

NENIC Year in Review

Spring 2016 – Winter 2017

May 12, 2017

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Conflict of Interest

Kathleen Donaher-Keough and Andrew Phillips

Have no real or apparent conflicts of interest to report.

Learning Objectives

- Evaluate themes that impact nursing informatics.
- Identify gaps in nursing informatics research.
- Generate logical next steps in advancing nursing informatics research.

Methods – Scoping Study

- Arksey and O'Malley¹
 - Step 1 – Identify the Research Question
 - Step 2 – Identify Relevant Studies
 - Step 3 – Study Selection (Iterative process which can change over time)
 - Step 4 – Charting the Data
 - Step 5 – Collating, summarizing, and reporting the results
 - Step 6 – Consultation – This is you guys

¹Arksey, H., & O'Malley, L. (2005). Scoping studies: towards a methodological framework. *International journal of social research methodology*, 8(1), 19-32.

Step 1: Research Question

- What trends and themes emerge from a survey of the published literature in the area of nursing informatics during the past year
- Make meaning of current and past themes – historical context.

Step 2: Identify Relevant Studies

- Search Strategy
 - Databases: PubMed and CINAHL
 - Search terms
 - (“nurse” or “nursing”) AND “informatics”) OR “nursing informatics”
 - Publication Dates 3/1/2016 – 2/28/2017
 - New issue – “roaming publication dates” due to publication process (accepted publications based on date noted in search)

