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REVIEW

A Transplant-Inclusive Value-Based Kidney Care Payment Model

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In the United States, kidney care payment models are migrating toward value-based care (VBC) models incentivizing quality of care at lower cost. Current kidney VBC models will continue through 2026. We propose a future transplant-inclusive VBC (TIVBC) model designed to supplement current models focusing on patients with advanced chronic kidney disease (CKD) and end-stage kidney disease (ESKD). The proposed TIVBC is structured as an episode-of-care model with risk-based reimbursement for "referral/evaluation/waitlisting" (REW, referencing kidney transplantation), "primary hospitalization to 180 days posttransplant," and "long-term graft survival." Challenges around organ acquisition costs, adjustments to quality metrics, and potential criticisms of the proposed model are discussed. We propose next steps in risk-adjustment and cost-prediction to develop as an end-to-end, TIVBC model.

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In the United States, kidney disease care has made a steady march away from fee-for-service medical care, with deemphasis on volume of services toward a VBC payment model emphasizing quality care at lower cost. A recent study of "bundled" prospective payment systems for ESKD-focused drugs showed that quality endpoints are achievable at lower cost.[1] The Comprehensive ESRD Care program implemented by the Center for Medicare and Medicaid Innovation, which incentivized nephrology practices and dialysis providers to partner in reducing total cost of care expenditures for patients with ESKD, resulted in ∼$200 million in cumulative savings over a 5-year period ending in 2020, though savings were offset by shared-saving payments to providers in the program.[2]

In Supplementary Appendix S1, we present an overview of current Medicare-based nephrology-focused payment models. The ESRD Treatment Choices (ETC; a mandatory VBC payment model applied to nephrology practices and dialysis providers) model benchmarks nephrology practices and dialysis providers located in specific hospital referral regions against a "Modality Performance Score," a composite quality scoring system calculated through a combination of a "home dialysis rate" and a "transplant rate," which can be achieved either by meeting an absolute threshold rate, or an incremental improvement rate over time.[3] Nephrologists and dialysis providers receive financial bonuses or penalties based on threshold or improvement achievements measured in 1-year intervals with penalties designed to accrue net cost-savings. The Kidney Care Choices (KCC) models serve as the "umbrella" for several voluntary VBC payment models administered as part of the Advancing American Kidney Health Initiative. The KCC models incentivize increasing the number of patients starting dialysis with a permanent dialysis access, improving patient-focused quality measures regarding "patient activation" and depression, and increasing the number of patients with 1-year, 2-years, and 3-years death uncensored transplant allograft survival.[4] Both models continue through 2026.

An "episodes-of-care" payment model inclusive of transplantation (Figure 1) is a natural extension of nephrology-focused VBC, extending the goals of the Advancing American Kidney Health Initiative.[5] Although only the first year of data from the ETC model is available for public assessment, to date the ETC model has not demonstrated significant changes in rates of kidney transplants nor waitlisting,[6] suggesting the need for payment models with more ambitious transplant-access focused targets. We propose

