

From the Vascular and Endovascular Surgery Society

Reimbursement in hospital-based vascular surgery: Physician and practice perspective

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ABSTRACT

Objective: The purpose of this study was to determine change in value of a vascular surgery division to the health care system during 6 years at a hospital-based academic practice and to compare physician vs hospital revenue earned during this period.

Methods: Total revenue generated by the vascular surgery service line at an academic medical center from 2010 through 2015 was evaluated. Total revenue was measured as the sum of physician (professional) and hospital (technical) net revenue for all vascular-related patient care. Adjustments were made for work performed, case complexity, and inflation. To reflect the effect of these variables, net revenue was indexed to work relative value units (wRVUs), case mix index, and consumer price index, which adjusted for work, case complexity, and inflation, respectively. Differences in physician and hospital net revenue were compared over time.

Results: Physician work, measured in RVUs per year, increased by 4%; case complexity, assessed with case mix index, increased by 10% for the 6-year measurement period. Despite stability in payer mix at 64% to 69% Medicare, both physician and hospital vascular-related revenue/wRVU decreased during this period. Unadjusted professional revenue/wRVU declined by 14.1% ($P = .09$); when considering case complexity, physician revenue/wRVU declined by 20.6% ($P = .09$). Taking into account both case complexity and inflation, physician revenue declined by 27.0% ($P = .04$). Comparatively, hospital revenue for vascular surgery services decreased by 13.8% ($P = .07$) when adjusting for unit work, complexity, and inflation.

Conclusions: At medical centers where vascular surgeons are hospital based, vascular care reimbursement decreased substantially from 2010 to 2015 when case complexity and inflation were considered. Physician reimbursement (professional fees) decreased at a significantly greater rate than hospital reimbursement for vascular care. This trend has significant implications for salaried vascular surgeons in hospital-based settings, where the majority of revenue generated by vascular surgery care is the technical component received by the facility. Appropriate care for patients with vascular disease is increasingly resource intensive, and as a corollary, reimbursement levels must reflect this situation if high-quality care is to be maintained. (J Vasc Surg 2017;■:1-6.)

In recent years, there has been a steady increase in government expenditure dedicated to health care. Health care expenditure accounted for 12% of the gross domestic product of the United States in 1990, 13% in 2000, and 17.5% in 2015.¹ In light of this situation, the government has reason to control costs of programs such as Medicare and Medicaid. Approximately 70% of patients nationwide requiring vascular interventions are insured through Medicare.² At our institution, Dartmouth-Hitchcock

Medical Center (DHMC), three-quarters of patients treated by vascular surgeons are insured by a government-sponsored program. Traditionally, hospital-based (or employed) vascular surgeon reimbursement has been driven primarily by professional revenue generated in a fee-for-service environment through submitted *Current Procedural Terminology* codes. Hospital reimbursement (ie, technical revenue) is generated by diagnosis-related group (DRG) for inpatients and by ambulatory payment classification (APC) for outpatients. Currently, 24% of vascular surgeons work under a hospital-based contract³ rather than a physician-owned practice. With a trend toward hospital-based employment and the potential shift toward value-based reimbursement models, it becomes increasingly important to understand the value of a vascular surgery practice to the health care system. Presently, there are no available data on the topic of how reimbursement has changed for the individual physician compared with the hospital or the overall value of the vascular service line to the health care system. The purpose of this study was twofold: to show the trend in net revenue in a

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Table 1. Physician and hospital unadjusted net revenue for fiscal years 2010 to 2015, with work relative value units (wRVUs), consumer price index (CPI), and case mix index (CMI) corresponding to these years

Fiscal year	2010	2011	2012	2013	2014	2015
Physician revenue, \$	5,576,963	5,353,000	5,119,661	4,887,198	4,419,000	4,966,786
Hospital revenue, \$	22,452,439	20,590,000	21,705,700	22,356,318	21,471,000	23,619,934
wRVUs	41,915	40,181	41,020	44,930	43,582	43,436
CPI	218.056	224.935	229.594	232.957	236.736	237.017
CMI (vascular)	2.41	2.4	2.48	2.52	2.51	2.61

vascular surgery division over time in real dollars (adjusted for volume, inflation, and case complexity) and to compare that trend in physician reimbursement with the net technical revenue derived by the hospital for these same services.

