Value-Based Health Care Delivery

Professor Michael E. Porter
Harvard Business School
Institute for Strategy and Competitiveness
www.isc.hbs.edu

Rethinking Malaria: A Leadership Forum
January 18, 2011

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.
Redefining Health Care Delivery

• Achieving universal coverage and access to care are essential, but not enough
• The core issue in health care is the value of health care delivered

Value: Patient health outcomes per dollar spent

• How to design a health care system that dramatically improves patient value?
Creating a Value-Based Health Care System

• Significant improvement in value will require **fundamental restructuring of health care delivery**, not incremental improvements

> Today, 21\textsuperscript{st} century medical technology is often delivered with 19\textsuperscript{th} century organization structures, management practices, and payment models

- Process improvements, safety initiatives, disease management and other **overlays** to the current structure are beneficial, but not sufficient
Creating Choice and Competition on Value

- **Competition** and **choice** for patients/subscribers are powerful forces to encourage restructuring of care and continuous improvement in value.

- Today’s competition in health care is often not aligned with value.

  
  
  Financial success of system participants $\neq$ Patient success

- Creating positive-sum **competition on value** is a central challenge in health care reform in every country.
Principles of Value-Based Health Care Delivery

Value as the Common Goal

- The central goal in health care must be value for patients, not access, volume, convenience, or cost containment.

\[
\text{Value} = \frac{\text{Health outcomes}}{\text{Costs of delivering the outcomes}}
\]

- Outcomes are the full set of patient health outcomes over the care cycle.
- Costs are the total costs of care for the patient’s condition over the care cycle.

- How to design a health care system that dramatically improves patient value.
Principles of Value-Based Health Care Delivery

- **Quality improvement** is the key driver of cost containment and value improvement, where quality is **health outcomes**

<table>
<thead>
<tr>
<th>Prevention of illness</th>
<th>Fewer complications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Early detection</td>
<td>Fewer mistakes and repeats in treatment</td>
</tr>
<tr>
<td>Right diagnosis</td>
<td>Faster recovery</td>
</tr>
<tr>
<td>Right treatment to the right patient</td>
<td>More complete recovery</td>
</tr>
<tr>
<td>Early and timely treatment</td>
<td>Less disability</td>
</tr>
<tr>
<td>Treatment earlier in the causal chain of disease</td>
<td>Fewer recurrences, relapses, flare ups, or acute episodes</td>
</tr>
<tr>
<td>Rapid cycle time of diagnosis and treatment</td>
<td>Slower disease progression</td>
</tr>
<tr>
<td>Less invasive treatment methods</td>
<td>Greater functionality and less need for long term care</td>
</tr>
<tr>
<td></td>
<td>Less care induced illness</td>
</tr>
</tbody>
</table>

- **Better health** is the goal, not more treatment
- Better health is **inherently less expensive** than poor health
Creating a Value-Based Delivery System

The Strategic Agenda

1. Organize into Integrated Practice Units (IPUs) Around Patient Medical Conditions
   - Primary and preventive care should be organized around distinct patient populations

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 Excellent IPUs Across Geography

6. Create an Enabling Information Technology Platform
1. Organize Around Patient Medical Conditions
Migraine Care in Germany

Existing Model:
Organize by Specialty and Discrete Services

New Model:
Organize into Integrated Practice Units (IPUs)

# The Care Delivery Value Chain
## HIV/AIDS

<table>
<thead>
<tr>
<th>INFORMING/ENGAGING</th>
<th>MEASURING</th>
<th>ACCESSING</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prevention counseling on modes of transmission and condom use</td>
<td>HIV testing for others at risk</td>
<td>Testing centers</td>
</tr>
<tr>
<td>Explanation of diagnosis and the implications</td>
<td>Clinical examination CD4+ count and other labs</td>
<td>High risk settings</td>
</tr>
<tr>
<td>Explaining the course of HIV and the prognosis</td>
<td>Testing for common co-morbidities such as tuberculosis and sexually transmitted diseases</td>
<td>Primary Care Clinics</td>
</tr>
<tr>
<td>Explanation of the approach to forestalling progression</td>
<td>HIV testing for others at risk</td>
<td>On-site laboratories at Primary Care Clinics</td>
</tr>
<tr>
<td>Explanation of Medication Instructions and Side-Effects</td>
<td>HIV Testing for Others at Risk</td>
<td>Testing Centers</td>
</tr>
<tr>
<td>Counseling about adherence: understanding factors for non-adherence</td>
<td>HIV Staging and Medication Response</td>
<td>Primary Care Clinics</td>
</tr>
<tr>
<td>HIV Staging and Medication Response (Continuous Staging)</td>
<td>Highly Frequency Primary Care Assessment</td>
<td>Laboratories (on-site at primary clinic)</td>
</tr>
<tr>
<td>HIV Testing for Others at Risk</td>
<td>Assessing/Managing Complications of Therapy</td>
<td>Pharmacy</td>
</tr>
<tr>
<td>Laboratory Evaluation for Medication Initiation</td>
<td>HIV testing for others at risk (bi-annually)</td>
<td>Community Health Workers/ Home Visits</td>
</tr>
<tr>
<td>Laboratory Evaluation</td>
<td>HIV Staging and Medication Response</td>
<td>Support Groups</td>
</tr>
</tbody>
</table>