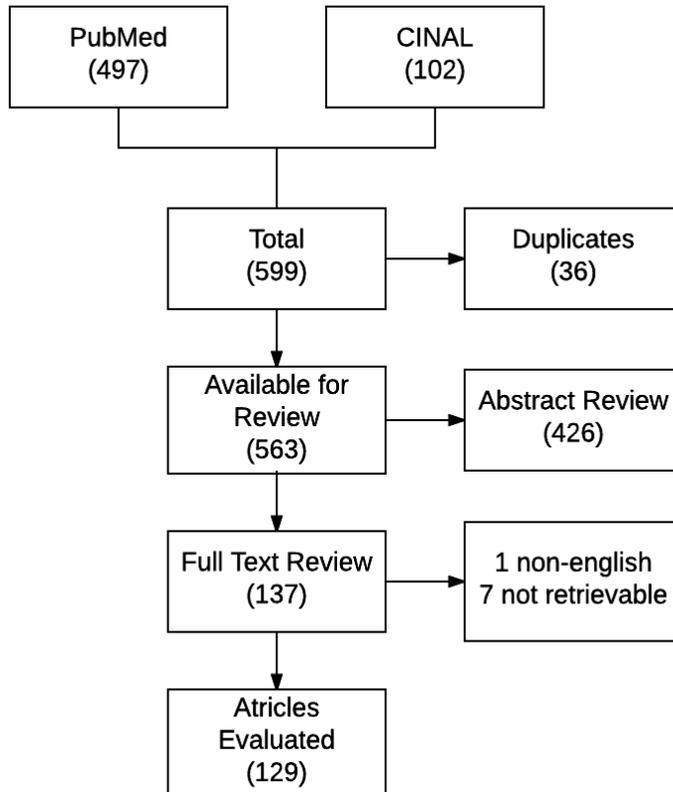
Step 3: Study Selection

Inclusion and Exclusion Criteria

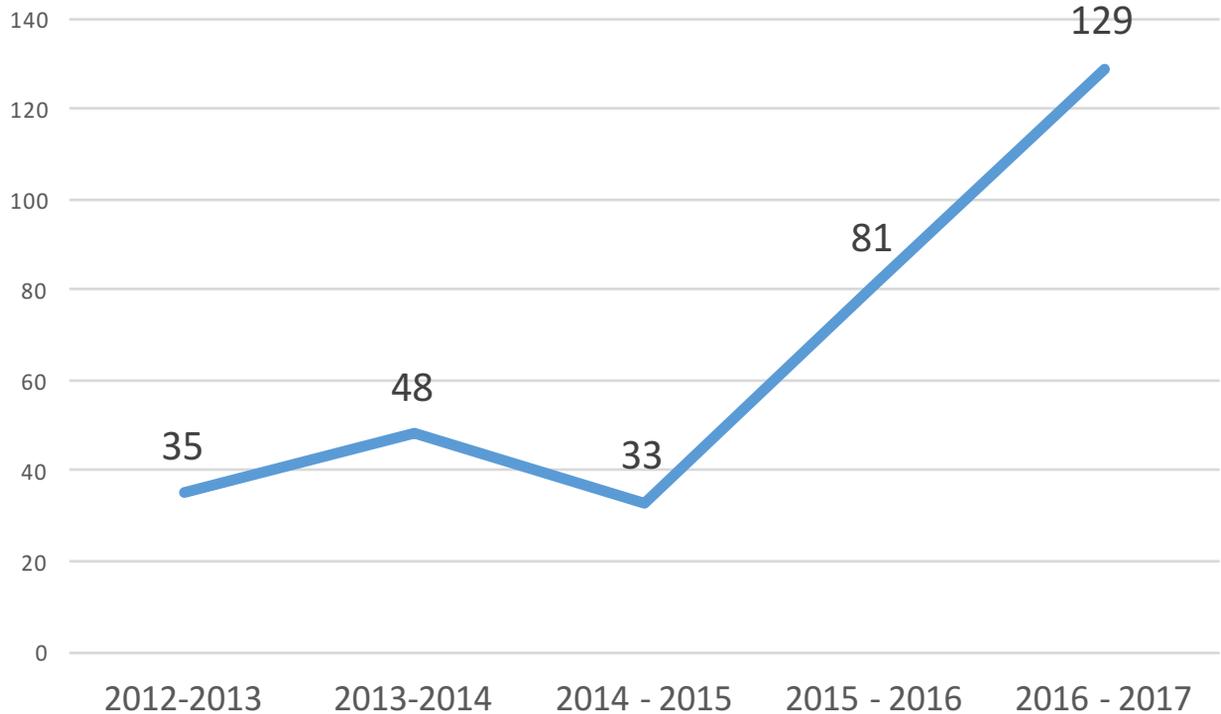
- Inclusion criteria: Research, contributes to nursing informatics knowledge base, prototype development and testing, clinical care delivery focus; informatics
- Exclusions: Articles that focused on informatics education programs, nursing education, nursing students, *competencies, simulation*

Re-evaluate for future?

Search Results (flow chart)



