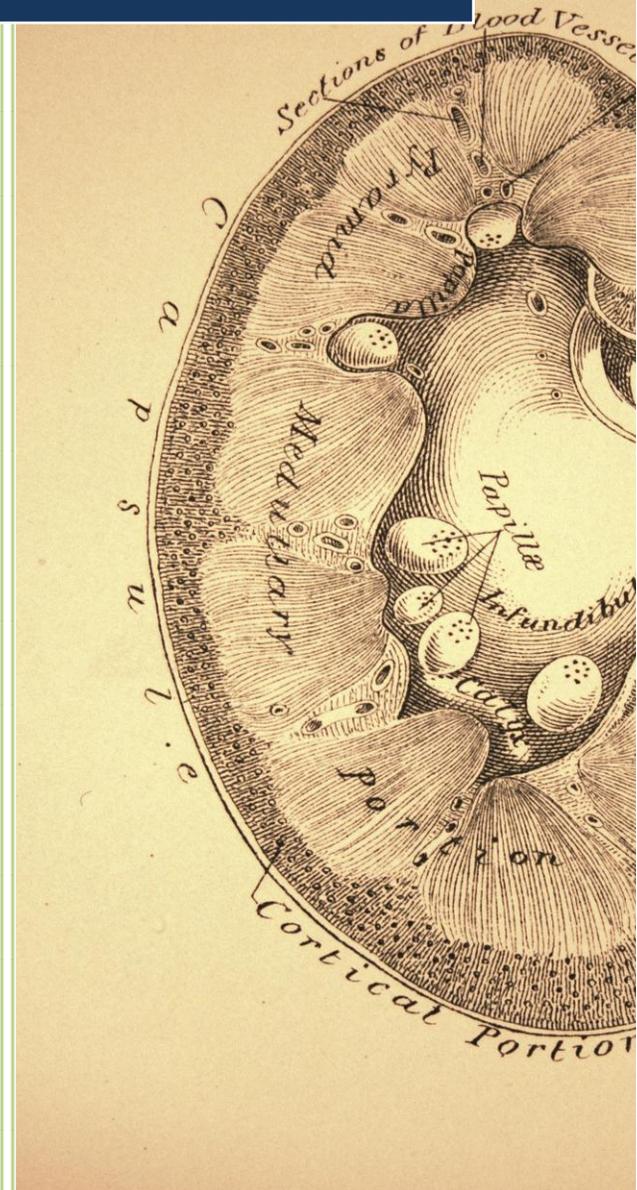


Managing Long-Term Outcomes for Kidney Transplant Patients: An Integrated Needs Assessment

Transplant Surgeons

April 20, 2012



Executive Summary

Since the first successful kidney transplant between identical twins in 1954, surgical techniques, pharmacotherapy, and organ donor registries have improved, making renal transplant the therapy of choice for a growing number of individuals.

Short-term care of kidney transplant patients focuses on suppressing the immune system to prevent the body from rejecting the new organ. This necessitates strong immunosuppressive medication that leaves the patient vulnerable to infection. Over time, the drug dosage is lowered and the risk of infection lessens, but kidney transplant recipients must take immunosuppressive medication for the rest of their lives. These drugs have serious adverse effects, including cancer, diabetes, bone disease, hypertension, dyslipidemia, and many other medical conditions. Physicians who manage the long-term care of kidney transplant patients must identify treatment that maximizes kidney function and averts rejection while simultaneously minimizing the risk of short- and long-term adverse effects.

In the United States, the increasing population with end-stage renal disease, better survival rates among transplant recipients, and advances in surgery and medicine that make transplant an increasingly viable option all contribute to the growing number of individuals living with a donor kidney. Increasingly, transplant surgeons — together with community nephrologists, transplant specialists, and other health care professionals — are expected to actively participate in the longitudinal management of kidney transplant recipients. Consequently, communication, coordination of care, delineation of roles and responsibilities, and effective referral procedures are key issues in the management of transplant patients.

This integrated needs assessment was designed to:

- Identify and quantify the attitudes and educational and behavioral needs of transplant surgeons surrounding the care of patients with kidney transplants.
- Assess current clinical performance to assure long-term graft and patient survival.
- Identify learning preferences, including educational interventions, preferred by transplant surgeons.
- Quantify the forces, attitudes, and barriers to practice improvement and the corresponding readiness of physicians to change.

Addressing gaps surrounding the management of the kidney transplant patient requires a multifaceted evaluation of the forces that impact patient care so appropriate educational strategies can be designed. Identifying variables that impact physician behavior is key to meeting educational challenges and

capitalizing on learning opportunities. This needs assessment project integrates data from the following sources to identify opportunities for physician education:

- Survey and analysis of clinical literature surrounding post-graft management and chronic care of kidney transplant patients.
- Review of relevant clinical guidelines on kidney transplant care.
- In-depth interviews with stakeholders, including transplant surgeons, nephrologists, urologists, and associated health care professionals.
- Analysis from a validated assessment tool completed by more than 200 specialists. The tool assessed clinician treatment behavior, perceived competency, barriers to care, clinical knowledge, and educational preferences.

This targeted report presents specific qualitative and quantitative findings from transplant surgeons — including urologists, nephrologists and general surgeons — who manage care of kidney transplant patients.

This needs assessment was funded through an educational grant from Pfizer Medical Education Group. The project was completed using a collaborative process between the participating organizations; no one member could have completed this rigorous analysis without the challenge and support of the others. This spirit of collaboration should continue with continuing medical education professionals designing education and interventions to improve the ongoing care of kidney transplant patients.

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Needs Assessment Overview

The behavior of physicians and health care professionals depends not only on skill and knowledge, but also on the clinical environment and the forces at play within that environment. For physicians and health professionals to change, systems and stakeholders must also change. This needs assessment was designed to:

- Identify barriers to best practice at individual and system levels
- Develop tools to assess the knowledge, attitudes, and practice gaps of transplant specialists
- Assess the knowledge, skill, and/or attitude gaps of transplant surgeons related to the care of the kidney transplant patient
- Determine how various factors, including systems factors, work together to accelerate or impede clinician adherence to best evidence
- Identify optimal change strategies and the resources to close the identified gaps

Research Questions

The following questions regarding the care of kidney transplant patients were addressed during this study:

- How are physicians and health care professionals managing patients through the life of the graft compared to consensus statements and standards of care?
- How do clinicians perceive their own care of kidney transplant patients?
- What gaps in knowledge, attitude, skills, and behavior exist that can be addressed through education?
- What are the most appropriate formats for educational interventions?

Stakeholders

This larger needs assessment project focused on three populations: community nephrologists, transplant specialists (primarily nephrologists who practice at transplant centers), and transplant surgeons—including urologists, nephrologists and general surgeons—who manage care of kidney transplant patients. Transplant coordinators and nurses who work with these patients were also included in the qualitative components of the needs assessment in order to provide a broader perspective of the physician needs.

This report presents quantitative and qualitative needs assessment results from the transplant surgeon group, as well as touching on comparisons and interactions between the three target groups. Specific results for community nephrologists and transplant specialists, as well as a comprehensive project report, are available as separate documents.

Needs Assessment Methodology

To identify the educational strategies needed to close the gaps in care, we first performed a thorough and detailed review of evidence-based literature, observational studies, guidelines, consensus statements, and research initiatives surrounding the care of kidney transplant patients. **Table 1** outlines various clinical guideline statements consulted during this process.

Guideline Title	Organization	Year(s) of Publication
Caring for Australasians with Renal Impairment (CARI) Transplantation Guidelines ⁱ	Australian and New Zealand Society of Nephrology (ANZSN), Board of Kidney Health Australia (KHA)	2005-2010 (various)
KDOQI Guidelines for CKD Care and Dialysis Care ⁱⁱ	National Kidney Foundation Kidney Disease Outcome Quality Initiative (NKF KDOQI)	2000-2009 (various)
KDIGO Guideline for the Care of the Transplant Patient ⁱⁱⁱ	Kidney Disease: Improving Global Outcomes (KDIGO)	2009
Guidelines on Renal Transplantation ^{iv}	European Association of Urology	2003 (full-text update 2009)
Immunosuppressive therapy for renal transplantation in adults ^v	National Institute for Clinical Excellence (NICE)	2004
European Best Practice Guidelines for Transplantation ^{vi, vii}	European Renal Association, European Dialysis and Transplant Association	2000 (Part 1) ; 2002 (Part 2)
United Kingdom Guidelines for Living Donor Kidney Transplantation ^{viii}	British Transplantation Society, the Renal Association	2000

Table 1: Clinical Guideline Documents for Kidney Transplantation and Disease

Of these documents, the main evidence-based comprehensive clinical guideline for the ongoing care of kidney transplant patients is a 2009 publication from *Kidney Disease: Improving Global Outcomes* (KDIGO). Results from 3,168 randomized control trials, 7,543 cohort studies, and 1,609 reviews informed the *KDIGO* recommendations, while previous publications on long-term management—such as part two of the European Best Practice Guidelines for Renal Transplantation, released in 2002—were based primarily on expert opinion.¹²

After the literature assessment was complete, we employed a number of distinct needs assessment techniques to identify gaps and determine the barriers to providing optimal patient care. These techniques included in-depth interviews with stakeholders, focus groups with target audiences, a Change Readiness Inventory® (CRI), a knowledge assessment tool, and a practice assessment tool.

Individually, each needs assessment component provides a unique perspective into the actual and perceived needs of clinicians as well as their barriers to best practice. Moreover, the systematic and integrated evaluation of all needs assessment components identifies and validates knowledge, attitudes, competencies, current clinical practices, and external systems barriers.

All needs assessment methods were designed to reflect the diversity of the practice settings in which care is provided. The provider-focused needs assessment methodology described below provides a multi-dimensional perspective on educational needs; results may be used to inform the development of educational interventions and encourage maximal impact on educational, behavioral, and clinical outcomes.

Qualitative Assessment

Interviews

To better target the needs of the learner, seventeen in-depth interviews were conducted with transplant specialists (ten of whom were urologists). They served to identify key issues and influences on clinical behavior, patient management, and educational needs. The interviews also helped identify touch points in the diagnosis, treatment, and long-term management of the kidney transplant patient as well as explore practice management issues that impact therapeutic decision-making. Twenty-nine interviews were also conducted with other stakeholders who work with transplant specialists to provide care to kidney transplant patients, including community nephrologists, transplant specialists, transplant coordinators, and one transplant medical social worker.

Project partners used the resulting information gathered through the literature review to create an interview guide that was then reviewed by a clinical expert. The interviews were conducted by telephone and lasted approximately one hour; participants were compensated for their time. Researchers used existing partner relationships to access interview participants.

Focus Groups

Project partners conducted and moderated focus groups in order to better understand the influence that each stakeholder group has on the clinical approach to and the long-term management of kidney transplant patients. This approach allowed researchers to discuss the topic areas of the one-on-one interviews in a group setting and develop the assessment tools for the quantitative phase of research.

Five of the six focus groups incorporated transplant surgeons:

- Two focus groups were conducted with transplant surgeons (urologists) in conjunction with the American Urological Association's Annual Meeting in Washington, D.C. (May 2011).
- Two focus groups were conducted with mixed-specialty teams affiliated with specific transplant centers in Detroit, MI (March 2011) and Birmingham, AL (April 2011). These teams included community nephrologists, transplant surgeons, transplant coordinators, and transplant specialists (nephrologists).

- One focus groups of transplant surgeons and specialists was conducted in conjunction with the American Transplant Congress (May 2011).

These sessions served to revise and validate the practice assessment and knowledge assessment questions.

Quantitative Assessment

Information from the interviews and focus groups aided in developing and refining the online assessment tool, consisting of three distinct sections. Each section provided valuable quantitative information and, cumulatively, allowed analysis on the perceived and actual needs of the learners. The three sections of the assessment are highlighted below:

- *Change Readiness Inventory® (CRI)*: The CRI measured attitudes, perceived needs, and barriers in clinical practices. The *clinical competencies* section was developed in cooperation with clinical experts from the American Society of Transplantation, referencing current literature. This section was used to establish the *perceived needs* of the target audience.
- *Knowledge and Practice Assessment tools*: These tools were designed to assess current knowledge and actual clinical behavior related to the long-term care of kidney transplant patients. The tools assessed a comprehensive baseline of physicians' knowledge and clinical care behavior in the management of immunosuppressive therapy as well as the recognition and treatment of common co-morbidities in transplant patients. The knowledge and practice assessment tools provided a self-report of clinicians' attitudes and behaviors surrounding the delivery of care and collected details regarding specific treatment modalities and reasons for treatment choices. Results present a quantitative measure of clinician's knowledge and skill gaps.
- *Educational Preferences Assessment*: The final portion of the quantitative survey assessed educational preferences. Questions were designed to determine the best formats in which to present educational activities. This helps to identify the preferred topics, design, learning format, and platform for the target learner groups. From this information, educational planners may design interventions that provide the greatest potential to impact clinical practice and patient health.

Specific survey questions were developed by Healthcare Performance Consulting, the American Urological Association, and the American Society of Transplantation. Items were reviewed by clinical experts and validated with a sample of the target audiences. The survey was posted online and a link was disseminated via email to members of the three target audiences.

The survey was distributed to 117 transplant surgeons, recruited through the American Urological Association, who had completed specialty training in urology. Sixty individuals responded for a total response rate of 51 percent. Additional data were collected from transplant surgeons at the AUA annual meeting, held in Washington, D.C., in May of 2011.

The complete text of the survey can be viewed in Appendix 1 (page 33).

Qualitative Results

The in-depth interviews and focus groups were designed to assess key issues and influences on the complex management of kidney transplant patients. The interviews identified numerous challenges in coordinating the care of patients throughout their transplant journey, from the community nephrologist's initial referral to a transplant center, to the subsequent transition of the patient back to the community nephrologist, to the continuing care of the patient for ongoing primary care issues.

