Does the Organization of Post-Acute Stroke Care Really Matter ?

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Background

- From 1986 to 1996 Medicare expenditures for post acute care benefits increased from $2.5 billion to $30 billion

Changes in Provider Supply

- **Between 1990-1996**
  - SNF 10,500 to 15,000
  - Home Health Care Providers 5,800 to 9,900
  - IRF 813 to 1,048

Sites for Post-Acute Care

- Inpatient Rehabilitation Facilities
- Skilled Nursing Facilities
- Home Health

Inpatient rehabilitation facilities

- Patient requires frequent physician involvement
- 24 hour rehabilitation nursing
- At least 3 hours a therapy a day
- Coordinated multidisciplinary care
- Patients are expected to improve as result of therapy

Skilled Nursing Facility

- 24 hour nursing care
- Physician supervises patient care-available 24 hours a day on an emergency basis
- Dietary, pharmaceutical, dental, and medical services available
- Limit minutes of care
- Staff or contract therapies
- Maintenance care not simply improvement

Home Health

- Intermittent or part-time skilled nursing care and therapy services
- Patients must be homebound
- Prescribed but rarely managed by a physician
- Therapy services maintain function

Medicare treats the types of post-acute care providers differently

- Eligibility
- Coverage
- Payment

Average charges to provide stroke care across sites (1991 Medicare)

- IRF $17,615
- SNF $9,839
- HHS $2400

Discharge Destinations for Stroke (1999 ASPE Report)

- IRF 10.6%
- SNF 31.85%
- HHA 28.23%
- More than one PAC 20.2%

More similarity in patients across sites

- The different types of providers may be becoming more similar in patients they serve and types of services they provide

Kramer et al, JAGS, July 2000

- Outcome and Utilization Differences for Older Persons with Stroke in HMO and Fee for Service Systems

Patients similar across HMO and FFS

- No significant difference across numerous demographics, social support,prior function stroke severity, except that FFS patients were:
  - more likely income less than $10,000 (39% vs. 22%
  - less likely married (43% married vs. 54% married)
  - less likely to have able and willing caregiver (59% vs. 83%
  - blind 5.9% vs. 1.9 %
  - any psychiatric diagnosis 12.5% Vs 6.5%

Kramer et al: JAGS, July 2000

- Utilization differences for stroke patients treated in HMOs compared to Fee for Service revealed HMO patients:
  - Had shorter acute hospitalizations 5.9(5.6) Vs 8.7 (6.2)
  - Were less likely to be discharged to IRF (13% vs. 85%)
  - Fewer physician visits, fewer specialty care
  - Fewer therapy sessions
  - More Home Health

Are there differences in outcomes?

- YES
  - During rehabilitation FFS patients improved more in ADLs adjusted difference .73 ADLS p<.001
  - No difference in ADL recovery between groups at 1 year
  - HMO patients more likely to reside in nursing home at 1 year 2.4 (95% CI 1.1-3.5)

Other NRCT studies comparing differences in outcomes across settings

- Kramer et al: JAMA 277:396-404, 1997
  - IRF had better outcomes than did SNF (ADLs and discharge to community) for stroke patients but not hip fracture patients
- Kane et al: JAGS 44:545-554, 1996
  - Stroke or hip fracture patients discharged from acute care to IRF had better functional improvement than those discharged to SNF

Kane study continued

- IRF patients relative to SNFs and HHA patients had better outcomes if patients had high levels of dependency
- HHA patients had better ADL recovery than IRF patients if patients had low levels of dependency

Randomized studies of multidisciplinary stroke unit care

- Langhorne and Duncan
  - Meta-analysis of clinical trials which randomized patients one week post stroke to inpatient multidisciplinary care or other alternatives
  - Outcomes: 1) death or institutionalization and 2) death or dependency

Alternative strategies for stroke care: RCT

- Kalra et al: Lancet , September 9, 2000
  - Single blind RCT of moderate stroke patients
  - Randomized within 72 hours of stroke
    - Stroke unit care n=152
    - General ward with stroke team n=152
    - Home Health Care n=153 (1/3 crossed over to stroke unit care)
  - Intention to treat analysis

Outcomes

- Mortality or institutionalization at 1 year
  - Stroke unit 14%
  - General ward with stroke team visit 30%
  - HHA 24%
- At 1 year alive without severe disability
  - Stroke unit 85%
  - General ward with stroke team 66%
  - HHA 71%

Summary

- Converging and convincing evidence that well-organized stroke care improves outcomes
- But what is different about process of care?
- Does the process of care make a difference?
- Is there a relationship between structure and process?

