2008 Social Capital Global Network Workshop
on Social Capital and Health
October 10-11, 2008

Social Capital, Education and Health Care Quality: The Case of Registered Nurses

Chris Brown Mahoney, PhD
National Institute of Mental Health Post-Doctoral Scholar
Petris Center on Health Care Markets and Consumer Welfare Policy
Global Center for Health Economics & Policy Research
University of California, Berkeley

Timothy T. Brown, PhD
Assistant Adjunct Professor of Health Economics
School of Public Health, University of California at Berkeley
Associate Director of Research and Training,
Petris Center on Health Care Markets and Consumer Welfare

University of California, Berkeley

PETRIS CENTER

School of Public Health

Outline

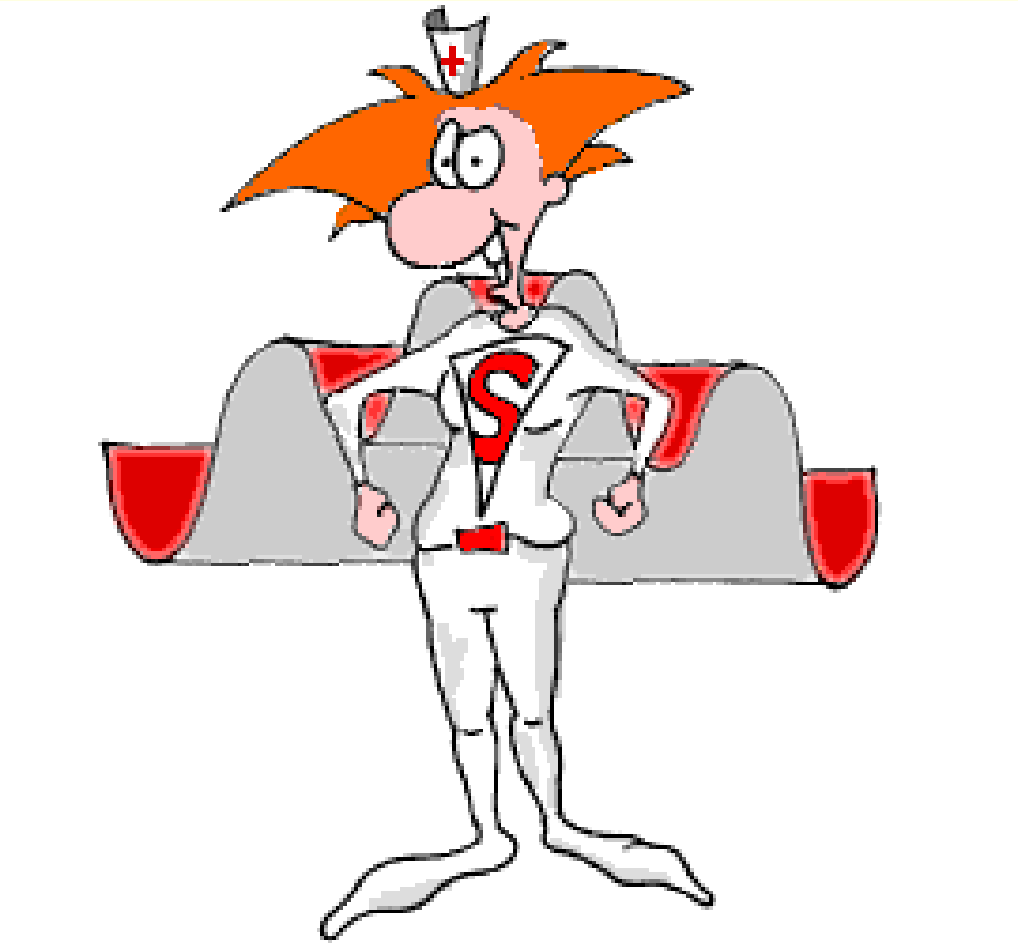
- Introduction
- Data and methods
- Results
- Discussion

Introduction

- Nursing quality matters in patient outcomes
  - Nurse-to-patients ratios
  - Level of nursing education
- Community Social Capital
  - Influence nurses to stay in given geographical area
  - Stronger influence on more highly educated nurses

PETRIS CENTER

Nursing Quality Matters!



