Value-Based Health Care Delivery:
Outcomes Measurement

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This presentation draws on Redefining Health Care: Creating Value-Based Competition on Results (with Elizabeth O. Teisberg), Harvard Business School Press, May 2006; “A Strategy for Health Care Reform—Toward a Value-Based System,” New England Journal of Medicine, June 3, 2009; “Value-Based Health Care Delivery,” Annals of Surgery 248: 4, October 2008; “Defining and Introducing Value in Healthcare,” Institute of Medicine Annual Meeting, 2007. Additional information about these ideas, as well as case studies, can be found the Institute for Strategy & Competitiveness Redefining Health Care website at http://www.hbs.edu/rhc/index.html. No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means — electronic, mechanical, photocopying, recording, or otherwise — without the permission of Michael E. Porter and Elizabeth O. Teisberg.
Creating a Value-Based Health Care Delivery Organization

The Strategic Agenda

1. Organize into Integrated Practice Units (IPUs) around Patient Medical Conditions
   - Organize primary and preventive care to serve distinct patient segments

2. Establish Universal Measurement of Outcomes and Cost for Every Patient

3. Move to Bundled Prices for Care Cycles

4. Integrate Care Delivery Across Separate Facilities

5. Expand Areas of Excellence

6. Create an Enabling Information Technology Platform
2. Measuring Outcomes and Cost for Every Patient

- Patient Initial Conditions
  - Processes
    - Patient Adherence
      - Protocols/Guidelines
        - E.g., Hemoglobin A1c levels for diabetics
      - Structure
        - E.g., Staff certification, facilities standards
  - Indicators
    - (Health) Outcomes

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Principles of Outcome Measurement

• Outcomes should be measured by **medical condition** or **primary care patient segment**

• Outcomes are **multi-dimensional** and should include the health circumstances **most relevant to patients**

• Outcomes should reflect the **full cycle of care**

• Outcomes should encompass **near-term** and **longer-term** patient health, covering a period that reflects the ultimate results of care

• Measurement should include **initial conditions/risk factors** to allow for risk adjustment

• Ultimately, outcome measurement should be **real time** and **in the line of care**, not just retrospective or in clinical studies
The Outcome Measures Hierarchy

Tier 1
Health Status Achieved or Retained
- Survival
  - Degree of health/recovery

Tier 2
Process of Recovery
- Time to recovery and return to normal activities
- Disutility of the care or treatment process (e.g., diagnostic errors and ineffective care, treatment-related discomfort, complications, or adverse effects, treatment errors and their consequences in terms of additional treatment)

Tier 3
Sustainability of Health
- Sustainability of health/recovery and nature of recurrences
- Long-term consequences of therapy (e.g., care-induced illnesses)

Source: NEJM Dec 2010
The Outcome Measures Hierarchy

Breast Cancer

**Survival**
- Survival rate (One year, three year, five year, longer)

**Degree of recovery / health**
- Degree of remission
- Functional status
- Breast conservation
- Depression

**Time to recovery or return to normal activities**
- Time to remission
- Time to functional status

**Disutility of care or treatment process** (e.g., treatment-related discomfort, complications, adverse effects, diagnostic errors, treatment errors)
- Nosocomial infection
- Nausea/vomiting
- Febrile neutropenia
- Suspension of therapy
- Failed therapies
- Limitation of motion
- Depression

**Sustainability of recovery or health over time**
- Cancer recurrence
- Sustainability of functional status

**Long-term consequences of therapy** (e.g., care-induced illnesses)
- Incidence of secondary cancers
- Brachial plexopathy
- Fertility/pregnancy complications
- Premature osteoporosis

**Initial Conditions/Risk Factors**
- Stage upon diagnosis
- Type of cancer (infiltrating ductal carcinoma, tubular, medullary, lobular, etc.)
- Estrogen and progesterone receptor status (positive or negative)
- Sites of metastases
- Previous treatments
- Age
- Menopausal status
- General health, including co-morbidities
- Psychological and social factors
Outcome Performance Over Time

MD Anderson Oral Cavity Cancer Survival by Patient Registration Year

Survival Rate Over Time by Stage and Registration Year:
- **Stage: Local**
  - 1944-1959
  - 1960-1969
  - 1970-1979
  - 1980-1989
  - 1990-1999
  - 2000-2006

- **Stage: Regional**
  - 1944-1959
  - 1960-1969
  - 1970-1979
  - 1980-1989
  - 1990-1999
  - 2000-2006

Source: MD Anderson Cancer Center
Comparative Success Rates Across Centers
In-vitro Fertilization

Percent Live Births per Fresh, Non-Donor Embryo Transferred by Clinic Size
Women Under 38 Years of Age, 1997-2007

Adult Kidney Transplant Outcomes
U.S. Centers, 1987-1989

Number of programs: 219
Number of transplants: 19,588
One year graft survival: 79.6%