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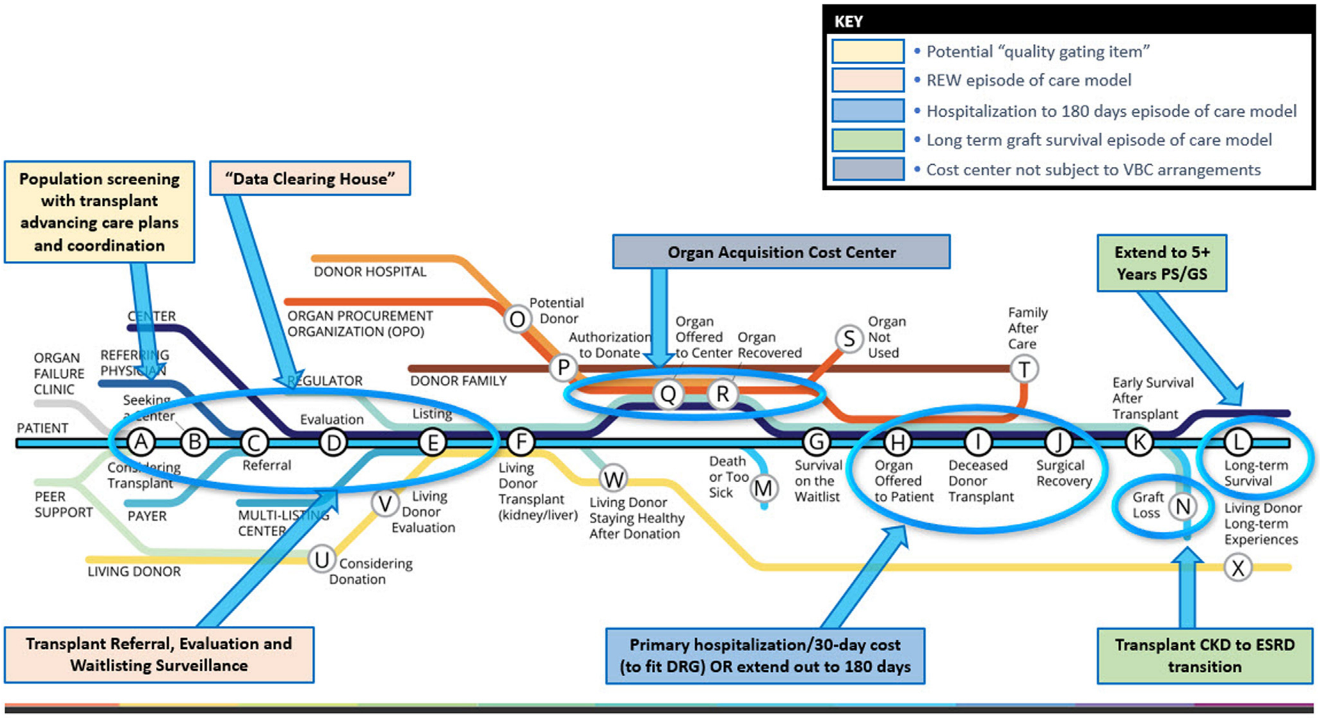

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Figure 1. A transplant-inclusive episodes-of-care payment model. CKD, chronic kidney disease; DRG, diagnosis-related group; ESRD, end-stage renal disease; PS/GS, patient survival/graft survival; REW, referral/evaluation/waitlisting; VBC, value-based care.

expanding the current ETC and KCC models into a new TIVBC model for patients with advanced CKD, ESKD, and kidney transplantation. Considering that the challenges of "siloed" care for patients with CKD, ESKD, and kidney transplants is a global challenge,[7] a successful end-to-end payment model in the United States may be useful to clinicians and health systems globally.

Proposal: An End-to-End TIVBC Model

Key Principles for a TIVBC Model

Patient-Focused Ends. Key principles for an end-to-end VBC model, which includes late-stage CKD, ESKD, and kidney transplantation are outlined in Table 1. Foremost, a TIVBC must include incentives which serve patient-focused ends. Kidney transplantation typically confers a longer quantity and better quality of life compared to other renal replacement modalities for many patients with advanced CKD and ESKD. Transplantation earlier in the kidney disease process has prognostic advantages compared to any exposure to dialysis.[8] The benefit of early transplantation is commensurate with a recent survey of 605 patients waiting for a kidney transplant, focused on trade-off preferences between kidney quality and waiting time. In that study, a majority (61%) of respondents explicitly preferred shorter waiting times even at the expense of kidney quality.[9]

A TIVBC should advance health equity as outlined in the "Strategic Refresh" announced by the Center for Medicare and Medicaid Innovation in November 2022,[10] by meliorating the long-standing inequities in access to transplantation for underserved populations.[11] This requires recognizing and responding to the multiple root

Table 1. The "Guardrails" – key principles for a transplant-inclusive value-based care model

Patient-focused ends:
1. Getting *more* patients successfully transplanted *earlier* in the kidney disease process
2. *Alleviating health inequities* in access to transplantation
3. Prioritize *transparency* and *shared decision making* in organ acceptance decision making
4. Maximize the utilization of donated organs by reducing the organ discard rate
5. Focus on longer-term (i.e., > 5-year) graft survival and optimal starts (or conservative management) for patients with advanced CKD in a transplant
Risk arrangements that benefit transplant centers:
1. Allow transplant centers to partner with larger, better capitalized entities to take on downside financial risk in exchange for opportunity to realize upside financial benefits
2. Allow stakeholders in a risk-bearing entity to take on different amounts of downside financial risk
3.Consciously avoid disincentives to listing/transplanting higher-risk candidates and accepting/utilizing higher risk organs by piloting carve-outs from the risk model and judicious use of risk-adjustment variables
Risk arrangements that benefit payors and society:
1. Achieving objectively benchmarked quality outcomes while reducing total health care expenditures
2. Encouraging use of anti-Kickback Law safe harbors as a component of value-based care arrangements to fund and operate care coordination service offerings to address social determinants of health barriers in access to transplantation

