Nursing Innovation through Technology: Ideas to Implementation

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Technology Targets

A Synthesized Approach for Identifying & Fostering Technological Solutions to Workflow Inefficiencies on Medical/Surgical Units

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Why is innovation needed?

- Increased demand
- Decreased supply
- Shortage estimates range from 400,000 to 1 Million RN's in the United States by 2020
- % of RN's in hospitals has dropped from 65 to 56.2

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Innovation to change the work environment and decrease the demand on RN time

- Efforts at recruitment have resulted in turning away more than 145,000 qualified applicants last year (NLN 2007)
- Shortages in faculty, classrooms, and clinical placements are slowing preparation of new nurses
- Inadequate number of nurses prepared to become faculty
- Supply cannot keep up with demand

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Retention of Current Workforce

- Nurses demand improvements in the hospital work environment
  - Safety
  - Efficient systems
  - Automation
  - Improved communication
- Technological products and processes have not incorporated nurses' viewpoints
- Multiple studies nationally and internationally speak to the need to improve the practice environment as a key strategy to retaining nurses and improving patient care outcomes.

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Addressing the Demand on Nurses

- Technology Targets Study funded by Robert Wood Johnson Foundation (RWJF)
- Aims of the study
  - Create an improved process for identifying technology solutions to medical/surgical unit workflow inefficiencies.
  - Capture the attention of and prompt industry to develop technology that improve workflow processes.

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Major Activities of Technology Targets

- Implement a "Technology Drill Down" or "TD2" process at 25 acute care sites
- Publish and disseminate a report of findings
- Disseminate findings broadly across the industry

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Project Deliverables

- Functional requirements for new or revised technology products
- Analysis and evaluation of the functional requirements emerging from the TD2 processes and synthesis with relevant TCAB/PDA and Time and Motion study findings.
- A stakeholder-driven planning, dissemination and engagement process that ensures project replication as well as the development of technological processes and products that improve medical/surgical unit workflow.

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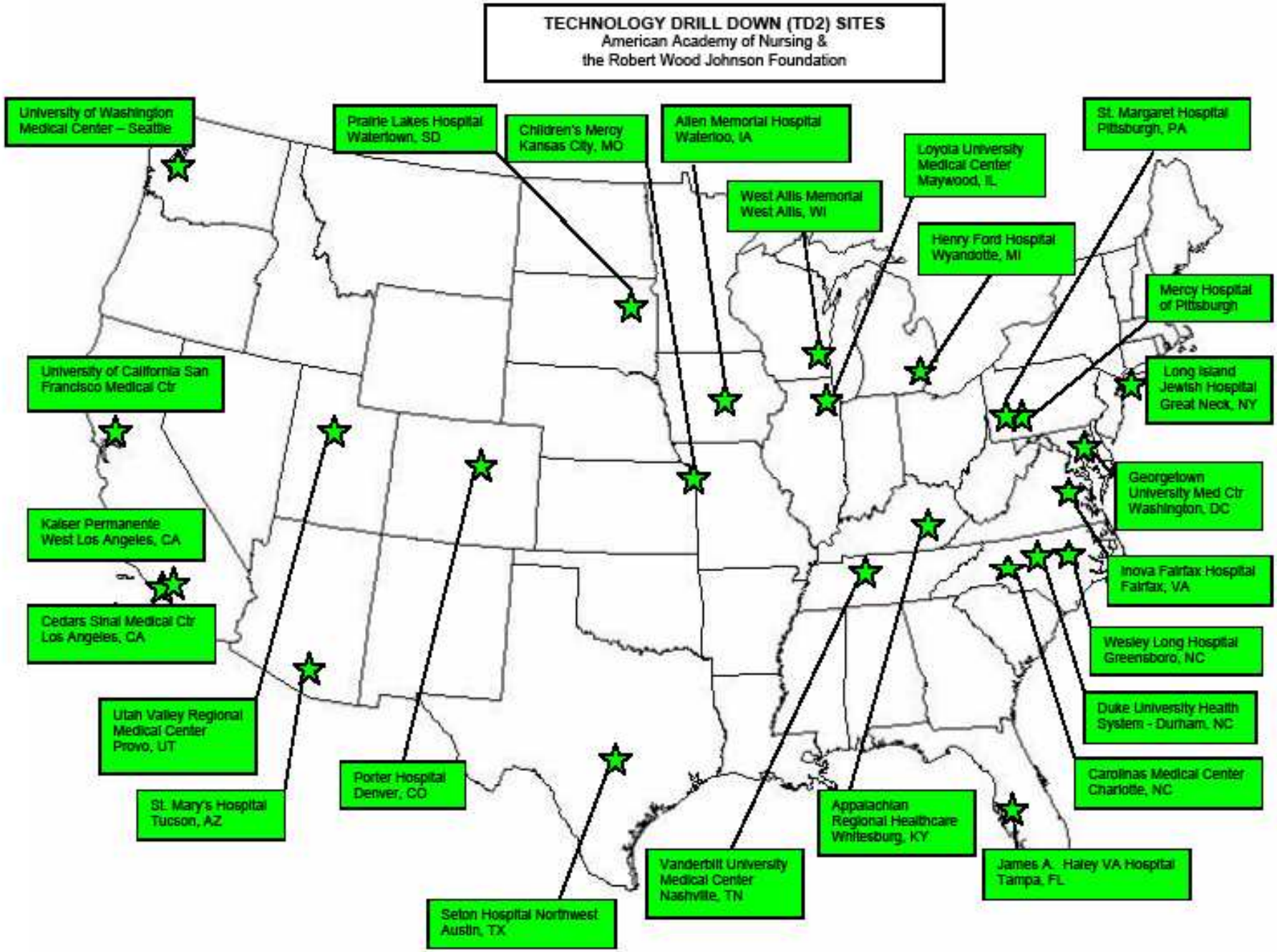
TECHNOLOGY DRILL DOWN (TD2) SITES
American Academy of Nursing &
the Robert Wood Johnson Foundation
University of Washington Medical Center – Seattle
Prairie Lakes Hospital Watertown, SD
Children's Mercy Kansas City, MO
Allen Memorial Hospital Waterloo, IA
Loyola University Medical Center Maywood, IL
St. Margaret Hospital Pittsburgh, PA
West Allis Memorial West Allis, WI
Henry Ford Hospital Wyandotte, MI
Mercy Hospital of Pittsburgh
University of California San Francisco Medical Ctr
Long Island Jewish Hospital Great Neck, NY
Georgetown University Med Ctr Washington, DC
Kaiser Permanente West Los Angeles, CA
Inova Fairfax Hospital Fairfax, VA
Cedars Sinai Medical Ctr Los Angeles, CA
Wesley Long Hospital Greensboro, NC
Utah Valley Regional Medical Center Provo, UT
Duke University Health System - Durham, NC
Porter Hospital Denver, CO
Carolinas Medical Center Charlotte, NC
St. Mary's Hospital Tucson, AZ
Appalachian Regional Healthcare Whitesburg, KY
Vanderbilt University Medical Center Nashville, TN
James A. Haley VA Hospital Tampa, FL
Seton Hospital Northwest Austin, TX

