

ORIGINAL ARTICLE

Defining the roles and responsibilities of the kidney transplant medical director: A necessary step for future training, mentoring, and professional development

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The management of a kidney transplant program has evolved significantly in the last decades to become a highly specialized, multidisciplinary standard of care for end-stage kidney disease. Transplant center job descriptions have similarly morphed with increasing responsibilities to address a more complex patient mix, increasing medical and surgical therapeutic options, and increasing regulatory burden in the face of an ever-increasing organ shortage. Within this evolution, the role of the Kidney Transplant Medical Director (KTMD) has expanded beyond the basic requirements described in the United Network for Organ Sharing bylaws. Without a clear job description, transplant nephrology trainees may be inadequately trained and practicing transplant nephrologists may face opaque expectations for the roles and responsibilities of Medical Director. To address this gap and clarify the key areas in which the KTMD interfaces with the kidney transplant program, American Society of Transplantation (AST) formed a Task Force of 14 AST KTMDs to review and define the role of the KTMD in key aspects of administrative, regulatory, budgetary, and educational oversight of a kidney transplant program.

KEYWORDS

business/management, clinical research/practice, education, employment, kidney transplantation/nephrology, Organ Procurement and Transplantation Network (OPTN), physician education, quality of care/care delivery, United Network for Organ Sharing (UNOS)

1 | INTRODUCTION

The role of the kidney transplant Medical Director (KTMD) evolved as the field of transplantation matured and moved from a surgical specialty to a highly multidisciplinary practice. From the time at which the first living donor kidney transplant was performed in 1954 until 1984, each transplant program evolved by creating local policies for organ allocation and transplant. With greater success and expansion of the field of transplantation, it became necessary to unify all transplant centers under one regulation. In 1984, the US Congress passed the National Organ Transplant Act to address organ donation, improve organ matching, and allow equitable organ distribution across the United States.¹ This led to the establishment of the Organ Procurement and Transplantation Network (OPTN) in 1986, which contracted the private agency United Network for Organ Sharing (UNOS) to oversee the regulatory aspects of transplantation. UNOS established the Membership and Professional Standards Committee (MPSC) to oversee the membership and outcomes of the participating transplant centers and mandated that each transplant program identify a primary physician, as well as a histocompatibility laboratory, Organ Procurement Organization (OPO) agreement, and a primary surgeon. OPTN/UNOS outlines the minimum clinical training requirements for a board certified nephrologist to serve as a primary physician for a kidney transplant program.² These requirements are limited to overseeing the management of recipients and donors in pre- and posttransplant phases. However, these requirements bear little resemblance to the job duties often required of the primary physician/KTMD. To date, no formal job description has been offered in a concise, publicly available document, leading each individual transplant center and each KTMD to recreate and evolve their own practices without the benefit of a summary statement of general expectations. This in turn leads to gaps in training for future KTMDs, who often have no such experience prior to assumption of the roles of a KTMD. In July 2019 the American Society of Transplantation (AST) formed a Task Force of 14 AST KTMDs with diverse representation from different geographic locations, program sizes, and academic vs nonacademic affiliations to better define the expectations of the KTMD. Clarity in the KTMD job description should help standardize expectations going forward and facilitate a formalized approach to training, continuing education, and mentoring of both transplant nephrology fellows and future and current KTMDs.

The Task Force summarized these expectations under four general aspects of the KTMD job description: (a) administrative, (b) regulatory, (c) financial/budgetary, and (d) educational. These four pillars are not all-encompassing, and do not include the assumed clinical

care responsibilities and leadership required of an experienced transplant nephrologist as a respected clinician, but permit the formation of a skeleton structure upon which transplant centers may consider and expand upon as transplant programs continue to evolve.

2 | ADMINISTRATIVE RESPONSIBILITIES

Transplant nephrologists were historically primarily aligned with renal divisions providing clinical transplant services as well as non-transplant nephrology activities. In this context, the KTMD role was often nominal with limited transplant program administrative participation. Growth in volumes, improved outcomes, and increased regulations from UNOS and Centers for Medicare and Medicaid Services (CMS) have largely dictated that transplant nephrologists now solely engage in clinical transplant activity. Transplant service lines have become popular care delivery models, structured academically as “institutes” or “centers,” to which transplant nephrologists now primarily affiliate, with academic appointments in the Departments of Medicine and/or Surgery.³⁻⁵ Concomitantly, KTMDs have become integrally involved in all kidney program aspects, including finances, budgets, operations, staffing, and strategic planning. KTMDs work closely with surgical directors and clinical manager(s) and meet regularly with hospital leadership to provide updates and ensure that programmatic needs are met.

