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Building HIT that Supports Continuity of Care at the Point of Delivery

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Continuity at Point of Care

- Definition:

  the high quality coordination and delivery of care that results when communication across clinician and setting transitions is efficient and continuously builds on a shared understanding of past care and the “dynamic team’s” * goals for patient outcomes.

• Team membership includes the patient and health clinicians who provide care. Membership naturally expands and contracts across time and settings

General Goal for Today's Talk

- To share my team's science and offer you language to advance VA as the premier "public health care option" that achieves continuity and high quality care precisely because of the administrative, HIT, and research infrastructures. The VA system is a compelling example of how full interoperability - done right – can produce high quality care that is cost effective.

Specific Objectives for Today's Talk

- Examine why many currently implemented EHRs do not improve continuity of care (COC)
- Describe important items to consider in developing tools to promote COC
- Present findings from HANDS and its research regarding the use of HIT to promote COC

Poll: Please tell me about you!!

Select 1 answer from each category:

- **Health Discipline**
  - Nursing
  - Medicine
  - Other
- **Degree**
  - Bachelors
  - Masters
  - Doctorate
  - Other
- **Primary Role**
  - Staff
  - Administration
  - Research
- **Major job focus is informatics**
  - Yes
  - No

ARRA* Feb.17.2009

Includes Health Information Technology for Economic & Clinical Health (HITECH) Act

1. Set forth a plan to advance use of HIT to improve care quality serve as a foundation for health care reform
2. Establish Office of National Coordinator **(ONC)** within **HHS**
3. Authorize **CMS** to administer incentives for **"meaningful use"** of EHRs

***ARRA -** American Recovery and Reinvestment Act

ONC

- Federal entity charged with coordinating the effort to implement an HIT infrastructure for use and exchange of health information in electronic format that ensures “meaningful use” of EHRs
- Advised by
  1. Health IT Policy Committee
  2. Health IT Standards Committee

Health IT Policy Committee

- Meaningful Use Health Outcomes Policy Priorities 8.20.2009
  1. **Improve quality, safety, and reduce health disparities**
  2. Engage patients and families
  3. **Improve care coordination**
  4. Improve population and public health
  5. Ensure adequate security & privacy

Current EHRs & Continuity

- Many existing EHR systems do not adequately consider that
  - Patients typically access a number of health care settings for their care
  - The main purpose of documentation is to efficiently support team decision making and communication across time and space
  - Data collected by clinicians that does not bring immediate value at the point of care has reduced reliability & validity

Current EHRs & Continuity 2

- Many existing EHR systems do not adequately consider that
  - Each extra "click" needed to locate or add information is a burden to the clinician
  - Information that is not consistently represented in documentation and communication produces errors
  - Systems need to be regularly updated to accommodate new knowledge but this is costly if done organization by organization

Current EHRs & Continuity 3

So too, documentation

- meets the organization's needs not the clinician's needs for concise, high quality, and easily accessible information to support PATIENT CARE
- is not designed to support nurses in their role as front line coordinators, implementers, and monitors of the interdisciplinary team's care
- is frequently recorded on "scraps" carried in the clinician's pocket and shared at the handoff but often NOTentered into the patient's record

Current EHRs & Continuity 4

The Plan of Care should help to coordinate the interdisciplinary team's communication about care but DOESN'T because:

- the format is cumbersome and variable
- it is hard to keep current
- accountability is not delineated
- there is no good tool to support interdisciplinary work flow (each discipline does its "own thing")

[redacted]

Nursing Care Plan

[redacted]

Patient Problem(s)	Plan: Mutually Agreed on with Patient/Family Considering Personal, Cultural, Spiritual and [redacted]	Evaluation	Daily Review Date/Initials
Pt./Family Goals for Hospitalization: ____ Date:	[illegible]	☐ Resolved Date: ☐ Ongoing at Discharge	[illegible]
Pt./Family Education Needs ____ Date:	☐ See PCIS for Patient Education ☐ See Patient Education Record ☐ See Critical Pathway Factors affecting learning ☐ None ☐ Trouble reading ☐ Cognitive ☐ Physical ☐ Other ☐ Culture/religion ☐ Language	☐ Resolved Date: ☐ Ongoing at Discharge	
☐ Critical Pathway: ____ Date:	☐ See Pathway for Plan and Progress ☐ See Pathway for Variances	☐ Resolved Date: ☐ Ongoing at Discharge	
☐ NMP or SOC ____ Date:	☐ See NMP or SOC for interventions Patient specific/individualized interventions:	☐ Resolved Date: ☐ Ongoing at Discharge	
☐ Fall Risk Reduction: Date: ____ N/A	☐ Implement Fall Risk Reduction Plan per Morse Scale: Medicine greater than 45, Surgery greater than 70: inform patient/family of increased risk of falls, [illegible], [illegible], assist [illegible] for ambulation, assist with elimination at regular intervals. Instruct patient to request assistance before getting out of bed. ☐ Utilize Assistive Devices (Bed) ____ ☐ Bedside Commode ☐ Request pharmacist review of medications for adverse effects ☐ Relocate patient closer to nursing station [illegible] ☐ Sundowner phenomenon – monitor closely at night ☐ DC Foley Catheter ASAP	☐ Resolved Date: ☐ Ongoing at Discharge	
☐ Alt. Skin Integrity: ☐ Potential ☐ Actual Related to: ____ Date: ____ N/A	☐ Implement NMP/SOC for Braden Scale 17 or less ☐ Utilize pressure redistribution measures including repositioning schedule ☐ Manage moisture: __ moisturize dry skin __ peri care __ skin care __ [illegible] ☐ Minimize pressure/friction/shear: __ heels suspended off bed __ HOB not elevated more than 30 degrees __ inspect bony prominences __ chair cushion __ reposition every 2 hrs __ inspect skin __ up in chair no more than 1 hr at a time ☐ Enc activity/mobility: __ [illegible] __ [illegible] movement/activity/ROM __ passive ROM __ [illegible] ☐ Consult to nutrition ☐ Wound care consult (according to decision grid) [illegible] ☐ Wound care instructions: ____ ☐ [illegible] see Wound Care flow sheet	☐ Resolved Date: ☐ Ongoing at Discharge	

