Evidence-based Medicine and Disease Management:
Strategic Context, Emerging Implications

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System: big, complex, change resistant...

ADMINISTRATORS/WATCHDOGS

INNOVATORS

SERVICE PROVIDERS

CONSUMERS

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The system has achieved much...

The Most Important Medical Developments of the Last Millennium

- Elucidation of Human Anatomy and Physiology
- Discovery of Cells and Their Substructures
- Elucidation of the Chemistry of Life
- Application of Statistics to Medicine
- Development of Anesthesia
- Discovery of the Relation of Microbes to Disease
- Discovery of the Immune System
- Development of Body Imaging
- Discovery of Antimicrobial Agents
- Development of Molecular Pharmacotherapy
- Sequencing of the Human Gene*
- Nanoscience tools for diagnostics and treatments*
- Biology of human behavior sequenced*
- Rational drug designs via proteomics, chemical biology, structural biology*
Results are impressive

- Virtual elimination of diphtheria, whooping cough, measles and polio
- Death rate from pneumonia reduced by 85%
- Over 90% reduction in deaths from tuberculosis
- Deaths from ulcers reduced by 60%
- In Hospital mortality from acute myocardial infarction reduced by 55% from 1975-1995 largely through the use of 3 drugs
- In industrialized nations there is a strong positive relationship between per capita pharmaceutical expenditure and life expectancy.
- In the 19 most prevalent diseases causing death, 73% of the reduction in life years lost before age 75 is due to new drug development.
- AIDS deaths in the U.S. reduced by over 50%
But it’s costly: $7523 per person in the U.S.!
Quality is suboptimal: “The quality of care we get is far from the care we should be getting” —Don Berwick, IHI

Preventive care deficiencies
- Child immunizations 76%
- Influenza vaccine 52%
- Pap smear 82%

Acute care deficiencies
- Antibiotic misuse 30-70%
- Prenatal care 74%

Chronic care deficiencies
- Beta blockers 50%
- Diabetes eye exam 53%

Hospital care deficiencies
- Proper CHF care 50%
- Preventable deaths 14%
- Preventable ADEs 1.8/100 admits
  - Life threatening 20%
  - Serious 43%

Surgery care deficiencies
- Inappropriate hysterectomy 16%
- Inappropriate CABG surgeries 14%

“Quality of Care”
- Safe
- Effective
- Patient-centered
- Timely
- Efficient
- Equitable
Quality varies depending on where you live

Note: State ranking based on 22 Medicare performance measures.

Why does “care” vary by where people live? Two possible answers.

- People have different medical needs and expectations
  - Epidemiology and population health
  - Patient preferences (preference sensitive care)

- Physicians practice differently
  - Practice patterns vary
  - Composition of medical community vary (supply sensitive care)
## Example: Variation in Chronic Care During Last Six Months of Life

<table>
<thead>
<tr>
<th>Metric</th>
<th>U.S. Average</th>
<th>Lowest</th>
<th>Highest</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Days Spent in Hospital</strong></td>
<td>11.7</td>
<td>7.3 (UT)</td>
<td>16.4 (NY)</td>
</tr>
<tr>
<td><strong>Days in ICU</strong></td>
<td>3.2</td>
<td>1.5 (ND)</td>
<td>4.7 (FL)</td>
</tr>
<tr>
<td><strong>Physician Visits</strong></td>
<td>29.0</td>
<td>17.0 (UT)</td>
<td>35.5 (NY)</td>
</tr>
<tr>
<td><strong>% Seeing 10 or More Physicians</strong></td>
<td>27.5%</td>
<td>13.3% (ID)</td>
<td>35.6% (NY)</td>
</tr>
<tr>
<td><strong>% Deaths Associated with Admission to ICU</strong></td>
<td>18.5%</td>
<td>11.7% (SD)</td>
<td>25.1% (NJ)</td>
</tr>
<tr>
<td><strong>% Deaths enrolled in Hospice</strong></td>
<td>27.2%</td>
<td>6.7% (AK)</td>
<td>39.3% (CO)</td>
</tr>
<tr>
<td><strong>Medicare Expenditures (A,B) in Last Two Years</strong></td>
<td>$29,199</td>
<td>$23,855 (ND)</td>
<td>$39,637 (DC)</td>
</tr>
</tbody>
</table>

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Example: Geographic Variation In The Appropriate Use Of Cesarean Delivery

There is enormous geographic variation in the use of cesarean delivery: For births over 2,500 grams, adjusted cesarean rates vary fourfold between low and high-use areas.

Even for births under 2,500 grams, high-use counties have rates that are double those of low-use ones. Higher cesarean rates are only partially explained by patient characteristics but are greatly influenced by non-medical factors such as provider density, the capacity of the local health care system,

and malpractice pressure. Areas with higher usage rates perform the intervention in medically less appropriate populations--that is, relatively healthier births--and do not see improvements in maternal or neonatal mortality.