Technology Drill Downs (TD^2s)

- Focus on medical/surgical unit workflow from a systems-wide perspective
- Interdisciplinary Perspective

  Engages RNs, assistive personnel, unit clerks, pharmacy, materials management, social work and respiratory therapy
- Involves key decision makers

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TD^2 Process

- Two day process of brainstorming and visioning
- 20 – 30 multidisciplinary representatives
- Primary Purpose
  - Map gaps between current workflow & idealized workflow
  - Identify potential technological applications that could close the gaps

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Day 1

- Discussion – envision ideal work environment vs. current state
- Captured in real time with process flow map
- Prioritization matrix – each group member selects top 4 issues
- Top 4 are selected as “ripe” for technological fixes

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Day 2

- Four small groups – correspond with the top processes identified on Day 1
- Brainstorm – potential technological advances to close gap between current and future, desired state

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Preliminary Findings from Sites
Documentation

- Computerized Order Entry included in electronic record
- Touch screen/Voice activated
- Global Documentation System
  - Multidisciplinary
  - Real time
  - Universal – physician, hospital, home care
- Flash Drive/Smart Card

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Preliminary Findings from Sites

Patient Care

- Interactive, multifunctional device at patient's bedside – patient chart, call light, touch screen, access to all medical information, order equipment, tests, schedule, menu, patient education, entertainment. Modified for those w/disabilities.
- Virtual interpreter - Family, patient & caregiver access.

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Preliminary Findings from Sites

Patient Care

- Smart Monitoring Devices – interfaced with EHR
- Portable devices to quickly add information and updates to patient charts
- ID Bracelet or Tracking Chip System - Use with a handheld scanner. Linked to chart. Interfaces with screen at bedside.
- Smart Bed

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Preliminary Findings from Sites

Communications

- Computerized, centralized patient scheduling system for all departments
- Wireless voice communication device/Hands free communication device.
- RFID for caregivers.
- Universal Translator/Automatic language interpretation device.