[illegible]

View/Print Plan of Care History Print Close

Patient Name : Johnson Jack
DOB : 1/1/1975
POC Date : 6/8/2008
Shift : 11a - 11p (8:14P)
Room # : 1000
MR# : **433647872a** **Gender** : Male

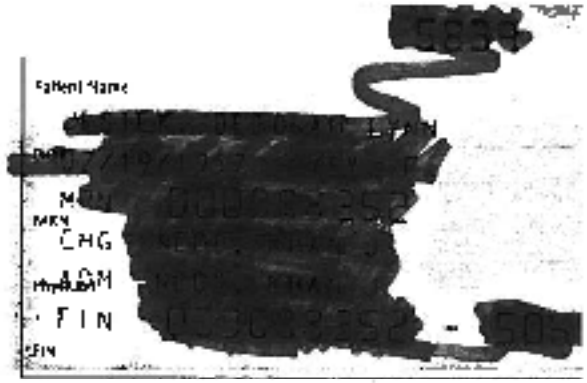
Medical DX : MI
Allergies : NKA
Code Status : Full
Physician : Dr. Mice
Other :

	Current Rating	Expected Rating	NIC Tally	Label Change Status
Decreased Cardiac Output				A ▶ A
Cardiac Pump Effectiveness(2nd q)	3	(3)		A ▶ A
Cardiac Care: Acute			1	A ▶ A
~~(R) Fluid Balance~~	3	(5)		A ▶ R
~~(R) Hypervolemia Management~~			1	A ▶ R
Activity Tolerance *goal 2 halls*	1	(3)		A ▶ A
Exercise Therapy: Ambulation			1	A ▶ A
Acute Pain				A ▶ A
Pain Control	4	(4)		A ▶ A
Active Listening			1	A ▶ A
Documentation			1	A ▶ A
Pain Management			1	A ▶ A
Environmental Management: Comfort			1	A ▶ A

NANDA	A - Active
NOC	I - InActive
NIC	R - Resolved

Nurse's Signature _____

[redacted]



ADULT INTERDISCIPLINARY PLAN OF CARE

START/ INIT	STOP/ INIT	PROBLEMS/COMPLICATIONS (NANDA)	OUTCOMES (NOC)	INTERVENTIONS/ACTIVITIES (NIC)
		PAIN ☐ **Acute Pain R/T** • _____ • _____ • _____ ☐ **Chronic Pain R/T** • _____ • _____ • _____	Pain Level (2102) • Reported pain • Frequency of pain • Facial expressions of pain • Protective body positions • Restlessness • Change in HR, RR, BP **Reported or Demonstrated Pain** • Severe • Substantial • Moderate • Slight • None	Pain Management (1400) • Utilize an appropriate assessment tool _____ • Minimize precipitating factors that contribute to the pain response (e.g. lack of knowledge, fear, anxiety, fatigue) • Identify pharmacologic and nonpharmacologic therapies (e.g. positioning, diversion) that eliminate or minimize pain _____ • Use pain control measures before pain becomes severe and prior to activity • Consider around the clock pain medication administration • _____ • _____
		ACTIVITY ☐ **Self Care Deficit R/T** • Fatigue, confusion, pain • _____ • _____ ☐ **Activity Intolerance R/T** • Cardiac, respiratory, circulatory endocrine, metabolic disorder or chronic disease • _____ • _____	Self-Care: Activities of Daily Living (ADL) (0300) • Eating • Dressing • Hygiene • Toileting • Ambulation **Perform Activities of Daily Living** • Dependent, does not participate • Requires assistive person and device • Requires assistive person • Independent with assistive device • Completely independent	Self-Care Assistance (1800) • Determine patient's need for assistance _____ • Determine patient's need for adaptive devices for personal hygiene, dressing, grooming, toileting, and eating _____ • Encourage patient to perform normal activities of daily living to level of ability _____ • Initiate Occupational/Physical Therapy consult _____ • _____ Energy Management (0180) • Determine patient's physical limitations • Determine causes of fatigue (treatment/pain/medications) _____ • Determine patient's and significant other's perception of causes of fatigue _____ • Encourage and plan for alternate rest and activity periods • Promote bedrest/ activity limitation (e.g. increase number of rest periods) • _____
		NUTRITION **Imbalanced Nutrition: Less than body requirements R/T** • Increased caloric needs • Dysphagia • Decreased absorption of nutrients • Inappropriate nutrient intake • _____ • _____	Nutrition Status: Food & Fluid Intake (1008) • Oral food intake • Tube feeding intake • TPN/PPN • Fluid intake • Weight **Food/Fluid Taken into the Body over 24*** • Not adequate • Slightly adequate • Moderately adequate • Substantially adequate • Totally adequate	Nutrition Monitoring (1160) • Monitor for nausea and vomiting • Monitor albumin, total protein, hemoglobin, and hematocrit • Initiate Dietician Consult, if less than 50% intake for greater than 3 days Nutrition Management (1100) • Ascertain patient's food preferences _____ • Determine in collaboration with dietician, as appropriate, number of calories and types of nutrients needed to meet nutrition requirement • _____ • _____ • _____

