Medical Informatics: Data Sharing, Organizational Impacts, and Quality Improvement Challenges

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About Cedars-Sinai Medical Center

- 950-bed acute care teaching facility,
- Largest nonprofit hospital in the western United States,
- Ranks among top 10 non-university hospitals for research,
- Geri and Richard Brawerman Nursing Institute—education and research
- American Nurses Credentialing Center Magnet Hospital,
- Longest running Nursing Magnet designation in California,
- CALNOC Data Management located at Cedars-Sinai.
Background and Research

- PhD in Communication Theory and Research: Annenberg School For Communication—University of Southern California
- Focus: Communication in Health Care Settings:
  — Caregiver-Patient Communication
  — Communication between Hospital Departments (e.g., health care institutions “silo” structure)
  — Impacts of healthcare information systems and computer-mediated communication on organizations and individuals
Evaluating the Organizational Impact of Healthcare Information Systems
(2nd Edition) 2005
James G. Anderson and Carolyn E. Aydin (Eds.)

Competing assumptions about organizational change:

- Optimist position predicts increased productivity, increased skill requirements, interdependent jobs, and enhanced communication—managers and clinicians can control system design and impacts.

- Pessimist position predicts technology will rob workers of expertise, increase job routinization, decrease interaction, and result in conflict over control of information and other resources.

- Pluralist position: Computer systems have both isolating and integrating capabilities—actual impacts depend on what is done with the technology and how implementation is managed.
Evaluation is Essential

Evaluation of healthcare computing requires understanding of both the technology and complex social and behavioral processes.

Example: Current concerns in American Medical Informatics Association that new stimulus funded projects will be accompanied by appropriate evaluation of outcomes.

Evaluation may strive for scientific rigor, but primary purpose is to provide information to stakeholders and decision-makers.
Evaluation Framework: 12 Questions

- Does the system work as designed?
- Is the system used as anticipated?
- Does the system produce the desired results?
- Does the system work better than the procedures it replaced?
- Is the system cost effective?
- How well have individuals been trained to use the system?
- What are the anticipated long-term impacts on how departments interact?
- What are the long-term effects on the delivery of medical care?
- Will the system have an impact on control in the organization?
- To what extent do impacts depend on practice setting?
- What are the impacts on the healthcare system at large?
- How will the system affect patient safety?
Multiple Methods: Triangulation

- Qualitative (interviews, observation, document review)
- Survey
  - Internet survey of users
- Cognitive approaches (e.g., usability, video recording, recording of thought processes)
- Work sampling
- Simulation
Occupational Adaptation to Computerized Medical Information Systems

1989: Journal of Health and Social Behavior (Vol. 30:163-170)

— Interviews with informants in pharmacy and nursing departments in 2 hospitals (no physician order entry).
— Hospitals as “political negotiated orders”—organizational structure results from conscious negotiation between subgroups.
— Groups attempt to adapt to change while preserving professional autonomy and maintain viability in changing healthcare environment, e.g.,
  ▪ Pharmacy as a “supply” department (1980’s)
  ▪ Nursing striving for professional recognition (1980’s)
  ▪ Professional autonomy as major issue for both groups
Hypotheses

- Hypothesis 1: Medical Information System will be associated with changes in task boundaries between departments—tentatively confirmed
  - Nursing responsible for order entry for both departments (performed by unit clerks and nurses). Pharmacy dependent on this information, but exercises expert power over order entry.
  - Pharmacy experiences loss of control over billing and revenues (now depends on computerized charting by nurses (Suburban hospital)).
  - Pharmacy perceives itself as doing unnecessary billing which could be replaced by computerized charting by nurses (Midtown hospital).
  - Functions of departments are interdependent as both maintain common database.

- System differences at the hospitals before and after implementation resulted in greater changes at Suburban hospital.

- Broader perspective: Pharmacy has lost control over specific tasks (order entry and billing)—compensating by using expertise to become consultants to nurses, clerks, and physicians on rounds.
Hypothesis 2: Medical Information System will be associated with decreased personal communication between departments.