The KTMD routinely serves as one of the leaders and the face of the transplant program with several administrative roles and responsibilities directed toward the goals of increasing or sustaining transplant volume while maintaining excellent outcomes. To accomplish these goals, close collaboration and identification of a shared vision with the surgical director and hospital leadership, administrative leaders, and hospital administration provides opportunity for center-specific needs. Examples of key areas in which the KTMD may assume a primary leadership role, and thus benefit from focused training, mentoring, and networking, are summarized in Table 1. These include but are not limited to protocol development for all phases of the transplant experience, promoting access to transplantation for the transplant center's community at large, monitoring and oversight of outcomes, promotion of living kidney donation, program management of personnel, and strategic planning. Beyond these examples, other leadership roles of the KTMD include team building, conflict resolution, training and education of staff, inspiring staff members to achieve their goals, taking steps for higher employee engagement and retention, giving guidance and feedback, giving them growth opportunities, and leading the change at the transplant center. The successful discharge of these responsibilities requires inculcation of emotional intelligence and leadership skills which unfortunately are

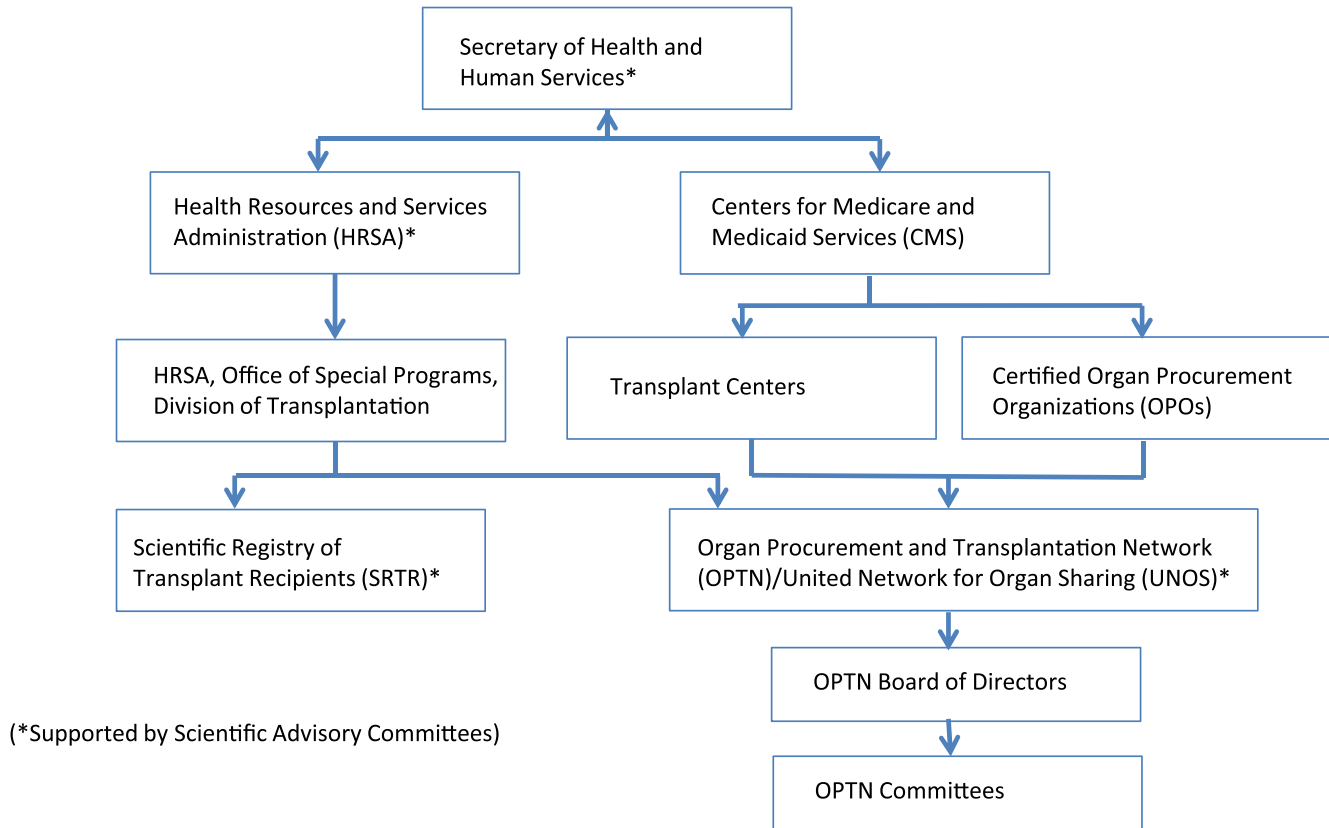


FIGURE 1 Organizational structure of the regulatory agencies that oversee the US transplant system [Color figure can be viewed at wileyonlinelibrary.com]

not explicitly made clear to medical directors or set as a requirement at the time of their hiring by hospital administration. Given these leadership roles, the KTMD should be encouraged to take leadership and human resources management courses either prior to or during the first year of directorship to prepare for the inevitable need to address teamwork and performance in their role.

3 | REGULATORY RESPONSIBILITIES