Structure, Process, and Outcome of Post-Acute Stroke Care

Duncan et al: Stroke 2002: 33:167-177

Study Investigators and Collaborators

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- Helen Hoenig, MD Durham VA and Duke
- Tara Knowles, Mstat Durham VA

Funded by:

Department of Veteran Affairs

Health Services Research and Development ACC 97-114

Donabedian's Model

- Structure
- Process
- Outcomes

Structure

- Characteristics of the facility, equipment, and personnel providing the care
  - Examples: Skilled nursing homes or inpatient rehabilitation units, access to specialty care (neurology, physical medicine and rehabilitation), staffing ratios, transitional apartment for ADL training

Process

- How care is delivered or what was done
  - Example: Compliance with AHCPR guidelines for post-acute care (e.g. screen for depression, discharge planning, multidisciplinary team conferences)

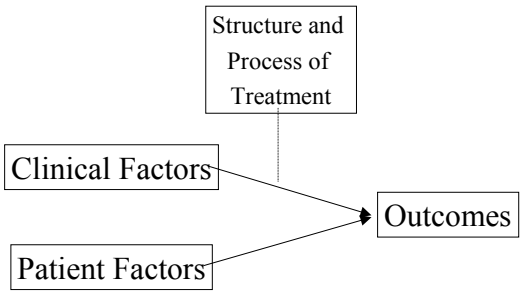
Outcomes

- "those changes either favorable or adverse.. That can be attributed to prior or current care"

Outcome Measures

- Mortality
- Functional Status (e.g. FIM)
- IADL
- Health-Related Quality of Life (SF-36)
- Stroke Specific Outcome Measure
- Satisfaction with Care

Conceptual Model of Treatment and Outcomes



Clinical Factors

- Prior Function
- Prior Stroke
- Stroke Severity
- Comorbidities

Patient Factors

- Age
- Sex
- Social Support

Questions we were asking

- Is there variability in structure of care?
- Is there variability in process (compliance with AHCPR Post Acute Guidelines) of care?
- Is there a relationship between structure process and outcome?

Study Design

- Two and one half years
- Multiple sites (n=11) representing continuum of programs
- Prospective (25-35 patients/site)
- Patients enrolled within 10 days of stroke
- Rehabilitation candidates (follow one step command and have a new ADL deficit, lived in community and independent in ADLS prior to stroke)

Prospective Clinical Evaluation of Patients

- Within 10 days of stroke patients were assessed by clinical researchers
  - Demographics
  - Prior Function
  - Comorbidities
  - Stroke Severity
  - Mental Status
  - ADL Status

Study Design

- 6 month telephone follow-up
- Independent Agency (National Follow-Up Service , Buffalo NY)

Site Characteristics

Location	#Stroke Pts	RBU	GEM
Minneapolis	165	YES	NO
Lexington	140	YES	YES
Portland	163	YES	YES
West LA	182	YES	YES
Tampa	203	YES	No
San Antonio	159	YES	No
Baltimore	246	No	YES
Washington	158	No	YES
St. Louis	171	YES	YES
Birmingham	126	No	No
Jackson	125	No	No

Definition of Structure of Post Acute Care (Macro)

- 0= No post acute care
- 1= Low level post acute care (outpatient, home health, nursing home)
- 2= High level post acute care (VARBU, VAGEM, and Inpatient Acute Rehab)

Definition of Process - Compliance with AHCPR Post-Acute Guidelines

- Guidelines developed in 1995 by expert panel
- Included 8 dimensions of acute rehabilitation care and 11 post-acute dimensions of care
- Scoring algorithms were developed for each dimension of care with a weighted composite score for all dimensions

Dimensions of Acute Care Rehabilitation

- Multidisciplinary Team Coordination
- Baseline Assessment
- Early Initiation of Rehabilitation
- Management of General Health Functions
- Prevention of Complications
- Use of Standardized Stroke Scale
- Prevention of Recurrent Stroke
- Screening for Rehabilitation

Dimensions of Post-Acute Care

- **Multidisciplinary team coordination**
- **Baseline assessments**
- **Goal Setting**
- **Treatment plan**
- **Monitoring of progress**
- **Management of impairments/ disabilities**
- **Prevention of complications**
- **Prevention of recurrent stroke**
- **Family involvement**
- **Patient & family education**
- **Discharge planning**

Primary Outcome

- Functional Status-FIM motor scores at 6 months post-stroke.

