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

April 30, 2015

Sarah Collins PhD, RN
Partners HealthCare
Patricia C. Dykes PhD, RN
Brigham & Women's Hospital
Boston, MA

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.

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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

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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

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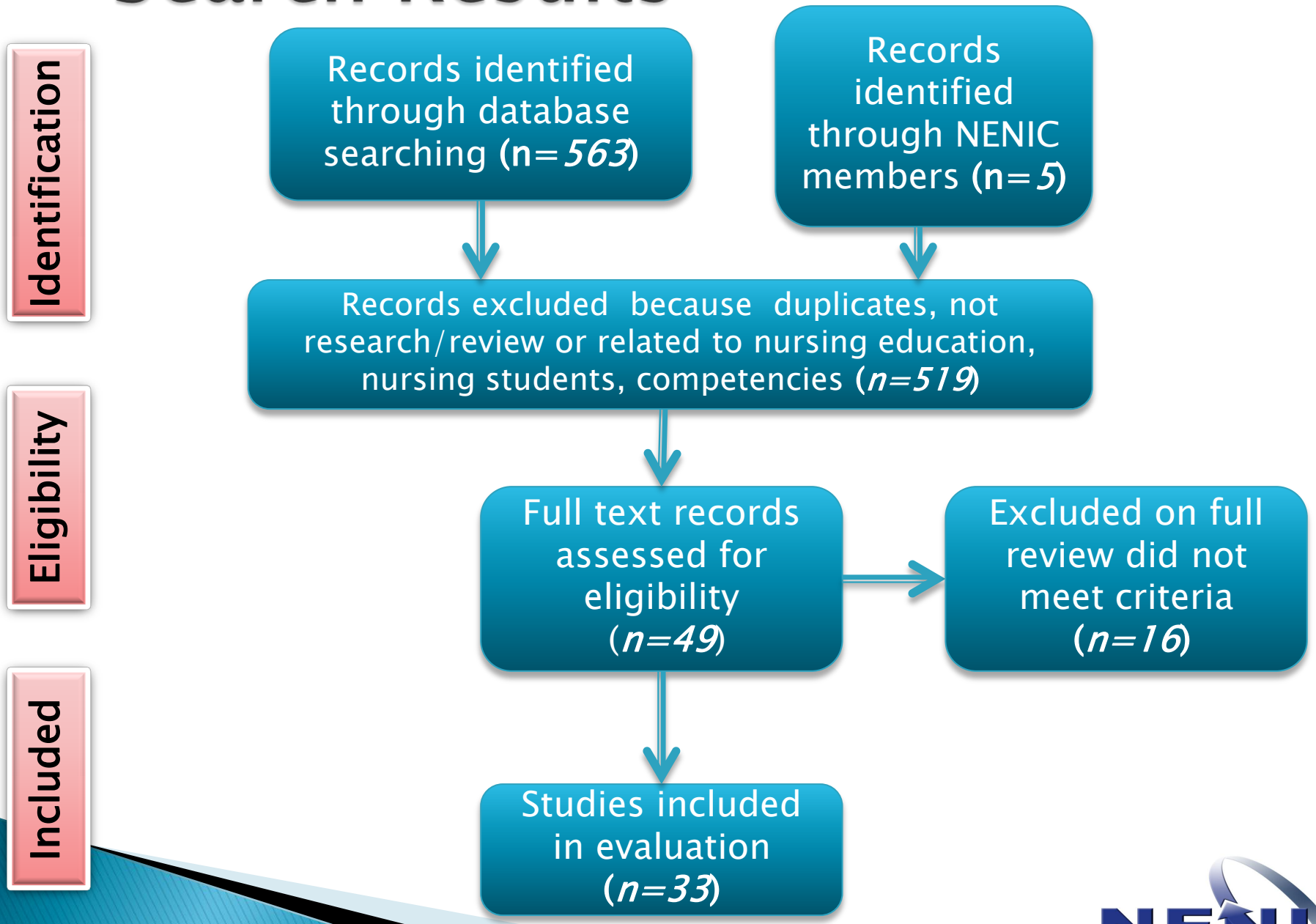
Search Results



