
Trailblazers and Pioneers: Nurses Leading the Advance of Informatics

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Acknowledgements

- Virginia Saba, EdD, RN, FAAN, FACMI, LL
 - Co-Author of forthcoming article, “A Brief History of Nursing Informatics in the United States of America”
- Connie Delaney and Anna McDaniel, Guest Editors of special Nursing Informatics issue of Nursing Outlook (September-October 2008)

Overview

- The advance of informatics over time, and the nurses who led the way
- Emerging leaders and their academic roots
- Current challenges
- Visions of the future

In the beginning . . .

- The first informatician
- The first health services researcher
- The first proponent of evidence-based practice
- The first modern nurse



Florence Nightingale

“There is a growing conviction that in all hospitals, even in those which are best conducted, there is a great and unnecessary waste of life; . . . In attempting to arrive at the truth, I have applied everywhere for information, but in scarcely an instance have I been able to obtain hospital records fit for any purpose of comparison. If they could be obtained, they would enable us to decide many other questions besides the one alluded to. . . . [I]f wisely used, these improved statistics would tell us more of the relative value of particular operations and modes of treatment than we have any means of obtaining at present. They would enable us, besides, to ascertain the influence of the hospital . . . upon the general course of operations and diseases passing through its wards; and the truth thus ascertained would enable us to save life and suffering, and to improve the treatment and management of the sick”

—Florence Nightingale, Notes on Hospitals, 1863, pp. 175-176.

The Second Nurse Informatician:

Harriet H. Werley, Ph.D., RN, Lt. Col., U.S.A.

- 1950's: Nurse Researcher at Walter Reed, worked with IBM to identify how to use computers in health care
- 1960's: Convinced ANA to include using nursing data and information to improve care among priorities for nursing research
- 1970's: Edited book (with Grier) detailing visions of computer applications in nursing
- 1980's: Nursing Minimum Data Set and ANA Council on Computer Applications in Nursing

Virginia Saba, PhD, RN, FAAN, FACMI, Living Legend

- 1970's: Program Officer at PHS Division of Nursing, supported early informatics work
- 1980's: Nursing track and SIG at SCAMC
- 1990's: Home Health Care Classification
- 2000's: Clinical Care Classification System (in public domain); IMIA NI-SIG chair, coordinated development of ISO Reference Terminology standard for nursing diagnosis and action models

The 1970's— Nursing Information Systems

- Early systems supported documentation and care planning.
- Prototype DSS's used patient data to propose nursing diagnoses and interventions.



1970's: Hospital Information Systems

- Technicon: First comprehensive system
- Margo Cook and Wanda McDowell led development of nursing component at El Camino Hospital.
- Created standard care plans to be edited for individuals
 - Focused on nursing problems, medical diagnoses, surgical procedures
 - Forerunners of today's evidence-based protocols and pathways
- Carol Romano and Kathleen McCormick helped to adapt and implement Technicon at NIH Clinical Center.

1970's: Omaha System

- DeLanne Simmons, Karen Martin, and others at Omaha Visiting Nurse Association developed data elements and forms.
- Improved care planning and helped to meet reporting requirements for home care
- Widely adopted by community health and home care agencies
- Initially funded by Division of Nursing; in public domain

1970's: Research and Development

- *Nursing Research* published first research reports in nursing informatics.
 - Lagina SM. A computer program to diagnose anxiety levels. *Nurs Res* 1971;20(6):484-492.
 - Goodwin JO, Edwards BS. Developing a computer program to assist the nursing process: Phase I—from systems analysis to an expandable program. *Nurs Res* 1975;24(4):299-305.
- Rita Zielstorff brought nursing perspective to informatics R&D at Mass. General Hospital.
- NANDA began to collect and approve nursing diagnosis terms as a way of defining nursing.

http://www.nanda.org/html/nursing_diagnosis.html

1980's: Informatics Courses in Schools of Nursing

- Judy Ozbolt (University of Michigan)
- Judith Ronald (SUNY Buffalo)
- Virginia Saba (Georgetown Univ.)
- Diane Skiba (Boston College)



1980's: Professional Associations

- Virginia Saba led Nursing Informatics SIG and nursing track at SCAMC.
- Judy Ozbolt was elected to Board of Directors of SCAMC and founding board of AMIA.
- The International Medical Informatics Association (IMIA) began sponsoring triennial conferences in nursing informatics.
- Nurses established informatics groups at ANA and NLN.

