A to Z: A Year in Review
Spring 2014–Winter 2015

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Conflict of Interest Disclosure

Sarah Collins PhD, RN and Patricia C. Dykes PhD, RN

Have no real or apparent conflicts of interest to report.
Learning Objectives

- Review purpose, objectives, search strategies and associated limitations.
- Review nursing informatics research topics, methods, findings and journals.
- Highlight gaps in nursing informatics research.
- Discuss opportunities for translating informatics evidence into clinical practice.
Purpose

To survey the published literature in the area of nursing informatics using the following criteria:

◦ Research (systematic reviews, RCTs, observational & qualitative research, case studies)
◦ Nursing informatics
◦ Published (including early e-published) in peer-reviewed journal between March 1 2014 – February 28 2015

To describe the corpus of publications collected in terms of:

◦ Author country
◦ Setting
◦ Topic
Search Strategies

- Database: PubMed
- Terms: “nursing informatics” combined with keywords “research” and “interprofessional” narrowed to publication dates March 1 2014 – February 28 2015
- Inclusion criteria: Research, contributes to nursing informatics knowledge base, prototype development and testing, clinical care delivery focus; informatics
- Exclusions: Articles that focused on informatics education programs, nursing education, nursing students, competencies
Records identified through database searching \((n=563)\)

Records identified through NENIC members \((n=5)\)

Records excluded because duplicates, not research/review or related to nursing education, nursing students, competencies \((n=519)\)

Full text records assessed for eligibility \((n=49)\)

Excluded on full review did not meet criteria \((n=16)\)

Studies included in evaluation \((n=33)\)
Countries of First Author (%)

- Australia: 27.0%
- USA: 50.4%
- UK: 3.5%
- Sweden: 3.5%
- Iran: 3.5%
- Netherlands: 3.0%
- Norway: 6.0%
- New Zealand: 3.0%
## Research Settings and Topics

<table>
<thead>
<tr>
<th>Settings</th>
<th>Topics</th>
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<tr>
<td>Continuum/Public health</td>
<td>Transitions/handoffs</td>
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<td>Expert panel</td>
<td>Standards/Terminology</td>
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<td>Hospital</td>
<td>Human Factors/Usability</td>
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<td>Long-term Care</td>
<td>Patient Engagement</td>
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<tr>
<td>Other</td>
<td>eHealth Surveillance</td>
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<td>Mobile Health</td>
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<td>Clinical Documentation</td>
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<td>Implementation</td>
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<td>Other</td>
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Research Settings

- Hospital: 72.7%
- Expert Panel: 12.1%
- Other: 6.1%
- Long-term Care: 3.0%
- Continuum/Public Health: 6.1%
# Research Topics

<table>
<thead>
<tr>
<th>Topic</th>
<th>Percentage</th>
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</thead>
<tbody>
<tr>
<td>Transitions/Handoffs</td>
<td>52%</td>
</tr>
<tr>
<td>Standards/Terminology</td>
<td>6%</td>
</tr>
<tr>
<td>Human Factors/Usability</td>
<td>12%</td>
</tr>
<tr>
<td>Mobile Health</td>
<td>6%</td>
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<tr>
<td>e-Health Surveillance</td>
<td>3%</td>
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<tr>
<td>Patient Engagement</td>
<td>6%</td>
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<tr>
<td>Implementation</td>
<td>6%</td>
</tr>
<tr>
<td>Clinical Documentation</td>
<td>3%</td>
</tr>
<tr>
<td>Other</td>
<td>6%</td>
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Transitions/Handoff
Smeulers M; Lucas C; Vermeulen H. Effectiveness of different nursing handover styles for ensuring continuity of information in hospitalised patients. *Cochrane Database of Systematic Reviews*, 2014 (6)

- **Topic:** Systematic review of interventions to improve handovers
- **Purpose:** To determine which nursing handover style(s) are associated with improved patient and nursing process outcomes focused on maintaining continuity of care.
- **Methods:** RCTs and cluster–RCTs were evaluated. Two review authors independently assessed trial quality. 9 large databases searched (e.g., MEDLINE, EMBASE, CINAHL)
- **Findings:** 2178 citations identified, 28 considered potentially relevant. After independent review of full text, **no eligible studies were identified for inclusion** in this review due to the absence of studies with a randomized controlled study design.
- **Implications:** There is no evidence available to support conclusions about the effectiveness of nursing handover styles for ensuring continuity of information in hospitalized patients because no studies fulfilled the methodological criteria for this review.
  - Uncertainty about the most effective practice remains. Research should strengthen evidence of nursing handover styles using well designed, rigorous studies.
  - Current knowledge supports the following: face–to–face communication, structured documentation, patient involvement, and use of HIT to support the process.
Standards/Terminology