- Health Affairs 25 (2006): w355-w367; 10.1377/hlthaff.25.w355
Examples of Inappropriate Variation Readily Available

**Misuse**
- 22% of patients take less medication than prescribed
- Antibiotic use for acute otitis media in children
- Bed rest instead of routine activity for back pain
- Cox2 inhibitors over older NSAIDS/ibuprofen (vioxx, celebrex 8-16 x more harmful)
- 16% of hysterectomies not necessary
- 14% of CABG procedures not necessary
- 7% of hospital patients experience serious medication error
- Antibiotic use for upper respiratory infections (physicians say it increases patient satisfaction)

**Under Use**
- Only 45% of diabetic patients receive appropriate care
- Only 53% of diabetics have retinal exam
- Only 50% of heart attack patients receive beta blockers
- Only 82% of women of pap smear
- Only 76% of children have immunizations
- Only 50% of elderly receive pneumoccal vaccine

**Overuse**
- No correlation between # of prenatal visits and outcome (birth)
- Urinalysis and culture for UTI in symptomatic women
- Tests for asymptomatic patients routinely done for which there is not evidence of efficacy:
  - Chest X Ray for elderly, smokers
  - Hemoglobin for anemia
  - ESR for inflammatory infective disease
  - Liver function tests in blood
  - Renal function tests
  - Calcium in blood
  - Uric acid in blood
  - PSA in men 50+
  - Glucose in blood
  - HDL/LDL ratio
  - Mammograms for women 40+
  - Ultrasound exam: ovaries
  - Bone densitometry in women
  - Resting ECG
  - Exercise ECG on treadmill
  - Ultrasound exam of aorta: males 55+
- 30% of children get excessive antibiotics for ear infections
- 20-50% of surgeries not necessary (IHI)
- 50% x-ray for low back pain not needed
### Why so much variation?
Adherence to evidence varies widely


<table>
<thead>
<tr>
<th>Condition</th>
<th>% Recommended Care Received</th>
</tr>
</thead>
<tbody>
<tr>
<td>Senile Cataract</td>
<td>78.7</td>
</tr>
<tr>
<td>Breast cancer</td>
<td>75.7</td>
</tr>
<tr>
<td>Prenatal Care</td>
<td>73.0</td>
</tr>
<tr>
<td>Low back pain</td>
<td>68.5</td>
</tr>
<tr>
<td>Coronary artery disease</td>
<td>68.0</td>
</tr>
<tr>
<td>Hypertension</td>
<td>64.7</td>
</tr>
<tr>
<td>Congestive heart failure</td>
<td>63.9</td>
</tr>
<tr>
<td>Cerebrovascular disease</td>
<td>59.1</td>
</tr>
<tr>
<td>Chronic obstructive pulmonary disease</td>
<td>58.0</td>
</tr>
<tr>
<td>Depression</td>
<td>57.7</td>
</tr>
<tr>
<td>Orthopedic conditions</td>
<td>57.2</td>
</tr>
<tr>
<td>Osteoarthritis</td>
<td>57.3</td>
</tr>
<tr>
<td>Colorectal cancer</td>
<td>53.9</td>
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<th>Condition</th>
<th>% Recommended Care Received</th>
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</thead>
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<tr>
<td>Asthma</td>
<td>53.5</td>
</tr>
<tr>
<td>Benign prostatic hyperplasia</td>
<td>53.0</td>
</tr>
<tr>
<td>Hyperlipidemia</td>
<td>48.6</td>
</tr>
<tr>
<td>Diabetes mellitus</td>
<td>45.4</td>
</tr>
<tr>
<td>Headache</td>
<td>45.2</td>
</tr>
<tr>
<td>Urinary tract infection</td>
<td>40.7</td>
</tr>
<tr>
<td>Community acquired pneumonia</td>
<td>39.0</td>
</tr>
<tr>
<td>Sexually transmitted diseases</td>
<td>36.7</td>
</tr>
<tr>
<td>Dyspepsia/peptic ulcer disease</td>
<td>32.7</td>
</tr>
<tr>
<td>Atrial fibrillation</td>
<td>24.7</td>
</tr>
<tr>
<td>Hip fracture</td>
<td>22.7</td>
</tr>
<tr>
<td>Alcohol dependence</td>
<td>10.5</td>
</tr>
</tbody>
</table>
Our challenges are many...
Solution: Health System Transformation

- Improve quality
  Safe and effective care
- Reduce demand
  Coordinated care: preventive, Chronic, acute, long-term
- Change incentives
  Value-based purchasing
- Leverage IT
  Clinical, administrative
- Engage consumers
  Financial participation
  Guided self-care
Safe and effective care will be the foundation for transformation...

- Evidence Based Care
- Patient Centered Approach
- System Orientation

It is the neutral ground upon which public policies and private initiatives are framed.
Safe and effective care is primarily about error avoidance and adherence to evidence-based practices.

