Radiologist Productivity Measurement

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I. INTRODUCTION

As the practice of medicine and the delivery of healthcare services have evolved from a "cottage industry" to a megaforce in the United States, the complexity of radiology practices has followed suit. As with any growing organization, there comes a need to be able to measure the efficiency of resource utilization in a radiology practice. Because the work effort of the physician radiologist is the principal resource utilized in a professional service organization, it is a system of measuring the utilization of radiologists work hours, and the resulting unit output, which is sought.

Historically, radiologists have been somewhat comfortable referring to the "number of procedures" to quantify the level of activity in their practices. As the practice diversity of the specialty has expanded to include more kinds of equipment (and the more complex examinations associated with these) and more extensive "special procedures," the reliability of comparing numbers of procedures as an indicator of output has been diminished.

In 1989 the American College of Radiology developed a Relative Value Scale (ACRRVS) in cooperation with the United States Department of Health and Human Services (HCFA). The ACR did so with the purpose of assisting HCFA to scale reimbursement under the Medicare program in a fashion which reflected the relative amount of work input for each type of imaging exam. There was a value of radiologist work (the Professional Component- PC) relative to the interpretation of a single view chest X ray examination. All other imaging examinations were assigned a work value relative to the effort of this exam. Values were also assigned to the technical work and costs involved in the examination (the Technical Component-TC).

In 1991 the HCFA adapted the ACRRVS to its more comprehensive Resource Based Relative Value Scale (RBRVS) for initial implementation in 1992. The RBRVS was slightly different in one major respect. For each code, the Relative Value Units (RVUs) assigned to the PC were subdivided into RVUs for Work, Practice cost overhead, and Malpractice risk expenses. Because HCFA has indicated a desire to measure and change P and M values based on future research, the members of the RBMA Committee felt it necessary to adopt the Professional Component Work RVU (PCWRVU) as the basis for
measuring work output by radiologists.

Only the use of the definitions and formulas will determine if they meet the needs of practice decision makers. It is intended that these serve as a basis for measuring resource input (Total PCWRVUs, TASH, FTEs) work output (Total Procedures, Intensity Indicator) and relative efficiency of resource utilization (Productivity Index, Availability Index). The Committee expects that over time additional formulas derived from these basic elements will be developed to further the evolution of assessing and managing practice activities.

II. DEFINITIONS

A. TOTAL PCWRVUS:
The number of procedures performed multiplied by the Professional Component Work (modifier 26) RVUs for each procedure. The work PCWRVUs for professional services will be used even when calculating for a global setting. The RVU values are published in the Federal Register dated November 25, 1991, and in any updates to that listing.

B. TOTAL AVAILABLE STAFFED HOURS (TASH):
Represents the total of all hours a radiologist is available to read films and perform studies. This specifically excludes vacation, call hours when not on site, CME workshops, staff meetings, lectures, days off, etc.

C. FTE:
Minimum hours worked in order to be considered a normal full-time physician by your medical group. A radiologist who works one third as many hours per week as a full-time radiologist in that medical group equals .33 FTEs. A radiologist who works normal full-time hours in that medical group but started April 1st (worked only 9 months of the year) equals .75 FTEs. (Note: The FTE for one physician cannot be more than 1.0.)

D. TOTAL PROCEDURES PERFORMED:
The sum total of all the CPT codes billed during the period.

III. FORMULAS

A. PRODUCTIVITY INDEX:
Average Professional Component Work RVUs per available staffed hour:

Total PCWRVUs  divided by Total Available Staffed Hours

B. AVAILABILITY INDEX:
A measure of the time all radiologists are available relative to the number of working hours in a standard business year.
Total Available Staffed Hours (TASH) per Year divided by 2080 Hours then divided by the number of FTE Radiologists 
(Note: 2080 hours represent 52 weeks multiplied by 40 hours per week.)

C. INTENSITY INDICATOR: 
A measure of the degree of difficulty of the procedures performed by the practice. The result of the calculation will yield the average number of Professional Component Work RVUs per procedure. The higher the number, the greater the degree of difficulty of the average procedure performed.