The KTMD has a responsibility to ensure that the transplant program(s) maintain compliance with transplantation regulatory bodies and that the transplant program has sufficient resources and process in place to provide safe patient care across all phases of the transplant continuum. In order to successfully accomplish this, an understanding of the organizational oversight and the methodology for center review is critical. This is not straightforward, and is not immediately obvious even to those actively involved and experienced in the field (Figure 1). Guidance regarding the *survey and certification* of transplant centers was defined by the Department of Health and Human Services (DHHS) in 2007 and updated in 2019.⁶ Responsibility for *oversight* of transplant center participation for Medicare beneficiaries rests within the Centers for Medicare and Medicaid Services (CMS) and is described in Conditions of Participation (CoP).⁷ The

CoP includes requirements for initial Medicare certification of a transplant program and subsequent maintenance of certification.

3.1 | CMS and the KTMD

The CMS CoP 482.98 requires that a transplant hospital or center have a designated director and that “the designated director of a transplant center must be either a transplant surgeon credentialed in the hospital for transplant surgeries or a qualified physician who is credentialed in the hospital to provide transplant medical services for the specific organ program type(s).” While the CoP allows the Director to delegate daily operational oversight, the Directors’ responsibilities include but are not limited to making sure that staff has “adequate” training, that there are policies and procedures in place to support program operations, and that the transplant program(s) have a robust Quality Assessment and Performance Improvement Program (QAPI).⁸ In addition to the CMS regulation that speaks to the Director’s responsibilities related to resources and staffing, other regulations found in the bylaws of the OPTN require the Director to ensure the program has adequate coverage by transplant surgeons and physicians to support patient care.⁹

One of the main components of the CoP is the development and management of the QAPI program.¹⁰ A robust QAPI program not

TABLE 1 Examples of administrative roles of the Kidney Transplant Medical Director

