Health Information Technology in Nursing Homes Symposium Overview

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University of Pittsburgh

Gerontological Society of America

November 21, 2010

New Orleans

Acknowledgments

- Study Team:
  - Howard B. Degenholtz, PhD, PI
    - Department of Health Policy and Management, Graduate School of Public Health
  - Steven Handler, MD, PhD, Co-PI
    - Department of Biomedical Informatics, and Division of Geriatric Medicine
  - Michael Lin, PhD, Co-I
    - Department of Health Policy and Management, Graduate School of Public Health
  - Sam Boonin, MBA, Consultant
  - Abby Resnick, MA, Project Coordinator
  - Natalie Bulger, BASW, Research Assistant
  - Coleen King, BA, Research Assistant
- Funding:
  - Commonwealth Fund
  - Project Officer: Mary Jane Koren, MD

Background

- HIT Defined:
  - Electronic systems to collect, store, retrieve and transfer clinical, administrative and financial data (IOM)
- Potential benefits of HIT:
  - Improve quality
  - Reduce errors
  - Provide administrative efficiencies
- Research on adoption and use of HIT in US Nursing Homes is limited
  - Consensus of expert opinion
  - Case studies
  - HIT broadly defined
    - presence or absence of technology, e.g., "Electronic Medial Record"
    - No distinction between acquisition and implementation or actual use

Approach to National Study

- Premise:
  - Adoption and implementation must be understood from multiple perspectives
    - Internal: Administrator, Director of Nursing, Aide
    - External: Physician/Med Director, Adv. Practitioner, Consultant Pharmacist
    - Software Vendors
  - Use of HIT decomposed into the technical system and specific clinical application
    - Many different technical 'things' that can be done with data
    - Many different clinical processes in the NH
- Instrument development based on perspective of users
- We conducted <u>multiple national surveys</u> with different sample frames:
  - Vendors
  - Professionals
  - Facilities*
  - Site visits/case studies*

*Symposium will not cover these data. Stay Tuned!

Overview of Symposium

- Introduction – Bulger
- Market Scan – Degenholtz
- Conceptual Framework – Handler
- Adoption and Use – Degenholtz
- Change Management – Lin

The Health Information Technology Software Marketplace:
Results of a Market Scan

Howard B. Degenholtz, Ph.D.

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Purpose

- Conventional wisdom is that facilities adopted financial management software first
- MDS Automation was required nationally in 1998
  - Free software from HCFA/CMS: RAVEN
  - Minimal functionality for clinical assessment, care planning, and reporting
- Many commercial products available:
  - MDS and OSCAR reporting
  - Claims Medicare and other payors
  - Financial management
  - Human resources
  - Inventory
- Many vendors offer 'advanced' HIT
  - Notes, order entry, medication management, communication, decision support, etc.
- What is the perspective of the industry:
  - Vendor landscape
  - Market dynamics and vendor motivation
 - Adoption barriers

Methods

- Informational research
  - Vendor and industry websites including product collateral and customer case studies
- Secondary research
  - Summaries published in McKnight's LTC News and Provider Magazine and other reports
- Interviews conducted in 2008
  - Software vendors (12 across 8 firms)
  - Consultants (2)
  - Experts (CTO, reporter)

Findings

- Landscape is crowded with at least 52 vendors (2007)
  - None have > 10% market share
  - Limited consolidation
- No meaningful differentiation, even among leaders
  - Many offer broad functionality and similar features
- There are too many options for consumers (nursing homes) to process
  - RFP and case studies to not provide meaningful product differentiation
- No meaningful efforts towards standardization
  - Data exchange between products is limited
  - Customer lock-in strategy
- No 'Killer Application' that drives rapid adoption
  - Most customers do not see value

Rapid and Delayed Adoption Curves
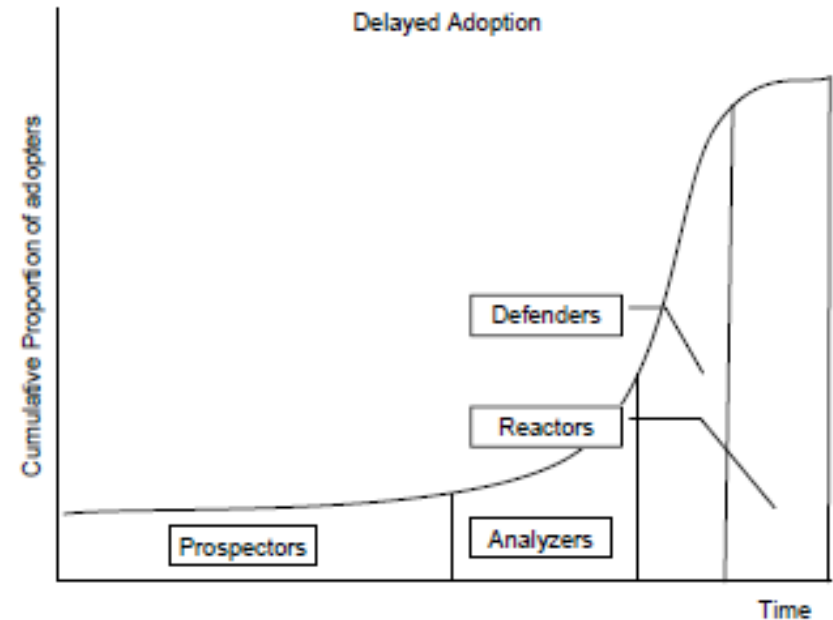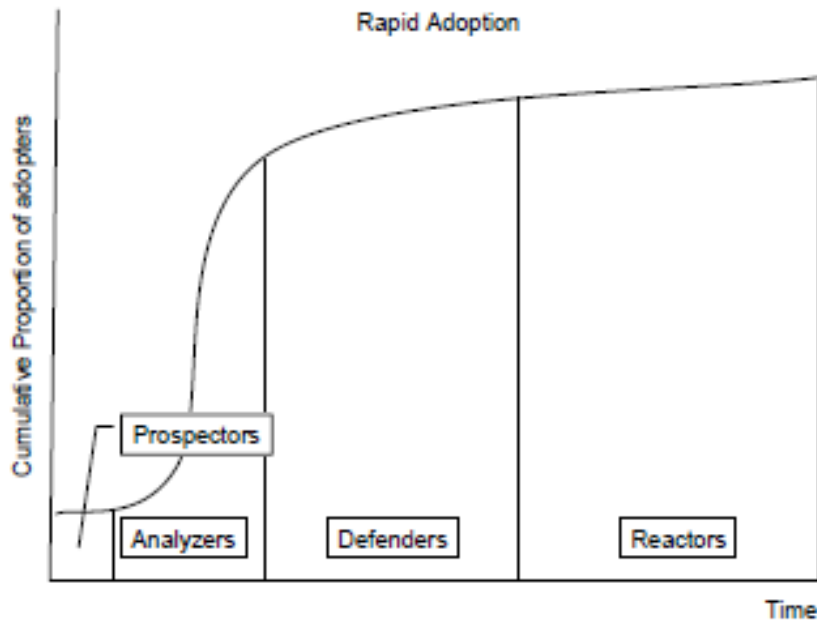
- Marketplace can be described as 'delayed adoption' or 'immature'
  - Large gap between 'prospectors/analyzers' and 'defenders/reactors'.

