In 1989, Congress enacted the Omnibus Budget Reconciliation Act, which authorized the Health Care Financing Administration to adopt the use of relative value units (RVUs) as the basis for Medicare and Medicaid reimbursement to physicians. Each RVU is related to the complexity of the services by a defined current procedural terminology (CPT) code, and each has 3 components: (1) physician work RVUs account for the time spent, the cognitive and technical skills needed, and the overall difficulty involved in providing a service or performing a procedure; (2) practice expense RVUs account for nonphysician clinical staff time, medical supplies, and equipment used to maintain and run the facility where the medical encounter occurs; and (3) professional liability RVUs account for the cost of malpractice insurance. Congress assigns a dollar value to an RVU as part of its annual budget process. The geographic differences in costs across the United States are equalized by a geographic practice cost index applied to each RVU. Over time, the use of RVUs has become the reimbursement basis for many private health insurance carriers and for Medicaid and Medicare and has been used as a surrogate measure of physician productivity; it is of paramount importance that the relative value of a physician’s work be accurately reflected by the RVUs generated, especially when comparing physicians’ work across specialties.

Of the three RVU components, physician work RVUs have proven the most controversial and challenging to accurately quantify. The Center for Medicare and Medicaid Services is required by Congress to review and update RVUs every 5 years. The Center for Medicare and Medicaid Services seeks input from a variety of sources including the American Medical Association—Specialty Society Relative Value Scale Update Committee, which is composed of 29 members, most of whom represent medical specialty societies. This committee meets 3 times yearly to develop recommendations regarding RVU assignment necessitated by revisions in CPT codes. Formulation of new and revised CPT codes is a separate process that has its own set of advisory committees. For example, the American Academy of Pediatrics through its Committee on Coding and Nomenclature develops new and revised CPT codes appropriate for pediatrics. Because the processes of CPT code revision and RVU apportionment are separate, the simple existence of a CPT code does not insure physician reimbursement. These periodic updates are an iterative process involving adjustments in the RVU scale related to changes in practice or technology or the availability of new information. These updates can be considered a budget-neutral process in which stakeholders marshal competing evidence to maintain or increase their portion of the pool of funds designated for physician reimbursement.

For procedures such as cardiac catheterization, the final RVU assignment represents the sum of the individual RVUs of the separate procedures performed. RVUs and DRGs: Do They Fairly Reimburse Physicians and Hospitals and Incentivize Improved Care?

**AUTHORS:** David Rubenstein, MD, Glenna Friedman, MBA, and David Bateman, MD

**ABBREVIATIONS**

- BAS—balloon atrial septostomy
- BW—birth weight
- CPAP—continuous airway pressure
- CPT—current procedural terminology
- DRG—diagnosis-related group
- ELOS—expected length of stay
- LOS—length of stay
- RVU—relative value unit

Opinions expressed in these commentaries are those of the authors and not necessarily those of the American Academy of Pediatrics or its Committees.

doi:10.1542/peds.2012-1434
Accepted for publication Oct 31, 2012

Address correspondence to David Rubenstein, MD, College of Physicians and Surgeons, Columbia University Medical Center, 3959 Broadway, CHN 1200A, New York, NY 10032. E-mail: sdr26@columbia.edu

PEDIATRICS (ISSN Numbers: Print, 0031-4005; Online, 1098-4275). Copyright © 2013 by the American Academy of Pediatrics

**FINANCIAL DISCLOSURE:** The authors have indicated they have no financial relationships relevant to this article to disclose.

**FUNDING:** No external funding.

**COMPANION PAPER:** A companion to this article can be found on page 258, and online at www.pediatrics.org/cgi/doi/10.1542/peds.2012-0043.
components of the procedure as defined by CPT codes. Total RVUs for pulmonary valvuloplasty, for example, consist of the sum of RVUs for generic right heart catheterization and angiography, as well as the RVUs assigned to specific types of contrast injections. The total RVUs for a given interventional procedure are not fixed but are dependent on complicating factors individualized for each patient, including, for example, the complexity of the lesion and the difficulty in obtaining vascular access. Thus, the number of RVUs assigned represents an attempt to accurately capture the amount of physician work expended that is unique to a particular patient.

