



PERSONAL VIEWPOINT

Transplant physician and surgeon compensation: A sample framework accounting for nonbillable and value-based work

Tracy Giacom¹ | Mehmet U. S. Ayvaci² | Robert S. Gaston³ | Alejandro Mejia⁴ | Bekir Tanriover⁵

¹Transplant Institute at Methodist Dallas, Dallas, Texas

²Information Systems & Operations Management, the University of Texas at Dallas, Richardson, Texas

³Division of Nephrology, the University of Alabama at Birmingham, Birmingham, Alabama

⁴Department of Surgery, Methodist Dallas Transplant Institute, Dallas, Texas

⁵Division of Nephrology, University of Texas Southwestern Medical Center, Dallas, Texas

Correspondence

Bekir Tanriover
Email: bekir.tanriover@utsouthwestern.edu

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Work relative value unit (wRVU)-based fee schedules are predominantly used by both the Centers for Medicare & Medicaid Services (CMS) and private payers to determine the payments for physicians' clinical productivity. However, under the Affordable Care Act, CMS is transitioning into a value-based payment structure that rewards patient-oriented outcomes and cost savings. Moreover, in the context of solid organ transplantation, physicians and surgeons conduct many activities that are neither billable nor accounted for in the wRVU models. New compensation models for transplant professionals must (1) justify payments for nonbillable work related to transplant activity/procedures; (2) capture the entire academic, clinical, and relationship-building work effort as part of RVU determination; and (3) move toward a value-based compensation scheme that aligns the incentives for physicians, surgeons, transplant center, payers, and patients. In this review, we provide an example of redesigning RVUs to address these challenges in compensating transplant physicians and surgeons. We define a customized RVU (cRVU) for activities that typically do not generate wRVUs and create an outcome value unit (OVU) measure that incorporates outcomes and cost savings into RVUs to include value-based compensation.

KEYWORDS

business, economics, income, editorial, management, organ transplantation in general, personal viewpoint

1 | INTRODUCTION

Since their inception in 1988, relative value units (RVUs) have become a widely accepted basis for ranking and evaluating the resources required and expended by physicians in providing each service. Both the Centers for Medicare & Medicaid Services (CMS) and private payers use RVU-based fee schedules to determine the payments for physicians' work effort. The RVU rate, updated annually by the CMS, includes compensation for three types of resources: physician's work (eg, physician time), practice expenses (eg, nonclinical labor and building space), and malpractice costs with geographic considerations in mind (eg, malpractice insurance premiums).

The focus of this article is work-RVUs (wRVUs), which quantify physicians' effort based on time, technical skill, and cognition in providing a service. Simply put, wRVUs are assigned to clinical activities; multiplying a dollar amount per wRVU by the number of RVUs performed by a physician (in direct patient care) determines the compensation for those clinical activities. Besides, a summation of wRVUs generated over a period is used as a standard to define overall physician productivity.

The origins of wRVUs come from a study in which physicians evaluated patient vignettes in terms of work effort in comparison to some reference services. It is periodically updated based on the recommendations from the American Medical Association/Specialty

Abbreviations: ACA, Affordable Care Act; ACO, accountable care organization; CMS, Centers for Medicare & Medicaid Services; cRVU, customized relative value unit; EMR, electronic medical record; FMV, fair market value; OVU, outcome value unit; RCE, reasonable compensation equivalent; RVU, relative value unit; wRVU, work relative value unit.

Society Relative Value Scale Update Committee (RUC). The methodology evolved over the years and became the uniform approach to maintaining schedules for fee-for-service payments and ensuring that clinical work is valued the same across services. The evolution of wRVUs, however, did not parallel the shift from fee-for-service to value-focused health care.¹ With the increasing regulatory emphasis on cost-efficient care, and the advent of new payment and delivery models such as accountable care organizations (ACOs), there is a dire need for redefining what constitutes an RVU and aligning physician and payer incentives to deliver value. Transplantation, subject to federal regulation and public oversight, is uniquely positioned to address such a need and lead the way to value-based payments² as it has been, for years, at the forefront of delivering value-driven, accountable, and team-based care.^{3,4}

1.1 | Benefits and challenges of the RVU system

Provider compensation is widely based on the number of wRVUs generated as an indicator of the volume of the work performed, also referred to as clinical productivity. There exist several benefits of using wRVUs as a basis to compensate providers' clinical effort. From the provider's perspective, it encourages work and is generally perceived as fair because clinically productive providers receive higher compensation under such schema. From a hospital or system perspective, the wRVU metric has merit as it (1) provides a uniform and transparent metric of physician effort across many types of patient care, (2) links clinical effort to payment, and (3) has already overcome the hurdles that an alternative model would face, such as buy-in from payers, physicians, and hospital managers.

Nonetheless, there exist key challenges to using wRVUs in compensating providers. The wRVUs may not fully capture labor-intensive tasks, often do not differentiate complex from noncomplex patients, may not reward nonclinical activities such as education and research, and, entirely only, promote volume over value. Some challenges may arise with changing payment and delivery models that should be addressed.¹ For instance, as physicians become aware of wRVU rates, clinical work that generates more wRVUs may be emphasized over work equally crucial to patients and payers, but associated with lower compensation. For example, conducting a procedure for differential diagnosis would generate revenue while spending additional time to understand patient preferences would not. Modifications to wRVUs should be designed carefully to avoid the unintended effects such as "distorted RVUs," which was exemplified in the shift of cardiac imaging from physician offices to hospitals as a result of reweighing of RVUs.¹ Hence, as we move to a value-based scheme, aligning the incentives of physicians, payers, and patients is essential, and will likely require changes in wRVU-based compensation.