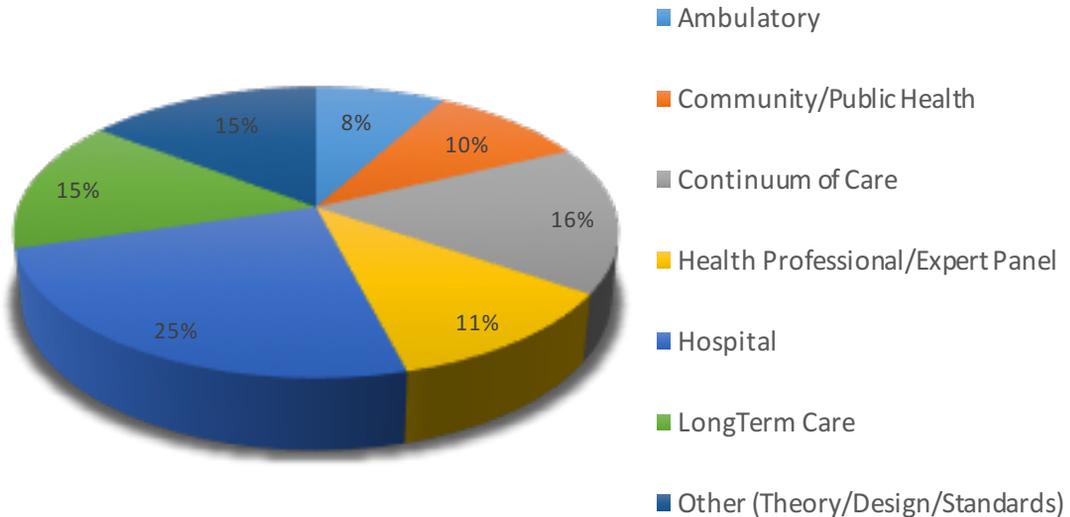
Articles Included in Evaluation



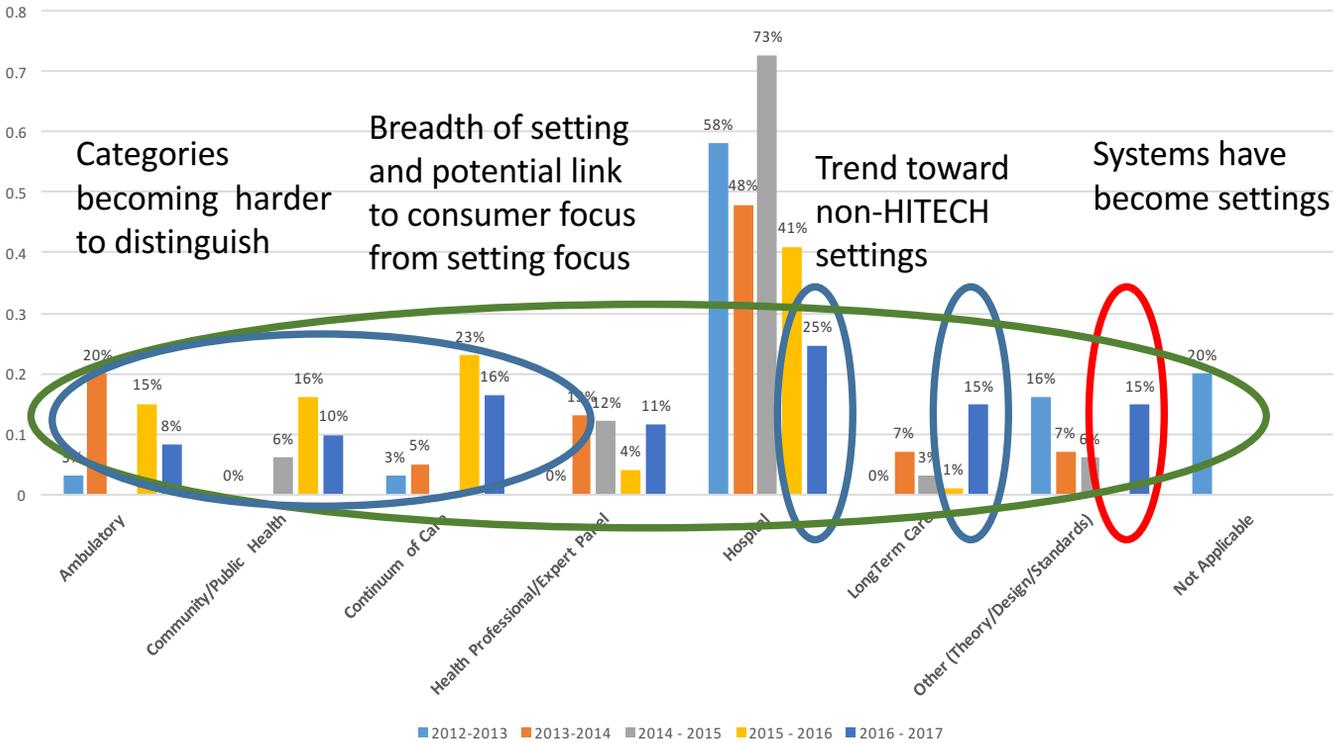
NENIC Publications

- Show of hands??

