Reforming Care for Patients at Increased Risk of Hospitalization: The Comprehensive Care Physician Program

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Increases in Health Care Costs

- **Nominal terms:**
  - $27 Billion in 1960
  - >$3 Trillion in 2016

- **As a percentage of GNP:**
  - 5% in 1960
  - 18% in 2016

- **As a percentage of the Federal Budget:**

Source: Congressional Budget Office.

Note: Excess cost growth refers to the number of percentage points by which the growth of annual health care spending per beneficiary is assumed to exceed the growth of nominal gross domestic product per capita.
Effects of Payment Policy
Annual Growth in Hospital Expenditures, 1960-2007

SOURCE: Centers for Medicare & Medicaid Services, Office of the Actuary: Data from the National Health Statistics Group.
Distribution of Medicare Spending

- Beneficiaries:
  - 5
  - 15
  - 25
  - 50

- Expenditures:
  - 43.1
  - 18.4
  - 23.5
  - 11.2
  - 3.8

Average Expenditures:
- $63,030
- $26,900
- $11,430
- $3,290
- $550
Distribution of Medicare Spending

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- 5 Beneficiaries: $26,900
- 15 Beneficiaries: $11,430
- 25 Beneficiaries: $3,290
- 50 Beneficiaries: $550

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- 43.1%: $63,030
- 18.4%: $26,900
- 23.5%: $11,430
- 11.2%: $3,290
- 3.8%: $550

WILLIE SUTTON (1901-80)
"When asked why he robbed somebody: 'To live, ma'am, to live.'"
Affordable Care Act (2010)

- Insurance Market Reform
  - Individual mandate
  - Insurance exchanges

- Payment and Delivery System Reform
  - Prevention
  - Comparative effectiveness research (PCORI)
  - Care integration (patient-centered medical home)
  - Bundling, capitation, and accountable care organizations (ACOs)
  - Center for Medicare and Medicaid Innovation (CMMI)
    - $1 Billion per year for 10 years
    - Ability of HHS Secretary to implement what works
  - Reinvestment in primary care workforce
Growth of Medical Specialization in the US

Effects of Specialization on Costs and Outcomes

Table 1.—Comparison of Patient Mix and Unadjusted and Adjusted Utilization Rates for Six Indicators Among the Four Specialties*

<table>
<thead>
<tr>
<th></th>
<th>Family Physicians</th>
<th>General Internists</th>
<th>Endocrinologists</th>
<th>Cardiologists</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Patient Mix Indicators</strong></td>
<td></td>
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</tr>
<tr>
<td>Mean age, y</td>
<td>40.0</td>
<td>46.9</td>
<td>44.2</td>
<td>55.5</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>Educational level, y</td>
<td>13.6</td>
<td>13.5</td>
<td>14.0</td>
<td>13.1</td>
<td>&lt;.01</td>
</tr>
<tr>
<td>No. of chronic diseases per patient</td>
<td>0.70</td>
<td>1.02</td>
<td>1.05</td>
<td>1.32</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>General health perception (0-100 scale)</td>
<td>72.8</td>
<td>67.0</td>
<td>67.9</td>
<td>63.0</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td><strong>Unadjusted Utilization Rates</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>% Hospitalized</td>
<td>4.30</td>
<td>5.43 (126)†</td>
<td>8.18 (190)†</td>
<td>15.64 (364)†</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Office visits per patient per y</td>
<td>4.53</td>
<td>4.37 (96)</td>
<td>5.57 (123)†</td>
<td>5.19 (115)†</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Prescription drugs per patient</td>
<td>1.18</td>
<td>1.47 (125)†</td>
<td>1.67 (142)†</td>
<td>2.30 (195)†</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>% Patients having tests per visit‡</td>
<td>38.6</td>
<td>43.7 (113)†</td>
<td>62.7 (162)‡</td>
<td>47.2 (122)‡</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Mean value of tests per visit‡</td>
<td>22.00</td>
<td>26.90 (122)†</td>
<td>22.70 (103)</td>
<td>33.80 (154)†</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Mean value of tests per patient per y‡</td>
<td>85.30</td>
<td>108.80 (129)†</td>
<td>112.00 (131)†</td>
<td>158.00 (185)†</td>
<td>&lt;.001</td>
</tr>
<tr>
<td><strong>Adjusted Utilization Rates</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>% Hospitalized</td>
<td>4.77</td>
<td>5.59 (117)</td>
<td>7.15 (150)†</td>
<td>10.55 (221)§</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Office visits per patient per y</td>
<td>4.64</td>
<td>4.42 (95)</td>
<td>5.22 (113)†</td>
<td>4.53 (98)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Prescription drugs per patient</td>
<td>1.40</td>
<td>1.46 (104)</td>
<td>1.54 (110)§</td>
<td>1.74 (124)†</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>% Patients having tests per visit‡</td>
<td>40.0</td>
<td>44.2 (111)†</td>
<td>55.9 (148)‡</td>
<td>47.7 (119)†</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Mean value of tests per visit‡</td>
<td>23.10</td>
<td>26.40 (114)†</td>
<td>24.00 (104)</td>
<td>34.10 (148)†</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Mean value of tests per patient per y‡</td>
<td>104.30</td>
<td>110.10 (106)</td>
<td>132.10 (127)†</td>
<td>150.50 (144)†</td>
<td>&lt;.001</td>
</tr>
</tbody>
</table>