1980's: Scholarship in Nursing Informatics

- NIH held first NI conference (1981).
- Joanne McCloskey and Gloria Bulechek led development of NIC.
- Judith Graves and Sheila Corcoran defined nursing informatics as a scientific discipline (1989).



1988: First Graduate Program in Nursing Informatics



- University of Maryland School of Nursing
 - Dean Barbara Heller
 - Carole Gassert
 - Mary Etta Mills
- 20th Anniversary in 2008!



1990's: Advancing the Science

- Nancy Staggers earned the first PhD in nursing informatics and launched research program on nurse-computer interaction.
- Linda Woolery Goodwin used data mining and machine learning to improve prediction of pre-term birth.
- Patricia Brennan began to study computer-based interventions for patients and caregivers at home.

1990's: Academic Recognition of NI

- New graduate programs launched by:
 - University of Utah (Judith Graves)
 - University of Colorado (Diane Skiba)
 - Duke University (Linda Goodwin)
- Endowed chairs for nurse informaticians
 - University of Wisconsin-Madison (Patti Brennan)
 - Vanderbilt University (Judy Ozbolt)
 - Columbia University (Suzanne Bakken)

1990's: Professional Associations

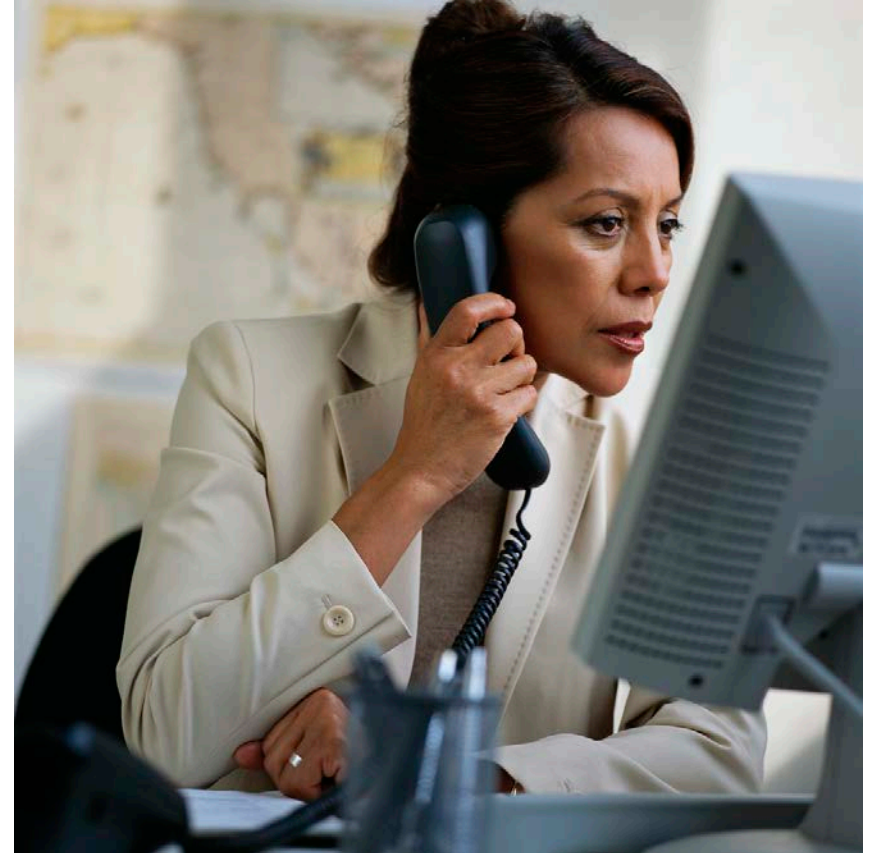
- SCAMC evolved into AMIA, and the NI-WG became a model for others.
- Nurses rose to leadership positions in AMIA.
- ANA defined scope and standards of nursing informatics practice and ANCC began certification.
- ANA began to recognize vocabularies useful for nursing.

1990's—Nursing Languages

- Sue Moorhead and Marion Johnson led the Iowa team in creating the Nursing Outcomes Classification (NOC), to be used with NANDA and NIC.
- NANDA, NIC, and NOC vied with Omaha System, HHCC, and other vocabularies for dominance.
- ICN asked June Clark, Norma Lang, and Randy Mortensen to develop the ICNP as an international model for reconciling vocabularies. (Today Amy Coenen maintains ICNP.)
- Ida Androwich, Suzanne Bakken, Patricia Button, Nicholas Hardiker, Judith Warren, and Christine Zingo explored possibilities for formal reference terminology for nursing.
- The first Nursing Terminology Summit (1999) achieved agreement to create a concept-based reference terminology model to which vocabularies could be mapped for interoperability.