- **Topic:** HL7 V.3 Care Transfer, Care Record Query, and Care Record messages
- **Purpose:** Development of core components of the HL7 Care Provision Domain Model
- **Methods:** Specification of international set of use cases and information analyses, model building, HL7 consensus methods (eg, working group meetings), conference calls, balloting, a draft standard for trial use, pilot implementations, and evaluation
- **Findings:** After iterative revisions and formal ballot process, HL7 membership accepted it as a normative standard and it is now ANSI approved. The Care Provision Domain Model defines the structure (data exchanged) and dynamics (workflow and communications) of the Care Record, Care Record Query, and Care Transfer.
- **Implications:** The HL7 V3 Care Provision Domain differs from the HL7 CDA regarding support of the dynamics of care (eg, for continuity of care) as provided through a series of interactions and queries, but is similar with respect to the data and their organization. Using a message is somewhat different from the approach offered in the current HL7 Clinical Document Architecture (CDA). The overall advantage is human–to–human communication and system–to–system processing of structured data through electronic messages, supporting continuity of care and interactive structured data exchange through querying.
Topic: User-centered design & associated outcomes

Purpose: To increase the efficiency, effectiveness, and satisfaction of the nursing interface with the EHR system to enhance the nursing influence in optimizing patient outcomes.

Methods: User-centered re-design. HIMSS usability checklist. Pre & post satisfaction, efficiency (time) and effectiveness metrics (CAUTI, pressure ulcers, and restraints)

Findings: 45.2% decrease in documentation time. The 6 month pre- and 6 month post-metrics for CAUTI rate decreased 30%. Indwelling catheter days only decreased 1.6%. Documentation of the presence of pressure ulcers, stages I to IV, demonstrated a significant decline of 43.8%. Finally, restraint utilization demonstrated a 14.3% decrease. Authors conclude that standardization and simplicity of the documentation fields enabled more accurate documentation of patient condition and care delivered.

Implications: Integration of the usability checklist as a standard tool in the software design process and user acceptance testing is a useful method. Focus on a set of complementary outcomes of satisfaction, efficiency and effectiveness is recommended.
Mobile Health
Topic: The Computerized Symptom Capture Tool (C–SCAT) is an iPad application, combining graphical images and free text responses to capture patient symptoms.

Purpose: To evaluate the feasibility and acceptability of C–SCAT to explore symptom clusters experienced by adolescents and young adults with cancer.

Methods: Seventy–two adolescents and young adults with cancer at five institutions across the US completed the C–SCAT 24–96 hours after initial chemotherapy dose in a chemotherapy cycle.

Findings: Completion of C–SCAT took 25 minutes on average. 74% reported that the final image was an accurate/very accurate representation of their symptoms. Clarification/coaching was necessary for how complete it “exactly right” and to draw lines and boxes. Few technical problems were encountered. Questions were found to be clear and endorsed ease of following instructions, typing, and drawing.

Implications: C–SCAT demonstrated feasibility and acceptability and should be further refined to: (a) empower adolescents and young adults with cancer to communicate their symptom experience and partner with providers in their care; (b) improve symptom management and ameliorate distress; and (c) be applicable for use with other highly symptomatic populations.

e-Health Surveillance
Topic: eHealth influenza surveillance

Purpose: To examine correlations between eHealth data and influenza case rates during seasonal and pandemic influenza outbreaks. Investigate associations between eHealth data and population immunity.

Methods: 5 year study in Sweden (population 427,000). Syndromic eHealth data were collected from Google Flu Trends (GFT), telenursing call centers, and local health service website visits at page level, and the major regional newspaper.

Findings: Local media coverage data and influenza case rates correlated with influenza A (A) pH1N1 outbreak in 2009 ($r=0.74$, $P<0.001$) and the severe seasonal A H3N2 outbreak in 2011–2012 ($r=0.79$, $P=0.001$). In other words, media coverage preceded case rates with one week. GFT and influenza case data was correlated for all outbreaks. The preceding time lag for GFT decreased from two weeks during the first outbreaks to one week from the 2009 A pH1N1 pandemic. Telenursing data and influenza case data was correlated for all outbreaks after the seasonal B and A H1 outbreak in 2007–2008. The time lag for Telenursing decreased from two weeks in 2008–2009 to none in 2009. Website visits and influenza case data were also correlated.