Stakeholders stated that the management of kidney transplant patients is challenging, time-consuming, and often requires a great deal of communication and coordination of care. Major challenges include managing immunosuppressive therapy, managing co-morbidities that often worsen after transplant, patient adherence and compliance issues, and monitoring and screening for signs of organ rejection, cancer, infections, and osteopenia. The issues that were discussed were consolidated into key themes, exemplified by direct quotes gathered from interviewees.

Key Themes from the Interviews

Coordination and Continuity of Care

Care must be carefully coordinated between the community/referring nephrologist and the transplant center both before and after the transplant. A number of challenges, both systemic and personal, affect this coordination of care. Communication between various physicians who care for the patient is, at times, sub-optimal. Often, reports such as doctor visits, labs, or screenings are not communicated in a timely manner between the primary care physician, community nephrologist, and transplant center. For the first three months after transplant, patients are seen primarily by the transplant specialist and surgeon; after three months, care is typically transitioned to the community nephrologist and/or the primary care physician and other specialists.

Ideally, the transplant centers would see patients quarterly for one year post-transplant and once a year thereafter; in actuality, this schedule varies widely. Patient distance from the transplant center, access to a community nephrologist, and patient preference play a role in how post-transplant care is provided. Patients located far from the transplant center may not return as frequently. Ideally, the nephrologist monitors kidney function and frequently co-manages co-morbidities with a primary care provider or other specialist(s). However, some patients do not have access to a community nephrologist, and are cared for by a primary care provider; other patients who see a community nephrologist may or may not have a primary care doctor as well. Either one may manage cancer screenings, monitor for osteoporosis and risk of infections, and provide appropriate vaccinations. The transplant center most often manages any changes to immunosuppression, but relies on the community nephrologist or primary care provider to communicate lab results or other patient data.

Busy community nephrology practices may lose track of transplant patients after a period of time. Patient and family education is crucial to ensure that patients get the appropriate screenings and are alert to additional risks for illness and disease, such as osteoporosis, certain cancers, and infection. Patient understanding that immunosuppression places them at greater risk for these conditions contributes to their motivation and adherence to appointments and medication regimens.

The development of protocols and communication strategies to identify a lead physician in ordering surveillance testing would benefit providers and patients. Up-to-date patient information should be shared in a timely manner.

“Patient management post-transplant is the art and science of medicine – the challenge of balancing immunosuppression efficacy versus side effects, toxicity and patient tolerance.”

Patient Diversity

Kidney transplant candidates represent a broad spectrum of patients: from relatively healthy to those with multiple co-morbidities and chronic diseases; from wealthy to poor; and from motivated to unmotivated. The ages of transplant patients range from teens to seniors, each presenting unique needs and challenges. Generally, younger patients tend to be less adherent. Pre- and post-transplant patient assessments by health care team members attempt to identify specific patient management issues.

Management of Co-Morbidities and Complicated Drug Regimens

Interviewees across all specialties note the many challenges in managing the multiple co-morbidities seen in transplant patients. Some of the most common co-morbidities include diabetes, kidney disease, hypertension and hyperlipidemia. Because most of these are treated with medication, the potential for drug interactions with immunosuppressive therapy is a major concern. Interviewees are apprehensive about pharmacies making generic substitutions, especially for immunosuppression medications that they feel may not be therapeutically equivalent. Interviewees also indicated that this switch confuses patients, since the pills may be a different color and shape. When asked about educational needs, participants listed ‘improving their ability to manage multiple co-morbidities’ and ‘recognizing the signs and symptoms of drug interactions’ as areas of interest.

“Pharmacy can change immunosuppression meds to generic willy-nilly, and it can be a problem for patients to recognize pills.”

Patient Adherence

Clinicians across all specialties agree that patient adherence (patient compliance) is an important, challenging, and time-consuming issue that affects all members of the health care team (transplant surgeon, nephrologist, coordinator, social worker, pharmacist, community nephrologist, and primary care physician). The complexities involved in managing the transplant patient present a challenge to patient adherence. Numerous financial issues play a role as well, including loss of a job and/or changes in insurance coverage, the costs of multiple medications, the costs associated with numerous doctor and lab appointments, and periodic visits to the transplant center. According to the clinicians, taking time off work to go to doctors' appointments, traveling to the transplant center, and transportation costs all were of concern to patients as well. Furthermore, patients may lose Medicare and/or Medicaid coverage at three years post-transplant.

Motivating patients to follow long-term, complex treatment plans is also a challenge. While younger patients and teens are often less adherent, family members play an integral part in ensuring that patients of all ages follow physician recommendations. If adherence is a concern, drug levels may be periodically checked to detect if the patient is taking his or her medications as prescribed. Some patients develop a strong, supportive relationship with the dialysis center staff and experience feelings of loss following transplant, which may affect adherence as well. Patients who are doing well post-transplant may skip follow-up appointments, lab work, and medications; though some can tolerate this, others will get into trouble. Frequently, patients are evaluated by a social worker pre-transplant to determine the likeliness of compliance post-transplant (e.g., was the patient compliant with dialysis, doctor's appointments, and lab work?).

Educational needs in this area include developing processes to educate patients and family members on the importance of long-term adherence and establishing communication guidelines, protocols, and adherence monitoring strategies. Helping patients access community resources that cover medication costs may also have a positive impact on patient adherence.

“Compliance with medications long-term can be challenging. Patients who are doing well may skip doctors' appointments, lab work, and meds: some will get by, and some will run into problems.”

Treatment Protocols and Guidelines

Treatment protocols and recommendations for patient follow up are developed by transplant teams (transplant surgeons and transplant specialists at each transplant center) and are based on clinical evidence from the literature as well as transplant center experience. Whenever possible, the transplant team develops standing orders and then customizes treatment based on individual patient needs. National guidelines are used to manage multiple co-morbidities, although most accepted national

guidelines for chronic disease and co-morbid conditions are not specific to transplant patients. AST, *KDIGO* and *KDOQI* guidelines were mentioned as providing useful general recommendations for patients with chronic kidney disease, although there are fewer evidence-based guidelines specifically for transplant patients. Some clinicians were not aware of specific guidelines for transplant patients.

Interviewees report that they rely heavily on teamwork to develop and update protocols. Typically, protocols are reviewed on an annual basis or when there is a change in leadership at the transplant center, and revised as needed. Educational needs in this area include developing a mechanism to educate community nephrologists and primary care providers (PCPs) on any protocol changes. Because community nephrologists and primary care clinicians may care for patients from multiple transplant centers with varying protocols, communication is vital to maintaining optimal patient care.

Immunosuppression and the Use of Steroids

The transplant team usually takes the lead in managing immunosuppression. The use of steroids varies among transplant centers. Most transplant centers use steroid minimization, rapid tapering, or steroid-free protocols (except for patients with underlying conditions, such as lupus). Centers report no change in patient outcomes with steroid minimization. Interviewees agree that it is a challenge to balance the risk for toxicity (over-immunosuppression) with the risk of rejection (under-immunosuppression). Patients who receive multiple transplants represent additional challenges, as they develop more antibodies and have a greater risk for graft rejection; therefore, every effort is made to encourage the first kidney transplant to last as long as possible. Most transplants are successful for at least five years. Years five to 10 post-transplant are often more difficult due to the long-term effects of immunosuppression and worsening co-morbidities. A transplant lasting 10 to 15 years is considered a very good result.

“Managing the risk of toxicity due to over-immunosuppression vs. the risk of rejection due to under-immunosuppression is complex. A kidney transplant survival of five to 1 years is considered good.”

Identifying potential drug interactions is a continual process. Risk factors and signs and symptoms of rejection must be frequently monitored (e.g., trends in creatinine levels, ultrasound if obstruction is suspected, biopsy if there are concerns about rejection, testing for BKV and CMV).

Interviewees expressed an interest in education related to best practice protocols, case studies on managing immunosuppression in first-time and repeat transplant patients, and how to manage adverse events related to over- or under- immunosuppression. Information on best practices and results for various steroid use protocols (steroid free, steroid minimization, and rapid tapering) would also be valuable.

“There is consensus that avoiding or minimizing steroids is the right approach due to side effects and aggravating comorbidities, though there is variation on how this is done.”

Most Recent Changes in Clinical Practice

When asked about recent changes in their practice, transplant specialists and surgeons stated that they were using fewer steroids, increasing testing for BKV (due to an increase in prevalence), and seeing more generic medication substitutions, especially the use of more generic immunosuppression agents. Educational needs cited included helping community nephrologists and primary care providers identify the signs and symptoms of rejection and determining course of action when creatinine levels are rising. Best practices and case studies on when to do biopsies would also be helpful.

Educational Opportunities for Transplant Center Physicians

Educational topics directed specifically toward transplant center physicians, including surgeons and specialists, may include:

- Managing chronic co-morbidities in the transplant patient
- Best practices and case studies on immunosuppression and steroid use
- Managing drug interactions
- Improving processes and communication with referring physicians, both pre- and post-transplant

Focus Groups

The focus groups allowed researchers to specifically target individual clinician groups to confirm interview findings and further explore the unique educational needs and opportunities of each specialty.

Specific findings for urologist transplant surgeons include the following:

- Challenges facing urologists in the management of kidney transplant patients center around co-morbidities and non-adherence to medication regimens.

“We are transplanting more comorbid people all the time...cardiovascular disease, diabetes, obesity, coming in with prior events in all these categories is challenging.”

- Urologists monitor for acute rejection by evaluating and continually monitoring the kidney function of the patient.
- Urologists use various signs to identify non-adherence to medication regimens: profiling patients, observing dialysis levels, checking weekly blood work, monitoring calcium levels, assessing the patient's financial situation, and using a database that alerts clinicians when patients miss appointments for blood work.
- Nearly all urologists in each group indicate that cultivating good relationships with nephrologists and dialysis centers is key in the continuity of care.

"I have to have a good relationship with my area nephrologists, not only for the good of the patient, but also so that the nephrologist will continue to refer his patients to my clinic for transplant and work with me in making sure patients are seen by the transplant centers at the earliest possible time."

- Finally, urologists indicated two areas of need regarding education and the expansion of transplantation within urology.
 1. The creation of a clinical guideline that covers the long-term (including pre-transplant) care of the kidney transplant patient is essential.

"There is a great need for the AUA to develop a comprehensive guideline that speaks to not only the long term care of transplant patients, but also helps general urologists identify certain risk factors associated with kidney transplant."

2. For transplant surgeons, all urologists indicated a marked need for the AUA to promote the subspecialty of transplantation among urologists, which starts with the residency programs.

"There are not enough people with urology experience that are conducting transplants. That is due to lack of training, lack of exposure during their residency, and the lack of intrinsic value that transplantations have; the residents don't know that transplants change these people's lives."

Transplant Center Focus Groups

Focus groups assessing transplant center staff revealed that systemic issues related to coordination of care are particularly troublesome. While transplant center clinicians have electronic health records available to them, the community physician may not, or electronic systems may not integrate. Regardless, communication and coordination is burdened by the need to record, review, and manage records that are partially on paper and partially electronic. Transplant coordinators spend hours a day pulling together patient information that would ideally be gathered by a system.

Additional issues identified included:

- Inadequate staffing to manage the patient load. Transplant coordinators may be responsible for up to 700 patients and cannot adequately monitor and oversee that number.
- Increasingly shrinking resources for providing care to patients who cannot afford it.
- Substitution of generic medications increases patient confusion, decreases adherence, and confuses assessment of efficacy.
- Community nephrologists, primary care physicians, and other specialists who care for kidney transplant patient have conflicting wishes about “who takes care of what.” It is difficult for the transplant center clinicians to balance the differing needs and desires. As an end result, clinical responsibilities tend to be handled on a case-by-case basis.

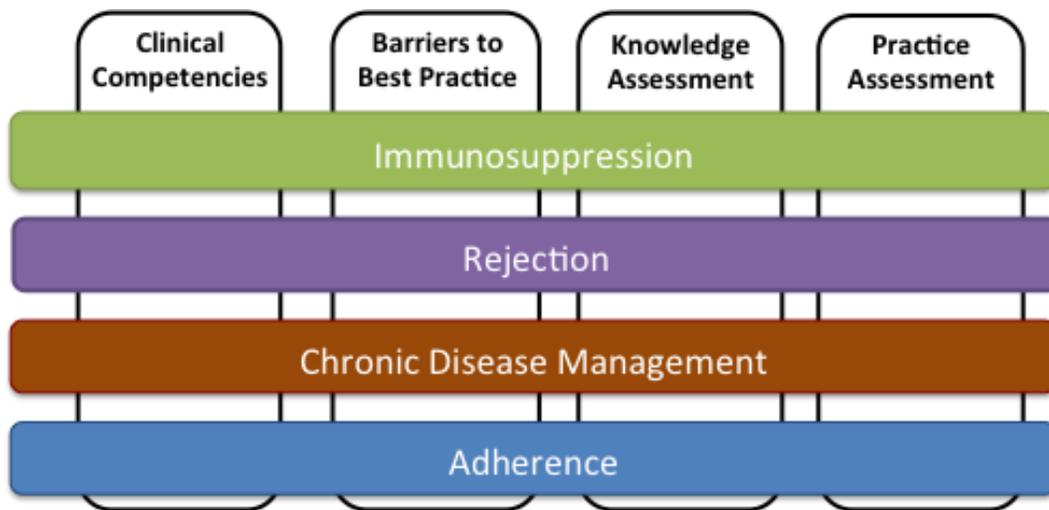
Quantitative Results

Development of the Quantitative Survey Instrument

After all in-depth stakeholder interviews and focus groups were complete, project partners performed a careful review and analysis of all available data in order to create a framework for a qualitative physician survey. Researchers determined that the most relevant issues in patient care could be categorized into four overarching themes:

1. Selection and management of immunosuppression therapy,
2. Risk and detection of graft rejection,
3. Chronic care of the kidney transplant patient (including management of co-morbidities and chronic disease), and
4. Patient adherence to therapy.