In the context of solid organ transplantation, with its unique relationship between institutions and physicians/surgeons, there are additional specific challenges.⁵ These include: (1) justifying payments for nonbillable work related to transplant activity/procedures

(satellite clinic visits, organ placement coordination, organ recovery including dry-runs, robotic surgery, and additional work burden such as patient portals, publications, and teaching sessions), (2) capturing the effort required of physicians/surgeons in support of the transplant center and infrastructure (academic, clinical, and relationship building) as part of RVU determination, and (3) contributing to regional and national transplant governing bodies.⁶ We believe sufficient data and experience already exist to address these challenges in solid organ transplantation and provide an institution-based example of redesigning RVUs to quantify better and compensate transplant services.

2 | TRANSPLANT PHYSICIAN AND SURGEON COMPENSATION STRUCTURE

A variety of options exist to address the limitations in the wRVU-based payments for transplant providers. For example, transplant centers can withhold a portion of the overall physician/surgeon compensation or ancillary revenue generated from wRVU activities and then redistribute the withheld part to value-generating activities. The redistribution can target billable activities to incentivize clinical work that improves patient outcomes, or it can focus on nonbillable activities such as outreach, writing, or teaching. The challenge with this approach is convincing those who will observe a reduction in their incomes to support the nonclinical work of others. This approach is successful in some physician practices that generate significant ancillary revenue that can be used to create the pool. Another example is increasing the payments for wRVUs generated from high-value clinical activities (eg, satellite clinic visits for providing convenient access to care, monitoring, and care coordination). Specific payment adjustments could be proportional to the impact of individual activities on outcomes or overall program success; hence, the per-RVU conversion rate would reflect the value of the activity. Abouljoud et al propose recognizing and rewarding non-RVU generating activities through the use of "virtual RVUs."⁶

Our proposed cRVU and OVU metrics are consistent with the concept of virtual RVUs but also promote the value-generating clinical effort. We offer a customized RVU (cRVU) for activities that typically do not generate wRVUs and create an outcome value unit (OVU) measure that incorporates outcomes and cost savings into RVUs based on value-based compensation. The newly developed cRVU corrects flaws in the wRVU while quantitating typically uncompensated work effort in an easily traceable and transparent fashion. Most transplant centers in the United States exist within academic medical centers; these new RVU metrics were developed with academic practices in mind.⁷⁻⁹ However, the proposed RVU metrics can be a roadmap for nonacademic transplant centers that seek to compensate physicians/surgeons for nonclinical work as well as align their activities with the changing payment and delivery environment. Hence, some of the uncompensated work efforts are unique to transplant (eg, reviewing organ offers and recovering organs) while others are common to most specialties (eg, training

TABLE 1 Definition, rationale, and data source for customized relative value unit (cRVU) for a transplant physician/surgeon

Mnemonic	Definition of the activity	Activity type/ time spent	cRVU	The rationale for how cRVUs are calculated	Sample data source
ATT	Manuscript development, research activity, teaching residents and fellows, clinical/regulatory meetings including patient selection, pathology, tumor board, radiology, QAPI	30 min	0.56	RVU calculated on \$106 per hour at a rate of \$56 per RVU = 1.12 RVU per hour or 0.56 RVUs per 30 min (based on CMS Medical Director RCE total August 22, 2014, for hourly rate and FMV source compensation per wRVU)	Fee ticket, sign-in sheets, physician calendars, time studies
MANPR	The primary author of manuscript or book chapter publication	Event	48.00	Calculated based on an average of 15 patients × New Patient visit code 99 205 (RVUs 3.2) = 48 RVU	E-copy of publications
MANCO	Co-author manuscript or book chapter publication	Event	24.00	Calculated based on an average of 15 patients × New Patient visit code 99 205 (RVUs 3.2/2) = 24 RVU	E-copy of publications
MRKT	Marketing and outreach. No additional if included in hours of medical director stipend	30 min	2.20	RVU calculated on \$214 per hour at a rate of \$48.56 per RVU = 4.4 RVU per hour or 2.2 RVUs per 30 min (based on FMV source median salary and median wRVU)	Physician Calendars, fee tickets, Outreach coordinator activities
STBN	Satellite start-up bonus	Event	48.00	Calculated based on an average of 15 patients × New Patient visit code 9205 (RVUs 3.2) = 48 RVU	EMR
NCALL	On-call transplant physician/surgeon	1 d	10.29	On-call market rates \$500 per day/48.56 per RVU = 10.29 RVUs (FMV source data based on 5 d per month is considered excessive and earns RVUs)	Call schedule
STO1	Coverage of more than one Satellite clinic located more than 30 miles but less than 50 miles away from the center	1 d	9.18	The calculated average of 15 patients × Modified New Patient visit code 99 204 (RVUs 2.45*15*25%)	EMR
ST30	Coverage of more than one Satellite clinic located more than 50 miles but less than 100 miles away from the center	1 d	18.35	The calculated average of 15 patients × Modified New Patient visit code 99 204 (RVUs 2.45*15 *50%)	EMR
ST100	Coverage of more than one Satellite clinic located more than 100 miles away from the center	1 d	36.75	The calculated average of 15 patients × Modified New Patient visit code 99 204 (RVUs 2.45*15*100%)	EMR
PICRD	Principal investigator research study	New study	26.78	Based on \$1500 per study \$1550/\$56 per RVU = 26.78 RVUs	Study list/Physician CV
SICRD	Sub investigator research study	New study	13.39	Based on \$750 per study \$750/\$56 per RVU = 13.39 RVUs	Study list/Physician CV
IREO	Patient identification and selection for research studies	Clinic visit	3.20	Credit for the time required for patient identification and selection for the research study. Calculated by New Patient Code 99 205 (RVU 3.2)	1st research study patient clinic visit
IRE1	Initial research patient enrollment study lasts < 6 mo	1st clinic visit	3.20	Credit for patient complexity during the research study. Calculated by New Patient Code 99 205 (RVU 3.2)	Research coordinator 1st clinic visit and study timeline
IRE2	Initial research patient enrollment study lasts 6-18 mo	1st clinic visit	6.40	Credit for patient complexity during the research study. Calculated by New Patient Code 99 205 (RVU 3.2) multiplier 2	Research coordinator 1st clinic visit and study timeline
IRE3	Initial research patient enrollment study lasts > 18 mo	1st clinic visit	11.80	Credit for patient complexity during the research study. Calculated by New Patient Code 99 205 (RVU 3.2) multiplier 3	Research coordinator 1st clinic visit and study timeline
EVAL	Patient evaluations, waitlist management, and preannuals. 1 × each annually per patient	Clinic visit	3.20	Credit for patient complexity during pre-transplant evaluations, waitlist management, and annuals. Calculated by New Patient Code 99 205 (RVU 3.2)	EMR