Implications: Large effect sizes were found for correlations between the eHealth data and influenza cases. The time lag between signals in eHealth data and influenza rates changed overtime. Alert-generating eHealth surveillance systems could be developed and evaluated prospectively. Further research is needed on dynamic analytic methods for eHealth surveillance.
Patient Engagement
Topic: Patient engagement technologies in hospital setting

Purpose: To review existing literature regarding patient engagement technologies used in the inpatient setting.

Methods: Systematic review of all English studies with keywords and subject terms related to (1) patient engagement, (2) involved health information technology and (3) took place in the inpatient setting ('inpatient' or 'hospital').

Findings: 17 papers met criteria. Most common foci were (1) design requirements for inpatient engagement technology (2) descriptions of patient engagement technology interventions categorized as follows:

1. Entertainment
2. Generic health information delivery
3. Patient-specific information delivery
4. Advanced communication tools
5. Personalized decision support

Implications: Considerable gaps in knowledge regarding patient engagement in the hospital setting. Inconsistent use of terminology regarding patient engagement. Dearth of research concerning the impact on health outcomes and cost-effectiveness.

Implementation
**Clinical Informatics Practice**

<table>
<thead>
<tr>
<th>Levels of Practice</th>
<th>Key Roles</th>
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<tbody>
<tr>
<td>Top Leader that Values, Invests in, and Supports Interprofessional Informatics</td>
<td>Chief Officers (e.g., Nursing, Medical)</td>
</tr>
<tr>
<td>Centralized and Strategic Leader with Decision-making Authority and Operational</td>
<td>Chief Information Officers (e.g., Nursing,</td>
</tr>
<tr>
<td>Oversight</td>
<td>Medical)</td>
</tr>
<tr>
<td>Experts to Evaluate and Optimize System Design and Align and Enhance Interprofessional Informatics Practice</td>
<td>Director of Professional Competencies</td>
</tr>
<tr>
<td>Respected Leaders to Manage Projects, Make Decisions, and Engage Clinicians to</td>
<td>Clinical Informatics Managers</td>
</tr>
<tr>
<td>Ensure Strategic Goals, Practice Goals, and End-User Needs Are Met</td>
<td></td>
</tr>
<tr>
<td>Expert Clinicians and End-Users that Communicate Clinical Relevance for System</td>
<td>Training Specialists</td>
</tr>
<tr>
<td>Design</td>
<td>Super Users</td>
</tr>
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Topic: Impact of an ITPA on nursing practice

Purpose: To explore nurses’ experiences of the benefits of and barriers to using an ITPA called Choice, in cancer care one year after its implementation.

Methods: Focus groups with 20 nurses who used the ITPA for 1–year post implementation. Data analyzed using qualitative content analysis.

Findings: Three themes emerged
1. “Choice as facilitator for shared understanding and engagement in patients’ own care”
   - preparing both patient and nurse for communication,
   - shared engagement in care planning,
   - giving the patients a voice
2. “Enhancing the patients’ strengths”
   - releasing patient’s internal strengths
   - confirming “normalcy” for the patient
3. “New challenges for the nurse”
   - organizational challenges
   - inter-actions with technology,
   - need for training in communication skills
   - new ethical challenges.

Implications: Integration of ITPAs in clinical practice offers can contribute to patient-centered care but require alignment with other clinical priorities and workflows.

Other important informatics papers that did not meet our criteria
In Spring 2014–Winter 2015 nursing informatics research was published on a wide variety of topics and in informatics, nursing and health care journals.

The most common research topic was transitions/handoff.

Fewer studies published on implementation, CPOE/BCMA/eMAR, health information exchange, comparative effectiveness.
Summary: Nursing Informatics Research Gaps

- Very few research publications related to the following:
  - 1. Clinical decision support for nurses
  - 2. Rigorous evaluation of the impact of HIT on nursing care and patient outcomes

Measurement gap:
- “Relevant” patient reported outcomes
- Metrics to support generalizability
  - Process metrics (e.g., Documentation efficiency)
  - RE–AIM Framework
Discussion Questions

- What studies did we miss?
- Which of these studies have relevance for your practice?
- What are the barriers to implementing the findings from these studies?
- What additional recommendations do you have for future research?
- What opportunities exist for multisite evaluation studies now that many organizations have implemented EHRs?
Clinical Documentation

Handoff/transitions
Bibliography

Handoff/transitions (Continued)
Bibliography

Human Factors/Usability


Implementation


Mobile health


Bibliography

Patient engagement

Standards/Terminology

Other

Other Important Papers That Did Not Meet Our Criteria
Questions?

Thank You!

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