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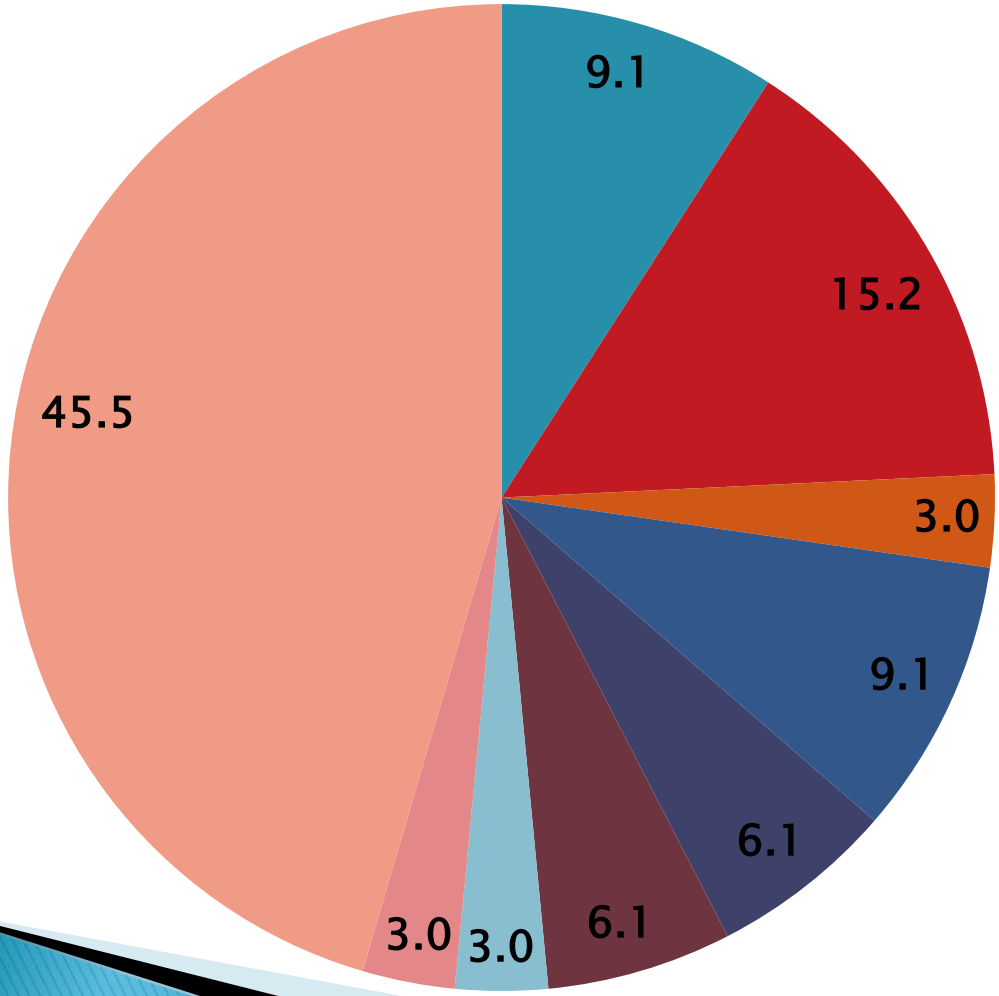
Journals (%)



- IJMI
- JAMIA
- JMIR
- J Clin Nurs
- J Adv Nurs
- AMIA Symposium
- Stud Health Technol Inform
- Health Informatics Journal
- Other

