wRVUs: Do They Really Measure the Workload and Complexity Of What We Do?

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Productivity-based Compensation

• Increasing use of wRVU in employed compensation models
• 2007 (16%) → 2016 (> 60%)
• Use of benchmarked data (MGMA, AMGA, SC) to determine compensation/productivity ($/wRVU)
  • e.g. AMGA $441,836 / 7649 = $57.76/wRVU
INTRODUCTION

wRVU

• RBRVS - Developed for HCFA by Hsaio et al (1986-92)
• Passed in 1989 -- implemented in 1992
Payment Rate = Work RVU \times \text{Work GPCI} + \text{Practice Expense RVU} \times \text{PE GPCI} + \text{Malpractice RVU} \times \text{MP GPCI} \times \text{Conversion Factor}

GPCI = \text{geographic practice cost index}
INTRODUCTION

• RVUs $\rightarrow$ metric of physician productivity
• RVUs : CPT code
Work = Time \times \text{Intensity}
The Components of Pre- and Post-Operative Work

**Pre**
- Preparing to perform the procedure, including communicating with the patient and with other professionals and any patient visits to confirm the decision to perform the procedure on the day before and day of the service. Excludes the initial consultation.

**Dress, Scrub, and Wait**
- Dressing, scrubbing and waiting before the service.

**Pre-Incision**
- Patient positioning and other extraordinary pre-incisional work.

**Same Day Post**
- Immediate post-operative care on the day of the service. Includes stabilizing the patient in the O.R., checking on the patient in the recovery room, ICU, or regular room and further communication with the patient, the patient’s family and other professionals.

**ICU Hospital**
- Visits in the hospital ICU/CCU following the day of the service.

**Non-ICU Hospital**
- Visits in the hospital on the patient’s floor or unit after the day of the surgery until discharge.

**Office Post**
- Office patient visits after discharge until 90 days post service.

* Shorter time periods following the procedure are used for minor surgeries and non-incisional procedures.
Work

100 units

- Male
- Cystoscope
- Urethra
- Prostate
- Bladder
INTRODUCTION

- RVU assignments initially made in consultation with nominees from various medical specialties
- Quarterly adjustments based on survey data
- Zero sum game
INTRODUCTION

Changes to Work RVUs

SUMMARY OF RECOMMENDATION

RUC

CMMS

Centers for Medicare & Medicaid Services
Who Gets Surveys?

• Respondents selected by AUA by random sampling
• May be sub-specialty, e.g. prosthetics
• May be general, e.g. cysto with dilation
• Private practice (small & large), hospital-based, and academic
• Need at least 30-50 responses -- ideally >100 responses
INTRODUCTION

• Subjective methodology linked with compensation
• Accurate measure of surgical complexity? workload? effort? time? difficulty?
• Controversy in literature
• Correlates with:
  • complications in hepatic, vascular, plastic surgery
  • op time in pediatric surgery
• Poor correlation with:
  • op time, LOS, mortality in general surgery

? Urology
METHODS

American College of Surgeons National Surgical Quality Improvement Program 2012-2016

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CPT codes → Work RVUs →
- Op time
- LOS
- Mortality
- Morbidity
- Serious Adverse Events
- Readmissions
METHODS

• Exclusion criteria
  • Non-elective procedures
  • Concurrent CPT codes
• 200,000 → 190,000 urologic procedures included
<table>
<thead>
<tr>
<th>NSQIP Variable</th>
<th>R-Squared</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length of Stay (LOS)</td>
<td>0.80</td>
</tr>
<tr>
<td>Operating Room Time</td>
<td>0.87</td>
</tr>
<tr>
<td>Morbidity</td>
<td>0.75</td>
</tr>
<tr>
<td>Mortality</td>
<td>0.52</td>
</tr>
<tr>
<td>Serious Adverse Events</td>
<td>0.65</td>
</tr>
<tr>
<td>Unplanned Readmissions</td>
<td>0.58</td>
</tr>
</tbody>
</table>
Outlying Procedures:
- Lap Partial Nephrectomy
  - RVUs: 27.4
  - Median LOS: 2
Outlying Procedures:

- Epididymovasostomy
  - RVUs: 14.2
  - OR Time: 182 mins
- RPLND
  - RVUs: 17.7
  - OR Time: 256 mins
Outlying Procedures:
- Lap Partial Nephrectomy
  - RVUs: 27.4
  - Median Morbidity %: 4.4
- Lap Ureteroneocystotomy
  - RVUs: 25.7
  - Median Morbidity %: 4.7
Outlying Procedures:
- None
Outlying Procedures:
- Pyeloplasty (complicated)
  - RVUS: 25.8
  - SAEs (%): 4.1
- Lap Partial Nephrectomy
  - RVUs: 27.4
  - SAEs (%): 6.8
Outlying Procedures:
- Ureteroneocystotomy (with ureteral tailoring)
  - RVUs: 20.7
  - Unplanned Readmissions (%): 16.7
# RESULTS

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<thead>
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<td>Adverse Events</td>
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</table>
### RESULTS

