Examining the Association between Physician Relational Coordination and Patient Outcomes for Seniors with Multimorbidity

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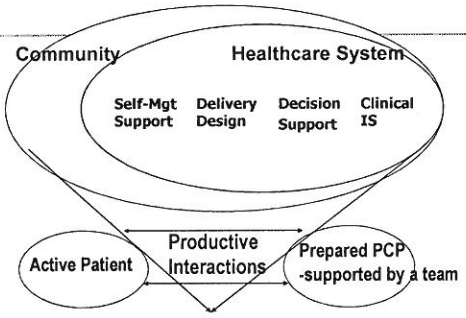
Context

- The IOM has identified care coordination as a national priority for improving health care quality
- Critical for senior patients with complex medical conditions
- Primary care physician is in a unique position to coordinate care
- Chronic Care Model provides the infrastructure to optimally support the PCP

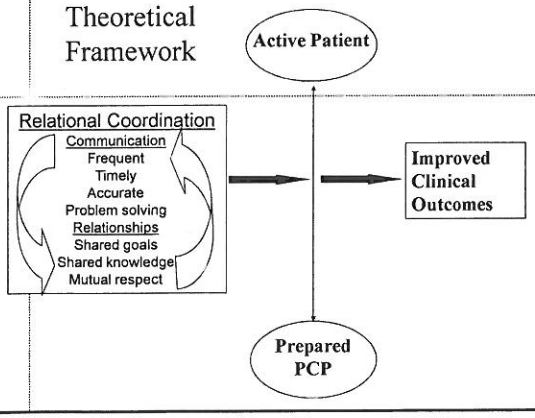
The Chronic Care Model



Gap in the Literature

- CCM acts implicitly as a coordinating mechanism through practice redesign
- Empirical studies to date have not measured or made explicit the pathway to the productive interactions between physicians and patients envisioned in CCM
- Relational coordination may play a significant role

Theoretical Framework



Research Question

Is there a relationship between PCP relational coordination and quality outcomes for elders with diabetes and additional co-morbidities?

- Diabetes Screen (A1c and LDL)
- Composite (A1c, LDL and Colorectal)
- Diabetes Screen, A1c and LDL control, and no acute utilization (no ACS admission)

Research Methods

- Longitudinal analyses were conducted using four years of medical claim/encounter and physician satisfaction data (proxy variables for Relational Coordination)
- Outcome measures included nationally recognized quality measures constructed as composite measures
- Hierarchical Generalized Linear Models were estimated.

Study Site and Population

- Large, multi-specialty medical group with an IPA division in southern CA
- Senior managed care patients with diabetes and at least one additional chronic illness
- Identified patients were linked to majority PCP over the four year period

Construction of Relational Coordination Measure

- Patient surveys on PCP satisfaction over four years assessing characteristics of RC
- Principal Components Analysis resulted in two component solution – communication and coordination
- Alpha Cronbach of domain scores (0.91)
- Domain scores were standardized using z-transformation with mean of 0 and SD of 1
- Final predicted values were estimated from yearly transformed scores and random error

Hierarchical Clustering

Level 3			Level 2		
#Pts-linked	#PCPs	%PCP	#Yrs	#Pts	%Pts
10	47	26.2	1	224	4.0
>10-<20	29	16.2	2	394	7.0
20-<35	40	22.3	3	792	14.0
35-<50	22	12.3	4	4265	75.1
≥50	41	22.9			
Total	179	100.0		5675	100.1

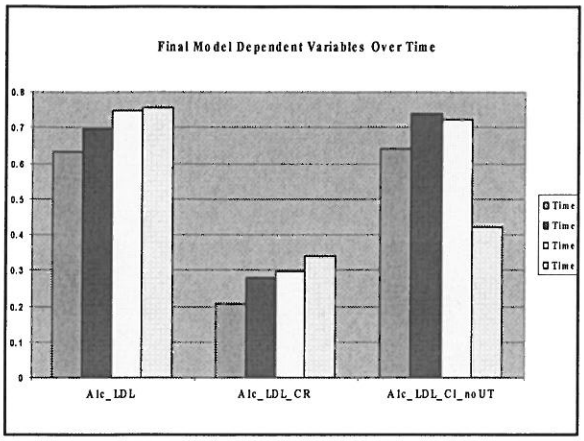
Key PCP Descriptive Statistics

Variable	Label	Mean
HPdCMCD	Pd Comm & Coord > average	0.38
LT10Yrs	In practice < 10 years	0.27
PCPsex	Male physician	0.60
IPA	Independent Practice Association	0.29
FTr	Foreign-trained PCP	0.34