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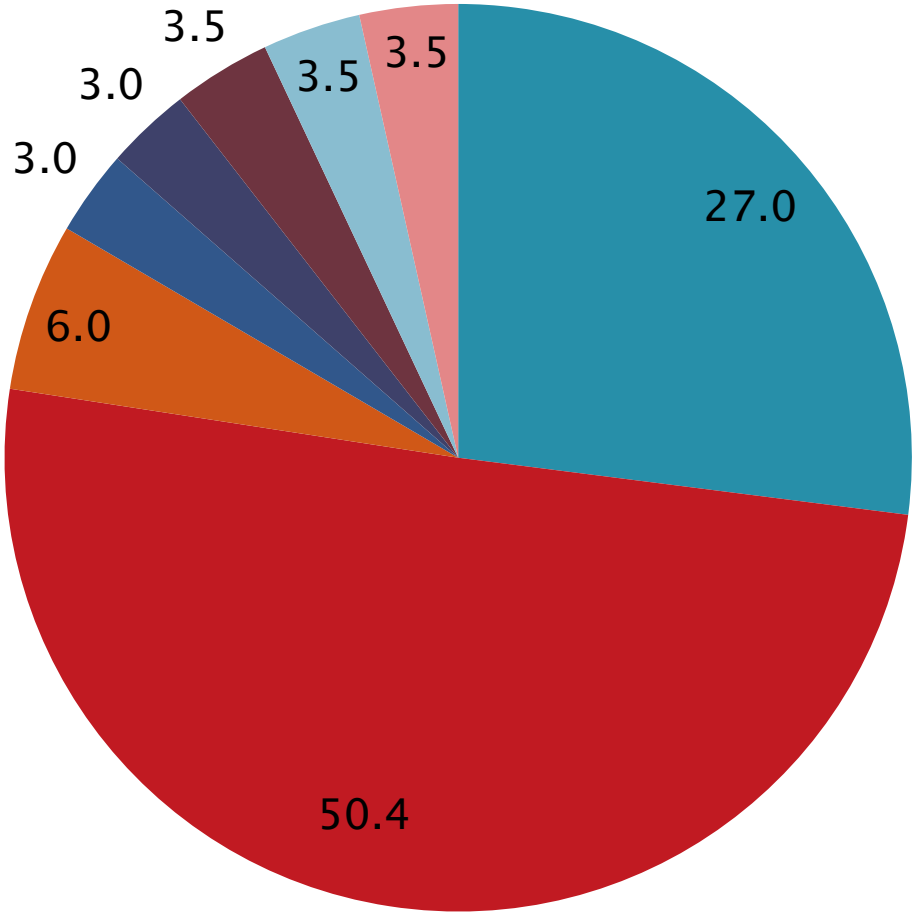
Countries of First Author (%)



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Research Settings and Topics