Other Outcomes

- IADL
- Physical Function of SF-36
- New Stroke Specific Outcome Measure - Stroke Impact Scale
- Patient Satisfaction

Stroke Cohort Description

N=288

Age	67 (10)
Male %	97%
Married %	47%
White %	67%
Living at home PTA%	98%
Barthel Index PTA	94 (14)

Stroke Characteristics and Severity

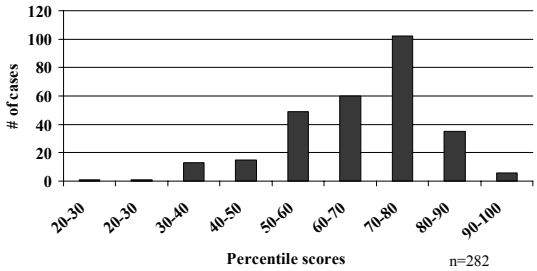
- **Ischemic Stroke** **93%**
- **Stroke Location**
  - **Right Hemisphere** **45%**
  - **Left Hemisphere** **42%**
  - **Other** **13%**
- **Severity (Rankin)**
  - **5- Severe Disability 5%**
  - **4- Mod. Disability 62%**
  - **3- Mod. Disability 17%**
  - **2- Mild disability 13%**
  - **1- No sig. disability 3%**

Structure of Care Variability

- **Level of post-acute care setting**
  - 41% High-level post-acute care (VA RBU, VA GEM, or private sector inpatient rehab unit)
  - 32% Low-level post acute care (VA ECRC, Nursing Home, Home Health or Outpatient treatment)
  - 27% No post-acute care

(n=288)

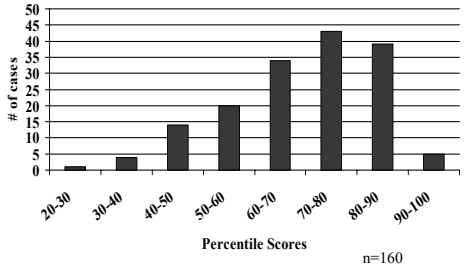
Process of Care Variability: Acute Guideline Compliance Score



n=282
Mean= 68.2%
Median=70.5%

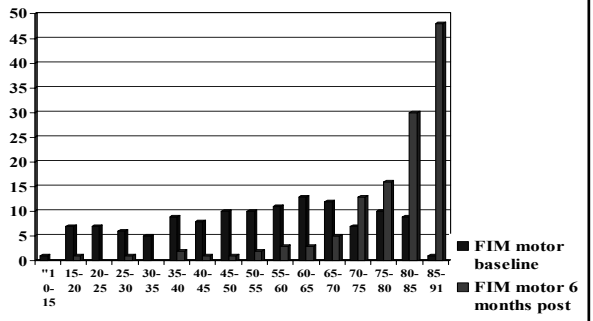
Process of Care Variability: Post-Acute Guideline Compliance Score-