All sections of the quantitative survey were designed to collect further data in each of these four topics, as illustrated in the following graphic. Throughout this document, charts and items that relate to each topic will be color-coded according to the graphic below: *immunosuppression* is green, *rejection* is purple, *chronic disease management* is maroon, and *adherence* is blue.



The individual quantitative assessment tools—which assessed competency, barriers to best practice, knowledge, and practice—were combined into a single survey in order to define relationships between knowledge, clinical practices, competencies and barriers. The relationship between these items is shown below in **Table 3**. While some items overlap and correlate, they may be grouped into 4 basic categories: **Immunosuppression**, **Rejection**, **Chronic Care**, and **Patient Adherence**. The groups and related charts will be color-coded throughout this report to reflect this correlation. Qualitative findings and educational implications also fall neatly within these categories, and will be organized and color-coded accordingly.

Competencies	Barriers	Knowledge Questions	Practice Questions
Immunosuppression			
C1....select an effective immunosuppressive drug regimen that attains adequate protection of the kidney allograft against rejection. C2....minimize short- and long-term adverse side effects of immunosuppressive medications. C3....identify potential interactions between immunosuppressive agents and other medications.	B1. I do not always have access to the patient information that I need to make the best decision about patient management. B3. We are not able to utilize the best therapies due to cost constraints. B4. Many patients cannot afford the treatments that will keep them healthy. B6. Primary care physicians are not adequately trained to manage the complexity of a transplant patient.	K1,K2,K3, K4,K7	P1, P2, P3
Rejection			
C4....identify risk factors for acute rejection. C5....detect signs and symptoms of acute graft rejection by monitoring creatinine levels. C6.... attain an allograft biopsy to determine if rejection is occurring.	B1. I do not always have access to the patient information that I need to make the best decision about patient management. B2. Access to the transplant center is limited. B4. Many patients cannot afford the treatments that will keep them healthy. B6. Primary care physicians are not adequately trained to manage the complexity of a transplant patient. B8. There is too much of a delay between when a patient first shows elevated creatinine and when they return to the center for appropriate testing and management.	K5	P3
Chronic Care			
C7....coordinate with other specialists or primary care physicians to manage co-morbid conditions (diabetes, hypertension, cardiovascular disease). C8....use screenings to detect cancer in the transplant patient. C9... monitor as appropriate for osteoporosis (calcium serum levels, phosphorus, bone-mineral density, and plasma intact PTH). C10....mitigate risk of infection by appropriate use of prophylactic antibiotic, antiviral and antimycotic treatment. C11....appropriately vaccinate six months post-transplant using inactive vaccines.	B1. I do not always have access to the patient information that I need to make the best decision about patient management B2. Access to the transplant center is limited and causes problems. B6. Primary care physicians are not adequately trained to manage the complexity of a transplant patient. B7. There is insufficient staff in our practice/facility to be able to support transplant patients as well as we should. B8. There is too much of a delay between when a patient first shows elevated creatinine and when they return to the center for appropriate testing and management. B9. Coordination of care for co-morbid conditions causes problems.	K6, K8, K9, K10, K11, K12	P5, P6, P7, P9, P10
Adherence			
C12....identify risk-factors for non-adherence to medication regimens. C13....effectively communicate risks of non-adherence to patients and family	B4. Many patients cannot afford the treatments that will keep them healthy. B5. Patients are not honest with me about adherence to their treatments	No related knowledge questions	P8

Table 3: Relationships Between Competencies, Barriers, and Knowledge/Practice Questions (Immunosuppression, Rejection, Chronic Care, Adherence)

Demographics

The assessment was distributed to three target specialties: community nephrologists, transplant surgeons, and transplant nephrologists. Responses were distributed evenly between the three specialty groups (Figure 1, below).

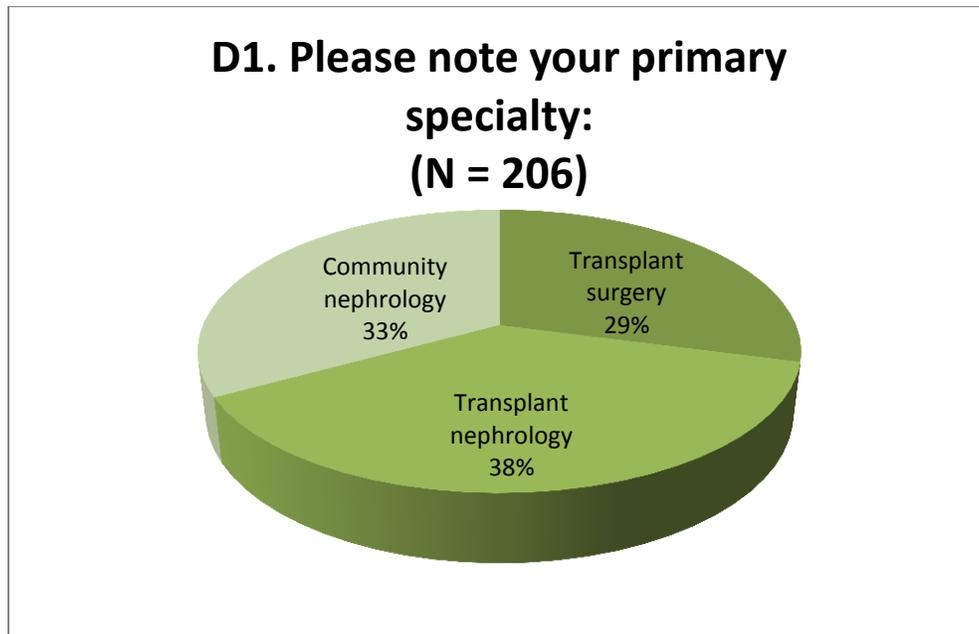


Figure 1: Primary Specialty

Of 206 total respondents, 60 identified themselves as transplant surgeons. The charts presented in this document graphically illustrate the responses of these 60 individuals. Select charts are included in this section; additional charts may be viewed in Appendix 2 (page 43).

There is variation in the number of transplant patients seen by each specialty in a typical week. Transplant surgeons are most likely to see 10 or fewer patients per week or 11-25 patients per week (39% and 41% of respondents, respectively; see Figure 2).

D2. Approximately how many transplant patients do you see in a typical week?

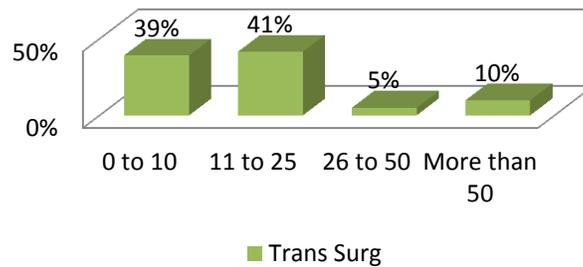


Figure 2: Patients Seen in a Typical Week

Clinical Competencies

The competencies are a series of statements that represent the abilities needed to successfully manage kidney transplant patients. These competencies were developed from clinical guidelines, current literature, and expert opinion. Physicians were asked to consider the following statements, then indicate both their *present* and *desired* levels of ability (from 1=*low* to 5=*high*) in performing each task.

- C1. Select an effective immunosuppressive drug regimen that attains adequate protection of the kidney allograft against rejection.
- C2. Minimize short- and long-term adverse side effects of immunosuppressive medications.
- C3. Identify potential interactions between immunosuppressive agents and other medications.
- C4. Identify risk factors for acute rejection.
- C5. Detect signs and symptoms of acute graft rejection by monitoring creatinine levels.
- C6. Attain an allograft biopsy to determine if rejection is occurring.
- C7. Coordinate with other specialists or primary care physicians to manage co-morbid conditions (diabetes, hypertension, cardiovascular disease).
- C8. Use screenings to detect cancer in the transplant patient.
- C9. Monitor as appropriate for osteoporosis (calcium serum levels, phosphorus, bone-mineral density, and plasma intact PTH).
- C10. Mitigate risk of infection by appropriate use of prophylactic antibiotic, antiviral and antimycotic treatment.
- C11. Appropriately vaccinate 6 months post-transplant using inactive vaccines.
- C12. Identify risk-factors for non-adherence to medication regimens.
- C13. Effectively communicate risks of non-adherence to patients and family

**Immunosuppression, Rejection, Chronic Disease, Adherence*

Transplant surgeons were asked to rate the importance of each area. Data were collected from urologist learners at a live session during the AUA 2011 annual meeting; participants indicated the importance of each competency using an audience response system (ARS).

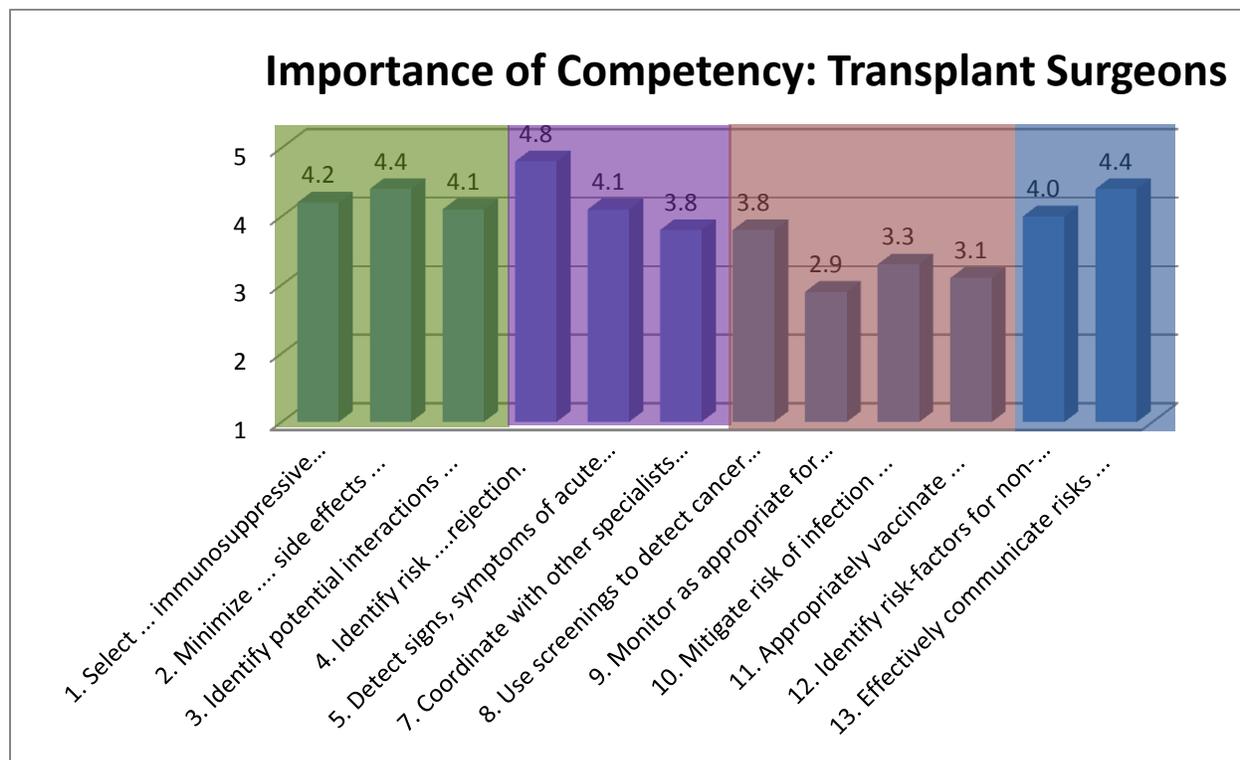


Figure 30: Transplant Surgeon Present and Desired Competencies (Immunosuppression, Rejection, Chronic Disease, Adherence)

Urologists place varying degrees of importance each competency. Several items rated lower than an average of 4.0 on a five-point scale (Figure 30):

- C9. Monitor as appropriate for osteoporosis (calcium serum levels, phosphorus, bone-mineral density, and plasma intact PTH).
- C8. Use screenings to detect cancer in the transplant patient.
- C11. Appropriately vaccinate 6 months post-transplant using inactive vaccines.
- C7. Coordinate with other specialists or primary care physicians to manage co-morbid conditions (diabetes, hypertension, cardiovascular disease).
- C10. Mitigate risk of infection by appropriate use of prophylactic antibiotic, antiviral and antimycotic treatment.

Barriers to Best Practice

Barriers are real or perceived issues that may prevent physicians from applying best practices. Knowledge of the nature and magnitude of these barriers helps educational designers address them within the scope of the interventions, and in doing so, encourage change in physician performance as well as change in knowledge and skill. These barriers were derived from expert opinion, data from the in-depth interviews, and literature on physician change.

The next set of statements represents barriers to best practice when managing transplant patients. Please rate each statement according your level of agreement as to whether the item represents a barrier to effective management of transplant patients. (1=Strongly Disagree, 5=Strongly Agree)

- B1. I do not always have access to the patient health information that I need to make the best decisions about patient management.
- B2. Access to the transplant center is limited.
- B3. I am not able to utilize the best therapies due to cost constraints.
- B4. Many patients cannot afford the treatments that will keep them healthy.
- B5. Patients are not honest with me about adherence to their treatments.
- B6. Primary care physicians are not adequately trained to manage the complexity of a transplant patient.
- B7. There is insufficient staff in our practice/facility to be able to support transplant patients as well as we should.
- B8. There is too much of a delay between when a patient first shows elevated creatinine and when they return to the center for appropriate testing and management.
- B9. Coordination of care for co-morbid conditions causes problems.