10% increase in proportion of nurses with bachelor's degree associated with 5% decrease in likelihood of patients dying within 30 days of admission **Educational Levels of Hospital Nurses and Surgical Patient Mortality**. Aiken et al. *JAMA*. 2003

PETRIS CENTER

Nursing quantity matters

- ***Each additional patient per nurse increases likelihood of dying by 7% within 30 days of admission.*** **Needleman (2002). Nurse-staffing levels and the quality of care in hospitals. *NEJM***
- ***Inverse relationship between RN hours per adjusted inpatient day and thrombosis, pneumonia, infection, pulmonary complications*** **(**standard hospital quality measures**) Kovner (2002). Nurse staffing and post-surgical adverse events: An analysis of administrative data from a sample of U.S. hospitals, 1990-1996. *Health Services Research***

PETRIS CENTER

Structural Social Capital Measures

- Community Social Capital (CSC)
  - **Demand Side: Aggregate Individual Level Responses to Community Level (Putnam)**
  - **Supply Side: Petris Social Capital Index**

PETRIS CENTER

Putnam and Petris Social Capital Index

- Putnam's Measure
  - Membership in voluntary organizations
    - Data sources: Social Capital Community Benchmark Survey
- Petris Measure
  - Employment in voluntary organizations
    - Data source: County Business Patterns (U.S. Census)
  - Match organizational types
  - Compute community social capital measure as the ratio of:

$$\frac{\text{Total employment in voluntary organizations}}{\text{Total county population}}$$

PETRIS CENTER

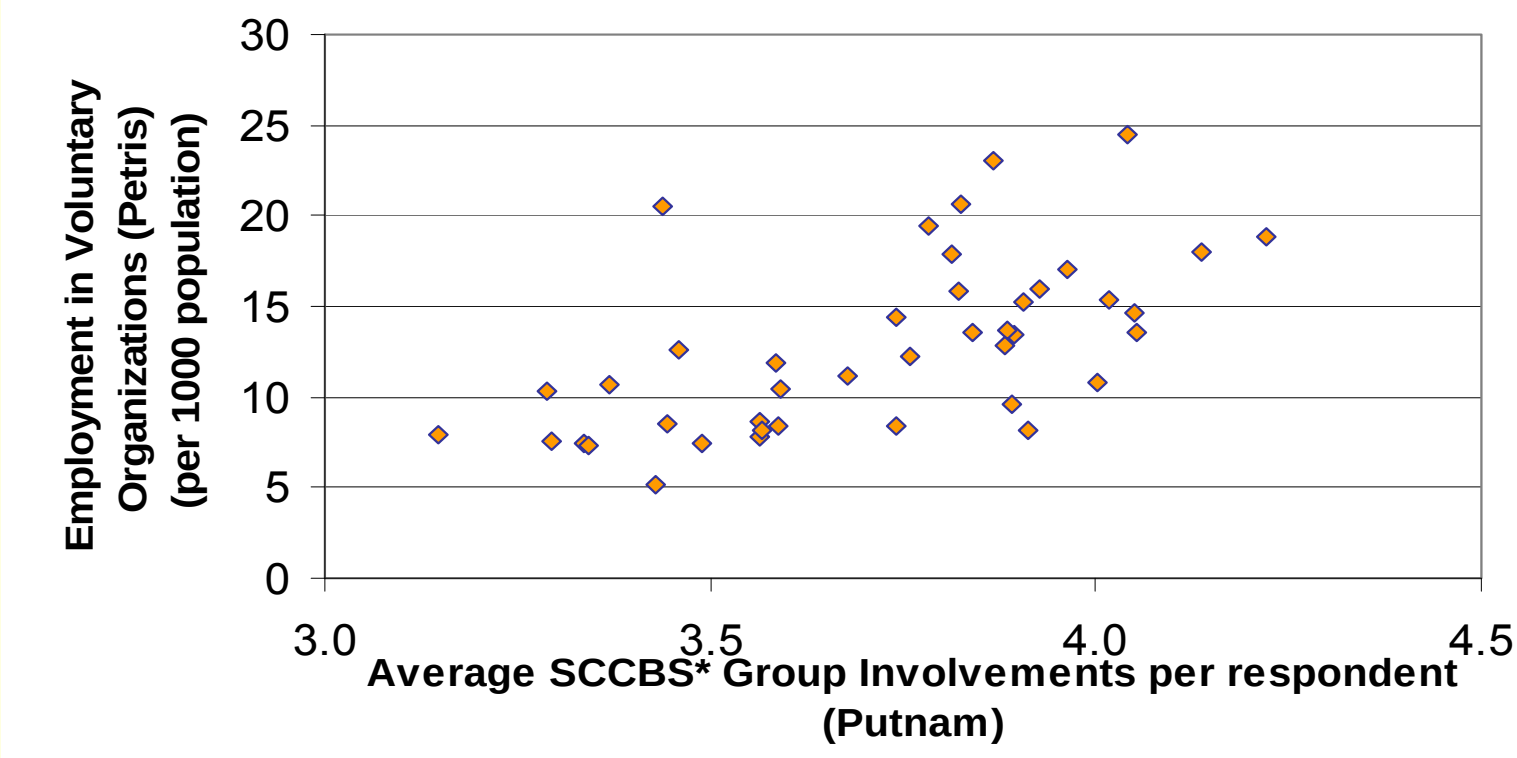
Social Capital Community Benchmark Survey