METHODS

We conducted a retrospective review of the billing database at DHMC corresponding to the fiscal years 2010 to 2015 under the approval of our Institutional Review Board. DHMC is a 445-bed hospital located in Lebanon, New Hampshire, serving as a major tertiary care referral site for New Hampshire, Vermont, and northern Massachusetts. The vascular surgery division employs nine surgeons, with a full-time employee measure of 4.2 after accounting for nonclinical work during the years studied. Hospital and physician practice financial statements were reviewed for net revenue. Individual patient billing was not examined, and as such, patient consent was not required. As is standard in accounting practice, net revenue was calculated as gross charges less contractual agreements, bad debt recovery, and charity. Net revenue was calculated separately for the physicians and for the hospital. Physician revenue pertains to all professional fees received for vascular-related services rendered by vascular surgeons in the operating room, same-day endovascular suite, and vascular laboratory plus all separately reportable inpatient and outpatient evaluation and management services. Hospital revenue was calculated on the basis of technical revenue received from DRG and APC payment. To adjust for change in volume on an annual basis, both physician and hospital net revenues were divided by annual work relative value units (wRVUs) generated by the vascular surgeons during the parallel 1-year time frame. DHMC operates as a single-unit health care provider. In this capacity, there is no allotment for office-based procedures; procedures are reimbursed as either a DRG or APC in the hospital setting. Whereas work, practice expense, and malpractice RVUs are calculated for Medicare reimbursement, it is only the wRVUs that were used to index revenue. To adjust for inflation, net revenue was divided by the relative change in consumer price index (CPI, as published by the U.S. Bureau of Labor), indexing all dollars to 2010, which served as the

base year for analysis. To adjust for case complexity, net revenue was indexed to the vascular surgery case mix index (CMI) for the corresponding year, with 2010 again serving as a baseline. The wRVUs, vascular CMI, and CPI are listed in Table 1. Statistical analysis was undertaken using Stata 14.0 (StataCorp LP, College Station, Tex). Nonparametric z-tests were used to analyze change in net revenue over time (using the STATA function *nptrend*), adjusted by wRVU, CMI, and CPI. The Wilcoxon signed-rank test was used to compare change in adjusted physician revenue vs change in hospital revenue for the period studied.

RESULTS

During fiscal years 2010 to 2015, a total of 5940 operative cases, 3860 outpatient endovascular suite procedures, and 65,599 vascular laboratory studies were performed by vascular surgeons at DHMC. Unadjusted professional net revenue for this work was \$5.58 million in fiscal year 2010, decreasing to \$4.97 million in fiscal year 2015, a 10.9% decline ($P = .07$; revenue, wRVU, CPI, and CMI values are listed in Table 1). In contrast to the decline in net professional revenue, unadjusted hospital net revenue corresponding to vascular surgery services rose 5.20%, increasing from \$22.5 million in fiscal year 2010 to \$23.6 million in fiscal year 2015 ($P = .58$; Fig 1). In the vascular surgery practice, physician wRVUs generated were 41,900 in 2010 increasing to 43,600 in 2015, a 4.0% increase. After adjusting only for wRVUs, which provided a normalization for physician volume and time and intensity expended, physician net revenue per wRVU declined by 14.1% during the 6-year period ($P = .09$), whereas hospital net revenue per wRVU increased by 1.5% ($P = .85$). When taking into account inflation (CPI), the physician revenue/wRVU, indexed to 2010 dollars, decreased by 20.9% from 2010 to 2015 ($P = .07$), whereas the hospital equivalent decreased by 6.6% ($P = .24$). CMI increased from 2.4 to 2.6 during the time studied (an 8.3% increase). When taking into account year over year change in CMI without an adjustment for inflation, the physician revenue/wRVU indexed to 2010 complexity decreased by 20.6% during the years studied ($P = .09$), with the hospital equivalent decreasing by 6.3% ($P = .07$; ie, adjusting for CMI and wRVU but not CPI). Finally, when indexing to wRVUs, change in CPI, and change in

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