- 16 greater than predicted survival (7%)
- 20 worse than predicted survival (10%)
Adult Kidney Transplant Outcomes
U.S. Center Results, 2008-2010

Number of programs included: 236
Number of transplants: 38,535
1-year graft survival: 93.55%

8 greater than expected graft survival (3.4%)
14 worse than expected graft survival (5.9%)
Steps to Creating an Outcomes Measurement System

1. Designing outcome measures
2. Collecting outcome data
3. Compiling and analyzing outcomes
4. Reporting
1. Designing Outcome Measures

- Establish an outcome measures team including physicians, nurses and skilled staff involved in the care cycle
- Define the medical condition
- Create a Care Delivery Value Chain for the condition
- Use the outcome hierarchy to define a comprehensive set of outcome dimensions, and specific measures
  - Engage patients to understand the outcomes that matter to them
- Tie the outcome measures to the CDVC to check for completeness and start to identify the causal connections between activities and each outcome
- Identify the set of initial conditions or risk factors necessary to control for patient differences
### The Care Delivery Value Chain

#### Acute Knee-Osteoarthritis Requiring Replacement

<table>
<thead>
<tr>
<th><strong>Informing and Engaging</strong></th>
<th><strong>Measuring</strong></th>
<th><strong>Accessing</strong></th>
<th><strong>Monitoring/Preventing</strong></th>
<th><strong>Diagnosing</strong></th>
<th><strong>Preparing</strong></th>
<th><strong>Intervening</strong></th>
<th><strong>Recovering/Rehabbing</strong></th>
<th><strong>Monitoring/Managing</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Importance of exercise, weight reduction, proper nutrition</td>
<td>Joint-specific symptoms and function (e.g., WOMAC scale)</td>
<td>PCP office, Health club, Physical therapy clinic</td>
<td>Conduct PCP exam</td>
<td>Performance MRI and x-ray</td>
<td>Conduct home assessment</td>
<td>Administer anesthesia (general, epidural, or regional)</td>
<td>Immediate return to OR for manipulation, if necessary</td>
<td>Consult regularly with patient</td>
</tr>
<tr>
<td>Meaning of diagnosis</td>
<td>Loss of cartilage</td>
<td>Specialty office</td>
<td>Imaging facility</td>
<td>Assess cartilage loss</td>
<td>Monitor weight loss</td>
<td>Maintain pain control</td>
<td>Monitor coagulation</td>
<td>Prescribe prophylactic antibiotics when needed</td>
</tr>
<tr>
<td>Prognosis (short- and long-term outcomes)</td>
<td>Change in subchondral bone</td>
<td>Specialty office</td>
<td>Pre-op evaluation center</td>
<td>Assess bone alterations</td>
<td>Operative time</td>
<td>Monitor coagulation</td>
<td>Monitor coagulation</td>
<td>Set long-term exercise plan</td>
</tr>
<tr>
<td>Importance of exercise, weight loss, vaccinations</td>
<td>Joint-specific symptoms and function</td>
<td>Operating room, Recovery room, Orthopedic floor at hospital or specialty surgery center</td>
<td>Conduct physical exam</td>
<td>Overall health</td>
<td>Complications</td>
<td>Monitor coagulation</td>
<td>Monitor coagulation</td>
<td>Revise joint, if necessary</td>
</tr>
<tr>
<td>Drawbacks and benefits of surgery</td>
<td>Overall health</td>
<td>Nursing facility, Rehab facility, Physical therapy clinic, Home</td>
<td>Conduct pre-op physical exam</td>
<td>Blood loss</td>
<td>Infections</td>
<td>Monitor coagulation</td>
<td>Monitor coagulation</td>
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<td><strong>Maneuver</strong></td>
<td><strong>Support</strong></td>
<td><strong>Monitor</strong></td>
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</tbody>
</table>

**Relevant Entities**

- Operating room
- Recovery room
- Orthopedic floor at hospital or specialty surgery center
- Specialty office
- Primary care office
- Health club
- Imaging facility
- Pre-op evaluation center
- Nursing facility
- Rehab facility
- Physical therapy clinic
- Home

**Other Relevant Entities**

- Orthopedic Specialist
- Other Provider Entities
2. Collecting Outcome Data: Initial Steps

- Identify the **best placed individual(s)** for **entering data** and making the **most informed judgment** on each measure
  - E.g. physicians, nurses, patients or dedicated measurement staff
- Extract **available** information from clinical and administrative systems
- Create an **auditing system** to eliminate clerical and other errors, as well as to test the objectivity of qualitative scoring and judgments
- **Chart review** and **paper-based forms** are starting points in expanding the measures tracked
2. Collecting Outcome Data: Moving to a Real-time System