Findings (continued)

- Long and complex sales cycles
  - 12-24 months
- Regulations create challenge
  - Meeting both Federal and State regulations is complex
  - Many firms tend to focus on individual states
- Limited consulting on change management

Some Promising Findings…

- Decreasing acquisition cost
  - Modular products and pricing
  - Move to web-based architecture
- Some consolidation beginning, entry of Keane into sector
- Differentiation in point of care
  - Handheld
  - Voice activated
  - Touchscreen panels
  - Licensing model
- Shift from 'best-of-breed' to single platform
  - Current customer base has separate financial, operational clinical systems purchased independently require redundant data
  - Many vendors OFFER single platforms, but this carries large transition cost

What Vendors Believe….

- Nursing homes see these investments as expensive, difficult, voluntary, and with questionable payoff.

- Many facilities have had negative experiences in implementation as well

- Vendors believe customers are waiting for regulation or incentives

- Vendors did NOT mention professional norms about innovation; something common in other sectors

Vendors Perspective of Barriers

- Many customers have purchased 'something' for clinical management, but few have <u>implemented</u> it fully
- Customer motivation is low due to imbalance in costs and perceived or actual benefits
  - Business motivation
    - ROI is clear for financial management and related administrative needs
    - Full-feature software is purchased but only used for back-office
    - Acquisition is led by CFO or NHA in small facility
  - Regulatory Requirements
    - Absence of a mandate or standard for interoperability (data transfer)
    - No requirement for electronic medical record, pharmacy or order entry
  - Quality/Safety
    - Benefits are not proven
    - Using HIT is not rewarded per se

National Follow-Up Survey of Vendors

- Supplement qualitative interviews with quantitative data on barriers

- Sample frame: 43 vendors listed in McKnight's LTC News summary
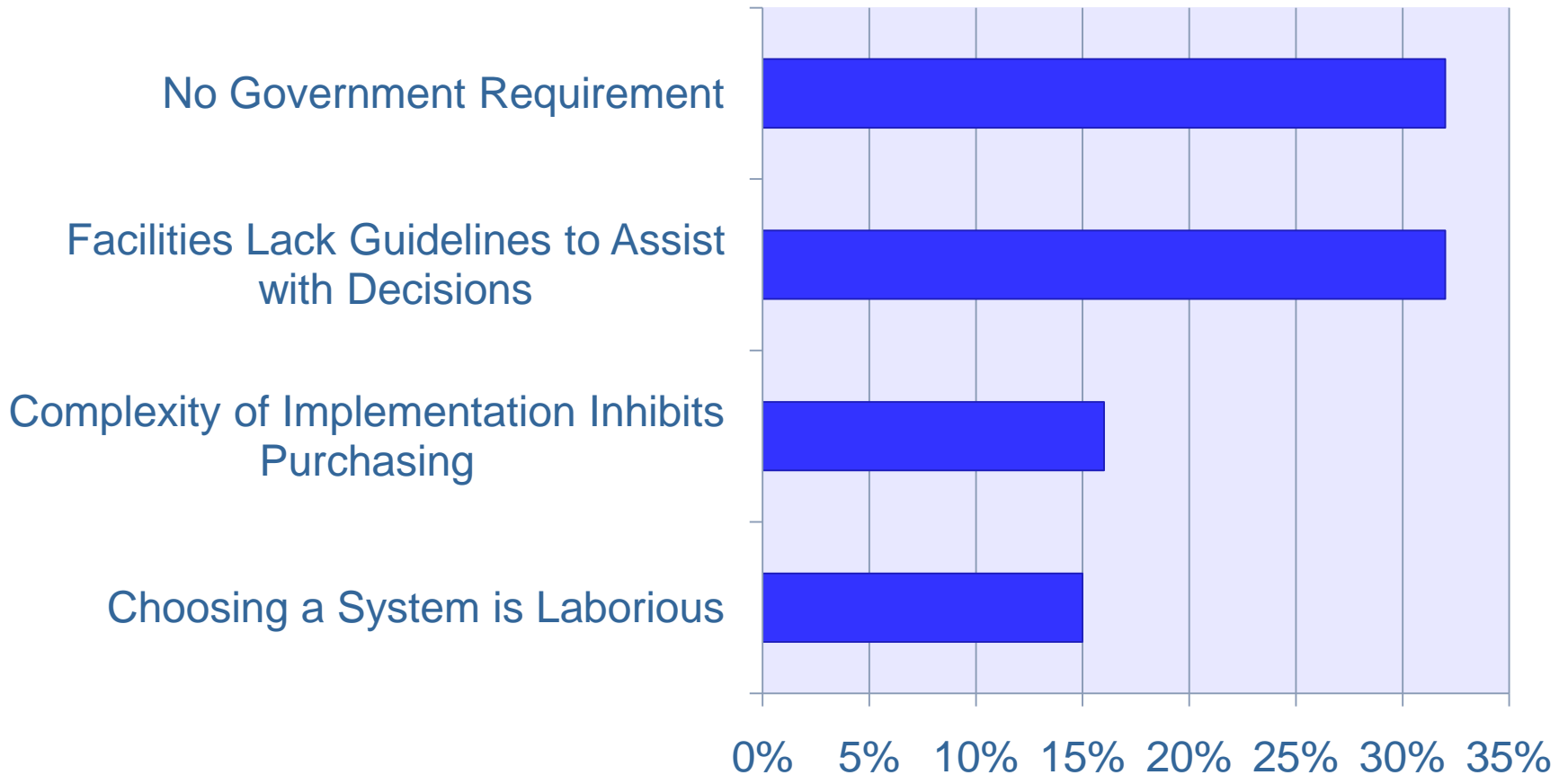
- Responses from 20 vendors
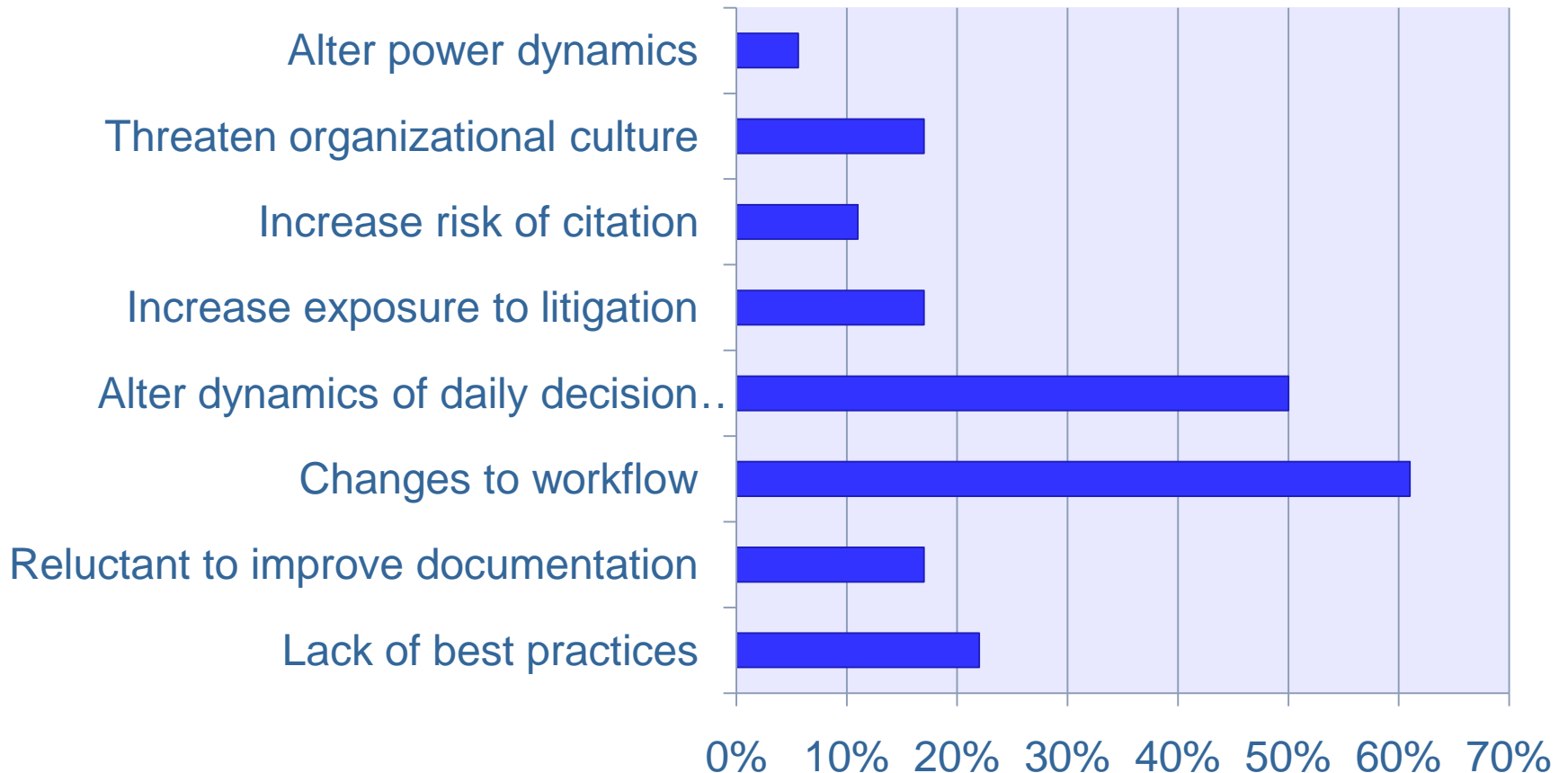
Vendors Rating of ROI