**Immunosuppression, Rejection, Chronic Disease, Adherence*

Figure 31 shows the list of statements arranged in order of respondents' highest perceived barriers. The bars to the right represent the percentage of respondents rating the barrier high (four or five on the five-point scale), indicating agreement. The bars to the left represent the percentage of respondents rating the barrier low (one or two), indicating disagreement.

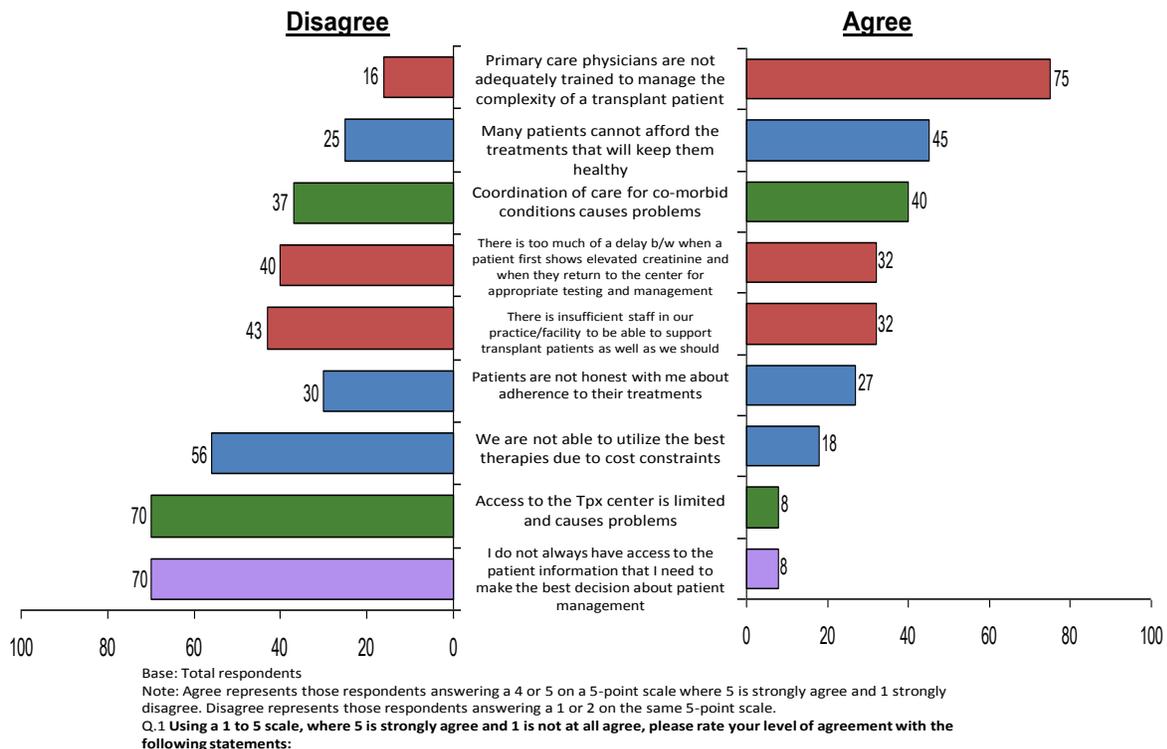


Figure 31: Transplant Surgeon Barriers to Best Practice (Immunosuppression, Rejection, Chronic Disease, Adherence)

Only one item garnered agreement from more than half of respondents: *B6. Primary care physicians are not adequately trained to manage the complexity of a transplant patient* (see Figure 31). The only other two barriers with which transplant surgeons agreed rather than disagreed were *B4. Many patients cannot afford the treatments that will keep them healthy* and *B9. Coordination of care for co-morbid conditions causes problems*.

Although fewer than half of transplant surgeons agreed with these two barriers, qualitative data suggest that they are indeed a problem that transplant surgeons must deal with in the long-term management of kidney transplant patients.

Knowledge Assessment

Prior to completing the knowledge questions, respondents were asked to indicate clinical aspects of transplant in which they felt the current body of knowledge and literature is “inadequate” to guide them in the best care of the transplant patient (Figure 32).

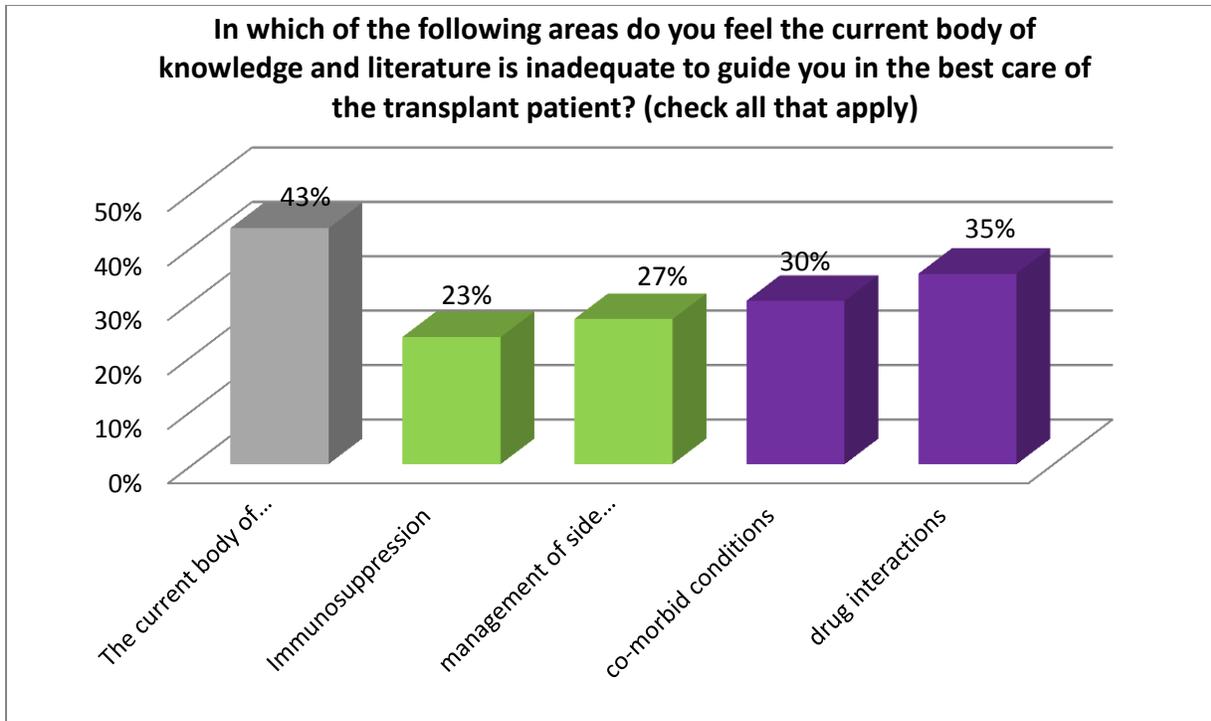


Figure 32: Transplant Surgeon Current Body of Knowledge and Literature (*Immunosuppression, Rejection, Chronic Disease, Adherence*)

Only 43 percent of the transplant surgeons indicated that *the current body of knowledge and literature is adequate*. The remainder of responses were divided, with *drug interactions* and *co-morbid conditions* selected as being inadequate by approximately one-third of transplant surgeons, while *Immunosuppression* and *Management of side effects* were rated as inadequate by about a quarter of respondents.

Subsequently, transplant surgeons were asked 12 knowledge-based questions concerning the long-term care of kidney transplant patients. Figure 33 represents the percentage of transplant surgeons correctly answering each question, with an additional score for the average percentage correct for all knowledge-based questions. The full text of the questions can be viewed in Appendix 1 (page 33).

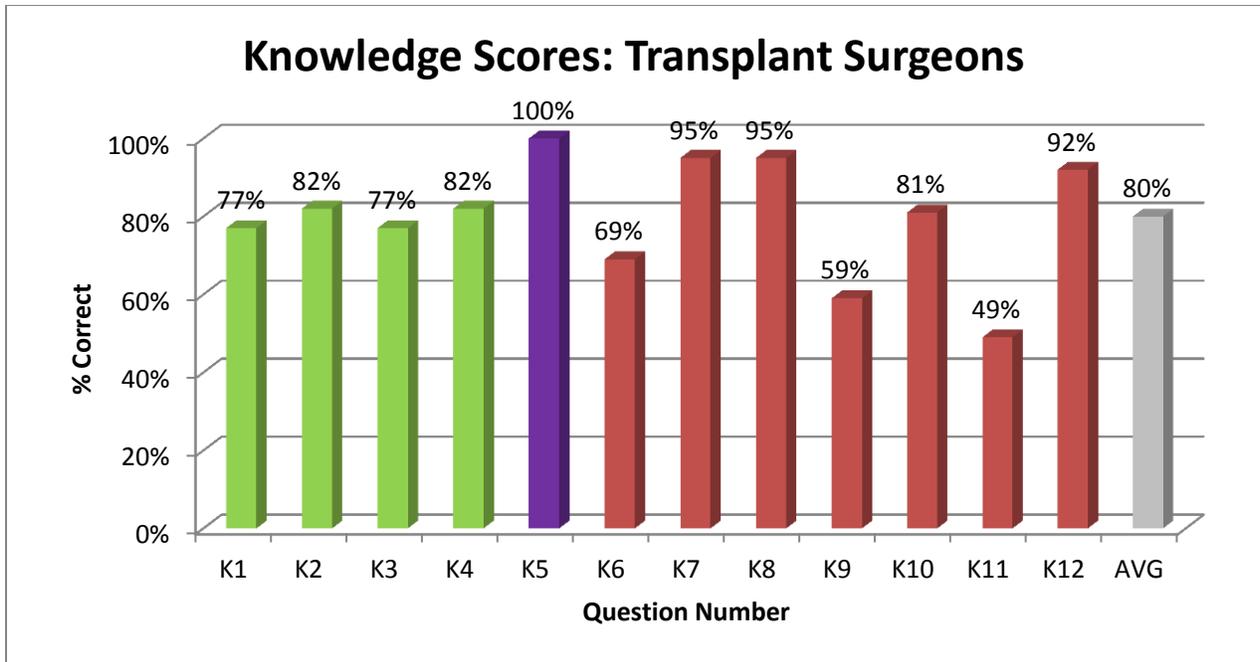


Figure 33: Transplant Surgeon Knowledge Questions (*Immunosuppression, Rejection, Chronic Disease, Adherence*)

Transplant surgeons' scores on the knowledge questions averaged 80 percent (Figure 33), while the score for one question fell below 50 percent. This clearly indicates need for additional knowledge-based educational efforts that could positively impact this population.

Practice Assessment Questions

The practice assessment questions were designed to assess actual clinical practices of the respondents. The results may be compared to best practices to establish real needs and their relationships to perceived needs and knowledge gaps. A selection of key practice question responses is shown below, with the remainder appearing in Appendix 2 (Page 43).

The first item of the practice assessment addresses attitude: **How comfortable are you monitoring immunosuppression?** On a one to five scale, (*1=very uncomfortable and 5=very comfortable*), transplant surgeons averaged 3.83. This represents slightly above the scale midpoint, showing that on average transplant surgeons are more comfortable than uncomfortable monitoring immunosuppression.

Nearly half of transplant surgeons (48 percent) play no role in immunosuppression at three months post-transplant, which confirms findings from the qualitative phase of the research. The remaining transplant surgeons either monitor immunosuppression and adjust dosages as needed to maintain the

set targets (43 percent), or change immunosuppression medications as needed (28 percent) (see Figure 34).

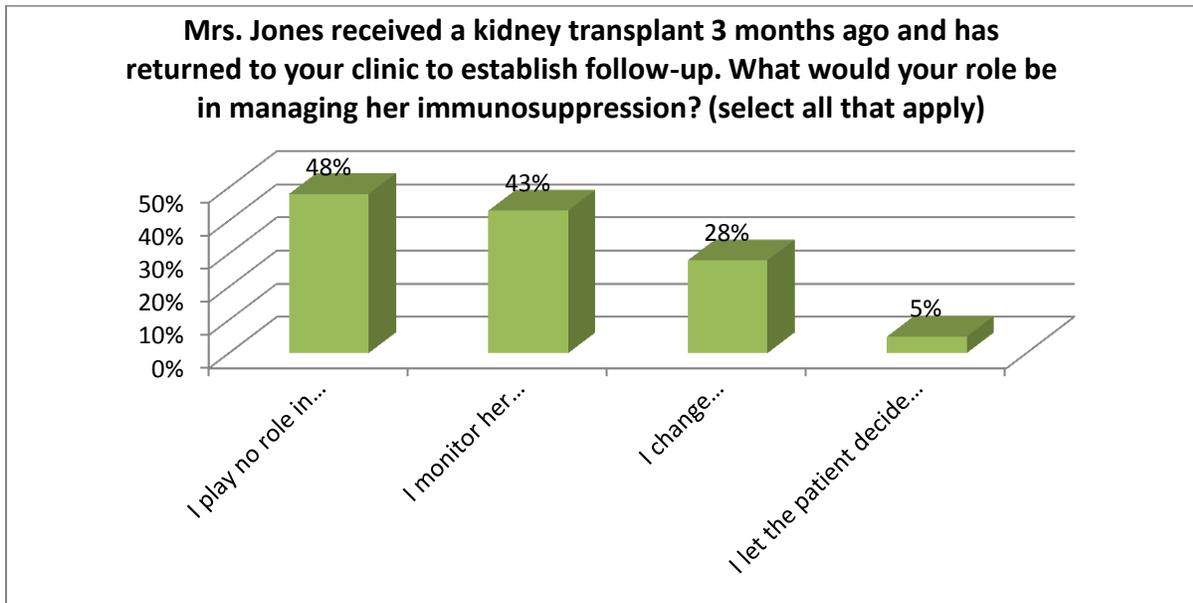


Figure 34: Transplant Surgeon Role in Immunosuppression Management

The majority of transplant surgeons (68 percent) prefer to independently manage their patients after they are released from the transplant center. Just over a quarter (27 percent) prefer to co-manage with the transplant center indefinitely, and very few (5 percent) prefer the transplant center to manage the patient until they develop progressive graft failure, requiring return to dialysis (see Figure 35).