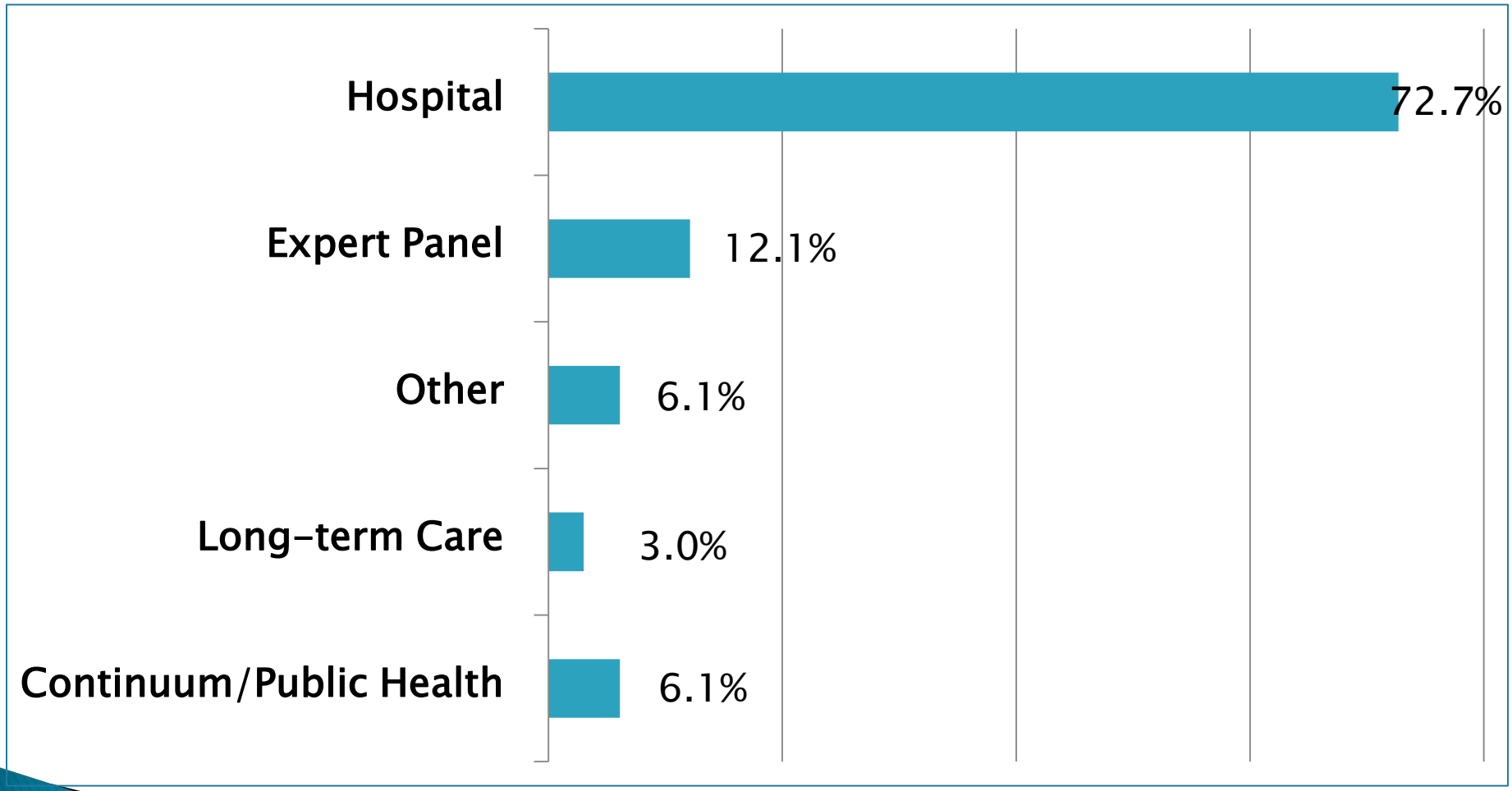
Settings

- Continuum/Public health
- Expert panel
- Hospital
- Long-term Care
- Other

Topics

- Transitions/handoffs
- Standards/Terminology
- Human Factors/Usability
- Patient Engagement
- eHealth Surveillance
- Mobile Health
- Clinical Documentation
- Implementation
- Other

Research Settings



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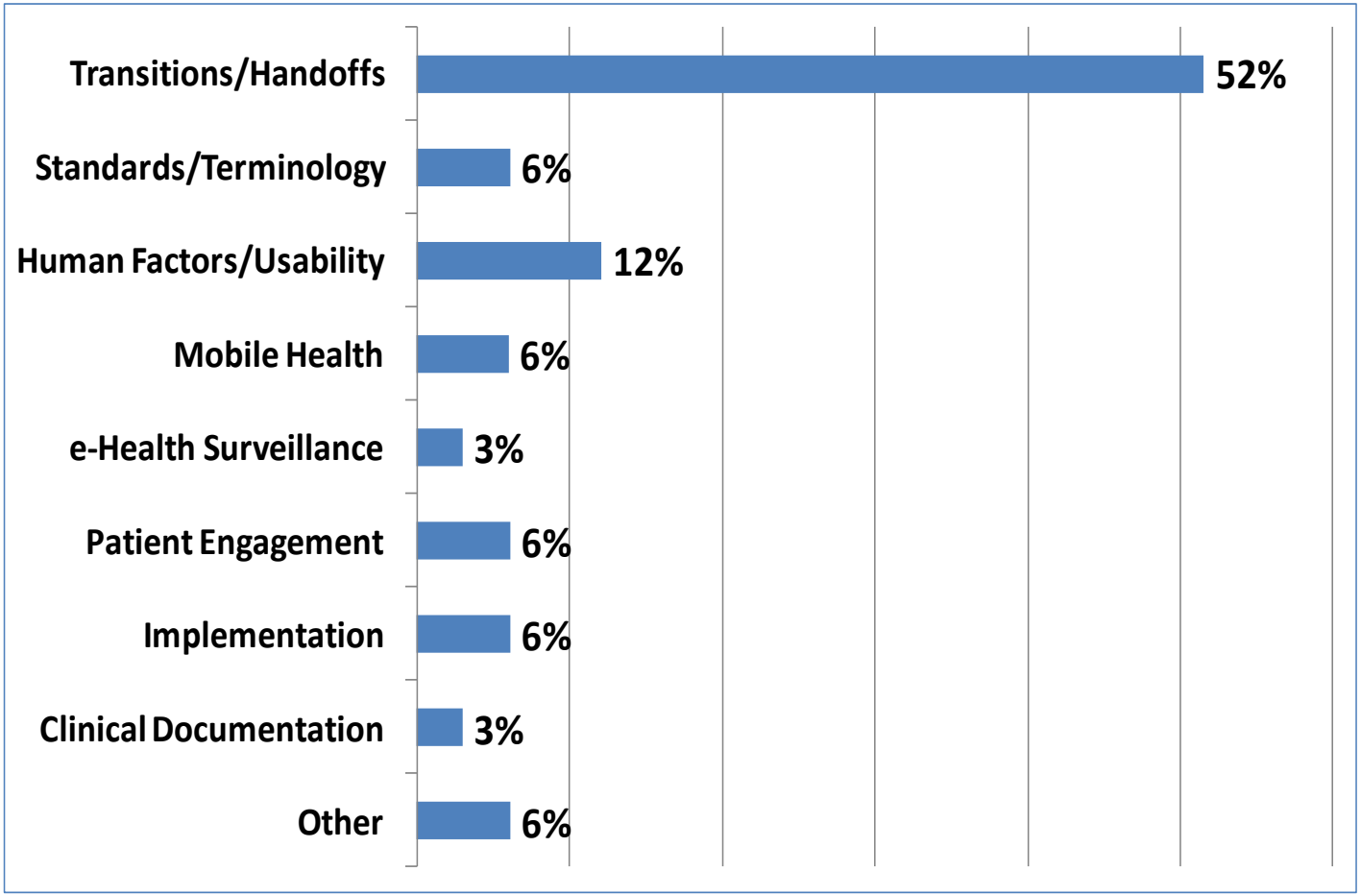
Research Topics



