Implementing Time-Driven Activity-Based Costing

January 9, 2014

Robert S. (Bob) Kaplan, Marvin Bower Professor of Leadership Development, Emeritus
Derek Haas, Senior Project Leader
Sam Wertheimer, Project Leader
## Agenda

<table>
<thead>
<tr>
<th>Timing</th>
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<tbody>
<tr>
<td>10 min</td>
<td>Overview of TDABC</td>
</tr>
<tr>
<td>25 min</td>
<td>Documenting Care Processes</td>
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<tr>
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<td>Questions and Information Sharing</td>
</tr>
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Time-Driven Activity-Based Costing (TDABC)

1. Determine the Care Process
   - What activities are performed over the care cycle for a medical condition?
   - Who is performing each activity?
   - How long does each activity take?

2. Calculate Cost Rates
   - What is the cost per unit of time for each type of personnel?

3. Account for Consumables
   - What materials, supplies, and drugs are consumed during the care cycle?

4. Allocate Indirect Costs
   - What are the drivers that determine the workload for each indirect department/area?
Determining the care processes over complete cycles of care

**Level 1: Overall care cycle**

- Patient problem
- Assess appropriateness
- Assess risk
- Schedule OR
- Procedure
- Recovery

**Level 2: Study care cycle**

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

**Level 3: Process maps**

Map 2

Source: Tim Ferris at Partners Healthcare
Process map for initial orthopedic office visit

New Patient Visit
w/ X-ray
(out of Study Care Cycle)

Step 1a
Through appeal line

Step 1b
@ test visit

Step 1c
By Office

Step 2
Obtain visit Referral

Step 3
Prep room

Step 4
Check In, Verification

Step 5
Collect Paperwork

Step 6
Pt sits in waiting area

Step 7
Pt Escort to Exam Room

Step 8
Pt waits in exam room

Step 9a
Consult (PA)

Step 9b
Consult (OF)

Step 10a
Consult - packet given (PA, CA)

Step 10b
Consult - packet given (OF, CA)

Step 11a
Dictate (PA)

Step 11b
Dictate (OF)

Step 12
SOS Enrollment

Step 13
Check out

Key:
- Receptionist
- Medical Assistant
- PA
- Research Assistant
- Orthopedic Fellow
- Attending Physician
- Coordinator

Patient has MRI

MRI needed?

Schedule MRI

MRI Auth needed?

Yes

MRI Auth

No

Pt leaves department
Calculate Capacity Cost Rates (CCR) for each resource (personnel or equipment)

*Data are illustrative*

<table>
<thead>
<tr>
<th></th>
<th>Attending Physician</th>
<th>Orthopedic Fellow</th>
<th>Physician Assistant</th>
<th>Medical Assistant</th>
<th>Research Assistant</th>
<th>Receptionist</th>
<th>Coordinator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Clinical Costs ($)</td>
<td>$ 546,400</td>
<td>$ 120,000</td>
<td>$ 100,000</td>
<td>$ 64,000</td>
<td>$ 51,000</td>
<td>$ 61,000</td>
<td>$ 57,000</td>
</tr>
<tr>
<td>Personnel Capacity (minutes)</td>
<td>91,086</td>
<td>89,086</td>
<td>89,086</td>
<td>89,086</td>
<td>89,086</td>
<td>89,086</td>
<td>89,086</td>
</tr>
<tr>
<td>Personnel Capacity Cost Rate ($/min.)</td>
<td>$ 6.00</td>
<td>$ 1.35</td>
<td>$ 1.12</td>
<td>$ 0.72</td>
<td>$ 0.57</td>
<td>$ 0.68</td>
<td>$ 0.64</td>
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</tbody>
</table>
Compute total patient care costs by multiplying resource capacity cost rate by process times & summing across each patient’s cycle of care

Initial consultation

<table>
<thead>
<tr>
<th>Activity</th>
<th>Minutes</th>
<th>Cost/minute</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>MD X₁ Y₁</td>
<td></td>
<td></td>
<td>136.13</td>
</tr>
<tr>
<td>RN X₂ Y₂</td>
<td></td>
<td></td>
<td>68.04</td>
</tr>
<tr>
<td>CA X₃ Y₃</td>
<td></td>
<td></td>
<td>6.17</td>
</tr>
<tr>
<td>ASR X₄ Y₄</td>
<td></td>
<td></td>
<td>15.74</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td><strong>$266.08</strong></td>
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</tbody>
</table>

Surgical procedure

<table>
<thead>
<tr>
<th>Activity</th>
<th>Minutes</th>
<th>Cost/minute</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>MD X₁ Y₁</td>
<td></td>
<td></td>
<td>584.99</td>
</tr>
<tr>
<td>Anes. X₂ Y₂</td>
<td></td>
<td></td>
<td>603.89</td>
</tr>
<tr>
<td>RN X₃ Y₃</td>
<td></td>
<td></td>
<td>136.29</td>
</tr>
<tr>
<td>Tech X₄ Y₄</td>
<td></td>
<td></td>
<td>97.82</td>
</tr>
<tr>
<td>OR X₅ Y₅</td>
<td></td>
<td></td>
<td>329.16</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td><strong>$1752.15</strong></td>
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Follow-up or post-operative visit