(Continues)

TABLE 1 (Continued)

Mnemonic	Definition of the activity	Activity type/ time spent	cRVU	The rationale for how cRVUs are calculated	Sample data source
POOLT		Clinic visit	1.60	Credit for patient complexity posttransplant management. Calculated by New Patient Code 99 205 (RVU 3.2/2) multiplier ½	EMR
NPSUP		Clinic visit	1.00	Income for NP supervision \$3.00 per NP wRVU	EMR

CMS Center for Medicare and Medicaid; EMR, electronic medical record; FMV, fair market value; RCE, reasonable compensation equivalent; RVU, relative value unit; wRVU, work relative value unit.

residents and fellows, research and publications). We also note that the cRVU and OVU metrics we propose do not target activities that make clinical care possible, particularly those covered by practice expense RVUs.

3 | CUSTOMIZED RVU (CRVU) AND OUTCOME VALUE UNITS (OVUS)

Creating cRVUs and OVUs has multiple advantages. Transplant surgeons and physicians engage in many activities, some of which (eg, travel for organ recovery, set up and maintain satellite clinics, outreach referring physician visits, quality and safety process

improvement, the United Network for Organ Sharing [UNOS] data registry management, regulatory oversight, budget, and insurance contract reviews, and teaching), although nonbillable, are critical to the success of the center. Promoting these activities that improve quality and value is essential in realizing not only the objectives of a transplant center but also in enhancing the financial stability of the organization. Quantifying such activities through cRVUs and OVUs makes these activities transparent throughout the organization, consistent with the team approach so prevalent in transplantation. The payments associated with cRVUs and OVUs align the incentives of the physicians, surgeons, and the transplant center to work toward the common good while avoiding the detrimental perception of unequal pay for the work effort. The cRVU and

TABLE 2 Sample calculation for transplant physicians/surgeons' customized relative value unit (cRVU), not included in the benchmark for salary or work RVUs per month

Mnemonic ^a	Corresponding activity	Sample count [†]	cRVU (per count)	cRVU total (sample count cRVU)
ATT1	Teaching	5	0.56	2.80
NCALL/HCALL/SURG	On-call (up to 5)	5	8.90	0.00
NCALL/HCALL/SURG	Additional On-call over five nights per month	5	8.90	44.50
MANCO	Co-author of manuscript/chapter	1	24.00	24.00
MRKT	Marketing and outreach	10	1.55	15.50
ST01	Satellite clinic within the transplant center's service area (<30 miles)	10	9.80	98.00
ST30	Satellite clinic within the transplant center's service area (30-50 miles)	4	27.56	110.24
ST50	Satellite clinic within the transplant center's service area (50-100 miles)	4	36.75	147.00
ST100	Satellite clinic outside the transplant center's service area (>100 miles)	2	45.94	91.88
VTMED	Nonbillable virtual/telemedicine	30	3.20	96.00
PICRD	Principal investigator research study	5	26.78	133.900
SICRD	Sub investigator research study	5	13.39	66.95
IREO	Patient identification and selection for research studies	10	3.20	32.0
IRE1	Initial research patient enrollment study lasts < 6 mo	5	3.20	16.00
IRE2	Initial research patient enrollment study lasts 6-18 m	5	6.40	32.00
IRE3	Initial research patient enrollment study lasts > 18 mo	5	11.8	59
NPSUP	Supervising a nurse practitioner per clinical visit	100	1.6	160.00

CPT4, Current Procedural Terminology, 4th Edition.

[†]The sample count is based on academic physician/surgeon working a mid-size program (50-100 transplants per year).

