Improving Coordination between Primary and Secondary Health Care through Information

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Primary Care/Specialty care in an Era of Multimorbidity

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The Situation

- Fragmented, sub-specialized environment
- Ageing population
- Increasing multi-morbidity
- Limited resources

THEREFORE NEED HEALTH CARE THAT IS COORDINATED
Multimorbidity is the norm

- **Diabetes**: 9% Single Condition, 22% Condition + 1, 21% Condition + 2, 21% Condition + 3, 27% Condition + 4+
- **Heart Disease**: 11% Single Condition, 21% Condition + 1, 25% Condition + 2, 24% Condition + 3, 19% Condition + 4+
- **Arthritis**: 12% Single Condition, 22% Condition + 1, 23% Condition + 2, 22% Condition + 3, 21% Condition + 4+
- **Hypertension**: 17% Single Condition, 24% Condition + 1, 23% Condition + 2, 20% Condition + 3, 16% Condition + 4+

Source: Partnership for Solutions
These patterns are linked to the prevalence of chronic co-morbidities

<table>
<thead>
<tr>
<th># Chronic Co-morbidities</th>
<th>% Pop.</th>
<th>Relative Cost (Per Pt.)</th>
<th>Est. % of Total Medicare Costs</th>
<th>Avg. # Unique MDs/Yr.</th>
<th>Avg. # Filled Rx / Yr.</th>
</tr>
</thead>
<tbody>
<tr>
<td>5+</td>
<td>20%</td>
<td>3.2</td>
<td>66%</td>
<td>13.8</td>
<td>49</td>
</tr>
<tr>
<td>3-4</td>
<td>27%</td>
<td>.9</td>
<td>23%</td>
<td>7.3</td>
<td>26</td>
</tr>
<tr>
<td>0-2</td>
<td>53%</td>
<td>.1</td>
<td>11%</td>
<td>3.0</td>
<td>11</td>
</tr>
</tbody>
</table>

Data Source: G. Anderson et. al., Johns Hopkins Univ. 2003. (Derived from US Medicare claims and beneficiary survey.)
The more common a single condition in primary care visits, the less the likelihood of referral, even after controlling for a variety of patient and disease characteristics.

With high morbidity burden, the number of different physicians seen rises, for both primary care and secondary care. Therefore, coordination of care is a major challenge for those with high morbidity burden.
Controlling for morbidity burden*:

The more DIFFERENT generalists seen (less continuity): the higher the total costs, diagnostic tests and interventions.

The more different generalists seen, the more DIFFERENT specialists seen among patients with high morbidity burdens. That is, the benefits of primary care are greatest for people with the greatest burden of illness.

The more DIFFERENT specialists seen: the higher the total costs, diagnostic tests and interventions, and types of medication.

*Using the Johns Hopkins Adjusted Clinical Groups System (ACGs)

What Do We Mean By Coordination?

“The extent to which a patient’s principal-care physician is aware of all treatments a patient is receiving and communicates with other providers.”

Potential Consequences of Uncoordinated Care

- Redundant investigations
- Harmful drug interactions
- Lower patient satisfaction
- Higher costs
- Lower quality of care
### Percent of Patients Reporting Any Error by Number of Doctors Seen in Past Two Years

<table>
<thead>
<tr>
<th>Country</th>
<th>One doctor</th>
<th>4 or more doctors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australia</td>
<td>12</td>
<td>37</td>
</tr>
<tr>
<td>Canada</td>
<td>15</td>
<td>40</td>
</tr>
<tr>
<td>Germany</td>
<td>14</td>
<td>31</td>
</tr>
<tr>
<td>New Zealand</td>
<td>14</td>
<td>35</td>
</tr>
<tr>
<td>UK</td>
<td>12</td>
<td>28</td>
</tr>
<tr>
<td>US</td>
<td>22</td>
<td>49</td>
</tr>
</tbody>
</table>

THE ROLE OF INFORMATION
How We Define Health Information Technology

The application of computers and other digital technology to the delivery and management of health care and public health services.
• To increase efficiency and eliminate waste within care settings and across the system
• To improve patient safety and minimize errors
• To increase quality improvement and improve outcomes
• To increase patient involvement in “person-centered” care
• To increase evidence base and knowledge
Information is key to improving the delivery of primary health care.

EMR (DATABASE WAREHOUSE) → ANALYTICAL TOOLS → REPORT GENERATORS → INTERVENTION PROGRAMS

FEEDBACK LOOP

IMPROVED POPULATION HEALTH STATUS

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Computerized summaries of information on problems, tests, and therapies which improves recognition of important patient information from one visit to another, especially if the inter-visit duration is long and the practitioner changes from one visit to the next. The objective is that doctors have easy access to comprehensive patient information.