<table>
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<tr>
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<th>Minutes</th>
<th>Cost/minute</th>
<th>Total</th>
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<tbody>
<tr>
<td>MD X₁ Y₁</td>
<td></td>
<td></td>
<td>55.19</td>
</tr>
<tr>
<td>RN X₂ Y₂</td>
<td></td>
<td></td>
<td>13.61</td>
</tr>
<tr>
<td>CA X₃ Y₃</td>
<td></td>
<td></td>
<td>3.09</td>
</tr>
<tr>
<td>ASR X₄ Y₄</td>
<td></td>
<td></td>
<td>1.77</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td><strong>$73.66</strong></td>
</tr>
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Source: Meg Abbott, MD & John Meara, MD Boston Children’s Hospital
Time-Driven ABC provides a common platform – a single version of truth – for productive discussions among clinical & administrative personnel.

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

We can skip this process and save $120 per patient.
How TDABC delivers benefits in health care delivery

**Pricing**

- **Bundling:** Understand costs over the full care cycle to prepare for implementing bundled payments

**Cost Management**

- **Process Improvement:** Optimize and standardize processes over a complete cycle of care
- **Personnel and Resource Utilization:** Enable care givers to work at the top-of-their-license; who should be doing the work, where, and how?
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Process maps: Collect care process data

1. Determine the Care Process
   - What activities are performed over the care cycle for a medical condition?
   - Who performs each activity?
   - How long does each activity take?

2. Calculate Cost Rates
   - What is the cost per unit of time for each type of personnel and equipment?

3. Account for Consumables
   - What materials, supplies, and drugs are consumed at each activity in the care cycle?

4. Allocate Indirect Costs
   - What are the drivers that determine the workload for each indirect department/area?
Use care cycle overview to identify priority processes

Determine the Care Process

1. **What activities** are performed over the care cycle for a medical condition?
2. **Who performs** each activity?
3. **How long** does each activity take?

- 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
Process map for initial orthopedic office visit

**New Patient Visit**

w/ X-ray
(out of Study Care Cycle)

1. **Step 1a** - Through appointment line
   - Pt gets referral to Orthopedic surgeon

2. **Step 1b** - Obtain visit Referral
   - Schedule Apppt @ 1st visit

3. **Step 1c** - By Office

4. **Step 2** - Prep room

5. **Step 3** - Check in, Verification

6. **Step 4** - X-ray
   - X-ray needed?

7. **Step 5** - Collect Paperwork
   - Pt sits in waiting area

8. **Step 6** - Pt Escorted to Exam Room

9. **Step 8** - Pt waits in exam room

10. **Step 9a** - Consult (PA)
   - Who sees patient?

11. **Step 9b** - Consult (OF)

12. **Step 10a** - Consult - packet given (PA, CA)

13. **Step 10b** - Consult - packet given (OF, CA)

14. **Step 11a** - Dictate (PA)

15. **Step 11b** - Dictate (OF)

16. **Step 12** - SOS Enrollment

17. **Step 13** - Check out

**Key**
- Receptionist
- Medical Assistant
- PA
- Research Assistant
- Orthopedic Fellow
- Attending Physician
- Coordinator

**SOS Follow-up for survey completion**
- Ending ≥ 1 yr = 10 times/pl.
Process maps:
Individual content experts (interviews or shadowing)
Process maps:
Groups of content experts (focus group or group meeting)
Process maps:
Combined sampling methods improve estimate accuracy
Process maps: Accuracy via (modified) Delphi method

- Process overview development and content expert identification
- Content expert input
- Validation

Iteration Feedback Refinement
Process maps:
Documenting care processes

Group Meetings and Focus Groups

Interviews and Shadowing

Sources: Connecticut Joint Replacement Institute and The PFCC Innovation Center of UPMC (www.PFCC.org)
Process maps: Focus group example video
Long leg cast

1. **Gore-Tex cast?**
   - Yes → **Cast Tech greets patient, checks order**
   - No → **ASR processes additional payment for Gore-Tex**

2. **Order OK?**
   - Yes (90%)
   - No (10%)

3. **Physician re-enters order**
   - Yes (80%)
   - No (20%)

4. **Need 2nd Cast Tech?**
   - Yes → **Apply cast**
   - No → **2nd Cast Tech assists during cast application**

5. **Patient departs**

Instructions, replace water, clean table, chart, bill
Process maps: Logistics (1 of 3)

Who

- Include at least one of each different personnel type involved

What to Communicate in Advance

- Describe IHI collaborative background
- Clarify that goal is to document current state
- Clarify that analyses are non-evaluative

Scheduling

- Begin scheduling immediately
- Allot ~1 hour per process (more for complex processes)
- Maximize physician engagement (primarily for validation)
Process maps: Logistics (2 of 3)

Facilitation
- Record in real-time (post-it notes or white board)
- Display initial flow quickly (20-30 min.) then refine