Benefits Outweigh Costs

Vendors Perceptions of Purchasing Decision

Vendors Perceptions of Implementation Process

Strongly Agree that Implementation Can…

Horizontal bar chart showing percentages for:
- Alter power dynamics: ~5%
- Threaten organizational culture: ~17%
- Increase risk of citation: ~11%
- Increase exposure to litigation: ~17%
- Alter dynamics of daily decision…: ~50%
- Changes to workflow: ~61%
- Reluctant to improve documentation: ~17%
- Lack of best practices: ~22%

X-axis: 0% 10% 20% 30% 40% 50% 60% 70%

Conclusion

- Vendors identified significant barriers to adoption

- Benefits beyond billing, finance not clear

- No dominant system or 'killer app'
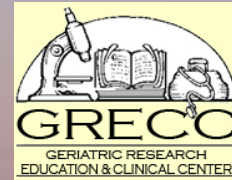
Developing a Framework for Understanding Use of Health Information Technology in <u>Nursing Homes</u>

Steven M. Handler, MD, PhD, CMD
Assistant Professor, Department of Biomedical Informatics, and
Division of Geriatric Medicine, University of Pittsburgh;
Core Faculty <u>RAND-University of Pittsburgh Health Institute</u>; and
Staff Researcher, Pittsburgh VA GRECC/CHERP.

Supported by the Commonwealth Fund

Objective

To identify care processes that could benefit from health information technology (HIT) in the nursing home (NH) setting from the perspective of multiple stakeholders.

Develop an instrument for a national study on the availability and use if HIT in the NH.

Stakeholders Included

- Advanced practitioners (i.e., NP and PA)

- Certified nursing assistants (CNA)

- Consultant pharmacists (RPh and PharmD)

- Directors of nursing (DON)

- Nursing home administrators (NHA)

- Physicians (MD and DO)

Nominal Group Technique (NGT)

- The NGT is a a research methodology used to build consensus and consists of four distinct steps:

    1. Generating ideas

    2. Recording ideas

    3. Discussing and clarifying ideas, and

    4. Prioritizing ideas about a specific topic.

NGT Question

We held 6 profession-specific sessions where we asked each group the following question:

"Which care processes in the nursing home would most likely benefit from the application of health information technology?"

Characteristics of NGT Participants

	AP	CNA	DON	NHA	MD/DO	RPh/PharmD
Number of participants	8	8	5	5	5	5
Gender (% female)	100	100	80	60	80	100
Tenure in the NH setting (% > 15 yrs)	25	25	80	20	20	20
# of beds (% > 150)	50	12.5	40	80	20	60
Ownership (% for-profit)	37.5	12.5	20	0	20	40
Affiliation (chain/multi-facility)	37.5	62.5	60	40	20	40

Results: Summary

	AP	CNA	DON	NHA	MD/DO	RPh/ PharmD
# of processes identified	16	15	27	31	29	26

- 144 statements overall

- 330 distinct concepts/applications

- 236 "top ten suggestions" (allowing ties)

Top 3 Care Processes to Benefit from HIT: AP Perspective

1. A complete electronic medical record that is template-driven

2. A system to assist with transitional care by sending and receiving resident information electronically between and within the nursing home and other clinical settings

3. Electronic prescribing with drug-drug interaction and adverse drug event information.

Top 3 Care Processes to Benefit from HIT: CNA Perspective

1. A system that communicates information about resident status (e.g., functional, cognitive and nutritional) and daily needs to CNAs that is responsive to change

2. A process for getting relevant clinical information (e.g., functional, cognitive and nutritional) from the sending hospital on admission directly to the CNA, so that a care plan can be developed and implemented independent of other care providers

3. Electronic process to capture necessary charting information (e.g., ADL, dietary, transfer, etc) in real-time and at the point of care.

