses often must interact directly with the computer while performing the function being documented. The need for system designers and programmers to choose hardware and software that are at least as efficient to use as manual systems is pointed out, as is the need for health professionals to become more receptive to technological changes and restrictions that accompany automation. Methods of data processing (on-line, batch-processing) are explained briefly. Opportunities for nurses to contribute to the development of the content of the automated data base are discussed. Examples of such contributions are noted.
-G-
-A-

217. *Zielstorff, Rita D.
Orienting Personnel to Automated Systems.
Pub. in Journal of Nursing Administration, March - April 1976, v.6, n.3, p.14-16.

Planning associated with the introduction of automated systems in the clinical setting is addressed. One of the primary tasks faced by nurse administrators in the use of automated systems involves instructing personnel. Two programs designed to teach personnel how to use computer systems are described: (1) orientation of all personnel to a system; and (2) introduction of new personnel to an already established system. Factors contributing to the complexity of orienting all personnel to a system are examined. Such factors are concerned with the consequences of change in an organizaton, conflicting elements of instructing large numbers of staff

members and completing the instruction in a relatively short time period, and the presentation of information to persons with widely varying backgrounds and educational levels. Objectives of instruction in the use of automated systems are noted. Consideration is given to the content, methods, and evaluation of instruction. It is felt that orienting new personnel to an already established system is easier than orienting all personnel to a system, since the established system is presumably more stable. Effective orientation is viewed as a critical aspect in the successful implementation of automated systems.
-G-
-A-
-E-

218. *Zielstorff, Rita D.
Designing Automated Information Systems.
Pub. in Journal of Nursing Administration, April 1977, v.7, n.4, p.14-19.

The importance of active participation by management and users in the design of an information system for nursing departments is discussed. Components of systems theory are delineated. Flow charts of a written medication order and an automated medication system are included. Examples of data required by system designers are given for the following subsystems: hospital administration, nursing, physicians, and the pharmacy. Statistical analysis, interviewing, flow charting, and work sampling techniques for use in the development of an information system are detailed. Charting the flow of information is helpful in determining the number of procedures or steps involved in a certain activity; the number, origin, and destination of documents produced; and the number of people or departments required to complete the activity. Work sampling may involve the use of work distribution charts, procedures analysis, physical layout studies, or forms analysis. Guidelines for the evaluation of an information system design are presented. They pertain to the characteristics of hardware and software, the extent of content development required, the method of processing, and the source and timing of input data. It is concluded that successful participation by management and users in information system design depends on an accurate appraisal of

problems through systems analysis, the formulation of attainable system requirements, and a sufficient knowledge of computers.
-G-

219. Zielstorff, Rita D.
Nurses Can Affect Computer Systems.
Pub. in Journal of Nursing Administation, March 1978, v.8, n.3, p.49-51.

This article is a rebuttal to the one by Birckhead, "Nursing and the Technetronic Age" in the February, 1978 issue of the Journal of Nursing Administration. Zielstorff rebutes Brickhead's central thesis of powerlessness relative to technology and proceeds to identify steps that can be taken to exploit technology's potential to enhance and promote patient care and nursing practice. The author discusses those areas that nurses need to have knowledge of "to achieve (computer) systems that are consonant with nursing's goals." This article is recommended for nurse administrators. (Brinkhead's response to this article can be found in the March, 1978 issue of the Journal of Nursing Administration.)
-G-
-A-

220. *Zielstorff, Rita D., Roglieri, J.L. and Marble, K.D.
Experience with a Computer-Based Medical Record for Nurse Practitioners in Ambulatory Care.
Pub. in Computers and Biomedical Research, 1977, v.10, n.1, p.61-74.

A computer-based problem-oriented, medical record system was adopted by the Massachusetts General Hospital Medical Nurse Clinic, which served chronically ill, mostly elderly, outpatients. The system was designed to provide an instantly accessible medical record, eliminate or reduce the need for requesting the manual records, reduce the time spent on documentation, provide a laboratory protocol reminder, and provide an automated audit. One nurse used the system for a gradually increasing proportion of her patient case load to evaluate the feasibility of the system. Assessment of the system after one year showed that the automated system had accomplished its stated objective of improved availability and assessibility of data; that it was impossible in this situation to eliminate the need

for the traditional medical record; that the system increased the average amount of time required to document patient visits; and that the lab protocol reminder did not significantly improve the timeliness of tests. The nurse user reported that the system was unacceptable to her because it did not contain enough information to replace the manual record, too much time was required to enter notes, and the restrictions imposed by having to make choices from a predetermined set of frames was viewed as more of a hindrance than a help. It was decided that the project should be withdrawn until more of the laboratories were automated; more providers, including physicians, entered information into the computer-based record; and improved technology permitted more rapid and flexible man-machine interaction.

-C-

PART III : APPENDICES

A. CLASSIFICATION MATRIX

NOTE: Numbers indicate the reference numbers of annotations/ abstracts. See page 5 for an explanation of the classification matrix.

-G- GENERAL

PRIMARY REFERENCE				SECONDARY REFERENCE			
2	41	91	174	34	66	107	183
3	43	93	175	45	92	138	196
4	47	95	176	65	102	142	
5	49	98	177				
6	53	101	181				
12	58	103	186				
13	59	105	187				
14	60	119	188				
15	61	120	191				
16	62	127	199				
17	68	143	200				
20	71	146	201				
22	72	147	203				
23	73	148	209				
27	75	152	212				
28	78	157	214				
29	79	159	216				
30	83	167	217				
33	88	170	218				
37	89	171	219				
38	90	173					

-E- NURSING EDUCATION

PRIMARY REFERENCE				SECONDARY REFERENCE		
9	50	117	162	24	100	202
11	54	123	165	96	116	217
25	56	126	166			
26	57	137	178			
32	67	140	179			
36	84	150	195			
39	101	158				
42	113	160				

-A- NURSING ADMINISTRATION

PRIMARY REFERENCE				SECONDARY REFERENCE			
7	65	130	168	3	30	106	199
10	66	132	169	9	46	114	200
19	69	133	180	11	47	138	206
21	77	136	182	13	53	142	207
34	80	139	183	16	71	147	211
35	85	141	184	17	74	151	216
45	97	144	193	22	78	157	217
48	104	149	196	23	88	170	219
51	109	154	208	26	90	172	
52	122	155	215	27	93	187	
55	129	156		29	101	189	

-C- CLINICAL PRACTICE

PRIMARY REFERENCE				SECONDARY REFERENCE			
8	102	128	194	3	80	88	146
18	106	131	197	7	81	105	147
31	108	145	204	40	82	118	149
44	110	151	205	41	86	131	157
46	111	153	206	51	88	132	164
63	112	161	207	70	89	133	175
64	114	163	210	79	93	134	198
76	115	185	211				
87	121	189	213				
92	124	190	220				
94	125	192					

-R- NURSING RESEARCH

PRIMARY REFERENCE				SECONDARY REFERENCE			
1	82	116	164	16	67	103	170
24	86	118	172	17	79	104	195
40	96	134	198	18	87	131	
70	99	135	202	36	90	140	
74	100	138		49	94	165	
81	107	142					

B. AUTHOR INDEX

NOTE: Numbers indicate the reference numbers of annotations abstracts. See page 7 for details of Author Index format and organization.

-T-

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