

ABSTRACTS

2015 UNOS Transplant Management Forum, San Diego, CA

CATEGORY 1

Cost Reduction/Increase in Work Efficiency/Patient Care Safety Programs

ABSTRACT C1-A

FEASIBILITY OF REMOTE MONITORING OF VITAL SIGNS AMONG KIDNEY TRANSPLANT RECIPIENTS

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Purpose: We conducted a pilot study of in-home monitoring in a cohort of renal transplant patients to determine the feasibility of remotely monitoring vital data, and to identify abnormal values that could be intervened upon early to avoid hospital readmissions. The use of in-home "hovering" technologies, which can remotely transmit relevant clinical data, has been associated with decreased readmission rates and reduced costs in other patient populations. However, no study has examined the impact of a hovering platform in post-kidney transplant patients – a population at high-risk for readmissions.

Methods: A cohort of adult kidney transplant recipients within 12 months of transplant were identified by transplant center coordinators and providers, and were given the hovering platform equipment during a post-transplant clinic visit. Patients were trained on equipment setup and use by study staff and were instructed to measure blood pressure, pulse oxygen, weight, temperature, and blood sugar levels (if diabetic) for 1 to 3 months. Except for the thermometer and glucometer, devices were connected via blue tooth to a main hub. Vital measurements were transmitted to the hub and automatically downloaded by cell or land-line to a software program that was monitored daily by study staff. In the case of an abnormal reading, study staff notified the patient's nurse and/or physician, who contacted the patient and intervened as necessary.

Findings: Of 31 patients enrolled in the study, only 23 (74.2%) utilized the hovering platform. Patient demographics are displayed below (Table). The median duration of equipment use was 56 days (IQR: 15-64; Range: 24-120). Over the course of 15 months, 2,154 flags for abnormal measurements were displayed in the software for the 23 patients using devices, the majority being missed measurements (79.0%) or false positives (19.3%). Of all flags, 36 (1.7%) necessitated communication with patients, though only 3 were clinically significant and led to intervention (adjustment of blood pressure medications and insulin). Thirteen (41.9%) patients in the cohort had at least one hospital readmission following transplant over the span of 1 year, and 9 of the readmissions were related to the kidney transplant. There were no readmissions that were prevented by use of the hovering platform.

Implications: The use of hovering technologies was found to be feasible in a population of post-transplant patients, although ~25% of patients did not use the equipment. We found that the current level of technology was challenging for many patients to set up and use consistently. Further, the percentage of clinically important flags was small. While hovering technologies have the potential to alert providers to the early detection of abnormal measurements in a patient population at high-risk for readmission, we found that improvements to the current platform and

software are necessary in order to facilitate use and improve efficiency in detecting abnormal measurements. In-home assistance for equipment set-up or the assistance of a visiting nurse may also improve utilization of the hovering platform.

Table: Patient Demographics Stratified by Equipment Use

	All Patients N=31	Used Equipment N=23	Did Not Use Equipment N=8	p-value
Age, Mean (SD)	48.0 (13.9)	48.9 (13.8)	45.8 (14.9)	0.596
Race, N(%)				0.411
White	14 (45.2)	12 (52.2)	2 (25.0)	
Black	14 (45.2)	9 (39.1)	5 (62.5)	
Asian	3 (9.6)	2 (8.7)	1 (12.5)	
Sex, N(%)				0.592
Male	18 (58.1)	14 (60.9)	4 (50.0)	
Female	13 (41.9)	9 (39.1)	4 (50.0)	
Marital Status, N(%)				0.134
Married	16 (51.6)	14 (60.9)	2 (25.0)	
Single	14 (45.2)	9 (39.1)	5 (62.3)	
Missing	1 (3.2)	0 (0.0)	1 (12.5)	
Diabetes, N(%)				0.935
Yes	12 (38.7)	9 (39.1)	3 (37.5)	
No	19 (61.3)	14 (60.9)	5 (62.5)	
Hypertension, N(%)				0.236
Yes	27 (87.1)	21 (91.3)	6 (75.0)	
No	4 (12.9)	2 (8.7)	2 (25.0)	
TX Type, N(%)				0.232
Deceased Donor	22 (70.9)	15 (65.2)	7 (87.5)	
Living Donor	9 (23.1)	8 (34.8)	1 (12.5)	
Hospital Readmission Post-Transplant, N(%)				0.689
Yes	13 (41.9)	9 (39.1)	4 (50.0)	
No	18 (58.1)	14 (60.9)	4 (50.0)	

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ABSTRACT C1-B

ORGAN CALL SUMMARY: A TECHNOLOGY BASED TOOL TO EVALUATE MULTIPLE CANDIDATES QUICKLY

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Problem

With a growing waitlist and workload split by alphabet among several transplant coordinators, staying abreast of the volatile health of our patient population became challenging. This was especially evident during evaluation of prospective candidates for a deceased donor organ offer. It was difficult for the on-call coordinator to perform evaluation tasks all within a one hour time frame: (1) review the organ offer; (2) review HLA information with HLA laboratory representative; (3) review both details of the case and several potential candidates with the physician; (4) provide accurate acceptance or refusal codes in UNETSM, the United Network for Organ Sharing (UNOS) database system.

The program maintains a very reliable and accurate transplant care database. However, reviewing all pertinent patient information prior to accepting an organ proved to be a cumbersome task, as it was scattered across various areas of the application. The growing volume of organ offers and slower remote connection to the database (used after business hours/off-campus) further complicated productivity and compliance with allotted response time.

Approach

Nursing staff who took organ offer call were polled to determine the most important data elements reviewed in the transplant care database and hospital electronic medical record (EMR) as well as information that could be extracted into a single automated and easy to use Organ Call Summary window/report that would allow quick reference yet provide thorough enough review with the physician. Elements found to cause most variability when coding candidates on a run list included the following:

- 1) Demographic information such as name, age, contact numbers, location of patient, evaluation date, listing date
- 2) BMI, height, weight including both US and metric measurements
- 3) Outstanding/past due health maintenance testing
- 4) Alerts for surgeon to be aware of (i.e. anticoagulant therapies)
- 5) Most recent cardiac testing/ result summation
- 6) Hepatitis B Antibody titer and date
- 7) Living donors in workup

A discrete patient summary window incorporating a logical design was built in the transplant care database displaying these items along with select laboratory results, dialysis regimen, primary nephrologist, and basic financial status information. Elements on the summary screen are interactive. For example, the coordinator can click a medical test to view details. Additionally, a quick link to the

Organ Call Summary window is available on the main patient window in the transplant care database for rapid and easy access.

During an organ offer, the coordinator searches for each candidate in the transplant care database and opens the Organ Call Summary window to review a precise patient status snapshot. The Organ Call Summary is viewable on screen, but can also be saved as a PDF file, or printed for portability of use. We began offering this as an option for on-call staff to use in May 2011.

Findings

We determined a lessened evaluation response time (calculation defined below) could demonstrate improved productivity.

$$\frac{\text{sum}(\text{offer response time} - \text{evaluation start time})}{\text{total number of candidates coded}}$$

We filtered the UNETSM Report of Organs Offered and Transplanted (ROOT) for two time periods: first quarter calendar year 2011, prior to implementation, and first quarter calendar year 2012, after implementation. We subsequently reviewed all organs offered by the local organ procurement organization (OPO) to the transplant center in UNETSM, documenting evaluation start date/time and offer response date/time for each candidate in the match run for which a response code was entered. We then calculated an average response time for all offers. We found after implementation of the Organ Call Summary, average evaluation response time decreased by 33% from 40 min to 30 min. Additionally, overtime wages paid out to on-call staff fell 19% from first quarter of calendar year 2011 to first quarter of calendar year 2012 providing a cost savings to the department. Review of these same metrics for the first quarter calendar year 2013 show a sustained improvement in evaluation response time as well as overtime costs.

Implications

The Organ Call Summary window/report has definitely eased the challenge of evaluating multiple candidates within the initial response period. In addition to the quantitative benefits of improved productivity and cost reduction, the Organ Call Summary also contributed to staff satisfaction. It has been mentioned the summary window/report has helped staff feel more confident in providing a thorough review, therefore equipping physicians to make the best decisions for acceptance or refusal of organ offers. It has reasonably eliminated the need to access many different locations within the patient's record contributing to overall patient safety, as coordinators are typically reviewing multiple patients at the same time.

The patient summary has also prompted discussions for similar reports in other areas of the transplant program to improve work efficiency. We have begun development of additional synopsis reports to streamline return evaluations and committee reviews for both donor and recipient selection discussions.

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ABSTRACT C1-C

Organizational flexibility: How a Transplant Program adapts to external environment changes: The creation of a Transplant Institute

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Problem: Organizations are open systems influenced by pressure for change from the external environment. Transplant programs have to develop adaptive mechanisms to survive external challenges such as regulatory requirements, the need for continuous improvement, regional competition, changes in insurance and reimbursement practices, and changes in technology. These culminate with the need to increase patient, referring physician, and other stakeholder satisfaction. We describe the revitalization strategy of a Transplant Program that increased its organizational flexibility by moving successfully towards the creation of a “true” Transplant Institute in order to stabilize and improve its performance, allowing it to thrive amongst the current external challenges, and position it for future growth.

Approach-Method: Our Transplant Program is a collaboration between a large county hospital and an academic institution that provides its faculty to staff the program. In our previous conventional structure we had to balance between the two different organizational cultures, with conflicting politics and priorities that resulted in fragmentation of services and the lack of power to implement change. Through official agreements we created a Transplant Institute to unify all stakeholders under a common roof with a joint staff committee consisting of “the” two top officials from both organizations and the Transplant Institute physician leader for the purpose of providing expertise and guidance on matters affecting the Institute. The committee ensures the unified and strategic direction of the Institute by empowering transplant administrative, financial and medical leadership.

Results: A year after the creation of the Institute we were able to implement radical changes to our culture, organization, facilities and staffing. With the creation of an independent institute came the shift of power out of each academic department to transplant. Additional tangible results included the improved ability to recruit new faculty, ability to focus growth on needed services lines, a new transplant patient management system interfaced over three health systems, two new patient floors and clinic, an inpatient 24/7 nurse practitioner model, and a commitment to build a 200,000 square foot “independent” transplant building. Clinical and financial efficiencies have been experienced throughout transplant including the doubling of wait listings.

Conclusion-Relevance: The creation of a Transplant Institute allowed us to lead a multidisciplinary team while granting us increased authority and financial independence to implement long needed changes in order to better deal with current challenges. For such a venture to succeed, it is essential to build wide stakeholder support across all levels in order to minimize resistance to change. We have noticed that this new organizational structure allowed us to increase our work efficiency, improve the quality of our work and most importantly improve patient outcomes and satisfaction.

Maggy Perez-Dickens, MBA, Rodrigo Vianna, MD, Panagiotis Tryphonopoulos, MBA, MPH

ABSTRACT C1-D

IMPLEMENTATION OF A CLINICAL PATHWAY TO REDUCE POST-KIDNEY TRANSPLANT LENGTH OF STAY

Problem/Situation: Post-transplant length of stay is an outcome that impacts patient morbidity, has financial implications, and is reported publicly. While we had made improvements in our median living donor recipient and deceased donor recipient post-kidney transplant length of stay over the preceding two years, our overall median length of stay had not improved. As a large Transplant Center that performs 130-160 kidney transplants per year, reducing post-transplant length of stay would result in cost savings and improved bed availability. Our goal was to develop a clinical pathway that would provide a framework to reduce overall post-kidney transplant length of stay to a median of 3 days.

Median Post-Kidney Transplant Length of Stay (Days)		
	11/4/2011 – 11/3/2012	11/4/2012 – 11/3/2013
Overall	4	4
Living Donor Kidney Recipient	4	3
Deceased Donor Kidney Recipient	5	4

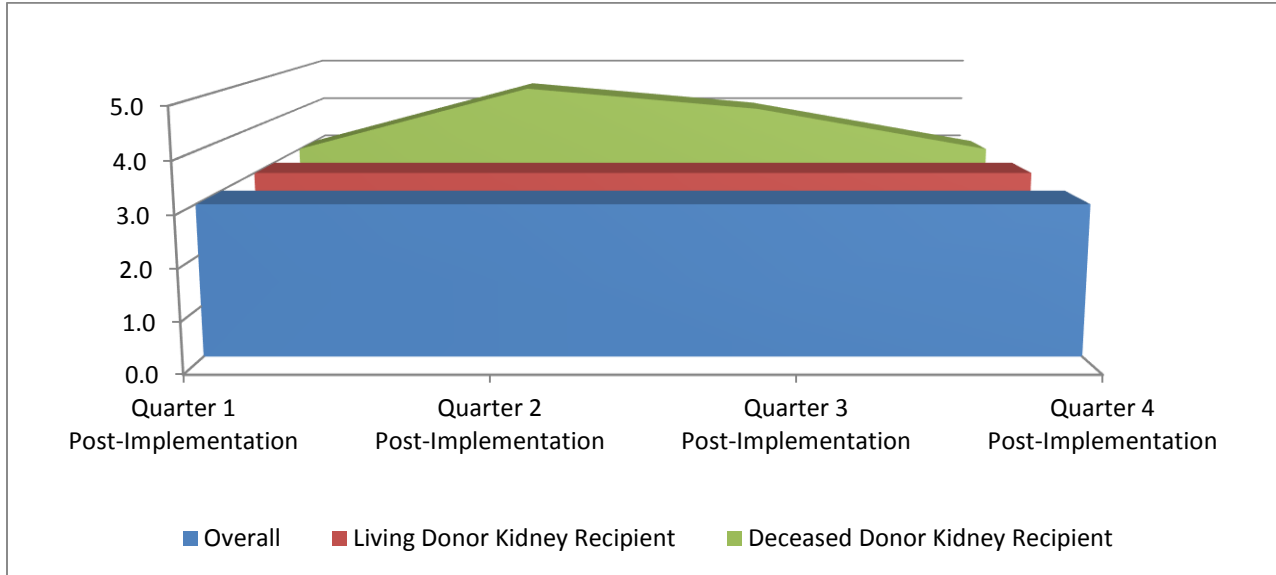
*excludes multi-organ transplants

Methods/Practices/Interventions: To reduce post-transplant length of stay, we began by reviewing current practices, pathways, and order sets. We also determined variations in provider practice. After analysis and review, we identified several opportunities for improvement, including standardization of medical and nursing care, earlier removal of urinary catheters, earlier administration of monoclonal antibody medications, and a decreased duration of polyclonal antilymphocyte medications. All opportunities were implemented with the creation of a new clinical pathway that was guided care for both living donor and deceased donor kidney recipients.

Findings/Solutions/Conclusions: We implemented the new clinical pathway on 11/4/2013 after educating all physicians, midlevels, and clinical staff members. During the time period 11/4/2013 – 11/3/2014, we performed a total of 139 kidney transplants (66 living donor recipients; 73 deceased donor recipients). Post-transplant length of stay was tracked and reported monthly. The medical records of all patients who did not meet the benchmark length of stay were reviewed further to identify barriers to discharge.

The benchmark length of stay was met every quarter for the living donor kidney recipients and for 2 of the 4 quarters for deceased donor kidney recipients. Analysis of the medical records

revealed that the increased median length of stay during quarters when the goal was not met was primarily related to delayed graft function, ileus, or unexpected medical complications necessitating longer stay.



Median post-transplant length of stay (days) by quarter and by donor type (*excludes multi-organ transplants)

Implications/Relevance: Implementation of a clinical pathway that standardized care for recipients of living donor and deceased donor kidney transplants did result in an overall reduction in length of stay by 1 day. This reduction in post-transplant length of stay has the potential to decrease costs and increase bed availability, as well as prevent other hospital-related morbidity. Along with continuing superior 1 year patient and graft survival, it demonstrates that length of stay can be effectively reduced without compromising outcomes. The potential impact on readmissions and rejection rates will need review to determine if the reduced length of stay negatively impacted those metrics.

Abstract Authors: Miguel Tan, MD; Eric Gibney, MD; Wendy Peavy, MSN, APRN, ACNS-BC, CCRN-CSC; Cerise Wotorson, RN, BSN; Christopher Fowler, PhD, MBA, RN.

ABSTRACT C1-E

SUCCESSFUL CONSOLIDATION OF TWO KIDNEY/PANCREAS TRANSPLANT PROGRAMS

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Problem/Situation: The decision to consolidate two separate kidney/pancreas transplant programs within the same healthcare system and located within a 10 mile radius of each other, was a pro-active approach in this new era of healthcare reform to maintain the highest quality of patient care and services while achieving efficiency of operations and cost savings without compromising patient access. One large volume center would additionally provide opportunities for advanced research. This decision was also consistent with the need for healthcare to develop strategies for providing tertiary services in a regionalized manner with local access points versus duplication of services in the same region. The plan for consolidation involved moving all services to the larger volume facility while maintaining satellite services for pre and post care at the smaller volume facility located in the inner-city. Prior to consolidation, these two separate renal/pancreas transplant programs were operationalized under common administrative and surgical teams which became increasingly inefficient and burdensome in the current regulatory environment.

Method/Practice/Intervention: There were a multitude of challenges to overcome and issues to consider. These included:

- regulatory compliance issues (DOH, UNOS, CMS, ESRD Network);
- patient notification and implications related to patient transfer;
- facilities' revenue/cost considerations;
- patient access and provision of services via satellite model;
- staffing consolidation;
- maintaining quality standards and optimal outcomes.