CKD, chronic kidney disease.

causes, across the CKD-ESKD continuum, of inequitable transplant access for disadvantaged populations.[12]

Opportunities for improving transplant evaluation and waitlisting practices abound. Young candidates (aged <40 years) without reported comorbidities continue to endure disparities in access to waitlisting, a finding exaggerated among marginalized populations.[13] A study of transplant centers in the Southeastern United States from 2015 to 2019 showed that only 50% of patients referred for transplant initiated an evaluation within 24 months of referral, and of those who initiated an evaluation, only 30% were waitlisted (either active or inactive) within 12 months of starting the evaluation.[14] The reasons for this substantial attrition between patients referred, evaluated, and ultimately waitlisted is unclear, but suggests ample opportunities to understand and improve prewaitlisting care coordination and post-waitlist management. Of patients waitlisted for kidney or kidney-pancreas transplant, 47.3% are "inactive," and thus ineligible for organ offers.[15] TIVBC models are uniquely well-situated to foster alignment of quality metrics and incentives to support multiple interventions across the patient journey, rather than hoping a single discrete intervention will alleviate durable inequalities. For example, our proposed TIVBC model would incentivize dedicated care coordination interventions after referral to reduce the likelihood of attrition due to missed appointments for evaluation testing or multidisciplinary evaluation, as well as more robust postwaitlist surveillance and management, to ensure waitlisted patients can maintain their active status by having updated testing; or if they develop a remediable contraindication to active listing, that issue is proactively and efficiently addressed and resolved.

Finally, a TIVBC should incentivize not only improved access to transplantation, but improved allograft longevity and the safe return of patients with a failing graft back to dialysis. Although 3-year graft survival may be sufficient for candidates facing <3 years of estimated lifespan on dialysis, for most patients, a benchmark of 5-year graft survival or longer is more appropriate. A 5-year time horizon for quality benchmarks is a timeframe where the cost-effectiveness of transplant compared to dialysis can be realized, as shown when comparing 10-year outcomes of transplant versus dialysis approaches break-even.[16] Implementing a more liberal organ and candidate acceptance may result in worse short-term and medium-term outcomes; however, this reality can be balanced with a version of the "optimal restart" metric for patients with a failing allograft.[17] The TIVBC model could reward rates of preemptive retransplantation, initiation of outpatient dialysis with a permanent access, or home therapy penetrance.

Risk Arrangements That Benefit Transplant Centers. Until recently, the regulatory milieu of kidney transplantation in the United States was one which encouraged significant risk aversion as noted by a persistently high organ discard rate.[18,19] Recent kidney discard rates have increased from a previous baseline of about 20%, up to 29% by the end of 2021 despite some recent policy changes to enhance organ acceptance rates.[20] Current regulatory and financial incentives for transplant centers makes it easier to discard than to accept organs offered for transplantation. Any TIVBC model should align incentives which favor more aggressive acceptance of higher risk organs and recipients, with the clear understanding that this change is likely to come at the expense of observed and expected patient and graft survival.

Risk Arrangements That Benefit Payors and Society. A challenge for any TIVBC which benefits payors and society is setting benchmarks which captures desired quality metrics, adjusts for donor and candidate risk factors, and accurately estimate costs. A benchmark which fails to capture and balance all 3 is highly likely to encourage risk averse behaviors. Prior experience with a narrow focus on 1-year patient and graft survival outcomes resulted in reduced transplant rates, more waitlist removals,[18] and increased discard rate for kidneys from donors with a high Kidney Donor Profile Index .[21] We still lack the means of combining administrative claims data and clinical data that reliably and reproducibly account for transplant-related expenditures,[22] proof that benchmarking expected expenditures are insufficient today. Given recent reports of inconsistent comorbidity coding behaviors at of transplant centers[23] as well as a historically incomplete source data reporting of posttransplant mortality in the Scientific Registry of Transplant Recipients data set,[24] establishing uniform standards of coding, reporting, aggregating, and analyzing data for the purposes of appropriate and uniform standards for risk adjustment and historic cost benchmarking will be a crucial task for the Center for Medicare and Medicaid Innovation to undertake in advance of implementing TIVBC models.