Top 3 Care Processes to Benefit from HIT: DON Perspective

1. A system to assist with the med administration (e.g., identify allergies, current orders in real time, require necessary documentation when giving meds)

2. A system or process that would automate the admission assessment process by electronically abstracting information from the prior care setting and facilitate data entry of necessary screening assessments (e.g., falls, pressure ulcers, cognition)

3. A system to facilitate monthly medication recaps.

Top 3 Care Processes to Benefit from HIT: NHA Perspective

1. Electronic medical record to automate insurance verification and authorization and document case management progress to discharge

2. Inventory management system for various supplies (e.g., durable medical equipment, ostomy supplies, and assistive devices) available at point of care

3. A system which would directly transmit orders and receive laboratory, radiology, and consultant pharmacist recommendations.

Top 3 Care Processes to Benefit from HIT: MD/DO Perspective

1. Electronic medication administration record that documents if and when a medication was given

2. Automatically generated "rounding note" that integrates the most recent vital signs, weight, bowel, bladder, wound and/or fall information, cognitive and functional status

3. Electronic prescribing that transmits prescription information to both pharmacy and nursing home and provides information on dosing, drug-drug interactions, formulary information, and commensurate orders.
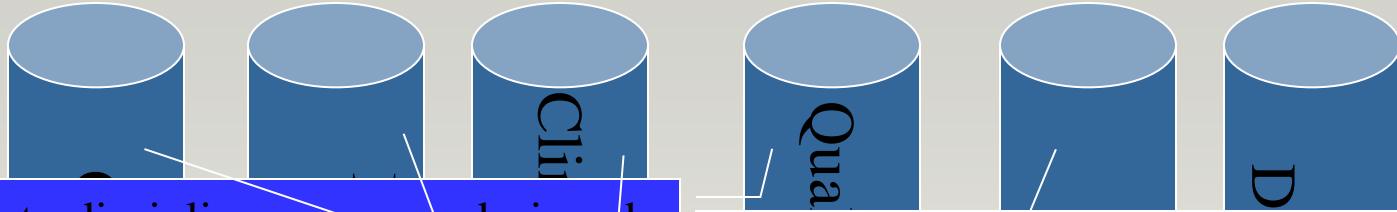
Top 3 Care Processes to Benefit from HIT: RPh/PharmD Perspective

1. Electronic prescribing system that includes standardized order set requiring documentation of specific data elements

2. An electronic medication administration record that that allows for documentation of patient refusal, that aides in identification of adverse drug events/side effects, and that that has integrated clinical protocols (e.g., pain)

3. An electronic prescribing system that requires all data elements be reconciled with patients medical chart (e.g. allergy information) prior to order communication.

Post-processing of Concepts and Applications

- We further edited, disaggregated, and combined the concepts and applications as appropriate to reduce redundancy

- Using a consensus process, we grouped the responses in to 'topical areas,' then focused our attention on the topical areas with high priority ranked items

- We also cross-walked our content with several published papers and reports.

3 Care Process and 3 Cross-cutting Domains

C...

Clin...

Qua...

D...

Ongoing interdisciplinary process designed to raise the standards of and improve the delivery of preventive, diagnostic, therapeutic, and rehabilitative measures in order to maintain, restore and improve

Hand-off communication is a defined by the Joint Commission as a process(es) to

Prescribing, order communication, dispensing, administering, monitoring and reconciliation of medications. These tasks

Regulatory Compliance refers to systems in place that ensure local, state and federal mandates are being followed within appropriate time frames.

ctured clinical documentation is a way gically collect, organize, and retrieve ical and/or administrative data.

transitions.

Operations

Technology/Infrastructure

Uses of HIT and Care Processes Mentioned in NGT

HIT can be used to:

- Capture data
- Track problems
- Monitor status
- Alerts
- Support QI
- Best Practices
- Regulatory Requirements

Care Processes:

- Infectious Disease
- Pressure sores
- Falls
- Nutritional Status
- Physical Restraints
- Vaccinations
- Mood/Behavior
- Changes in status (e.g., cognitive or functional status)

Limitations

- Convenience sample

- NGT participants were limited to the Mid-Atlantic/Midwest regions

- There may be other aspects of HIT that our particular NGT participants did not rank highly and hence were not included in our conceptual model or subsequent surveys

Conclusion

- We successfully conducted nominal group technique sessions to identify care processes that could benefit from HIT in the NH setting from the perspective of multiple stakeholders

- We developed a conceptual model of HIT functions that informed survey development and site visits

Thank you!

- Email: handler@pitt.edu
- Phone: (412) 647-1452

- Acknowledgments:
  - The Commonwealth Fund
  - Research Team
    - Howard Degenholtz, PhD
    - Mike Lin, PhD
    - Abby Resnick, MS

Implementing HIT in US Nursing Homes:
A Report on Adoption and Use

Howard B. Degenholtz, PhD

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Research Question

- What is the availability and use of HIT in nursing homes…

  …From the perspective of clinical professionals who are not necessarily employees

- Chosen because they need to access clinical data

- High skill and training

- Can potentially serve as leaders or impediments to adoption and use

Sample Frame

- Selected States to Capture Regional Variation:
  - California
  - Georgia
  - Illinois
  - Massachusetts
  - Maryland
  - Ohio
  - Texas
- Several Plains/Western States Were Combined to Capture Rural Experience:
  - Montana
  - Wyoming
  - North Dakota
  - South Dakota
  - Iaho

- Obtained mailing lists from professional societies for selected states
  - American Society for Consulting Pharmacists
  - Gerontological Advance Practitioners Association
  - American Medical Directors Association

Methods

- First class envelopes sent to each person
  - Instructions to access online survey
  - Included a University of Pittsburgh Debit Card
    - Only activated with $50 after survey was complete
  - Four repeat mailings and reminders
- Asked to report on facility where you spend the most time
- Response Rates:
  - Pharmacists: 196/522 = 38%
  - Adv. Practitioners: 146/306 = 48%
  - Physicians: 169/502 = 34%

HIT Domains

- **Quality Improvement**
  - Identify Residents at Risk (9)
  - Trending (9)
  - Generate Alerts about Changes in Resident Health (9)
  - Generate Alerts about Orders (4)
- **Communication and Documentation**
  - Generate Messages for Clinicians (5)
  - Structured Clinical Documentation (9)
  - Point of Care Documentation (7)
- **Medication Use Process**
  - Prescribing and Order Communication (6)
  - Administration (4)
  - Monitoring (4)
  - Reconciliation, Recap, Dispensing (3)

- **Data Transfer**
  - Send/Receive Clinical Information (5)
  - Receive Orders at Admission (5)
  - Send Orders on Discharge (5)
- **Reminders and Orders**

Specific Quality Problems (9):
- New or recurrent infection
- New or recurrent Pressure Sore
- New or recurrent Fall
- Poor nutritional status
- Vaccination Status
- Mood or behavioral problems
- Changes in physical function
- Changes in cognitive function
- Physical restraint use

Response Set & Scoring

- Response set was:
  - Not available
  - Available, Not Used
  - Used Rarely
  - Used Some of the Time
  - Used Most of the Time
  - Used All of the Time
- Calculated the percent of sub-areas in which respondent indicated they use each feature "All of the Time"
  - Score is 0 to 1
  - Measure of implementation that values routinization
  - Interpret as "Percent of Available Features Used All the Time"
- Created indices for each functional domain and each quality area