**EMR Capture**
- Modify the EMR to allow efficient collection of clinician-reported measures
  - E.g. standardized, medical-condition specific templates
- Create paper or web-based tools that incorporate patient-reported outcomes
  - E.g. Dartmouth Spine Center tablets, patient portals

**Long Term Tracking**
- Develop practical patient tracking methods to follow patients over extended time periods
  - Links to registries and payor and government databases (death records, worker’s compensation, unemployment, etc.)
3. Compiling and Analyzing Outcomes

- Compile outcomes data and initial conditions in a **centralized registry or database**
  - Structured around patients and their **medical conditions**, not visits or episodes
- Create reports for **risk-adjusted patient cohorts** over time
- Compare outcomes **across providers and locations**
- Convene **regular meetings** to analyze variations and trends
  - Create an environment that allows **open discussion of results** with no repercussions for participants willing to learn and make constructive changes
- Utilize outcome learning to investigate **processes, potential care innovations**, and **other improvement approaches**
  - Combine with care cycle costing data
- **Refine** the measures, collection methods, and risk-adjustment factors over time
4. Reporting

• Start first with **internal reporting to providers** - move over time to referring providers, payors, and patients
• Create an agreed upon path to **external** transparency of outcomes
• Work with provider peers, payors, and government to **standardize reporting measures and methods**, including
  – Metrics
  – Method of stratification/risk adjustment
  – Unit of analysis (individual physician vs. group practice)
  – Process for improving metrics and practices
• Collaborate with external registries and leading national and international providers to **benchmark performance and compare best practices**
• Ultimately, **national reporting of standardized measures** will be the strongest driver in value improvement
The Role of Registries in Outcome Measurement: Selected Swedish National Quality Registers, 2007

Respiratory Diseases
- Respiratory Failure Register (Swedevox)
- Swedish Quality Register of Otorhinolaryngology

Childhood and Adolescence
- The Swedish Childhood Diabetes Registry (SWEDIABKIDS)
- Childhood Obesity Registry in Sweden (BORIS)
- Perinatal Quality Registry/Neonatology (PNQn)
- National Registry of Suspected/Confirmed Sexual Abuse in Children and Adolescents (SÖK)

Circulatory Diseases
- Swedish Coronary Angiography and Angioplasty Registry (SCAAR)
- Registry on Cardiac Intensive Care (RIKS-HIA)
- Registry on Secondary Prevention in Cardiac Intensive Care (SEPHIA)
- Swedish Heart Surgery Registry
- Grown-Up Congenital Heart Disease Registry (GUCH)
- National Registry on Out-of-Hospital Cardiac Arrest
- Heart Failure Registry (RiksSvikt)
- National Catheter Ablation Registry
- Vascular Registry in Sweden (Swedvasc)

Endocrine Diseases
- National Quality Registry for Stroke (Riks-Stroke)
- National Registry of Atrial Fibrillation and Anticoagulation (AuriculA)

Gastrointestinal Disorders
- Swedish Hernia Registry
- Swedish Quality Registry on Gallstone Surgery (GallRiks)
- Swedish Quality Registry for Vertical Hernia

Musculoskeletal Diseases
- Swedish Shoulder Arthroplasty Registry
- National Hip Fracture Registry (RIKSHÖFT)
- Swedish National Hip Arthroplasty Register
- Swedish Knee Arthroplasty Register
- Swedish Rheumatoid Arthritis Registry
- National Pain Rehabilitation Registry
- Follow-Up in Back Surgery
- Swedish Cruciate Ligament Registry – X-Base
- Swedish National Elbow Arthroplasty Register (SAAR)

* Registers Receiving Funding from the Executive Committee for National Quality Registries in 2007
Enabling Universal Outcomes Measurement: Leverage Points for Government

- Provide **seed funding** for registry development
- Streamline **policy hurdles** that impede measurement and registry development and implementation (e.g., privacy rules, definitive patient identifiers)
- **Incentivize** outcomes measurement and reporting
  - Initially, incentives for reporting
  - Required reporting for participation in **new reimbursement models**
  - Required reporting for **all** reimbursement
- Strengthen **IT standards** to allow easy transfer of information across data sources
- **Stimulate EMR improvements** that enable efficient data-entry workflow and easy extraction of outcome measures
Enabling Universal Outcomes Measurement: Leverage Points for Patients, Payors, and Employers

**Patients**

- Work with providers to define the outcomes that **matter to patients** by medical condition
- Utilize **outcomes data** in provider selection

**Payors**

- Become active **users** of outcome data to inform contracting and guide subscriber choices
- Introduce **incentives** for outcome reporting and registry participation
  - Tie pay-for-performance programs initially to **reporting of outcomes**, but eventually to outcomes themselves
- Create a pathway to **external transparency** of outcomes

**Employers**

- Use purchasing power to require outcomes reporting by medical condition **as a condition for contracting**