Payment: Framing TIVBC as an Episodes-of-Care Rather Than a Total Costs of Care Model

A challenge of viewing TIVBC models through the lens of reducing total expenditures becomes clear when considering the entire "ecosystem" of the transplant process (Figure 1). However, the key policy goals of increasing access to transplantation will require additional resources. Increasing deceased donor organs will require increasing procurement and acceptance rates from higher risk donors. Kidneys from higher risk donors, combined with new allocation policies requiring broader "geographic" sharing of kidneys entails higher costs in the form of logistics, tracking, and transportation,[25] as well as additional exposure of organs to cold ischemia time.[20] Novel organ preservation technologies may be required to achieve a higher procurement and transplant rate, while reducing or attenuating delayed graft function (DGF). The salient goals of a TIVBC program is to improve patient access and patient outcomes while reducing expenditures, without depriving transplant centers of key financial resources needed to successfully place and transplant donated kidneys. To this end, we propose to frame a TIVBC proposal as an episodes-of-care model rather than a total-cost-of-care model, on the hypothesis that certain cost centers (e.g., organ preservation, logistics, and transportation) may not be helpful targets for reducing total expenditures.

REW Episode of Care

We propose a triage system (Table 2) prioritizing the referral, evaluation, and waitlisting of patients who are likely to be transplanted the soonest, thereby introducing efficiencies into the REW workflow. Most patients triaged will undergo transplant evaluation and testing only once in their waitlisting tenure, eliminating the need, operational burdens, and costs of periodic retesting and reevaluations over years. Evaluation and testing in the new system is more likely to be current relative to a candidate's transplant date. Transplant center personnel can focus their attention on viable candidates, all of whom are eligible for forthcoming organ offers. The proposed system offers transparency, truth in advertising, and reassurance to waitlisted candidates. Waitlist removals for reasons other than transplant, death on the waiting list, and waitlist inactive status will diminish, and providers can assure patients that most will only be removed from the waiting list through receiving a transplant.

Table 2. REW episode of care triage proposal

Overview
1. Patient with living donor candidate – Refer and evaluate
2. Patient likely to receive an organ offer with 18 months of waitlisting at a given Center - Refer and evaluate:
a. Long dialysis vintage increasing candidate's waiting time to ≤18 months of median waiting time for transplant calculated by period prevalence method;
b. Very highly sensitized candidates
c. EPTS priority candidates (EPTS <20)
d. Prior living donor in need of transplant
e. Willingness to consent to "high risk" organ where median waiting time for such organs is ≤18 months of waitlisting.
f. Preemptive referrals.
Challenges and Criticisms:
1. Perception the REW model will be interpreted as limiting overall access to the waiting list, and by extension, limiting access to transplantation.
2. Hospitals that host transplant centers rely on transplant evaluation testing as a revenue stream.
3. May be limited cost-savings opportunities available in the REW Episode of Care cost center.
4. Extent to which kidney transplant centers (with thin margins) are able/willing to accommodate two-sided financial risk arrangements.
5. Ensuring gating metrics provide sufficient protection to inequitably served populations.
6. The REW model will require reconceiving existing waitlist growth-focused metrics, including the Percent of Prevalent Patients Waitlisted, the Standardized Waitlist Ratio, and the ETC - Transplant Rate component of Modality Performance Score.
7. Contemplated referral growth-focused metrics would also need to be abandoned.

EPTS, estimated posttransplant survival score; ESRD, end-stage renal disease; ETC, ESRD Treatment Choices; REW, referral/evaluation/waitlisting.

The REW episode of care proposal is designed to realize operational efficiencies and cost-savings in the transplant referral, evaluation, and waitlisting process by triaging patient referral and evaluation for patients with a high likelihood of receiving an organ offer within 18 months of waitlisting, or those patients who have a candidate for living kidney donation. Although the appropriate definition and determination of median waiting time to transplantation is complex,[26,27] it is clear that waiting time has been increasing, now approaching ∼5 years for the patients waitlisted in 2015 to 2018.[26] The current system of referral, evaluation, and waitlisting is heterogeneous,[28] opaque to patients and referring providers, and is rife with inefficiencies and inequities. Centers with a high waiting list-to-transplant ratio result in much higher organ acquisition costs, including the cost of organ procurement and preservation with pretransplant evaluation and testing costs. Transplant centers with a waitlist-to-transplant ratio of >4.7 had increased organ acquisition cost center costs of $6930 per patient for every 1.0 increase in the ratio.[29] This finding is commensurate with observations made about the relationship between waiting list size and organ acquisition costs 2 decades ago.[30] Nearly half of listed patients are not eligible for an organ offer, median waiting times often outlast median patient survival times, and "stagnant" large volume waiting lists increase costs.

