Economic Impact of Transradial in the Cath Lab

Michael Guiry, PA-C, MBA
Assistant Vice President
Holy Name Medical Center
Teaneck, NJ
Disclosures

Advisory Board:

• Cardinal Health
US Healthcare

$3 trillion = cost of US Healthcare in 2014
• Equivalent to 17.5% of GDP
  ($9,523/person, 5.3% increase year over year)

Total US GDP: $17.1 Trillion

CMS.gov, research/data statistics
World Gross Domestic Product

1. U.S. $16.8T
2. China $9.2T
3. Japan $4.9T
4. Germany $3.7T
5. France $2.8T
National Health spending projected to reach $5.2 Trillion dollars by 2023; reflecting a growth assumption of 6% per year.

CMS.gov, research/data statistics
Workplace Health Premiums Continue to Rise

2015 Health Premiums:
Single Coverage = $6,251
Family Coverage = $17,545

Source: Kaiser/HRET Survey of Employer-Sponsored Health Benefits.
US Healthcare: Medicare

• Projected change in Medicare enrollment

2012 Annual Report Federal Hospital Insurance and Federal Supplementary Medical Insurance Trust Funds.
Healthcare Reform Goals

- **Access**
- **Quality**
- **Cost**

\[
\frac{QUALITY}{COST} = VALUE
\]
Health Care Reform Timeline

2010
- Market Basket & Productivity Cuts
- Dependent Coverage to Age 26

2012 - 2013
- Value Based Purchasing
- Readmission and HACs Penalties
- Pharmaceutical and Medical Device Fees
- ACO’s in MCR

2014
- Individual Mandate/Health Exchanges Open
- Medicare & Medicaid DSH Cuts
- Insurer Fees

2018
- Full Impact of Medicaid DSH Cuts
- Cadillac Tax
**Hospital Value Based Purchasing**

*Shifting of Domain Weights*

- Core Measures
- Patient Experience
- Outcomes
- Efficiency (MSPB)
## Financial Impact

<table>
<thead>
<tr>
<th>FY</th>
<th>(10/1/2011)</th>
<th>Readmissions</th>
<th>Value Based Purchasing</th>
<th>Hospital Acquired Conditions</th>
<th>Annual Payment Reduction</th>
</tr>
</thead>
<tbody>
<tr>
<td>FY12</td>
<td>(10/1/2011)</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>FY13</td>
<td>(10/1/2012)</td>
<td>1%</td>
<td>1%</td>
<td>---</td>
<td>2%</td>
</tr>
<tr>
<td>FY14</td>
<td>(10/1/2013)</td>
<td>2%</td>
<td>1.25%</td>
<td>---</td>
<td>3.25%</td>
</tr>
<tr>
<td>FY15</td>
<td>(10/1/2014)</td>
<td>3%</td>
<td>1.5%</td>
<td>1%</td>
<td>5.5%</td>
</tr>
<tr>
<td>FY16</td>
<td>(10/1/2015)</td>
<td>3%</td>
<td>1.75%</td>
<td>1%</td>
<td>5.75%</td>
</tr>
<tr>
<td>FY17</td>
<td>(10/1/2016)</td>
<td>3%</td>
<td>2%</td>
<td>1%</td>
<td>6%</td>
</tr>
</tbody>
</table>

Percent refers to DRG payment reduction on all Medicare discharges.

Total: $2.6B
Healthcare Industry Consolidation

- Physician Practices
- Hospital
- Payers
- Integration
Hospital Industry

“I predict that 1 in 5 hospitals will close by 2020”

Ezekiel Emmanuel, White House Health Policy Advisor
Trends in Vertical Integration

- The lines among different players involved in healthcare delivery are increasingly blurring with payers and companies from other segments converging on the provider space.

Providers are becoming payers

Payers are becoming providers

Companies from other segments are becoming providers

“1 in 5 Health Systems to Become payers by 2018”

Government and Private Payers are engaging providers to participate in value based plans in order to improve efficiency while demonstrating evidence of higher quality scores.
“Ok. I understand a lot is going to change, but how do I stay the same?”
Economic Impact of Transradial PCI
Examples of Hospital Costs

• Procedural costs
  • *Equipment, devices, medications, overhead, etc.*

• Other hospital costs
  • *Comorbidities and complications*

• Physician and non-physician staff
What are the potential benefits of Transradial PCI?

• Clinical benefit
  • Reductions in death, MI, bleeding complications

• Reduced cost
  • Less time to patient ambulation and length of stay; better patient throughput

• Better patient comfort; potential to change referral patterns
PCI Complications and Costs

N = 335,477 Medicare patients undergoing PCI in 2002

Incremental Cost of Complications

<table>
<thead>
<tr>
<th></th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Death</td>
<td>19,208</td>
</tr>
<tr>
<td>CABG</td>
<td>31,104</td>
</tr>
<tr>
<td>Stroke</td>
<td>13,929</td>
</tr>
<tr>
<td>Renal Failure</td>
<td>21,468</td>
</tr>
<tr>
<td>Vascular</td>
<td>6337</td>
</tr>
</tbody>
</table>

(4278-4830*)

Incidence of Complications

<table>
<thead>
<tr>
<th></th>
<th>Incidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Death</td>
<td>1.9</td>
</tr>
<tr>
<td>CABG</td>
<td>0.55</td>
</tr>
<tr>
<td>Stroke</td>
<td>0.16</td>
</tr>
<tr>
<td>Renal Failure</td>
<td>2.27</td>
</tr>
<tr>
<td>Vascular</td>
<td>5.47</td>
</tr>
</tbody>
</table>
Selected PCI Complications
Radial vs. Femoral Access

Comparison of Costs Between Transradial and Transfemoral PCI

Inpatient analysis from the national Premier registry matching 609 transradial cases with 60,900 transfemoral cases, 2004 to 2009.