*Numbers in parentheses are the ratios of that specialty's utilization rate to that of family medicine, which was set to 100. Sample size varies by type of utilization: for hospitalizations, 9020; for office visits, 17,580; for prescription drugs, 17,780; for tests and procedures, 17,498. Of the total number of patients studied, 28% were seen by family physicians, 59% by general internists, 6% by endocrinologists, and 7% by cardiologists.

†P<.01.
‡Mean value of tests or procedures.
§P<.05.
What is the right degree of specialization for American Medicine?
Classic Economic Theory of Benefits of Specialization

• “The greatest improvement in the productive powers of labour, and the greater part of the skill, dexterity, and judgment with which it is anywhere directed, or applied, seem to have been the effects of the division of labor.”
  Adam Smith, The Wealth of Nations, Book I, Chapter I, 1776.

• Mechanisms of advantage
  – Improved dexterity from repetition
  – Savings of time otherwise spent switching between tasks
  – Application of machinery, invented by workmen or others
Classic Economic Theory of Efficient Specialization

• Division of labor limited by the “extent of the market” (Smith 1776)
  – Extent of market determined by total demand for product and by transportation costs
  – Costs of ”coordination”

• Efficient division of labor balances benefits of specialization and costs of coordination (Becker and Murphy, 1992)
  – Many citations
  – Not so many direct tests
Medical Theories of Specialization

• Importance of doctor-patient relationship
  “The treatment of a disease may be entirely impersonal; the care of patient must be completely personal. The significance of the intimate personal relationship between physician and patient cannot be too strongly emphasized...”
  - Francis Peabody, The Care of the Patient, JAMA, 1927.

• Importance of specialized knowledge
  “…one cannot expect to become a skillful practitioner of medicine in the four or five years allotted to the medical curriculum. Medicine … is an ever-widening field that requires continued study and prolonged experience in close contact with the sick.”
  - Francis Peabody, The Care of the Patient, JAMA, 1927.
"we don’t treat fingers or skin or bones or skulls or lungs. We treat people. Entire human people"
Specialization is a Balance of Costs and Benefits
New Economic Theory of Specialization

• **Adaptive Organization Perspective** (Dessain and Santos, JPE 2006)
  – In presence of high coordination costs and increasing returns to division of labor, firm may simplify product to reduce needs for coordination – reduce specialization
    • Wood + metal $\rightarrow$ plastic

– Medical analogy
  • New technologies (bariatric surgery for diabetes)
  • Use of practice guidelines and standardization of care (Lean)
  • Focus team care on simpler cases where care coordination easier
  • “Solution Shop” (Clay Christensen)
Growth of Hospital Medicine

• Traditionally in US, primary care doctor cares for patient in clinic and in the hospital for general medical problems
  – AM hospital rounds and then clinic
  – Emphasis on continuity of care & doctor/patient relationship
  – Unique in the developed world