### SCREENING
- Connecting patients with primary care system
- Identifying high risk individuals
- Testing at-risk individuals
- Promoting appropriate risk reduction strategies
- Modifying behavioral risk factors
- Creating a medical record
- Connecting patients with primary care system

### DIAGNOSING/STAGING
- Formal diagnosis and staging
- Determine method of transmission and others at potential risk
- Identify others at risk
- Screen for TB, syphilis, and other sexually transmitted diseases
- Pregnancy testing and contraceptive counseling
- Create management plan, including scheduling of follow-up visits
- Formulate a treatment plan

### DELAYING PROGRESSION
- Initiate therapies that can delay onset, including vitamins and food
- Treat co-morbidities that affect progression of disease, especially tuberculosis
- Improve patient awareness of disease progression, prognosis, and transmission
- Connect patient to care team, including community health work

### INITIATING ANTIRETROVIRAL THERAPY
- Initiate comprehensive antiretroviral therapy and assess medication readiness
- Prepare patient for disease progression and side-effects of associated treatment
- Manage secondary infections and associated illnesses

### ONGOING DISEASE MANAGEMENT
- Managing effects of associated illnesses
- Managing side effects of treatment
- Determine supporting nutritional modifications
- Preparing patient for end-of-life management
- Primary care and health maintenance

### MANAGEMENT OF CLINICAL DETERIORATION
- Identifying clinical and laboratory deterioration
- Initiating second-line, third-line drug therapies
- Managing acute illness and opportunistic infection either through aggressive outpatient management or hospitalization
- Provide additional community/social support if needed
- Access to Hospice Care

---

Copyright © Michael Porter 2011
Volume and experience will have an even greater impact on value in an IPU structure than in the current system.
# Role of Volume in Value Creation

## Fragmentation of Hospital Services in Sweden

<table>
<thead>
<tr>
<th>DRG</th>
<th>Number of admitting providers</th>
<th>Average percent of total national admissions</th>
<th>Average admissions/provider/year</th>
<th>Average admissions/provider/week</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knee Procedure</td>
<td>68</td>
<td>1.5%</td>
<td>55</td>
<td>1</td>
</tr>
<tr>
<td>Diabetes age &gt; 35</td>
<td>80</td>
<td>1.3%</td>
<td>96</td>
<td>2</td>
</tr>
<tr>
<td>Kidney failure</td>
<td>80</td>
<td>1.3%</td>
<td>97</td>
<td>2</td>
</tr>
<tr>
<td>Multiple sclerosis and cerebellar ataxia</td>
<td>78</td>
<td>1.3%</td>
<td>28</td>
<td>1</td>
</tr>
<tr>
<td>Inflammatory bowel disease</td>
<td>73</td>
<td>1.4%</td>
<td>66</td>
<td>1</td>
</tr>
<tr>
<td>Implantation of cardiac pacemaker</td>
<td>51</td>
<td>2.0%</td>
<td>124</td>
<td>2</td>
</tr>
<tr>
<td>Splenectomy age &gt; 17</td>
<td>37</td>
<td>2.6%</td>
<td>3</td>
<td>&lt;1</td>
</tr>
<tr>
<td>Cleft lip &amp; palate repair</td>
<td>7</td>
<td>14.2%</td>
<td>83</td>
<td>2</td>
</tr>
<tr>
<td>Heart transplant</td>
<td>6</td>
<td>16.6%</td>
<td>12</td>
<td>&lt;1</td>
</tr>
</tbody>
</table>