2000's: Language and Data Standards

- ISO and CEN
- HL7
- LOINC
- SNOMED CT
- IHTSDO
- NCVHS
- HITSP
- CCHIT



2000's: ISO and CEN

- Nursing Terminology Summit collaborated with IMIA, ICN, and CEN to propose, develop, and submit to ISO reference terminology models for nursing diagnoses and actions.
- ISO International RT Standard 18104 was adopted in 2003.
- Now undergoing review and possible revision in light of subsequent developments and experience.

2000's: HL7

- Nurses chair and participate in interdisciplinary committees to create standards for sending messages between computer-based systems.
- Nursing languages have been recognized by and represented in HL7.

2000's: Clinical LOINC

- Susan Matney chairs nursing subcommittee of Clinical LOINC to create codes for nursing observations.
- Suzanne Bakken and associates have verified that the Clinical LOINC structure can adequately represent nursing observations.

2000's: SNOMED and IHTSDO

- Debra Konicek led nursing panel to represent nursing concepts in SNOMED CT, guided by ISO standard reference terminology models.
- Nursing classification systems and ICNP mapped to SNOMED CT.
- SNOMED CT now maintained by International Health Terminology Standards Developing Organization (IHTSDO).
- Judith Warren chairs Nursing work group.

2000's: NCVHS

- National Committee on Vital and Health Statistics advises Secretary of HHS on data standards, procedures, and policies.
- Judith Warren co-chairs the patient care data subcommittee and influences language to be inclusive of nurses (e.g., “prescribers” rather than “physicians.”)

2000's: HITSP and CCHIT

- The Health Information Technology Standards Panel recommends standards for adoption by the Dept. of HHS.
- The Certification Commission on Health Information Technology determines whether hardware and software meet required standards for the public and private sectors.
- Nurses are well represented on both.

2000's: Status of Standards

- Tools exist to create “records fit for any purpose of comparison.”
- Remaining barriers to comparable records:
 - Legacy systems that don't meet standards
 - Nurses and executives who don't understand importance of standards for comparable data that can be shared
 - Challenges in harmonizing and implementing standards

2000's: Current Research

- Patricia Brennan: Personal Health Records
- Eun-Shim Nahm: Support for elders and caregivers at home
- Cornelia Ruland: Decision support systems that engage patients' preferences and autonomy
- Nancy Staggers: Usability of Systems
- Nancy Staggers, Carole Gassert, and Christine Curran: Informatics competencies

2000's: The Leading Edge

- Connie Delaney and Joyce Sensmeier:
Alliance for Nursing Informatics
- Angela McBride, Marion Ball, Diane Skiba,
and many others: TIGER
- Judith Effken and Carol Bickford:
Occupational designation for informatics
nurses in the North American Industry Code

The Future

- Using technologies in novel ways that change care processes
- Creating new tools for education, practice, research, and personal health management
- Seeking the wisdom to transform nursing practice and health care systems
- Fulfilling the vision: “to save life and suffering, and to improve the treatment and management of the sick”

Professor Mary Etta Mills, ScD, RN, FAAN

- A founding faculty member of the University of Maryland graduate programs in Nursing Informatics
- A keeper of the vision who continues to inspire her students and colleagues
- A nurse who honors our past, shapes our present, and helps us to dream our future

Forward into History

Dissertation Authors and Titles from the University of Maryland School of Nursing



UM Dissertations (1)

- Detecting Critical On-Line Information: The Relationship between Nurse Characteristics, Computer Screen Designs and Computer Interaction- **Nancy Staggers**
- Predictors of Adoption of Nursing Clinical Information Systems as an Innovation- **Carol Ann Romano**

UM Dissertations (2)

- Impact of MEDLINE Usage on Nurses' Research Utilization & Decision Making- **Patricia Prin**
- Concern about the Privacy of One's Health Care Information & Non-Disclosure of Health Information- **Eleanor Henry**
- Systems, Protocols and Power- **Fern FitzHenry**

UM Dissertations (3)