Total PCWRVUs divided by Total Procedures Performed

IV. DISCUSSION

The formulas are designed to establish a methodology for measuring the performance of the practice and to assess its efficiency relative to the production of work. In order to establish a basis on which to compare different practices and to be able to offer comparisons over various time periods when procedure mixes change, we have chosen to use the Professional Component Work Relative Value Unit (PCWRVU) as a standard of measure. The RVU gives us a common ground on which to base all procedures, where the amount of work required to perform each study is compared to the work required to read a one-view chest (whose professional component work RVU = 0.19).

The total RVU is composed of three elements which include a factor for work, practice expense and malpractice values. We are predominantly concerned with the work factor. When comparing numbers from other practices or over various time periods within the same practice, one must be sure that all ratios were calculated on the same basis.

A. PRODUCTIVITY INDEX
The productivity index, calculated with the first formula is derived by tabulating all of the procedures performed by the practice by procedure code (professional component 26 modifier only) and then multiplying the total number of procedures for each code by the PCWRVU for each code. When the total PCWRVUs for all procedures are established, that number is divided by the Total Available Staffed Hours (TASH).

TASH is the total of all time the radiologists are available to read films and perform studies but specifically excludes vacation, call hours when not on site, CME workshops, staff meetings, lectures, days-off, etc. Call hours are of specific concern since types of call can vary widely over practices and areas. It is our assumption that call time should be restricted to those times when the radiologist is prepared to and is expected to be reading films. In extremes, if the radiologist is called in to perform a study and there are
stacks of films which he reads during any waiting time he may have, then all his call time would be included. If, however, the radiologist lives far from the facility where he is on call and therefore decides to remain at the facility for convenience but has no work to do, only the actual time he spends reading would be included in TASH. Each practice will have to determine the reasonable amount of call time to be included in TASH and needs to be diligent in developing a number which accurately depicts the true time the radiologists are working or available awaiting the completion of the study. When comparing calculated results with other practices, it would be prudent to know the times included in the results being compared so as to assure consistency.

Another factor for consideration is travel time. If the radiologist travels between offices and/or hospitals, the travel time would be included in TASH when that time falls in between the normal beginning and end of the work day. Travel time to the first stop and from the last stop of the day would not normally be included unless additional allowances are made by the practice for the excessive travel time reducing the ability of the radiologist to work a full shift.

A normal work day would be included in TASH regardless of the time of day worked. In other words, a radiologist working from 5:00 pm to 2:00 am works the same number of hours as a radiologist working from 8:00 am to 5:00 pm, 8 hours excluding an hour for lunch.

It is not always necessary to compare the results to other practices. If we are asked to determine whether it is time to add another radiologist, we may decide to compare current results with those from previous years. We would perform the same tests going back possibly three or five years and by comparing the results to the current year would be able to determine if the total work load of the practice has increased. The advantage to using standards developed within the practice is that they more closely relate to the manner in which that particular practice chooses to function. Since some practices may desire a rapid pace while other practices may prefer a relaxed pace, comparing two differently paced practices may result in conclusions undesirable or inappropriate to the decision makers.

B. AVAILABILITY INDEX
The Availability Index is determined by dividing TASH by 2080 hours (based on 40 hours per week and 52 weeks in a year), then dividing by the number of FTE radiologists whose work time is included in TASH. The index number will reveal a value that can be compared to other practices to determine the relative amount of time spent in the practice of radiology.

C. INTENSITY INDICATOR
The Intensity Indicator is used to establish the average amount of work units derived by the practice, per procedure. This will help to determine the character of the practice in that if the number is very high, a large quantity
of high PCWRVU procedures are being performed, such as MRI exams. If the number is very low, a large number of small PCWRVU procedures are being performed, such as chest radiographs. We expect most practices to fall somewhere in the middle revealing an average mix of high and low value procedures.

While we expect variations in the methods of determining values used in the calculations for TASH, the accuracy of the other values used in the formulas are expected to provide a line of comparison between practices that is consistent and useful to practice administrators. We have listed those obvious items to include and exclude in TASH and stress that the analyst be diligent in arriving at a value that closely represents the true time the radiologists are available.

V. EXAMPLE

A. PROBLEM
Derive the Productivity Index, Availability Index and Intensity Indicator for the ABC Radiology Group. This group consists of three radiologists and a part time associate.