TABLE 3 Definition, rationale, and data source for customized relative value unit (cRVU) for a transplant surgeon, customized relative value unit (cRVU)

CPT4 codes	CPT4 description activity	RVU ^a	RVU rationale	Sample data source
32 850	Donor pneumonectomy, including cold preservation, lung procurement research only	2.81	Based on \$160 payment, 160/\$55.16 per wRVU	Fee ticket
33 940	Donor cardiectomy, including cold preservation, heart procurement research only	2.81	Based on \$160 payment, 160/\$55.16 per wRVU	Fee ticket
44 132	Donor enterectomy, including cold preservation, intestine procurement research only	2.81	Based on \$160 payment, 160/\$55.16 per wRVU	Fee ticket
47 133	Donor hepatectomy, including cold preservation, liver procurement	79.22	Based on \$4370 payment, 4370/\$55.16 per wRVU	Fee ticket
48 550	Donor pancreatectomy, including cold preservation, pancreas procurement (with or without duodenal segment)	30.09	Based on \$1660 payment, 1660/\$55.16 per wRVU	Fee ticket
50 300	Donor nephrectomy, including cold preservation, kidney procurement (unilateral or bilateral)	22.66	Based on \$1250 payment, 1250/\$55.16 per wRVU	Fee ticket
S2900	Robotic-assisted surgery	30% of wRVU	Credit for additional time (average 2 h) and complexity associated with robotic surgery	EMR
Mnemonic				
DRYRU	Surgeons travel for organ procurement but no organs recovered (dry-run)	11.33	Based on \$625 payment, 625/\$55.16 per wRVU	Fee ticket

CPT4, Current Procedural Terminology, 4th Edition; EMR, electronic medical records.

^aRVUs assigned to the CPT codes to capture work effort.

TABLE 4 Sample calculation for a transplant surgeon's customized relative value unit (cRVU), not included in a benchmark for salary or work RVUs per month

CPT4 codes and mnemonic	Description of the activity	Sample count ^a	cRVU (per count)	cRVU total (count × cRVU)
32 850	Lung procurement	6	32.00	192.00
33 940	Heart procurement	6	22.00	132.00
47 133	Liver procurement	6	79.22	475.32
48 550	Pancreas procurement	6	30.09	180.54
50 300	Kidney procurement	6	22.66	135.96
S2900	Robotic-assisted surgery	6	30% of wRVU value	
DRYRU	Travel- Dry run	6	11.33	67.98

CPT4, Current Procedural Terminology, 4th Edition

^aThe sample count is based on the average number for an academic physician/surgeon working in a mid-size program (50-100 transplants per year).

OVU metrics are easy to tailor to ever-changing delivery and payment models and can facilitate meeting the needs of individual organizations. The separation of cRVUs and OVUs from wRVUs can also avoid the possible unintended effects of reweighing RVUs to compensate for distorted RVUs. Potential disadvantages to cRVU and OVU constructs include introducing incentives for nonpatient care activities that can lead to fewer patient care activities being performed at transplant centers. In addition, the new RVU metrics require more administrative effort among physicians/surgeons and center management to generate granular reporting and tracking of RVUs, a potential burden in an already documentation-heavy work environment.

3.1 | Creating Crvus

Designing cRVUs requires identification of what work activity is not captured in the current wRVU system. Examples of cRVUs involve: (1) for a transplant physician/surgeon (Tables 1 and 2) including teaching activities (lecturing/mentoring fellows, residents, and medical students), excess on-call (higher than 5 days per month), co-authoring abstract and manuscript and/or book chapter writing, marketing and outreach visits, satellite start up and coverage, virtual (provider-patient interactions that occur via e-mail or through a web-based portal) and/or telemedicine (store-and-forward, remote patient monitoring, real-time online

Mnemonic	Description of the activity	Sample count ^b	cRVU (per Count)	cRVU total (Count × cRVU)
Eval	Pretransplant evaluations, waitlist management, and pretransplant annual visits	40	3.2	128
POOLT or POKT	Posttransplant follow-up visits management	100	1.6	160

^aThese services include a chart review, following up on patients' test results, calling patients and meeting with their families, peer-to-peer review, literature search, preprocedure preparation, preauthorization, coordination of care, updating referring physicians, curbside consulting to peers and referring doctors and patient satisfaction.

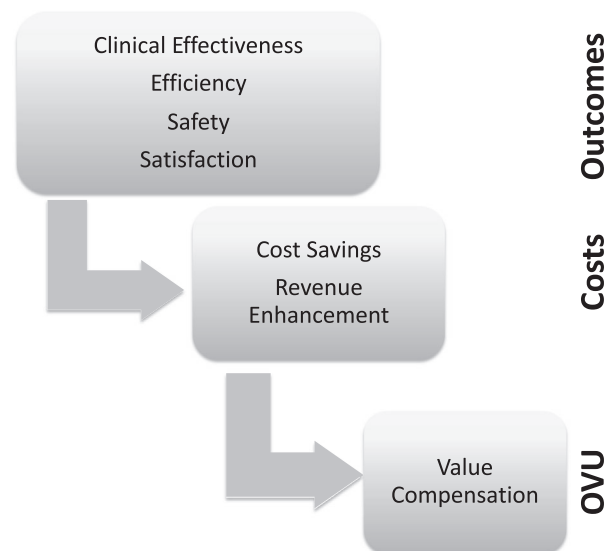
^bThe sample counts are based on monthly average numbers for an academic physician/surgeon working in a mid-size program (50-100 transplants per year).

encounter), being a principal or subinvestigator of a research study, patient identification/enrollment for research study, and supervising physician assistants and nurse practitioners; (2) for a transplant surgeon (Tables 3 and 4) comprising organ procurement, dry-runs, and utilization of robotic procedures; (3) non-face-to-face prolonged services (crediting for patient complexity during pre- and posttransplant phases) before and/or after direct patient care (Table 5) covering chart review, following up on patients' test results, calling patients and meeting with their families, peer-to-peer review, literature search, preprocedure preparation, preauthorization, coordination of care, updating referring physicians, and patient satisfaction. Each transplant center will incorporate different cRVUs into their physician/surgeon compensation to acknowledge the value of these essential cognitive clinical works depending on their institutions' goals and needs. Then, these cRVUs are converted to compensation at a rate according to fair market

value. The cRVU payment is based on direct patient care, on-call hourly or daily rates, or medical/surgical director hourly rates.