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Spring 2014 – Winter 2015 Highlighted Publications

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Transitions/Handoff

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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.

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Standards/Terminology

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Goossen W, Langford LH. Exchanging care records using HL7 V3 care provision messages. *J Am Med Inform Assoc.* 2014 Oct;21(e2):e363-8.

- **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.

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Human Factors/Usability

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Page CA, Schadler A. Nursing Focus on EMR Usability Enhancing Documentation of Patient Outcomes. *Nurs Clin North Am.* 2014 Mar;49(1):81-90.

- **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.

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Macpherson CF, Linder LA, Ameringer S, Erickson J, Stegenga K, Woods NF. Feasibility and acceptability of an iPad application to explore symptom clusters in adolescents and young adults with cancer. *Pediatr Blood Cancer.* 2014 Nov, 61(11):1996-2003.

- **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.

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e-Health Surveillance

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Timpka T, Spreco A, Dahlström Ö, Eriksson O, Gursky E, Ekberg J, Blomqvist E, Strömgren M, Karlsson D, Eriksson H, Nyce J, Hinkula J, Holm E. Performance of eHealth data sources in local influenza surveillance: a 5-year open cohort study. *J Med Internet Res.* 2014 Apr 28. 16(4):e116.

- **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=.74, P<.001) and the severe seasonal A H3N2 outbreak in 2011-2012 (r=.79, P=.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.

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Patient Engagement

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Prey JE, Woollen J, Wilcox L, Sackeim AD, Hripcsak G, Bakken S, Restaino S, Feiner S, Vawdrey DK. Patient engagement in the inpatient setting: a systematic review. *J Am Med Inform Assoc.* 2014 Jul-Aug;21(4):742-50.

- **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.