B. SOLUTION
Since the Total Available Staffed Hours (TASH) will be used in two of the formulas, we will develop that number first. The normal working hours in the practice are 8:00 am to 5:00 pm with a one hour lunch. Therefore, the base hours to start with are 40 hours per week per radiologist. Each doctor takes off one afternoon per week so we must subtract 4 hours. Call is rotated among the three radiologists and each doctor is usually called in twice a week during which time an average of three hours is spent reading films. We must therefore add 6 hours per week to the doctors' time. Each doctor in the group takes off 8 weeks per year for vacation, workshops and lectures and as such, works 44 weeks per year. Based on this data, the available time would be:

<table>
<thead>
<tr>
<th>Description</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Base Hours</td>
<td>40</td>
</tr>
<tr>
<td>Afternoon Off</td>
<td>-04</td>
</tr>
<tr>
<td>Net Hours per Week</td>
<td>36</td>
</tr>
</tbody>
</table>

Net Hours Available (36 x 44) 1584 Hours per year

44 weeks divided by 3 = 14.67 weeks of call per year.
Call hours available (14.67 X 6) = 88 Hours

Holiday hours available (4 Holidays X 8) = 32 Hours

Sundays @ 4 hours each divided among the three radiologists (4 X 52/3) = 69 Hours
Committee/Business Meetings (20 X 1 Hr Meetings) = - 20 Hours

Total Hours Available 1753 Hours/year/full-time radiologist

Since all three doctors work the same hours, we can multiply the 1753 hours each is available by 3 to get a total of 5,259 hours for the three full time radiologists.

The associate physician covers Saturdays only from 8:00 am to 5:00 pm with no lunch for a total of 9 hours. On the Saturdays he doesn't work, another associate fills in. Since each Saturday is accounted for, the total time for Saturdays would be 9 hours multiplied by 52 weeks or 468 hours to be added to the total.

The total available staffed hours for the practice for the year equals 5,359 plus 468 worked by the associate equals a TASH of 5,727 for the year.

The normal work week for the group equals 36 hours and each of the three full time members work at least 36 hours. They would be counted as 3 FTE's. Since the associate works 9 hours the FTE for this radiologist would be .25 (9 divided by 36). The total FTE's are now 3.25.

Now that we have the data to calculate the Availability Index, we may do so using the formula:

\[
\frac{5727}{2080} = 2.753 \div 3.25 = .847
\]

The Availability Index for this group is .847.

In order to calculate the Productivity Index, we must sum all the procedures by their CPT Code and multiply each procedure by the appropriate PCWRVU work factor. Remember to use the professional component (Modifier 26) only.

An abbreviated summary for this group's procedures is:

<table>
<thead>
<tr>
<th>Description Code</th>
<th>PCWRVU</th>
<th>Quantity</th>
<th>Extended</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single View Chest 71010</td>
<td>.19</td>
<td>456</td>
<td>86.64</td>
</tr>
<tr>
<td>AP and LAT Chest 71020</td>
<td>.23</td>
<td>2,345</td>
<td>539.35</td>
</tr>
<tr>
<td>CT of Chest 71250</td>
<td>1.22</td>
<td>247</td>
<td>301.34</td>
</tr>
<tr>
<td>Thoracic Spine 72072</td>
<td>.23</td>
<td>873</td>
<td>200.79</td>
</tr>
<tr>
<td>MRI Spine 72156</td>
<td>2.71</td>
<td>181</td>
<td>490.51</td>
</tr>
</tbody>
</table>

Total of above illustrations: 4,102 1,618.63
Total of all other examinations summarized but not illustrated here: (51,200 examinations): 113,750.37

Total PCWRVU’S of all studies performed by group: 115,369.00

To calculate productivity, we would use the same total available staffed hours from the previous formula and the total PCWRVUs calculated and applied as such:

115,369 divided by 5,727 = 20.14 PCWRVUs per Available Staffed Hour

To calculate the Intensity Indicator we may again use the total PCWRVU number from above and add up the total number of examinations performed (51,200 plus the 4102 from the illustration for a total of 55,302) and apply them to the formula.

115,369 divided by 55,302 = 2.09 is the Intensity Indicator

VI. SUMMARY

We hope that this discussion will provide assistance in evaluating a practice. However, the Business Manager should take care that the values, when compared to standards and other practices, do compensate for the personality of the practice, the geographic location nor the desired work habits of the group. No formula can replace the manager’s ability to determine the needs of the practice better than a hands-on evaluation of day-to-day operations and constant communication with the physicians.