What do EHRs need?

1. To be interoperable on three levels (technical, semantic, and process) so
    1. Continuity of care is supported through data and information that
        1. is gathered in the same way
        2. Is always available and easily accessible
        3. is in a consistent format
        4. Retains the same meaning for those who use it
    2. System can be cost effectively maintained and sustained over time
    3. System can automatically generate new evidence from the data collected and deliver it immediately back to the point of care

What do EHRs need? 2

Compelling scientific evidence that the functionality, features, and content enables clinicians to give COC that is the highest of quality across time and settings

- Need an accurate "Big Picture" of care that is regularly updated and used to guide the transfer of information at handoffs
  - that has shared meaning
  - directed at achieving the team's goals for care
- Need to fully test all new features using multiple methods under real time conditions

Interoperability Defined

Concept allows us to communicate about how well systems interact with one another about a specified domain of information on 3 interconnected levels

1. Technical-**TI**-conveyance of information
2. Semantic-**SI**-persistence of meaning
3. Process-**PI**-integration into workflow[1]

[1]*HL7 EHR Interoperability Work Group. (February 7,2007). Coming to terms: Scoping interoperability for health care*

Technical Interoperability (TI)

Example: Strong versus Weak

Conveyance of "Big Picture" information across EHRs:

- **Strong TI:** the database architectures and software programs for storing, retrieving and displaying elements needed to create the the "Big Picture" are the same for multiple systems (VA)

- **Weak TI:** the database architectures and software programs for storing, retrieving, and displaying data elements for the "Big Picture" differ significantly across multiple systems (Private)

Semantic Interoperability (SI)

Example: Strong versus Weak

Persistence of Meaning of the BIG PICTURE component of EHR

Strong SI: the content is represented in same way (e.g. same taxonomies are used to represent the concepts included in the BIG PICTURE with each concept having a single unique meaning) across EHRs (VA)

Weak SI: the content is represented in multiple ways within and across EHR systems (some narrative, variable use of taxonomic terms) (Private)

Process Interoperability (PI)

Examples: Strong versus Weak

The integration of The BIG PICTURE of care component of the EHR into work flow

Strong PI: rules pertaining to use of BIG PICTURE component are the same across systems (e.g., when to enter data, how, by whom, use in interdisciplinary and disciplinary handoffs)

Weak PI: rules pertaining to use of BIG PICTURE component vary by system.

Conclusions about IO

Thus, the GREATER the

- Technical Interoperability
- Semantic Interoperability
- Process interoperability

The GREATER the overall interoperability and likelihood that the information needed to promote the continuity and quality of care will transfer seamlessly across organizations/systems.

It will take a major overhaul of our laws and massive funding for the private sector to achieve interoperability comparable to the VA levels.

Questions & Answers

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HANDS "Big Picture" Component of the EHR

Poll: Please answer YES or NO about your familiarity with NANDAI, NOC, and NIC

I have at least some understanding of the following

1) **HANDS** Plan of Care Method
   YES NO

2) The **NANDAI** Nursing Diagnosis Classification
   YES NO

3) The **NOC** Nursing Outcome Classification
   YES NO

4) The **NIC** Nursing Intervention Classification
   YES NO

HANDS Method Defined

An electronically supported communication and care management system designed to promote **COC** at handoffs within and across systems:

- developed and refined through 10 + years of research
- provides 3 levels of interoperability; technical, semantic, and process

HANDS: Technical Features

Electronic tool

- Database architecture and software support the capture, storage, retrieval, and display of the data elements and their relationships to each other (e.g., diagnoses, outcomes, and interventions)
- Centrally deployed through ASP (Application Server Provider) mechanism
- HIPAA Compliant
- Connects to EHR through an HL7 admission discharge and transfer (ADT) feed
- Central data repository