• “Hospitalist” defined in 1996 as physicians working ≥ 25% in inpatient care

• >30,000 hospitalists today

• 1/3 of general medicine admissions

• Is this change in specialization a desirable one?
  – Can we improve care by understanding why hospitalists arose?
Growth of Hospitalist vs. Traditional Model: Two Theories

• Needs of hospital care
  – Incentive and ability to reduce hospital costs (Medicare PPS)
  – Increasing acuity in hospital

• Needs of ambulatory care
  – Declining hospital vs. ambulatory use decreased PCP incentives to see patients in both settings
    • Declining hospital use with shift from hospitalization to ambulatory care
    • Increased ambulatory use with growth of preventive care
  – Organization of physicians into groups encouraged specialization

Meltzer, Chung JGIM 2010
Net Benefits of Hospitalists

• Costs
  – Savings of up to $750-$1,000 per admission
  – Greater savings with experience
  – No effects on post discharge costs

• Value to patient
  – Outcomes similar
    • Survival, quality of life, functional status, patient satisfaction
  – Preference for physician they know
  – Willingness to pay <$200/admission
Growth of Hospitalist vs. Traditional Model: Two Theories

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  – Incentive and ability to reduce hospital costs (Medicare PPS)
  – Increasing acuity in hospital

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Meltzer, Chung JGIM 2010
Ambulatory Economics Theory of Hospitalist Growth
(Meltzer, Chung, NBER Working Paper, 2010)

- Compare time costs of two models:
  - Traditional model:
    - Internist time to see patients in hospital, clinic, transport
  - Hospitalist/PCP model
    - Hospitalist time to see patient in hospital, communicate with PCP
    - PCP time to see patient in clinic, communicate with hospitalist
  - Cost of PCP/Hospitalist vs. traditional model driven by per capita communication costs relative to transport costs for a traditional internist

\[
\Delta Cost_{PCP/Hospitalist \ vs. \ Traditional} = 2\pi t_C - t_T \left( \frac{t_A + \pi t_H}{T_I - t_T} \right) = 2\pi t_C - \frac{t_T}{N_{IA}}
\]

- Cost of PCP/Hospitalist Model vs. Traditional Model falls when:
  - Admissions (\(\pi\)) fall relative to ambulatory visits
  - Communication costs (\(t_c\)) decline
  - Transport costs (\(t_T\)) rise
  - Physician work hours (\(T_I\)) decline

- Test with data on PCP use of hospitalists from Community Tracking Study
## Effects on Fraction of Patients for whom Physician Uses Hospitalists

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coef.</th>
<th>S.E.</th>
<th>P</th>
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</thead>
<tbody>
<tr>
<td><strong>Lower Probability of Hospital Admission</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than 33% Total Payments from Medicare</td>
<td>0.55</td>
<td>0.14</td>
<td>0.00</td>
</tr>
<tr>
<td><strong>Lower Communication Costs</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Access Qualified Specialists</td>
<td>0.29</td>
<td>0.14</td>
<td>0.04</td>
</tr>
<tr>
<td>Access Timely Report</td>
<td>0.31</td>
<td>0.16</td>
<td>0.06</td>
</tr>
<tr>
<td>Low Hospital Errors</td>
<td>0.40</td>
<td>0.16</td>
<td>0.01</td>
</tr>
<tr>
<td>MD Reported &lt;2 Communication Costs</td>
<td>0.47</td>
<td>0.17</td>
<td>0.01</td>
</tr>
<tr>
<td><strong>Higher Switching (Transportation) Costs</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MD Practice in Top 25 Most Congested MSAs</td>
<td>0.49</td>
<td>0.16</td>
<td>0.00</td>
</tr>
<tr>
<td><strong>Lower MD Hours</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MD Practiced &lt;60 Hrs in Last Week of Work</td>
<td>0.50</td>
<td>0.15</td>
<td>0.00</td>
</tr>
<tr>
<td>MD Female</td>
<td>0.39</td>
<td>0.16</td>
<td>0.01</td>
</tr>
</tbody>
</table>

ii) All frequencies were weighted to produce U.S. population estimates. The total weighted population size in our analyses was 106,113 generalist physicians.
## Forces Affecting the Growth of Hospitalists: Why did the Marcus Welby Model Decline?