Feasibility plans were developed and decided upon, articulating the issues above and projecting the impact on both facilities as well as for the parent corporation. A core *transition taskforce* was formed consisting of clinical, financial and administrative disciplines. Members took responsibility for researching each of the issues outlined above, mapped out detailed action plans with time-lines and identified potential barriers. For example, the patients requiring notification of program closure and action to transfer were broken down into categories for prioritization with the closure of the pancreas program being first and closure of the living donor program following. This prioritization for action was executed as follows:

- pancreas evaluation phase candidates
- listed pancreas candidates
- recipients and living donors in the evaluation phase and/or scheduled for living donation
- all other candidates in evaluation phase
- Status 1 listed candidates
- Status 7 listed candidates.

By tackling each complex issue and barrier in a methodical, step-wise fashion, the transition taskforce stayed on point and focused. Regular reporting mechanisms were established that tracked progress and afforded opportunities to re-align priorities and issues as they arose.

Findings/Solutions/Conclusions: A retrospective review of the past year yielded a number of insights and “lessons learned”. While both facilities were part of the same healthcare system and were under the same leadership for many years, each facility had different personnel practices including pay scales, methodologies for such things as coordinator on-call and overall separate and distinct cultures.

There were significant financial implications with respect to this consolidation. Overall expenses were reduced or avoided by approximately \$2.1 million dollars in the first year of consolidation. The reduction is attributed to both capital and operational cost that would have been required for the continuance of the

smaller program. There was a nominal operational cost savings, as two (2) Full-Time Equivalent (FTE) staff transferred to other departments and were not replaced. Additionally the consolidation had no capital requirements and no impact on physical plant or major equipment requirements. There was no increase in staffing or operational expenses to the health care system and the project was deemed neutral with respect to other area services.

To date, consolidated services are either at or above projected volume, which has supported that the consolidation of services did not have a negative impact on access to patient care. Our transplant team, consisting of both clinical and non-clinical staff, is fully trained to provide care and services at either location, to ensure maintenance of competencies and resources which leads to enhanced overall quality and outcome management. While the loss of a transplant service at one facility had a considerably negative financial impact on their total reimbursement, the system did realize an overall enhanced financial result within the current reimbursement environment.

Patient access was proven not to be compromised. The consolidated center is easily accessible via public transportation, and approximately 60% of the patients from the smaller center's demographic area are Medicaid beneficiaries with access to transportation assistance.

To date there has been a 12% increase in patients evaluated at both sites. Total system transplant volume is down by 15%— primarily due to lower deceased donor organ procurement since consolidation but also due in part to the re-evaluation of all candidates at the smaller site, which resulted in removal of 22% of listed candidates determined no longer to be suitable for transplantation. 8% of the patients transferred from the smaller center have already received a transplant and patient and graft survival outcomes as well as all other quality metrics – such as Readmissions, Return to OR, Infections, Adverse Events, etc., remain at or above expected.

Lastly, with such endeavors, the political environment must also be carefully considered when closing a major service such as transplant and this was particularly important given the inner-city location of the lower volume facility. Consolidating staffing, which included some lay-offs, re-vamping of the transplant on-call structure and integration of roles and responsibilities, was quite challenging. The initial time-frame for patient transfer was extended by at least six-months due to unexpected difficulties of getting patients to respond and comply. In the end, it took approximately one year before the program waitlist was completely closed. Lastly, maintaining a pre and post-transplant satellite clinic off-site of the main facility remains a daily challenge. Coordinating care, particularly post care and staffing with multi-disciplinary team members is difficult at best and needs at a minimum, hospital administrative support, a sound system of referral post-transplant surgery, consistent EMR practices and cross-training of staff for coverage.

Implications/Relevance: Many transplant programs will need to evaluate the efficacy of consolidation as healthcare economics and markets change and evolve and larger healthcare systems are formed. Our experience leads to the conclusion that successful consolidation of two renal/pancreas transplant programs can happen with proper planning, anticipation of economic and political impact, and a carefully thought out plan for implementation and continuous evaluation. This plan needs to be fluid and flexible as various unanticipated roadblocks emerge.

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ABSTRACT C1-F

KIDNEY TRANSPLANT TECHNOLOGY INNOVATION: INCORPORATING A WEB BASED REFERRAL SYSTEM

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Problem/situation:

Paper referrals are the current practice at most transplant facilities. This practice is time consuming and inefficient. Often the data is coming from a multitude of sources and in a number of formats that must be understood by the transplant referral coordinator. The data collection, interpretation and progression takes up to an hour for one referral to be processed. Time spent searching through paper documentation inhibits productivity, therefore reducing profitability and wasting valuable time. Coordinators lose one full 40 hour work week per year when 10min is spent searching for and collecting referral information from multiple sources. Even with an internal database, the task of managing and reporting is considered double charting by hand, which introduces the potential for error and inaccuracy.

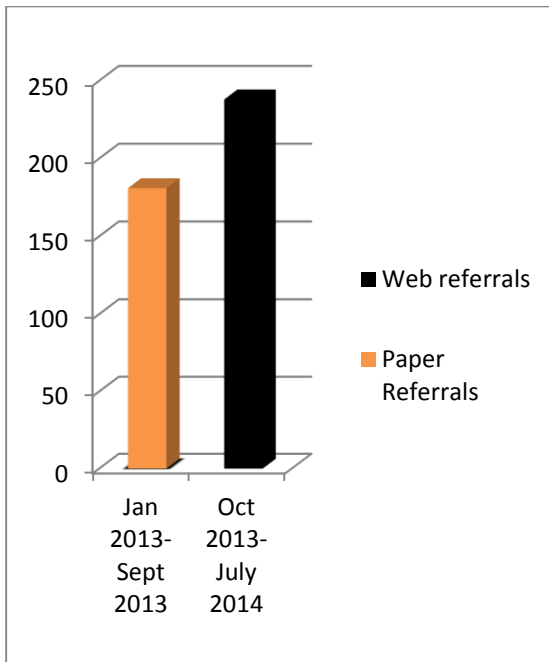
Approach:

In an effort to improve competitiveness and effectiveness, the transplant center implemented the web based referral system with two goals in mind: to create more time for the clinicians, and to bring a higher level of reporting accuracy to the transplant process. Web based referral system is a secure portal that allows a health care provider to enter a transplant referral electronically and to manage the results effectively. The referral system provides current, accurate data that enables the transplant center to manage referral applications with precise information instead of physical charts. The referring individual is required to enter the following information into the secure portal: Demographics, Dialysis Unit, Referring Nephrologist, Areas of concern, Height, and Weight. The referring individual receives a confirmation email that the referral has been securely sent. The referral coordinator then receives an email notification that a referral has been received. Over the past 10 months, 95% of referrals have been received through the web based system. Within the initial 10 months of implementing the new system our referral numbers have increased 76 %. Utilizing statistics from the transplant database, the center performed a time study to determine the greatest time loss with expenses per year.

Findings/Solutions/Conclusions:

The transplant web referral database has been installed now for approximately 10 months. The center has been able to see significant productivity gains in all of the areas that were targeted. This significantly reduced the hand entered data into the transplant database for the Kidney Program: Saving (8) hours per week (**\$12,500K savings / year**). Moving to the web based referral system saved a total of (**400**) hours annually of clinical and data coordinator time in the

kidney transplant department. This significant amount of time has allowed the staff to re-allocate valuable time to processing these referrals as well as getting patients listed quicker. The ability of a web based system helps to consolidate patient and donor data from a number of internal sources into one database, which is built to facilitate outcomes-based research. The open architecture of the new database system allows for additional data feeds to be automated, such as histocompatibility (HLA) data, pathology results, cardiac tests, laboratory results, and the potential to download detailed donor and recipient data from UNOS. This additional automation will equate to higher quality research, reduction of manual data entry, and continued cost savings.



Time Cost of Paper Referral	
Minutes/ day	100
Minutes/ week	500
Time per year	400 hrs

Implications/Relevance:

Implementation of web based referrals resulted in dramatic increases in referral numbers. It supports the effort to improve quality of patient care and patient safety. Web based referral is simply a redesign of complex clinical processes, integrating technology at key points to enhance and optimize coordination. Web referrals decrease time for processing and improve clinical decision support, thus making crucial information more readily available; improving communication among staff. The most beneficial components include process improvement, cost-conscious decision-making, clinical decision support, and overall efficiency. Time efficiency incorporates nearly all of these identified factors and is a high priority in health care today. Specifically, with enhanced time efficiency, clinicians can communicate more effectively, provide care more accurately, and ultimately increase transplant success and revenue.

Krista Norrid RN, BSN, Haley Lewis LCSW, David Lewis

ABSTRACT C1-G

Mechanical Circulatory Support Device: A Process Improvement Approach in Coding and Billing Efficiency to maximize reimbursement

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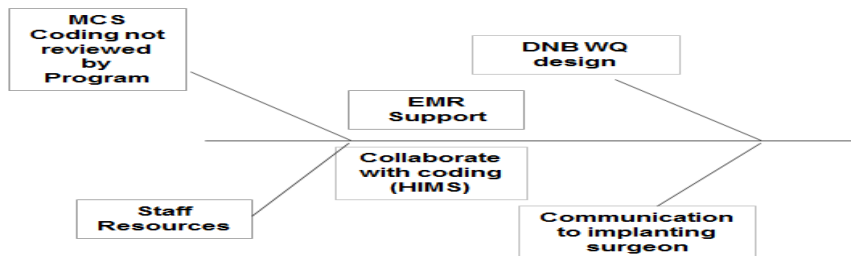
Situation:

The Program has determined after review of cases that several of the Mechanical Circulatory Support (MCS) devices were coded incorrectly the implanting surgeon or coder during the first and second year of the program start. The process for analysis of these cases was being done retro-actively, labor-intensive, and involved multiple systems and areas for review. Coding errors between MSDRG (Diagnosis Related Group) 1 and MSDRG 2 can have a significantly higher financial impact and examination of each individual case is a necessary step in the process prior to release of the charges to the payers.

Approach:

The team assembled and reviewed the possible causes of incorrect MSDRG assignment and approaches to efficiently maintain accuracy and verify accuracy of coding see Figure 1.

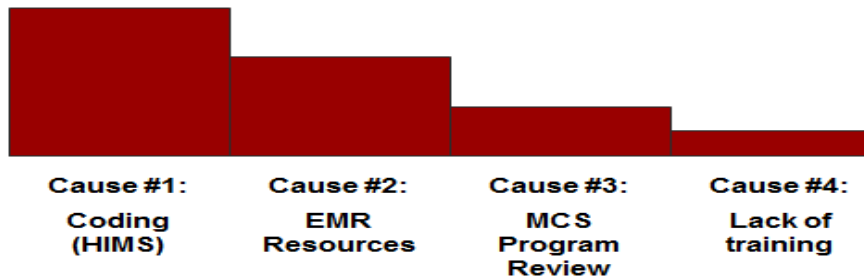
Figure 1



Team members were identified by the program Director of Operations based upon identified issues and needs of the program. The team consisted of the Transplant Program Director of Operations, EMR security team, and charge coordinator.

The team determined some of the significant causes of incorrect coding see graph 1.

Graph 1:



Each of these causes was reviewed in detail to determine how to allocate resources, concentrate training efforts, and initiate direct program review. The team isolated MCS Procedure codes, designed an EMR template to capture MCS codes, and created an EMR Do Not Bill (DNB) Work Queue (WQ) to capture DRG 1 and 2 procedure codes

Testing was completed with patients over a three month time span to ensure all patients were accounted for and appropriate codes were selected before billing was released. Admissions and re-admissions were determined to be necessary in the WQ so both were tracked for accuracy.

Once the testing was complete, the WQ was implemented into production for use by the program charge coordinator.

Results:

Review of all MCS cases and their MSDRG coding assignment on the front-end resulted in 100% compliance of all claims posted and submitted to payers. The efficiency of reviewing a WQ at the time of discharge, before release of charges to the payer, has had an impact on both the transplant program, team members reviewing the claims, and Patient Financial Services (PFS).

There are no longer delays in reviewing multiple areas to determine MSDRG or coding issues, along with potential revenue loss. And, PFS no longer has the burden of requesting a coding change or reprocessing of claims, Claims now are resolved quickly and timely

Conclusion

The implementation of this new methodology has improved the operational margin, eliminated charge correction by PFS staff and aided in a smooth and efficient review of all MCS cases. Mechanical Circulatory Support programs can utilize this methodology to ensure accuracy in billing and coding of MCS cases to increase efficiency and use; and extraction of the necessary data elements.

Kim Standridge, MPH

ABSTRACT C1-H

VALUE OF THE TRANSPLANT EDUCATION COORDINATOR POSITION AS MEASURED BY EFFICIENCY AND QUALITY

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Problem: The transplant specialty is an evolving discipline that requires healthcare providers to stay abreast of current trends while maintaining role competencies for regulatory purposes. With the increasing demands of meeting patient and program-specific needs, it is challenging for transplant professionals to carve time to plan and implement quality educational programs to support staff development. In addition, coordinating orientation for new transplant employees can be a challenge that often falls to the manager, senior employee, or other program leader. Implementing the role of a dedicated Transplant Education Coordinator can support transplant team members and the overall program, by organizing quality educational programs, maintaining annual competencies, and coordinating new hire orientation. As a result, programs may see better prepared staff, decrease in turnover rates, and increase staff investment within the program. Additionally, relieving many of these tasks from managers will enable transplant leaders to focus on developing their organ specific program, and foster innovation within their programs.

Approach: In November 2013, a busy transplant and VAD center added the Transplant Education Coordinator role to its management structure. This role was developed as a full time (1.0 FTE) position. Requirements of the role included American Board of Transplant Certification, Master of Science in Nursing, and experience in field of transplantation. This role supports the 5 organ programs, Heart, Liver, Lung, Kidney, Pancreas and Ventricular Assist Device (VAD) program at the facility. The education coordinator in the role received 2 months of orientation, and began working independently in January 2014. Since that time, the educator was able to implement manager program requests, including, a six week VAD orientation program, a five session Donor Call Center education program, and assisted in coordinating the NATCO Introductory Course for Transplant Professionals, which was hosted by this transplant center. The educator also absorbed numerous tasks from management, such as, new hire on-boarding, competency assessment, skills stations, CPR renewal, and needs assessment based in-services. Presently, the educator is coordinating a test preparation program for the CCTC examination to increase the current certification rate (30%) within the program. A survey was administered to staff to assess new hire orientation satisfaction before and after the implementation of the educator role. Managers were also polled to quantify time gained with the resource of an educator. Financially, the budget was analyzed to identify cost saving benefits of the educator role.

Results: The results of the survey performed among staff showed a definite improvement in the organization and efficiency of orientation after employment of the education coordinator role. The value analysis showed a net gain for productivity when Medicare cost reimbursements were factored into the equation. It is anticipated that there will continue to be data to positively support this role as the year progresses, including an increase in National Transplant Certification rates, decreased employee turnover, and an overall increase in work satisfaction

among transplant professionals. While this is cost-effective for our center, the scale and breadth of our programs are likely an influence.

Conclusion: The role of the Transplant Education Coordinator is a valuable role in growing and maintaining a successful transplant program. The Transplant Education Coordinator can provide critical support and education to transplant professionals, while increasing productivity and improving employee satisfaction within the program.

Natalie Santiago Blackwell RN, MSN, CCTN

ABSTRACT C1-I

PATH TO BECOMING A HIGH RELIABILITY ORGANIZATION USING PROCESS IMPROVEMENT AND EMPLOYEE ENGAGEMENT

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Problem/Situation: In an effort to improve patient safety, healthcare organizations are increasingly turning to High Reliability as a model of safety and reliability. The Joint Commission has described this as an incremental process which includes a culture of safety and widespread deployment of effective process improvement tools (1, 2).

Our work product, the pre-transplant evaluation process, had a high degree of variability. It did not consistently meet the needs of the clinical team or patients. It was not consistently timely, which imposed a safety risk for patients with end stage disease. There was extensive variability in practices.

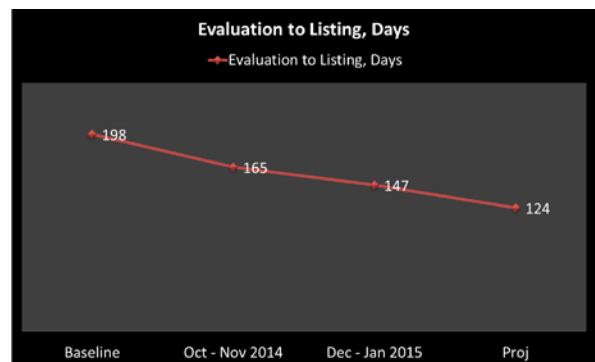
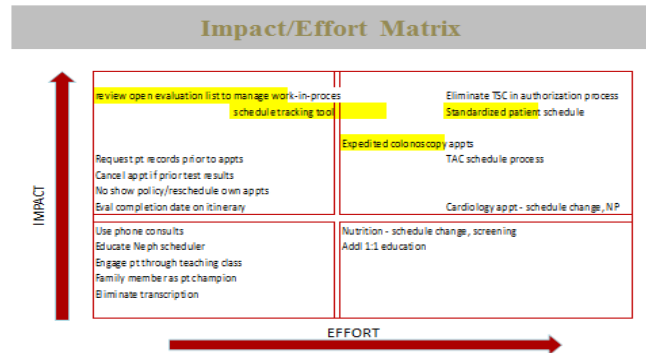
This report describes the use of Lean and Six Sigma tools as part of a change management process which included specific efforts to move toward a culture of safety in a kidney transplant program. The outcome measure was reduction of cycle time for the transplant evaluation process.