HANDS: Semantic Features

- Utilizes complete **NANDAI, NOC, and NIC** taxonomies to represent the “Big Picture” of care and facilitates shared meaning of the clinical diagnoses, outcomes, and interventions

- **Content of training and competency assessment** designed to ensure “Big Picture” is properly represented and used by clinicians to guide SHARER handoff communication

HANDS: Process Features

- **Learn -** train the trainer model
  - 1/3 didactic - 2/3 independent on-line study
  - Champions 40 hr - Staff RNs 8 hr
- **Document** - an admission or update POC on each of RN's patients into HANDS (electronic tool)at every formal handoff
- **Communicate -** use POC to structure the "report/handoff" dialogue conversation (SHARER)

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HANDS

Findings: HIT Support for Safe Nursing Care

1 R01 HS015054-01- HHS PHS NIH AHRQ (2004-2008)

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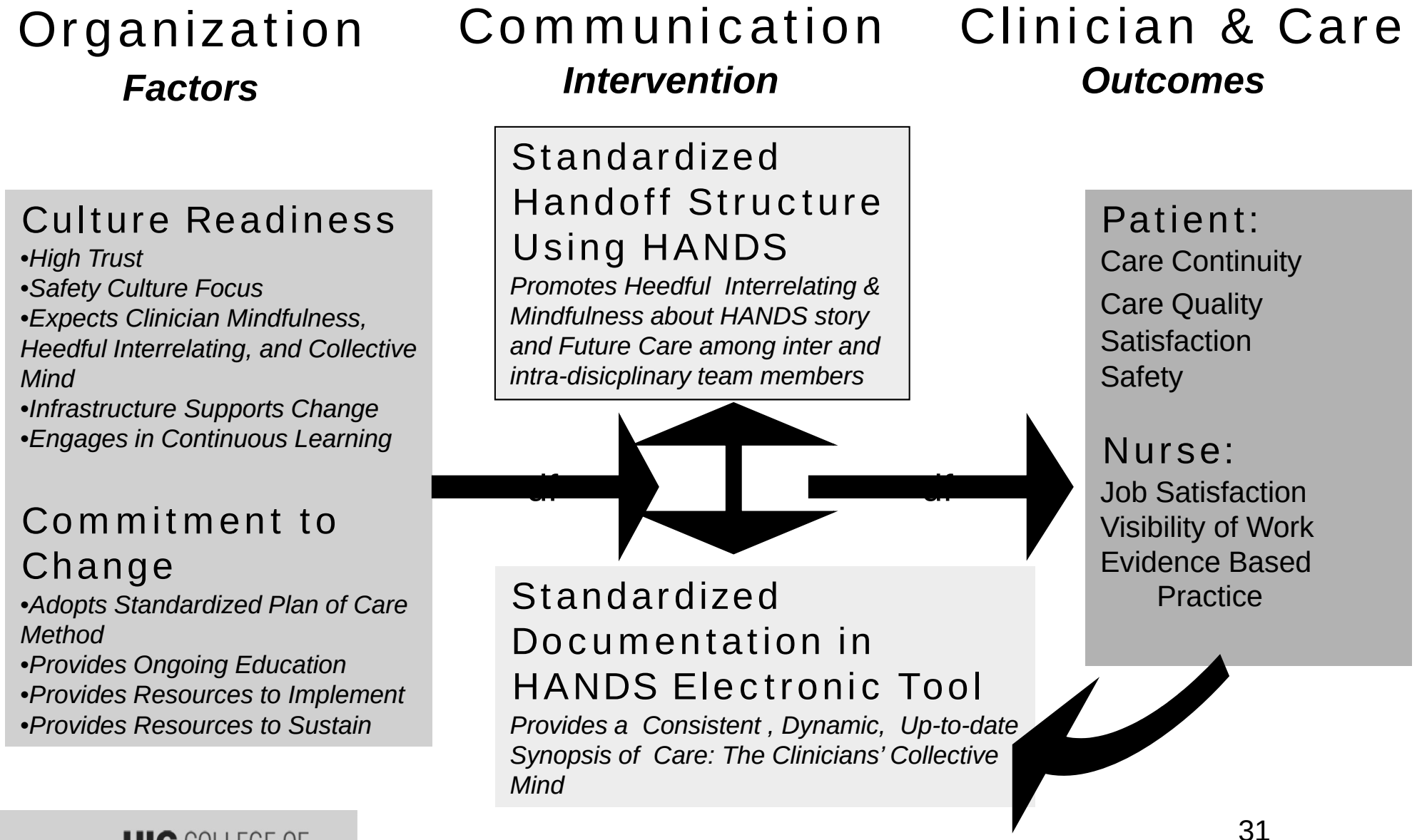
HANDS Research Based Conceptual Framework



