COMPLEXITY OF AMBULATORY CARE ACROSS DISCIPLINES

David Katerndahl, M.D., M.A.
Family & Community Medicine
University of Texas Health Science Center
San Antonio, Texas

This project was funded through a contract with the American Academy of Family Physicians
WHY COMPLEXITY OF CARE MATTERS
- POTENTIAL FOR:

1. Reduced Quality Of Care
   1. Reduced Comprehensiveness Of Care
   2. Decreased Use Of Practice Guidelines
   3. Increase Risk Of Medical Errors

2. Increased Health Care Costs
   • Inefficiency
   • Increased Testing
   • Increased Referrals

3. Decreased Patient & Physician Satisfaction
   1. Perceived Inadequate Visit Time
   2. Increased Physician Burnout

4. Health Care Reform Process
WHAT IS “COMPLEXITY”?

“Complexity” = Interrelatedness Of System Components\(^1,^2\)

1. Cognitive Complexity Component
   - Content Of Information (Counts)

2. Relational Complexity Component
   - Flow Of Information Between Members (Variability)
   - Uniqueness Of Relationships (Diversity)

\(^1\)Boisot & Child, 1999 \(^2\)Kannampalli et al, 2011
WHAT MAKES AMBULATORY CARE COMPLEX?

Flows:
- Information
- Care
- Money
MEASURING COMPLEXITY

• Requirements Of Measure
  • Includes Quantity Of Activity
  • Reflects Variability & Diversity Across Visits
  • Considers Time Availability
  • Differentiates Input & Output Effects

• Error Rates (Complexity Measure\(^1\)) Depend On:\(^2\)
  • Quantity Of Activity
  • Variability
  • Diversity
  • Time Availability

\(^1\)Baryam, 1997 \(^2\)Crookery et al, 2004
PRIOR ATTEMPTS AT ESTIMATING COMPLEXITY

• Measures Currently Used
  • Case-Mix Measures\(^1\)
  • Risk Adjustment Measures\(^2\)
  • Patient Severity Measures\(^3\)
  • Patient Complexity\(^4\)
  • Problems Per Hour\(^5\)

• Why These Measure Do NOT Measure Complexity
  • Complexity ≠ Severity
  • Assume Linearity (Regularity, Predictability)\(^6\)
  • Do Not Capture ALL Relevant Dimensions
  • Single Patient Measures

\(^1\)Fetter et al, 1980  \(^2\)Rosen et al, 2003  \(^3\)Horn et al, 1988  \(^4\)Peek et al, 2009  \(^5\)Tempte et al, 2007  \(^6\)Green, 2010
COMPLEXITY OF CARE MEASUREMENT USED*

-2010 NATIONAL AMBULATORY MEDICAL CARE SURVEY-

1. Identify Each Average Input / Output For Each Discipline

<table>
<thead>
<tr>
<th>Inputs</th>
<th>Outputs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reasons</td>
<td>Medications</td>
</tr>
<tr>
<td>Diagnoses</td>
<td>Other Treatments</td>
</tr>
<tr>
<td>Examinations</td>
<td>• Education</td>
</tr>
<tr>
<td>Testing</td>
<td>• Counseling</td>
</tr>
<tr>
<td>Patient Demographics</td>
<td>• Therapies</td>
</tr>
<tr>
<td></td>
<td>• Procedures</td>
</tr>
<tr>
<td></td>
<td>Disposition</td>
</tr>
</tbody>
</table>

2. Weight Each Input / Output By Its Variability & Diversity

3. Add All Inputs / Outputs Components Together


5. Calculate “Complexity Burden” (Encounter Complexity / Duration-Of-Visit)

*Katerndahl et al, 2010*
ENCOUNTER COMPLEXITY*

- Internal Medicine & Family Medicine Encounters Most Complex

- Encounters Of Internal Medicine, Family Medicine, Cardiology & Oncology Clearly Much More Complex Than Those Of Other Disciplines

- Encounters Of Internal Medicine & Family Medicine About 3X As Complex As Those Of Ophthalmology, ENT, Orthopedics & Psychiatry

ENCOUNTER COMPLEXITY

*NAMCS, 2010
COMPLEXITY BURDEN*

- Complexity Burden Is Highest For Family Medicine & Internal Medicine
- Complexity Burden Of Family Medicine & Internal Medicine Care Is 2X That Of Most Surgical Disciplines & Neurology, But 5X That Of Psychiatry

*NAMCS, 2010
CHANGES IN RANKING BY DISCIPLINE*

Internal Medicine
Family Medicine
Cardiology
Oncology
OBGYN
Neurology
Pediatrics
Urology
General Surgery
Dermatology
Ophthalmology
ENT
Orthopedics
Psychiatry

ENCOUNTER COMPLEXITY	COMPLEXITY BURDEN

*NAMCS, 2010
CONCLUSIONS

1. Encounter Complexity
   1. Internal Medicine & Family Medicine Most Complex
   2. Internal Medicine, Family Medicine, Cardiology & Oncology More Complex Than Other Disciplines

2. Complexity Burden
   1. Most For Family Medicine & Internal Medicine
   2. Twice That Of Most Surgical Disciplines & Neurology
   3. 5X That Of Psychiatry
THANK YOU