Procedures of this sort are susceptible to fine tuning of RVU assignment (and perhaps endless quibbling over redundant documentation). One form of evidence that presumably weighs heavily in this process is peer-reviewed research demonstrating misalignments between the resources consumed during medical encounters and allotment of RVUs to each encounter. In an article in the current issue of this Journal, Bergersen et al argue that case complexity in interventional cardiac catheterization in children with congenital heart disease is not correctly represented by the current RVUs assigned to various procedure codes. The authors offer the large experience from Children’s Hospital Boston and include a wide array of cases differing by case type and complexity, with a range of RVUs within each case type. Central to the argument is their definition of case complexity based on several quantifiable surrogate measures of physician work including radiation time (a measure of cognitive skill), the number of component interventions (a measure of technical skill), and the predicted rate of adverse events (a measure of stress). Their data show that, for a given set of procedures, no correlation exists between their 3 surrogate measures of complexity studied and the number of RVUs assigned.

The authors also point out that the RVU model of reimbursement does not reliably or properly identify cardiac catheterization procedures unique to children. As a vivid example, 300 cases of balloon atrial septostomy (BAS), representing 10% of cases in their study sample, were excluded from their analysis because, although BAS has its own CPT code (92992), this code has no assigned RVU value. BAS is a potentially life-saving procedure frequently performed in critically ill neonates with transposition of the great vessels or in those with hypoplastic left heart syndrome with a restrictive atrial septum. BAS is rarely performed in adults.

An alternative physician reimbursement strategy involves the use of global CPT codes, which are not procedure specific and allot RVUs on the basis of aggregate measures of resource utilization over inclusive groups of patients. For these codes, RVU assignment is insensitive to the disease complexity of an individual patient; instead, it represents the average level of complexity of all patients within the category. An example is CPT code 99469, used for the continuing care of all critically ill neonates. When global codes are used, a physician caring for a critically ill neonate receives the same number of RVUs per care day regardless of the baby’s birth weight or the number of procedures performed. A similar reimbursement strategy is used in the assignment of diagnosis-related groups (DRGs) for hospital reimbursement.

An interesting problem is how these reimbursement systems incentivize (or de-incentivize) aspects of patient care. For example, the DRGs used for hospital reimbursement are length of stay (LOS) independent for most patients; unless a patient’s LOS is so long as to be defined as an outlier, the hospital receives the same reimbursement for a patient’s hospital stay regardless of its duration. For the hospital, this incentivizes shorter LOS, reduced resource utilization, and increased patient turnover. Conversely, using CPT codes, physicians may be incentivized to increase LOS, procedure complexity, and resource utilization. Moreover, it is doubtful that either system incentivizes improvements in quality of care that might reduce disease complexity and complication rates. In fact, if such improvements occur, hospitals and physicians may incur financial penalties resulting from the redesignation of a patient’s global CPT code or DRG to one that offers a lower level of reimbursement.

We recently uncovered such an example with all patient refined-diagnosis related groups (APR-DRGs) in our own day-to-day practice as neonatologists, involving the preferential use of bubble nasal continuous airway pressure (CPAP) over mechanical ventilation in preterm neonates with respiratory failure. At our hospital, all spontaneously breathing premature infants with respiratory distress, regardless of birth weight and gestational age, are placed on CPAP as the initial mode of respiratory support. Success rates for maintaining the babies on CPAP range from about 50% in infants 24 to 25 weeks of gestational age to almost 100% in infants >28 weeks of gestational age. As a result of this practice, premature infants cared for at our hospital have rates of bronchopulmonary dysplasia that are one-third to one-half the national median rate, as measured by standard databases such as the Vermont-Oxford Network. Preferential use of CPAP also reduces LOS, but only modestly. Birth weight and gestational age remain the major drivers of LOS and resource utilization in premature neonates.