The proposed REW triage system is solely designed to avoid redundant (and ultimately discarded) testing and reevaluations of patients who are facing median waiting times to transplant that extend to several years, ensuring all patients on active waiting lists are "ready to go," when an organ offer comes. Cost-savings emerge from realizing these efficiencies, which we believe are in the direct interests of patients and transplant centers. Different regional markets populated by centers with different organ acceptance behaviors may have different median waiting times for patients in their catchment areas. In some markets, long median waiting times may not be a challenge for most patients, and perhaps most patients in such markets would be suitable and appropriate for triaged evaluation and waitlisting. Ultimately, a well-functioning REW system should yield an active waiting list with a high turnover rate, allowing patients not initially triaged through the REW system to navigate it quickly and efficiently, rapidly replenishing the waiting list.

Just as current KCC entities are overseen by "Kidney Care Entities," a governing body comprised of clinician stakeholders in the KCCs, we propose that the REW triage criteria as well as other care coordination pathways throughout the episodes of care system be developed, promulgated, implemented, and overseen by Kidney Care Entities with expanded participation from transplant center clinical and administrative leaders. Not all markets face the same operational and structural challenges, so there are no single solutions to actualizing an REW system across all markets. Rather than prescribing a universal approach to an REW system, we believe that instituting "guardrails" or "gating items" to ensure existing disparities are not entrenched or exacerbated in any application of an REW system is the preferred approach. We discuss these gating items in more detail under the "Criticisms" section.

Ultimately, stakeholders should be incentivized to implement system-level interventions to render all patients eligible for triaged referral. This requires coupling financial incentives for increasing the total number of transplants with safe harbor provisions allowing TIVBC participants to fund evidence-based interventions shown to successfully improve the identification and evaluation of living donor candidates. Such programs as the living donor "house calls" program,[31,32] the living donor navigator program,[33,34] culturally competent interventions proven to work,[35] and paired-exchange programs will expand access to actual transplants. Patients should be encouraged to reconsider the risks and benefits of accepting organs from, for example, high-Kidney Donor Profile Index and hepatitis C virus-positive donors, given current therapeutic strategies. Local median waiting times and organ acceptance behaviors of local transplant centers should be transparently available through a freely available online search tool curated by the Scientific Registry of Transplant Recipients.[36] These and other interventions can balance improved access to transplantation with the gains in transparency, efficiency, and cost-savings realized by implementing the REW triage criteria suggested in Table 2.

If an REW triage system is implemented, we believe patients already waitlisted should not be removed people from the waiting list, even if their estimated remaining waiting time is longer than 18 months.

Calculating and Realizing Cost-Savings in the REW Model

Baseline cost measurements for the REW model could be ascertained from a cumulative analysis of transplant centers' Medicare Cost Report data. This baseline includes items attributable to the transplant evaluation and waitlisting process, such as laboratory, radiology, and health maintenance testing, professional services, medical records aggregation, and budgeted staffing requirements for the transplant center. United Network for Organ Sharing (UNOS currently holds the OPTN contract) candidate registration costs and organ acquisition cost line items would be excluded from such a cost baseline. Potential opportunities for cost-savings include reductions in the total number of tests ordered and professional services provided, avoidance of redundant or discarded testing, recovered opportunity costs from reducing the number of waitlist inactive patients, waitlist removals for reasons other than transplant, and deaths on the waiting list. Because there is likely wide variability in total costs in REW-related expenditures, entities considering taking risk on REW-related costs would have the opportunity to review their attributable Medicare Cost Report expenditures before committing to a shared savings model. Anti-kickback safe harbors can be used to create care coordination interventions and patient navigators to expedite required testing, identify lower cost testing vendors, and leverage a health information exchange of transplant test results to expedite the evaluation (Supplementary Appendix S2).

Criticisms of the REW Episode of Care Model

Objections to the proposed REW model are outlined in Table 2. Endorsement of the REW model assumes that access to "upstream" end points such as referral and waitlisting are not the same as access to a functioning transplant. Broader community acceptance of the REW model will depend on alleviating inequities in access to actual transplants and system-wide interventions to help patients outside the proposed triage criteria. Hospital systems may be concerned with reduced revenue streams from Medicare Cost Report revenue, though this may also improve their negotiating position with commercial payors. Participation (and success) in shared savings in a TIVBC could prove useful in contracting with commercial payors. Transplant center personnel will also be freed up to focus on patient education and preparing candidates who are more likely to receive an organ offer in a shorter time frame. Although the plausible cost-savings realizable from the REW episode of care model is likely to be less than other cost centers across the transplant continuum, even modest cost-savings coupled with improvements in efficiency and transparency still commend the REW model.