The cRVUs are given mnemonics to match the billing mnemonics used by the provider billing system, in our case Epic (<https://www.epic.com>). These cRVU mnemonics and values are added to the billing system for capturing the RVU activity (both wRVU and cRVU) into one comprehensive report that can be reviewed quarterly. Implementing the cRVUs requires training of the physicians/surgeons and billers. Any activity that does not get automatically generated from the electronic medical record (EMR) or billing system requires the physician/surgeon to document the activity and the billers to enter it into the billing system like any patient charge. Mandatory documentation for cRVUs includes fee ticket, EMR/registration, provider-billing system, call schedule, satellite schedule, manuscript and publications titles, and revenue payments not attached to wRVUs. The physician/surgeon needs only to complete

TABLE 5 Sample customized relative value units (cRVU) for non-face-to-face prolonged services to credit for patient complexity (the part not captured with work relative value units -wRVUs) during pre and posttransplant phase^a



Example I	Example II
Initiation of Tacrolimus 24 hours post op with no delay in discharge to achieve therapeutic dosage	Standardize blood product use for correction of PTT based on TEG for high risk procedures performed on liver transplant patients on waitlist
Cost savings due to no discharge in delay	Cost savings due to elimination or reduction in blood product
Award Amount based on achieving both metrics: <ul style="list-style-type: none"> 65-75% post-op within 24 hour initiation and no delay in discharge \$1000 75-90 % post-op within 24 hour initiation and no delay in discharge \$2500 90-100% post-op within 24 hour initiation and no delay in discharge \$4,000 	Award Amount based on achieving both metrics: <ul style="list-style-type: none"> 30-50% compliance to protocol \$1000 50-70% compliance to protocol \$2500 70-100% compliance to protocol \$5,000

FIGURE 1 Example of an outcome value unit (OVU) construction

TABLE 6 Examples for outcome-value units (OVU) payments

Key indicator kidney/liver transplant surgery (inpatient transplant surgery admission)	Source	Award amount transplant group ^a
1. Initiation of tacrolimus within 24 h postoperative period with no delay in discharge to achieve tacrolimus therapeutic levels	Electronic medical record	<ul style="list-style-type: none"> • 65% 24-hour initiation of tacrolimus and no delay in discharge \$1,000 or 27.78 OVU • 75% 24-hour initiation of tacrolimus and no delay in discharge \$2,500 or 69.45 OVU • ≥90% 24-hour initiation of tacrolimus and no delay in discharge \$4,000 or 111.11 OVU
Key indicator liver transplant patients wait list management	Source	Award amount transplant group
1. Education of emergency room, catheter lab, and interventional radiology staff regarding new protocol for correcting platelet function and coagulation disorders based on thromboelastography (TEG) analysis for high-risk procedures	Sign-in sheet	100% education to receive any award amount
2. Standardize blood product use based on TEG for high-risk procedures performed on liver transplant patients on waitlist.	Electronic Medical Record	<ul style="list-style-type: none"> • 30% compliance to protocol \$1000 or 27.78 OVU • 50% compliance to protocol \$2500 or 69.45 OVU • ≥70% compliance to protocol \$5000 or 138.89 OVU

^aOne OVU generates \$35.9996 based on the Medicare Physician Fee Schedule (MPFS).

the fee ticket, with support staff obtaining the rest of the documentation. Tables 1 and 3 show a detailed definition and rationale of cRVUs assigned to the nonbillable activities. Compensation for the cRVUs is based on the fair market value for median physician/surgeon salaries and CMS Medical/Surgical Director Reasonable Compensation Equivalent (RCE).^{6,10}

3.2 | Creating Ovus

CMS implemented the population health management models with Accountable Care Organizations (ACOs) that share financial savings and financial risks. ACOs contract with members, which include transplant physicians/surgeons, to directly impact activities most important to quality in patients they serve. OVUs are created to provide a methodology to define performance improvement targets, established and updated annually, to engage the transplant physician and surgeon in the ACO's shared savings or revenue enhancement activities while addressing meaningful outcomes outside the typical

payer incentives (Figure 1 and Table 6). OVUs can be considered in two main categories: (1) outcomes metrics: clinical effectiveness (patient/graft survival rates as expected or above the average, organ acceptance rate as expected or above the average, decreased blood product utilization, less in-patient dialysis use, hepatitis C screening and treatment, cancer surveillance protocol adherence), safety (high-risk organ utilization rate, waitlist mortality rate, etc), and patient satisfaction (such as Press Ganey surveys); (2) costs metrics including throughput efficiency (decreased length of stay, adherence to care bundles >90%, and clinical pathways such as delayed graft function utilization of services management) (revenue enhancement), timely radiological procedures (cost avoidance), living donor robotic procedure costs (cost savings), operating room time (cost-saving), and overall cost per unit of care (transplant hospitalization cost to global reimbursement ratio calculated for individual patients taking into consideration payer and patient complexity). The two results of improved outcomes and financial benefit are always tied together. Real-practice examples are provided in Figure 1 and Table 6.

TABLE 7 Sample^a for a new annual compensation model for a transplant nephrologist

	Compensation components	Sample number of units	Compensation (% of total compensation)
	Base salary ^a		\$180 000 (49.2)
	Clinical productivity (any wRVU billed above 3500/y)	wRVUs ^b 500	\$17 910 (4.9)
	Nonbillable work	cRVU ^c 1200	\$67 200 (18.4)
	Value based work	OVU ^b 800	\$28 800 (7.9)
	Medical directorship fee	Hourly compensation (\$180/h) 400	\$72 000 (19.7)
	Total compensation		\$365 910 (100)

^aThe sample counts are based on average numbers for an academic physician/surgeon working in a mid-size program (50-100 transplants per year).