<table>
<thead>
<tr>
<th>Force</th>
<th>Driver</th>
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</thead>
<tbody>
<tr>
<td>Falling Admission Probability</td>
<td>Increasing emphasis on preventive care</td>
</tr>
<tr>
<td>Falling Communication Costs</td>
<td>Improved information technology</td>
</tr>
<tr>
<td>Rising Travel Costs</td>
<td>Increasing urban sprawl and congestion</td>
</tr>
<tr>
<td>Falling Physician Hours</td>
<td>Increasing lifestyle concerns of physicians</td>
</tr>
</tbody>
</table>
What is the Value of the Doctor-Patient Relationship for the Hospital Setting? And for Whom does it Matter?

• Rich literature on the value of the doctor-patient relationship
  – Trust, interpersonal relationship, communication btw. doctor/patient, knowledge of the patient
• Patients value seeing their own doctor in the hospital
  – But willingness to pay is not so high
• Observational studies show lower costs, better outcomes with continuity of care
  – Care by PCP for > 10 years: 15% lower Medicare costs (Weiss et al AJPH 1996)
  – Lung CA patients cared for by own doctor in terminal hospitalization have 25% lower (OR=0.74, p<0.01) odds ICU use (Sharma et al, Annals, 2009)
• One experimental study
  – Wasson et al (JAMA, 1984) randomized 776 complex VA patients to see same physician vs. different physician in each primary care visit. Continuous care group:
    • 49% lower emergent hospitalizations (20% vs. 39%, p<0.002)
    • 38% lower hospital days (6.6 vs. 9.1, p<0.02)
    • 74% lower ICU days (0.4 vs. 1.4, p<0.01)

→ Discontinuity harmful/costly, esp. for complex, frequently hospitalized patients
→ Can better coordination of inpatient and outpatient care improve outcomes?
Lessons from Medicare’s Demonstration Projects on Disease Management, Care Coordination, and Value-Based Payment (CBO, January 2012)

Other Lessons:
1. Target interventions to high-risk enrollees
2. Gather timely data on use of care, esp. hospital admissions
3. Focus on transitions in care settings
4. Use team-based care
5. Limit the costs of intervention
Financing Care Coordination

<table>
<thead>
<tr>
<th>Ambulatory</th>
<th>Hospital</th>
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<tbody>
<tr>
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<tr>
<th>Ambulatory</th>
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</table>
Tailored Approach to General Medical Care

Stratify Patients by Expected Hospital Use

- Low Expected Hospital Use
  - Ambulatory-based Primary Care Physician and Hospitalist

- High Expected Hospital Use
  - Comprehensive Care Physician / Primary Care Hospitalist

Advantages?
- Most frequently hospitalized patients get own doctor in both settings
  - Patients value continuity
  - Continuity decrease unneeded testing/treatment
  - Continuity lowers doctor costs ($t_c=0$, $t_{HH} < t_{HHH}$)
- All hospitalized patients get doctors with significant hospital experience and presence
  - Physicians can be specialists
- Patient choice restored
- CCP/PCH model can work for physician
- Patient-centered medical home / bundling / readmission penalties
- Smaller primary care base can fill hospital

Challenges?
- Are enough patients willing to switch?
- Will doctors let patients switch?
- Will doctors do this job?
- Can it be economically viable?
Research Approach

• Talked with physicians/practice leaders to determine interest/challenges

• Implementation/Pilot studies
  – Predictive modeling to identify patient group with enough predicted hospital use to provide physician with adequate daily inpatient volume given available time remaining for clinic (4 half-days per week)
  – Simulation models using operations research methods to model feasibility

• Demonstration Study
  – Centers for Medicare and Medicaid Innovation (CMMI) Health Care Innovation Challenge
  – $1 Billion to fund “applicants who propose compelling new models of service delivery/payment improvements that hold the promise of delivering the three-part aim of better health, better health care, and lower costs through improved quality for Medicare, Medicaid and CHIP enrollees”
  – Received $6.1 Million 3-year award in July 2012 to develop and test model
# Key CMMI Design Elements