Approach: Our efforts to improve the process were data driven, involved systematic identification of failure points and piloted initiatives to test impact through a rapid cycle improvement project. We began with analysis of baseline data and documentation of current processes, including identification of variation and delays, through a process flow map. We used brainstorming techniques and affinity mapping to further explore factors leading to failure points.

The use of these tools was an effort to avoid the tendency to over simplify and rush to implementation of changes. Solutions were categorized and prioritized using an impact-effort matrix. Four solutions were identified to pilot: (1) review of open evaluation list to manage work-in-process; (2) schedule tracking tool (3) standardized patient schedule and (4) expedited colonoscopy appointments.

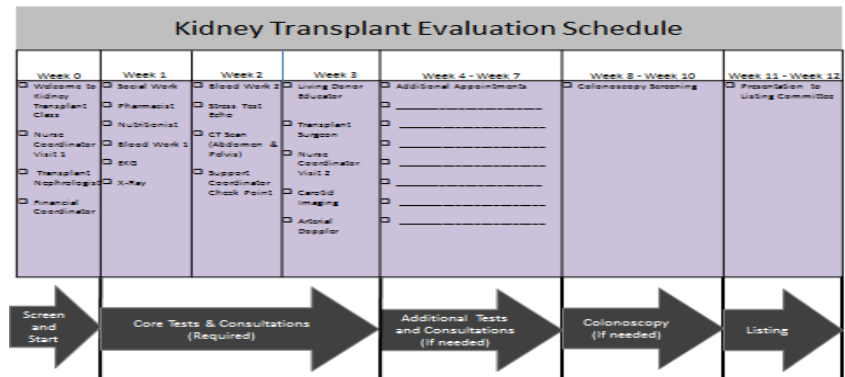
Efforts to improve the culture of safety were integrated and included the following: involvement and engagement of staff performing the work, defining expected performance, review of deviations from expected performance, elevating expectations of ourselves and our patients, and encouraging an environment of “collective mindfulness” (2).

Findings/Conclusions: Cycle time for evaluation to listing decreased by 26 % utilizing a structured weekly review of the open evaluation list. This consisted of a review of individual patients with scheduling and nurse coordinators and involved managers and physicians. This process change required a disciplined structure and reinforcement of expectations. The impact was maintained through the next phase of the pilot. Further reduction in cycle time is projected based on the impact of the standardized patient schedule described below to reduce the total number of days to listing by 37%.



The use of a standardized schedule took more lead time to introduce to the team. During the initial pilot, the time from the initial screening appointment to the first testing was projected to drop from 36 days baseline to 7 days, an 80% reduction. During the first 6 weeks of the pilot, 24 patients began the pilot process. Ten percent did not proceed for financial reasons and 10% were scheduled but did not show for initial testing appointments. Of those that proceeded, 80% completed their first core appointments as expected. The projected impact based on data from the early stages of the pilot is a 23 day reduction in cycle time by using a standardized patient schedule to initiate the testing and consultation process.

Standardized Patient Schedule



Patient Schedule Tracking Record

The tool below was used for tracking individual patients and monitoring implementation of the pilot evaluation process.

Last Name	First Name	Screen & Start	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12	Comments
			Core Testing and Consults			Additional Testing and Consults			Colonoscopy			Listing Decision			
A	B	Actual 12/17/14	12/31/14	1/7/15	1/14/15	1/21/15	1/28/15	2/4/15	2/11/15	2/18/15	2/25/15	3/4/15	3/11/15	3/18/15	
		Expected 12/17/14	12/31/14	1/7/15	1/14/15	1/21/15	1/28/15	2/4/15	2/11/15	2/18/15	2/25/15	3/4/15	3/11/15	3/18/15	
C	D	Actual 12/23/14	12/31/14	1/7/15	1/14/15			2/11/15	3/13/15				3/19/15	3/18/15	Card 2/11, Pulm 3/13, plan to move forward
		Expected 12/31/14	1/7/15	1/14/15	1/21/15	1/28/15	2/4/15	2/11/15	2/18/15	2/25/15	3/4/15	3/11/15	3/18/15		
E	F	Actual 12/17/14	1/7/15	1/14/15											Week 3 not scheduled; TSC to fu on appt
		Expected 12/31/14	1/7/15	1/14/15	1/21/15	1/28/15	2/4/15	2/11/15	2/18/15	2/25/15	3/4/15	3/11/15	3/18/15		
G	H	Actual 12/17/14	1/15/15												On hold psychosocial
		Expected 12/31/14	1/7/15	1/14/15	1/21/15	1/28/15	2/4/15	2/11/15	2/18/15	2/25/15	3/4/15	3/11/15	3/18/15		

Legend:
 Completed on or before expected date
 Scheduled on or before expected date
 Off track
 Scheduled but off track

One of the four efforts that was implemented, expedited colonoscopy scheduling, was included because of the strong perception of staff that this was a major cause of delays. The baseline data did not support that but process changes were implemented because of beliefs. Through the course of the pilot, the validity of the baseline data was reinforced and the impact of the colonoscopy testing on the evaluation process was determined to be minor. Although the changes were positive, substantial effort was utilized for colonoscopy scheduling with very little gain, further demonstrating the value of obtaining and utilizing baseline data to direct change.

Implications/Relevance: The use of Lean and Six Sigma analytical tools along with process change techniques and employee engagement efforts have demonstrated substantial impact during the pilot period producing a 37% reduction in time for evaluation to listing. It is expected that the active management of and ongoing engagement of staff will be necessary to sustain these changes for patient safety and work efficiency.

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1. Chassin, M.R., Loeb, J.M, The Joint Commission. 2013. High-Reliability Health Care: Getting There from Here. The Milbank Quarterly, Vol. 91, No. 3, 2013 (pp. 459–490)
2. May, Ellen Lanser, American College of Healthcare Executives. 2013. The Power of Zero: Steps Toward High Reliability Healthcare. Healthcare Executive, Mar/Apr 2013 (pp. 16-24)

ABSTRACT C1-J

INTRODUCING LIDO: THE LIVING DONOR DATABASE

University of California Davis Medical Center, Sacramento, CA

PROBLEM

Until last year, our living donor kidney transplant program relied upon paper donor health questionnaires, paper charts, review of physical information, and manual tracking of status and program statistics. This made it harder for potential donors to express their interest, reduced program efficiency, precluded multiple people from reviewing the same document without a physical handoff, and made it difficult to assess the effectiveness of interventions intended to make the program more successful.

METHODS

After ascertaining that existing available products suffered from critical limitations (e.g. difficulty of use for potential donors, inability to integrate with other institutional systems, lack of support for a fully paperless living donor evaluation process), the living donor team partnered with the IT department to develop a secure living donor database. We collaborated weekly to educate the IT staff about living donation and develop a process map for current and desired workflows. Together, we determined the high-level functionality the system should accomplish to make our program as nimble as possible:

- 1) Allowance of secure, easy-to-use, online submission of donor health questionnaires with real-time triage of probable donor candidacy.
- 2) Facilitation of an easy, integrated, paperless process for evaluating potential living donor candidates.
- 3) Support for real-time program monitoring for center leadership and reporting for QAPI and oversight.
- 4) Direct integration with the program's database of transplant recipients.
- 5) Full configurability, including user and role management, by transplant program staff so that new programming is not needed as the program, clinical science, or regulations evolve and necessitate system changes.

Programming was initiated prior to conclusion of project definition, resulting in an iterative, feedback-driven software development cycle with stepwise requirement document evolution. This facile process accomplished development in the shortest possible time while assuring robust functionality tightly aligned with the program's goals. Rather than staff adapting practices to software as so often happens in healthcare system implementation, the software was tailored to serve the living donor transplant staff.

SOLUTION

The resulting software ably met the five goals outlined above. The online health history questionnaire (fig. 1) was kept simple to make it easy for donors to express interest, but still allow as much triage as possible based on patient-reported history.

A “stoplight” approach to donor screening was developed. Questions were formulated related to absolute contraindications to donation (e.g. high BMI, history of significant thrombotic event, current smoking). A “yes” answer to any of those questions results in the donor being declined, which places the donor in the red queue. Donors receive a real time message to explain the decline. If the donor answers no to all questions, they are routed to the green queue and are immediately contacted by an Administrative

The image shows a screenshot of a web-based questionnaire titled "LIVING KIDNEY DONATION INTEREST FORM". At the top, there is a date "01/19/2015". Below the title, a welcome message reads: "Welcome to the [redacted] Considering live kidney donation is a tremendous act of kindness. The donation process can be time consuming and we value your time. The first step is to learn whether you have any past or present medical problems that would rule you out as a donor. The following series of questions will allow us to determine whether you might be a suitable donor. Please answer the questions accurately and completely. Only our medical team will use this information and it will not be shared with anyone. Once you complete the questions you will receive a message that will instruct you on the next steps. Again we value your generosity and we thank you for your time." Below this, a note states "Fields marked * are required." The form contains several input fields: "* First Name" and "* Last Name" (text boxes); "* Country" (dropdown menu); "* Street" and "* City" (text boxes); "* State" (dropdown menu); "* Zip Code" (text box); "* Date of Birth" (text box with "(mm/dd/yyyy)" prompt); "* Gender" (dropdown menu); "* Height" (text box with "0 feet" and "0 inch" dropdowns); "* Weight" (text box with "lbs" prompt); "* Best Contact Number" (text box with "Select" dropdown); "Email Address" (text box); "* Do you prefer an interpreter?" (dropdown menu); "* Do you have a specific recipient?" (dropdown menu); "* Do you take any prescribed medications every day including psychiatric medications? (Do not include vitamins)" (radio buttons for "Yes" and "No"); and "If Yes please list your medications." (text box).

Fig. 1: Partial Online Questionnaire

Assistant. The team decided that a medication list and hospitalization history could be used as a surrogate predictor for co-morbid conditions requiring further data-gathering and review. Such patients are placed in the yellow queue and are first contacted by the living donor RN and then routed to green or red based on the nursing assessment.

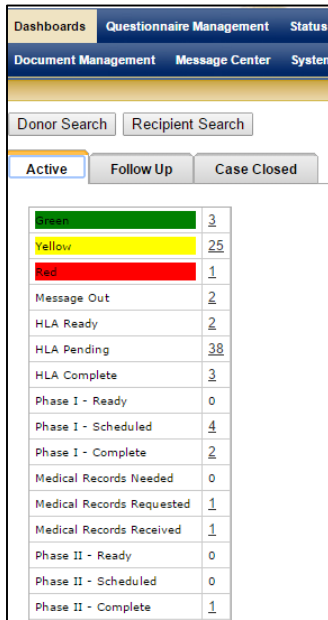


Fig. 2: Status Dashboard

Beginning with the questionnaire, the system supports full paperless completion of the donor workup, focusing on staff communication. Features include scanning outside documents, a staff messaging center, linkage with the existing recipient transplant database, and worklists generated by follow-up dates which allow program staff to manage their work using the system. Users can see at a glance how many patients are in each phase of the process (fig. 2). Tracking phases electronically further allows QAPI reporting of the time the process takes to facilitate program development and assess changes for effect on process. The full configurability allows the program to change all aspects of the software without requiring IT programming. For example, questions can be added and removed to the initial questionnaire and automatic triage settings changed directly from the interface (fig. 3). The task management screen allows staff to monitoring scheduling and completion of all testing and administrative tasks.

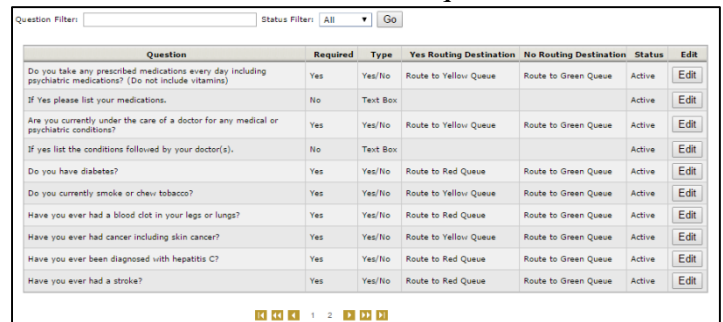


Fig. 3: User-configurable Questionnaire and Triage

RESULTS

Prior to implementation, the program was averaging 86.5 rule-outs per year, based solely on initial screening of paper health history forms. In the first 45 days of implementation, the system screened out 22 donors. This volume suggests both increased volume of questionnaires, as well as more efficient rule-out of candidates. In addition to rule-outs, in our new workflow, the first contact for all green queue donors is made by the transplant administrative staff, saving additional hours of nursing time. Our first paper-free donor was able to have an evaluation completed less than one month following system go-live. Moving forward, the use of this system will continue to allow easier access for potential donors, more efficient work for program staff, and faster evaluations.

Authors:

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ABSTRACT C1-K

CONTINUOUS IMPROVEMENT PDCA's FOR DECREASING TIME TO LISTING

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Purpose:

The Transplant Quality Assurance and Performance Improvement (QAPI) program has been tracking evaluation times for all solid organ transplant programs at our center. For the Kidney Transplant program, this measure was at 1 year, much higher than the benchmark and the program goal. Lengthy evaluation times resulted in delayed listings at the UNOS national waiting list, decreased patient & staff satisfaction and worsened patient health conditions. During the annual QAPI planning meeting, the Kidney Transplant Quality Council brainstormed Quality Improvement (QI) project ideas, conducted prioritization and project selection. This project was selected as a priority with the goals of decreasing evaluation times, and increasing patient and staff satisfaction.

Method:

At the beginning, quality leader collected data regarding the evaluation phase. Process mapping, data collection and analysis identified the following areas as causes for prolonged evaluation process:

- Time for insurance clearance to start evaluation
- Low attendance rates for kidney transplant appointments
- Inconsistent evaluation process

For these identified causes, the quality leader worked with QI teams and conducted the following Plan- Do- Check- Act's (PDCA's):

1st PDCA: Decreasing time for insurance clearance prior to evaluation:

Data collection showed that time for insurance clearance took ~ 25 days. This process is critical, as it is the front gate to start evaluation. Recognized reasons were: high turnover rate among Transplant Financial Coordinators (TFCs) and lack of a standard process to clear patients financially. In addition, TFCs reviewed the current process which revealed that financial clearances were performed in batches. To decrease the time for financial clearance, TFCs started working on a PDCA project. Initially, TFCs created a standard work template based on insurance type. In addition, the TFCs changed the expectation that insurance clearance should be done more frequently: batching: weekly vs. one piece flow: daily. The TFC QI team set a short-term goal for this process to be less than 10 business days.

2nd PDCA: Increasing Attendance Rates for Kidney Transplant appointments:

The first consultation during the Kidney transplant evaluation at our center was with the Transplant Nephrologist. Data collection and analysis showed that the attendance rate for this appointment type was 45%. Hospital-wide attendance rate was 60%. Quality leader started working with Transplant Program Assistants (TPAs) and Transplant Nurse Coordinators (TNCs) to do process mapping. This team identified that appointments were scheduled and letters were sent to patients, however patients did not receive personal contact/communication. For this PDCA, the QI team started implementing phone calls at the time of initial scheduling. In addition, patients started receiving reminder calls a week prior to the Nephrology visit. If patient could not be reached, TPAs made calls to dialysis centers and worked with dialysis center staff to help patients move efficiently through the evaluation process in a timely manner. Also, in the new process, in addition to mailing the appointment letter to the patient's home address, a copy of the letter was sent out to dialysis center. The other reason for low attendance rate was inappropriate scheduling: chart review of patients who no-showed revealed some instances where patients were only scheduled for one appointment in a day. Patients who lived far away did not come for only one appointment. Inappropriate scheduling was due to lack of organization of appointments in the scheduling system (see below- 3rd PDCA for detailed information). As a result of this finding, TPAs decided to create a system which would provide bundle appointments to schedule appointments at patients' convenience.