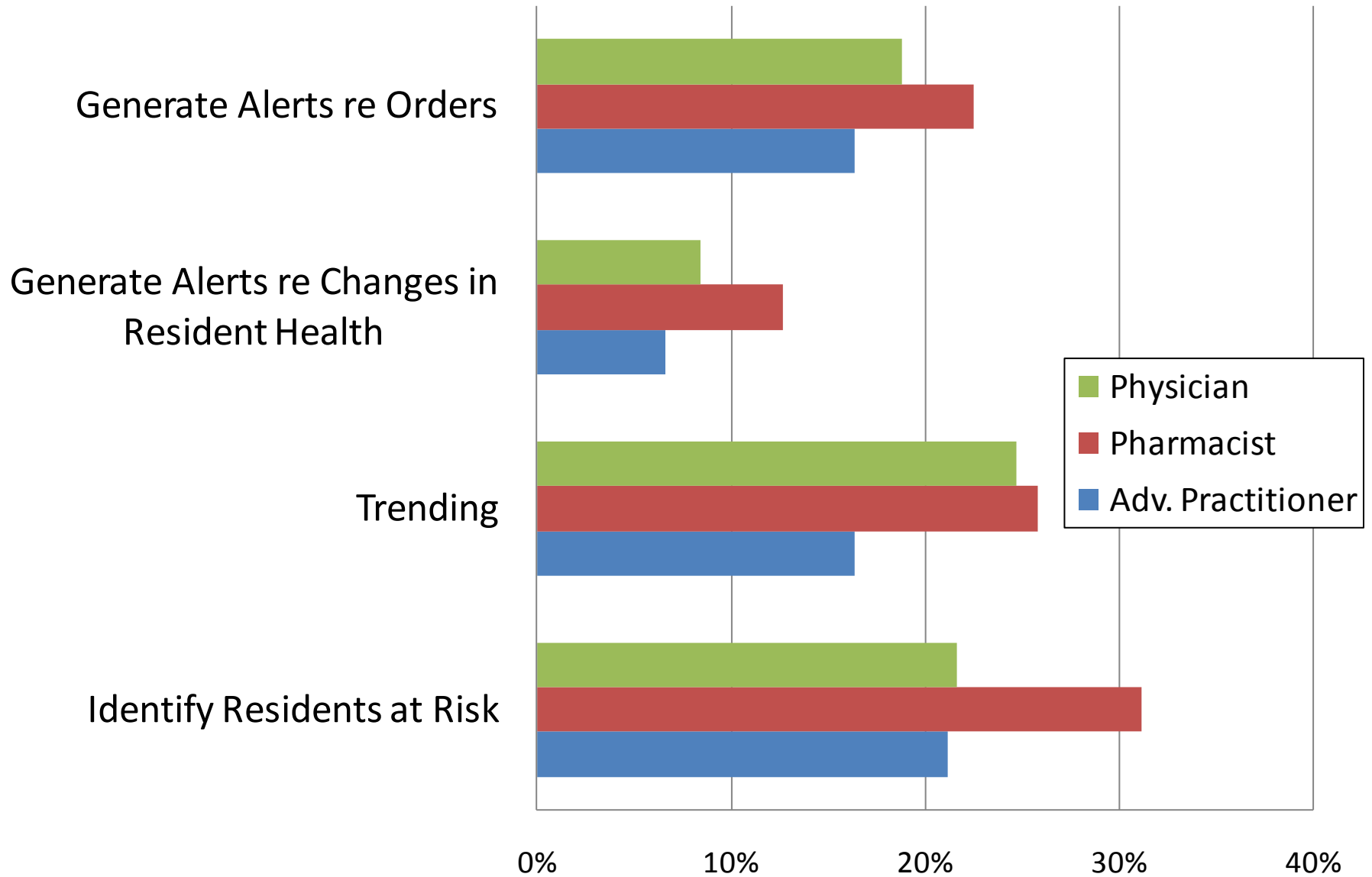# Selected Respondent Characteristics

		Adv. Practitioner	Pharmacists	Physicians
Years Since Training	Up to 5	23%	16%	9%
	6 to 15	50%	28%	18%
	16 and over	19%	47%	51%
Years at Curr. Facility	Up to 5	56%	54%	23%
	6 to 15	28%	27%	26%
	16 and over	2%	8%	28%
Medical Director?		n/a	n/a	67%

Use of HIT by Domain:
Percent of Available Functions Used All the Time

Domain	Percent
Quality Improvement	19
Communication and Documentation	22
Medication Use Process	25
Data Transfer	10
Reminders and Orders	13
Operations	14

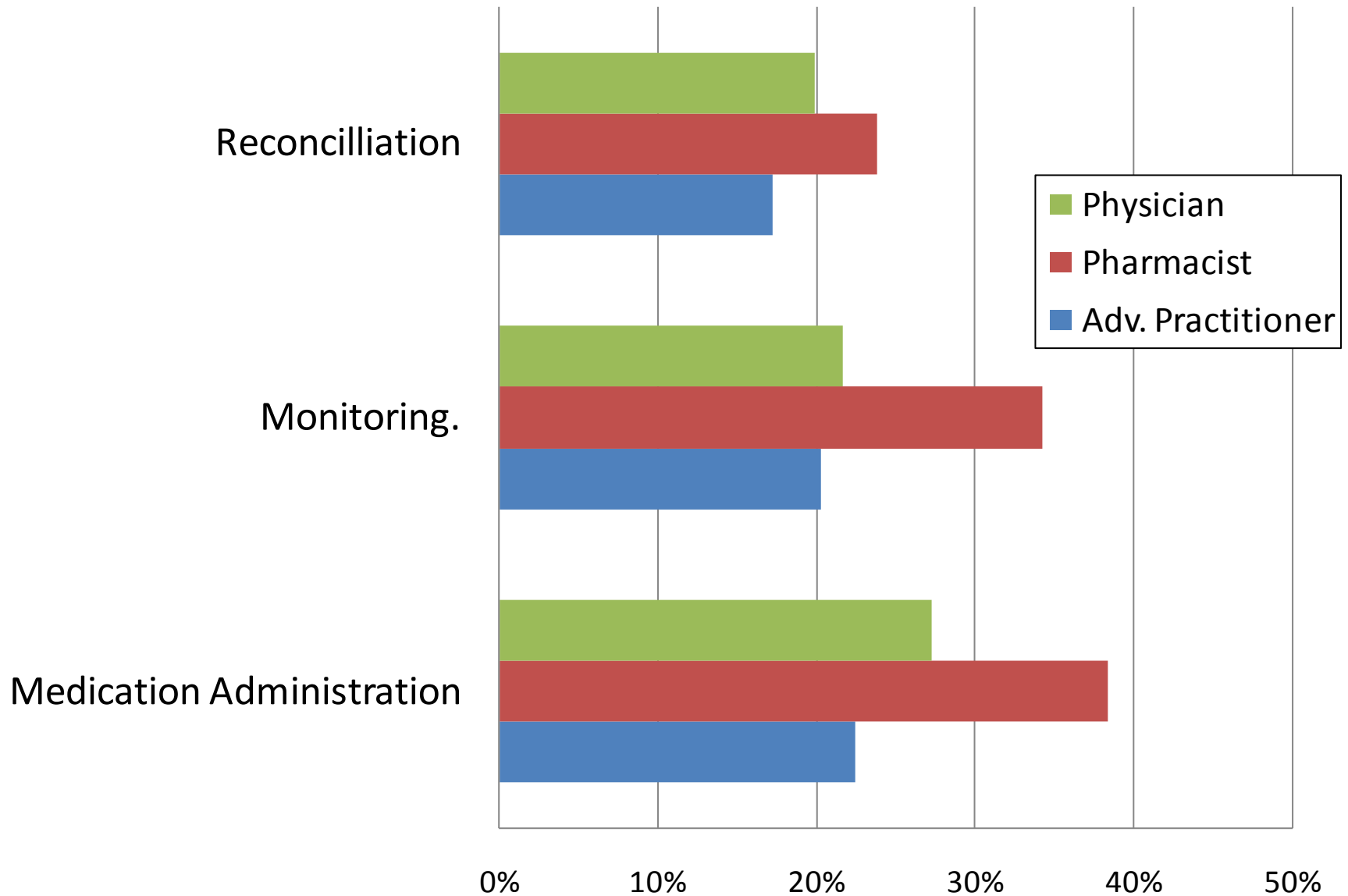Note: Combines all three professional groups.