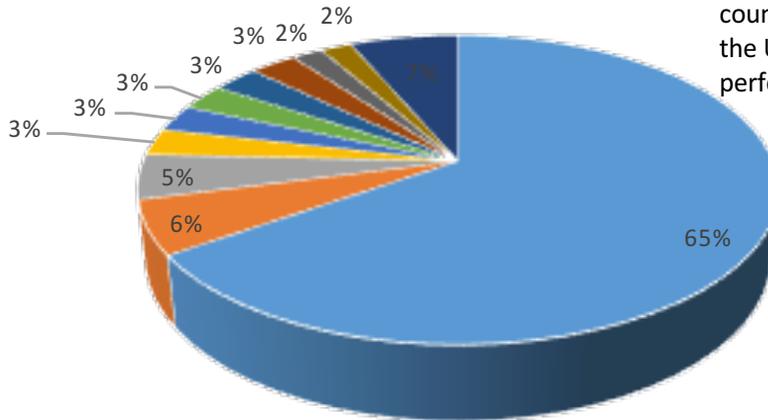
Research by Setting (%) 2016-2017



Research Setting (%)
By Year



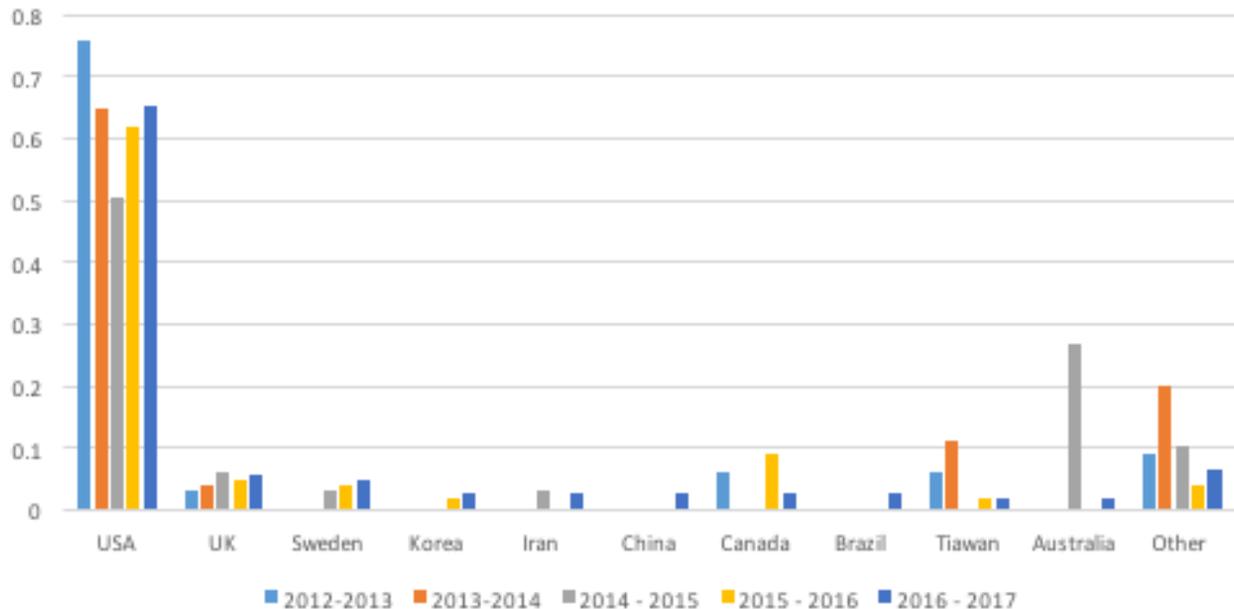
By Country (%) 2016-2017



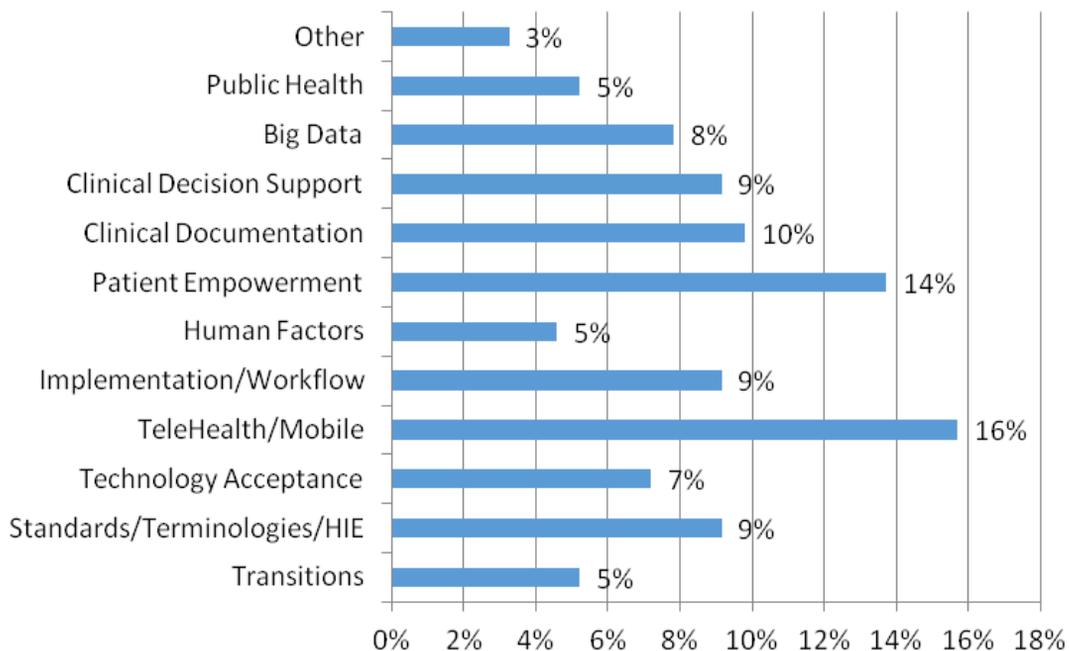
Note: While first author country is noted here, many of the US authored studies were performed in other countries.