• At an average cost reduction of $553, total inpatient costs were lower for transradial procedures compared with transfemoral procedures ($11,736 vs. $12,288)
• Post-procedure costs were $571 lower with transradial PCI
• 95% of the post-procedure reduction ($541) was attributable to a 0.31-day decrease in length of stay

Implications: Transradial compared with transfemoral PCI was associated with lower average direct hospital costs and shorter hospital stays.

Transradial vs. Transfemoral PCI

• 7,121 patient retrospective cohort enrolled from 2010-2011 across 5 US hospitals

• Primary outcome was cost of PCI admission
  • Nearly $830 overall cost savings favoring transradial
  • More significant savings appreciated in higher risk bleeding groups

• Secondary outcomes looked at length of stay (LOS) and Post-PCI related bleeding
  • LOS 2.5 days in transradial vs. 3.0 days in transfemoral
  • In-hospital bleeding 1.1% transradial vs. 2.4% transfemoral
## Transradial vs. Transfemoral PCI

<table>
<thead>
<tr>
<th>Unadjusted costs</th>
<th>All patients</th>
<th>Radial</th>
<th>Femoral</th>
<th>Difference: Radial vs. Femoral</th>
<th>p Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>n</td>
<td>7,121</td>
<td>$14,441</td>
<td>$15,983</td>
<td>$1,541</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Bleeding risk</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low, &lt;1%</td>
<td>2,292</td>
<td>$13,919</td>
<td>$14,690</td>
<td>$771</td>
<td>0.014</td>
</tr>
<tr>
<td>Moderate, 1%–3%</td>
<td>3,541</td>
<td>$14,668</td>
<td>$15,983</td>
<td>$1,316</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>High, &gt;3%</td>
<td>1,288</td>
<td>$15,361</td>
<td>$17,749</td>
<td>$2,388</td>
<td>0.007</td>
</tr>
<tr>
<td>Adjusted costs</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>All patients</td>
<td>7,121</td>
<td>$14,954</td>
<td>$15,784</td>
<td>$830</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Bleeding risk</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low, &lt;1%</td>
<td>2,292</td>
<td>$14,074</td>
<td>$14,716</td>
<td>$642</td>
<td>0.035</td>
</tr>
<tr>
<td>Moderate, 1%–3%</td>
<td>3,541</td>
<td>$15,161</td>
<td>$15,867</td>
<td>$706</td>
<td>0.029</td>
</tr>
<tr>
<td>High, &gt;3%</td>
<td>1,288</td>
<td>$16,115</td>
<td>$17,776</td>
<td>$1,621</td>
<td>0.038</td>
</tr>
</tbody>
</table>

*J Am Coll Cardiol Intv*. 2013;6(8):827-834
Same Day Discharge after PCI

Consecutive PCIs June 2009 to March 2011

- TF: $15,608 ± $6920 (n = 2600)
- TR: $14,468 ± $5442 (n = 563)

Δ = $1140
Same Day Discharge after PCI

Financial:

<table>
<thead>
<tr>
<th></th>
<th>Inpatient</th>
<th>Outpatient</th>
</tr>
</thead>
<tbody>
<tr>
<td>PCI Reimbursement</td>
<td>$18,970</td>
<td>$12,000</td>
</tr>
<tr>
<td>Avg Total Costs</td>
<td>$12,500</td>
<td>$11,300</td>
</tr>
</tbody>
</table>

- Outpatient PCI is reimbursed at 28-38% less than inpatient PCI
- Reimbursement is the same regardless of LOS for outpatient PCI
- Net Margin approximately $6,500 vs. $1,000 for IP vs OP, respectively
- On 250,000 PCI/year = $1.8 Billion decrease in revenue
- However, hospitals experience $600 Million in direct costs savings
  - AND potential for increased revenue due to bed availability

Heyde, GS et al. Circulation 2007
Transradial PCI on the Rise

- >700% increase in TRI approach for PCI in the since 2007
- TRI expected to account for 50% of PCI in the US by 2020
- TRI currently 50% of EU and 65% of Japan PCI and still expanding
Cost of a Transradial Learning Curve

28 Operators, 1,672 TR-PCIs
Odds of procedural failure ↓ 32% for every 50 cases
Contrast vol, fluoro time highest for low-volume operators

Overall $P = .007$

Transradial Learning Curve

<table>
<thead>
<tr>
<th>TR-PCI Cases</th>
<th>1-50</th>
<th>51-100</th>
<th>101-150</th>
<th>151-300</th>
<th>Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>PCI Failures, n</td>
<td>43</td>
<td>10</td>
<td>5</td>
<td>5</td>
<td>6</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Transradial Learning Curve</th>
<th>Year 1</th>
<th>Year 2</th>
<th>$P$ value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transradial use</td>
<td>15.6%</td>
<td>21.6%</td>
<td>&lt; .001</td>
</tr>
<tr>
<td>Transradial cost savings</td>
<td>$851</td>
<td>$1357</td>
<td>.567*</td>
</tr>
</tbody>
</table>
Transradial PCI has demonstrated a reduction in both access site complications and length of stay in select studies and patient populations.

Cost savings from Transradial PCI are favorable, especially in high bleeding risk patients where this approach can be performed.

Use of Same Day PCI programs yields the greatest benefit in cost savings.