Study Aim

To determine if a fully interoperable method of creating and maintaining a current "Big Picture" plan of care (POC) based on **High Reliability Organization** principles can be implemented in 8 diverse units located in 4 organizations (generalizability)

Sample = 8 "RIPE" Units

4 ORGANIZATIONS/ 8 UNITS/ 700 RNs

- 4 organizations
  - 1 university, 2 community, 1 small community
- 8 units - 4 - (24 mo) & 4 -(12 months)
  - Med-surg , neuro, thoracic, ICU, progressive care, older adult/stroke, acute care elderly

Sample

Unit	Time/study	Org	Beds	RNs
A	24m	a	32/48	60/71
B	24m	b	42	48
C	24m	c	22	32
D	24m	d	22	26
A2	12m	a	60/44	120/93
B2	12m	b	42	79
B3	12m	b	10	36
C2	12m	c	23	22

Multiple Methods Used

- Observations
- Surveys
- Interviews
- Meetings
- Focus Group
- IRR checks for outcome ratings
- Term meaning reliability checks
- Think-alouds of system usage
- Web analytics *(Analysis of transaction logs)*

Timeline & Measure Types

	Pre	Post 0m	Post 6m	Post 12m	Post 18m	Post 24m
General *Application Functionality* *Training, Competencies*	X X	X	X	X	X	X
Safety Culture *Observations, Errors* *Culture, Trust*	X X	X	X	X X	X	X X
Mindfulness *Thoughtful Plans of Care (POCs)*			X	X	X	X
Heedful Interrelating *Rich handoff dialogue with POCs*	X		X		X	X
Collective Mind *Shared understanding of POCs*			X	X	X	X

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Findings

Baseline Observations

- Shadowed 18 RNs (minimum of 2/unit) to observe 24 hour work flow relative to documentation and communication practices pre go-live

Findings

- Observed enormous variation in documentation and communication across individuals, units, & organizations
- RNs used from 5-11unique forms each shift
- RNs indicated plan of care brings little value
- RNs focused on details and rarely connected them to the big picture
- RNS WERE NOT ALWAYS CONSCIOUS OF THEIR BEHAVIOR

Application Functionality

- Conducted 7 think-alouds to identify interface barriers
- Asked questions about functionality in interviews, focus group, and informal phone meetings with champions

Findings:

- Identified problems with the software and made changes to improve usability
- RNs WERE NOT ALWAYS CONSCIOUS OF THE PROBLEMS THEY EXPERIENCED WITH THE SOFTWARE
- RNS suggestions for improving software frequently did not work

Mindfulness Measures
thoughtfulness in plan of care documentation

- Conducted web analytics on HANDS
  - RN patterns of use – types of NANDA, NOC, and NIC updates, features used, sequence of actions
  - NOC rating analyses

Findings:

  - RN entry patterns of changes across time indicated sustained mindfulness in updating plan (sig)
  - % patients meeting expected outcomes improved over time (sig)

Collective Mind Measures

evidence of shared meaning among users

- NANDA, NOC, NIC term meaning exercises
  - conducted at 3 points in time (n RNs =105)
- IRR NOC ratings 3 raters/NOC (n RNs =66)
- Compliance with entry of POCs at handoffs
  - Total POC entries for 8 units = 275,628

Findings

- .74 IRR for term meaning exercises
- IRR .95 for expected rating and .86 for current rating both within 1
- 78-91% compliance rate for POC entries

Heedful Interrelating Measures

consistency in use of handoff protocol

- Interviews (n=77 - 2 different time periods), focus group, regular phone meetings with champions (repeated across time), handoff observations final 6 mos of study (n=43)

Findings

- Handoff training inadequate revised for Yr2
- Observations in Y2 indicated RNs did not regularly use SHARE protocol to guide handoff
- RN interviews indicated desire to use SHARE but wanted more training and support

Other Major Findings

- 78% - 91% compliance with POC submissions (literature reports around 50%)
- Surveys pre (n=419) post (n=241):
  - RNs found HANDS significantly more useful than previous care planning method ($p<.001$)
  - RNs significantly more familiar & satisfied with NNN than at baseline ($p<.001$)

Anecdotal Findings

- All units indicated desire to keep HANDS “post” study
- RNs set up use group in 1 organization
- RNs reported successful use in rounds
- New unit gives handoff at bedside and involves patient
- 1 Chief Nurse Executive reported appreciating how HANDS enhanced the critical thinking of her RNs

Facilitators of HANDS Adoption

Chief Nurse Executive and organization-wide endorsement

- Belief that change will bring desired goals
- Well constructed flexible change management strategy that addresses
  - *Technical, Training, Implementation, Continuous Evaluation and Improvement*
- Adequate resources to carry out and sustain strategic plans
  - *Personnel & Funding*

Limitations/Barriers

- Impact on MDs was not directly examined
- Commercial vendors business models oppose “vendor neutral” standardization at the interface
- Studying technology adoption “in the wild” is messy
- Since HANDS was a “research project” (tested in limited # of units per organization) systemic benefits could not be examined