3rd PDCA: Standardizing evaluation process:

Process mapping showed that there was a lack of consistent and standard evaluation process. Each of the three coordinators would coordinate evaluations differently, and each patient may have had a different path and experience during the evaluation process. While the beginning of evaluation process was standard, starting with orientation class, the end of the evaluation was not consistent. Moreover, there was not an expected evaluation completion date. This inconsistency resulted in much difficulty for TPAs to schedule appointments, since the TPAs needed to search for all appointments one by one and tried to put them together. Each evaluation scheduling would require lots of brainstorming, creativity and problem solving. TPAs, TNCs, quality leader started a new PDCA to streamline this process to eliminate the

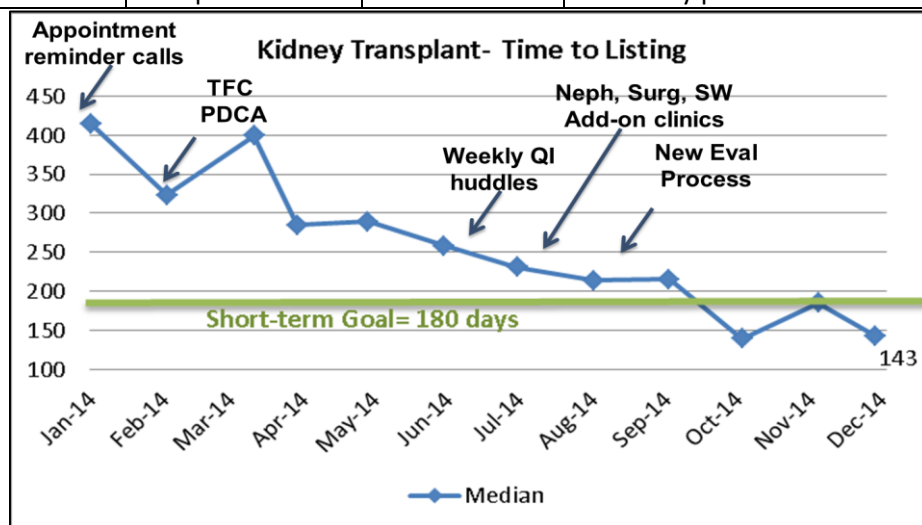
need for decision making and to cut extra time spent for scheduling. Firstly, providers who can identify contraindications were asked to see patients at the beginning of the evaluation process. These provider appointments (Orientation class, Transplant Nephrology, TFC and Social Worker) were grouped together and named as Bundle Day1. Secondly, the QI team worked with the clinic manager to create these bundle appointments in the scheduling template so that it was standard and transparent. The QI team's other intervention was to schedule bundle day1 and last (surgeon) visit at the same time. In this new way, patients were scheduled for their bundle day1 and last day of evaluation (surgeon visit) at the same time. After bundle day1, TPA and TNC reviewed patient's chart to identify and to schedule additional required testing prior to last (surgeon) appointment. As a result, both patient and staff knew when the patient was expected to complete evaluation.

During the planning phase, prior to implementation of the new process, the QI team collected data on pre-transplant patients and recognized that there were patients who had already started their evaluation, therefore would not fit into the new scheduling and evaluation process. Providers were asked and agreed to have add-on clinics so that these patients would not fall through the cracks and so that the new process would start fresh and efficiently.

Findings/Results:

The QI teams implemented the interventions, and added "Time for insurance clearance" and "Transplant Nephrology Attendance Rates" measures to monthly QAPI dashboard. The Kidney Transplant Quality Council started tracking these new measures in addition to "Times to Listing" measure. Along with these interventions, the teams started weekly QI huddles – TNCs, TPAs and TFCs reviewed patients going through the evaluation to identify next steps and next step owners to ensure tight connections and transparency among providers. All PDCA's have had successful results, shown in the table below. As a result Kidney Transplant Time to Listing decreased steadily from a median of 1 year to < 180days in the last three months as shown in the graph below.

PDCA Project	Before PDCA	PDCA Target	After PDCA
Decreasing time for insurance clearance	25 days	< 10 business days	4 days
Increasing Attendance Rates for Kidney Transplant appointments	45%	> 60%	75%
Streamlining Evaluation Process	Not Standard & No Expected Eval Complete Date	Standard	Standard: Starts w/ Bundle Day1, ends with Surgeon (~3 months). Expected Eval Complete Date known by patient and team



Implications/Relevance:

Cycle time is a key quality measure in all industries including health care. In Transplant, key primary time quality measures include time to listing (evaluation times), time to transplant (waitlist times) and length of stay. These measures are a representation of transplant center process efficiencies which impact patient experience, patient and staff satisfaction and patient health conditions. It is crucial for Transplant programs to deliver the highest quality of care and patient experience throughout transplant processes in a timely manner.

ABSTRACT C1-L

ANALYSIS OF LENGTH OF STAY AND MELD SCORES ON 30 DAY READMISSION RATE AFTER LIVER TRANSPLANTATION AT A SINGLE CENTER

Meredith Stanley, MHA, Vanderbilt University Medical Center, Nashville, TN

Purpose: Readmission to the hospital is an important metric when assessing the cost-effectiveness of the hospital. Hospitals are paying closer attention to readmissions due to the high costs. This is especially true for liver transplant recipients, as the costs for complications that lead to readmission are incrementally higher in liver transplant recipients versus other patient populations. Decreasing readmission rates would lead to cost reductions for the hospital overall. A liver post-transplant length of stay (LOS) and Model for End-Stage Liver Disease (MELD) score may be associated with readmission rates. Few studies have evaluated the association of LOS and MELD score readmission rates within 30 days of discharge, and no other study has examined the effect of LOS and MELD score and readmission charges. The purpose of this retrospective review was to evaluate the impact of the ranges of LOS and/or MELD scores on liver transplant readmission rates as well as readmission charges.

Method: We analyzed readmission rates and overall hospital charges of liver transplant patients from 2012-2014. We calculated the LOS post-transplant and the UNOS MELD score at transplant. Once these factors were calculated, we determined which patients were readmitted within 30 days of discharge. A readmission is defined as an inpatient hospital stay exceeding 24 hours. The readmission charges were captured for 30 days post patient discharge. These readmission charges were then calculated as an average charge per day. We excluded 5 patients because they had not reached the 30-day post-discharge date and excluded 2 more patients based on the inability to capture charges at present date. By using SPSS software, we calculated statistical significance of several of these factors, including: both LOS and MELD score and readmission rates; LOS and readmission rates; MELD score and readmission rates; LOS and readmission charges per day; and MELD score and readmission charges per day.

Results: There were a total of 261 liver transplants performed during the reviewed time period. Of these patients, 52 (20%) were readmitted to the hospital within 30 days of post-transplant discharge. To analyze the data, we grouped the LOS days into 4 quadrants: ≤ 5 days, 6-8 days, 9-11 days, and ≥ 12 days. The MELD scores ranged from 15 to 40; the median MELD score was 26. Given the small sample size, a statistical significance is present if the p-value is $<.05$. In Tables 1-2 below, LOS is a categorical variable and the LOS ≤ 5 days is used as the baseline. There was no statistical significance of both the LOS and MELD score and readmission rates. There was also no statistical significance between LOS and readmission rates. As seen in Table 3, there was a very weak statistical significance between MELD score and readmission rates (p-value $<.05$). To analyze the readmission charges, the LOS was not separated into quadrants because of the small sample size. The average readmission LOS was 6.5 days. The average readmission charge per day is \$9,698.19; and the standard deviation is \$7,732.13. Upon analysis, though, there was also no correlation between LOS and MELD score and readmission charges (Table 4).

Table 1: Significance of both LOS and MELD and Readmission

	Coefficient	P-Value
Intercept	-2.5194	0.0002
LOS: 6-8 days	0.2271	0.5779
LOS: 9-11 days	0.6930	0.1333
LOS: \geq 12 days	0.6041	0.2268
MELD score	0.0339	0.1845

Table 2: Significance of LOS and Readmission

	Coefficient	P-Value
Intercept	-1.7047	0.0000
LOS: 6-8 days	0.3029	0.4521
LOS: 9-11 days	0.8224	0.0674
LOS: \geq 12 days	0.8445	0.0678

Table 3: Significance of MELD score and Readmission

	Coefficient	P-Value
Intercept	-2.5863	0.0000
MELD score	0.0477	0.0431*

Table 4: Correlation of LOS and MELD score and Readmission Charges

	Readmission Charge Correlation
LOS	-0.0317
MELD score	-0.0106

Conclusion: Based on this single center study, we found that the LOS and MELD score of the liver transplant recipient does not have an effect on readmission rate or the readmission charges. Therefore, in this single center study, we found no evidence that indicates a low LOS could lead to increased readmission and charges.

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CATEGORY 2

Quality Assurance/Improvement/Transplant Pharmacoeconomics

Abstract C2-A

REMOTE BLOOD PRESSURE (BP) MONITORING WITH INTEGRATED CLINICAL PHARMACY SERVICES TO IMPROVE BP CONTROL IN THE RENAL TRANSPLANT CLINIC

Purpose: It is estimated that 70-90% of renal transplant recipients have hypertension and many require one or more antihypertensive agents to maintain goal BP targets in the post-operative period¹. An increase of SBP of 5 mm Hg increases the risk of graft loss and death, while a reduction in SBP and DBP, maintained over a 4 year period following renal transplant, is associated with a significant improvement in graft survival². Poor control of hypertension is the most significant non-immunologic cause of renal allograft loss. In-office BP measurement is the current practice for diagnosis, classification and monitoring of hypertension. However this method introduces several limitations. BP is not static, thus two consecutive in-office readings provide limited information regarding BP control over time. Patient follow-up with in-office visits may also be completed at extended intervals, particularly for transplant patients who are well out from transplant. In addition, the phenomenon of white coat hypertension can result in elevated in-office readings, potentially leading to inappropriate dose titration(s) or therapeutic additions to control BP. Home-based, remote electronic BP monitoring (HeBPM) is an emerging technology for the care of patients with hypertension as it may reduce these limitations of office BP readings.

Method: We have designed and implemented an intervention that includes a dedicated transplant clinical pharmacist who provides Medication Therapy Management (MTM) services to renal transplant recipients and incorporates Home Electronic BP Monitoring (HeBPM) to enhance the quality of care to renal transplant recipients. Patients are given an electronic BP cuff (uploadable via a cellular hub, home computer or kiosk) and instructed to monitor at home. Their BP readings are analyzed via a clinical dashboard, and their medications are titrated and/or changed by the transplant clinical pharmacist in conjunction with a pharmacist-physician collaborative care agreement to support expert and timely optimization of complex medication regimens outcomes.

Results: We have extracted a cohort of 50 patients, with baseline SBP and DBP values as well as SBP and DBP values at 30, 90, 180 and 360 days following enrollment in the program. Of these 50 patients, 31 have baseline hypertension as defined by a SBP>140 and a DBP>90. **Figure 1** illustrates the trend of

¹ Miller LW. Am J Transplant 2002; 2: 807; Schwenger V, *et al*, Ann Transplant 2001;6:25

² Midtevd K, *et al*, Nephrol Dial Transplant 2002;17:1166-1169

SBP and DBP values of this patient cohort as well as average reduction in SBP and DBP compared to baseline. For these patients, average SBP values were significantly lower ($p < 0.001$) on 30, 90, 180, and 360 days following patient program enrollment, compared to baseline. Similarly, DBP values were significantly lower ($p < 0.001$) on 180 and 360 days following patient program enrollment, compared to baseline. Additionally, the magnitude of SBP and DBP reduction increased as patients continued to enroll in the program and receive the intervention (**Figure 1B**). Furthermore, the impact of remote monitoring coupled with clinical pharmacy services on healthcare-associated costs is highlighted by comparing the number and probability of 30-day readmission rates in the pre-intervention period (**January 1st 2011 to December 31st, 2011**) and the post-prevention period (**January 1st 2013 to December 31st, 2013**). There was an estimated absolute reduction in the risk of re-hospitalization of **16%** or a relative reduction in risk of hospitalization of **43%**. It is estimated that each 30-day readmission after transplant costs an average amount of \$10,551³.

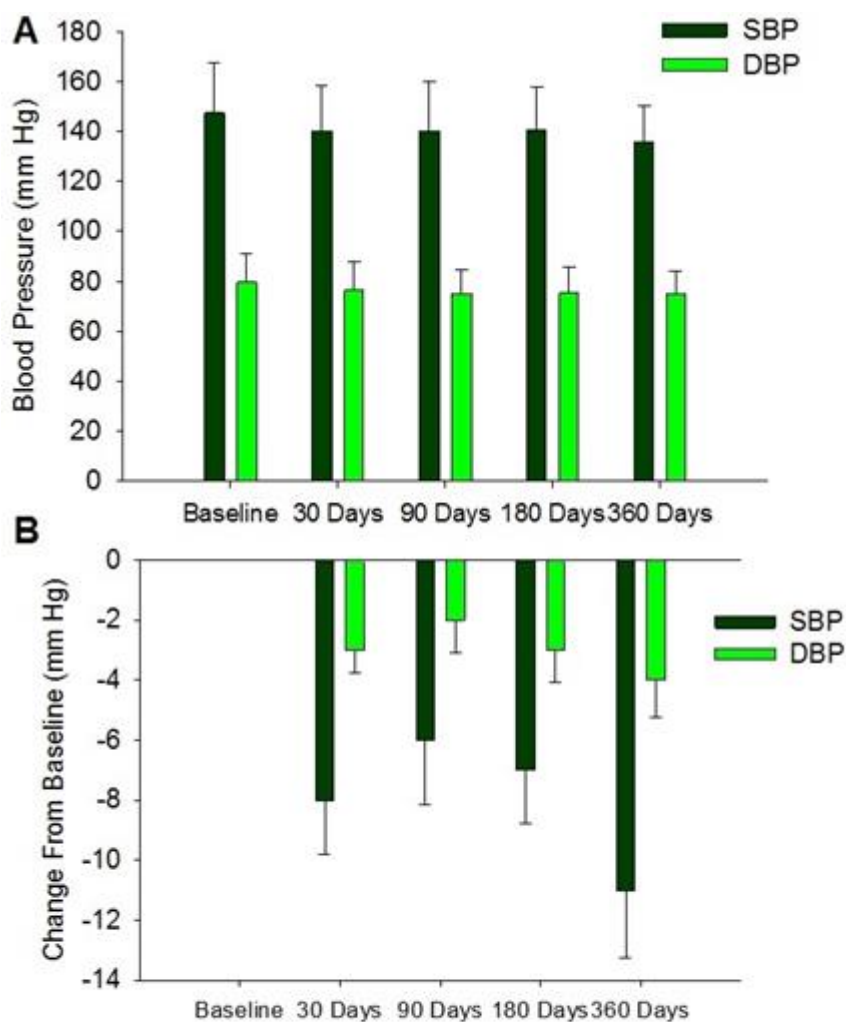


Figure 1 SBP and DBP changes at 30, 90, 180 and 360 days following enrollment in the HeBPM with clinical pharmacy services program (n=50). **A)** SBP and DBP values show significant reduction compared to baseline at 30, 90, 180 and 360 days compared to baseline. **B)** Average reduction in SBP and DBP compared to baseline values at the indicated time points.

Conclusion: The present results show both statistically and clinically meaningful reductions in BP in renal transplant patients via an integrated remote monitoring and MTM intervention program. . Optimizing BP control is likely to benefit renal transplant patients in terms of preventing premature graft failure and reducing unnecessary use of healthcare services and associated costs. Connected health technologies integrated with clinical pharmacy services hold great promise for enabling team-based care and improved health outcomes.

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Education: Northeastern University, Bouvé College of Health Sciences (2008) Doctor of Pharmacy

³ McAdams-DeMarco MA, Grams ME, Hall EC et al. Early Hospital Readmission After Kidney Transplantation: Patient and Center-Level Associations. American Journal of Transplantation 2012; 12: 3283–3288

ABSTRACT C2-B

CONTINUAL SURVEY PREPAREDNESS

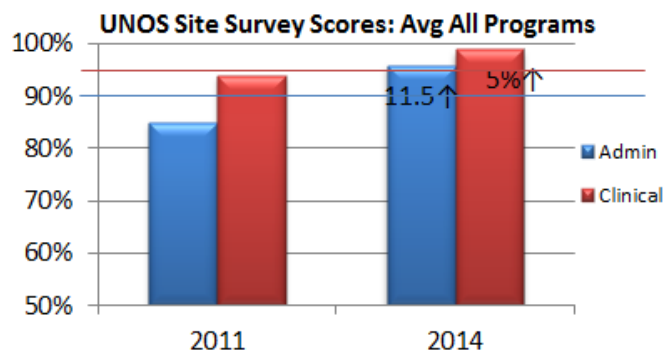
Kristine Dahl, RN, Houston Methodist J.C. Walter Jr. Transplant Center, Houston, TX

Purpose: Regulating bodies' surveys are very stressful and time consuming, placing a burden on the transplant team. Goals were set to be above the threshold for UNOS administrative and clinical scores and decrease the overall burden of site visits. A new process for continual compliance monitoring of regulating bodies' requirements was developed and implemented following our 2011 UNOS Administrative Site Visit. Our center's patient records are maintained partially in paper charts and partially via electronic medical record (EMR). In preparation for a UNOS site visit a paperless approach was planned for a simple, organized format of documents requested prior to the visit, to expedite the survey itself, and minimize the incidence of missed documents being reviewed by the surveyor.

Method: Upfront planning for resources of 2 Data and Compliance Specialists to audit documents for CMS/UNOS compliance of regulatory requirements. During audits, issues and errors are identified immediately instead of during preparation for site visits or when surveyors are on site. Examples of compliance monitoring include but are not limited to: Evaluation informed consent prior to listing; Accurate and Timely MRB outcome, listing, and delisting patient letters; ABO typing twice prior to listing; Patient Demographics entered in UNet with listing; Supporting Documents for Organ Allocation and Exceptions; ABO Transplant Verification; Date of Transplant; High Risk Donor Informed Consent, and Timely Delisting for Transplant or Other. Elements that were identified as repeat compliance issues such as documentation of Waitlist Options and Transfer Options were embedded in the Evaluation Informed Consent. Collection of audited information was stored in the patient's EMR in a format that simplified extraction when surveys occurred. When we received the site visit data request from UNOS, documents requested were gathered and scanned to PDF format or extracted from the EMR and saved in PDF format. Then all files were compiled and stored on a ShareDrive in organ specific folders, with a subfolder labeled for each attachment on document request, and then labeled by patient name so the surveyor was able to scroll through the documents quickly and efficiently. When the surveyors were on site, hospital laptops with all EMR systems were provided to each surveyor and the organ specific manager was available for any further data needs.

