Do Hospital-Based Skilled Nursing Facilities Provide Better Post-Acute Care?

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Background: Hospital-Based SNFs

Pre-SNF PPS

- Cost-based payment and higher capital costs led to costs being twice as high in HB-SNFs
- ~2,200 (14%) HB-SNFs nationwide

Post-SNF PPS

- Particularly unfavorable for hospital-based SNFs in that it leveled payments across all SNFs, leading to closures
- ~800 (5%) HB-SNFs nationwide

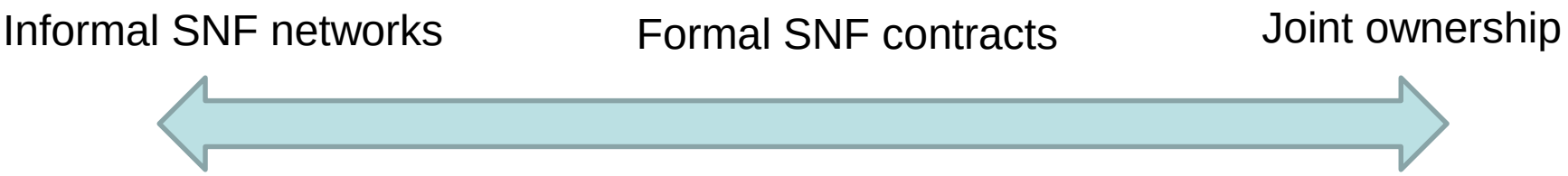
ACA Payment Reforms

ACA introduces global, accountable payment systems for hospitals and post-acute providers

- Accountable Care Organizations (ACOs)
- Bundled payment
- Hospital readmission penalties
- Comprehensive Care for Joint Replacement (CJR) Model

Hospital-SNF Linkages?

In new global payment era, hospitals looking to partner with SNFs



New Era of Hospital-PAC Consolidation?

Modern Healthcare

Kindred offer for Gentiva signals start of post-acute care consolidation

Provider
LONG TERM & POST-ACUTE CARE

Kindred Merger Demonstrates Explosive Growth Potential for Profession

SG2 health care intelligence — *Anticipate the Impact of Change*

BLOG
PAC Consolidation Brings Partnership Possibilities, Better Care Coordination

Deloitte.

Going vertical
Opportunities for hospitals to embrace post-acute care

post-gazette.com
Pittsburgh Post-Gazette

UPMC joins in hospice, home-care consolidation

Modern Healthcare

Consolidation in post-acute care continues with Addus deal, others

The Advisory Board Company

Kindred, Gentiva merge to create massive post-acute care system

Clinical Review & Education

Special Communication

Hospitals, Market Share, and Consolidation

David M. Cutler, PhD; Fiona Scott Morton, PhD

Modern Healthcare

Genesis, Skilled deal emblematic of post-acute care growth

Kindred Healthcare Makes Unsolicited Bid for Gentiva

By Michael J. de la Merced
Published: May 15, 2014

Kindred?s offer to buy Gentiva Health Services for about $514 million in cash and stock sets up a potential battle over the health care services company.

Theory

Two pathways by which vertically integrated HB-SNFs may increase efficiency:

- Economies of scope: If complementarities exist in production, hospitals and SNFs can produce better outcomes at a given cost through joint ownership
- Specialization: HB-SNFs generally specialize in production of Medicare services. Assuming commonality in production, freestanding SNFs must cross-subsidize the production of long-stay Medicaid care, thereby lowering efficiency

Prior Literature

- In unadjusted analysis, Liu and Black (2003) found HB-SNFs had lower LOS (13 days vs 27 days), mortality (4% vs 7%), and hospital readmission (23% vs 28%)

- Using propensity matching, Stearns et al. (2006) found HB-SNFs had 16.7% shorter LOS, a 7.7% greater likelihood of 30-day home discharge, and 2.3% fewer preventable 30-day hospital readmissions

  "One limitation of our analysis is that unobserved selection still may explain the remaining differences in outcomes for patients of hospital-based SNFs. A natural approach to investigate this issue is to use instrumental variables (IV) models." (p 620)

- David et al. (2016) instrument for HB-SNF by using the rate of SNF ownership by other hospitals in same market and found lower 60-day hospital readmissions for patients discharged to a hospital-owned SNF

Research Objective

To examine the effect of instrumented hospital-based SNF status on post-acute discharge outcomes

Data and Cohort

- Medicare enrollment file and Medicare SNF, inpatient and home health claims within 180 days of hospital discharge
- Minimum Data Set (MDS) to identify first-time admissions in 2009 (827,153 beneficiaries discharged from 3,173 acute care hospitals to 14,374 SNFs)
- Facility data from CMS Online Survey Certification and Reporting (OSCAR) system.
- Zip code level data from Census 2000 aggregates

General Empirical Approach

$$Y_{in} = HB_n\beta + X_i\delta + v_{HRR} + \varepsilon_{in}$$

Where:

Y_{in} is the outcome for person *i* in SNF *n*

HB_n is hospital-based status at SNF j

X_i is a vector of person and zip-code residential covariates

v_{HRR} = hospital referral region fixed effects

ε_{in} is a randomly distributed error term

Table 2: Summary of (N=827,513)