- **Minimum volume standards** in lieu of compelling outcome information is an interim step to drive service consolidation
2. Measure Outcomes and Cost for Every Patient

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

Structure

(more details not visible in the image)
The Outcome Measures Hierarchy

Tier 1
Health Status Achieved or Retained

Tier 2
Process of Recovery

Tier 3
Sustainability of Health

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

Recurrences
Care-induced Illnesses
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. Centers, 2005-2007

Number of programs: 240
Number of transplants: 38,515
One year graft survival: 93.2%

- 16 greater than expected graft survival (6.6%)
- 19 worse than expected graft survival (7.8%)
Measuring Cost in Health Care

- Current cost accounting practices in health care obscure understanding of the actual costs of care delivery and severely compromise the ability for true cost reduction.

Cost Definition Problem
- Costs are widely confused with charges, or allocated based on charges.

Cost Aggregation Problem
- Costs are measured and aggregated for departments, specialties, discrete services, and line items (billing units).
- Costs should be aggregated for the full care cycle for the patient’s medical condition.

Cost Allocation Problem
- Costs of shared resources are allocated using averages or estimates.
- Costs should be allocated to individual patients based on their actual use of the resources involved.
- The application of time-driven activity-based costing to health care organization reveals structural opportunities for true cost reduction.
3. Move to Bundled Prices for Care Cycle
Hip and Knee Replacement in Stockholm, Sweden

- **Components** of the bundle

  - Pre-op evaluation
  - Lab tests
  - Radiology
  - Surgery & related admissions
  - Prosthesis
  - Drugs
  - Inpatient rehab, up to 6 days
  - All physician and staff costs
  - 1 follow-up visit within 3 months
  - Any additional surgery to the joint within 2 years
  - If post-op infection requiring antibiotics occurs, guarantee extends to 5 years

- Applies to all **relatively healthy patients** (i.e. ASA scores of 1 or 2)
- The same **referral process** from PCPs is utilized as the traditional system

  - **Mandatory reporting** by providers to the joint registry plus supplementary reporting

- Provider participation is **voluntary** but all providers are involved

- The bundled price for a knee or hip replacement is about **US $8,000**
4. Integrate Care Delivery Across Separate Facilities

Children’s Hospital of Philadelphia Care Network

- Choose an overall **scope of service lines** where the provider can achieve excellence
- **Rationalize service lines/ IPUs** across facilities to improve volume, avoid duplication, and deepen teams
- **Offer specific services** at the **appropriate facility**
  - E.g. acuity level, cost level, need for convenience
- Clinically integrate **care across facilities**, within an IPU structure
  - Expand and integrate the care cycle
  - Better connect **preventive/primary care** units to specialty IPUs
Health Care Delivery in Resource-Poor Settings: The Need for New Approaches

<table>
<thead>
<tr>
<th>Current Model</th>
<th>New Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>• The product is <strong>treatment</strong></td>
<td>• The product is <strong>health</strong></td>
</tr>
<tr>
<td>• Measure <strong>volume</strong> of services (number of tests, treatments)</td>
<td>• Measure <strong>value</strong> of services (health outcomes per unit of cost)</td>
</tr>
<tr>
<td>• Discrete <strong>interventions</strong></td>
<td>• <strong>Care cycles</strong></td>
</tr>
<tr>
<td>• <strong>Individual</strong> diseases</td>
<td>• Sets of prevalent <strong>co-occurring conditions</strong></td>
</tr>
<tr>
<td>• <strong>Fragmented, localized, pilots, programs, and entities</strong></td>
<td>• Large scale <strong>integrated</strong> care delivery systems</td>
</tr>
</tbody>
</table>
I. Care Delivery Value Chains for Medical Conditions