Role	Examples
Improving access to transplantation by developing and implementing protocols for specific populations	Developing protocols for waiting list and transplant medical management: examples include obese, elderly, and highly sensitized candidates; HIV+ recipients; inmates; candidates residing in remote areas; candidates with incompatible living donors: Non-A1/A1B deceased and living donor utilization for blood type B and O waitlisted candidates
Defining and optimizing protocols for pretransplant evaluation, listing, and wait list management	Center-level protocol management Development of partnerships with ancillary services to define and expedite transplant-specific evaluations and minimize a candidate's time in inactive status while awaiting transplant
Improving access to transplantation and increasing organ utilization	Development of protocols that address utilization of deceased donor kidneys defined as HCV+, PHS Increased Risk, high KDPI, pediatric en-block, Hepatitis BcAb+ and/or AKI and sensitized candidates with donor-specific antibodies Establishing criteria for donor biopsy and pump parameters, use of Organ Procurement Organization (OPO) Report of Organ Offers (ROO), and communication and partnership with the local OPO
Developing quality metrics and methods of posttransplant surveillance beyond those required by regulatory agencies	Development and implementation of clinical pathways to better standardize care, including but not limited to: CMV, BK virus, and other infection surveillance, malignancy surveillance, immunosuppression and graft function monitoring, cardiovascular disease risk factor modification, immunizations, and psychosocial/adherence assessment
Developing protocols for live donor evaluation	Strategic planning for expedited evaluation in a cost-effective manner Defining criteria for the assessment of medically complex living donors (eg, prospective donors with obesity, hypertension, and/or a history of nephrolithiasis) Developing processes for participation in paired kidney donation networks
Leadership in strategic planning and growth	Development of outreach programs (clinical and/or educational) to engage referring providers, to develop and cultivate a system for referral for transplant, and to provide an information stream to key stakeholders, including health-care systems, insurers, patients, and providers Knowledge and use of marketing tools (website, mailers, symposia) and fundraising/philanthropic activities Utilization of satellite clinics and telemedicine clinics to improve the pretransplant evaluation process and posttransplant care Participation in community events to educate the public and nontransplant health-care providers regarding organ donation and live kidney donation to reduce the organ shortage
Assessment of resource and staffing needs	Work together with executive directors, program managers, clinic managers, inpatient unit managers, nursing leadership, transplant coordinators, and laboratory staff to define and assign roles and responsibilities to staff Participate in recruiting efforts that align with the transplant program vision Cultivate a team of consultants (eg, cardiology, infectious disease, dermatology) with a focus in the care of transplant patients Oversee the development and integration of nephrology/transplant fellow trainees
Liaison and advisor to transplant-affiliated organizations	Contribute expertise and guidance to local, regional, and national organizations including the local organ procurement organization, nonprofit organizations with interest in transplantation, regional UNOS and Medicare ESRD networks, and clinical guidelines and policy organizations, for example Kidney Disease Improving Global Outcomes (KDIGO), American Society of Nephrology, American Society of Transplantation, American Society of Transplant Surgeons

only includes necessary activities such as analysis of adverse events, management of data to fulfill hospital and federal requirements, and use of data to assess and improve quality of care, but also includes performance improvement projects. The latter should be multidisciplinary in nature and involve all phases of care of the transplant and living donation episode. Since the KTMD is primary to all phases of care, he/she carries significant responsibility for the identification, implementation, and assessment of such PI projects. Promoting an engaging and active QA/QI process and understanding evaluation tools such as Root Cause Analysis, CUSUM reports, and other outcomes projection tools are necessary skills that the KTMD must acquire, yet little to no attention to this component of the job description is addressed in transplant nephrology training curricula.

3.2 | HRSA, OPTN, and its contracted agencies UNOS and SRTR

While CMS through its CoP and QAPI comprises a large component of the KTMD responsibilities with respect to regulatory activity and reporting, the DHHS also has a separate private, not-for-profit entity with an expertise in organ procurement and transplantation that reports to Health Resources and Services Administration (HRSA). This entity is the OPTN whose responsibility is to “operate and monitor an equitable system for allocating organs donated for transplantation; maintain a waiting list of potential recipients; match potential recipients with organ donors according to established medical criteria for allocation of organs and, to the extent feasible, for listing and de-listing

transplant patients; facilitate the efficient, effective placement of organs for transplantation; and increase organ donation."¹¹ The contracted organization for OPTN since 1986 has been United Network for Organ Sharing (UNOS), a Virginia non-stock, not-for-profit corporation, formed shortly after the origination of OPTN. In 1987, the Scientific Registry of Transplant Recipients (SRTR) was founded as a national database of all transplant-related statistics. The SRTR is responsible for the analysis of data that are pertinent to transplant outcomes; use of these data by both UNOS and CMS allows program-specific data to be generated and compared, and are used to identify underperforming programs. Unlike OPTN/UNOS, who simply gathers data, SRTR analyzes data from multiple sources and draws conclusions from it. Similar to OPTN/UNOS, the SRTR is a contracted organization for HRSA. In general, policy making falls under the OPTN, while SRTR provides policy makers with the data required to make informed decisions.

3.3 | The KTMD and CMS, HRSA/OPTN, and its contracted agencies

The KTMD must be aware of the myriad requirements for data reporting by CMS and the OPTN and the shifting regulatory landscape in order to create systems and collaborate with program leadership to remain in compliance. Ongoing data reporting is required by CMS CoP and is significant. This includes data regarding clinical experience, outcomes requirements, and transplant candidate and living donor demographic and clinical information. Patient information must be submitted multiple times throughout the care continuum, and outcomes are benchmarked and closely monitored. The KTMD must understand the data elements that are gathered, the interpretation of these elements, and the representation of these data elements as a reflection of the success of the transplant program. A basic understanding of the statistical methodology used in the interpretation of data is important to best understand the measures that may be taken to improve the transplant center's performance. Further, the KTMD must understand the different benchmarks and outcomes-specific thresholds for graft and patient survival between CMS and OPTN/UNOS in order to maintain the transplant program in good standing. Last but not least, the KTMD must understand the process in which a transplant program fails to reach these defined thresholds and falls under regulatory review, the risks and consequences if regulatory review is required, and be capable of identifying and contributing to QAPI to define clinical pathways and protocols that may prevent regulatory review and also lead to transplant center improvements if regulatory review is imposed.