Perhaps the most disruptive implication of the REW model is that proposed referral-rate and waitlist-based metrics (the Percent of Prevalent Patients Waitlisted, the current and proposed Standardized Waitlist Ratio, and the waitlist component of the Modality Performance Score in the ETC model) would all probably have to be abandoned. If the REW model reduces waitlist removals for illness and death, centers in the REW model are less likely to run afoul of the recently enacted Organ Procurement and Transplantation Network (a contract administered by the Health Resources and Services Administration) pretransplant mortality ratio (i.e., death on the waitlist) as a performance measure for centers.[37] To address concerns about patient access generally and the unintended possibility of exacerbating existing disparities in access to transplantation for underrepresented groups (e.g., age <40 years, African American and Hispanic patients) specifically, risk-bearing participants in the TIVBC could be required to meet certain "gating items" to realize any shared-savings from reduced costs in the REW model, analogous to the "gating quality metrics" in the current Comprehensive Kidney Care Contracting model (one of the Kidney Care Contracting value-based care payment models). TIVBC participants could be required to demonstrate evidence of population level patient counseling and assessment for transplant candidacy and frequency of reassessing candidates with remediable clinical and psychosocial barriers to transplantation, to develop and deploy Quality Assessment and Process Improvement projects to identify and intervene on identified and reversible clinical, psychosocial, and/or social determinants barriers to transplantation, and have these interventions assessed by a suitable patient-centric metric. A health equity performance benchmark, similar to the recent revision to the ETC model prioritizing patients who are dual-eligible for Medicare-Medicaid and/or receive the Low Income Subsidy, could also be introduced, and expanded upon to specifically avoid exacerbating existing access disparities for particular groups.[3] We envision that these "gating items" would change what is currently required of dialysis facilities by the ESRD Conditions for Coverage; however, the type and quantity of requirements must be balanced against the complexity and burden of implementing change.

Primary Hospitalization to 180 Days Posttransplant Episode of Care Model

The primary goal of a model focused on the primary transplant hospitalization to the first 180 days posttransplant (hereafter, "0–180 model") is to identify opportunities to concomitantly improve quality outcomes and reduce the cost of care for common peritransplant and posttransplant treatments and complications. Ostensible opportunities for realizing cost-savings in a 0–180 model are clear. DGF, defined as the requirement for at least 1 dialysis treatment after transplant, increases posttransplant costs by $18,000 in the first year, primary hospitalization lengths of stay, and all-cause readmissions in the first 90 days.[38] Strategies to improve the frequency, duration, and management of DGF would reduce expenditures in the 0–180 model timeframe. Managing DGF in outpatient dialysis clinics could attenuate the added costs of DGF.[39] Outpatient dialysis facilities are increasingly accommodating patients with acute kidney injury and incomplete recovery. Although this is not a clinically identical entity to DGF, the need for more frequent clinical and laboratory monitoring offers in these patients offers a basis for developing the capacity for reliably and reproducibly providing careful surveillance and care coordination for patients with DGF. A complementary approach is to routinize the use of organ preservation technologies such as hypothermic machine perfusion, which has been repeatedly shown to reduce rates of DGF[40,41] and have been shown to accrue cost-savings compared to standard preservation.[42]

Reducing primary hospitalization length of stay after kidney transplantation to ≤4 days has recently been shown to be noninferior to a "regular" 5 to 7 day length of stay for 1 year patient survival, graft survival, and 90-day readmission rates.[43] These authors note that an early versus regular discharge policy would have realized $200 million in cost-savings over 5 years. Additional opportunities to reduce lengths of stay include expanding outpatient infusion capabilities for administering induction immunosuppression, and tailor induction agents for patient subgroups.[44] A recent meta-analysis of early recovery after surgery protocols in kidney transplantation showed a paucity of well-designed published trials, but generally associated early recovery after surgery implementation with reductions in hospital LOS without increases in rates of readmission.[45]