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Preliminary Findings from Sites
Medications

- Robotic delivery
- Medication Barcode/Chip System (same system for labs, blood products)
- Smart IV/Blood Pump
- Simplify systems and eliminate redundancies

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Preliminary Findings from Sites
Supplies & Equipment

- RFID tag - item scanned when used Inventory to central computer Include linens, supplies & equipment
- Robot to restock and deliver supplies & equipment
- Ensure availability at the point of care

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TD^2 Evaluation & Dissemination

- Completion of data analysis (in progress)
- Report of Findings
  - Stimulate the design & development of technological advances.
  - Demonstrate the effectiveness of the TD2 process as well as capacity for replication.
  - Underscore idealized but evidence-based nursing units of the future.
- Leverage partnerships and coalitions to disseminate results and achieve industry buy-in.

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Implications for Improving Quality and Safety

- Return RN to bedside for additional direct care time
- Implement technology to reduce opportunities for error
  - Medication administration
  - Communication
  - Timely acquisition of equipment/supplies
  - Patient identification

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Implications for Addressing Nursing Demand

- Eliminate waste in nursing workflow
- Increase RN direct care time
- Reduce stressors resulting from:
  - Inefficient work patterns
  - Interruptions
  - Missing supplies/equipment/medications
  - Inaccessible information/documentation
- Reduce physical burden of work to improve retention

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Opportunities for Policy Development

- Health Information System standards for interoperability
- Facilitate adoption of technology as an adjunct to other quality and safety measures (smart systems, CPOE, etc)
- Set industry standards for communication
- Enable portability of health information

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Summary of TD2 findings to date

- Improving the practice environment is essential to retaining nurses, providing safe patient care and increasing the direct time nurses spend with patients.
- Using the TD2 process, facilities can identify inefficient and burdensome workflow processes in their institutions that could be improved with technology.

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How can new technology empower innovative approaches to transforming care?

- Technology should not fit the status quo (same as automating poor manual systems)
- Assume significant change and buy-in are needed
- Capitalize on early adopters
- Build on current capabilities but extend the boundaries (wireless, portable devices at the point of care)

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Example: Life-critical communications—wireless link to the patient's care provider

- Must be timely and wireless
- Extend the reach of the information beyond system source (data, alarms, nurse call, phone)
- Differentiate urgency

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Example: Life-critical communications—wireless link to the patient's care provider

- Early efforts
  - –Bed-to-bed communications for ECG waveforms
  - –Nurses carried (proprietary) devices to receive signals (one way pagers high degree of error in patient data)
  - –Multipatient displays in strategic areas requires multiple interfaces
  - –Voice paging of critical events

Example: Life-critical communications—wireless link to the patient's care provider

- Integrations solutions for more devices
  - Nurse call
  - Ventilators
  - Infusion pumps
  - Monitoring systems
  - Communication to the care giver via wireless phone network
    - Message logging
    - Multidirectional communication via service bus
    - Location based services
- Integration of communications enhances workflow

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Nursing Adoption of IT

- Study conducted by KLAS (July 2007)
  - Interviewed nurses and IT professionals for feedback about nurses' IT adoption
  - Understand vendor specific clinical information system adoption
- Most adopting organizations performing basic functions plus one or two deeper functions such as vital signs, eMAR, care plans, ICU data

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Nursing Adoption of IT

- Challenges to Adoption:
  - It is difficult to automate the nurse's complex work flow
  - Missing functionality and software inadequacies (inflexibility, interface needs
  - Problems with data entry devices
  - Challenges with human behavior of users (acceptance/readiness for change, commitment)
  - Lack of basic computer skills for first time users and associated training challenges/learning curve
  - Increased effort, time, cost

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Nursing Adoption of IT

- Investing in Research and Development
  - Addressing advanced functionality
    - Greater support in workflow
    - Greater ease of use
    - Address the ergonomics of patient care
    - On screen reviews of frequently used forms essential—must be user friendly
  - User friendly devices
  - Rapid retrieval of data
  - Connectivity to all systems

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Technologies across settings

- From home to care givers
  - Home monitoring advances
- Increasing safety of medication use
- Repurposing of existing personal equipment
- Achieving portability of personal health information

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Innovations and Technology Solutions for the Future

- Care giver developed and tested
  - User friendly and useful
  - Patient friendly
  - Affordable
  - Uniform interoperability standards
- Will achieve integration of communication
- Will achieve work flow process improvements

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Summary

- Technology solutions can eliminate repetitive and mundane tasks.
- Nurses will be able to spend more time on direct patient care.
- Greater input in development and testing of technology by nurses will speed adoption and reduce learning curve.
- Technology is the greatest tool available to transform and innovate the delivery of nursing care.
- *Imagine a hospital of the future without nurses*….the time to act is now.

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