— Neither hospital reported a decrease.
— Both reported increased communication required to ensure correct order entry and maintain accurate information for both departments; computer became the topic of conversation.
— Suburban hospital pharmacy department used presence of computer terminals on nursing units to enhance mobility of pharmacists and increase face-to-face interactions with all staff and return to expanded consultative role.
— Computer was a “trigger” for social dynamics, rather than the cause of any specific change.
— Provided opportunity to encourage better working relationships as common database became “superordinate goal”.
— Similar outcomes seen in unrelated work re-design projects in subsequent years.
Computers in the Consulting Room: Case Study of Clinician and Patient Perspectives*

- Kaiser-Permanente San Diego Department of Preventive Medicine
- CompuHX designed to recode patient information during preventive physical exam
  - Enforces thoroughness and records and stores information in legible, structured easily accessible medium (patient history and lab values)
- Multi-method Approach
  - Examiner surveys (nurse practitioners and physician assistants (5 users at time of study) regarding system use or expectations
  - Social network questions included in survey (frequency of communications with other departments and individuals
  - Interviews with 11 of 22 examiners
  - Patient surveys

Findings

To describe patient and clinician reactions to computerized health appraisal system:

— No difference in any aspect of patient satisfaction between computer and non-computer groups: Computer neither enhanced nor depersonalized patient satisfaction.

— Clinicians willing to use system and perceived benefits, but concerned about:
  - Increased time required for exams,
  - Effort to learn while interacting with patient at same time,
  - Increased monitoring of performance, and
  - Organization issues (e.g., Director as champion of system)

— Clinicians using system communicated more frequently with each other and others throughout department.

— Implementation slowed by need to demonstrate monetary value.
The Problem:

- Exchanging data between organizations is proving harder than expected. (Grossman et al., 2006; Adler-Milstein et al., 2007; Frohlich et al., 2007; Miller & Miller, 2007; Korst et al., 2008)

- Little is known about inter-organizational HIT (health information technology) implementation.

- Most implementation research has looked at intra-organizational implementation. These projects also have a poor success rate. (e.g., ONCHIT, 2007; Chaudry et al., 2006)
To develop an instrument to assess organizations’ readiness for data sharing *before* they invest time & resources.

Relevant stakeholders: health care facilities, funders, and policy makers.

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Our Goal

- **Research Question:**
  What are the critical milestones for system implementation and the areas of critical organizational capacity to achieve successful data exchange?

- **Specific Aim:**
  Develop and pilot test a framework to determine whether organizations have the capacities to achieve data exchange goals.

Identifying Organizational Capacities and Incentives for Clinical Data-Sharing: The Case of a Regional Perinatal Information System

*Journal of the American Medical Informatics Association, Volume 15, No. 2, Mar/Apr 2008*

Lisa M. Korst, MD, PhD, Jordana M.K. Signer, PhD, Carolyn E. Aydin, PhD, Arlene Fink, PhD
2 Different Data Exchanges

**Perinatal Data Center**
- First study (Korst et al., 2008)
- Start-up (2 founding hospitals + 2 later joiners)
- Feasibility study conducted 2003-2004, but did not continue
- Qualitative case study with in-depth interviews

**CALNOC**
- Second study
- Mature organization (200+ members actively sharing data)
- Founded in 1996, and continuing to grow
- Cross-sectional survey
Perinatal Data Center

- Start-up
  (2 founding hospitals + 2 other facilities)
- Purpose: Research, aiming for clinical
- Physician-driven
- Identified patient data shared across hospitals
- Did not continue after pilot study
Conceptual Framework

- Incentives
  - Organizational Capacities for Data Sharing
    - Leadership
    - Organizational Policies
    - Operational Systems
    - IT
    - Legal
    - Cross-Organizational Collaboration

- Critical Incidents
  - Workarounds
    - No Resolution
      - Project Fails
    - Resolution