Benefits to Administrative Communication

- Generates standardized data useful in supporting administrative decisions, can
  - characterize practice patterns on one's unit (clinical dx, outcomes, interventions)
  - examine compliance with plan of care (POC) submission
  - evaluate individual, unit, or organization's success in meeting expected outcomes
  - contrast workload of nurses and units
  - structure and justify staffing and scheduling practices

Revised "SHARER" Handoff

S - Sketch: provide patient name, age, gender, medical diagnoses, code status, allergies, and other pertinent information

*For each problem repeat **HARE:***

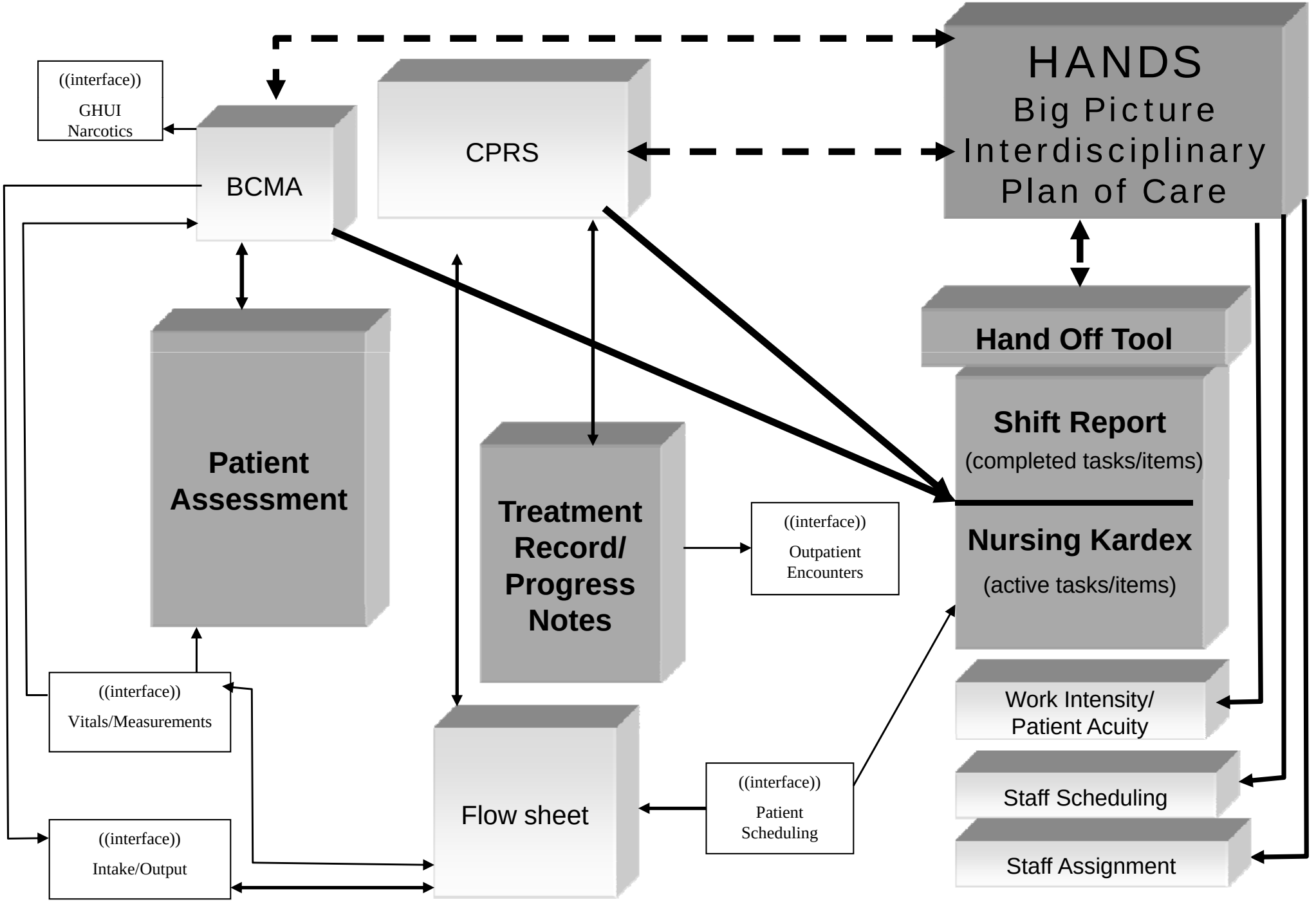
H - HANDS: review "Plan of Care" history and current plan at computer screen add essential details only

A - Aim: discuss focus of care for next shift/dc

R - Rationale: explain your thinking

E - Exchange: invite questions, debate, dialogue

R - Reconcile: present closing remarks



Nursing Integrated Information System Data & Work Flows Schematic Rev2 7/24/08

Example Reports Generated from Repository

- RN patient load & differences across RNs
- Top problems, interventions, and outcomes by unit
- Number of unique RNs per patient episode
- Compliance with Plan of Care submissions
- Unit success rate in meeting expected outcomes at discharge