■ USA ■ UK ■ Sweden ■ Korea ■ Iran ■ China ■ Canada ■ Brazil ■ Tiawan ■ Australia ■ Other

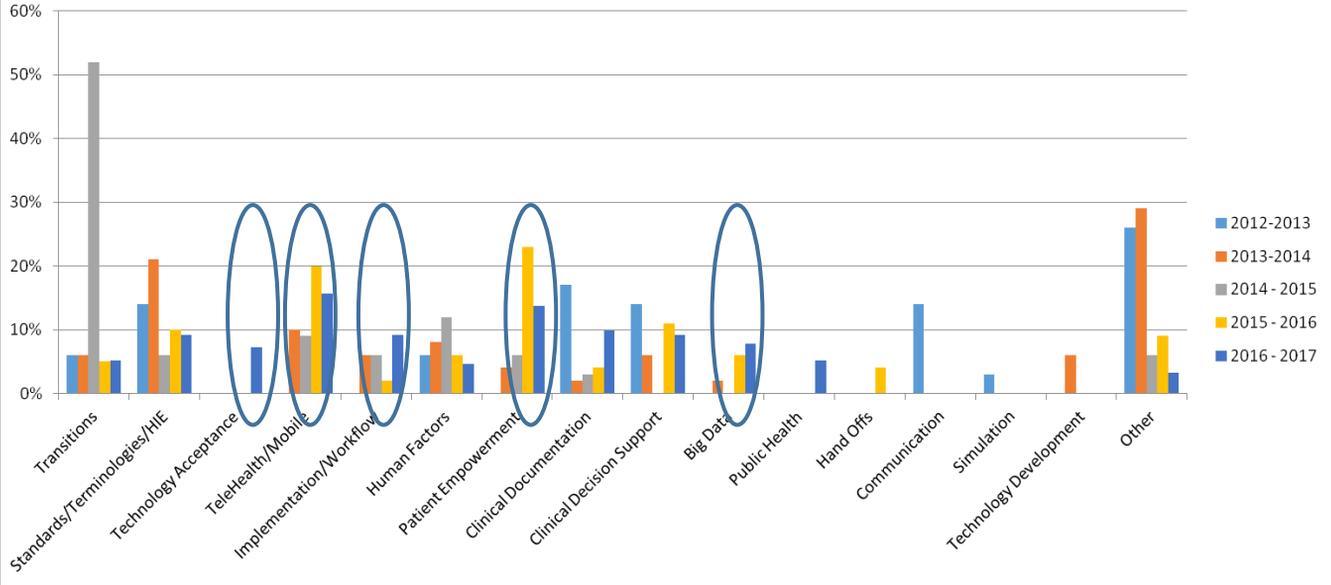
Research Country (%) By Year



Topic (%)



Topic (%) by Year



Step 5 – Collating, summarizing, and reporting the results

Themes Identified

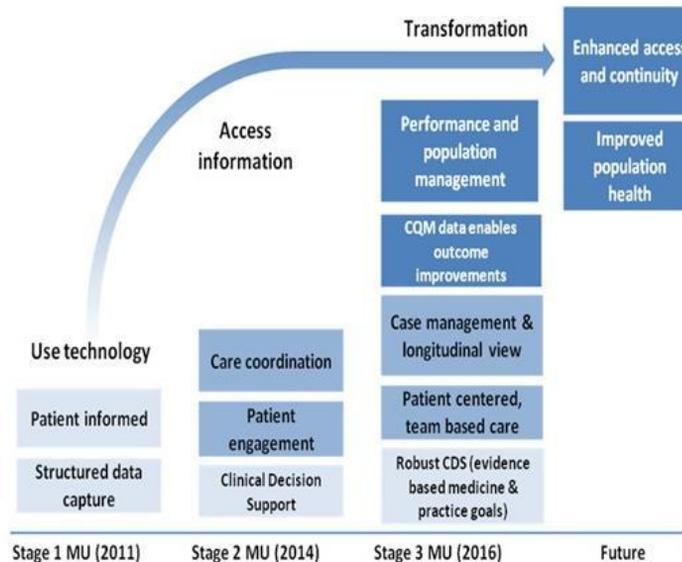
1. Potential for direct consumer involvement and engagement
2. Process/Workflow/Outcomes/QI (*Deep Structure*)
Patient/consumer involvement/ empowerment
3. Public Health and Reporting (learning health system)
4. Transitions of Care
5. Big Data continues (patient as population)
Data Mining
Public and Population Health
Precision nursing
6. Cost effectiveness, identification of value, QI (Patient as customer)
7. Cultural Sensitivity (patient)
8. Technology Acceptance, usability (patient/consumer), competencies
9. Care Coordination, Interprofessional Care, Collaboration, Shared Decision Making (patient/consumer now included)
10. Movement to new settings of care – LTC, Skilled Nursing, Home Health, School Health, Smart Home (patient)
11. Reevaluation of Existing IT