Results: Our center's overall compliance with UNOS Administrative Site Visit for clinical and administrative scores improved significantly from 2011 to 2014 site visits (average overall improvement: clinical score 5% and administrative score 11.5%) as well as the actual survey process was very organized and efficient. More importantly, we scored above the thresholds required by UNOS. Feedback received from the UNOS surveyors was that the paperless review process was a very positive experience. The continual auditing process provided real time awareness of the compliance issues so they could be evaluated and processes improved, instead of at the time of the survey or post survey action plan. We also were able

to identify during the preparation for the 2014 UNOS survey the need for similar auditing of the liver MELD variables and exceptions as we had implemented with the lung allocation score (LAS).



Conclusion: By having continual survey preparedness as exemplified in this abstract, your center's overall compliance may improve by continual auditing providing the platform to identify where the repeated issues remain. Surveys will be much less stressful and potentially an enjoyable experience for the surveyors and the center. The approach does require intensive resources and planning of resource allocation proactively. Our center believes that it is well worth the cost and is a savings in the end to be compliant and improve processes.

Kristine Dahl, RN; Susan Zylicz RN, BSN, MHA; Ann Stock; Kelley Fry

ABSTRACT C2-C

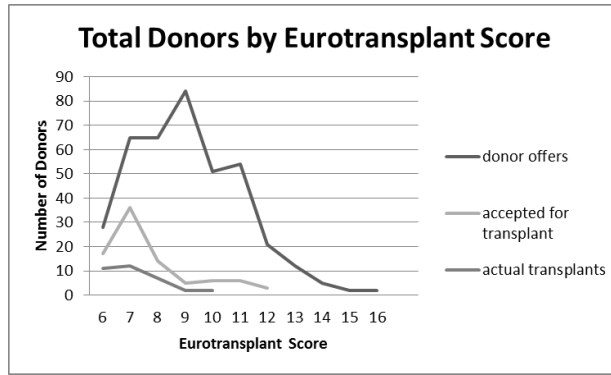
A Single Center U.S. Experience with the Use of Eurotransplant Donor Scoring on Donor Lung Utilization

Erin Mahoney, ANP-BC, Loyola University Medical Center, Maywood, IL

Purpose: In the United States there continues to be a disparity between the number of patients with pulmonary disease waiting for lung transplant and the number of suitable organs for transplant. The utilization of alternative options to expand the donor pool with the use of donation after cardiac death remains low and ex-vivo lung perfusion is still investigational. A scoring system originally developed by Oto et al. from the Melbourne group was expanded by Eurotransplant in the hopes of quantifying donor risk characteristics to enable improved evaluation of donor acceptability. The donor score consists of age, social history, smoking history, chest x-ray findings, bronchoscopy results, and arterial blood gas. In this investigation, our center implemented the Eurotransplant scoring system in all lung donor offered to assess impact on donor lung utilization rates.

Methods and Materials: Donors were scored during the evaluation process over one year and the scores presented to evaluating physicians and surgeons. Acceptance rates and subsequent transplants by donor score were then compared by doing retrospective scoring of the previous year.

Results: Prior to implementation, we accepted 72 out 581 total lung donors as suitable, with only 3% of total offers proceeding to transplant. Following implementation, we accepted 41 out of 485 total lung donors as suitable with 7% of total offers proceeding to transplant ($p=0.01$). There was an increased likelihood of accepting a lung donor as suitable in the Eurotransplant score cohort (OR 1.86, CI 1.34-2.58, $p=0.0002$) At our center, 65% of all offers have a Eurotransplant score of 9 or less, while the majority of donors deemed acceptable for transplant score at a 7 (see figure 1).



Conclusion: Utilizing a donor scoring system improved our overall acceptance rate of potential lung donors as well as increased the total number of lung transplants performed at our center. While scoring donors should not overrule clinical judgment into the acceptance of donor lungs, it can be a tool used to provide some objectivity to donor selection.

Erin Mahoney ANP-BC, Jeffrey Schwartz, MD, Daniel Dilling, MD, & Erin Lowery, MD

ABSTRACT C2-D

Title: "DECREASING HEART TRANSPLANT SURVEILLANCE BIOPSIES: A MODEL TO IMPROVE PATIENT SATISFACTION, SAFETY AND HEALTH CARE SAVINGS"

Contact Person: Linda Irwin, RN, ANP, CCTC, Director of Compliance
Massachusetts General Hospital Transplant Center, Boston, MA

Problem:

Asymptomatic heart transplant recipients undergo frequent endomyocardial biopsies after transplantation to assess rejection in the transplanted heart. Potential consequences of these biopsies include both the risk and discomfort of invasive procedures and the costs to the health care system. Our Center was interested in determining if any grade 3 level rejection was identified on a surveillance biopsy versus those performed for clinical symptoms and if the frequency of these biopsies could be safely reduced.

Approach:

Heart transplant recipients at our Center underwent surveillance biopsies at the following intervals after transplant:

Year 1: every week x4, every 2 weeks x4, every 3 weeks x1, every 4 weeks x3, every 6 weeks x1, every 8 weeks x 2

Year 2 thru 5: every 6 months

Transplant Center Cardiac Transplant and Quality and Compliance Sections performed a retrospective analysis of patients who underwent a heart transplant from 2007-2012 during post-operative follow-up period of 2-5 years. We assessed the number of biopsies, the number of biopsies with grade $\geq 3R$ rejection and stratified the biopsy as either a routine surveillance biopsy or based on clinical symptoms or signs.

Findings/Solution/Conclusion:

The Transplant Center's Quality and Compliance team reviewed this clinical post-transplant metric each quarter from 2012 thru 2014 and presented the data on dashboards which were posted on the Center's SharePoint site and shared at quality team meetings.

A review of surveillance biopsies from 2007 thru 2012 at our Center demonstrated no incidences of \geq Grade 3R rejection identified on a surveillance biopsy. Two patients were identified as having grade 3R rejection based on biopsies conducted for patient reported symptoms: medication noncompliance (n=1), dyspnea (n=1).

As a result of the findings the frequency of heart transplant biopsies was reduced to once a year (from twice a year) in years 3-5 after transplant. Patients a between 3 and 5 years post transplant will now undergo 1 biopsy/year. With an estimated charge of \$26,423 for ambulatory right heart catheterization with biopsy, a charge reduction of \$79,269 is achieved over years 3-5 for each cardiac recipient with elimination of these 3 biopsies.

Implications/Relevance:

As a result of quality discussions within the Cardiac Transplant and Quality and Compliance Teams, the analysis of data will now be further expanded to patients between 1.5 years and 2 years after transplant to assess whether the frequency of biopsies can be further reduced. Decreasing surveillance biopsies has the potential to improve patient satisfaction and safety and to provide cost savings to the health care system.

Authors:

Linda Irwin, RN, MA, ANP, CCTC

Jay Fishman, MD

Jose Garcia, MD

Sally Keck, RN

Coral Haggan, RN

Marc Semigran, MD

ABSTRACT C2-E

Title: *“INCREASED RISK FOR TRANSMISSION OF INFECTION DONORS: HOW ARE YOU TRACKING YOUR RECIPIENTS?”*

Contact Person: *Linda Irwin, RN, ANP, CCTC, Director of Compliance
Massachusetts General Hospital Transplant Center, Boston, MA*

Problem:

Over 30% of deceased donor organs procured in UNOS Region 1 in 2014 were designated as Public Health Service (PHS) increased risk for infectious disease transmission donors compared to 13% nationally. As the acuity level of patients in this Region is among the highest in the nation based on waitlist data, safe transplantation of these donor organs is an important option to prevent waitlist mortality. CMS mandates that transplant programs that utilize these organs obtain written consent from the recipient and offer follow-up serological testing for HBV, HCV, and HIV. Transplant programs must develop tools to ensure that these recipients are identified and that follow-up testing is implemented.

Approach:

To assess the number of patients transplanted with PHS increased risk donors, the Transplant Center’s Quality and Compliance team conducted a retrospective analysis of the patients transplanted with a PHS increased risk donor organ from 2011 thru 2014. During this time period there were 114 donor organs transplanted that met the definition of “increased risk”. The team assessed the mechanisms used to track the recipients.

The Transplant Center’s Infectious Disease Program conducted Grand Rounds on “Expanded Use of Increased Risk Donors- A Lifesaving or Risky Business?” where the topics of waitlist mortality, HIV/HCV/HBV treatment options and a protocol for serological tracking were discussed.

Findings/Solution/Conclusion:

The number of organs transplanted from increased risk donors has more than doubled at our Center in the past 3 years. Through close collaboration with the Transplant Center’s Infectious Disease (ID) Program, a protocol was created to advise Center staff and for post-transplant monitoring of recipients including: informed consent for each recipient with documentation; consultation with Transplant ID as needed; immediate pre-transplant HIV, HBV and HCV serology and viral load testing; and screening at 1-3 months and 6-12 months post transplant.

To ensure that the patients who receive an increased risk donor organ are identified, a “Transplant Event” note in the Transplant Center’s electronic medical record was modified to capture this element. The Transplant Center’s Quality

and Compliance Team initiated audits to track each transplant for the following elements: donor was identified by UNOS as a PHS increased risk donor; the informed consent is documented in the medical record; transplant event note documents this status; and staff communication reflects increased risk donor transplant. The results of these audits are then shared real time with practitioners and are incorporated into the Center's QAPI program. The team will also track compliance with follow-up serologies according to protocol as a new post-transplant clinical metric.

As each organ-specific transplant program previously differed in the tracking of recipients of increased risk donor organs, the Transplant Center's Quality and Compliance Team in conjunction with the Center's database committee is creating an increased risk donor recipient "flag" for the medical record. This flag will be incorporated into the transplant banner to alert to practitioners that the recipient received an organ from a PHS increased risk donor.

Implications/Relevance:

The utilization of PHS increased risk donors has been a valuable opportunity to increase the donor pool while necessitating the implementation of new mechanisms to track these recipients and offer follow-up serological testing. Incorporating this tracking into the Transplant Center's QAPI program is one mechanism to help ensure appropriate documentation and follow-up testing is conducted.

Authors:

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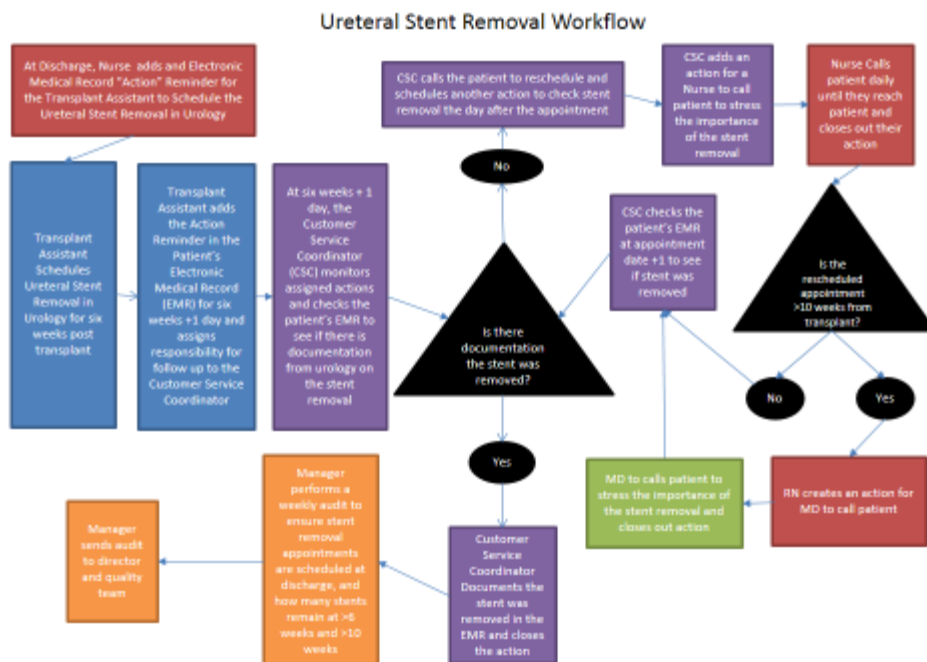
ABSTRACT C2-G

KIDNEY TRANSPLANT URETERAL STENT REMOVAL: A MULTI-TIERED APPROACH TO TIMELY REMOVAL WITH MULTIPLE SYSTEM CHECKPOINTS

Corey King, MBA/MHA, Northwestern Memorial Hospital, Chicago, IL

Problem Statement: Our large multi-organ transplant program performs approximately 300 kidney transplants per year. Our center identified an opportunity to improve the timely follow up on kidney transplant patients' ureteral stent removal. All kidney transplant recipients have a double "J" stent placed in the renal pelvis through the ureter to the bladder at the time of transplant to promote healing of the anastomosis and decrease the risk of a urine leak. At six weeks post-transplant, the stent should be removed to decrease the risk of infection. Ureteral stent removal follow-up of kidney transplanted patients between six and ten weeks is crucial for minimizing the risks of infection for stents remaining in the ureter longer than ten weeks. In an effort to improve the timely removal of the ureteral stent, we developed new procedures to improve the follow-up.

Approach/Method: We developed a multi-tiered approach schedule the ureteral stent removal and follow up with the patient at the designated times via multiple channels. The key to the method was to create a redundant process with multiple checkpoints to ensure that a single point of failure would not result in a missed stent removal. This included creating a series of electronic medical record "actions" for the team to assign responsibility handoffs as well as to monitor deadlines. The electronic medical record lists are also used to audit the process and ensure all patients receive proper follow up. Following is a summary of the steps included in the new procedure that have assisted in the ureteral stent removal process:



A process has been implemented to monitor the medical record of each patient until evidence of stent removal. A weekly audit is performed to monitor our compliance in meeting our goal of 100% stent removals and any patient without medical record evidence of stent removal greater than ten weeks is escalated to management and quality.

Results/Findings:

The collaborative work of the transplant team lead to better ureteral stent removal follow up in the following five categories: 1) Action for appointment at Discharge, 2) Responsible person assigned to monitor EMR until removal, 3) Monitor the electronic medical record until the ureteral stent is removed, 4) Delayed Ureteral Stents greater than 10 weeks post-transplant, and 5) Documentation of the Ureteral Stent removal. As highlighted in the following table, all five categories improved our follow up immediately after implementation.

Ureteral Stent Removal Follow up Indicators Immediately after Implementing New Process

	FY12	FY13	FY14
Action for appointment at discharge	98%	100%	100%
Responsible person assigned to monitor EMR until removal	96%	100%	100%
Monitor EMR until evidence of removal	100%	100%	100%
Delayed Ureteral Stent Removal (# stents > 10 weeks)	2%	2%	2%
Documentation of Ureteral Stent Removal	100%	100%	100%

Conclusions/Relevance to category (Quality assurance/Improvement/Transplant pharmacoeconomics):

In order to provide the best kidney post-transplant follow-up care, it is essential for transplant centers to have a well thought out process and procedure outlining specific steps the center will perform to meet proper ureteral stent removal follow-up care. At our center, this includes a multi-tiered approach to reach kidney transplant recipients via multiple channels including appointment scheduling, follow up calls, and electronic medical record documentation. Through electronic medical record lists that were set up to monitor the patients through this process, we were able to properly follow up with the patients and ensure the ureteral stent was removed in a timely manner. We also created a redundant process with multiple checkpoints to reduce the number of missed stent removal appointments. In order to document compliance, our center has established an audit plan ensuring the appointments are scheduled and ureteral stents are removed to ensure 100% compliance with key indicators on the quality plan and with above protocol. We continue to monitor the procedure and will make changes as necessary to ensure the success of ureteral stent removal follow-up.

Corey King, MBA/MHA; Eileen DeMayo, RN, BSN; Terri Halverson, MS, RN; Gwen McNatt, MS, RN, CNN, FNP-BC; Jason Skrzypinski, MBA

ABSTRACT C2-H

Implementation of Discharge Phone Calls in Liver Transplant Patients to Reduce Readmission Rates

Piedmont Transplant Institute, Atlanta, GA

Problem/Situation: According to the Center for Medicare and Medicaid Services (CMS), the 30-day unplanned readmission measures are estimates of unplanned readmission for any cause to any acute care hospital within 30 days of discharge from a hospitalization. Hospitals with a high number of patients readmitted within a short time period after discharge could be criticized for providing inadequate quality of care or a lack of collaboration and coordination of post discharge care and risk a reduction in reimbursement dollars. According to research, there are strategies that hospitals can implement to avoid frequent readmissions. Our goal was to develop an evidence-based sustainable program aimed at decreasing our readmission rate in our post-liver transplant population, as they had been unacceptably high over the previous year and a half.

