Determining the “Real” Costs of Transplant: The Health Services Research Perspective

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Real Costs

- Overall actual expense involved in creating a good or service for sale to consumers … typically includes value of all tangible resources such as raw materials and labor that are used in the production process
What Are “Real” Costs of HCT?

“Real” Costs: HSR Perspective

Challenges

Accomplishments

Opportunities
Challenges

Healthcare Costs: The Maserati Example
Types of Costs
(From Data Perspective)

MANUFACTURER

Direct Costs
Indirect Costs

MSRP
Margin
Negotiation

Actual Price
Taxes, addons

CUSTOMER

Final Price

Types of Costs
(From Data Perspective)

HOSPITAL/CENTER

Direct Costs
Indirect Costs

Margin
Negotiation

Charges

Adjudicated Costs
Deductibles, Out-of-pocket

PATIENT

Total Costs
Sources of Cost Data for **Transplant**

<table>
<thead>
<tr>
<th>Source</th>
<th>Collection</th>
<th>Reliability</th>
<th>Expense</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient</td>
<td>+ to +++</td>
<td>+ to ++</td>
<td>+ to +++</td>
</tr>
<tr>
<td>Hospital</td>
<td>+ to ++</td>
<td>+++</td>
<td>++</td>
</tr>
<tr>
<td>Claims</td>
<td>+++</td>
<td>+++</td>
<td>+ to +++</td>
</tr>
</tbody>
</table>

Poor/inexpensive (+) … to … Good/expensive (+++)
ICD 9 Codes For Myeloid Leukemia

- 205.0X – Acute (including APL)
- 205.1X – Chronic
- 205.2X – Subacute
- 205.3X – Myeloid sarcoma
- 205.8X – Other myeloid leukemia
- 205.9X – Unspecified myeloid leukemia

All Databases Are Not Equal

<table>
<thead>
<tr>
<th></th>
<th>Hospital Billing Data</th>
<th>AHRQ Nationwide Inpatient Sample</th>
<th>Private Claims Databases</th>
<th>Medicare</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data type</td>
<td>In/outpatient</td>
<td>Inpatient</td>
<td>In/outpatient</td>
<td>In/outpatient</td>
</tr>
<tr>
<td>Cost data</td>
<td>Various</td>
<td>Charges</td>
<td>Adjudicated claims</td>
<td>Charges</td>
</tr>
<tr>
<td>Cost categories (eg, pharmacy)</td>
<td>Available</td>
<td>No</td>
<td>Maybe</td>
<td>Available</td>
</tr>
<tr>
<td>Patient costs (eg, deductible)</td>
<td>No</td>
<td>No</td>
<td>Maybe</td>
<td>Available</td>
</tr>
<tr>
<td>Generalizable</td>
<td>No</td>
<td>Yes</td>
<td>??</td>
<td>Yes</td>
</tr>
<tr>
<td>Outcomes</td>
<td>Yes</td>
<td>Limited</td>
<td>Maybe</td>
<td>Yes</td>
</tr>
</tbody>
</table>
Other Challenges

- Data on costs of long term care not available
- Data on complications (e.g., GVHD) difficult to obtain
- Intangible costs hard to measure (e.g., lost productivity)
Costs of HCT
Using Hospital Billing Data

- Single center study (N=294), allogeneic HCT
- Costs from day -30 to +100 (excluding MD costs)
- Median costs by conditioning
  - Myeloablative = $137,112
  - Non-myeloablative = $84,824
- Median costs by graft source
  - Umbilical cord blood = $137,564
  - Sibling donor = $83,583
- Cost predictors
  - HCT type, complications and length of hospital stay

Cost Categories
Using Hospital Billing Data

- Median Cost Per Day Survived, $
Costs Of HCT
Using Claims Data (Private Claims Data)

- Analysis of private claims database (MarketScan, now called Truven Health Analytics) – pilot feasibility analysis
- Evaluated inpatient and outpatient costs through day 100
- Patients identified using ICD 9 procedure codes
- N=3,365 hospitalizations, 2007-2009

Median costs
~$85,000

Median costs
~$150,000

NS Majhail et al, Bone Marrow Transplant, 2013
Costs Of HCT
Using Claims Data (Using AHRQ NIS)

- Analysis of Nationwide Inpatient Sample to evaluate regional variation in costs
- Only provides inpatient costs for first hospitalization
- Patients identified using ICD 9 procedure codes
- N=9,470 discharges, 2008-2010
- Mean costs
  - Autologous HCT: $71,000 to 91,000
  - Allogeneic HCT: $72,000 to 109,000

Patient Costs of HCT

- Pilot study of feasibility of capturing out-of-pocket costs over first 100 days and information on financial impact of HCT through 2 years
- Enrolled 30 patients at 3 sites
Literature on Costs of HCT (US Studies)

<table>
<thead>
<tr>
<th>Reference</th>
<th>Data Source</th>
<th>Population Characteristics</th>
<th>Costs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lu et al. (22)</td>
<td>Single institution, 1994-1997</td>
<td>Time-horizon hospital admission for conditioning and discharge</td>
<td>n = 236 (103, allog MRD, UCB)</td>
</tr>
<tr>
<td>Saito et al. (59)</td>
<td>Single institution, 2004-2004</td>
<td>Time-horizon admission to 1 year post-HCT</td>
<td>n = 315 (82, PMD, MUD)</td>
</tr>
<tr>
<td>Piskulic et al. (19)</td>
<td>Single institution, 2004-2006</td>
<td>Time-horizon from 30 days before until 150 days after HCT</td>
<td>n = 254 (175, PMD, UCB, RIC, MRD, UCB)</td>
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<tr>
<td>Piskulic et al. (28)</td>
<td>Single institution, 2004-2006</td>
<td>Time-horizon from 30 days before until 150 days after HCT</td>
<td>n = 146 (86, PMD, MUD, UCB)</td>
</tr>
<tr>
<td>Jones et al. (39)</td>
<td>Secondary database analysis (NCJPRN), 2000-2001</td>
<td>Time-horizon admission to discharge for single HCT hospitalization</td>
<td>n = 8,881 (use)</td>
</tr>
</tbody>
</table>

J Preussler et al, Biol Bone Marrow Transplant, 2012

Opportunities
Ideal Cost Data – The Utopian Vision

• Prospectively collected
• Data from diagnosis to post-transplant (extended time period)
• Includes patient and hospital costs
• Easily linkable to other databases
• Readily available in variety of platforms
• Includes outcomes and quality of life data
• Free!!

Areas For Research

• Cost identification studies
  – Costs of various transplant modalities
  – Cost predictors/drivers
  – Variation in costs of transplant
• Evaluate “value” with costs – cost-effectiveness studies
  – Transplant versus other therapies (cost-effectiveness of transplant vs. chemotherapy for AML CR1 in older patients)
  – Between transplant modalities (UCB vs. haploidentical HCT as part of BMT CTN 1101 study)
• Identify and mitigate patient costs
Innovative Methods To Leverage Existing Data

Bloomberg

UnitedHealth Joins Mayo Clinic In Pact to Improve Care
By Michelle Fay Cottrell—Jan 10, 2013

UnitedHealth Group Inc. (UNH), the largest U.S. provider of medical coverage, will join the Mayo Clinic in a research alliance designed to merge insurance records and medical data to find more efficient ways to deliver care.

The venture will focus on fundamental issues that may help standardize care in a way that will lower costs, said Vernonia Ragan, head of the clinic’s Center for the Science of Health Delivery. This could include things such as analyzing the steps needed for successful hip replacement surgery or ways to get patients to consistently take their medicines, she said.

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Questions?

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