Defining, Measuring and Improving Healthcare Value

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Professor Robert S. (Bob) Kaplan,
in collaboration with Professor Michael E. Porter
The central goal in health care must be **value for patients**, not access, volume, convenience, quality, or cost containment.

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

The Value approach requires that we measure two fundamental parameters:

1. Outcomes: the **full set of patient health outcomes** over the care cycle
2. Costs: the **total costs of resources** used to care for a patient’s condition over the care cycle
Measurement matters!

“In the past year, I have been struck by how important measurement is to improving the human condition. You can achieve incredible progress if you set a clear goal and find a measure that will drive progress toward that goal.”

2013 Annual Letter from Bill Gates
Bill and Melinda Gates Foundation
Patient-level outcomes and costs should be measured over a complete cycle of care for a clinical condition.

Source: Tim Ferris, MD, personal communication
Measurement Tension: Process or Outcomes?

Patient Adherence

Patient Initial Conditions

Patient Adherence

Processes

Indicators

(Health) Outcomes

Patient Adherence

Processes

Indicators

(Health) Outcomes

Structure

e.g., Staff certification, facilities standards

Protocols/ Guidelines/ Checklists

e.g., Hemoglobin A1c levels for diabetics

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Measuring Outcomes (Michael Porter, NEJM, Dec 23, 2010)

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

- **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/recovery and nature of recurrences
  - Sustainability of Health
  - Long-term consequences of therapy

- Recurrences
- Care-induced Illnesses

- Clinical Status
- Functional Status
The Outcome Measures Hierarchy: Prostate Cancer

Survival
- 5 year survival rate

Degree of recovery / health
- PSA level

Time to recovery or return to normal activities
- Patient satisfaction
- Sexual function
- Urinary continence
- Urinary Bother
- Bowel function

Disutility of care or treatment process (e.g., treatment-related discomfort, complications, adverse effects, diagnostic errors, treatment errors)
- Infection
- Readmission
- Rectal bleeding
- Urinary blockages
- Depression

Sustainability of recovery or health over time
- bRFS, 10 and 15 year survival rates
- Sustainability of functional status

Long-term consequences of therapy (e.g., care-induced illnesses)
- Incidence of secondary cancers
- Penile shortening
• A bottoms-up approach to costing patient care based on the actual clinical and administrative processes, and resources, used to treat patients.

• Combines process mapping from industrial engineering with the most modern approach for accurate and transparent patient-level costing
TDABC Step 1: Develop process maps for the complete care cycle

**Level 1: Overall care cycle**

- Map 1: Surgical consultation
- Map 2: Pre-operative testing
- Map 3: Day of surgery pre-operative prep
- Map 4: Operation
- Map 5: Post-anesthesia care unit
- Map 6: Discharge
- Map 7: Rehabilitation
- Map 8: Follow-up visit

**Level 2: Study care cycle**

- Map 1: Surgical consultation
- Map 2: Pre-operative testing
- Map 3: Day of surgery pre-operative prep
- Map 4: Operation
- Map 5: Post-anesthesia care unit
- Map 6: Discharge
- Map 7: Rehabilitation
- Map 8: Follow-up visit

**Level 3: Process maps**

- Map 2

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Process map for initial office visit

**Patient Check In**
- Patient arrives
- Patient checks in
- Review and record patient info

**Waiting Room**
- Patient fills out paperwork
- Patient waits for appointment

**Exam Room**
- Patient assessment
- Need to X-ray?
  - Yes: 85%
  - No: 15%
- Patient waits for surgeon

**X-Ray Room**
- Take X-rays
- Process and annotate image
- Is patient having a TKA?
  - Yes: 60%
  - No: 40%
- Dictate notes and consult with staff as needed
- Transcribe notes

**Education Room**
- Bring patient to education room
- Patient watches video
- Discuss surgery and answer questions

**Patient Check Out**
- Patient checks out
- Patient departs

### Staff Key
- Office Assistant
- Physician Assistant
- X-Ray Tech
- Surgeon
- Scribe
- RN

### Average time
- 2 minutes
- 5 minutes
- 7 minutes
- 10 minutes
- 8 minutes
TDABC Step 2: Calculate each resource’s Capacity Cost Rate ($/minute)

- **Costs**: All the costs (salary, fringe benefits, occupancy, technology, supervision, support resources) associated with having that person (or piece of equipment) available to treat patients.