- Analysis of the Relationship among Patient Profile & Nursing Elements in Predicting Home Care Resource Utilization & Outcomes- **Ting Ting Lee**
- Information System Integration in a Geographically Distributed Organization – **Kathleen Charters**

UM Dissertations (4)

- Predictors of Declarative & Procedural Knowledge in Nursing Students using Computer Mediated Instruction- **Dorothea McDowell**
- A Comparison of Computerized Geographical Display Formats for the Titration of Sodium Nitroprusside- **Christine Curran**

UM Dissertations (5)

- Computer Based Patient Record: An Ethnographic View- **Carol Bickford**
- The Influence of Nursing Home Characteristics on the Accuracy of the Long Term Care Minimum Data Set- **Susan Joslin**

UM Dissertations (6)

- Evaluation of the Proposed International Standards Organization Reference Terminology Model for Nursing Actions-
Jacqueline Moss

- A Model of Computer Mediated Social Support among Older Adults –
Eun-Shim Nahm

UM Dissertations (7)

- The Effect of a Computerized Medication Order Entry System on Managing Continuous Infusion Medications at a Pediatric Intensive Care Unit –
Azizeh Sowan
- A Comparison of Paper-Based Data Submission to Remote Data Capture for Minimizing Date Entry Errors –
Beverly Meadows

UM Dissertations (8)

- Association between Ozone & Emergency Department Visits: Application of Geostatistics & Geographic Information Systems - **Mona Choi**
- Nurses' Acceptance of Handheld Computers- **Yen-Chiao Lu**

UM Dissertations (9)

- Utility of Search Strategies Used by Nurses Seeking Internet-Based Health Information –
Susan Newbold
- Clinicians' Perceptions of Usability of an Electronic Medical Record Over Time-
Charlotte Seckman

Emerging Trends: Results of a Survey, 2007-2008

- Survey of 27 Registered Nurses
- 25 hospitals in Maryland, Virginia, D.C.
- Questions:
 - What informatics initiatives are occurring now in your hospital?
 - What are nursing's greatest information management needs?
 - What are the institutional priorities?
 - What questions need further study?

Current Information Management Initiatives in Healthcare Organizations

- Paperless charting (including radiology; physician orders)
- Laptops on wheels (one/nurse/shift)
- Integrating an information system able to track patient progress
- Scanners to identify right patient to right medication

Information Management Initiatives

(2)

- Computerized provider order entry
- Military- Computerized health record accessible 24/7 from any military treatment facility
- Upgrade patient documentation to become completely computerized in all areas

Current Nursing Needs

- Update of the electronic charting system
- Ability to follow the patients' progress
- Standardized barcoding system and process for all units
- CPOE
- Advanced intensive care monitoring

Current Nursing Needs (2)

- Progress Notes
- Link personal health information to online search for medical information
- Easy navigation of patient information
- User friendly system (checklist type for assessments with free text for abnormalities; non-repetitive; integrated)

Nursing Needs (3)

- Adequate number of input stations to reduce waiting times
- Record integration across areas (“Integrated simplified computer system”)
- More complete documentation availability and more time for the nurse to spend at the bedside

Nursing Needs (4)

- Keep the users, the nurses, in mind during development
- Constant communication about system development plans, implementation, and progress

Current Institutional Priorities

- Integrated systems
- Progress notes
- Military- Trying to make the Electronic Health Record accessible to the private sector

Questions for Study

- Do increased technology and the time spent on it really promote safety? Do they (also) create different safety issues?
- What data should be developed to provide evidence that insurance should/should not cover the cost of certain procedures (as bariatric surgery)?

Questions for Study (2)

- To what extent is online patient information secure?
- Does concern for the security of online health data affect the willingness of people to seek medical attention?

Building Connections for Patient-Centered Records

- A State of Maryland Study on Adoption of Electronic Health Records, 2007

Factors that would promote adoption of Electronic Health Records (1)

■ Financial:

- Balance relationship of HIT costs and benefits (through payments & subsidies)
- Identify incentives for e-prescribing

Factors that would promote adoption of Electronic Health Records (2)

■ Technology

- Encourage physician implementation of EHR
- Hospital implementation of EHR & CPOE
- Implement a statewide health information exchange

Factors that would promote adoption of Electronic Health Records (3)

- Allow market forces to drive consumer adoption of personal health records
- Develop a statewide outreach and education program for consumers
- Resolve differences between State privacy and security laws, HIPAA and FERPA (for School Health Records)

Future Possibilities



Thank you!

- Questions?
- Comments?