II. Shared Delivery Infrastructure

III. Aligning Delivery with External Context

IV. Leveraging the Health Care System for Economic and Social Development
## The Care Delivery Value Chain
### HIV/AIDS

<table>
<thead>
<tr>
<th>INFORMING/ENGAGING</th>
<th>MEASURING</th>
<th>ACCESSING</th>
<th>SCREENING</th>
<th>DIAGNOSING/STAGING</th>
<th>DELAYING PROGRESSION</th>
<th>INITIATING ANTIRETROVIRAL THERAPY</th>
<th>ONGOING DISEASE MANAGEMENT</th>
<th>MANAGEMENT OF CLINICAL DETERIORATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prevention counseling on modes of transmission and condom use</td>
<td>HIV testing</td>
<td>Testing centers</td>
<td>Screening</td>
<td>Formal diagnosis and staging</td>
<td>Initiating therapies that can delay onset, including vitamins and food</td>
<td>Managing effects of associated illnesses</td>
<td>Identifying clinical and laboratory deterioration</td>
<td>Connecting patients with primary care system</td>
</tr>
<tr>
<td>Explanation of diagnosis and the implications</td>
<td>Screen for sexually transmitted infections</td>
<td>High risk settings</td>
<td></td>
<td>Determine method of transmission and others at potential risk</td>
<td>Treat co-morbidities that affect progression of disease, especially tuberculosis</td>
<td>Managing side effects of treatment</td>
<td>Initiating second-line, third-line drug therapies</td>
<td>Identifying high risk individuals</td>
</tr>
<tr>
<td>Explaining the course of HIV and the prognosis</td>
<td>Collect baseline demographics</td>
<td>Primary Care Clinics</td>
<td></td>
<td>Identify others at risk</td>
<td>Improve patient awareness of disease progression, prognosis, and transmission</td>
<td>Determine supporting nutritional modifications</td>
<td>Managing acute illness and opportunistic infection either through aggressive outpatient management or hospitalization</td>
<td>Testing at-risk individuals</td>
</tr>
<tr>
<td>Testing for common co-morbidities such as tuberculosis and sexually transmitted diseases</td>
<td>HIV HIV testing for others at risk</td>
<td>Primary Care Clinics</td>
<td></td>
<td>Screen for TB, syphilis, and other sexually transmitted diseases</td>
<td>Prevent patient for disease progression and side-effects of associated treatment</td>
<td>Preparing patient for end-of-life management</td>
<td>Managing acute illness and opportunistic infection either through aggressive outpatient management or hospitalization</td>
<td>Promoting appropriate risk reduction strategies</td>
</tr>
<tr>
<td>Pregnancy testing</td>
<td>Clinical examination CD4+ count and other labs</td>
<td>On-site laboratories at Primary Care Clinics</td>
<td></td>
<td>Pregnancy testing and contraceptive counseling</td>
<td>Manage secondary infections and associated illnesses</td>
<td>Primary care and health maintenance</td>
<td>Provide additional community/ social support if needed</td>
<td>Modifying behavioral risk factors</td>
</tr>
<tr>
<td>HIV Staging and Medication Response</td>
<td>HIV Testing for Others at Risk</td>
<td>HIV Testing for Others at Risk</td>
<td></td>
<td>Create management plan, including scheduling of follow-up visits</td>
<td>Initiate comprehensive antiretroviral therapy and assess medication readiness</td>
<td>Identifying clinical and laboratory deterioration</td>
<td>Access to Hospice Care</td>
<td>Creating a medical record</td>
</tr>
<tr>
<td>Highly Frequency Primary Care Assessment</td>
<td>Laboratory Evaluation for Medication Initiation</td>
<td>Laboratory Evaluation for Medication Initiation</td>
<td></td>
<td>Formulate a treatment plan</td>
<td>Prepare patient for disease progression and side-effects of associated treatment</td>
<td>Initiating second-line, third-line drug therapies</td>
<td>Managing acute illness and opportunistic infection either through aggressive outpatient management or hospitalization</td>
<td>Distributing education and advice about HIV/AIDS prevention</td>
</tr>
<tr>
<td>HIV testing for others at risk</td>
<td>HIV Testing for Others at Risk</td>
<td>HIV Testing for Others at Risk</td>
<td></td>
<td>Create management plan, including scheduling of follow-up visits</td>
<td>Connect patient to care team, including community health work</td>
<td>Managing acute illness and opportunistic infection either through aggressive outpatient management or hospitalization</td>
<td>Providing additional community/ social support if needed</td>
<td>Connecting patients with primary care system</td>
</tr>
<tr>
<td>Laboratory Evaluation</td>
<td>Laboratory Evaluation</td>
<td>Laboratory Evaluation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Identifying high risk individuals</td>
</tr>
<tr>
<td>Counseling about adherence: understanding factors for non-adherence</td>
<td>HIV Staging and Medication Response</td>
<td>HIV Staging and Medication Response</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Testing at-risk individuals</td>
</tr>
<tr>
<td>End-of-Life Counseling</td>
<td>HIV Staging and Medication Response</td>
<td>HIV Staging and Medication Response</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Promoting appropriate risk reduction strategies</td>
</tr>
<tr>
<td>HIV Staging and Medication Response</td>
<td>HIV Staging and Medication Response</td>
<td>HIV Staging and Medication Response</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Modifying behavioral risk factors</td>
</tr>
<tr>
<td>HIV Staging and Medication Response</td>
<td>HIV Staging and Medication Response</td>
<td>HIV Staging and Medication Response</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Creating a medical record</td>
</tr>
<tr>
<td>HIV Staging and Medication Response</td>
<td>HIV Staging and Medication Response</td>
<td>HIV Staging and Medication Response</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Connecting patients with primary care system</td>
</tr>
<tr>
<td>HIV Staging and Medication Response</td>
<td>HIV Staging and Medication Response</td>
<td>HIV Staging and Medication Response</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Connect patient to care team, including community health work</td>
</tr>
<tr>
<td>HIV Staging and Medication Response</td>
<td>HIV Staging and Medication Response</td>
<td>HIV Staging and Medication Response</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Testing at-risk individuals</td>
</tr>
<tr>
<td>HIV Staging and Medication Response</td>
<td>HIV Staging and Medication Response</td>
<td>HIV Staging and Medication Response</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Modifying behavioral risk factors</td>
</tr>
<tr>
<td>HIV Staging and Medication Response</td>
<td>HIV Staging and Medication Response</td>
<td>HIV Staging and Medication Response</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Creating a medical record</td>
</tr>
</tbody>
</table>
The Prevention Delivery Value Chain