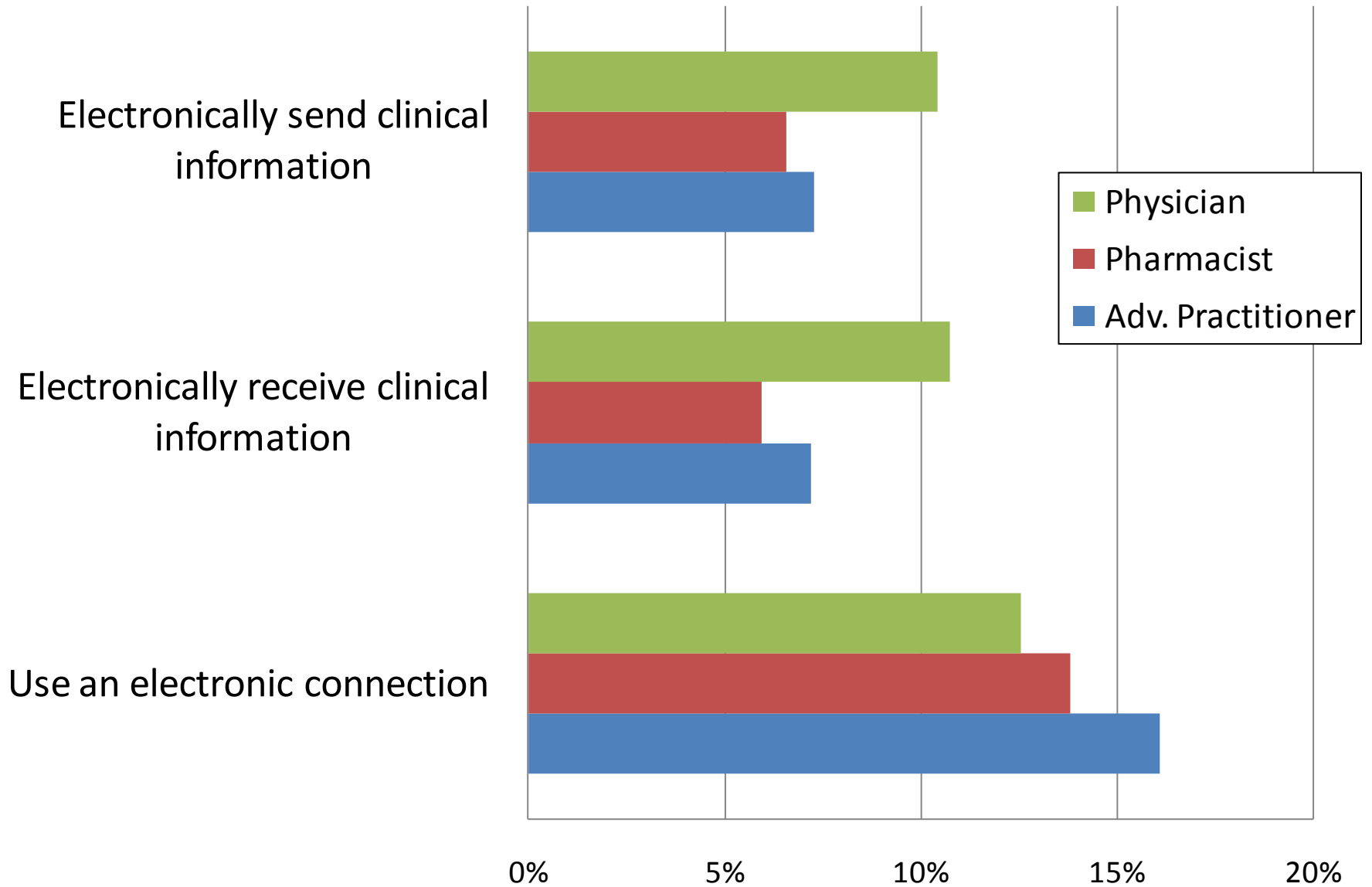# 1. Quality Improvement (Cross Clinical)

Clinical Domains (Cross Function)

Categories (top to bottom):
- Physical restraint use
- Changes in cognitive function
- Changes in physical function
- Mood or behavioral problems
- Vaccination Status
- Poor nutritional status
- New or recurrent Fall
- New or recurrent Pressure...
- New or recurrent infection

Legend:
- Physician
- Pharmacist
- Adv. Practitioner

X-axis: 0% 10% 20% 30% 40%

2. Communication and Documentation

4. Data Transfer

Electronically send clinical information

Electronically receive clinical information

Use an electronic connection

Legend:
- Physician
- Pharmacist
- Adv. Practitioner

0%   5%   10%   15%   20%

5. Reminders & Orders and Operations

Legend:
- Physician (green)
- Pharmacist (red)
- Adv. Practitioner (blue)

Categories:
- Planning functions
- Inventory management
- Use HIT to manage
- Electronically review and acknowledge
- Generate reminders