^bOne wRVU or OVU generates \$35.9996 based on 2018 Medicare Physician Fee Schedule (MPFS) conversion factor.

^cOne cRVU generates \$56.0 based on fair market value.

TABLE 8 Kidney, simultaneous kidney-pancreas and kidney-liver service line analysis and their corresponding International Classification of Disease–10th Revision-Clinical Modification (ICD-10-CM) codes

Definitions	
Phase and codes	Data location
Pretransplant/evaluation services	
Kidney transplant acquisition salaries, benefits, medical director fees, operating costs	Cost Center (CC) Organ Acquisition Center (OAC)
Pancreas transplant acquisition salaries, benefits, medical director fees, operating costs	CC OAC
Exclude organ costs	Organ costs are pulled out of CC's and added to inpatient case costs
Pretransplant evaluation/ Waitlist management - Outpatient revenue and direct and indirect expenses	Patient accounts
	The fiscal year (FY) Evaluated patient list and waitlist patient names from Transplant EMR (EPIC Phoenix). All testing is done for FY
Living Donor workup revenue and direct and indirect expenses	Z00.5 and FY patient names from Transplant electronic medical record (EMR)
Pretransplant Human Leukocyte Antigen (HLA) lab revenue and direct expenses	FY Evaluated patient list and waitlist patient names from Transplant EMR. All testing is done for FY
HLA outside revenue and direct expenses	CC Revenue
Total Pretransplant	
Inpatient Phase (transplant event)	
Deceased Donor Kidney Transplant episode (hospital transplant event)	MS-DRG: 652 Kidney
Living Donor Kidney Transplant episode (hospital transplant event)	MS-DRG: 652 Kidney
Kidney-Pancreas Deceased Donor Transplant episode (hospital transplant event)	MS-DRG: 008 SPK (simultaneous kidney-pancreas), 010 Pancreas alone
Living Donor nephrectomy	Expenses under donor/recipient name.
Simultaneous Kidney/ Liver (L/K) Transplant episode (hospital transplant event)	MS-DRG: 005 Liver transplant with major complicating comorbidities (MCC). Medicare only recognizes the liver but pays for both organs in OAC
	Transplant Patient List from Transplant EMR

(Continues)

TABLE 8 (Continued)

Definitions	
Phase and codes	Data location
Inpatient Revenue	Patient accounts
Medicare Reimbursement	Obtain revenue from Cost Report Department
Organ Costs	Pull out organ costs from Transplant Department CCs
Inpatient Care Direct Expenses	Exclude entire organ acquisition charge on all recipient patient accounts as all expenses in organ costs or in transplant cost centers
Indirect Expenses	Formula provided by finance/expense allocation
Total Inpatient Phase (transplant event)	
Posttransplant	
Outpatient Post Transplant Follow up Revenue and Direct and Indirect expenses	Patient Accounts
	FY Post transplant patient list from Transplant EMR
	Diagnosis codes
T86.10	Unspecified complication of kidney transplant
T86.11	Kidney transplant rejection
T86.12	Kidney transplant failure
T86.13	Kidney transplant infection
T86.19	Other complications of Kidney transplant
Z49.83	Pancreas transplant status
Z94.0	Kidney transplant status
Z52.4	Kidney donor status
Inpatient Post Transplant Readmissions Revenue and direct and indirect expenses	Patient Accounts
	FY Posttransplant readmission patient list from Transplant EMR
T86.11	Kidney transplant rejection
T86.12	Kidney transplant failure
T86.13	Kidney transplant infection
T86.19	Other complications of Kidney transplant
T86.899	Complications pancreas transplant
	FY Posttransplant readmission patient list from Transplant EMR
Z49.83	Pancreas transplant status
Z94.0	Kidney transplant status
Z52.4	Kidney donor status
Total Post Transplant	

(Continues)

TABLE 8 (Continued)

Definitions	
Phase and codes	Data location
Transplant Surgeon non Transplant Cases	
Inpatient and outpatient non transplant surgical cases revenue and direct and indirect expenses	Patient Accounts
	Surgeon IDs or names
Total Transplant Surgeon non Transplant Cases	
Non-acquisition expenses	
All direct expenses hitting this cost center including physician practice subsidy expenses for transplant work and global contracting distribution gain/loss	Transplant non-acquisition CCs capture marketing and physician subsidy expenses. Subsidy expense written off monthly to CCs includes contracting gain/loss
Total Non-Acquisition Expenses	
Total Kidney Transplant Service Line	

CC, Cost center; EMR, electronic medical records; FY, Fiscal year; HLA, Human Leukocyte Antigen; ICD-10-CM, International Classification of Disease–10th Revision–Clinical Modification; K/L, Kidney/ Liver; MCC, Major complicating comorbidities; MS-DRG, Medicare Severity Diagnosis Related Group; OAC, Organ Acquisition Cost Center.

These outcome/value changes, once implemented, are expected to be sustainable, but can recur as targets if critical to a transplant program's success. OVU-related compensation can be arbitrarily allocated among outcomes and cost-saving metrics ranging from 50/50 to 80/20 percentage ratio depending on transplant center preference. The OVUs can be kept separate for payment or, if implementing the pure RVU model, they may be added to the total RVUs that determine physician/surgeon compensation.