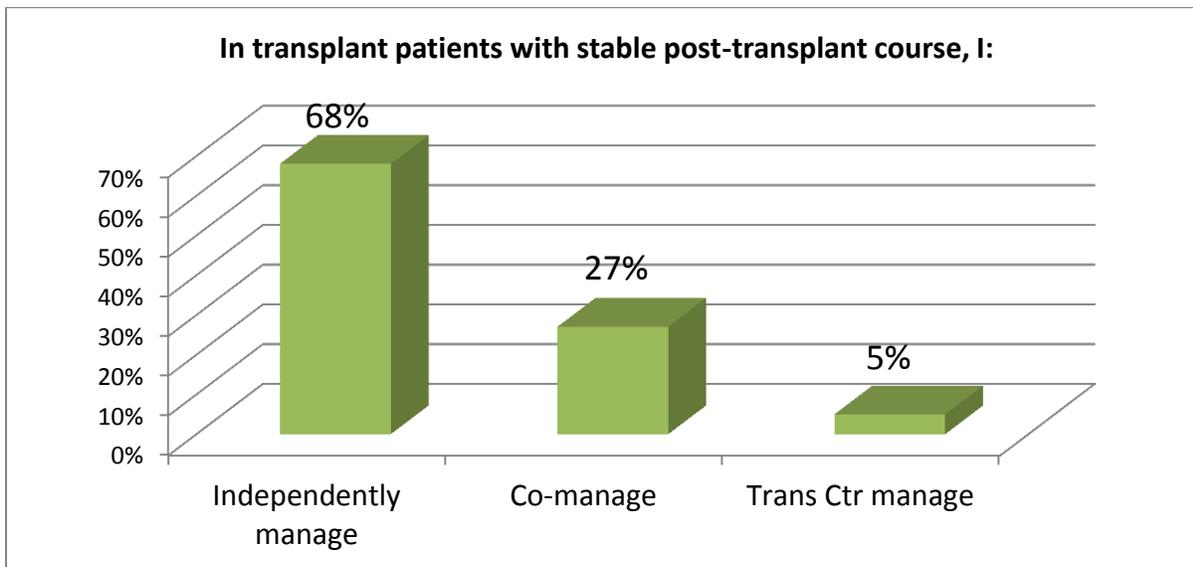


Figure 35: Transplant Surgeon Role in Managing Stable Transplant Patients

When managing long-term care of kidney transplant patients, the majority of transplant surgeons do not have the responsibility for the preventive care issues shown in Figure 36. Of the six preventive care issues rated, none rated three or higher on a five-point scale (where one indicates no responsibility and five indicates complete responsibility). As shown in the qualitative assessment, most preventive care issues were coordinated by the nephrologist or patient’s primary care team.

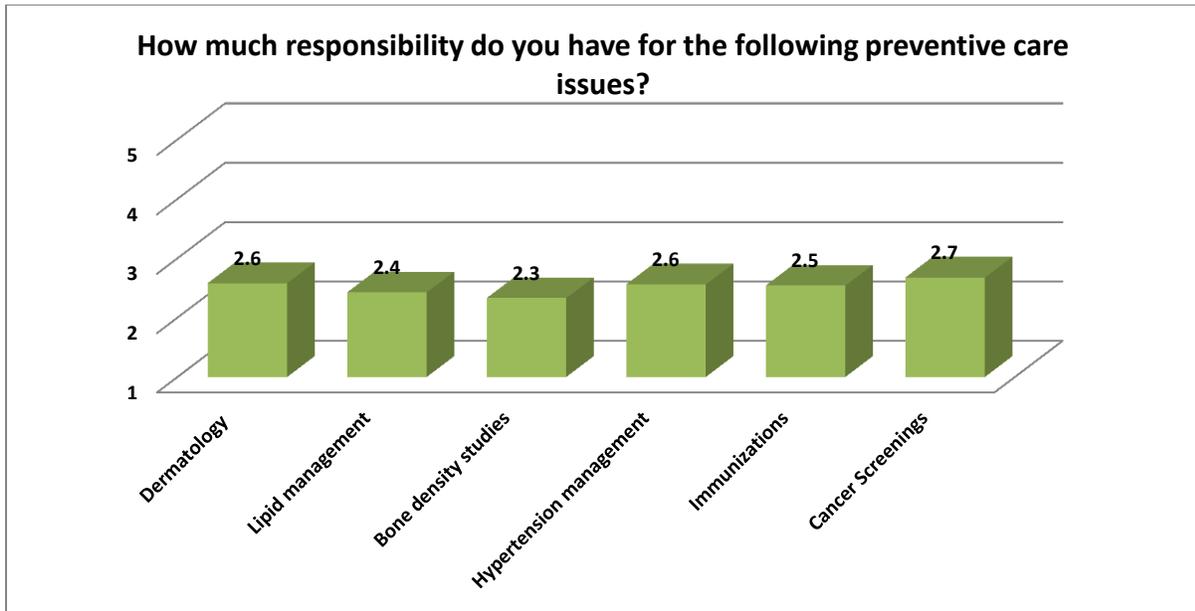


Figure 36: Transplant Surgeon Responsibility for Preventive Care Issues

When asked which vaccinations transplant surgeons administer to their patients, nearly all indicated they administer the annual influenza vaccination (94 percent), while just under two-thirds administer pneumococcal (64 percent) and approximately half administer hepatitis B (56 percent). Only one in five indicate they administer Tdap to their kidney transplant patients (See Figure 37).

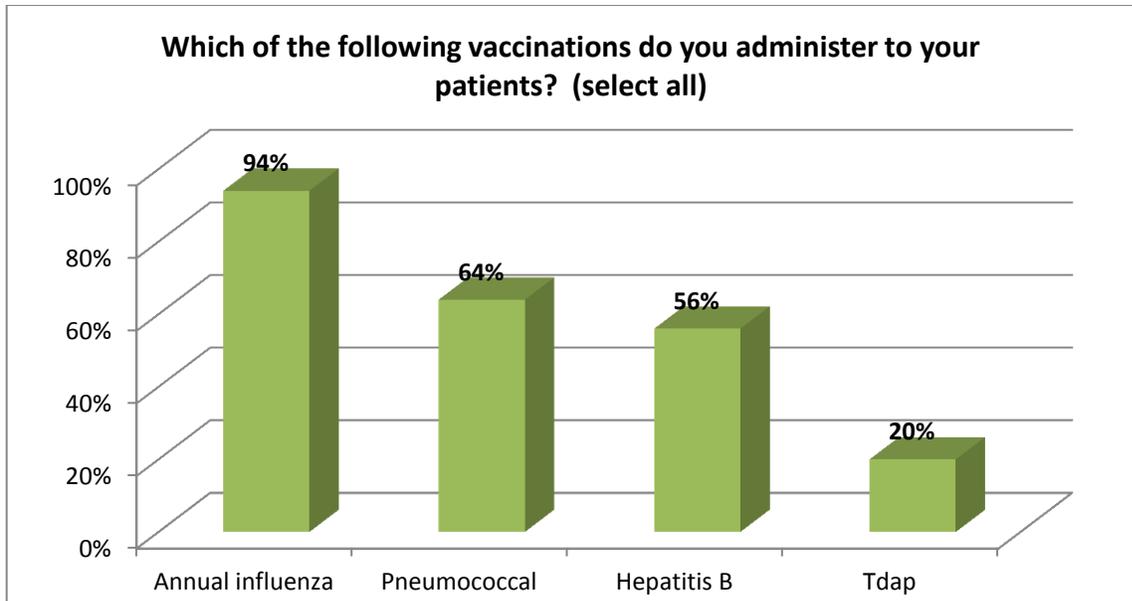


Figure 37: Transplant Surgeon Responsibility for Vaccinations

Because transplant recipients are at higher risk for bone disease, respondents were asked which monitoring methods they routinely use. Although there were a variety of responses, most respondents utilize methods in accordance with existing guidelines. Nearly three-fourths (74 percent) of transplant surgeons routinely utilize DEXA scans to monitor transplant patients for post-transplant bone disease. Just over half also use PTH levels (56 percent) and Vitamin D-25 levels (51 percent), and few use C-telopeptide levels (3 percent) (See Figure 38).

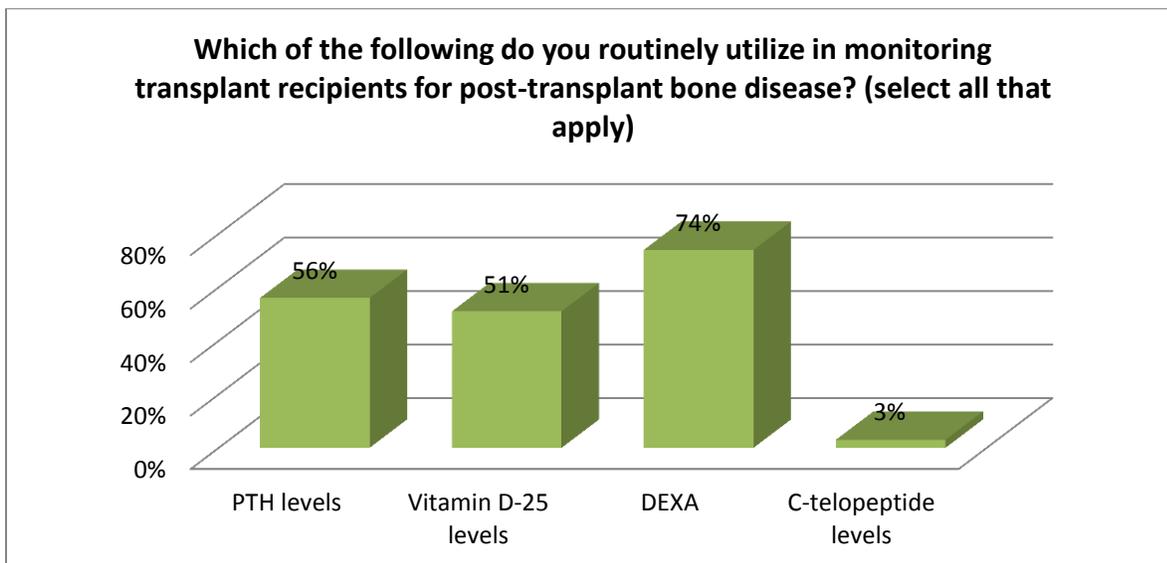


Figure 38: Transplant Surgeon Monitoring for Bone Disease

BK viremia is of particular concern in transplant patients and has been more prevalent in recent years. *KDIGO* recommendations call for monthly screenings for three to six months post-transplant and every

three months afterward for the first year. The majority of transplant surgeons screen for BK viremia monthly for three to six months after the kidney transplant (44 percent), while significantly fewer screen only if evidence of graft dysfunction is present (26 percent) or every 6 months indefinitely (15 percent) (See Figure 39).

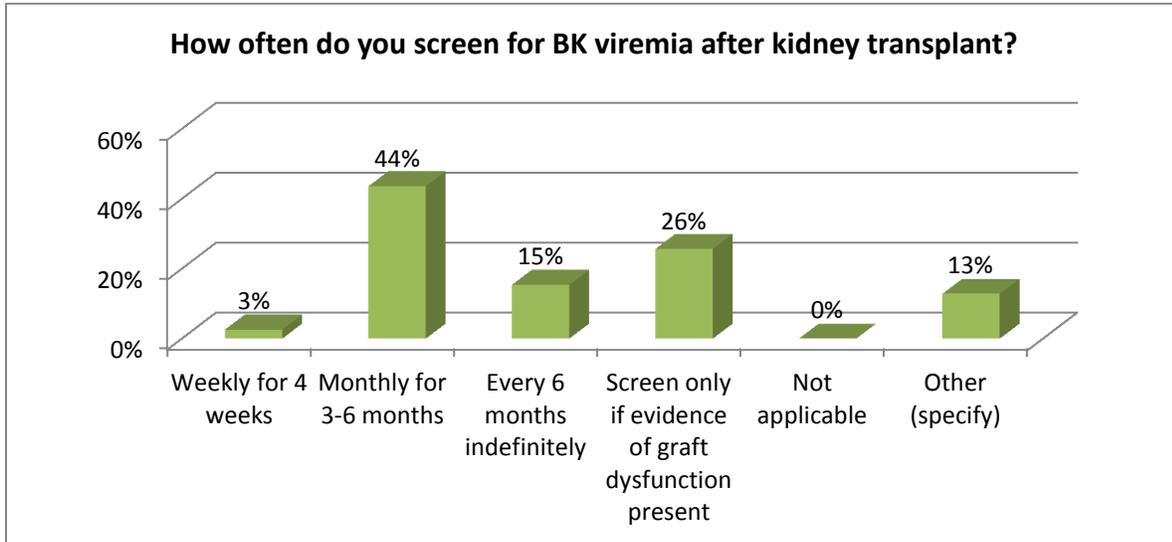


Figure 39: Transplant Surgeon Screening for BK Viremia

Transplant surgeons’ practices regarding renal allograft biopsies are mixed. Nearly the same amount would confer with the center that performed a patient’s transplant to decide whether or not to proceed with a kidney allograft biopsy (46 percent) as would order renal allograft biopsies if there is concern of dysfunction (42 percent). Just over a third (35 percent) would perform renal allograft biopsies themselves (See Figure 40).