Highlighted Publications

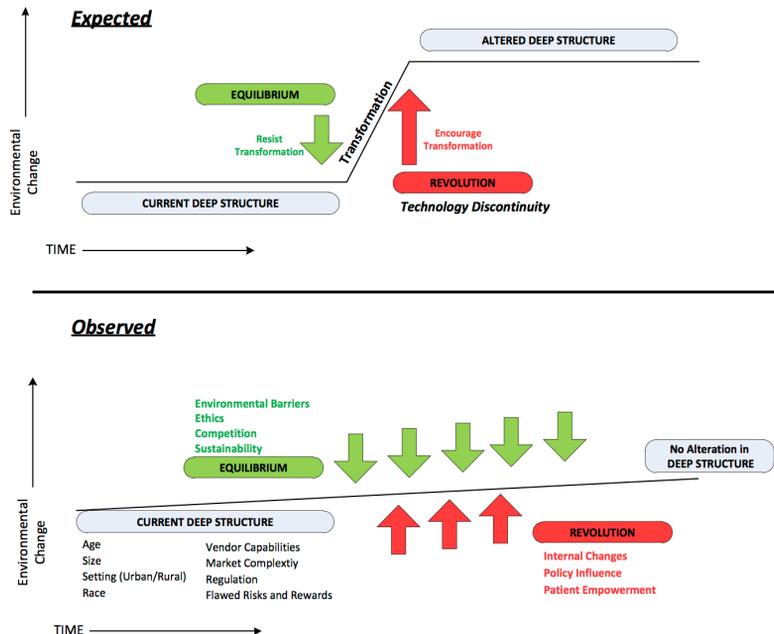
Spring 2016 – Winter 2017

Changing the “deep structure” of the delivery system to capture the patient/persons story, support engagement, and coordinate care.

Policy framework was evident in the literature...



...evidence of need for deep structural change and consumer involvement.



Khokhar, A., Lodhi, M. K., Yao, Y., Ansari, R., Keenan, G., & Wilkie, D. J. (2017). Framework for mining and analysis of standardized nursing care plan data. *Western Journal of Nursing Research*, 39(1), 20-41.

Topic: Structural change to capture the story, support engagement, and coordinate care.

Purpose: Demonstrate knowledge discovery with broad applicability - for patients, clinicians and institutions – need for common framework for use and re-use of existing EHR data.

Methods: Applies “big data analytics” to a data repository of hospital generated nursing care plans(>300,000 care plans from HANDS dataset for ~35,000 patients) using Knowledge Discovery Framework

Findings: Confirms benefits of standards in knowledge discovery from multiple perspectives. Consumer choice; nursing can “see” link between intervention and improved outcomes over time.

Implications: Capturing a multidimensional story to affect outcomes.

Matney, S. A., Dolin, G., Buhl, L., & Sheide, A. (2016). Communicating nursing care using the health level seven consolidated clinical document architecture release 2 care plan. *Computers, Informatics, Nursing : CIN*, 34(3), 128-136.

Topic: Structural change to capture the story, support engagement, and coordinate care.

Purpose: Can we use existing data standards supported by ONC and others to effectively communicate nursing care plans across systems and settings as part of the “patient story.”

Methods: Examination of existing methodologies with a “use case”

Findings: Demonstrates the successful mapping of the nursing process to SNOMED and LOINC using HL 7 C-CDA - interoperability

Implications: Capturing patient story is not easy, but it is possible using existing standard ontologies

Perri-Moore, S., Kapsandoy, S., Doyon, K., Hill, B., Archer, M., Shane-McWhorter, L., et al. (2016). Automated alerts and reminders targeting patients: A review of the literature. *Patient Education and Counseling*, 99(6), 953-959.

Topic: Structural change to capture the story, support engagement, and coordinate care.

Purpose: Investigation into efficacy of alerts and reminders to consumer to support Patient Self-Management

Methods: Review of the literature

Findings: Automated reminders were shown to “work” including appointment, adherence and behavioral reminders. Evidence supported by 23 out of 51 studies were RCTs

Implications: Economic evaluation limited across studies; environment influences success, but success goes across gender, age, and socioeconomic status. *Economic Value must be demonstrated to inform public policy.*

Samal, L., Dykes, P. C., Greenberg, J. O., Hasan, O., Venkatesh, A. K., Volk, L. A., et al. (2016). Care coordination gaps due to lack of interoperability in the united states: A qualitative study and literature review. *BMC Health Services Research*, 16, 143-016-1373-y.

Topic: Structural change to capture the story, support engagement, and coordinate care.