4 | INCORPORATING CRVUS AND OVUS INTO A TRANSPLANT PHYSICIAN/SURGEON COMPENSATION MODEL

Our new compensation model (Table 7) is composed of four parts: (1) clinical productivity (wRVUs) generated by billing for providing patient care service and categorized in transplant service line analysis according to phases of the transplantation (see Tables 8 and 9 for sample service line definitions for identifying how to capture all revenue associated with a service line); (2) nonbillable work (cRVUs, summarized in Tables 1-5); (3) value-based work (OVUs) originating from achieving outcomes and cost-saving metrics; and (4) medical and surgical directorship fee, hourly compensation per CMS Medical Director Reasonable Compensation Equivalent (RCE) and fair market value. Overall, total compensation generally encompasses wRVUs

(50%-55%), cRVUs (10%-20%), OVUs (7%-10%), and directorship fee (15%-20%) if in a leadership role.

Funding for the proposed compensation model (transplant physicians/surgeons' nonbillable and value-based work) can originate from a shared revenue pool/group withhold (there can be many variations of how these are implemented ranging from the use of seed grants to settlement at the end of current year or next year), service line shared revenue when the health system owns all ancillaries, value-added/cost elimination, revenue enhancement, quality payment sharing, and mission-driven endowments.

Specific funding considerations include the following.

(1) As organizations embrace value-based care models, there will be more opportunities to fund payment adjustments according to cRVUs and OVUs. For example, the expected success of the ACO model and cost savings brought by it can be a catalyst for the rearrangement of physician/surgeon compensation for a variety of specialties, including transplant.¹¹ In an ACO setting, reductions in costs (as a result of related OVU incentives) can generate revenue to the ACO for shared savings between the center/hospital and physicians/surgeons under the ACO Medicare Shared Savings Program's leniency of Stark restrictions.

(2) Improvements in transplant outcomes/quality can lead to more referrals, a higher volume, and better contract terms with payers, in the long run, generating additional revenue.

(3) Specific contractual agreements with private payers (eg, under global contracts) to support alternative funding, have been applied already with some success.¹²⁻¹⁴

(4) Finally, transplant is among the few areas within a hospital that continues to receive cost-based reimbursement concerning the ratio of acquisition of organs for transplant to Medicare beneficiaries.¹⁵ Therefore, hospitals already receive compensation for some, but not all, of the activities we list in our tables as part of cRVU (eg, pretransplant patient evaluation). Such payments to hospitals may further facilitate the implementation of customized RVUs, particularly for specific measures that are captured by Medicare cost reports.

The proposed systematic framework in this article is a possible first step for transplant centers in accounting for nonbillable work and promoting value, although partly implemented in other forms. Many centers have adopted different methods for calculating nonbillable time. Our proposed system has advantages as it uses mnemonics entered into the billing system or uses already created existing CPT codes to capture all the data in one place, which is the billing system. It minimizes the need for additional documentation, as it uses data already being captured for most work and is objective. It is not developed for replacing but instead developed for enhancing a system already in place. The concepts can be adapted to fit any institution where gaps may exist in capturing time.

Our newly introduced RVU metrics constitute a balanced approach by capturing the teamwork implicit in transplantation while also recognizing individual productivity.² Transplant centers can further customize the proposed cRVU or OVU metrics in parallel to their mission/vision and they can reweigh each aspect to fit different priorities. When implementing our framework, a transplant

TABLE 9 Liver transplant service line analysis and their corresponding International Classification of Disease-10th Revision-Clinical Modification (ICD-10-CM) codes

Definitions	
Phase and codes	Data location
Pretransplant/evaluation services	
Liver Transplant Acquisition Salaries, benefits, Medical Director fees, operating costs	Cost Center (CC) Organ Acquisition Center (OAC)
Exclude organ costs	Organ costs are pulled out of OAC CC and added to inpatient care costs
Pretransplant Evaluation/Waitlist Management - Inpatient and Outpatient Revenue and direct and indirect expenses	Patient Accounts
	Fiscal Year (FY) Evaluated patients list and waitlist patient names from Transplant Department electronic medical record (EMR)
All inpatients admitted by transplant hepatologists revenue and direct and indirect expenses	Patient Accounts/ Hepatologist IDs or names
	Inpatient and Outpatient Hepatology list provided by the Transplant Department
	Diagnosis codes
	Exclude Surgeons and transplant cases
Pretransplant Management IP/OP (Hospitalists)	Inpatient and Outpatient Hepatology list provided by the Transplant Department
All inpatients referred for admission and clinically managed by hepatologists but admitted by hospitalists/internists	Diagnosis codes
	Exclude Surgeons and transplant cases
Total Pretransplant/Evaluation Services	
Inpatient Phase Transplant Event	
Liver Transplant episode (hospital transplant event)	Medicare Severity Diagnosis Related Group (MS-DRG) 05 Liver Transplant with major complicating comorbidities (MCC) and DRG 06 Liver transplant without MCC. Transplant Patient List from Transplant EMR (EPIC Phoenix)
Inpatient Revenue	Patient Accounts
Medicare Reimbursement	Obtain revenue from Cost Report department

(Continues)

TABLE 9 (Continued)