NOT A SUBSTITUTE FOR CLINICAL JUDGEMENT – BUT A SUPPLEMENT
- International Classification of Diseases, versions 9 and 10 (ICD-9, ICD-10)
- Read codes (in the UK and New Zealand)
- International Classification for Primary Care (ICPC) developed by Wonca and acknowledged by the WHO
- In addition, numerous local variations
Pharmacy Coding Systems

- Anatomical, Therapeutic, Chemical (ATC)

- Local coding systems such as National Drug Codes (NDC) in the US, British National Formulary (BNF) in the UK, Pharmazeuticalnummmer (PZN) in Germany

- As well as numerous others.
Case mix (risk adjustment) is the process by which the health status (morbidity profile) of a population is taken into consideration when setting budgets or capitation rates, evaluating professionals’ performance, or assessing outcomes of care.
Conceptual Basis for the ACG System

- Individual diagnoses are less important than are disease patterns and overall burdens of morbidity.

- Models of care need to be based on overall morbidity burdens rather than on specific diagnoses.

- Assessing the appropriateness of care needs to be based on patterns of morbidity rather than on specific diagnoses.
What Can Be Achieved by Understanding Individual & Population Morbidity Burden?

- Improved Accuracy & Equity
- Understand Morbidity Burden
- Improve Research & Clinical Guidelines
- Assess Data Validity
- Monitor Population Health Status
- Evaluate Quality of Care
- Allocate Resources
Predictive Modeling

- Targeting patients for chronic care management.
- Identifying patients at risk of high future need of healthcare resources.
- Assessing the patients at risk of hospitalization.
- Finding those patients at risk of unusual high use of pharmaceuticals.
- Identifying patients at risk of poorly coordinated care.
Understanding population-based morbidity
Benefits of Population Profiling

• Understanding population risk and overall morbidity patterns

• Detection of life style issues that may lead to health problems

• Ability to identify trends in population health

• Development of education or outreach programs
Types of Morbidity Varies by Region

- Time Limited: Minor-Primary Infections
- Time Limited: Minor
- Signs/Symptoms: Uncertain
- Signs/Symptoms: Minor
- Prevention/Administrative
- Likely to Recur: Discrete
- Dermatologic
- Chronic Medical: Unstable
- Chronic Medical: Stable
- Asthma
Care Management
Our goal:

1. **Identify** all persons with diabetes, and

2. **Stratify** them into three levels of complexity, and

3. **Intervene** appropriately. Each level of complexity has an appropriate level of care management intervention.
Intervention varies for each level

Level 1
High risk with multiple chronic illness
- Intensive Case Management: Guided Care
  - RN or Social Work Case Manager
  - Individualized Assessment
  - Care Plan
  - Self-Management Plan

Level 2
Moderate risk patients with single chronic illness or risk factors
- Disease Management: Health Coaching and Lifestyle Management
  - Remote monitoring with TeleWatch
  - Programs to modify diet, increase exercise, smoking cessation, weight loss

Level 3
Low risk
- Health Education and Promotion
  - Healthwise information—online and in print, handbooks and mailing
  - Direct messaging via mail and web
  - Healthy lifestyle program promotions
Potential uses

• To identify persons for inclusion in care management programs:
  – multi-disease (case-management) and
  – single disease (DM) programs.
  – person-oriented education/outreach programs.

• To provide comprehensive information to clinicians to help manage the ongoing care of their patients.
Performance Assessment
Interpreting Profiling Results

Potential Access Issues / Withholding Services

Performance Feedback / Contracting / Incentives

Over Utilization / Potential Fraud/Abuse

Number of Physicians

Efficiency Index

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Risk-Adjusted Profiling Ratios for GPs Across a UK Primary Care Trust (PCT) (2005)
Understanding resource use

Comparison of ACG- and Age/Gender-Based O/E Ratios
Practices of All Physicians

Based on British Columbia Ministry of Health practitioner profiles data from calendar 2000
Assessing Coordination
In primary care,
- who refers
- which patients and
- why?
Coordination Markers

- **Majority Source of Care**: An assessment of the level of participation of each clinician that provided care to each patient.

- **Unique Provider Count**: A count of the number of unique clinicians that provided care to the patient.

- **Specialty Count**: A count of the number of specialty types that provided care to the patient.