- Charity or Social Welfare Organization
- Professional, trade, farm or business association
- Hobby, Investment, or Garden club
- Youth Organization
- Neighborhood Association
- Literary, Art, or Musical Group
- Service or Fraternal Organization
- Self-help Program
- Parent Association or other School Support Group
- Political Group
- Organization Affiliated with Religion
- Seniors Groups
- Sports Club, League, or Outdoor Activity Club
- Ethnic, Nationality, or Civil Rights Organization
- Other kinds of Clubs or Organizations
- Veterans Group
- Labor Union
- Group that meets over the Internet*

* Putnam only

PETRIS CENTER

Petris vs. Putnam



Correlation: 0.60 (p<0.01)

* Social Capital Community Benchmark Survey

Data and Methods: Data

- National Sample Survey of Registered Nurses
  - Repeated cross-section: 2000, 2004
  - Covers all 50 states
  - Includes over 3,000 counties (check!)
  - 67,386 observations

Data and Methods: Dependent Variable

- Migration
  - *Did you move in the last year?*
    - 1 if move
    - 0 if stay

PETRIS CENTER

Variable means & standard deviations

Variable	Mean	Std Dev
Married	72.75%	44.52%
age 25-29	6.46%	24.58%
age 30-34	9.10%	28.75%
age 35-39	11.90%	32.38%
age 40-44	15.95%	36.61%
age 45-49	18.15%	38.54%
age 50-54	14.73%	35.44%
age 55-59	10.19%	30.25%
age 60-64	6.33%	24.34%
> age 65	5.42%	22.64%

Variable means & standard deviations (cont.)

Diploma	26.45%	44.11%
Baccalureate	30.99%	46.25%
Masters or higher	0.44%	6.63%
Petris Social Capital index	0.010298	0.005555
PSCI * diploma	0.004117	0.005924
PSCIB * Baccalureate	0.003404	0.006092
PSCI * Masters or higher	5.11E-05	0.000906
Unemployment (% - county)	4.84%	2.08%
Hospital beds per capita (county)	0.004257	0.003533
Physicians per capital (county)	0.003003	0.002296
Per capita income (county)	30396.85	8544.47
Children at home age < 18	7.7%	26.6%

Data and Methods: Model

$$\Pr(move) = \beta_0 + \beta_1 D + \beta_2 E + \beta_3 SC + \beta_4 SC \cdot E + \beta_5 C + \varepsilon$$

D = age, marital status, children

E = education (diploma, associates, bachelor, masters or higher

SC = Petris Social Capital Index

C = county level measures (unemployment, hospital beds per capita, physicians per capita, per capita income

PETRIS CENTER

Data and Methods: Econometrics

- Linear probability model
  - County-level fixed effects
  - Correction for heteroscedasticity
  - Accounts for probability weighting
  - Interaction effects need no adjustment
    - (as in probit)

PETRIS CENTER

Model estimates

Variable	Coef	Std. Err.
Married	**-0.0408**	**0.0034**
age 25-29	**-0.1228**	**0.0177**
age 30-34	**-0.1868**	**0.0170**
age 35-39	**-0.2281**	**0.0167**
age 40-44	**-0.2482**	**0.0165**
age 45-49	**-0.2492**	**0.0164**
age 50-54	**-0.2454**	**0.0165**
age 55-59	**-0.2418**	**0.0167**
age 60-64	**-0.2371**	**0.0171**
> age 65	**-0.2564**	**0.0171**
Diploma	0.0004	0.0074
Baccalureate	**0.0172**	**0.0073**
Masters or higher	**0.0891**	**0.0397**

PETRIS CENTER

Petris Social Capital index	**-1.2581**	**0.5338**
PSCI * diploma	0.7928	0.6344
PSCIB * Baccalureate	**-0.0900**	**0.6521**
PSCI * Masters or higher	**-5.0388**	**2.1638**
Unemployment (% - county)	**0.0061**	**0.0007**
Hospital beds per capita (county	**-1.5401**	**0.5534**
Physicians per capital (county)	-0.3295	0.9028
Per capita income (county)	**0.0000**	**0.0000**
Children at home age < 18	**-0.0235**	**0.0051**
constant	**0.2870**	**0.0184**

Individuals in the reference group are unmarried, have a associates degree, have no children, and are aged < 25

** $p \leq 0.01$, * $p \leq 0.05$

67,386 observations

All regression models include county fixed effects

PETRIS CENTER

Discussion

- Community Social Capital aids in retention of nurses
  - Retention highest among best trained nurses
- How to use this information to motivate changes that impact healthcare availability and quality?