X-axis: 0%, 5%, 10%, 15%, 20%, 25%, 30%
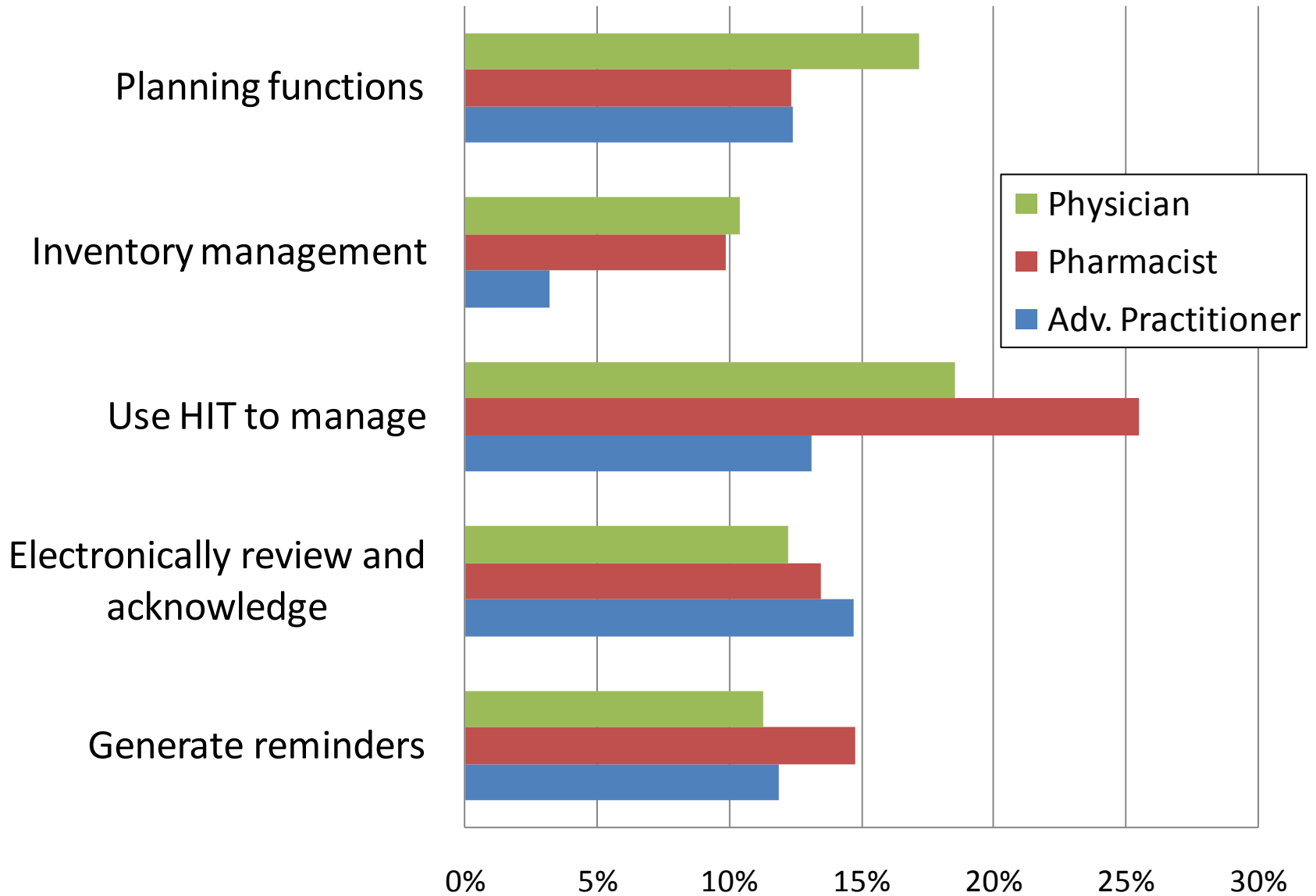
Summary

- Aggregating:
  - Medication Domain rates highest
  - Data Transfer rates lowest
- Use rates range widely:
  - Adv Practitioners rate Inventory Management Lowest (3%)
  - Pharmacists rate use of medication administration highest (38%)
- Differences by type professional
  - Seems to reflect role functions

Limitations

- Items in each domain may not represent all possible uses of HIT
  - Based on NGT process
  - There are many possible 'uses' that could be added by getting more granular
- Sample bias
  - Participants may be more favorably disposed to technology
    - Internet based survey weeded out some people with poor skills
- Generalization to professional groups in selected states
  - Does not represent facilities

Next Steps

- Differences by facility characteristics
  - Size, urban/rural, ownership, etc.
- Analysis of survey of facility respondents is underway
  - Nursing home administrators
  - Directors of nursing
- Integrate case study findings into results

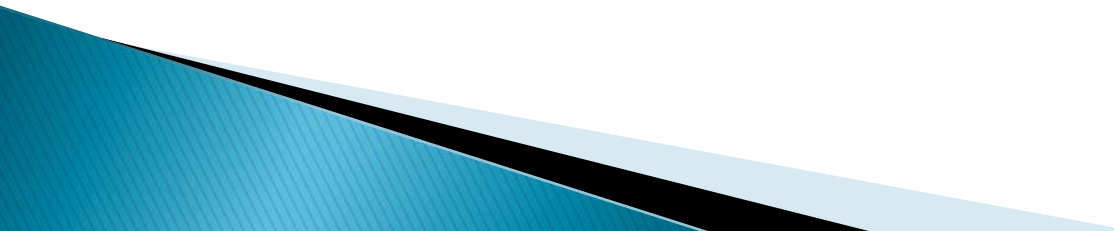# Health Information Technology and Organizational Change in Nursing Homes

Michael K. Lin

Assistant Professor

Department of Health Policy & Management

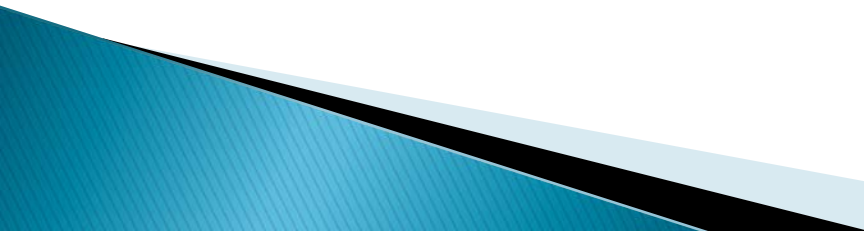University of Pittsburgh Graduate School of Public Health

Overview

- Why study change?
- Conceptual framework
- Methods
- Results
- Implications
- Next steps

Why Study Change

- To understand where facilities have been, how they arrived at their current state, and how they may evolve
- This information will help:
  - managers learn from others
  - providers understand the past, present and future
  - policymakers place important levers on the agenda

Conceptual Framework

- Nursing home dynamics may be captured by considering patterns regarding *what:*
  - *transpires in the facility*
  - *influences these changes*
- Innovation is the development and use of a practice, policy, or technology that is new to a focal organization *(Rogers, 2003)*
- To facilitate learning from practice, organizational researchers study how nursing homes innovation and change over time