4 | BUDGET AND FINANCIAL RESPONSIBILITIES

The KTMD plays a critical role in developing policies and practice guidelines at his/her individual center that influence the financial

viability and success of a transplant program. However, in the absence of well-established KTMD training and educational courses, a comprehensive understanding of this responsibility is frequently learned on an "ad hoc" basis. An unintended consequence of such an unstructured learning approach is the potential for an incomplete or even incorrect appreciation of the financial ramifications of a given clinical protocol (such as mandatory qualifying testing prior to listing and frequency of testing while on the waiting list). In this section, the general concepts of transplant finance are presented from the perspective of the KTMD role:

4.1 | Defining financial value of transplant programs to hospitals

Transplant programs require a significant start-up investment from hospitals and considerable ongoing resource support to operate effectively. Although kidney transplantation tends to be a low margin service, careful management and oversight, even in medium-sized kidney programs, can generate positive contribution margins.^{12,13} For this reason, once up-and-running, well-functioning programs can be financially successful for hospitals, in addition to providing the prestige that comes with providing that level of cutting-edge care. In contrast, sustaining poorly performing or low-volume transplant programs can create significant ongoing losses. Hospitals with transplant centers are profitable not only due to transplant events and downstream revenue generated from the evaluations, transplant events, and posttransplant follow-up care, but also due to the impact of transplant upon the hospital's case mix index, a measure of the average severity level of a hospital's procedures used by CMS to determine a hospital's reimbursement rate across all of its cases.

As reflected by national data (Table 2), the primary payment source for kidney transplants is most commonly Medicare (44% of patients in 2018) with Medicaid insurance comprising a small percentage and a further handful of patients being uninsured. Consequently, at many institutions, kidney transplantation offers a competitive mix of payers. The importance of understanding the kidney transplant payer mix lies in the fact that at the present time, Medicare reimburses transplant centers at cost for pretransplant

TABLE 2 Primary payment source for kidney transplants in 2018 (source OPTN data)

Primary payment source	Number	Share
Medicare FFS	9336	44.11%
Medicare Advantage/Choice	3121	14.74%
Medicaid	1540	7.28%
Other government or VA	483	2.28%
Private insurance	6651	31.42%
Free care	5	0.02%
Other/unknown	31	0.15%
Total	21 167	100%

evaluation, at a proportion equal to transplants paid for by Medicare, plus organs procured at the center, divided by total organs transplanted and procured at the center. This reimbursement, via the Medicare Cost Report, is one of the last bastions of cost-based reimbursement in health care, and allows administrative and overhead costs to be included. Medicare and other payers then reimburse the hospital for the transplant itself, and for readmissions and outpatient posttransplant care. Medicare uses the Diagnostic Related Group payment system to reimburse the transplant, while private payers mostly use a negotiated case rate (usually inclusive of the transplant, very often the pretransplant evaluation, and occasionally part of the early posttransplant period). As a result, the primary determinant of the kidney transplant programs' financial performance is the ability to control costs during the index transplant admission and evaluations based on the proportion of Medicare cases. For programs with a high rate of Medicare cases the focus should be on containing costs for the index transplant admission, while those with lower rates of Medicare cases can control costs for evaluations and posttransplant admissions. The KTMD should be aware of the Medicare ratio of transplants to implement appropriate financial strategies. Since most admission-related, variable costs are controlled by physicians, the KTMD must work closely with program leadership to ensure that clinical protocols and guidelines take into account optimizing patient well-being and outcomes in the setting of containing costs.

Long-term posttransplant care is often considered a financial loser for transplant hospitals given the resource-intensity of transplant clinics. However, such analyses invariably fail to take into account the contribution margin generated from chronic care related to managing the myriad posttransplant complications that recipients develop. Additionally, creating a transplant pharmacy is another way posttransplant care can generate contribution margin, especially if the hospital participates in the 340(b) program allowing purchase of medications for outpatient use at a lower cost. The KTMD should meet regularly, suggested every 3–6 months, with the program administrative leadership, surgical director, and Chief Financial Officer to review the financial health of the program and to explore opportunities for improvement.