- **Capacity**: The capacity (time) that each resource (personnel, equipment) has available for treating and caring for patients.

- **Capacity Cost Rate** = Resource Cost / Resource Capacity

  = $ (€) per minute
Calculate Capacity Cost Rates (CCR) for each resource (personnel or equipment)

*Data are illustrative*

<table>
<thead>
<tr>
<th></th>
<th>Surgeon</th>
<th>Registered Nurse</th>
<th>X-Ray Technician</th>
<th>Physician Assistant</th>
<th>Office Assistant</th>
<th>Scribe</th>
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<tbody>
<tr>
<td>Total Clinical Costs ($)</td>
<td>$ 546,400</td>
<td>$ 120,000</td>
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<td>Personnel Capacity (minutes)</td>
<td>91,086</td>
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<tr>
<td>Personnel Capacity Cost Rate ($/min.)</td>
<td>$ 6.00</td>
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<td>$ 1.12</td>
<td>$ 0.72</td>
<td>$ 0.57</td>
<td>$ 0.68</td>
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Compute total patient care costs by multiplying process times by its resource capacity cost rate and sum across the patient’s cycle of care.

### Initial consultation

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<th>Minutes</th>
<th>Cost/minute</th>
<th>*Total</th>
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<tr>
<td>MD X₁</td>
<td>Y₁</td>
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<td>RN X₂</td>
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<tr>
<td>CA X₃</td>
<td>Y₃</td>
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<tr>
<td>ASR X₄</td>
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### Surgical procedure

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<td>OR X₅</td>
<td>Y₅</td>
<td>329.16</td>
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<td></td>
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<td>$1752.15</td>
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### Follow-up or post-operative visit

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Source: Meg Abbott, MD & John Meara, MD Boston Children’s Hospital
We can display value – outcomes and cost – on a radar/spider chart.

Prostate Cancer Treatments

- Brachytherapy (LDR)
- Photon (IMRT)
- Proton (IMPT)
- Radical Prostatectomy

- Sexual Function (EPIC)
- Urinary Incontinence (EPIC)
- Urinary Bother (EPIC)
- Bowel Function (EPIC)
- Cure - bRFS (%)
- 1/Cost
Time-Driven ABC provides a common platform – a single version of truth – for productive discussions among clinical & administrative personnel.

By standardizing on this procedure and we can achieve consistently excellent outcomes at lower cost.

We can skip this process and save $120 per patient.
Clinicians and Staff collaborate to increase value in health care delivery

• **Process Improvements:** Optimize and standardize processes over complete cycles of care

• **Personnel and Resource Utilization:**
  - Care givers work at the top-of-their-license; who should be doing the work, where, and how?
  - Optimize the utilization of resource capacity
We are about to start several TDABC projects at the new PIH hospital in Mirebalais, Haiti

1. Surgeries
   • Mastectomies
   • C-sections

2. Emergency room: Moderate to severe trauma

3. Maternal Health: Vaginal Delivery
Valid outcome and cost measurements also provide the foundation for bundled (episode-based) reimbursement

• For each medical condition, a bundled price covers the costs of all the resources required to deliver excellent outcomes for a full cycle of care assuming resources are used effectively and efficiently, including high capacity utilization.

• Time-based reimbursement for complete care of a chronic condition (e.g., diabetes, end stage renal disease)

• Time-based reimbursement for primary/preventive care for defined patient populations (healthy infants and children, healthy adults, frail elderly)