30 Readmission Rates Pre-Pilot Program	
Transplant Date	Readmission Rate
2/2013 – 4/2013	55.6%
5/2013 – 7/2013	40.9%
8/2013 – 10/2013	52.4%
11/2013 – 1/2014	30.0%
2/2014 – 4/2014	57.1%

*Includes dual organs (liver/kidney)

Methods/Practices/Interventions: We implemented a 3-month pilot program aimed at decreasing our readmission rates by 25% from the previous 3 months. The program consisted of daily discharge phone calls (including weekends), from the day after discharge up until the patients' first clinic appointment (usually scheduled 3 to 5 days after discharge). These follow-up phone calls included scripted questions and phone assessments of our recently transplanted liver and liver/kidney patients. After the first clinic visit, the phone calls were strategically spaced (twice a week) for the next two to eight weeks and decreased to once a week for weeks nine through twelve. The premise of the program was that frequent phone communication with our patients would allow us to identify concerns and/or problems sooner and intervene earlier prompting a clinic visit versus an emergency room visit and possible subsequent hospital admission.

Findings/Solutions/Conclusions: We implemented the pilot program 5/1/2014 after educating all physicians, advanced practice nurses, physician assistants, and clinical staff members. During the time period 5/1/2014 to 8/1/2014, we performed 19 transplants (liver and liver/kidney), which was consistent with our 3 month data collection points over the previous year in which we averaged 18.5 transplants/3-months. All 19 patients were included in the pilot (including patients discharged to rehabilitation facilities). During the pilot program, we readmitted one patient (a liver/kidney recipient) giving us a readmission rate of 5.3%. We concluded that, as existing evidence suggests, discharge phone calls prevent unplanned readmissions if conducted

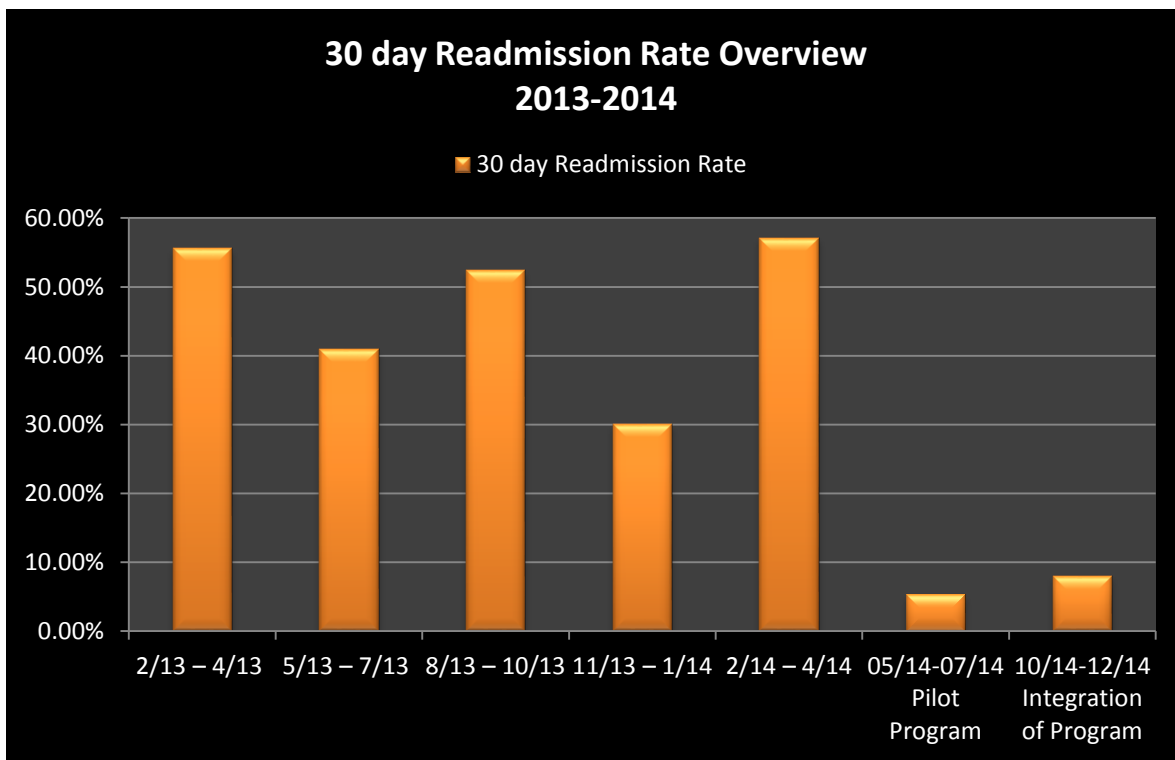
frequently and consistently through a programmatic approach. The program was integrated into our post-transplant coordinators' workflow at the end of 9/2014 after sharing the results of the pilot and further education. Three-month data collected from 10/2014 to 12/2014 after implementation of the program denotes a sustained decrease in our 30-day readmission rate.

30 Readmission Rates Pilot Program	
05/2014-07/2014	5.3%

*Includes dual organs (liver/kidney)

30 Readmission Rates After Program Integration	
10/2014-12/2014	8.0%

*Includes dual organs (liver/kidney)



Implications/Relevance: Current evidence exists that substantiates the premise of discharge phone calls in many high-risk patient populations (i.e. heart failure). We applied this evidence to our abdominal transplant population and were not disappointed. Decreased readmission rates have the potential to maximize profitability, reduce financial risk, decrease our 30 day morbidity and mortality, increase our patient satisfaction, provide evidence-based practice and increase our quality of care, as well as increase our inter and intra-disciplinary post discharge collaboration.

Authors: Harrison Pollinger, DO, Roshan Shrestha, MD, Christopher Fowler, PhD, MBA, RN, Bonnie Fricke, BSN, RN, Wendy C. Peavy, MSN, APRN, ACNS-BC, CCRN-CSC, Cerise Wotorson, BSN, RN, Shannon Daniel, MSN, RN, CCRN

ABSTRACT C2-I

IMPROVED ADULT DECEASED DONOR LIVER TRANSPLANT OUTCOMES: FUTILITY PREDICTORS AND CHANGES TO RECIPIENT SELECTION CRITERIA

Nanci J. Flores, RN, MBA, Ronald Reagan UCLA Medical Center, Los Angeles, CA

Purpose: Transplant centers are increasingly dependent on their published outcomes for approval by CMS and the OPTN, Center of Excellence (COE) designation by payors and inclusion in payor networks, and for physician referrals and patient self-referrals. Our institution has historically transplanted medically complex patients at high MELD scores, and has had accordingly lower, though not statistically significant, rates of graft and patient survival. In recent years, the ongoing shortage of deceased donor livers for transplantation in our UNOS region has led to longer wait times, higher MELD scores at transplant, and an increased prevalence of co-morbidities in our waitlisted patients.

At the time of the July 2012 SRTR center-specific report (CSR) we identified downward trends in our center's one-year adult deceased donor graft and patient survival rates that were approaching statistical significance. Petrowsky et al had previously reported a retrospective review of 169 adult patients with MELD greater than or equal to 40 at the time of transplant that underwent liver transplantation at our institution between the years 2002 and 2010. In this study, the investigators identified several predictors of post-transplant mortality, of which two of the most powerful were severe cardiac disease and sepsis.

Methods: A focused retrospective chart review was conducted for all 393 recipients that appeared in the July 2012 CSR adult one-year graft survival cohort, and 358 recipients in the patient survival cohort. These were patients that underwent deceased donor liver transplantation at our center between January 1, 2009 and June 30, 2011. Of the 393 transplants performed, 31 (7.9%) involved patients with a MELD score greater than 35 that had severe cardiac risk, sepsis within 30 days prior to transplantation, or a combination of both. Using the SRTR's one-year expected survival worksheets, a what-if analysis was performed to determine the impact on one-year patient and graft survival had these high-MELD, high-risk patients been excluded (not transplanted). The survival worksheets are constructed using the same hazard ratios and complex risk adjustment formulas as are employed by the SRTR in calculating a center's expected outcomes.

Results: Baseline (published) one-year graft and patient survival rates were 77.54% and 81.98%, respectively, with corresponding observed-to-expected (O:E) event ratios of 1.12 (graft) and 1.15 (patient). Using the SRTR's risk model and excluding those patients with severe cardiac disease and/or sepsis at transplant, calculated one-year graft and patient survival rates improved to 81.71% (+4.17%) and 86.06% (+4.08%), respectively, with decreased O:E ratios of 0.90 (-0.22, graft) and 0.89 (-0.26, patient).

Given the strong predictive value of sepsis within 30 days and/or severe cardiac disease at the time of transplant, our program's adult deceased donor liver transplant selection criteria were amended in April 2013 to exclude from transplantation those candidates with one or both of these risk factors, irrespective of MELD score. Subsequently, we have demonstrated a marked improvement in both one-year graft and patient survival rates; for the latest December 2014 CSR, published one-year outcomes were 83.26% (graft) and 87.42% (patient), changes of +5.72% (graft) and +5.44% (patient) relative to the July 2012 CSR. The December 2014 published O:E ratios were 1.05 (-0.07, graft) and 0.98 (-0.17, patient)

Conclusion: Sepsis within 30 days prior to liver transplantation and severe cardiac disease have previously been shown to be powerful predictors of futility, defined as graft failure or patient death within the first year post-transplant. This study demonstrates significant, measurable improvements in published one-year adult liver transplant graft and patient survival rates through retrospective risk validation using the SRTR's expected survival worksheets, followed by revision and prospective application of the center's recipient selection criteria.

Nanci J. Flores, RN, MBA; Tyler Flores; Nicholas J. Feduska, Jr., MSHA; Fady M. Kaldas, MD;
J. Thomas Rosenthal, MD; Ronald W. Busuttil, MD, PhD

ABSTRACT C2-J

CONFIRMING FIRST DATE OF DIALYSIS: A QAPI PROJECT

Chad Gorn, BS, Thomas Jefferson University Hospital, Philadelphia, PA

Problem/Situation: A robust and well-managed Quality Assurance & Performance Improvement plan is an important ingredient in a successful transplant program. It is also mandated by CMS, with specific components required to meet their conditions of participation. The management itself is left up to the transplant program itself, including choosing the metrics and targets, devising follow-up plans, determining the plans' efficacy, remeasuring the data and reassessing the plans. Transplant programs face the challenge of designing meaningful, measurable and achievable metrics and targets. This abstract focuses on one specific metric we identified and how we achieved success over the course of three measured quarters.

One of the key pieces of data that needed to be verified in preparation for the new Kidney Allocation System was the date of initiation of chronic dialysis. When we investigated this data at our own center, we learned that we were unable to confirm this date on a majority of candidates with our existing processes. In addition to devising a plan to confirm our current waitlist against the UNOS-provided report and tools, we knew we needed to ensure that this data was confirmed for all new candidates. When our initial review revealed that 3.6% of listings in a quarter had a confirmed dialysis date, we determined that we needed a comprehensive plan to address this deficiency. This plan included: investment of key stakeholders; defining acceptable data sources; and developing processes for procuring and confirming the data.

Approach: We added "confirmation of first date of dialysis for new registrants" to our official Quality Assurance & Performance Improvement program, which ensured the involvement of senior members of the transplant team. We defined the primary data source as the CMS-2728 form that the dialysis center completes. We defined the secondary source as the Renal Network 4, the agency commissioned by CMS to collect and report this data to Medicare, who also receives the CMS-2728 forms and enters the data into their CrownWeb database. We defined the tertiary source of data as the dialysis center itself.

Our first step of the data procurement and confirmation process was to strengthen the language on the letters that get sent to every dialysis center prior to the start of each potential candidate's evaluation, emphasizing the importance for the receipt of the CMS-2728 by the time the patient is listed. The second step was to provide a monthly report of newly listed patients for whom the CMS-2728 form was not received to the Renal Network so that their data team could provide this date from their CrownWeb database. The third step was for the data team to request the CMS-2728 form directly from the dialysis centers for any patients for whom the form was not received by the start of the official evaluation. We also built checks and balances into our TDA (Transplant Database Application) to ensure that each of these steps was followed.

Findings/Solutions/Conclusions: After one quarter of following these three steps, the confirmation of the first date of dialysis jumped from 3.6% to 54.8%. For the next quarter, efforts to ensure follow-up with the Renal Network 4 data team were increased, and the UNet waitlist rules changed to allow users to alter dialysis dates on their own. The success rate rose to 90.9%, with each missed patient situation accounted for and adjudicated. The situations were addressed with education and additional tracking, and by the fourth quarter, the compliance rate was 100%. In addition to achieving our goal, we also experienced one month where no dialysis dates needed to be confirmed with the Renal Network 4 because the source documents were successfully obtained at the time of evaluation.

Implications/Relevance: The approach we applied to the confirmation of the first date of dialysis will serve as a blueprint for other performance improvement plans, and builds on standard performance improvement cycles like DMAIC or DMADV. This approach includes: buy-in from key stakeholders; defining and prioritizing acceptable resources; developing processes that involve the identified resources; and continuous review, reassessment and modification of these processes.

Author: Chad Gorn, BS

ABSTRACT C2-K

HOW TO MONITOR MY CENTER'S COMPLIANCE WITH LIVING KIDNEY DONOR FOLLOW-UP

Claudine Lougee, BA, United Network for Organ Sharing, Richmond, VA

Purpose: In November 2012, the OPTN Board of Directors approved a new policy for living kidney donor (LKD) reporting requirements that became effective February 1, 2013 for LKDs recovered on or after that date. Policy 18.5.A, Reporting Requirements after Living Kidney Donation, requires that the recovery hospital must report accurate, complete, and timely follow up data for both donor status and clinical information, as well as kidney laboratory data using the living donor follow-up (LDF) forms.

Policy 18.5.A requires follow-up data for individual data elements for a specified percentage of LKDs based on cohorts beginning with donors recovered on or after February 1, 2013. The percentage increases for donors recovered in years 2014 and 2015. The policy requires that the follow up data are **both** complete and timely for all of the individual data elements. Policy 18.2, Timely Collection of Data, requires that the recovery hospital collect living donor status on the LDF 60 days before or after the six-month, 1-year, and 2-year anniversary of the donation.

The OPTN Standard Living Kidney Donor Follow-up Report, available by submitting a data request on the OPTN website, provides kidney programs with their follow-up rate percentage based on the policy requirements for various LKD cohorts and highlights the individual data elements not collected according to policy.

Method: The UNOS Research department developed a standard report to provide metrics and data collection elements for LKD programs prior to Policy 18.5.A becoming effective on February 1, 2013. Because the 6-Month LDF would not be collected for the first donors within the policy cohort dates until August 2013, several prior years' of data were used to report metrics for those centers requesting their own follow-up rates. The first Standard Living Kidney Donor Follow-up Report was sent in February 2013 with data on donors recovered through June 2011. This original report provided metrics for 6-Month, 1-Year, and 2-Year follow-up data for different cohorts and provided individual follow-up data collected on each form. The report has changed visual appearance and content based on initial feedback from programs. The standard report currently uses red and bold fonts to address missing data or data not collected as required by policy.

Results: The October 2014 version of the Standard Living Kidney Donor Follow-up Report provided the first full cohort for donors recovered between February 1, 2013 and December 31, 2013, where according to policy, 60% of center's LKDs recovered must have complete and timely required donor status and clinical information and 50% of

donors must have complete and timely kidney laboratory data. If the program did not meet the required percentage, the cell was highlighted in red to show that policy requirements were not met at the time of the report. The report is updated monthly. The Standard Living Kidney Donor Follow-up Report contains several worksheets. The “Follow-Up Rates” worksheet, Figure 1, provides the percentage for the cohort listed in first column. The additional columns provide the total number of LKDs recovered within that cohort and the number and percent of LKDs with requirements complete.

Donation Time Period	Number of Living Kidney Donors Recovered within Donation Time Period	Living Kidney Donor Follow-Up Form	Number of Living Kidney Donors Recovered With Required Donor Status and Clinical Information: Based on OPTN Living Kidney Donor Policy (Effective for Living Kidney Donors who Donated on 2/1/2013 or after)	% of Living Kidney Donors Recovered With Required Donor Status and Clinical Information: Based on OPTN Living Kidney Donor Policy (Effective for Living Kidney Donors who Donated on 2/1/2013 or after)	Number of Living Kidney Donors Recovered With Required Kidney Laboratory Data: Based on OPTN Living Kidney Donor Policy (Effective for Living Kidney Donors who Donated on 2/1/2013 or after)	% of Living Kidney Donors Recovered With Required Kidney Laboratory Data: Based on OPTN Living Kidney Donor Policy (Effective for Living Kidney Donors who Donated on 2/1/2013 or after)
February 1, 2013 - December 31, 2013	38	6-Month	27	71.1	32	84.2
February 1, 2013 - December 30, 2013	27	1-Year	21	77.8	23	85.2
February 1, 2012 - December 30, 2012	31	2-Year	10	32.3	4	12.9

Figure 1

The next set of worksheets, Figure 2, provides all of the required data elements for each of the 6-Month, 1-Year, and 2-Year LDFs. The individual data elements are highlighted in red for data missing or not completed according to policy requirements. The report also provides calculated yes/no fields such as “Donor Status Collected?” and “Donor Status Date Dated within 60 days before or after the anniversary of the donation date?” Other calculated fields provide aggregate “Yes/No” summary of several data elements combined for clinical information and kidney laboratory data.