**HIV/AIDS**

<table>
<thead>
<tr>
<th>GENERATING DEMAND</th>
<th>MEASURING</th>
<th>ACCESSING</th>
</tr>
</thead>
<tbody>
<tr>
<td>REDUCING STRUCTURAL RISK</td>
<td>REDUCING RISKY BEHAVIOR</td>
<td>REDUCING BIOLOGICAL VULNERABILITY</td>
</tr>
<tr>
<td>TESTING</td>
<td>LINKING TO CARE AND SUPPORT</td>
<td></td>
</tr>
</tbody>
</table>

**INDIVIDUAL**

**COMMUNITY**

**NATIONAL**
Shared Delivery Infrastructure

- Community Health Workers
- Health Clinics
- District Hospitals
- Testing Laboratories
- Tertiary Hospitals

Cross Cutting Issues
- Supply Chain Management
- Information and IT
- Human Resource Development
- Insurance and Financing
Integrating “Vertical” and “Horizontal”

**Care Delivery Value Chains**

- HIV/AIDS
- Malaria
- Perinatal
- Tuberculosis

**Shared Delivery Infrastructure**

- Health Clinics
- Community Health Workers
- District Hospitals
- Testing Laboratories
- Tertiary Hospitals

- **Scope of services** at each facility
  - Integrate care across related diseases
- Provide care at the right facility
- Integrate care across facilities
Integrating Delivery and Context

Integrated Care Delivery

- Access to Care Facilities
- Health Awareness
- Nutrition
- Family/Community Attitudes and Support
- Environmental Factors
- Water & Sanitation

External Context for Health

Broader Influences

- JOBS
- HOUSING
- EDUCATION
- PHYSICAL INFRASTRUCTURE
- TRANSPORTATION
- VIOLENCE
- POLITICAL STABILITY
- COMMUNICATION SYSTEMS
- POLITICAL STABILITY
- EDUCATION

Environmental Factors

- Access to Care Facilities
- Health Awareness
- Nutrition
- Family/Community Attitudes and Support
- Water & Sanitation
The Relationship Between Health Systems and Economic Development

Better Health **Enables** Economic Development
- Enables people to work
- Raises productivity

Health System Development **Fosters** Economic Development
- Direct employment (health sector jobs)
- Local procurement
- Catalyst for infrastructure improvement (e.g. cell towers, internet, and electrification)
A New Field of Health Care Delivery

Basic Science

Clinical Science

Evaluation Science

Health Care Delivery Science

• What is the **pathophysiology**?

• What is the **proper diagnosis** and **appropriate intervention**?

• Does the **intervention work**?

• What is the **overall value** of care (outcomes, costs)?

• How are interventions best **delivered**?

• How can the **entire set of interventions** and supporting services be integrated and optimized over the care cycle?

• How should delivery adapt to **local conditions**?