Level of Detail
- Avoid excess complexity (fit on single page, 12+ font)
- Use $10 materiality threshold

Current State
- Avoid capturing ideal or planned processes
- Use “parking lot” of performance improvement ideas
Process maps: Logistics (3 of 3)

Time Estimates
- Capture average times at a comfortable pace
- Gather time-stamp data if available

Recording Maps
- Record maps visually (paper, photo, Visio, PowerPoint)
- Enter initial data at www.CareMeasurement.com

Validation and Iteration
- Circulate maps to meeting participants
- Develop consensus on process flow and time estimates
- Update data at CareMeaurement.com
Process maps: Initial focus

- Begin with care cycle for organizational average OR for one (or two) individual physician(s)

- Consider knee replacement care cycle, then consider differences in hip replacement care cycle
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<tr>
<td>January 16&lt;sup&gt;th&lt;/sup&gt;</td>
<td>Complete draft process map for post-surgery recovery (PACU)</td>
</tr>
<tr>
<td>January 23&lt;sup&gt;rd&lt;/sup&gt;</td>
<td>Complete draft process map for pre-op outpatient visit #1</td>
</tr>
<tr>
<td>February 26&lt;sup&gt;th&lt;/sup&gt;</td>
<td>Complete at least 60% of draft process maps, and all personnel cost per minute data</td>
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<tr>
<td>March 26&lt;sup&gt;th&lt;/sup&gt;</td>
<td>Complete all draft process maps and financial info for initial unit of focus</td>
</tr>
<tr>
<td>April 23&lt;sup&gt;rd&lt;/sup&gt;</td>
<td>Finalize information for all care cycles that will be submitted for the May 7&lt;sup&gt;th&lt;/sup&gt; meeting</td>
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Time period of cost data

**Cost Rate Data**

- Cost rate data should be at least 3 months old (i.e. as of October 1, 2013 or earlier)
- Cost rate data includes personnel wages, benefits, etc., the costs of consumables, purchases services, and indirect costs

**Care Processes**

- Collect information on the current state of care processes (activities, who is performing them, how long they take, etc.)
## Surgery procedure

<table>
<thead>
<tr>
<th>Activities</th>
<th>Consumables</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Prep room</td>
<td>1. Medications</td>
</tr>
<tr>
<td>2. Move patient into room</td>
<td>2. Knee/hip packs</td>
</tr>
<tr>
<td>3. Deliver anesthesia</td>
<td>3. Blades</td>
</tr>
<tr>
<td>4. Position patient and complete preparations</td>
<td>4. Cement</td>
</tr>
<tr>
<td>5. Perform surgery</td>
<td>5. Blood products</td>
</tr>
<tr>
<td>6. Surgery closure</td>
<td></td>
</tr>
<tr>
<td>7. Transport patient out of room</td>
<td>Note: Implant cost will be addressed separately during the learning community</td>
</tr>
<tr>
<td>8. Clean room</td>
<td></td>
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Concluding advice

- Engage leadership
- Schedule, schedule, schedule
- Draft and iterate
- Ask a lot of questions
- Have fun!
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# Information sharing standards

<table>
<thead>
<tr>
<th>Types of data requested</th>
<th>How data will be shared</th>
<th>May Be Used by IHI &amp; Faculty in Research and Presentations Outside of Learning Community</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name of participating org</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Outcomes data from each org</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Clinical process measures from each org (e.g. SCIP measures, etc)</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Contextual information on each org or physician (e.g. number of joint replacements)</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Care cycle representation (what activities with what probabilities, who is performing them, and how long they spend)</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Compensation, benefits, other employee related costs (e.g. training, supervision, admin support, travel, etc.), and capacity (available work minutes) by employee type (note the LC is not collecting data on individual employees)</td>
<td>Yes</td>
<td>When De-Identified</td>
</tr>
<tr>
<td>Materials, supplies, medications, and other consumables costs</td>
<td>Yes</td>
<td>When De-Identified</td>
</tr>
<tr>
<td>Spend on external post-acute care (e.g. rehab hospital, skilled nursing facility)</td>
<td>Yes</td>
<td>When De-Identified</td>
</tr>
<tr>
<td>Equipment and space costs and capacity (not a focus of the LC due to their relatively small size, but the LC will work with organizations interested in this)</td>
<td>Yes</td>
<td>When De-Identified</td>
</tr>
<tr>
<td>Indirect costs (not a focus of the LC, but the LC will work with organizations interested in this)</td>
<td>Yes</td>
<td>When De-Identified</td>
</tr>
<tr>
<td>Full cost for the full care cycle to allow for before and after comparisons</td>
<td>Yes</td>
<td>When De-Identified</td>
</tr>
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- De-Identified means that organizational identifiers are removed and that care is taken to avoid categorization of organizations in such a way that the identity of individual organizations could be inferred.
- It is ok if an organization cannot share a particular piece of data due to another contractual requirement
- If any analysis includes a combo of types of data the data will only be shared in accordance with the most strict standard