**Clinical Processes**
- Adherence to evidence-based pathways in the diagnosis and intervention planning with patients
- Safe, effective, timely, patient-centered care
- Collaborative care management

**Structural Processes**
- Access to needed services in appropriate settings
- Paperwork/administrative procedures to access services and document transactions

**Service Delivery Processes**
- Satisfaction with care management processes
- Amenities to reduce anxiety, increase comfort

*Clinical Excellence!*
Effective care is based on evidence-based medicine

“Evidence-based medicine is the judicious application of relevant scientific studies to patient preferences and values.”

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Strategic Perspective: EBM in Coordinated Care

- Relatively strong evidence for drug and lifestyle interventions for the major patient populations
- Emerging evidence for interventions involving self-care, devices, and adherence (but much left to be studied)
- Fairly strong consensus from evidence about diagnostic indicators (but more discreet tools needed for co-morbidities, risk factors, and values-based treatment plans)
- New conditions and opportunities for expanded application of the coordinated care model
Most consumers think they are getting evidence-based care NOW!

73% of patients depend on physicians to make decisions for them!

**Arora NK and McHorney CA. Med Care. 2000; 38:335
And most physicians are being alerted to the gaps.

- Provide patient centered care
- Work in interdisciplinary teams
- Employ evidence-based practice
- Apply quality improvement
- Utilize informatics

*Health Professions Education: A Bridge to Quality*
*Institute of Medicine 2003*
Lots of explanations ...

- “they don’t pay for it..”
- “the tools aren’t available”
- “my patients don’t care”
- “it’s a fad”
- “the only evidence I need is what I know”

*Is it going away?*
The correlation between adherence and outcomes is strong

Outcomes (p<0.0001)

- Death
- Respiratory Failure
- Prolonged Length of Stay
- Elevated Charges
- Blood Cultures
- Appropriate Antibiotics

Pathway vs. non Pathway

Payers are noticing: adherence is a key metrics for acute & chronic populations

<table>
<thead>
<tr>
<th>Program Name</th>
<th>Sponsor</th>
<th>Date Begun</th>
<th>Clinical Condition Focus</th>
<th>Bonus Target Payment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reporting Hospital Quality Data for Annual Payment Update</td>
<td>CMS</td>
<td>FY 2005</td>
<td>Acute Myocardial Infarction, Heart Failure, Pneumonia</td>
<td>-0.4 % of Medicare Payments for Hospitals not reporting</td>
</tr>
<tr>
<td>The Premier Hospital Quality Incentive Demonstration</td>
<td>CMS</td>
<td>October 2003</td>
<td>Acute Myocardial Infarction, Heart Failure, Pneumonia, CABG, Hip + Knee Replacement</td>
<td>Top Decile - 2% bonus of DRG Payments by Condition, Second Decile - 1% bonus</td>
</tr>
<tr>
<td>Bridges to Excellence</td>
<td>NCQA</td>
<td>Diabetes Care Link began in 1997</td>
<td>Diabetes Care, Cardiac Care</td>
<td>$80 per diabetes patient, $160 per cardiac patient, payed to physicians</td>
</tr>
<tr>
<td>Leapfrog Hospital Rewards Program</td>
<td>Leapfrog Group</td>
<td>April 2005</td>
<td>Acute Myocardial Infarction, CABG, PCI, Pneumonia, Deliveries</td>
<td>Bonuses every six months based on market and performance group activity</td>
</tr>
</tbody>
</table>
The model of coordinated care will expand to acute, long-term care settings
Results from CMS Hospital Compare April 2005 (4203 hospitals reporting)

<table>
<thead>
<tr>
<th># Reporting</th>
<th>Heart Attack (2008)</th>
<th>Heart Failure (2963)</th>
<th>Pneumonia (3393)</th>
</tr>
</thead>
<tbody>
<tr>
<td># indicators</td>
<td>6</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Top 20% Score Median Bottom 20%</td>
<td>96% 92% 85%</td>
<td>87% 76% 64%</td>
<td>84% 76% 69%</td>
</tr>
<tr>
<td>Higher performers</td>
<td>Major teaching Tax Exempt Public* Urban</td>
<td>Major teaching Urban Tax Exempt</td>
<td>Rural Public Non-teaching</td>
</tr>
<tr>
<td>Lower performers</td>
<td>Rural Investor-owned Non-teaching Public*</td>
<td>Rural Investor-owned Public Non-teaching</td>
<td>Major teaching Investor-owned Urban</td>
</tr>
</tbody>
</table>
Looking ahead: EBM in Coordinated Care

- Increased opportunities in new populations & settings
- Increased attention to coordination between coaches, clinicians and consumers
- Increased integration of holistic interventions with conventional
- Increased pressure to show long-term behavior change
- Increased scrutiny of business model and results
- Increased influence of government at state and federal levels to improve performance
Contact

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