	Mean	Std. Dev.
Days in different setting in the 180 days following hospital discharge		
Death (# of days)	25.19	52.79
Hospital (# of days)	8.29	18.02
Skilled nursing facility (# of days)	51.01	52.00
Community with home health care (# of days)	28.44	38.47
Community (# of days)	67.06	63.85
Accumulated outcomes in first 30 days following discharge		
Reimbursement for Inpatient hospital care ($)	2,256	6,327
Reimbursement for SNF care ($)	9,160	4,438
Reimbursement for Home health care ($)	415	781
Total reimbursement ($)	11,903	6,815
Death	0.071	0.257
Any hospital readmission	0.201	0.401
Accumulated outcomes in first 180 days following discharge		
Reimbursement for Inpatient hospital care ($)	8,214	16,978
Reimbursement for SNF care ($)	14,413	10,673
Reimbursement for Home health care ($)	2,545	3,299
Total reimbursement ($)	25,790	22,151
Death	0.220	0.414
Any hospital readmission	0.446	0.497

IV

Assume hospital-based status has the following reduced form:

$$HB_n = DD_{in}\lambda + X_i\gamma + v_{HRR} + u_{in}$$

Can we identify a variable *DD* that is correlated with hospital-based status, but not ε, the error term in the quality equation?

<u>Instrument = Differential distance (DD)</u>

- Grabowski et al. (2013) and Hirth et al. (2014) used a DD instrument to examine FP-NFP nursing home outcomes
- Brooks et al. (2006) used a DD instrument to examine survival differences across FP-NFP dialysis centers

DD Instrument: Rationale

- Distance matters in the choice of hospitals (e.g. McClellan et al., 1994)

- Individuals choose their place of residence without regard to whether surrounding hospitals have a SNF; hospitals locate without regard to types of residents

IV Assumptions

Assumption 1: Instrument is correlated with the treatment

- Expected negative sign and strongly significant in first stage

Assumption 2: The instrument is uncorrelated with the error

- Compare observables by value of instrument
- Falsification test

Comparison of Observables by Value of Instrument

	DD>median	DD<median
Hospital-based	7%	17%
Age	81.5	81.2
Female	66%	65%
White	90%	89%
Medicaid	19%	19%
CHF	21%	21%
# meds last 7 days	12.10	12.25
ADL score	16.58	16.49

Falsfication Test

- Doyle (2011) examines effect of health spending on outcomes for individuals on vacation

- DD Instrument should only work for individuals entering hospital near their residence
  - For individuals on vacation or entering hospital near an adult child, instrument will only work if DD correlated with unobservables

Table 4: First-stage results, regression of a hospital with a skilled nursing facility (SNF) on differential distance

	All	All	Entered hospital 100km+	Entered hospital 200km+	Entered hospital 500km+
Differential Distance (natural log of nearest hospital w/ SNF – natural log of nearest w/out)		-0.0579***	-0.0135***	-0.0044***	-0.00184
Differential Distance (nearest hospital w/ SNF – nearest w/out)	-.0017***				
t-statistics	8.78	20.06	6.77	3.31	1.21
F-statistics	77.01	402.40	45.87	10.98	1.47
Partial *R*-squared	0.031	0.057			
Observations	826,485	826,485	48,287	27,449	17,996
R-squared	0.0927	0.104	0.041	0.037	0.035

Note: All the regressions include patients and residential zip-code level explanatory variables listed in table 3 and hospital referral region (HRR) fixed effects. Test statistics are based on robust standard error.

Estimation

- Least squares to replicate previous literature with endogenous hospital-based status

- Two-stage least squares (2SLS)

180-Day Results – Marginal Effects

Outcome (days)	**OLS**	**IV**
Death	0.55***	0.85
Hospital	0.47***	-0.61**
SNF	-16.91***	-5.71***
Home w/ home health	5.04***	0.70
Home w/out home health	10.85***	4.76***
N	827,513	827,513

*** p<.001, ** p<.01, * p<.05

Magnitude of IV Estimates

Relative to dependent variable means, hospital-based SNFs:

- Decrease hospital days by 7%
- Decrease SNF days by 11%
- Increase home days (w/out HHA) by 7%
- No stat significant impact on HHA days or mortality

180-Day Spending Outcomes

Outcomes (spending)	Unadjusted	IV
Hospital	-$327***	$43
SNF	-$4,677***	-$3,858***
Home Health	$414***	-$57
Total	-$4,550***	-$4,196***
N	827,513	827,513

16% Decline in Medicare spending

*** p<.001, ** p<.01, * p<.05

180-Day Outcomes

Outcomes	**OLS**	**IV**
Rehospitalization (0/1)	-0.027***	-0.040***
Death (0/1)	0.001	0.002
N	827,513	827,513

*** p<.001, ** p<.01, * p<.05

Summary

- In 180 days following discharge, hospital-based SNF patients have:
  - Fewer days in institutional setting, more in community
  - Lower Medicare spending
  - Fewer hospital readmissions
  - No impact on mortality
- 30 day outcomes largely consistent with these 180-day findings
- IV results differ from the OLS, confirming importance of instrumenting for hospital-based status

Implications

- Payment policies
  - In “make or buy” decision under ACA reforms, our results suggest hospital systems may wish to “make” these services rather than “buy” these services from freestanding SNFs
  - In era of site-neutral payments, should CMS look to increase payments to HB-SNFs?
- Care-planning
  - Could aid patients/families in choosing hospitals for elected procedures
  - SNF ownership could be reported on Hospital Compare