Key Patient Descriptive Statistics

Variable	Label	Mean
CtPCP	All time with same PCP	0.37
Ages	Age as Jan 1, 2004	74.2
AvgMeds	Avg Med Classifications	9.3
TotRAF*	Overall risk factor 2007	2.7
HCostDz	III-IV renal dz, CHF, COPD, emphysema	0.57

* CMS assigned demographic, HCC, and disease interaction risk factor



HGL Model Building Approach

- Level-one: test time-varying covariates including annual continuity variables and random effects
- Level-two: patient covariates, continuous continuity variable, any HE receipt, etc.
- Level-three: PCP communication/ coordination, PCP covariates & PCP contextual variables

Unconditional HGLM – Annual DM Screens

Level-1 Model

Prob DM Screens (Y=1) = P

log[P/(1-P)] = P0 + P1*(TIME)

Level-2 Model

P0 = B00 + R0

P1 = B10

Level-3 Model

B00 = G000 + U00

B10 = G100 + U10

ICC = 7.7%

Level-1 variance = 1/[P(1-P)]; fixed (estimated 3.29)

Final HGLM Diabetes Screens

- N_{ijk} = f (primary care visits yearly, endocrinology visits yearly, time; patient risk covariates, termed*time, avgmeds*time; high PCP communication & coordination, foreign-trained PCP, male PCP, IPA, foreign-trained*time, hcostpts*time, total PC visits*IPA, random effect at level-two, random effect at level-three, and random effect*time)

Fitted HGLM – Diabetes Screens Key Results:

conditional on other model parameters

- PCP communication & coordination above average increases log odds (p = 0.001)
- Any HE receipt increases log odds (p = 0.001)
- Total PC & endocrinology visits increases log odds (p < .001)
- Male PCPs and IPAs decreases log odds
- IPA*Total PC visits increases log odds (p = .03)
- Pt-PCP sex concordance increases log odds (p = 0.03)

DM Screen Composite

(A1c, LDL, colorectal screens)

- HGLM fit similarly to the DM screen HGLM with random patient and PCP effects and a random time component at level-three.
- ICC = 7.3%; negative covariance B00 & B30
- PCP communication & coordination above average marginally significant (p = 0.07) however variable significant as positive modifier of time (p = 0.03)
- Any HE receipt increases log odds (p = 0.04)
- Continuous PCP relationship increases log odds (p = 0.03)
- Pt-PCP sex concordance increases log odds (p = 0.03)

A1c & LDL Screens, Control & No Acute Utilization

- HGLM fit without time-varying covariates and time and time^2 at level-one –fixed effects only
- ICC = 4.2%
- PCP communication & coordination above average almost significant at the 0.05 level ($p = 0.058$)
- Any HE receipt increases log odds ($p = 0.02$)
- Patient risk factors explain majority of variation; the most significant predictors were baseline A1c and LDL values

Significant correlations between proxy variable in longitudinal analyses & Relational Coordination

	CMCD	RC
CMCD	1.00	0.311 P=0.004
RC	0.311 P=0.004	1.00

-Spearman Correlation Coefficient

Conclusions

Study found partial support for all tested hypotheses -

- H-1: PCP communication/coordination would be positive predictor of improved outcomes
  - Significant in all models examining quality composites
- H-2: PCP communication/coordination would correlate with measured Relational Coordination
  - Spearman correlation coefficient was 0.31 and significant
- H-3: Patient level – Pt continuity with PCP would be positive predictor
  - Significant predictor only in the DM screen composite
- Estimated ICCs 4.3 to 7.9%; fitted models reduced variation by 12.4 to 67.5%

Study Limitations

- Study conducted within a single organization and no comparison groups was employed – associations found, no causal inferences can be derived
- High patient-PCP continuity was required for sample eligibility

Policy Implications

- Supports the current emphasis on the creation of patient-centered medical homes within an infrastructure of CCM especially for elders with chronic disease
- A broader construct of PCP relational coordination may be the pathway to improved outcomes rather than simply provider continuity, CCM components, or provider communication.