Daily Documentation Report

Downtown Hospital
Unit: 1 (93% Compliance)
From Date: 01/01/2007

Patient	7:00a-11:00a	11:00a-3:00p	3:00p-7:00p	7:00p-11:00p	11:00p-3:00a	3:00a-7:00a
Strawberry, Susan	Lois H 11:16p (D)					
Blueberry, Barry	Chris T 2:42p (D)	Chris T 2:42p (D)				
Peach, Perry	Chris T 2:44p	Chris T 2:44p	Julie M 10:18p	Julie M 10:18p	Miranda P 5:50a	Miranda P 5:50a
Kiwi, Karen	Cathy N 11:30a	Cathy N 11:30a	Cathy N 11:30a	Miranda P 5:54a	Miranda P 5:54a	Miranda P 5:54a
Orange, Donna	Chris T 2:40p	Chris T 2:40p		Jan D 3:28a	Jan D 3:28a	Jan D 3:28a
Pineapple, Priscilla	Cathy N 11:30a	Cathy N 11:30a	Cathy N 11:30a	Miranda P 5:54a	Miranda P 5:54a	Miranda P 5:54a
Blackberry, Barbara	Cathy N 11:31a	Cathy N 11:31a	Cathy N 11:31a	Nancy J 5:36a	Nancy J 5:36a	Nancy J 5:36a
Cantalope, Christopher	Lois H 1:30p	Lois H 1:30p	Julie M 10:21p	Julie M 10:21p	Miranda P 5:51a	Miranda P 5:51a
Plum, Professor	Jason K 10:02a			Mona G 10:56p	Nancy J 5:28a	Nancy J 5:28a
Nectarine, Nelson	Jason K 4:14p	Jason K 4:14p		Nancy J 5:31a	Nancy J 5:31a	Nancy J 5:31a
Honeydew, Harold	Chris T 2:47p	Chris T 2:47p		Jan D 3:23a	Jan D 3:23a	Jan D 3:23a
Banana, Brice	Lois H 1:32p	Lois H 1:32p	Julie M 10:17p	Julie M 10:17p	Nancy J 5:35a	Nancy J 5:35a
Lemon Lester	Jason K 4:14p	Jason K 4:14p	Jason K 4:14p	Mona G 10:57	Jan D 3:22a	Jan D 3:22a

(D)=discharge Gray cell=omitted Plan of Care

Work Load Summary Report

Downtown Hospital
Unit: 1
Total Care Plans: 9635
Total Unique Patients: 1011
From Date: 01/1/2008-4/14/08

Nurse	Total Hrs Worked	% Time Worked 11p-7a	Total # of Care Plans	Care Plans/Hrs Worked	Admission/Hrs Worked	Discharge/Hrs Worked	Avg Load	Hrs Worked >5 pt	Avg Pt >5 /Hrs worked
Chris T	160	0	57	0.36	0.02	0.06	3.88	72	0.77
Sue B	132	0	66	0.50	0.03	0.09	4.15	16	0.12
Jason K	120	0	52	0.43	0.02	0.04	4.40	12	0.10
Julie M	144	0	89	0.62	0.09	0.03	4.69	20	0.14
Jan D	116	61.41	61	0.53	0.00	0.01	5.48	72	1.03
Miranda P	120	60.00	66	0.55	0.00	0.00	5.90	80	1.17
Mona G	180	52.22	101	0.56	0.00	0.02	5.40	88	0.93
Lois H	128	65.21	68	0.53	0.00	0.02	5.78	76	0.94