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Implementation

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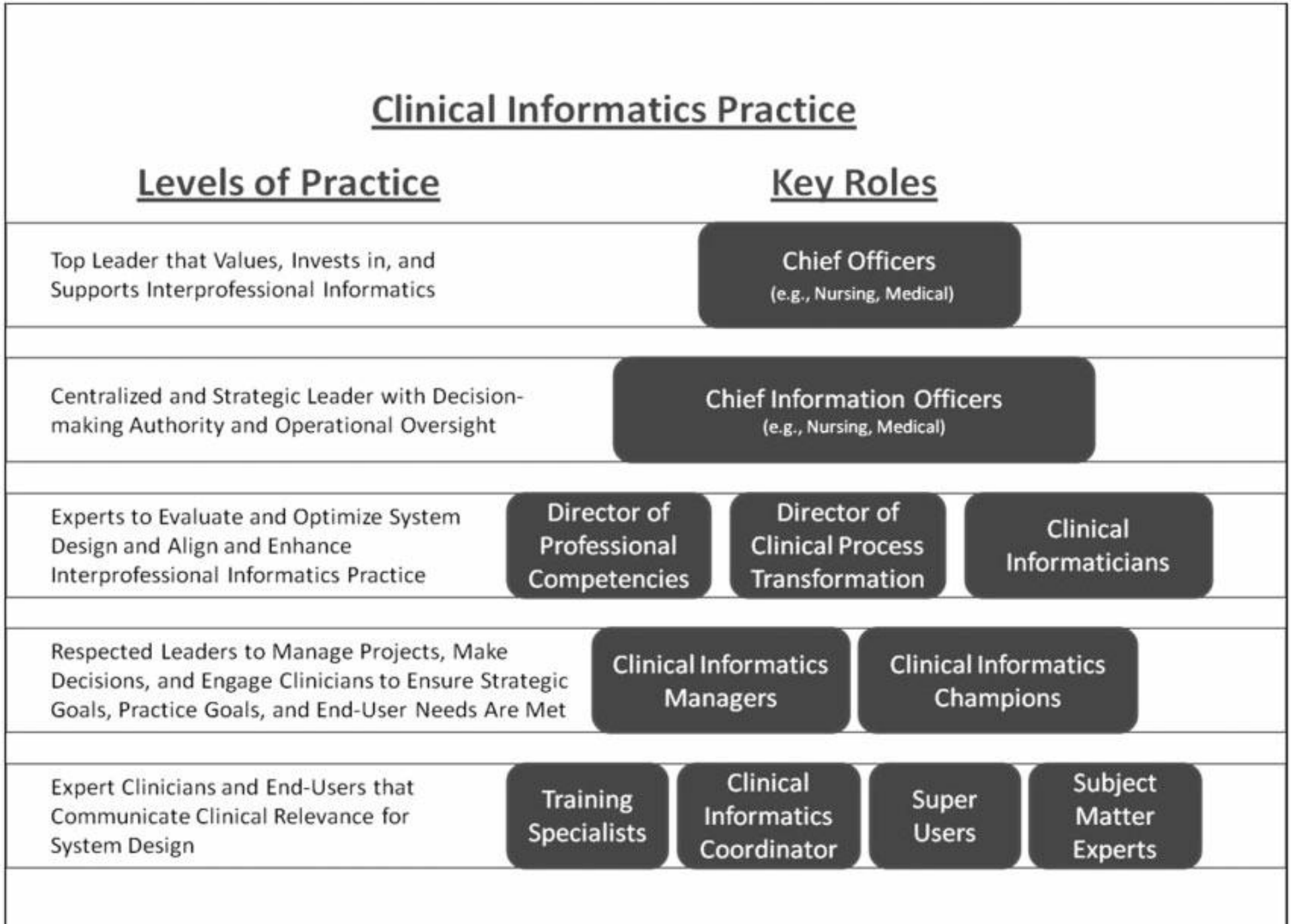
Collins S, Alexander D, Moss J. (2014). Nursing Domain of



Clinical Documentation

Børøsund E, Ruland CM, Moore S, Ekstedt M. (2014). Nurses' experiences of using an interactive tailored patient assessment (ITPA) tool one year past implementation. *Int J Med Inform*. 2014 Jul;83(7):e23-34.

- **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.