Inpatients Only



n=160
Mean =69.4%
Median=72.5%

FIM motor scores at baseline and 6 months post-stroke

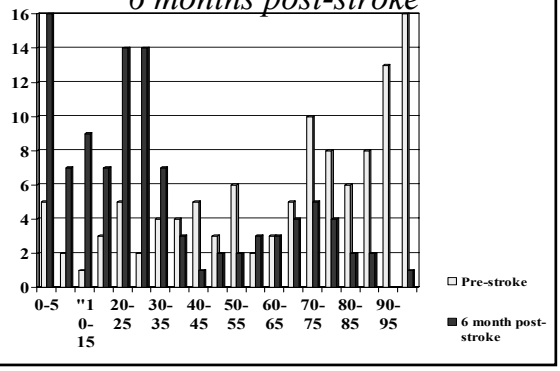


FIM Motor Scores

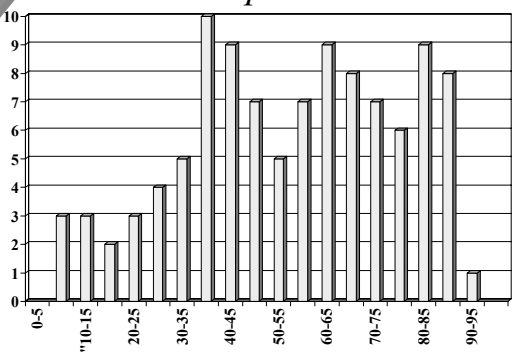
range 13-91

- Baseline 54.4 (20.2) N=285
- 6 Month F/U 76.3 (17.3) N=236

SF-36 Physical Function-Baseline and 6 months post-stroke



SIS Physical Scale at 6 months post-stroke



Case Mix Adjusters R^2= 30%

- Age
- Race
- Social Support
- Pre-stroke walking ability
- Charlson comorbidity
- Cognition (MMSE)
- FIM motor baseline

Association of Guideline Compliance with Outcomes

- After case mix adjustment, level of compliance with post-acute rehabilitation guidelines was significantly associated with six month recovery as measured by the FIM motor, IADL, SIS Physical Score. It was not related to mortality or SF-36 physical function. Level of compliance with acute rehabilitative care guidelines was unrelated to any of the outcome measures.

Effect of Guideline Compliance is Statistically and Clinically Meaningful

- Increasing post-acute guideline compliance from 50% to 100%, could increase FIM motor score 12 points or IADL scores by 4 points.
- The increased variance in outcomes explained by compliance variables was 8% for FIM

Post-Acute Stroke Guideline Compliance Leads to Greater Patient Satisfaction *(among other things)*

Reker et al: Archives Physical Medicine and Rehabilitation 2002: 83: 750-756

Background

- Satisfaction as an outcome measure
  - Indicator of Quality of Care
  - Health care delivery performance assessment
  - Evaluation and development of patient care models- CQI, TQM

Satisfaction Instrument

- Pandora Pound- Stroke Specific
  - Two dimensions
    - Hospital Based Services- 9 items
    - Home and Community Based Services- 4 items
  - Scoring
    - 4 point likert scale
      - 0=Strongly Disagree 3= Strongly Agree

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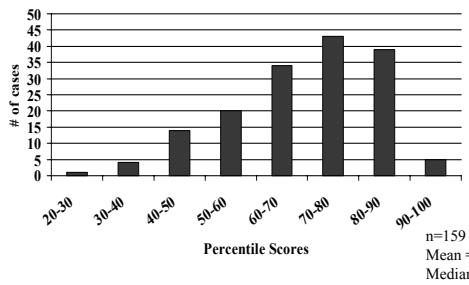
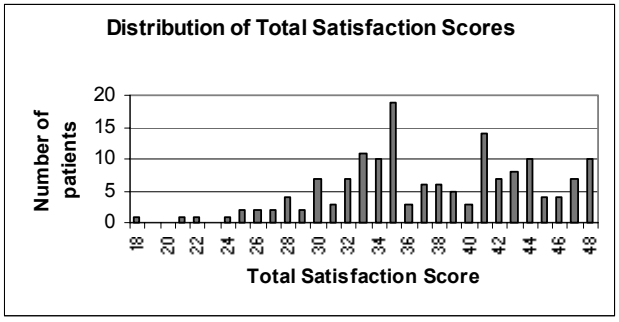
Process of Care Variability: Post-Acute Guideline Compliance Score- Inpatients Only



n=159
Mean =70%
Median=73%

Overall Satisfaction Scores



Satisfaction Outcome-Multivariate Results

Variable	Parameter Estimate	Standard Error	Pr > | t |
Intercept	0.28	9.72	0.977
Folstein at Baseline	0.09	0.18	0.611
FIM motor score at Baseline	0.09	0.04	0.012
Age	0.09	0.07	0.205
Charlson comorbidity index	-0.68	0.63	0.282
Race (nonwhite/white)	1.37	1.42	0.337
Full social support (no/yes)	2.38	1.72	0.171
Prior function (walking)	0.01	0.02	0.535
Acute AHCPR compliance score	0.02	0.05	0.670
Postacute AHCPR compliance score	0.15	0.05	0.002

R-squared= 0.158
R-squared covariates only= 0.072

Compliance Affects on Satisfaction

- Largely independent of patient functional outcome
  - Inserted FIM motor score at 6 months post-stroke into model
  - Coefficient for post acute compliance score decreased from .146 to .126 (p=.002 and p=.009 respectively)