<table>
<thead>
<tr>
<th>Lessons from Literature</th>
<th>Program Element</th>
</tr>
</thead>
<tbody>
<tr>
<td>Focus on High-Cost Patients</td>
<td>Patients expected to spend &gt;10 days in hospital in next year; up to 40% of general medicine days, annual Medicare costs $100,000 per year; diverse recruitment sources, including resident clinics</td>
</tr>
<tr>
<td>Build Interdisciplinary Team</td>
<td>5 CCPs = 1000 patients. Organize CCP/PCH, APN, nursing, social work, etc. around common patient medical and psychosocial needs</td>
</tr>
<tr>
<td>Minimize costs (esp. coordination costs)</td>
<td>Small, well-connected teams, provider continuity</td>
</tr>
<tr>
<td>Focus on care transitions</td>
<td>Post-discharge calls, Health IT</td>
</tr>
<tr>
<td>Financial incentives</td>
<td>Prepare for shared savings (randomized internal controls, external controls from Chicago AMCs via UHC)</td>
</tr>
<tr>
<td>Sustainable roles and training for care team</td>
<td>Support the team members (group to spread weekend coverage, night coverage, psychosocial support, relevant clinical training (e.g., communication, palliative care), academic development, recognition).</td>
</tr>
<tr>
<td>Rapid cycle innovation</td>
<td>Frequent, data-driven meetings that seek to engage relevant leaders</td>
</tr>
<tr>
<td>Rigorous evaluation</td>
<td>Randomized design, Medicare claims data, external and internal evaluators</td>
</tr>
</tbody>
</table>
Status and Early Lessons

- **Program operations**
  - Weekly operations and evaluation meetings
  - Recruitment of 2,000 patients completed in June 2016
    - Hospital > ED > departing PCPs > community
    - CCP panel size 150-200 patients; ~3 inpatients/CCP per day

- **Positive interim qualitative and quantitative impressions**
  - Data on individual patients to help CCPs improve care
  - Weekly discussions of complex and/or informative cases
  - Population health metrics driven by evaluation plan
    - Better care, better health, lower costs
    - Value of multiple data sources (e.g., admissions)
    - Need for longitudinal follow-up and analysis
  - Completing 1-yr follow-up (June 2017), 3-yr follow-up planned (Donaghue)

[The IHI Triple Aim diagram]

Experience of Care  
Population Health  
Per Capita Cost
Future

• Address longer-term issues
  – Financial model for expansion/sustainability
    • Fee for service (revenue maximization, clinical volumes, CCM codes)
    • Risk-based arrangements (cost management, UCM MSSP/ACO, UCM MA, City of Chicago, CMS Physician Focused Payment Model)
    • Specific high need populations (e.g., sickle cell disease)

• Partnerships with others interested in CCP
  – Villages/USF, Vanderbilt, VA/Wash U, Kaiser, Medical College Wisconsin, National University Singapore
  – Learning Collaborative supported by Medicare TCPI (GLPTN) with Project Echo
  – Interest:
    • >10 hospitals nationally and internationally (Manipal)
    • Opportunity for CCP-connected network?
      – Patient-centered clinical integration
      – Provider autonomy/competition
      – Rounder model extend to lower risk patients?
  • Ingalls
    – Help interested PCPs develop CCP panels
    – Discussing with Ingalls leadership and key stakeholders
Comprehensive Care, Community and Culture Program (C4P)

- Program seeks to address needs of and engage most difficult to engage patients
  - Funded by RWJF Systems for Action program as part of Culture of Health initiative
- Systematic assessment of unmet social needs
- Community Health Worker (CHW) Program
  - Seek to engage patient in community/home to deepen understanding of and address unmet social needs (navigate system, connect to economic and other resources, reminders, assess home environment, engage psychologically), pull out of home, connect to clinical team
  - Community members, not disease-focused, tightly linked to clinical team
- Artful Living Program (ALP)
  - Engage patients with others and clinical team
    - Music, arts, theater, movies, books, speakers
  - Promote self-efficacy
    - Exercise, cooking, crafts, addressing social determinants
  - Explore and share values that enhance life, health
    - narrative (e.g., Stanford Letter Project, photovoice)
- Goals
  - Establish program
  - Pilot/perform RCT to assess effects of SC/CCP/C4P on engagement, triple aim (better care, better health, lower cost), goal attainment