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Other

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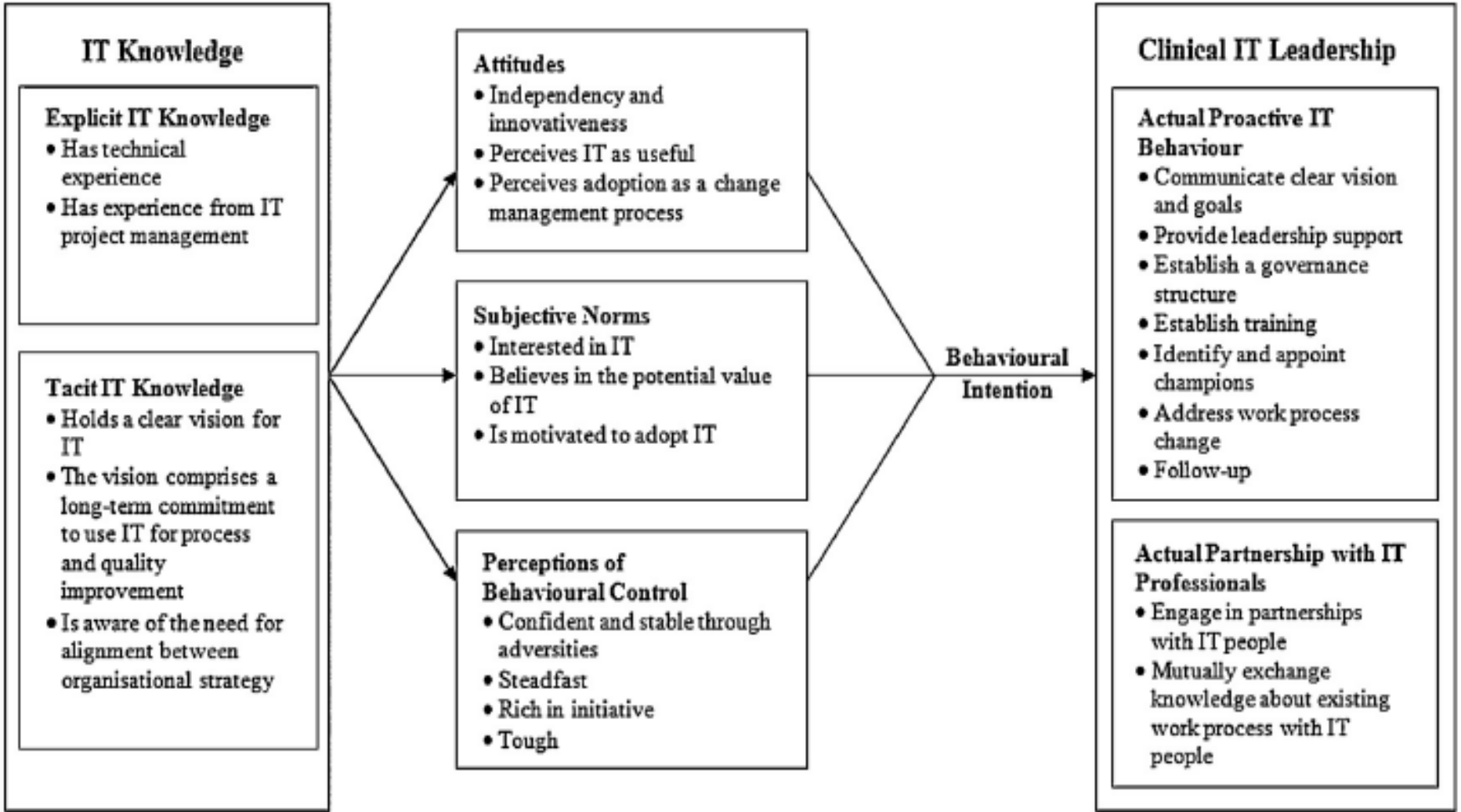
Ingebrigtsen T, Georgiou A, Clay-Williams R, Magrabi F, Hordern A, Prgomet M, Li J, Westbrook J, Braithwaite J. The impact of clinical leadership on health information technology adoption: systematic review. *Int J Med Inform*. 2014 Jun;83(6):393-405.