Purpose: To evaluate the extent HIT is “involved when transitioning patients between emergency departments, acute care hospitals, skilled nursing facilities, and home health agencies in settings”

Methods: Expert Panel and Literature Review

Findings: Identified gaps from a lack of interoperability and link to community resources

Implications: Unrealized Potential of HIT in coordination of care, but also found that not all processes should be automated

Table 6 Interpretation of gaps between current capability of HIT and future potential for HIT to support care coordination

	L	IL
AHRQ care coordination activities	Current capability of HIT	Future potential for HIT*
Establish accountability or negotiate responsibility	0	Low
Communicate		
Interpersonal communication	+	Low
Information transfer	0	High
Facilitate transitions	0	Moderate
Assess needs and goals	++	Moderate
Create a proactive plan of care	0	Moderate
Monitor, follow up, and respond to change	+	High
Support self-management goals	0	High
Link to community resources	+	High
Align resources with patient and population needs	++	High

*Low potential indicates that HIT has a limited role. Moderate potential indicates that HIT could be an instrumental support for people and processes. High potential indicates that the care coordination activity could be almost completely automated with oversight by clinicians

Technology acceptance and inclusion of patient and family

Holden, R. J., Asan, O., Wozniak, E. M., Flynn, K. E., & Scanlon, M. C. (2016). Nurses' perceptions, acceptance, and use of a novel in-room pediatric ICU technology: Testing an expanded technology acceptance model. *BMC Medical Informatics and Decision Making*, 16(1), 145.

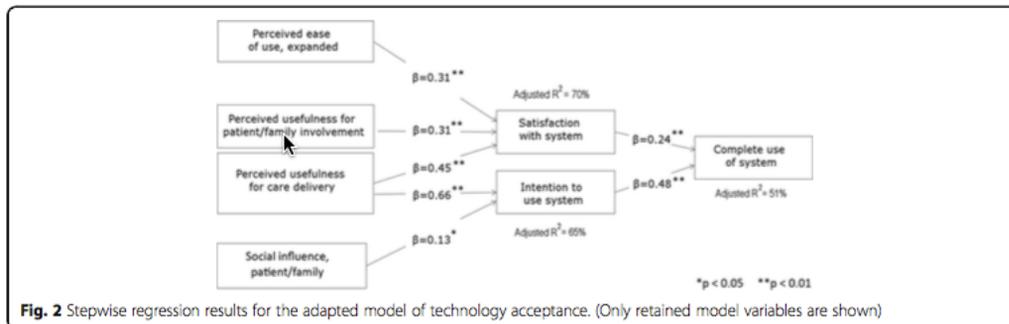
Topic – Technology acceptance by nursing. Adaption of existing acceptance models to nursing.

Purpose – Tests an adapted TAM which includes learnability, usefulness for patient/family engagement, and social influence from institution, patients and families and others.

Methods – Cross sectional survey within a Pediatric ICU (new EPIC System based Interactive Monitor) and stepwise linear regression for model fit.

Findings – Perceived usefulness for patient caring strongest predictor of intention to use and satisfaction. Perceived usefulness for patient/family involvement also found to be significant and social influence, while weak, also significant.

Implications – technology acceptance models with greater healthcare focus needed (patient caring) and role of patient and family in satisfaction and intention to use.



Process Improvement and Quality Improvement

Kricke, G. S., Carson, M. B., Lee, Y. J., Benacka, C., Mutharasan, R. K., Ahmad, F. S., et al. (2016). Leveraging electronic health record documentation for failure mode and effects analysis team identification. *Journal of the American Medical Informatics Association : JAMIA*,

Topic – Process Improvement, Quality Improvement, Care Coordination

Purpose – Can the secondary use of EHR data be used to enhance accuracy or process understanding using Failure Mode Effects Analysis (FMEA) method and guide quality improvement.

Methods – Using FMEA practices/protocols, hand-drawn process maps were developed by interdisciplinary team of expert clinicians. Map included activities who completed them.

Findings – 35% of activities were completed by unexpected providers including providers not part of the documented workflow

Implications – Access to greater data provided by EHR and other electronic sources has the ability to greatly improve process documentation accuracy – first step for improving quality. Also highlighted the true interdisciplinary nature of patient care.

Figure 2: Redrawn process map of discharge-related activities on an inpatient cardiology unit with diagnostic characteristics indicated, as determined by data extracted from the institution's Enterprise Data Warehouse. New activities not identified in the process map are noted in yellow. Highlighted diagnostic measures indicate where observation differs from expectation.