New York State, where our hospital is located, recently replaced its own DRG reimbursement system with the APR-DRG
system for hospital reimbursement. The designation of a neonatal APR-DRG is based on birth weight (BW) and the presence or absence of associated conditions including major surgical procedures. Within each neonatal APR-DRG, many secondary diagnoses, structural elements, and procedures are used to assign a severity of illness score (mild, moderate, major, or extreme) used to determine reimbursement and expected LOS (ELOS). Nonsurgical neonatal APR-DRGs include intermittent positive pressure ventilation greater than or equal to 96 hours as a “boost” of intensity to major/extreme. However, many neonatologists use CPAP as a less invasive alternative to mechanical ventilation. Although patients receiving CPAP may be just as ill and as resource consuming (eg, in nursing care-hours per patient), use of CPAP is not considered a boost to major/extreme intensity.

We hypothesized that a byproduct of CPAP use under the APR-DRG system would be decreased hospital income per patient and underestimated ELOS. The charts of 33 neonates (APR-DRG 593; BW = 750–999 g) and 10 neonates (APR-DRG 591; BW < 750 g) discharged from our NICU whose respiratory support was bubble CPAP were selected. Using criteria based on BW, the degree of respiratory distress described, radiologic findings, and blood gas results, one of the authors (D.R.) reviewed each chart to identify a subsample of infants who were highly likely to have received intermittent positive pressure ventilation (IPPV) greater than or equal to 96 hours at other institutions. DRGs for the infants in this subsample were recoded (G.F.) as if they had received IPPV greater than or equal to 96 hours. Compared with coding with CPAP, ELOS increased in the IPPV greater than or equal to 96-hour group by ~28 (DRG: 593) and 43 days (DRG: 591) per case; hospital reimbursement would have increased $33,500 to $36,565 per case. It is worth noting that, although the actual LOS for the babies in this cohort was ~3 days less than the ELOS under the assumption of IPPV greater than or equal to 96 hours use, it was still far longer than the ELOS granted them by the use of CPAP. Thus, when neonatologists treat extremely low BW neonates with a less-invasive modality that results in decreased rates of a debilitating complication (chronic lung disease), the hospitals where they practice receive lower reimbursement, and ELOS is underestimated.

A medical care finance system that seeks to insure and improve patient care and provide equitable and appropriate reimbursements for costs and labor, yet operates fundamentally outside the free market, requires constant surveillance and updating to meet these goals. It needs to continually adjust what it rewards and discourages on the basis of feedback from patients and care providers. Two examples of such feedback discussed above are likely representative of many more.

REFERENCE

RVUs and DRGs: Do They Fairly Reimburse Physicians and Hospitals and Incentivize Improved Care?

David Rubenstein, Glenna Friedman and David Bateman

*Pediatrics* 2013;131;340; originally published online January 21, 2013; DOI: 10.1542/peds.2012-1434

Updated Information & Services

including high resolution figures, can be found at:
/content/131/2/340.full.html

Subspecialty Collections

This article, along with others on similar topics, appears in the following collection(s):
Administration/Practice Management
/cgi/collection/administration:practice_management_sub
Fetus/Newborn Infant
/cgi/collection/fetus:newborn_infant_sub

Permissions & Licensing

Information about reproducing this article in parts (figures, tables) or in its entirety can be found online at:
/site/misc/Permissions.xhtml

Reprints

Information about ordering reprints can be found online:
/site/misc/reprints.xhtml
RVUs and DRGs: Do They Fairly Reimburse Physicians and Hospitals and Incentivize Improved Care?
David Rubenstein, Glenna Friedman and David Bateman
Pediatrics 2013;131;340; originally published online January 21, 2013;
DOI: 10.1542/peds.2012-1434

The online version of this article, along with updated information and services, is located on the World Wide Web at:
/content/131/2/340.full.html