NOC Ratings Report

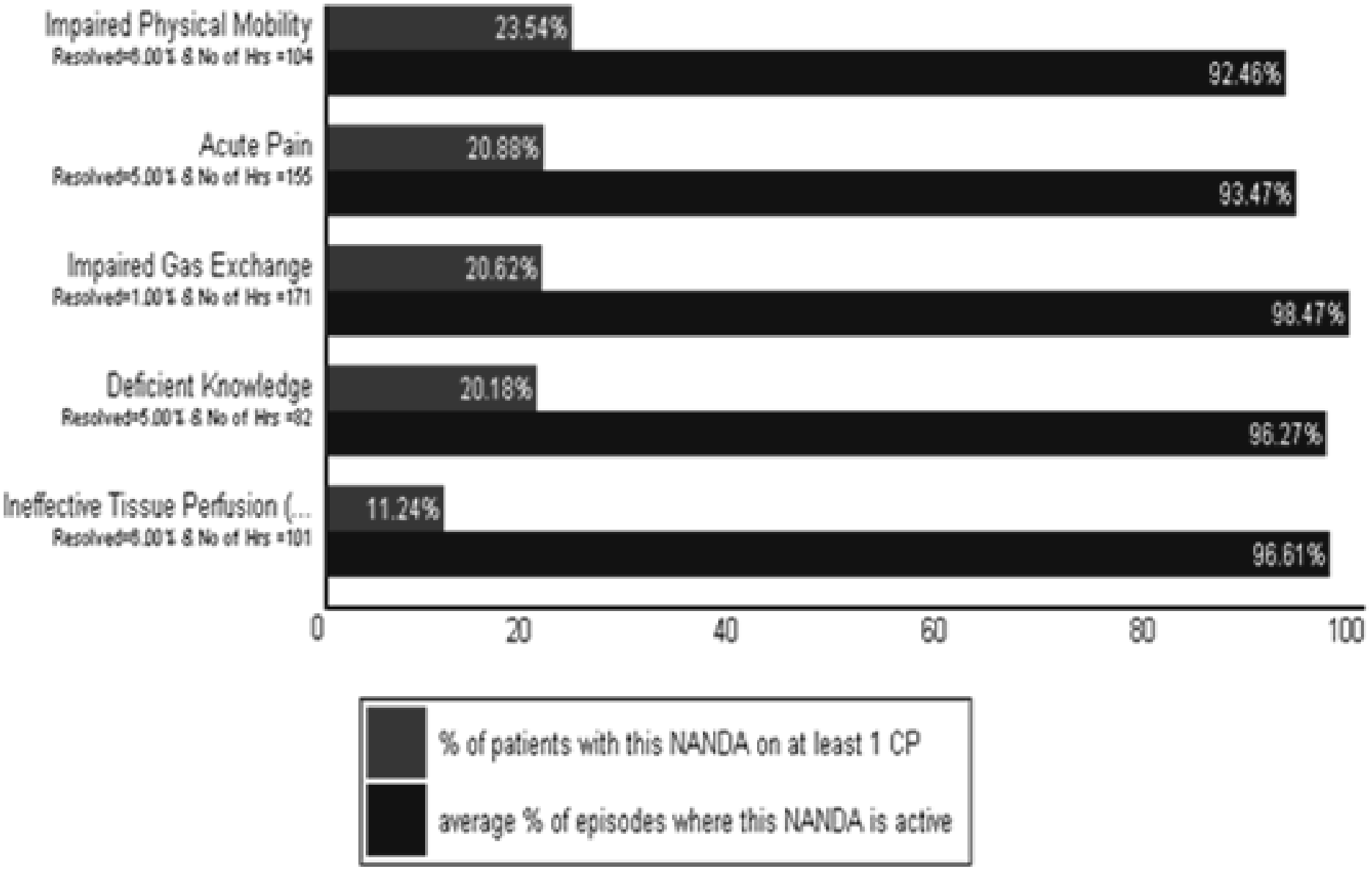
Downtown Hospital
Unit: 1
Total Care Plans: 9635
Total Unique Patients: 1011
From Date: 01/19/2007-5/19/07

NOC		# Unique Pt	# of POCs	Avg Initial Rating	Avg Expected Rating	Avg at Discharge	Avg Change	% Met Expected at Discharge	% Ever Met Expected Rating	% Met Expected Rating Within 1
Pain Level		160	1430	3.35	4.46	4.17	0.82	64.29	64.29	95.03
Cardiac Pump Effectiveness		120	1091	3.17	4.39	3.95	0.79	56.56	56.56	85.63
Wound Healing, secondary intention		46	581	2.74	4.14	3.30	0.56	38.00	38.00	70.25
Fall Prevention Behavior		392	3169	4.18	4.87	4.68	0.51	78.86	81.34	98.02
Blood Loss Severity		54	426	3.11	4.77	4.47	1.37	73.21	73.21	96.35
NANDA	**NOC**									
Acute Pain	Pain Control	78	683	3.04	4.45	3.96	0.92	51.25	51.25	83.86
Hyperthermia	Thermoregulation	24	229	3.29	4.63	4.47	1.18	75.00	75.00	90.22

NANDA Usage Report

Top 10%

Downtown Hospital
Unit: 1
Total Care Plans: 9635
Total Unique Patients: 1011
From Date: 01/1/2008-4/14/08



Conclusions

- All aspects of the HANDS interventions worked as planned with the exception of the handoff protocol
- Valid testing of EHRs requires the use of multiple methods including unobtrusive observations of users
- HANDS is a foundation for creating and maintaining a feasible and valuable “Big Picture” of care that is interoperable on three levels and
  - allows the seamless transfer of key patient care information needed to support COC
  - provides a data base for multiple uses
  - provides the infrastructure to cost effectively update and sustain itself over time

Next Research

- Test newly revised handoff procedure "SHARER" and on-line training materials that incorporate findings from fully analyzed handoff data
- Test data mining techniques and statistical algorithms for efficiency in
  - targeting best practices
  - supporting an evidence based staffing methodology

Next Research 2

- Indentify, add, and test new features that:
  - increase the use of HANDS among all members of the interdisciplinary team
  - strengthen the decision support and ensure the immediate usefulness of it to the clinician
  - provide the means to seamlessly deliver evidence generated from the data collected in HANDS (e.g., benchmarking, data-mining, statistical analysis) back to the clinicians in an immediately useful format

Questions & Answers

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