Criticisms of the 0–180 Model

It is imperative that a 0–180 model avoid incentivizing risk aversion in organ or candidate acceptance behaviors to avoid quality metrics penalties, financial losses, or both. The new kidney allocation system prioritizing geographic distribution of kidneys has resulted in higher rates of DGF.[46] The traditional approach of avoiding candidate selection bias by tying cost benchmarks to risk adjustments for relevant donor and candidate variables is limited by the lack of an adequate risk adjustment model, which robustly predicts medical expenditures, with the most sophisticated explaining only 15% of total expenditures.[22] Most kidney transplant centers typically operate on narrow financial margins and are not positioned to take on downside financial risk alone. Neither transplant centers nor larger consortia of risk-bearing stakeholders should assume significant downside risk in the absence of models which provide transparency and a higher degree of confidence in forecasting costs of care. The Centers for Medicare and Medicaid Services must develop better, more robust risk adjustment models with sufficient explanatory power of medical spending to allow future TIVBC participants to construct reliable quality achievement and cost-reduction strategies.

Organ Acquisition Cost Center Model

Kidney acquisition costs are a tempting financial target for a future TIVBC model, accounting for $400 to $500 million/year of medical spending, and accounting for approximately a third of the total cost of a kidney transplant.[47] There are several reasons for concern about targeting organ acquisition costs. First, the recent shift in the kidney allocation system has resulted in broader sharing of organs. Held *et al*.[47] showed (using 2013–2017 data) an imported kidney increases acquisition costs by about $4000 per organ. Transplant centers should not be dissuaded from accepting an imported kidney because of higher acquisition costs. Second, increased regulatory pressure on organ procurement organizations to improve their performance will entail consenting and procuring kidneys from donors with higher medical risks, including donation after circulatory death donors. To improve the likelihood of those organs being accepted, organ procurement organizations will, reasonably, make increasing use of organ preservation technologies (e.g., machine perfusion) to mitigate the effects of prolonged cold ischemia time (due to broader organ sharing) and by extension, reduce the risk of DGF. Higher utilization of organ preservation technologies increases organ acquisition costs, presumably with the benefit of increasing the total number of transplantable organs.

A TIVBC should avoid disincentivizing use of preservation technologies to increase access to transplantation. Furthermore, organ procurement organizations are nonprofit organizations that are not incentivized to realize cost-savings, much less have an interest in bearing downside financial risk. However, if transplant centers are disincentivized to accept "more expensive" organs, organ procurement organizations may in turn be less willing to use effective preservation strategies if the added expense is perceived as a negative influence on organ acceptance behaviors. Although there may well be future opportunities to reduce variability in organ acquisition costs, a TIVBC may not be the appropriate payment model to pursue those ends.

Long-Term Graft Survival Model

Although kidney transplantation has been repeatedly demonstrated to improve the quantity and quality of life compared to other kidney replacement modalities, maximizing the lifespan of the allograft has not been foregrounded in reimbursement models to date. Regulatory frameworks for transplant centers have traditionally focused on 1-year patient and graft survival, though 3-year outcomes have long been a staple of public reporting. Most patients and transplant professionals would agree that efforts to improve longer-term (>5-year) outcomes should be a policy priority. The principle of VBC is that "value" equals quality/cost. In other words, expanding a therapy which tends to improve patient quality of life is preferable even if the cost comparisons with therapies which (on average) confer a lower quality of life are equal or slightly less expensive. Based on this principle, to the extent that the longitudinal (i.e., 10-year) costs of transplant versus dialysis have been shown to be nearly identical,[16] the improvements in conferred quality and quantity of life in expanding access to transplantation and allograft lifespan are compatible with the principles of VBC payment models. Although long-term outcomes have improved over time,[48] median long-term graft survival (i.e., beyond the first transplant year) in the United States still lags behind other countries,[49] suggesting ample room for improvement in providing longitudinal care. Furthermore, avoidable premature allograft failure offers ample opportunity for improved quality and reduced medical spending. The aggregate cost of premature allograft failure was $1.38 billion in 2017,[50] with the first-year costs of a failed graft at $153,000.[51] A TIVBC which incentivized longer allograft survival would be commensurate with patient interests and policy goals, could also realize cost-savings, and provides a clear opportunity to share in significant cost-savings attributed to avoiding dialysis exposure with transplant programs.[52]

In addition to extending the survival of the allograft, an alignment of stakeholder incentives also harnesses the promise of improving outcomes for patients with a failing allograft, to include a "shared care" approach to safely transition of patients with a failing graft back to dialysis.[53] Transplanted patients who return to dialysis frequently do so with a tunneled catheter,[54] poor CKD clinical quality indices,[55] and no standardized plan for immunosuppression management,[56] resulting in higher infection and mortality rates.[57] Some of the higher costs for patients with a failed graft can be attributed to the absence of care coordination and attention to preparations to return to dialysis.[58]