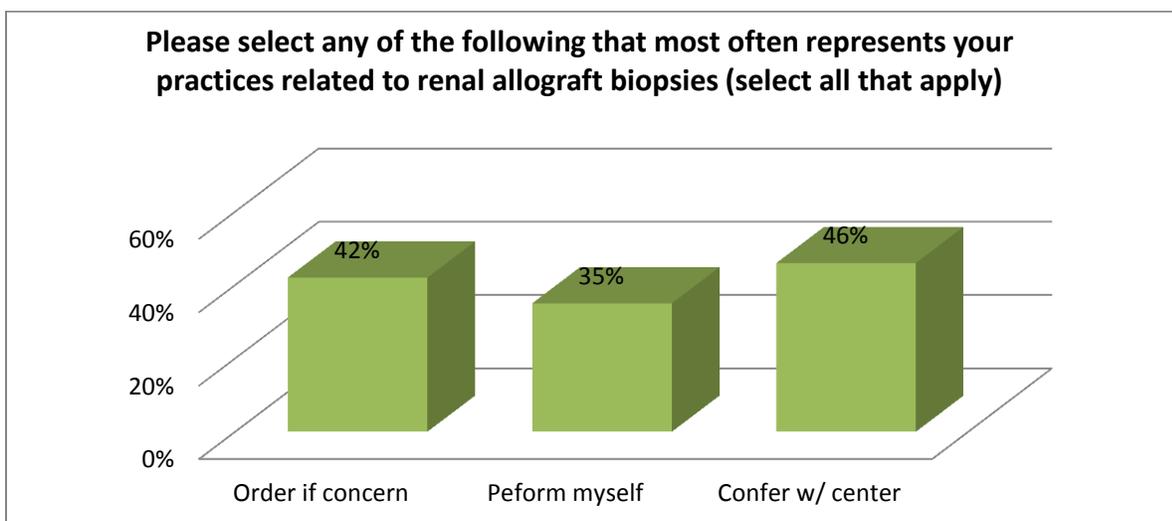


Figure 40: Transplant Surgeon Renal Allograft Biopsy Practices

Nearly all transplant surgeons (85 percent) indicate that they use prophylaxis with acyclovir or valganciclovir depending on donor/recipient serologies for post-transplant CMV. Few indicate that they use preemptive therapy (6 percent) or treatment only (6 percent) (See Figure 41).

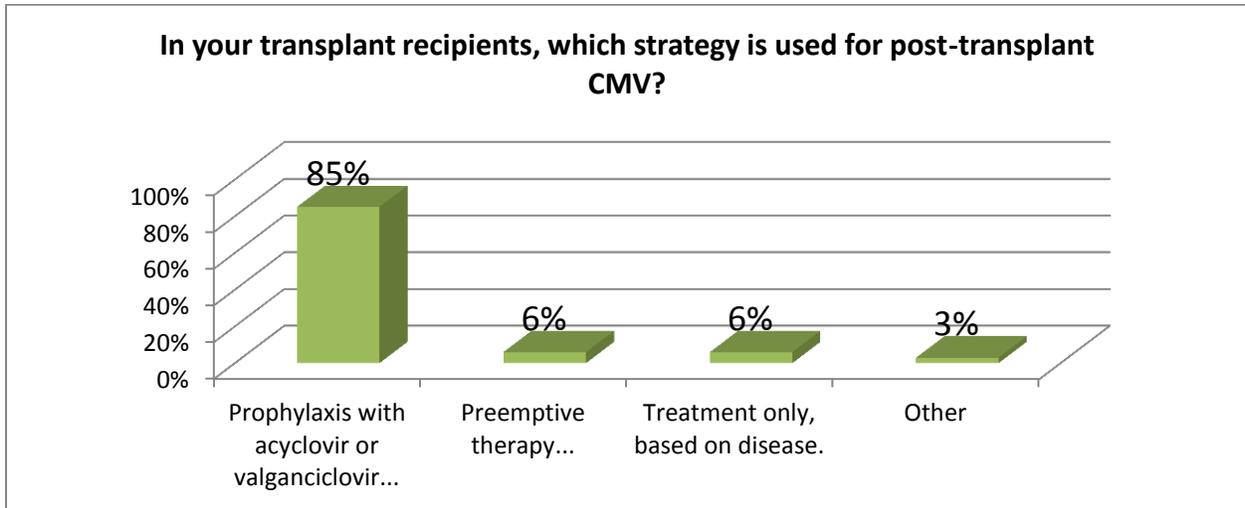


Figure 41: Transplant Surgeon Strategies for cytomegalovirus (CMV)

Transplant surgeons were asked to select up to three measures they rely on the most to monitor adherence to therapy. Nearly half use blood medication levels or attendance at clinic visits (44 percent), while approximately one fifth use compliance with routine laboratory testing (21 percent) or prescription refill records (17 percent). Only one in 10 transplant surgeons relies on self-reported adherence (See Figure 42).

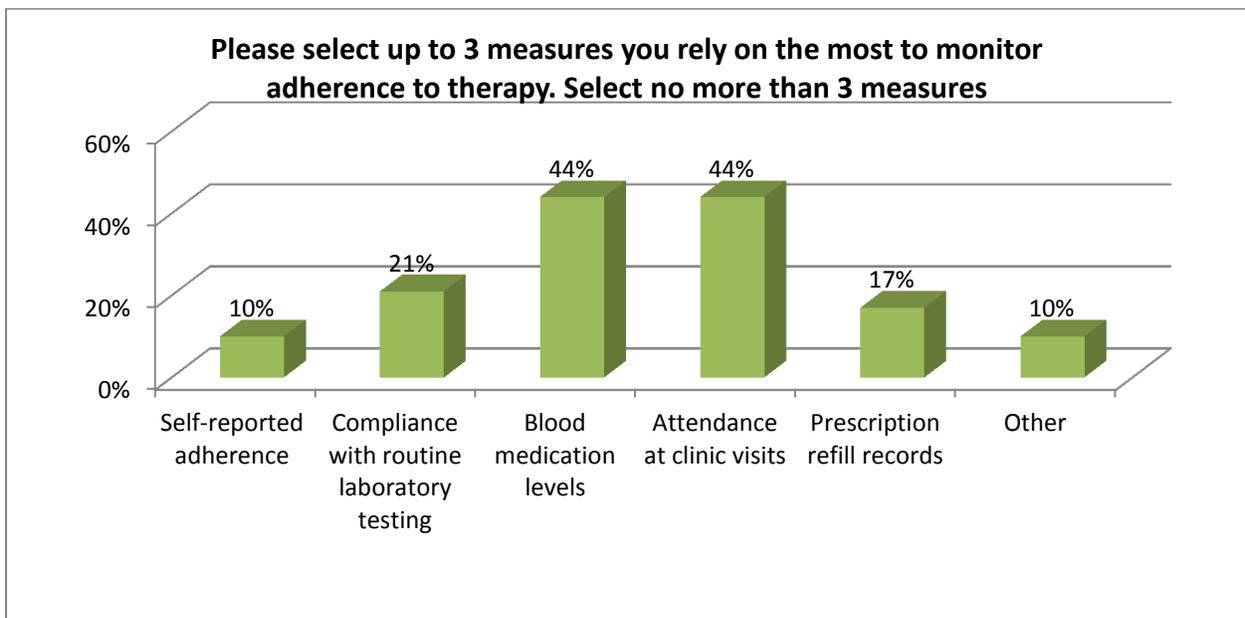


Figure 42: Transplant Surgeon Adherence Monitoring

Implications for Continuing Education

Table 6 summarizes the findings for transplant specialists in terms of each of the four assessment categories.

Summary of Findings

Topic	Perceived Need	Knowledge Gap	Practice Gaps	Barriers
Immunosuppression	- Minimize side effects - Identify potential interactions	Yes	Yes	- Multiple protocols - Limited number of patients - PCPs not adequately trained
Rejection	None	No	No	- PCPs not adequately trained - Delay between elevated creatinine levels and when return to center
Management of Chronic Disease	- Coordination w/ PCPs - Use screenings to detect cancer - Monitor for osteoporosis - Mitigate risk of infection - Appropriately vaccinate	Yes	Yes	- PCPs not adequately trained - Adherence to regimen - Coordination of care - Access to patient information
Adherence	- Identify risk factors for non-adherence - Effectively communicate risks of non-adherence	No	No	- Cost of medications - Adherence to regimen

Table 6: Transplant Surgeon Summary of Findings (*Immunosuppression, Rejection, Chronic Disease, Adherence*)

Immunosuppression

The greatest area of real and perceived need for transplant surgeons is in the area of immunosuppression. Survey results indicate that 52 percent of these surgeons have a role in immunosuppression; this topic is one of the highest *perceived* educational needs as assessed by the

Change Readiness Inventory. Immunosuppression also represents the greatest area of *real needs*, as shown by the knowledge assessment tool, where four scores were below the 80 percent threshold that defines adequate knowledge. Based on the interviews and focus groups, many barriers to best care relate to the immunosuppression regimen: adjusting doses, monitoring for rejection, etc. Like community nephrologists, transplant surgeons are not equipped to manage these issues, but they may be responsible for them. These findings are consistent with the topics that are most preferred by transplant surgeons: immunosuppression updates and appropriate monitoring.

Education of transplant surgeons should emphasize the “basics” of current immunosuppressive therapy, adverse effects of drugs, common interactions, and issues with generic substitution. Surgeons would value clinical guidelines in immunosuppression.

Rejection Risk Assessment and Monitoring

Transplant surgeons indicated that they had inadequate knowledge and resources to assess and monitor rejection, citing drug interactions as a specific gap in knowledge. Educational programs focusing on knowledge of specific therapies would be beneficial for this group of transplant surgeons.

Chronic Care

Transplant surgeons play a collaborative role with community nephrologists in managing chronic care issues. The majority of transplant surgeons indicated they are not responsible for managing each of the six preventive care issues surveyed.

These findings confirm qualitative data suggesting that the management of many chronic diseases is coordinated between the community nephrologists and/or primary care physicians, and that the patient is no longer being actively managed by the transplant surgeon by three to six months post-transplant.

Two fifths (43 percent) of transplant surgeons feel that current literature and knowledge about chronic disease in the kidney transplant patient is adequate. Education on chronic disease management should focus on best evidence and be relevant to the relatively short-term care provided by transplant surgeons.

Transplant centers can play a significant role in developing tools and resources that enhance coordination of care for these patients. Creating processes to share and coordinate care—and developing tools, resources, and education to facilitate those processes—should help to improve management of chronic disease in these patients.

Adherence

Allograft rejection is sometimes related to adherence issues. Perceived needs and barriers related to adherence were rated highly by community nephrologists, transplant specialists and transplant surgeons. All are aware of the role that adherence plays in the success of immunosuppression, organ rejection, and chronic care management. They report that adherence is closely linked to socioeconomic factors and recognize the unique adherence risks in young adult populations due to resistance and in the older populations due to confusion and the multiplicity of medications. Adherence should be addressed in all educational activities as a key factor in allograft survival. Tips and tricks to increase adherence should be part of the common curriculum of managing the transplant patient. This should include the identification of risk factors for non-adherence, the communication of health risks to patients and caregivers, and the signs and symptoms of non-adherence.

The cost of care emerged as a key factor influencing patient adherence. Physicians in the community may not be well connected to resources that provide medications and care for those who cannot afford it. Some aspect of educational activities should focus on the identification and use of available resources so that they are accessible to community physicians as well as transplant centers.

Educational Attributes

Research conducted by the AUA in 2010 indicates that urologists do not strongly favor any particular attribute of educational activities (format, venue, faculty, setting). When asked their preferred method of receiving continuing education, AUA urologists preferred an even distribution of formats/venues, with 29 percent preferring in-person at a specific location and 35 percent preferring a web-based enduring activity. The remaining 36 percent indicated they were unsure and that their answer depended on the course topic. That said, educational activities should be implemented using a variety of formats and settings to garner the broadest possible interest and participation by transplant surgeons and primary care physicians who care for kidney transplant patients.

Appendix 1: Quantitative Assessment Tool

Using a 1 to 5 scale, where 5 is strongly agree and 1 is not at all agree, please rate your level of agreement with the following statements:

	Strongly Agree	5	4	3	2	1	Strongly Disagree	Don't Know
B1. I do not always have access to the patient information that I need to make the best decision about patient management	<input type="checkbox"/>							
B2. Access to the Tpx center is limited and causes problems	<input type="checkbox"/>							
B3. We are not able to utilize the best therapies due to cost constraints	<input type="checkbox"/>							
B4. Many patients cannot afford the treatments that will keep them healthy	<input type="checkbox"/>							
B5. Patients are not honest with me about adherence to their treatments	<input type="checkbox"/>							
B6. Primary care physicians are not adequately trained to manage the complexity of a transplant patient	<input type="checkbox"/>							
B7. There is insufficient staff in our practice/facility to be able to support transplant patients as well as we should	<input type="checkbox"/>							
B8. There is too much of a delay between when a patient first shows elevated creatinine and when they return to the center for appropriate testing and management	<input type="checkbox"/>							
B9. Coordination of care for co-morbid conditions causes problems	<input type="checkbox"/>							

E4. Which of the following areas do you feel the current body of knowledge and literature is inadequate to guide you in the best care of the transplant patient. (check all that apply)

- Immunosuppression
- management of side effects
- co-morbid conditions
- drug interactions
- the current body of knowledge and literature is adequate to guide me in all of these areas.
- None of the Above

P1. Mrs. Jones received a kidney transplant 3 months ago and has returned to your clinic to establish follow-up. What would your role be in managing her immunosuppression?

(select all that apply)

- I play no role in immunosuppression.
- Monitor her immunosuppression and adjust dosages as needed to maintain the set targets.
- Change immunosuppression medications as needed.
- Let the patient decide between the community physician and the transplant center for managing immunosuppression.