- Achievement of Milestones
  - Agreements
  - System Design
  - System Development & Project Operations
    - Implementation
    - Expansion
    - Governance
    - Sustainability
Lessons from the Start-Up

Four requirements for sharing data across organizations:
1) Readiness assessment;
2) Perceived mandate;
3) Formal governance structure; and
4) Third party IT component.
1. Readiness Assessment for each Member Joining Collaborative

Examples:
- Detailed work required often overlooked
- Funding for membership requirements from within organization
- IT expertise
- Legal expertise for contracting
- Frequently “ad hoc” team “under the radar”
- Incentive structure to bridge gaps
2. Perceived Mandate within each member hospital

Examples:
- Struggle for resources
- Turnover of key personnel
- Accountability
- External incentives
3. Formal Governance Structure for Collaborative
   — Creation of rules, policies, contracting and/or agreement procedures
   — Obtaining and administering funds

4. Third Party IT Component for Collaborative
   — IT expertise to link and safeguard patient identifiers, independent responsibility to each participating hospital.
CALNOC
(Collaborative Alliance for Nursing Outcomes)

- Mature organization (200+ members)
- Purpose:
  Quality Improvement, benchmarking
- Nurse-driven
- De-identified data
- Still operating & expanding
About CALNOC

- Collaborative Alliance for Nursing Outcomes (CALNOC) (formerly known as California Nursing Outcomes Coalition)
- Launched in 1996 as nation’s first ongoing nursing quality database
- Joint venture of Association of California Nurse Leaders and American Nurses Association\California
- Operations Team: ACNL (Sacramento), UCSF (San Francisco), Cedars-Sinai (Los Angeles)
- 13-year history of nursing sensitive quality measurement, benchmarking, web-based reporting innovation and research
- Currently 223 hospitals in California, Washington, Oregon, Arizona, Nevada, Hawaii
- International pilot project in 2009
- CALNOC findings are regularly reported in peer-reviewed journals
- 501c(3) status in 2009-2010
Benchmarking and Performance Improvement

- National agenda to improve patient safety and quality of care,
- Need systems to provide direct and measurable information on hospital performance to identify problems and generate quality improvement (QI) projects
- The Joint Commission, nursing Magnet recognition and others require benchmarking with other hospitals
- Hospital QI teams staffed with novice users with split responsibilities
- Hospitals are *Data Rich, but Information Poor (DRIP)*
- CALNOC reports “cut” the data in useful ways with meaningful comparison groups
CALNOC’s Role

- CALNOC reports provide data for benchmarking with other hospitals.
- CALNOC performance measures meet/set national performance standards.
- CALNOC data and processes can be utilized to demonstrate compliance to regulatory, accrediting and payer organizations.
- CALNOC provides one-stop shopping for dashboard reports to generate quality improvement projects.
Readiness Assessment Survey

- Developed survey using lessons from the Start-up
- Survey questions tailored to match CALNOC terminology/processes in collaboration with CALNOC investigators
- IRB approval
- Invitation with surveymonkey link sent to CALNOC Primary Site Coordinators and CNEs in over 200 hospitals from CALNOC leadership
- Approximately 40% of hospitals responded
External Mandates Contribute to CALNOC Success

- Nursing ratios in California intensified focus on nurse staffing
- National Quality Forum endorsement of CALNOC measures as part of nursing-sensitive care performance measures
- CHART public reporting in California includes CALNOC pressure ulcer measure
- California SB 1301 requires reporting of adverse events measured by CALNOC
- CMS will no longer pay for hospital acquired conditions including CALNOC pressure ulcers and falls.
Future Research

- Which organizational capacities are most critical for achieving data exchange goals:
  a) in different kinds of collaboratives (clinical, research, quality improvement)?
  b) at different stages of development and implementation (e.g., start-up vs. mature collaborative)?
- Does the order of milestone achievement matter?
Next Steps

1) Find collaborators willing to develop our readiness assessment instrument in new test beds.
2) Obtain new funding to refine instrument.