Donor Status (6 Month Follow-Up)	Donor Status Completed? (6 Month Follow-Up)			Donor Clinical Information (6 Month Follow-Up)		Kidney Laboratory Data (6 Month Follow-Up)			Kidney Laboratory Data Completed? (6 Month Follow-Up)		
Most Recent Donor Status Since Last Seen	Donor Status Collected?	Donor Status Date Dated within 60 days before or after the anniversary of the donation date?	Number of Days Outside of Data Collection Timeliness Window	Working for Income	Has the Donor Been Readmitted Since Last Seen	Serum Creatinine	Urine Protein	Urine Ratio	Kidney Laboratory Data Collected? (Serum Creatinine, and Urine Protein)	Donor Status Date Dated within 60 days before or after the anniversary of the donation date?	Number of Days Outside of Data Collection Timeliness Window
Living: Donor contacted, declined follow-up with transplant center	No	No	2	Yes : Working Full Time	No		Unknown		No	No	2
Living: Donor seen at transplant center	Yes	Yes		Unknown	Unknown		Not Done		No	Yes	
Living: Donor seen at transplant center	Yes	Yes		Yes : Working Part Time due to Patient Choice	No	1.2	Negative		Yes	Yes	

Figure 2

Conclusion: The UNOS Research department developed the Standard Living Kidney Donor Follow-up Report for programs to track compliance with the new OPTN living kidney donor policy. The report can be requested on the OPTN website through the data request process by including “Standard Living Kidney Donor Follow-up Report” in the description box. It will be provided monthly or quarterly upon request.

Claudine Lougee, BA, Sarah Taranto, BA, Jennifer Wainright, PhD.

ABSTRACT C2-L

RESTRUCTURED DONOR FOLLOW-UP PROCESS SIGNIFICANTLY IMPROVES UNOS COMPLIANCE

University of California San Francisco Medical Center

Problem:

The submission of Living Donor follow-up data has been required by UNOS since 2005. However, new OPTN policy adopted in 2013 specified increasingly stringent, targeted follow up requirements, based on the date of donation. Implementation of this new policy has been incremental, but by 2015, living donor programs will be required to submit 80% of their donor clinical data and 70% laboratory data to maintain compliance. This has had a significant impact on each, and every, program, with associated increase in workload, and the need for additional, and/or re-allocation of resources.

Consequently, our program completely restructured its living donor follow up process. This new process includes targeted pre-donation education, creation of a post-donation specialty clinic; partnership with a nationwide laboratory; and implementation of a new, automated closed-loop software that facilitates the seamless collection of all relevant clinical data.

Method:

Historically, our living donor follow up process was reactive and focused on meeting regulations as opposed to an easy to use and informative process for our donors after donation. We historically struggled to successfully track, maintain contact, or collect required data by searching the patient medical record just as the TIEDI deadline approached.

With the implementation of the new regulations we developed a comprehensive proactive process. Post donation follow up requirements are now discussed with potential donors as part of their work up process and reiterated through each step of the process. During the second phase of donor testing, when the donor meets with the Independent Living Donor Advocate (ILDA) the need for lifetime follow up is reviewed. The donor's email address is confirmed and it is explained that a closed loop software system will be reaching out to them at six months, 12 months and two years to collect laboratory and health information. At this time the donor is given a copy of the information that will be requested in the future. After donation, a member of the data center actively partners with the clinical staff that manages the donors in the outpatient setting. This analyst provides continuity by contacting and tracking each living donor and acts as liaison between the living donor and the clinical team for the 2-year follow-up period. The analyst also initiates the automated software, receives the collected data, submits electronic laboratory orders with our partner laboratory, and works closely with donors to facilitate the timely collection of the follow-up data. The analyst is responsible for data submission through TIEDI.

Additional resources utilized to facilitate this program are an account with a national lab has been instituted to allow for the donors to have testing done close to home at no personal cost. We have also made an agreement with a national pharmacy chain to allow the donor to have their blood pressure monitored, with the results directly interfacing with the Medical Center electronic medical record. Finally, we have instituted an additional clinic time one day per week for donors to make appointments to be seen by a Nurse Practitioner who reviews their labs, blood pressure and any other health issues they may have concerns about.

Findings:

Between September 2011 and August 2012 (historical control) complete clinical and laboratory data were only available in a small percentage of donors (n=226). After the implementation of the new process 2015 UNOS compliance (80% clinical data and 70% laboratory data) has already been achieved for clinical and laboratory data (n= 163).

Implications:

New UNOS bylaws will increase institutional efforts to comply with living donor follow up. A newly implemented process, combining traditional and novel forms of interacting with donors resulted in major improvements at our transplant center.

Authors: Kathleen Carlsen, Helen Christensen, RN, Tiane Jennings, MSW, Melissa Parente, MBA, Pamela Thiessen

ABSTRACT C2-M

CREATION AND IMPLEMENTATION OF A TRANSPLANT QUALITY-DRIVEN INFRASTRUCTURE: A NEW MODEL SHOWS DEMONSTRATED SUCCESSES BEYOND CMS QAPI REGULATIONS TO INCREASE COLLABORATION, REDUCE VARIATION AND IMPROVE OUTCOMES

University of Minnesota Medical Center Fairview, Minneapolis

- a. **Problem/situation:** Briefly state the problem/situation to be investigated or described

In January 2013, new CMS Quality Assessment and Performance Improvement (QAPI) regulations for solid organ transplant (SOT) went into effect. Neither the quality model nor the resources would support the new QAPI components at that time. In addition, the Affordable Care Act provision mandating insurance went into effect, and many hospitals were unable to accurately predict reimbursement, budget accurately or hire many additional resources because of the uncertainty. Therefore, an efficient, cost-effective solution that could still ensure top decile outcomes had to be implemented in order to meet the new standards.

- b. **Approach:** Describe the methods/practices/interventions used to approach the problem/situation

Method for improvement included structural changes and standardized QI tools within transplant. A dyad leadership model was designed and implemented using a quality professional and a Certified Nurse Specialist (CNS) as a clinical director. Further structural changes included the following and would be described in detail during the presentation with graphics: organizational chart with QAPI plan reporting up to highest Board level back to staff at bedside, QAPI teams use of charters, A3 tool for all quality projects, Pareto analysis, flowcharts, balanced scorecards, a transplant-specific scorecard metric development template and an actionable QAPI meeting minutes template. Tools for quality leadership included an innovative weekly QAPI “huddle” tool and Venn diagram outlining quality professional and clinical director accountabilities for transplant quality.

- c. **Findings/Solutions/Conclusions:** Present data that correlates the problem/situation with the findings/Solutions/Conclusions

Findings of our work are outlined below, categorized using the Triple Aim.

1. Improve the health of the population (safe, effective, equitable care)

The mortality rates for all organs in adult and pediatric mortality have been updated reflecting the status: “not statistically different” for observed vs. expected mortality ratios. Prior reporting period showed one organ group with the status “higher than expected” mortality ratios. Data Source: Scientific Registry of Transplant Recipients (SRTR) publically-reported data reports <http://www.srtr.org/csr/current/Centers/Default.aspx> [accessed August 1, 2014]. The CUSUM mortality measurement is used in transplant at this time (vs. a more common Bayesian model) which is monitored and used by all QAPI teams. Current CUSUM reports show a downward and plateau trend indicating no significant increases in mortality for Q2 2014 (April-June).

We are beginning to further analyze and trend our adverse event data. In the past we had looked at reported adverse events in silos. Current analysis allows for trending to determine if there are commonalities among inpatient and outpatient care as well as with all types of organ groups both recipient and donor.

2. Enhance the patient experience of care (timely, patient-centered)

We created a first of its kind organ-specific, interactive patient education electronic application for patients to use on mobile devices or by DVD. Patients now have on-demand access to the right education at the right time of the transplant continuum.

By sharing best practices across organ groups, we enhanced the pre-transplant RN patient coordinator work flow. Because of these changes, we call the patient and referring primary care or specialty care provider offices less than prior to changes. We also decreased unnecessary testing, repeat labs and increased efficiency for obtaining clinic information for donors. Because we began measuring a lagging, publically-reported patient satisfaction (CG CAHPS and HCAHPS) and analyzed results, we were able to develop a rapid-cycle feedback tool. We now have a mechanism for timely service recovery and gather information quickly from our patients such as feedback on a change made in one of the transplant clinics.

3. Affordability/Cost of Care (efficient)

- Our model of care utilized existing resources and conversion of open positions into the dyad leadership model of a quality professional and advanced practice nurse.
- The structure and sustainable nature of organ-specific quality teams ensures efficiency. Improvements in quality outcomes increase our Center of Excellence (COE) status with insurers, resulting in preferred referral status for patients and maximum reimbursement for our services; since April we have added 2 COEs with local insurers
- Patient satisfaction and other publically-reported data improve our reputation and status in the community, adding to patient preference and physician referral based on those scores
- Adverse event mitigation results in cost savings for the health system
- Quality improvement projects such as decreased pulmonary embolisms result in lower cost of care for patients, health insurers and our hospitals
- As we increase referral times for living donors, those patients on waiting lists can be transplanted sooner, allowing for more transplants for those in need; this generates revenue but also improves quality of life, reduces mortality on waitlist and improves patient satisfaction
- Data analysis halo effect: by better organizing our data systems for regulatory and quality, we have been able to further stratify cost data allowing for improvements in saving on total cost of care by identification of variation as compared to our benchmarks, most recently by \$3,000 per case for kidney transplant recipients
- Additional revenue stream due to patient education app development; this app can be purchased for use by other transplant centers

d. **Implications/Relevance:** State the implications of the findings/solutions to the award category selected

This model and the quality tools developed can be easily replicated at other transplant centers who are looking for an innovative approach to be successful in focused QAPI CMS site visits and improve clinical outcomes.

Authors:

Rebecca A. Stepan, MPH, RD, CPHQ, LSSBB

Michelle James, MS, RN, CNS, CPTC

Gail Frankle RN, DHA, CPTC

ABSTRACT C2-N

Lean Six Sigma Quality Tools: What's In Your Tool Box? (And What Should Be If It Is Not Already In Use At Your Center!)

University of Minnesota Medical Center Fairview, Minneapolis

a. Problem/situation:

Our health system did not have standardized quality tools for use in transplant QAPI teams. As a trained Certified Professional of Healthcare Quality (CPHQ) and Lean Six Sigma Black Belt (LSSBB), I was asked to join the transplant team and bring a standardized tool set to the transplant QAPI teams.

b. Approach:

We began by standardizing a tool box for which all QI teams would learn and use going forward for all quality project work.

Standardized tools include the following “essential eight”, *note: presentation would include descriptions, examples and definitions:

1. Project charter
2. A3
3. Metric development template (from x to y by z) for pre-, peri- and post transplant categorized by the Triple Aim (clinical outcomes, patient experience, value/cost of care)
4. Balanced Scorecards
5. Pareto Analysis
6. Run chart/Control charts
7. PDSA (plan, do, study, act)
8. Value Stream Maps (VSMs) or flowcharts

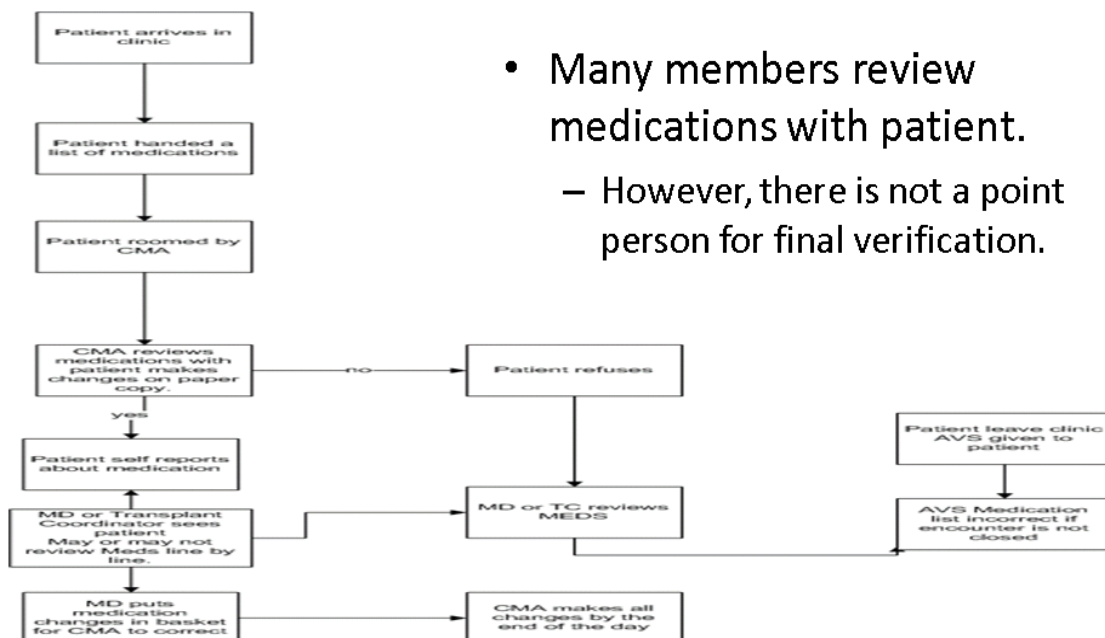
c. Findings/Solutions/Conclusions:

Findings include engaged physicians and staff as evidenced by use of tools in QI projects which going forward were sustainable and did not include the quality professional as the leader but rather counsel for guidance. Preliminary quality collaborative projects began in November 2013 and ended in April 2014. The An example project of 6 total include the following with demonstrated use of the tools:

“Medication error improvement from inpatient to outpatient for the adult lung transplant population”

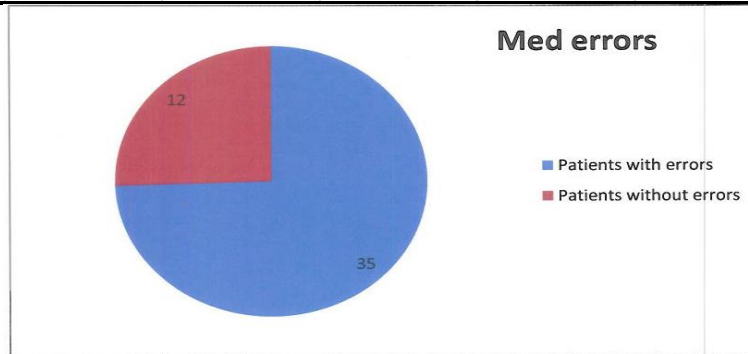
Process measures: decrease medication list errors found when patient is being roomed in the clinic by 10%, medication lists for all patients daily improved to 100%, phone calls due to a medication error discrepancy reduced to 1 per week per coordinator.

Current State Process Flow



Baseline Data:

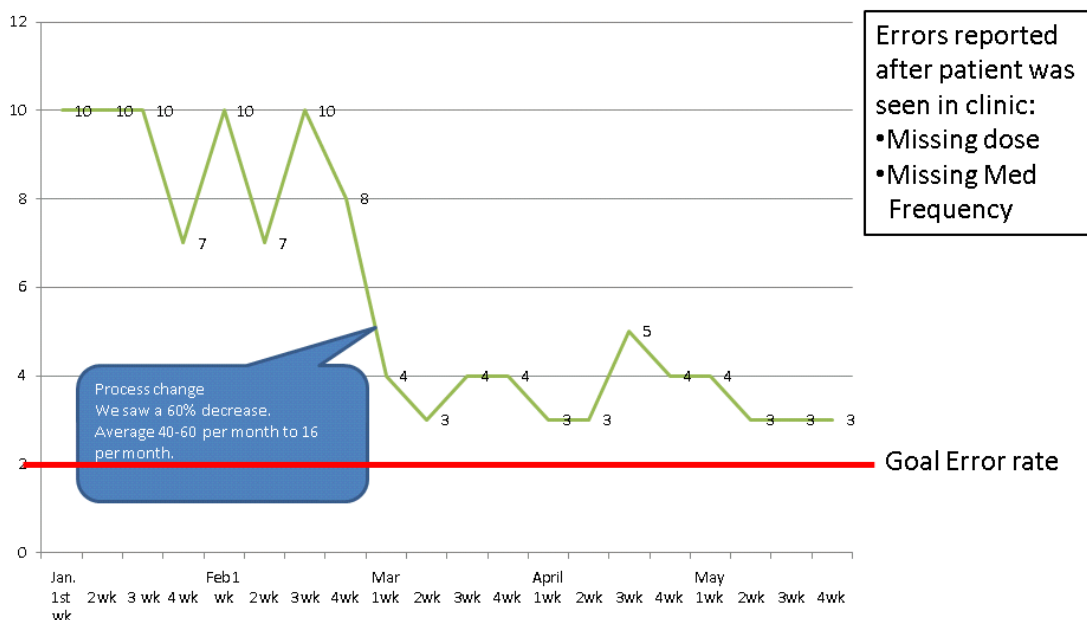
	Number of PT with Errors	Number of PT w/o Errors	Total PT	Total Errors	Avg. Errors per PT	Avg. Errors for all PTs
CMA	25	8	33	132	5.3	4.0
RN	10	4	14	35	3.5	2.5
Total	35	12	47	167	4.8	3.6



PDSA (plan, do, study, act) included 3 trials: RN Coordinator to review medications with patient in clinic, specialty pharmacy to see patients on first visit CMA to collect the data for this work (intent to make them aware, engaged)

Results:

Medication ERROR Post Clinic



- TX Coordinators, Specialty Pharmacy, and MD's reviewing medications with the patient line by line.
- Reduced medication errors from 74% to 30%.
- Identified GAP in patient care. Proposal:
 - Specialty Pharmacy to see the patients at initial clinic visit, post discharge and 3 month, 1 year intervals to provide focused med reconciliation.

d. Implications/Relevance:

The quality tools can be easily taught to QAPI teams at other transplant centers who are looking for a methodical, sustainable way improve clinical outcomes.