P2. Ms. Smith is a 23-year-old African American female who received her second deceased donor kidney transplant for ESRD due to lupus nephritis 6 months ago. Her post-transplant course was complicated by one episode of acute cellular rejection. She is maintained on tacrolimus, mycophenolate mofetil and prednisone. She comes to you asking if she can stop the prednisone as she has heard of transplant recipients who are not taking it. What would you do? (select all that apply)

- Contact the transplant center that performed the transplant to obtain their opinion
- Advise her to taper the prednisone by 1 mg per week until she is off completely
- Stop the prednisone given her young age and potential for long term complications of corticosteroid therapy.
- Advise her that she should stay on it given her medical history

A1. Using a 1 to 5 scale, where 5 is extremely comfortable and 1 is not at all comfortable, how comfortable are you in monitoring immunosuppression?



A2. Using a 1 to 5 scale, where 5 is highly involved and 1 is I have no role, please indicate your role with respect to adjusting immunosuppression therapy?



A3. Using a 1 to 5 scale, where 5 is highly involved and 1 have no role, What is the appropriate role of the community nephrologist with respect to adjusting immunosuppression therapy?



P3. Please select any of the following that most often represents your practices related to renal allograft biopsies:

- I order renal allograft biopsies if there is concern for allograft dysfunction.
- I perform renal allograft biopsies myself.
- I confer with the transplant center that performed a patient's transplant to decide whether or not to proceed with a kidney allograft biopsy.

P4. In transplant patients with a stable post-transplant course, I:

- Prefer to independently manage care after they are released by the transplant center (after 3 months post-transplant)
- Prefer to co-manage with the transplant center indefinitely
- Prefer the transplant center to manage until they develop progressive graft failure requiring return to dialysis

P5. How much responsibility do you have for the following preventive care issues?

	Responsibility					No Responsibility
	5	4	3	2	1	
Dermatology consultations	1 icon	1 icon	1 icon	1 icon	1 icon	
Lipid management	1 icon	1 icon	1 icon	1 icon	1 icon	
Bone density studies	1 icon	1 icon	1 icon	1 icon	1 icon	
Hypertension management	1 icon	1 icon	1 icon	1 icon	1 icon	
Immunizations	1 icon	1 icon	1 icon	1 icon	1 icon	
Colonoscopy, Mammogram, PSA,	1 icon	1 icon	1 icon	1 icon	1 icon	

P6. In your transplant recipients, which strategy is used for post-transplant CMV?

- Prophylaxis with acyclovir or valganciclovir depending on donor/recipient serologies
- Preemptive therapy: initiate antiviral medication if laboratory evidence (eg. positive CMV PCR) for CMV replication
- Treatment only, based on disease.

P7. Which of the following vaccinations do you administer regularly to your transplant patients?

- Annual influenza
- Pneumococcal
- Hepatitis B
- Tdap

P8. Please select the 3 measures you most commonly use to monitor adherence.

- Self-reported adherence (from patient or family)
- Compliance with routine laboratory testing
- Blood medication levels
- Attendance at clinic visits
- Prescription refill records
- Other (please specify)

K13. A 65-year-old male patient with ESRD from polycystic kidney disease has had a living unrelated kidney transplant from his then 50-year-old wife for 10 years. He is maintained on tacrolimus and mycophenolate mofetil without corticosteroids. Renal allograft function has been excellent without any proteinuria and no history of rejection. He has had recurrent squamous cell cancers of the skin. He comes to you to ask if he should take less immunosuppression. What would you advise?

- He should continue on the current regimen
- He should stop the mycophenolate mofetil and take only tacrolimus
- He should take sirolimus in place of tacrolimus
- He should stop mycophenolate mofetil and start taking prednisone 5 mg daily

K1. You are seeing a 36-year-old 8 months out from a deceased donor kidney transplant. You note that there is significant albuminuria. Which of the following medications could be contributing to this?

- Tacrolimus
- Cyclosporine
- Azathioprine
- Sirolimus

K2. Which of the following medications is most likely to contribute to a patient's dyslipidemia?

- Sirolimus
- Tacrolimus
- Mycophenolate Mofetil
- Belatacept

K3. Which of the following medications would preclude the use of allopurinol for hyperuricemia?

- Azathioprine
- Mycophenolate mofetil
- Cyclosporine

K4. You would like to start a kidney transplant patient on clarithromycin. What will happen to the blood level of tacrolimus if the dose is not changed?

- The tacrolimus level will increase
- The tacrolimus level will decrease
- There will be no change
- Tacrolimus has to be stopped as it is contraindicated with clarithromycin

K14. Which of the following is not a risk factor for acute cellular rejection?

- Older recipient age
- Second kidney transplant
- African American heritage
- HIV infection
- Previous pregnancies

K5. A 68-year-old white male who received a kidney transplant from his wife 10 years ago for end stage renal disease due to polycystic kidney disease has had diarrhea for the past three days. He did not take his medications for two of those days. Presents to you feeling light headed. Blood pressure seated was 126/76 an on standing 90/55 Laboratories reveal a creatinine of 2.6 (baseline 1.5). What would you do?

- Give intravenous fluids and biopsy immediately to exclude rejection.
- Encourage oral fluid intake and biopsy immediately to exclude rejection.
- Give intravenous fluids and biopsy only if creatinine does not decrease the following day
- Proceed with a biopsy to exclude concomitant rejection even if the creatinine decreases the following day

K6. John receives a kidney transplant and requires anti-hypertensive therapy post-transplant. Which of his pre-transplant anti-hypertensive medications would be expected to increase tacrolimus levels?

- Diltiazem
- Carvedilol
- Lisinopril
- Clonidine

K7. Which of the following medications has the strongest association with the development of post-transplant diabetes?

- Sirolimus
- Tacrolimus
- Mycophenolate mofetil
- Cyclosporine

K8. Which is the leading cause of death in the transplant recipient?

- Malignancy
- Cardiovascular disease
- Infection
- Cerebrovascular disease

K9. For the kidney transplant recipient, what cancer has the risk most similar to the age-matched general population?

- Kidney
- Colon
- Non-melanoma skin
- Lymphoma

K10. Which is the correct virus-associated malignancy pair?

- BKV-bladder cancer
- HHV-6-Kaposi sarcoma
- EBV-Post transplant lymphoproliferative disease (PTLD)
- CMV-colon cancer

P9. Which of the following do you routinely utilize in monitoring transplant recipients for post-transplant bone disease? (select all that apply)

- PTH levels
- Vitamin D-25 levels
- DEXA
- C-telopeptide levels

K11. The agent used for pneumocystis prophylaxis with the highest propensity for hemolytic anemia in select individuals is:

- Dapsone
- TMP/SMX
- Pentamidine
- Atovaquone

K15. KDIGO recommendations for screening for BK viremia by nucleic acid testing (PCR) after kidney transplant is:

- Weekly for 4 weeks
- Monthly for 3-6 months
- Every 6 months indefinitely
- Screen only if evidence of graft dysfunction present

K12. Mark is a 65 year old male who wishes to update his immunizations. He asks if he should avoid any of the following. Which of the following would you tell him is/are UNSAFE? (select all that apply)

- Injected influenza
- Varicella zoster
- Tetanus
- Pneumovax

E5. What do you think the greatest educational need is for your colleagues related to managing kidney transplant patients?

5

6

E6. How can the AUA better serve Urologists who are involved in Kidney Transplantation?

- Work with Residency Program Directors to include Transplantation in training
- Educate young urologist on the speciality of Transplantation
- Be a vocal advocate for Urologists in the field of transplantation
- Provide more educational courses in the field of transplantation at the AUA Annual Meeting
- Provide stand alone educational courses in the field of transplantation
- Other (please specify)

E7. Using a to to 5 scale, where 5 is extremely important and 1 is not at all important, how important is it for the AUA to become more active in promoting the specialty of transplantation within Urology?



D2. Approximately how many transplant patients do you see in a typical week?

- 0 - 10
- 11-25
- 26-50
- More than 50

D3. Please estimate the percentage of your transplant patients that see a community nephrologist outside of your institution.

- Less than 10%
- 11-25%
- 26-50%
- More than 50%

D4. Type of practice

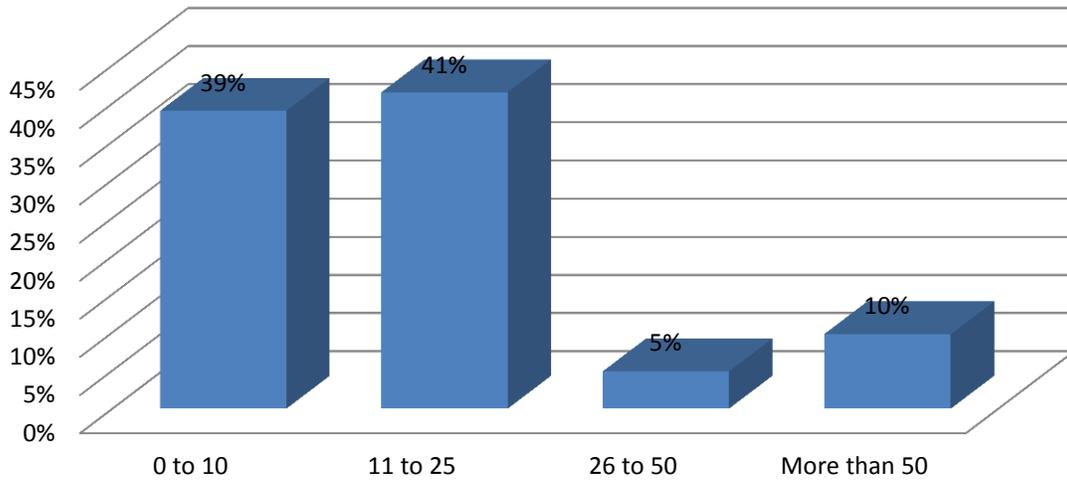
- Solo
- Single specialty group
- Multi-specialty group
- Hospital transplant center
- Other (please specify)

D7. Average travel distance for transplant patients under your care:

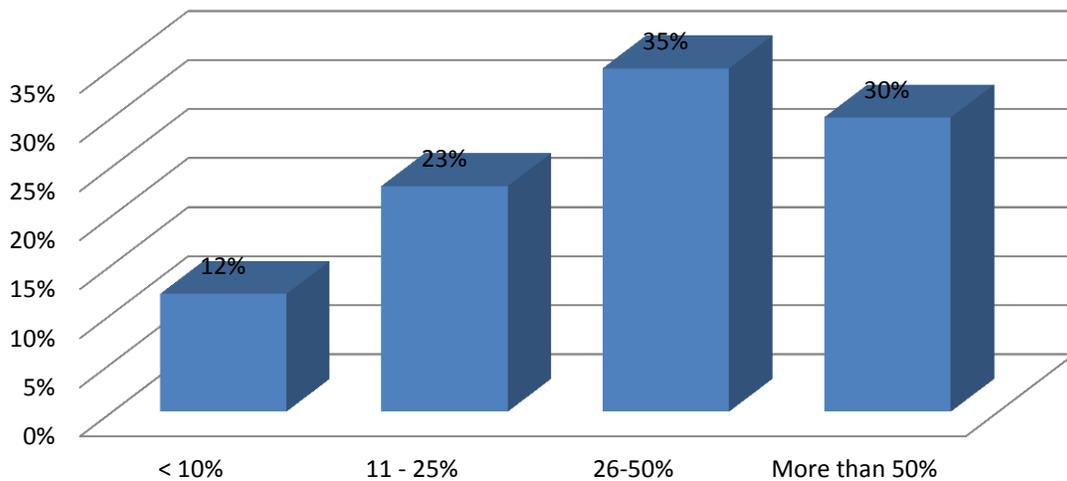
- 0-10 miles
- 11-25 miles

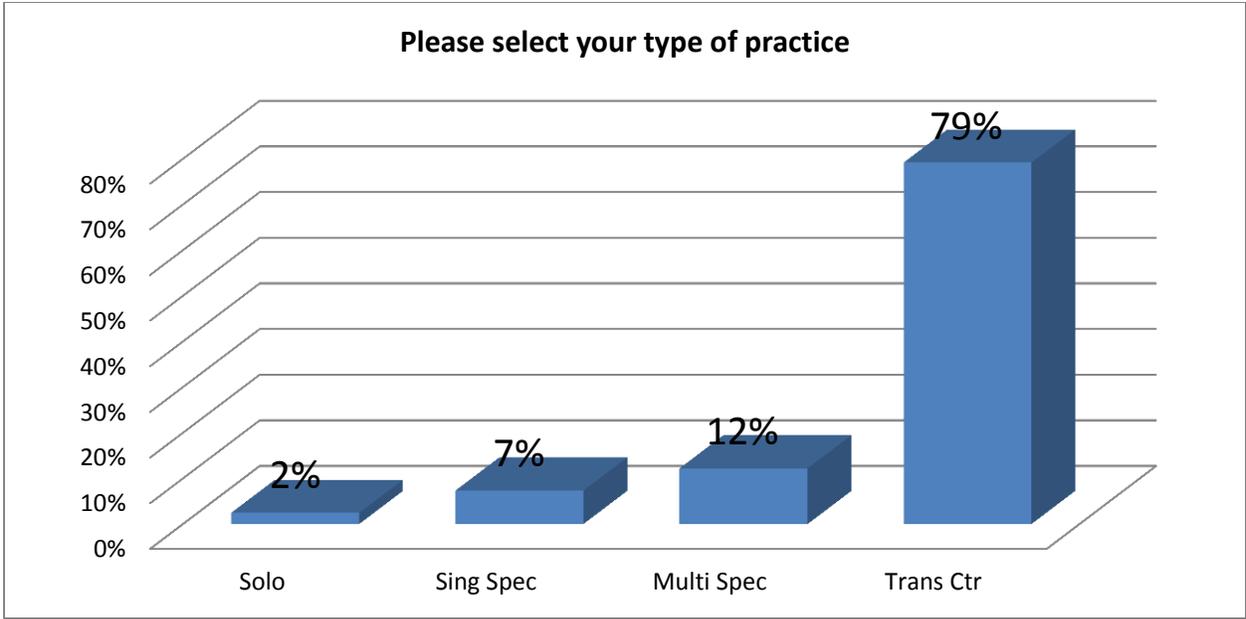
Appendix 2: Additional Data Charts

Approximately how many transplant patients do you see in a typical week?