Definitions	
Phase and codes	Data location
Organ costs	Pull out organ costs from transplant dept CC or where organ costs are paid
Inpatient Care Direct Expenses	Exclude entire organ acquisition charge on all recipient patient accounts as all expenses in organ costs or transplant department CC
Indirect Expenses	Formula provided by finance/expense allocation
Inpatient Phase Kidney Liver Transplant Event	
Liver Transplant episode (hospital transplant event)	MS-DRG 05 Liver Transplant with MCC and DRG 06 Liver transplant without MCC.
Kidney Liver transplant episode	MS-DRG 05 Liver Transplant with MCC
	Transplant Patient List from transplant department EMR (EPIC Phoenix)
Inpatient Revenue	Patient Accounts
Medicare Reimbursement	Obtain revenue from Cost Report department
Organ costs	Pull out organ costs from transplant department CC or where organ costs are paid
Inpatient Care Direct Expenses	Exclude entire organ acquisition charge on all recipient patient accounts as all expenses in organ costs or transplant department CC
Indirect Expenses	The formula provided by finance/expense allocation
Total Inpatient Phase/Transplant Event	
Posttransplant	
Posttransplant Outpatient Revenue and direct and indirect expenses	Patient Accounts
Posttransplant Inpatient Revenue and direct and indirect expenses	Patient Accounts
	FY Post transplant patient list from transplant dept. EMR
	Diagnosis codes
T86.40	Unspecified complication of liver transplant
T86.41	Liver transplant rejection
T86.42	Liver transplant failure
T86.43	Liver transplant infection
T86.49	Other complications of liver transplant

(Continues)

TABLE 9 (Continued)

Definitions	
Phase and codes	Data location
Z09, Z48.298, Z48.23, Z94.4	Post liver Fu
Z94.4	Liver transplant status
Total Post Transplant	
Downstream Liver Disease or Liver Transplant Management. Out or Inpatient and outpatient primary surgeon cases	
Other system hospitals and facilities outpatient revenue and direct and indirect expenses	Patient Accounts
	Outpatient Hepatology list provided by Transplant Department
	Diagnosis codes
	Include Surgeons and transplant cases
Other system hospitals inpatient and outpatient surgical cases performed by Transplant Surgeons	Surgeon IDS assigned by the hospital or by name
Total Downstream	
Transplant Surgeon non-Transplant Cases	
Inpatient and Outpatient non transplant surgical cases revenue and direct and indirect expenses	Patient Accounts
	Surgeon IDS assigned by the hospital or by name
	Exclude liver transplant inpatient and outpatient cases
Total Downstream	
Liver Program Administration	
All expenses are hitting transplant department CCs, including physician practice expenses. Global Contracting gain/loss distribution is also included	CC marketing and Transplant Physician Practice subsidy expenses. Expense is written off monthly to CC. consists of the Global contracting gain/loss revenue
Total Liver Program Administration	
Outpatient/Specialty Pharmacy Revenue	
Medication Therapy Management Clinic Revenue and Direct Expenses related to Hepatitis C other Liver Disease Management Patients and Transplant Medications	CCs
Salary and Drug Direct Expenses related to transplant hospital management referrals	Transplant Surgeons, Transplant Hepatologists and Transplant ID ordering physicians

(Continues)

center using salary with bonuses can set expectations (ie, a cap based on RVU metrics) and provide extra compensation to physicians/surgeons beyond those expectations or based on OVUs (see

TABLE 9 (Continued)

Definitions	
Phase and codes	Data location
Total Outpatient/Specialty Pharmacy Revenue	
Total Liver Transplant Service Line	

CC, Cost center; EMR, electronic medical records; FY, Fiscal year; ICD-10-CM, International Classification of Disease-10th Revision-Clinical Modification; HLA, Human Leukocyte Antigen; K/L, Kidney/Liver; MCC, Major complicating comorbidities; MS-DRG, Medicare Severity Diagnosis Related Group; OAC, Organ Acquisition Cost Center.

Table 7).¹⁶ The highly dynamic nature of transplant and changing payment landscape may require changes in how wRVUs, cRVUs, and OVUs are weighed in the overall physician/surgeon compensation and how they are is modified over time. Moreover, adjustments can be made to meet the needs of individual institutions, academic or otherwise.

As noted earlier, the adoption of new RVU metrics will require additional reporting. Expert panels can assign RVU values using a transparent process while administrators can randomly audit. Some of the activities represented by cRVUs are already traced. In particular, organ offers can be tracked down through the UNet/DonorNet (powered with advanced data analytics) and the increased use of electronic medical records (specifically for organs accepted for a patient) that could automatically capture needed information. Time studies for physicians/surgeons may also be of benefit and could be utilized to lessen the reporting burden.

Physician compensation is a topic of high importance because it determines the ability of each center to retain talent and recruit new team members. From the surgical perspective, there is a great amount of nonbillable work that is not compensated in a fee-for-service model. In this article, we present a formula that allows physicians to document most of the nonbillable work. Creating these categories and making compensation not dependent on wRVUs only would positively affect physician satisfaction and overall morale. For example, if a physician is out in the community marketing the transplant program, they can document this time as work and be compensated for their time. Another aspect is the ability to expand the transplant program services for cutting-edge technologies that can enhance its marketability. In the surgeon's case, the adoption of robotic donor nephrectomies, for example, is a way of adding value to the program but requires additional training and processes that are not captured by the wRVUs.

In conclusion, transplantation can be a leader in further development of value-based population management payment structures. Utilizing currently available data and norms, it is possible to augment wRVUs with additional metrics of nonclinical work of critical importance to patients and providers alike. Our proposed new transplant physician and surgeon compensation model can (1) provide a detailed and auditable record of nonbillable work; (2) align incentives and goals for physician/surgeon and transplant

center; (3) increase physician/surgeon satisfaction; and, ultimately (4) prioritize quality, not just quantity.

DISCLOSURE

The authors of this manuscript have no conflicts of interest to disclose as described by the *American Journal of Transplantation*.

DATA AVAILABILITY STATEMENT

Data sharing is not applicable to this article as no new data were created or analyzed in this study.

ORCID

Mehmet U. S. Ayvaci  <https://orcid.org/0000-0001-6997-1639>

Bekir Tanriover  <https://orcid.org/0000-0002-2378-9302>

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