Conceptual Model

Nursing Home Innovation

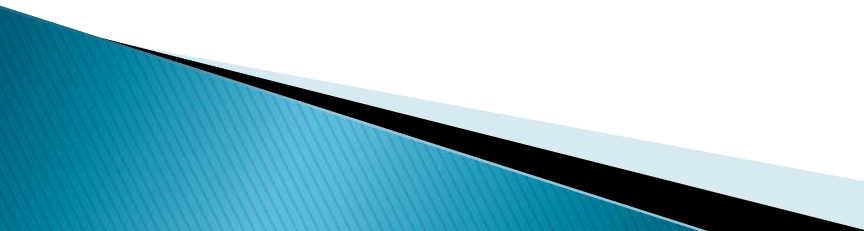| Original Structure and Behavior | HIT Adoption HIT Implementation → | Altered Structure and Behavior |

1.Individual Changes
2.Interpersonal Changes

Methods

- Development of a survey through literature review, vendor survey, and practical experience
  - Pre-test with select individuals during nominal group technique sessions
  - Inclusion with Adoption and Use survey
- Today's presentation focuses on our project's Professional Sample

Change Management Topics

- Stage of Innovation: Adoption or Implementation
- Locus of Change: Top-Down or Bottom-Up
- Preparedness for HIT
- Selection Process
- Pace of Change and Learning Process
- Technical Support and Training
- Leadership and Commitment to Team Approach
- Top Management and Psychological Climate
- Workflow Changes
- Organizational Politics

Stage of Innovation

Stage of Innovation	Number of Facilities	Percentage
Non–Adoption	119	28%
Agenda Setting	138	33%
Matching	51	12%
Restructuring	46	11%
Clarifying	33	8%
Routinization	36	9%

Locus of Change

Primary Decision–Maker Re: HIT Changes	Number of Facilities	Percentage
Administration	264	65%
Equal Role	114	28%
Direct Care Staff	27	7%

Preparedness

	Number of Facilities	Percentage
Reluctant to abandon <u>paper method</u> for documentation	214	52%
<u>Lack of experience</u> with computers	204	50%
Uncomfortable <u>relying on technology</u> for care processes	125	31%

Selection Process

Process used to select HIT for purchase	Number of Facilities	Percentage
Recommendation from peer / colleague	131	50%
Vendor demonstration	119	46%
Site Visit to Another Facility	82	32%
Viewed product at conference	75	29%
Participated in Webinar	24	9%
Telephone conference call	24	9%
Reviewed magazine / journals	23	9%

Pace and Approach to Change

A. Pace of Change	Number of Facilities	Percentage
Implement in <u>subset</u> of facility before full-scale roll-out	306	86%
Implement <u>all-at-once</u>	49	14%
B. Approach to Change		
<u>Trial-and-Error</u>	161	44%
Extensive <u>Planning</u>	136	37%
Careful <u>Experimentation</u>	68	19%

Technical Support: Who & How

A. Who Provides Tech Support	Facilities	Percentage
Reliance on consultants	149	42%
Vendors provide technical support	144	40%
Rely on trial and error among our own staff	65	18%
B. How is Support Provided		
Telephone Support	176	49%
On–Site Support	145	41%
Digital Support (email and/or web–based)	37	10%

Gaps in Training Approach

Activity	Number of "Nevers"	Percentage
Senior leadership participates in training with direct care workers	174	41%
Direct care workers have dedicated time for training	172	40%

Gaps in Leadership

Leadership Actions	Number of "Nevers"	Percentage
Identifies HIT-related performance gaps	193	45%
Acknowledges both strengths and weaknesses of HIT	178	42%
Creates short term wins with HIT implementation	178	41%
Refers to team-related HIT benefits	156	36%
Articulates a vision involving HIT	151	35%
Mentions HIT-related regulatory compliance	140	32%

Psychological Climate

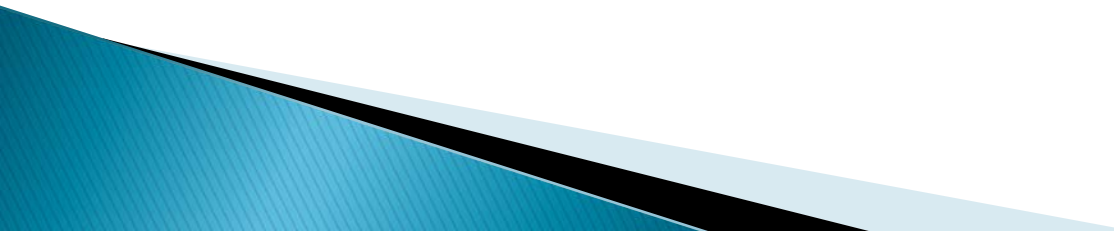|	Number of "Agree" or "Strongly Agree"	Percentage
HIT purchases require <u>compatibility</u> with regulatory requirements	254	62%
HIT purchases require <u>positive financial return</u>	219	53%
HIT purchases must be "<u>best of breed</u>"	141	34%

Workflow Changes

	Number of Facilities	Percentage
Workflow changes are made <u>Top-Down</u>	253	69%
Workflow changes are <u>Negotiated</u>	108	29%
Workflow changes are made <u>Bottom-Up</u>	7	2%
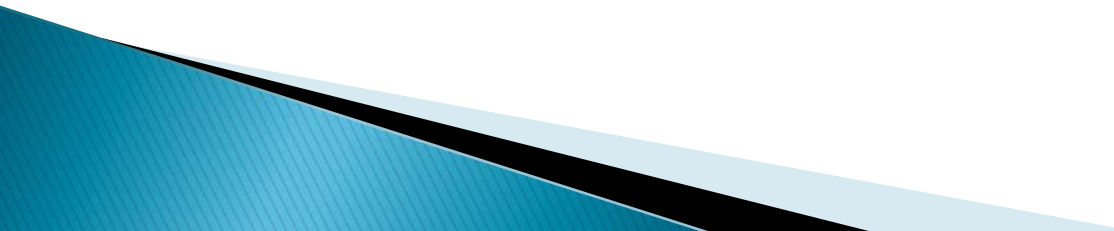
Organizational Politics

	Number of "Agree" or "Strongly Agree"	Percentage
Reluctant to participate in HIT training unless paid	233	67%
Staff fear that they will be asked to do more work with HIT	164	40%
Reluctant to alter roles and routines for HIT	159	39%
Conflict among staff over HIT selection	95	23%
Fear HIT will disrupt relationships with residents	76	19%
Fear HIT will alter power dynamics among staff	61	15%

Implications

- Importance of informal and formal structures
- Individual and Group beliefs
- Agenda for top management
- Key priorities for professional groups
- Policy support for implementation

Next Steps- Analysis

- Association between change management and use of health information technology
- Association between change management and effects of health information technology use
- Clusters of change activities
- Replication and update on additional facilities

Symposium Overall Points

- There is a large gap between the potential uses of HIT in the nursing home setting and the actual level of implementation.
- Benefits such as reduced costs and improving quality will depend on deeper integration of available systems into day-to-day clinical operations.

Questions or Comments?

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- Acknowledgments:
  - Funding from The Commonwealth Fund
  - Research Team
    - Howard Degenholtz, PhD
    - Steven M. Handler, MD, MS, CMD
    - Abby Resnick, MS