4.2 | Value of transplant nephrologist to the transplant hospital

In the context of the financial value of transplantation to the transplant hospital, transplant nephrologists are essential stewards for patients, for the program, and for the hospital alike. As kidney transplantation has become a more widely available therapy, older and sicker patients are increasingly being considered for this therapy.¹⁴ Transplant nephrologists play a critical role in the evaluation and optimization of potential candidates. Their involvement helps to streamline the candidate evaluation process, coordinate care with other consultants and referring nephrologists, and avoid unnecessary testing, leading to efficient wait listing with the ultimate goals of safeguarding outcomes for patients who get transplanted. Beyond the obvious benefit to recipients, excellent patient and allograft survival also preserves

acceptable center-specific outcomes for the transplant hospitals, thereby avoiding costly and time-consuming program reviews and corrective action planning, and in many cases, preserving leverage in contract renegotiations with insurers. In the posttransplant period, transplant hospitals benefit from more specialized outpatient recipient management by transplant nephrologists with opportunities to avoid readmissions and maintain good outcomes.

Currently the value of clinical activities of a physician is assessed via relative value units (RVU). This method does not accurately capture the clinical activities of the transplant nephrologist, who engages in a large burden of pretransplant evaluation and patient management that is not directly patient-facing and does not qualify for traditional evaluation and management (E&M) or CPT code billing. Time spent performing these activities can be billed on the Medicare Cost report, which requires time-based billing and careful documentation. The value added to a transplant program is realized in the number and quality of transplants and outcomes. With attention through public reporting websites on patient outcomes including graft survival, access to transplant waiting times and transplant rates, and waitlist mortality, the transplant nephrologist can work with the transplant program to optimize waitlist size and transplant rates while maintaining outcomes. As a nonprocedural subspecialty, the effort expended by transplant nephrologists in the care continuum from evaluation to transplant and posttransplant may be under-recognized by transplant hospital administrators and/or Academic department leadership. It is incumbent upon the KTMD, as the leader, to showcase the value of transplant nephrology and to leverage this value in terms of compensation and additional resources.

4.3 | Compensation models for transplant nephrologists

There is no standardized compensation model for transplant nephrologists.¹⁵ Institutions that recognize the value of transplant nephrologists to the hospital are increasingly basing compensation in part on metrics important to the transplant center, which as a hospital-based program, either compensates transplant nephrologists directly, or through academic departments via a funds flow mechanism. However, this is by no means universal practice. Some transplant nephrologists continue to be held to the same RVU-generating standards as general nephrologists and do not receive adequate hospital financial support. In the future, salary compensation surveys of transplant nephrologists should highlight these diverse payment models and provide a basis for compensation and workload benchmarks.

5 | TRANSPLANT NEPHROLOGY EDUCATION: HISTORICAL OVERVIEW AND PRESENT-DAY STATUS

In 1998, AST along with American Society of Nephrology (ASN) established the transplant nephrology fellowship training criteria

outlining the educational infrastructure needed by training institutions across the United States and Canada. The accreditation criteria expanded upon the UNOS established clinical training. The program was co-sponsored by the ASN until June of 2013. In May 2014, the Transplant Nephrology Fellowship Training Accreditation Program (TNFTAP) was registered as an LLC and an operating agreement (that acts as the LLC's Bylaws) was developed between the LLC and the AST.¹⁶ There are five Board of Manager members who oversee Transplant Nephrology Fellowship Accreditation Review Committee that includes 12–15 members. The standard transplant nephrology fellowship is a 1-year clinical fellowship, designed for nephrologists who have successfully completed a standard ACGME (or foreign equivalent for Canadian programs) nephrology fellowship. An alternative pathway designed for nephrology fellows who have a more in-depth academic interest in transplantation and wish to pursue active research related to transplantation over the span of a 2- or 3-year training period. There are currently 72 accredited programs in the USA and Canada, of which 14 accept more than one fellow each year. Sixty-two transplant fellows graduated in June 2019 and 76 fellows are expected to finish the fellowship in June 2020. TNFTAP accredits transplant centers that have developed programs to provide specialty transplant nephrology training. As a result of the Program's approval by the UNOS, graduates of accredited transplant nephrology fellowship programs are qualified to head UNOS approved transplant nephrology programs. Transplant Nephrology Fellowship accreditation criteria include recommendations for training in the business and regulatory aspects of a kidney transplant program but these are not specifically mandated, and it delegates the educational curricula to the discretion of the training center. Transplant Nephrology Fellowship Programs are expected to develop an educational curriculum for the transplant nephrology fellows. The content and implementation of the curriculum are an

essential part of the program evaluation during the initial accreditation and reaccreditation processes by TNFTAP.