Other important informatics papers that did not meet our criteria

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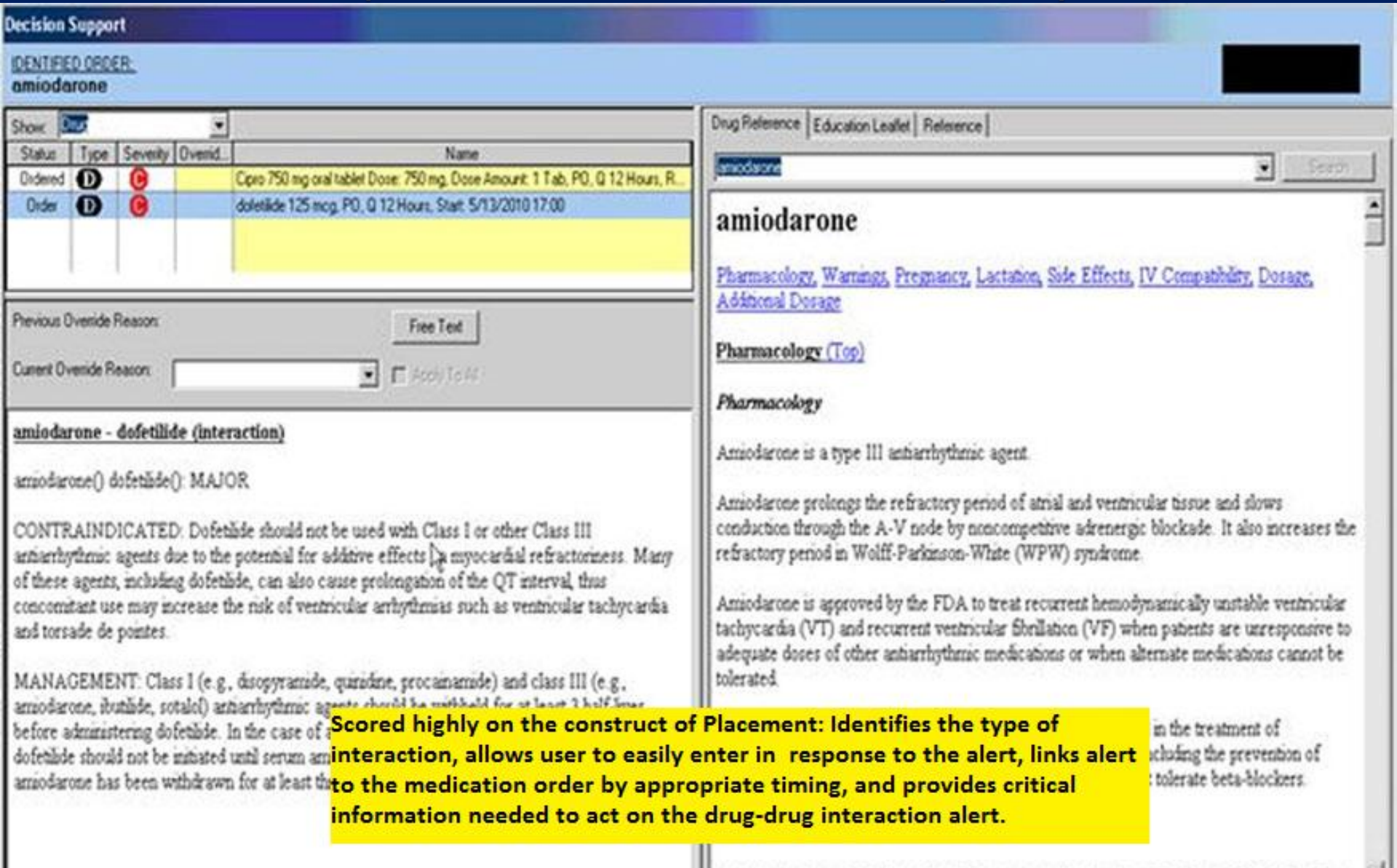
Phansalkar S, Zachariah M, Seidling HM, Mendes C, Volk L, Bates DW. (2014). Evaluation of medication alerts in electronic health records for compliance with human factors principles. *J Am Med*



Scored highly on the construct of Placement: Identifies the type of interaction, allows user to easily enter in response to the alert, links alert to the medication order by appropriate timing, and provides critical information needed to act on the drug-drug interaction alert.

Summary

- 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.

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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

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Summary: Nursing Informatics Research Gaps (Methods)

- Methods gap: Evaluation/comparative effectiveness of health IT interventions.
- Measurement gap:
  - "Relevant" patient reported outcomes
  - Metrics to support generalizability
    - Process metrics (e.g., Documentation efficiency)
    - RE-AIM Framework

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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?

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Clinical Documentation

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ehealth surveillance

2. Timpka T, Spreco A, Dahlström Ö, Eriksson O, Gursky E, Ekberg J, Blomqvist E, Strömgren M, Karlsson D, Eriksson H, Nyce J, Hinkula J, Holm E. (2014). Performance of eHealth data sources in local influenza surveillance: a 5-year open cohort study. J Med Internet Res. 16(4):e116.

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Mobile health

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Other Important Papers That Did Not Meet Our Criteria

34. Phansalkar S, Zachariah M, Seidling HM, Mendes C, Volk L, Bates DW. (2014). Evaluation of medication alerts in electronic health records for compliance with human factors principles. J Am Med Inform Assoc. Oct;21(e2):e332-40.
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Questions?

Thank You!

sacollins@partners.org

pdykes@partners.org

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