Compliance and Satisfaction by Dimension

AHCPR Dimension	Correlation of Dimension Compliance Score with Total Satisfaction Score
Patient and Family Education	0.35
Baseline Assessments	0.23
Discharge Planning	0.22
Family Involvement	0.20
Monitoring of Patient Progress	0.15
Management of Impairments	0.13
Multi-disciplinary evaluation	0.11
Prevention of Recurrent Stroke	0.06
Prevention of Complications	0.04
Treatment Plan	-0.02
Goal Setting	-0.02

Conclusions

- Process of post-acute stroke care affects patient satisfaction, as well as, patient function in ADLs, IADLs, and multiple Stroke Impact Scale dimensions.
- More visible (to the patient) process of care components appear most strongly associated with patient satisfaction

Structure Effects on Process

Hoenig et al: Medical Care 2003, 40: 1036-1047

Historical Perspective

- Henry Ford changed the structure of automotive manufacturing with major effects on process and outcome
- Agriculture has changed from small family owned and operated farms to mega-farms
- The structure of surgical intervention has changed dramatically over the past 25 years

What are the structures of care in stroke rehabilitation?

- Acute Inpatient Rehab in dedicated hospital unit or free standing center for patients with mild to severe impairments that can tolerate intensive physical treatments- often defined by 3 hour rule
- Subacute Inpatient Rehab in a nursing home- vaguely defined as less intensive than acute rehab for patients with moderate to severe impairments or lacking access to above
- Home health or outpatient rehabilitation for patients with mild impairments or lacking access to above.

Structure of Rehabilitation

- Literature provides a strong link between structure and patient outcome
- Specialized stroke rehabilitation care is associated with decreased mortality, increased function, and community dwelling
- How is structure associated with process?

How we dissected structure

- Based on prior empirical work and theory, we selected three domains of study

1. Systemic organization
2. Staffing
3. Technology

Systemic Organization

- Scored 0 to 3: 1 point each for the presence of :
  - Acute Rehabilitation Unit
  - Stroke protocol in place
  - All stroke patients shared a common nursing station

Staffing

- Scored 0 to 4: 1 point each for the presence of:
  - 9 or more staffing disciplines
  - Clinical nurse specialist in rehabilitation
  - Physiatrist medical director
  - Continuing ed 4 or more times per year

Technology

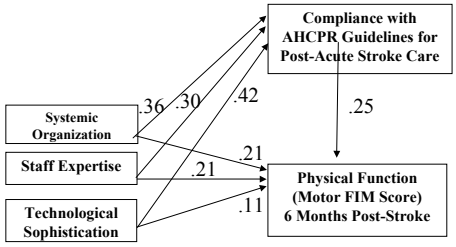
- Scored 0-3: 1 point each for the presence of:
  - Adaptive apartment on site
  - Adaptive bathroom
  - 11 or more types of rehab equipment

Correlations within Structure (kappas)

	Staff	Technology
System	**.57**	**.20**
Staff		**.05**

Staff variable dropped in multivariate analyses due to high collinearity

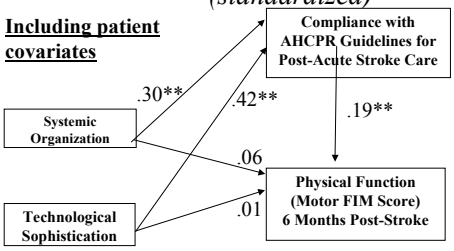
Bivariate Correlations



All correlations statistically significant at α 0.05 except 0.11.

Multivariate Coefficients (standardized)

Including patient covariates



** Statistically significant at α 0.05.

Limitations

- **Causality is suggested by not proven due to observational study design**
- **Generalizability to private sector**
- **Small sample size…type II error**
- **Didn't measure staff availability**

Conclusions

- In stroke rehabilitation-
  - Structure affects process of care and process affects patient outcomes
  - Improving process of care should have a significant and positive affect on patient outcomes, but
  - Having the appropriate structures of care may be necessary to optimize the process of care

Summary

- Compliance with guidelines may be a means of assessing quality of care and improving outcomes across sites

Summary

- In today's health care environment there will definitely be continued efforts to contain costs of post acute care and find the cheapest site of care
- Quality indicators are needed to ensure that quality of care is not comprised with organizational and funding changes

Where are we going from here?