5.1 | Key gaps in education for the KTMD

Given the lack of defined educational objectives for training as a KTMD during Transplant Nephrology fellowship, there is a need to outline the key aspects of the KTMD position that each trainee should gain competence, given their *de facto* eligibility to act as KTMD immediately upon completion of fellowship. Current and future transplant nephrology fellows who aspire to become medical director must attain the following knowledge and skills:

- In-depth knowledge of UNOS and Center for Medicare and Medicaid Services (CMS) rules and regulations
- Understand/oversee Quality Assessment and Performance Improvement (QAPI) activities.
- Gain experience in developing, executing, and updating center-specific policies and protocols, understand the implications of being flagged and strategies to avoid it.
- Understand finances of transplant, including the Medicare cost report, the various financial models of transplant centers and the financial expectations and methods of support of the medical specialties.
- Understand the transplant referral process and collaboration with referring providers, hospitals, dialysis units, referring physicians, and the community at large.

These skills are summarized in greater detail in Table 3 and may be viewed as an initial guide for transplant nephrologists aspiring to become a KTMD. Some of these educational activities can be easily incorporated into fellowship training such as need for a QI project

TABLE 3 Recommendations for career development: building foundational skills toward medical directorship

Metrics	Examples
Establish a record of postfellowship training (mandatory)	Completion of an AST-accredited Transplant Fellowship Maintenance of patient log demonstrating acceptable clinical experience
Gain experience in Quality Assessment and Performance Improvement	Development and oversight of QAPI projects within the hospital program
Attend regional UNOS meetings, volunteer for UNOS committees	Involvement in allocation and policy development at the local OPO Understand the transplant regulatory environment
Enhance clinical expertise	Attendance in CME activities through the American Transplant Congress, ASN, and/or National Kidney Foundation–transplant-focused symposia Expanded education in tissue typing
Develop a network of mentorship and collaboration	Membership in AST committees and communities of practice (COP; eg, the Trainee and Young Faculty COP, Kidney Pancreas COP, and Living Donor COP) Volunteering for subcommittees and workgroups within COP
Increase knowledge of transplant finance	Local education with transplant administration, attendance at national workshops
Establish track record in leadership role, navigating institutional processes	Participating in and chairing committees at transplant center, hospital, and (if applicable) university Participating in leadership courses at the institutional level
For academic centers: establishing a record of scholarly activity and national recognition	Advancement according to institutional metrics; examples include: Invited lectures for transplant centers, local, regional, and national meetings Participation as site Principal Investigator in clinical trials

and mandatory participation in selected administrative meetings. Others would have to be attained via webinars, management conferences, and leadership programs offered at their institution. In the future, a longitudinal training program with regularly scheduled workshops could be provided with collaboration among key stakeholders including the AST, TNFTAP LLC, UNOS, and American Society of Transplant Surgeons.

6 | SUMMARY

With increasing complexity in the regulatory, financial, and administrative aspects of transplantation, there is a growing need to define the enhanced responsibilities of the Kidney Transplant Medical Director and provide educational opportunities both in fellowship training and beyond. Current management conferences such as UNOS Transplant Management Forum, American Society of Transplant Surgeons Transplant Management Boot Camp, or the Kellogg/Northwestern transplant management course are excellent resources, but do not specifically focus upon the needs of the Medical Director. In the future, a program should be designed to fill these gaps for education of Medical Directors beyond clinical activities designed for individuals practicing in different settings, that is, academic vs nonacademic, and small- vs large-volume programs, realizing that each brings unique challenges. It is expected that this White Paper will provide a construct from which these focused opportunities can be developed, beginning with plans by the AST for a Kidney Transplant Medical Director's forum at the forthcoming American Transplant Congress.

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DATA AVAILABILITY STATEMENT

Data sharing not applicable to this article as no datasets were generated or analyzed during the current study.

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