- **Generalist Seen**: A marker indicating a generalist’s participation in an individual’s care.
### Example

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>67</td>
</tr>
<tr>
<td>PCP Id</td>
<td>300*99199207</td>
</tr>
<tr>
<td>Resource Utilization Band</td>
<td>5</td>
</tr>
<tr>
<td>Gender</td>
<td>M</td>
</tr>
<tr>
<td>Product</td>
<td>HMO</td>
</tr>
<tr>
<td>Local Weight</td>
<td>9.55</td>
</tr>
</tbody>
</table>

#### Model

- **DXRx-PM - total cost - lenient dx -> total cost**
- **DXRx-PM - rx cost - lenient dx -> rx cost**

#### Prior Costs

- **Total Cost**
  - $8,043
- **Rx Cost**
  - $506

#### Predictive Values

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Probability High Total Cost</td>
<td>0.49</td>
</tr>
<tr>
<td>Predicted Total Cost Range</td>
<td>$20,000-$25,000</td>
</tr>
<tr>
<td>Probability High Rx Cost</td>
<td>0.03</td>
</tr>
<tr>
<td>Predicted Rx Cost Range</td>
<td>$500-$1,000</td>
</tr>
<tr>
<td>High Risk Unexpected Pharmacy</td>
<td>N</td>
</tr>
</tbody>
</table>

#### Coordination of Care

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chronic Condition Count</td>
<td>13</td>
</tr>
<tr>
<td>#Unique Providers Seen</td>
<td>13</td>
</tr>
<tr>
<td>#Specialty Types Seen</td>
<td>10</td>
</tr>
<tr>
<td>No Generalist Seen</td>
<td>N</td>
</tr>
<tr>
<td>% Visits Provided By Majority Source of Care</td>
<td>15</td>
</tr>
<tr>
<td>Frailty Flag</td>
<td>Y</td>
</tr>
</tbody>
</table>

#### Utilization

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outpatient Visits</td>
<td>48</td>
</tr>
<tr>
<td>ER Visits</td>
<td>4</td>
</tr>
<tr>
<td>Inpatient Admissions</td>
<td>3</td>
</tr>
<tr>
<td>Major Procedure Performed</td>
<td>N</td>
</tr>
<tr>
<td>Dialysis Service</td>
<td>N</td>
</tr>
<tr>
<td>Nursing Service</td>
<td>N</td>
</tr>
</tbody>
</table>

#### Likelihood of Hospitalization

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hospital Dominant Count</td>
<td>2</td>
</tr>
<tr>
<td>Probability Hospital Admission (6 mos)</td>
<td>0.56</td>
</tr>
<tr>
<td>Probability Hospital Admission (12 mos)</td>
<td>0.66</td>
</tr>
<tr>
<td>Probability ICU/CCU Admission</td>
<td>0.34</td>
</tr>
<tr>
<td>Probability Injury-related Admission</td>
<td>0.13</td>
</tr>
<tr>
<td>Probability Long-term Admission (12+ days)</td>
<td>0.35</td>
</tr>
</tbody>
</table>
Resource Allocation, Budgeting & Other Financial Issues
Determining the Healthcare Budget Involves a Variety of Factors

- Available Budget
- Political Forces
- Actuarial Forecasts

Size of the Healthcare Pie
Risk Adjustment Can Be Used To Slice The Pie
Reasons why Risk Adjusted Payment & Budgeting May Be Necessary

• Supporting clinicians that are selected by a costlier than average group of patients.

• Deterring clinicians from selecting healthier patients.

• Facilitating clinicians attempts to specialize in treating people with certain illness or conditions.
Challenges:

• Confidentiality of data

• Data ownership (Information governance)

• Interoperability of information systems

• Silos of information
Challenges:

• Who pays for the investment

• Reimbursement of clinicians and aligning of incentives

• Integrating informatics into medical education

• Providing the necessary feedback to clinicians
Information enables:

- Improve Research & Clinical Guidelines
- Monitor Population Health Status
- Assess Data Validity
- Evaluate Quality of Care
- Allocate Resources
- Understand Morbidity Burden
- Improved Accuracy & Equity
Family Doctors’ role:

- Ensure complete and accurate electronic records
- Apply the information feedback to them to their clinical practice
- Alter medical education programs to include information training
- Advocate for a national health information strategy
“We have instruments to assess the utility of health systems, the strength of primary care, and the outcomes as measured by morbidity burden. We need the political will to use them.”

- Barbara Starfield, Cebu, 2011
The Barbara Starfield Scholarship supports doctoral students who focus their studies in health services research or health policy with priority given to those interested in the organization, delivery and outcomes of primary care and in understanding the impact of equity on health.