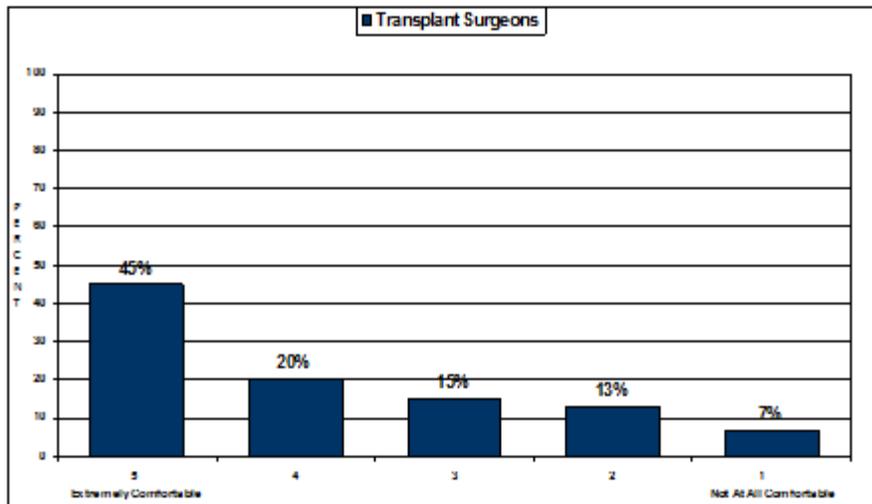


Please estimate the percentage of your transplant patients that see a community nephrologist outside of your institution.

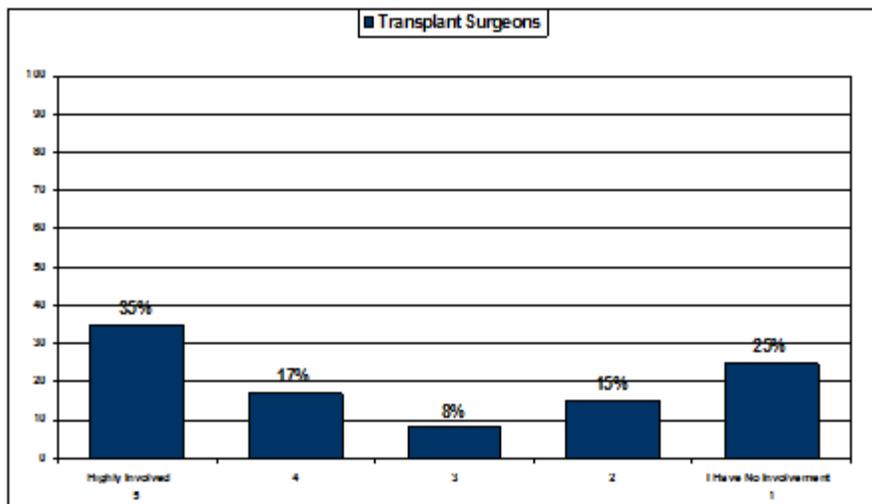




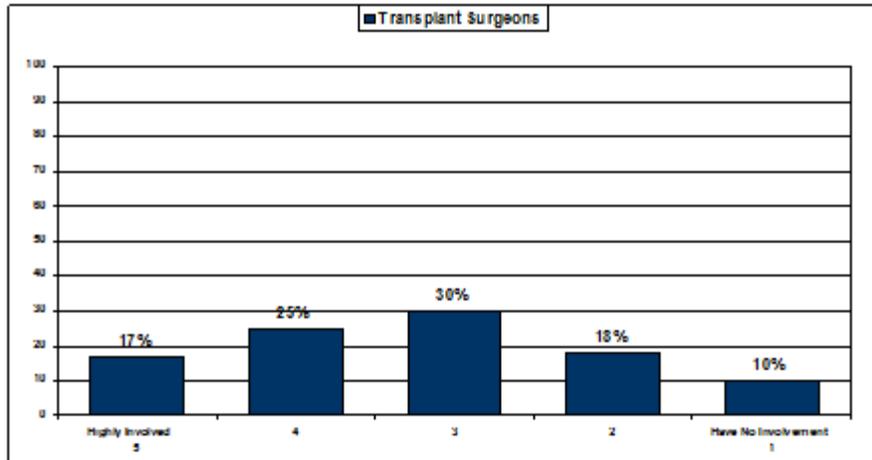
Comfort Level Monitoring Immunosuppression



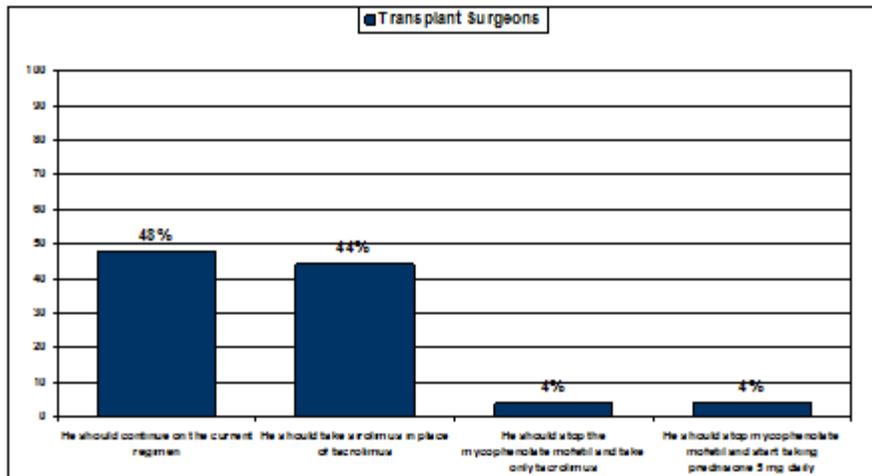
Level of Involvement with Adjusting Immunosuppression Therapy



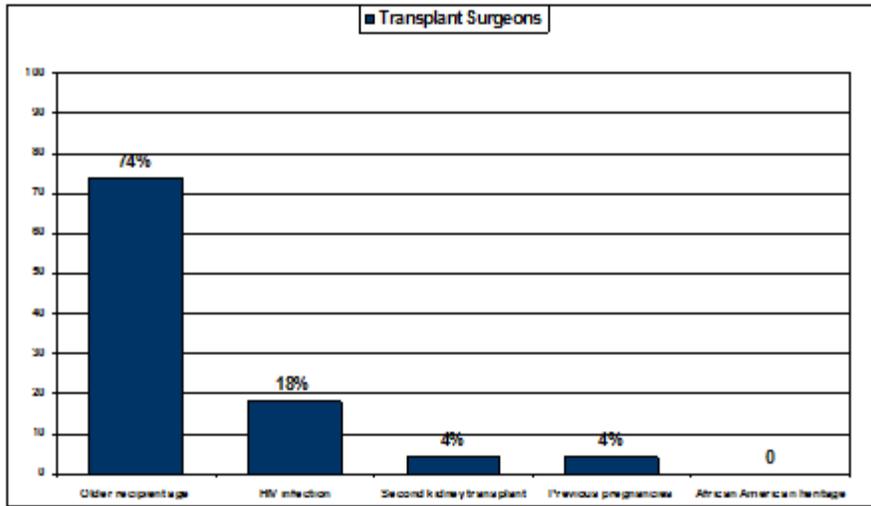
Appropriate Level of Involvement for Community Nephrologist with Respect to Adjusting Immunosuppression



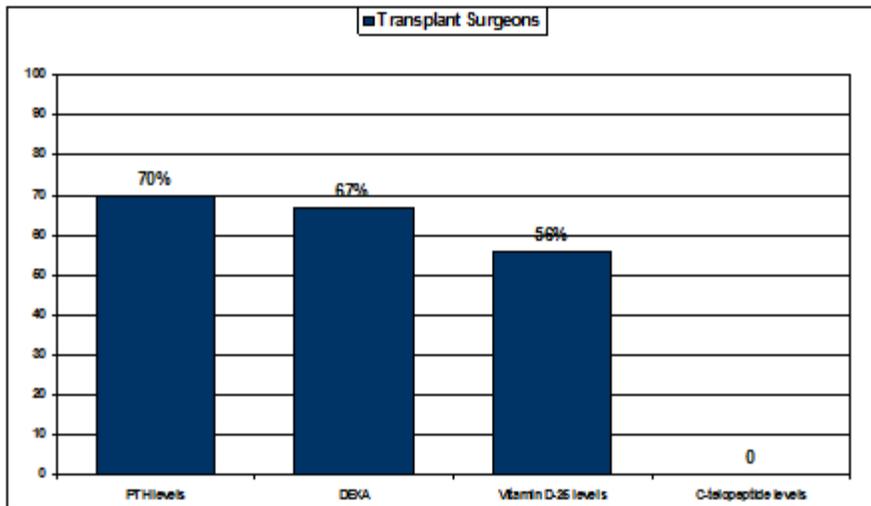
A 65-year-old male patient with ESRD from polycystic kidney disease has had a living unrelated kidney transplant from his then 50-year-old wife for 10 years. He is maintained on tacrolimus and mycophenolate mofetil without corticosteroids. Renal allograft function has been excellent without any proteinuria and no history of rejection. He has had recurrent squamous cell cancers of the skin. He comes to you to ask if he should take less immunosuppression. What would you advise?



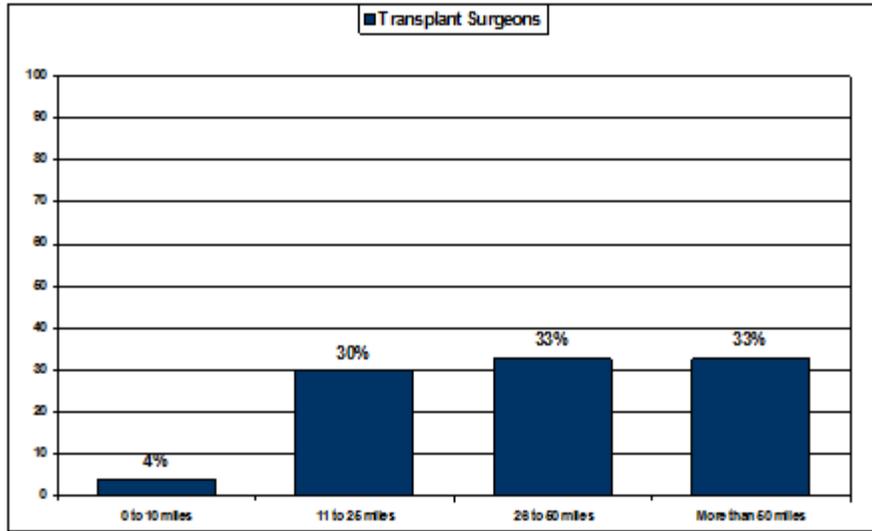
Which of the following is not a risk factor for acute cellular rejection?



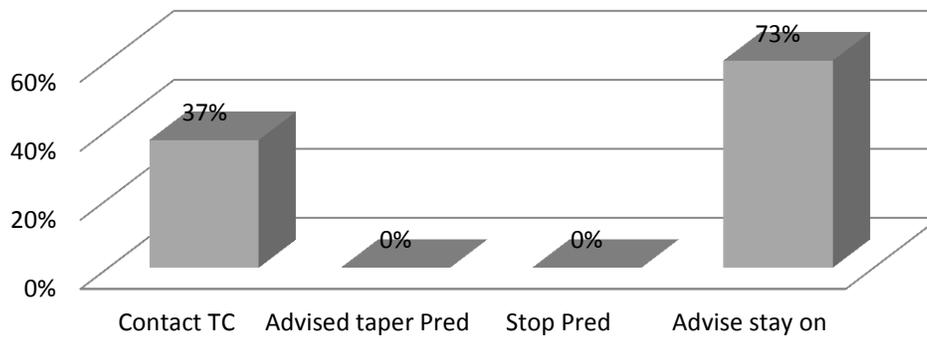
Which of the following do you routinely utilize in monitoring transplant recipients for post-transplant bone disease?



Average Travel Distance for Transplant Patients Under Your Care



Ms. Smith is a 23-year-old African American female ...How would you respond to her request?



Appendix 3: References

ⁱ CARI Guidelines. 2004; <http://www.cari.org.au/guidelines.php>. Accessed December 18, 2010.

ⁱⁱ KDOQI Guidelines and Commentaries. 2010;
http://www.kidney.org/professionals/kdoqi/guidelines_commentaries.cfm#guidelines.
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ⁱⁱⁱ KDIGO clinical practice guideline for the care of kidney transplant recipients. *Am J Transplant*.
Nov 2009;9 Suppl 3:S1-155.

^{iv} Kälble T AA, Budde K, et al. *Guidelines on Renal Transplantation*: European Association of
Urology;2009.

^v Immunosuppressive therapy for renal transplantation in adults. NICE Technology Appraisal No.
85, September 2004.

^{vi} European Best Practice Guidelines for Renal Transplantation (part 1). *Nephrol Dial Transplant*.
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^{vii} European best practice guidelines for renal transplantation: Part II. *Nephrol Dial Transplant*.
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^{viii} *United Kingdom Guidelines for Living Donor Kidney Transplantation*: The British
Transplantation Society and the Renal Association;2000.