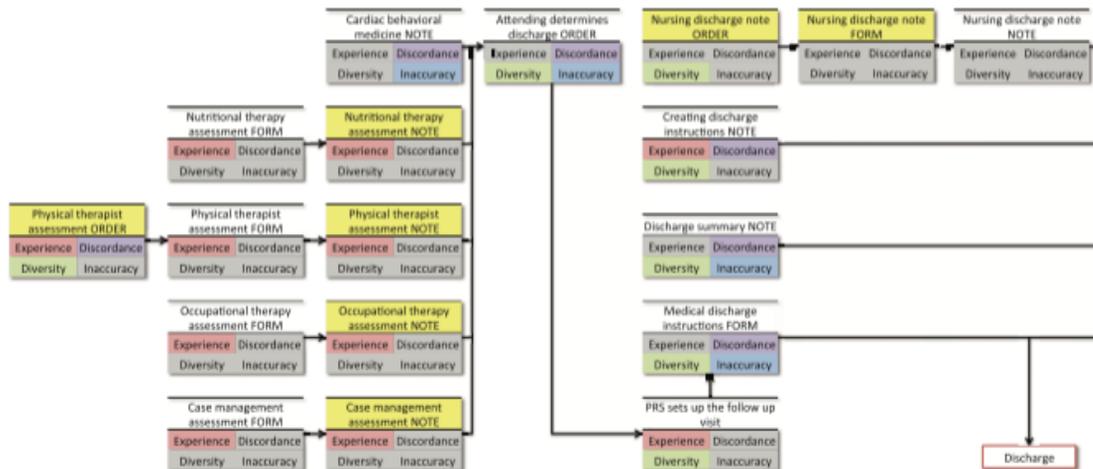


Table 2: Experience, Diversity, Discordance, and Inaccuracy Diagnostics by Activity Type

Activity Type	EHR Action Type	Freq.	Count of Providers	Experience	Diversity	Discordance (%)	Inaccuracy
High Discrepancy							
Medical discharge instructions	Form	2076	147	No	9	100	Yes
Cardiac behavioral medicine	Note	292	4	No	2	100	Yes
Discharge determined	Order	4344	328	No	10	86	Yes
Discharge summary	Note	2191	176	No	10	64	Yes
Creating discharge instructions	Note	2695	139	Yes	8	63	No
Physical therapist assessment	Order	741	180	Yes	9	61	No
Follow-up visit scheduled	Order	6260	165	Yes	10	40	No
Low Discrepancy							
Nursing discharge note	Order	2129	158	No	5	1	No
	Form	2143	159	No	4	1	No
	Note	4294	157	No	4	1	No
Occupational therapy assessment	Form	168	16	No	1	0	No
	Note	1400	23	Yes	1	0	No
Physical therapist assessment	Form	371	22	Yes	1	0	No
	Note	2895	28	Yes	1	0	No
Nutritional therapy assessment	Form	889	16	Yes	1	0	No
	Note	650	14	Yes	1	0	No
Case management assessment	Form	501	34	Yes	1	0	No
	Note	900	30	Yes	1	0	No

Wild Card – Reevaluation of “Old” Technology – The pager

Kummerow Broman, K., Kensinger, C., Phillips, C., Fesseha, B., Fill, M. M., Borges, N., et al. (2016). Characterizing the clamor: An in-depth analysis of inpatient paging communication. *Academic Medicine : Journal of the Association of American Medical Colleges*, 91(7), 1015-1021.

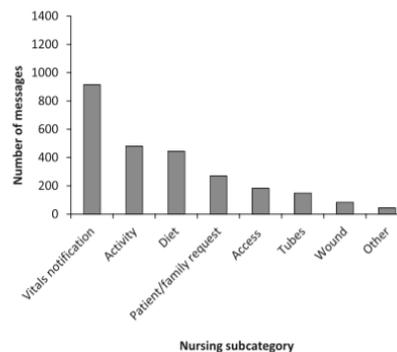
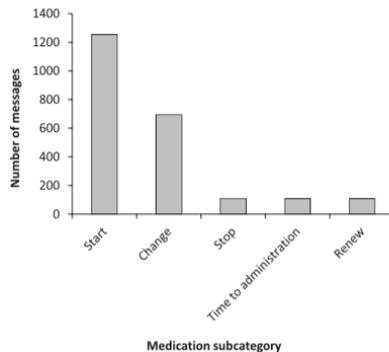
Topic: Wild Care

Purpose: What is the quality of paging data and does it contribute to communication failures.

Methods: Retrospective analysis of paging data at large US health system

Findings: Large number of non-critical messaging “clamor” (estimated 2 – 8 pages per hour/physician)

Implications: Tough to move away from old technologies which require reevaluation as part of process. Creates a significant amount of duplicative information.



Step 6 – Consultation

Feedback and Professional Input...