<table>
<thead>
<tr>
<th>NSQIP parameter</th>
<th>CPT code</th>
<th>Procedure</th>
<th>2016 Work RVU</th>
<th>Projected Work RVU&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Projected difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>LOS&lt;sup&gt;b&lt;/sup&gt;</td>
<td>50543</td>
<td>Laparoscopic partial nephrectomy</td>
<td>27.41</td>
<td>17.27</td>
<td>-10.14</td>
</tr>
<tr>
<td>OR time&lt;sup&gt;b&lt;/sup&gt;</td>
<td>38780</td>
<td>RPLND</td>
<td>17.70</td>
<td>30.60</td>
<td>+12.90</td>
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<td></td>
<td>54900</td>
<td>Epididymovasostomy</td>
<td>14.20</td>
<td>23.00</td>
<td>+8.80</td>
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<td>Morbidity&lt;sup&gt;c&lt;/sup&gt;</td>
<td>50543</td>
<td>Laparoscopic partial nephrectomy</td>
<td>27.41</td>
<td>14.71</td>
<td>-12.70</td>
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<tr>
<td></td>
<td>50947</td>
<td>Laparoscopic ureteroneocystotomy</td>
<td>25.78</td>
<td>15.06</td>
<td>-10.72</td>
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<tr>
<td>Mortality&lt;sup&gt;c&lt;/sup&gt;</td>
<td>None</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
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<tr>
<td>SAEs</td>
<td>50405</td>
<td>Complicated pyeloplasty</td>
<td>25.86</td>
<td>13.04</td>
<td>-12.82</td>
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<td></td>
<td>50543</td>
<td>Laparoscopic partial nephrectomy</td>
<td>27.41</td>
<td>14.51</td>
<td>-12.90</td>
</tr>
<tr>
<td>Readmissions</td>
<td>50783</td>
<td>Ureteroneocystotomy with ureteral tailoring</td>
<td>20.70</td>
<td>33.1</td>
<td>+12.4</td>
</tr>
<tr>
<td>LOS&lt;sup&gt;b&lt;/sup&gt;, OR time&lt;sup&gt;b&lt;/sup&gt;, morbidity&lt;sup&gt;c&lt;/sup&gt;</td>
<td>38780</td>
<td>RPLND</td>
<td>17.70</td>
<td>28.34</td>
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<td></td>
<td>50543</td>
<td>Laparoscopic partial nephrectomy</td>
<td>27.41</td>
<td>20.58</td>
<td>-6.83</td>
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<td></td>
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<td>Laparoscopic ureteroneocystotomy</td>
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<td>19.00</td>
<td>-6.78</td>
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<tr>
<td></td>
<td>51575</td>
<td>Cystectomy with bilateral pelvic lymphadenectomy</td>
<td>34.18</td>
<td>40.72</td>
<td>6.54</td>
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</tbody>
</table>

LOS = length of stay; OR = operating room; RPLND = retroperitoneal lymph node dissection; SAEs = significant adverse events. <sup>a</sup>Based on best fit line for the given NSQIP parameter(s). <sup>b</sup>Median values shown. <sup>c</sup>Estimated probability determined by NSQIP model accounting for individual patient risk factors.
DISCUSSION

• Work RVUs in urology correlate well with:
  – Op time ($R^2 = 0.87$)
  – LOS ($R^2 = 0.80$)
  – Morbidity ($R^2 = 0.74$)

• Only moderately correlate with:
  – Mortality ($R^2 = 0.51$)
  – Serious Adverse Events ($R^2 = 0.65$)
  – Readmissions ($R^2 = 0.57$)