A long-term patient and graft survival model should include incentives to improve patient and allograft survival at or beyond 5 years. For patients with returning to dialysis after allograft failure, a parallel ''optimal start'' benchmark could be implemented, like the ''optimal start'' quality metric employed in current KCC payment models. The current KCC models provide additional payments for death-uncensored graft survival through 3 years, an approach which incentivizes increasing the total number of transplants while avoiding the complexities of developing a reliable risk-adjustment model that would provide an ''expected'' graft survival rate and an observed to expected graft survival ratio. The Centers for Medicare and Medicaid Services should begin collaborating with stakeholders now to develop a valid risk-adjustment model suitable for quality benchmarking long-term survival outcomes, a process which will need to account for the recent import of missing patient mortality data to Scientific Registry of Transplant Recipients and Organ Procurement and Transplantation Network databases in 2022 and additional system flaws identified in Organ Procurement and Transplantation Network data.[23,59,60] Finally, consideration should be given to weighing long-term graft survival achievements more than optimal start achievements, while allowing stakeholders to meet survival and optimal start benchmarks for the same patient. For example, a patient with an expected graft survival of 5 years who achieves 7 years should be rewarded more than the same patient who realizes only 5 years of graft survival but achieves an optimal start.

In addition, a challenge to a long-term graft survival model is whether initially attributed transplant patients are likely to remain in the payment model over many years (Supplementary Appendix S3). Patients who choose to switch insurance plans (e.g., from Medicare to Medicare Advantage coverage) will be excluded from the model, because Medicare is not financially responsible for the costs of care for non-Medicare beneficiaries. Stakeholders prepared to take 2-sided risk on long-term graft survival will struggle to accurately assess risk if too many beneficiaries initially attributed to the model exit this program before key quality endpoints are measurable. We identify some next steps in developing a TIVBC model in Table 3.

Table 3. Next steps toward a transplant-inclusive value-based care model

1. Soliciting TIVBC policy priorities and quality endpoints from patients and stakeholders
2. Inter-agency and multi-stakeholder collaboration in developing risk adjustment models incorporating donor, candidate, and social influencers of health variables which reliably forecast expected quality outcomes and financial expenditures.
3. Include mechanisms for rapid adjustments to a TIVBC model to quickly identify and avoid disincentives to accepting higher risk organs, candidates, and/or exacerbating existing disparities in access to transplant.
4. Designing a beneficiary attribution model which balances patient choice regarding health care coverage while also discouraging insurance coverage "churn" over time.
5. Developing shared-savings TIVBC models which allow transplant center participants to balance opportunities for financial upside with protection from potential financial downside risks, particularly in end-to-end care models which include patient with advanced CKD and ESKD.
6. Establishing "shared care" models between transplant centers and local nephrology practices for transplanted patients with advanced CKD in the allograft.

CKD, chronic kidney disease; ESKD, end-stage kidney disease; TIVBC, transplant-inclusive value-based care.

Conclusion: Toward an End-to -End TIVBC Model

A comprehensive VBC model for patients with advanced CKD, ESKD, and a functioning transplant is the next chapter in VBC for kidney disease. It affords outcomes which matter to patients and families, improves quality in care delivery, alleviates inequities in access to transplantation, and reduces total health care expenditures by relieving inefficiencies. Developing robust risk-adjustment methodologies, avoiding disincentives to accepting higher-risk organ offers or candidates, and ensuring the stability of the attributed beneficiary pool will be crucial to achieving improved quality at lower cost. This vision is designed to provide patients with kidney disease a seamless system of care delivery that they need and that they deserve.

DISCLOSURE

BEH reports being an employee of Fresenius Medical Care, and having equity in InterWell Health and Revalia Bio. FWM reports being and employee of and having equity in Fresenius Medical Care, being on the board of Vifor Fresenius Medical Care Renal Pharma (Board), and being a Board Observer of Humacyte. GMH reports being and employee of and having equity in Interwell Health.

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SUPPLEMENTARY MATERIAL

Supplementary File (PDF)

Supplementary Appendix S1. Summary of current Medicare-based nephrology-focused payment models and opportunities for expansion to a transplant-inclusive value-based care (TIVBC) payment model.

Supplementary Appendix S2. A transplant evaluation medical records "clearing house."

Supplementary Appendix S3. The "wild card" of Medicare Advantage enrollment trends.

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