• Outliers

$$wRVU = 3.14 + 6.64 \times \text{(operative time in hrs)} + 0.59 \times \text{(LOS in days)} + 0.37 \times \text{(readmission rate)} + 0.06 \times \text{(SAE rate)} - 0.13 \times \text{(death rate)}.$$
• Importance of wRVU to fairly and accurately measure work
• Need to move from subjective assessment to objective measure
  • Effort over 30-day post-operative period
  • Reflect patient co-morbidities
• Does not include quality / cost of care
• Need to be consistent within specialty and across specialties
<table>
<thead>
<tr>
<th>Surgical Specialty</th>
<th>Correlation Coefficient (R)</th>
<th>Estimated mRVU for 1hr procedure</th>
<th>Increase in mRVU per hour of op time</th>
<th>Correlation Coefficient (R)</th>
<th>Estimated mRVU for 1 day admission</th>
<th>Increase in mRVU per hospital day</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cardiac Surgery</td>
<td>0.51</td>
<td>27.21</td>
<td>9.20</td>
<td>0.47</td>
<td>27.20</td>
<td>4.43</td>
</tr>
<tr>
<td>General Surgery</td>
<td>0.86</td>
<td>14.84</td>
<td>11.28</td>
<td>0.60</td>
<td>16.58</td>
<td>2.93</td>
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<tr>
<td>Gynecology</td>
<td>0.84</td>
<td>13.47</td>
<td>11.45</td>
<td>0.72</td>
<td>18.67</td>
<td>7.38</td>
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<tr>
<td>Neurosurgery</td>
<td>0.80</td>
<td>17.65</td>
<td>12.90</td>
<td>0.42</td>
<td>29.95</td>
<td>2.25</td>
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<tr>
<td>Orthopedics</td>
<td>0.80</td>
<td>12.04</td>
<td>12.55</td>
<td>0.33</td>
<td>16.21</td>
<td>1.98</td>
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<tr>
<td>Otolaryngology (ENT)</td>
<td>0.97</td>
<td>9.04</td>
<td>9.51</td>
<td>0.81</td>
<td>17.24</td>
<td>5.83</td>
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<tr>
<td>Thoracic</td>
<td>0.91</td>
<td>16.15</td>
<td>8.12</td>
<td>0.54</td>
<td>17.48</td>
<td>2.20</td>
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<tr>
<td><strong>Urology</strong></td>
<td><strong>0.92</strong></td>
<td><strong>11.85</strong></td>
<td><strong>8.70</strong></td>
<td><strong>0.81</strong></td>
<td><strong>15.38</strong></td>
<td><strong>5.50</strong></td>
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<tr>
<td>Vascular</td>
<td>0.85</td>
<td>13.07</td>
<td>11.24</td>
<td>0.41</td>
<td>18.91</td>
<td>1.88</td>
</tr>
<tr>
<td><strong>Overall</strong></td>
<td><strong>0.85</strong></td>
<td><strong>13.57</strong></td>
<td><strong>11.16</strong></td>
<td><strong>0.58</strong></td>
<td><strong>17.50</strong></td>
<td><strong>3.05</strong></td>
</tr>
</tbody>
</table>
Op time

![Graph showing total operation time vs. total RVU Mean across different surgical specialties.

- **Surgical Specialty**:
  - Cardiac Surgery
  - General Surgery
  - Gynecology
  - Neurosurgery
  - Orthopedics
  - Otolaryngology (ENT)
  - Thoracic
  - Urology
  - Vascular

2019-05-13 Analysis totalRVU_mean.rtf]
## Correlation and Linear Regression between Risk Variables mRVU

<table>
<thead>
<tr>
<th>Surgical Specialty</th>
<th>Readmission Rate</th>
<th>SAE Rate</th>
<th>Morbidity Rate</th>
<th>Mortality Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Correlation Coefficient (R)</td>
<td>Change in mRVU for 10% increase</td>
<td>Correlation Coefficient (R)</td>
<td>Change in mRVU for 10% increase</td>
</tr>
<tr>
<td><strong>Cardiac Surgery</strong></td>
<td>0.01</td>
<td><strong>0.65</strong></td>
<td>0.60</td>
<td>6.82</td>
</tr>
<tr>
<td><strong>General Surgery</strong></td>
<td>0.46</td>
<td>14.32</td>
<td>0.65</td>
<td>9.20</td>
</tr>
<tr>
<td><strong>Gynecology</strong></td>
<td>0.70</td>
<td><strong>29.15</strong></td>
<td>0.61</td>
<td>8.27</td>
</tr>
<tr>
<td><strong>Neurosurgery</strong></td>
<td>0.43</td>
<td>17.34</td>
<td>0.45</td>
<td>6.32</td>
</tr>
<tr>
<td><strong>Orthopedics</strong></td>
<td>0.20</td>
<td>6.61</td>
<td>0.32</td>
<td><strong>3.62</strong></td>
</tr>
<tr>
<td><strong>Otolaryngology</strong></td>
<td>0.72</td>
<td><strong>40.87</strong></td>
<td>0.84</td>
<td><strong>23.35</strong></td>
</tr>
<tr>
<td><strong>Thoracic</strong></td>
<td>0.33</td>
<td>11.41</td>
<td>0.67</td>
<td>6.33</td>
</tr>
<tr>
<td><strong>Urology</strong></td>
<td>0.74</td>
<td><strong>17.96</strong></td>
<td>0.83</td>
<td><strong>9.01</strong></td>
</tr>
<tr>
<td><strong>Vascular</strong></td>
<td>0.01</td>
<td><strong>0.17</strong></td>
<td>0.71</td>
<td>5.32</td>
</tr>
<tr>
<td><strong>Overall</strong></td>
<td><strong>0.42</strong></td>
<td><strong>13.00</strong></td>
<td><strong>0.61</strong></td>
<td><strong>6.70</strong></td>
</tr>
</tbody>
</table>
Readmissions
Morbidity

![Morbidity Graph]

- **Surgical Specialty**
  - Cardiac Surgery
  - General Surgery
  - Neurosurgery
  - Orthopedics
  - Otolaryngology (ENT)
  - Thoracic
  - Urology
  - Vascular

2019-05-30 Analysis totalRVU_mean.rtf
Conclusions

• Importance of wRVU to fairly and accurately measure work
• Need to move from subjective assessment to objective measure
  • Effort over 30-day post-operative period
  • Reflect patient co-morbidities
• Does not include quality / cost of care
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QUESTIONS