Authors:

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Michelle James, MS, RN, CNS, CPTC

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Patti Herzog, RN

Jagadish Patil, MD

ABSTRACT C2-O

Increasing Transplant Rate, Decreasing Time to Transplant and Increasing Waitlist Active %

Zeynep Tulu, MS, MEMP, CSSBB, Sr. Organizational Excellence/Quality Leader, UNC Center for Transplant Care, Chapel Hill, NC

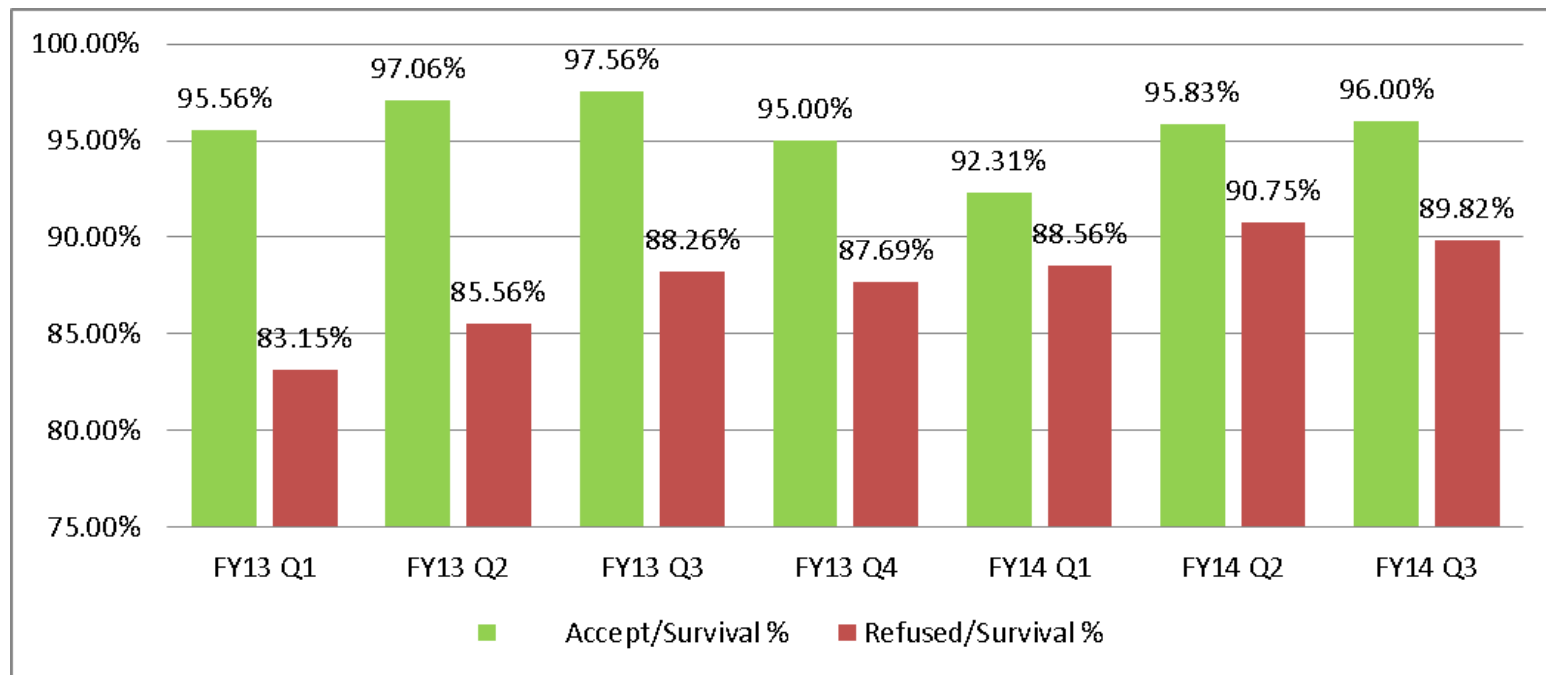
Project Background: SRTR time to transplant and transplant rate are some of the key quality measures for transplant recipients, transplant centers, referring physicians, regulatory bodies and insurance companies. The Kidney Transplant Program's (Quality Assurance & Process Improvement) QAPI team tracks both measures on the dashboard and has identified these as areas that have room for improvement. For these measures, the Kidney Transplant QAPI program goals were to decrease time to transplant, increase transplant rate and as a result increase transplant volumes for the program and provide better quality of life for patients as a result of providing the gift of Kidney Transplantation.

Methodology: Kidney Transplant multi-disciplinary QAPI program formed a QI team, including a Transplant surgeon, Transplant nephrologists, quality leader, and waitlist coordinators. This QI team was tasked with finding root causes, creating and implementing solutions and sustaining results.

1st Hypothesis: Kidney organ offer acceptance decision making results in missed opportunities: higher rate of decline of good organs resulting in patients having to wait longer for Kidney Transplantation.

Data Collection: Three-year-data from UNOS Report of Organs Offered and Transplant (ROOT) report were collected and 1 year survival analysis was conducted for those organ offers that were declined by our center but transplanted elsewhere.

Data analysis showed that our center's organ acceptance decision making was solid, and organs declined by our surgery team that were transplanted elsewhere observed a much lower 1 year survival rate: while organs accepted and transplanted by our center achieved 96% 1 year survival rate, organs declined but transplanted elsewhere observed 89.82% 1 year survival rate. See below for survival comparison. Therefore this hypothesis was not verified, and surgery team continued with their practice.



2nd Hypothesis: Kidney patients have high % of inactive status on the waiting list, making them ineligible for receiving organ offers resulting in prolonged waitlist times.

Data Collection: Team decided to look at the UNOS waiting list and conducted data analysis which showed that Kidney Transplant Program has a high percentage of inactive patients on the UNOS waiting list, resulting in increased time to transplant and decreased transplant rates. Team collected data from the center transplant database to identify the reasons for inactive status.

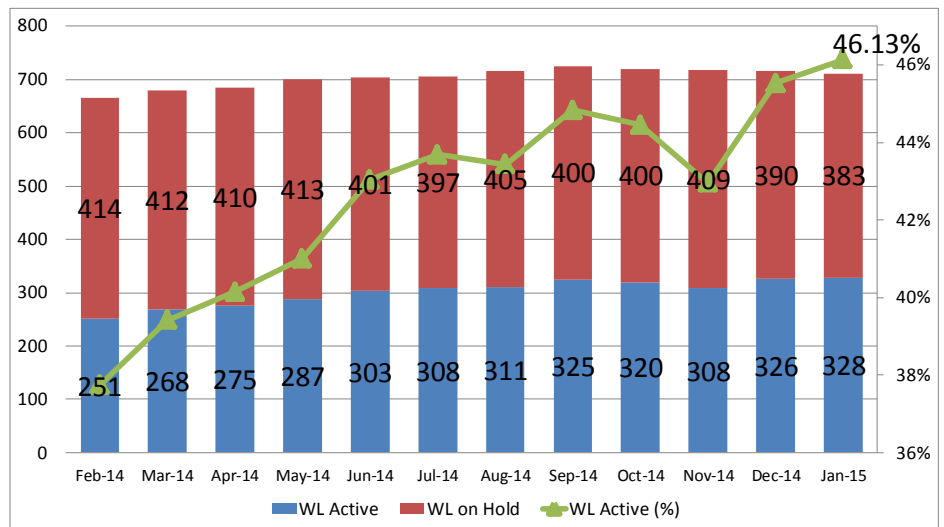
Inactive status data analysis revealed that most common reason for inactive status was “Annual Updates Needed”. Process mapping and voice of customer data analyses with waitlist coordinators showed that the program needed a standardized, consistent and efficient way to schedule patients for their annual updates. The QI team created monthly reports that are sent to waitlist coordinators as reminders to initiate the scheduling process for annual updates. This intervention resulted in overall increase in WL Active percentage (see below, bar chart with volumes, and green line for Active %).

The QI team then decided to focus on Top50 patients who accrued the most time waiting for a Kidney and contributed the most to SRTR’s person years’ time that is used in Transplant rate calculation. We had 50 patients on A, 50 on B, 50 on O and 22 on AB blood type's top50 list= total of 172 pts on the program waitlist “Top 50”. The QI team presented findings to Kidney Quality Council, and Kidney QAPI program made Waitlist Top 50 a program priority and initiated a standing multidisciplinary weekly meeting. At these meetings, 10-12 inactive patients from Top50 list are reviewed weekly and reasons for being inactive are identified. Plans for resolving barriers for patients to become active on the list or to be removed from center's waiting list, in cases where patients are not interested, or non-complaint with the process are made.

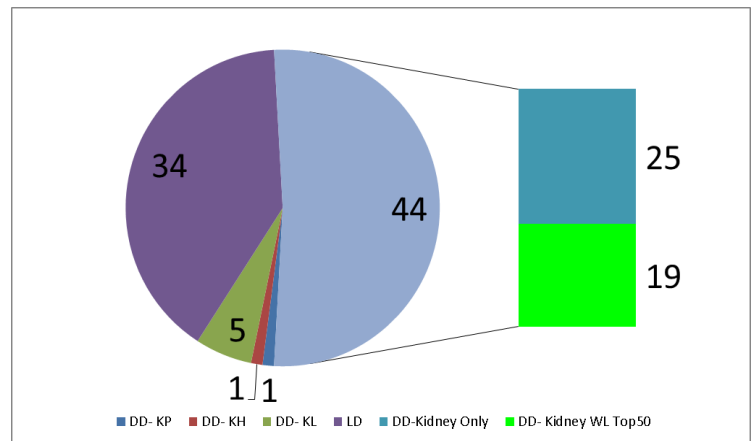
Results: Since January 2014, interventions:

- 1) monthly list of patients who are due for annual updates and
- 2) weekly Top50 meetings are being implemented.

Graph on the right is showing the increase in Waitlist Active %, and successful project results. WL Active % (green line) increased from 38% to 46%. QAPI program short term goal is >50%.



Between 1/1/2014 and 12/15/2014, program performed 44 Kidney only Deceased Donor Transplants; 19 of these transplants were a direct result of the Top50 focus. Without this project, Top50 patients who have been in inactive status for long times may have remained inactive and ineligible for organ offers. As multidisciplinary team reactivated Top50 patients on the list, these patients received transplant within a week of reactivation. Top 50 focus resulted in 19 additional Kidney transplants for the program: 76% increase in DD Adult transplants.



Conclusion: Through a systematic approach and a detailed root cause analysis, the QI team was able to identify root causes resulting in undesired measures for patients and the transplant program. QI team’s interventions have been implemented, and as a result QAPI program has achieved successful result. To monitor the improved measures and sustain these results, QAPI program has added WL Active % and Top50 status changes/QI project updates as measures to monthly QAPI dashboard to track progress. Waitlist coordinators, as the process owners report status of these measures to QAPI program on a monthly basis.

Zeynep Tulu, MS, MEMP, Latonia Bulgin, RN, BSN, Julie Ramsey, RN,BSN, CNOR, Karin True, MD, Eddie Fuller, MD, Randy Detwiler, MD, Tomasz Kozlowski, MD

CATEGORY 3

Revenue Management/Optimizing Profitability

ABSTRACT C3-A

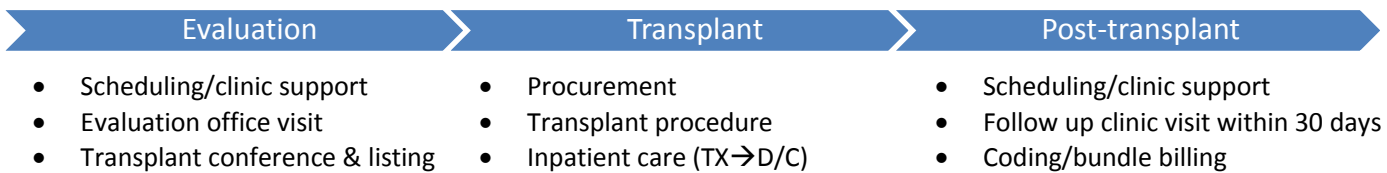
COST MODELING AND GLOBAL REIMBURSEMENT ANALYSIS IN THE MEDICAL GROUP: ESTABLISHING THE REIMBURSEMENT TO COST RATIO FOR THE HEART TRANSPLANT SURGERY PRACTICE

Scott Kihoi, MS, Oregon Health & Science University, Portland

Problem/Situation: The approach to managed care transplant contracting and reimbursement at our center is driven by costs and financial goals set by the hospital. While transplant global reimbursement, or *case rate*, from commercial payers is intended to reimburse the hospital and providers for the evaluation, transplant, and post-transplant phases of a transplant, a one sided methodology disregards the costs and revenue targets of the medical group and often leaves them settling for a less than optimal portion of revenue to distribute among surgeons, medicine practices, anesthesiologists, pulmonologists, and pathologists. The Division of Cardiothoracic Surgery (“Division”) did not know the costs associated with heart transplants or the reimbursement to cost (RTC) ratio from any payer. Since case rates can be negotiated with the payer, the hospital, and stakeholders within the medical group, reimbursement should be optimized to cover transplant costs while providing sufficient revenue for program development, continuing education, and research.

Approach: Our project goals included 1) the development of a Division transplant cost model that includes payer RTC, 2) the identification of causes for low RTC, and 3) the creation of an action plan to reverse low RTC trends. Our team consisted of engaged members from the Department of Surgery (Finance), the University Medical Group (Revenue Cycle), the Division of Cardiothoracic Surgery (Operations), and the Division of Abdominal Transplant Surgery (Administration). Our charter excluded ventricular assist device (VAD) implant procedures but included transplant cases in which VADs were removed with the patient’s native heart at the time of transplant. Additionally, we did not include Medicare or Medicaid reimbursement in goals #2 or #3, but we did include all commercial (contracted and non-contracted) payer reimbursement since they employ global payment methodologies.

Our first step was to create a process map to highlight the services and phases of transplant care that the Division provides which are also covered by commercial case rates.



Next, we conducted time studies to identify hourly costs associated with those services. Direct costs included salaries, benefits, and overhead from transplant surgeons, physician assistants, schedulers, medical assistants, and clinic manager (Fig. 1). We counted surgeon on-call, UNOS and hospital medical directorship duties, surgeon administrative time, and operating costs as indirect costs which were not captured in the process map. Total cost per case was calculated on a four year average of 18.75 cases per year.

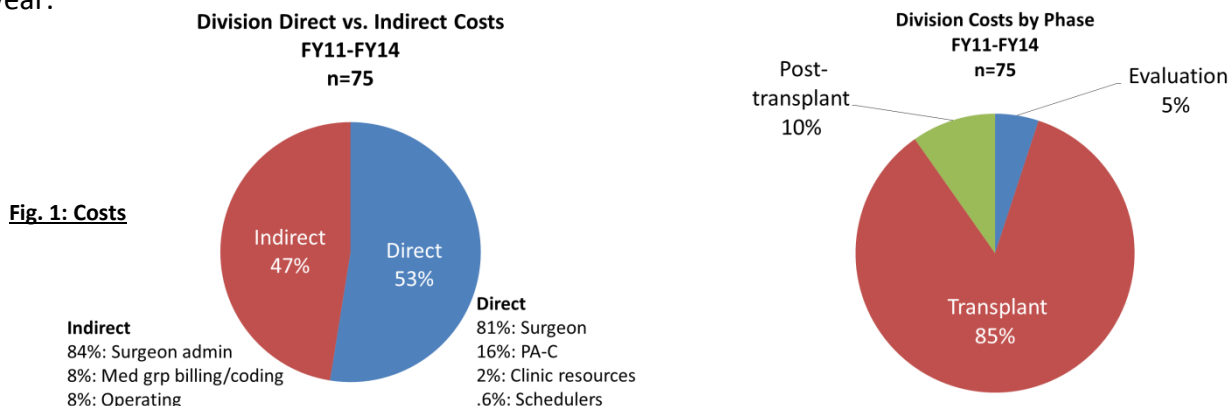


Fig. 1: Costs

Finally, we analyzed the financial performance of global payments for reconciled cases in FY13 and FY14 (n=12) using the RTC calculation (Fig. 2). Reconciled cases were “paid in full” by case rate reimbursement due to the Division for transplant services. Also included as payment in the calculation were \$2,700 from our local OPO for procurement services and .5 surgeon FTE support from the hospital for transplant surgery medical directorship. If RTC is .99 or less, costs are not met; if RTC is 1.0 or greater, costs are met.

Fig. 2: RTC Calculation

$$\frac{\text{Global payment to the Division}}{\text{Division transplant costs}} = \text{Reimbursement to cost}$$

Findings: Eighty-four percent of transplant cases (n=12) with commercial case rate reimbursement were not profitable (Fig. 3). Average RTC for this case mix was only .73. The average RTC for Medicare and Medicaid cases (n=9) during the same period was .65.

Frequency Distribution for Transplant Reimbursement to Cost FY13-FY14 n=12

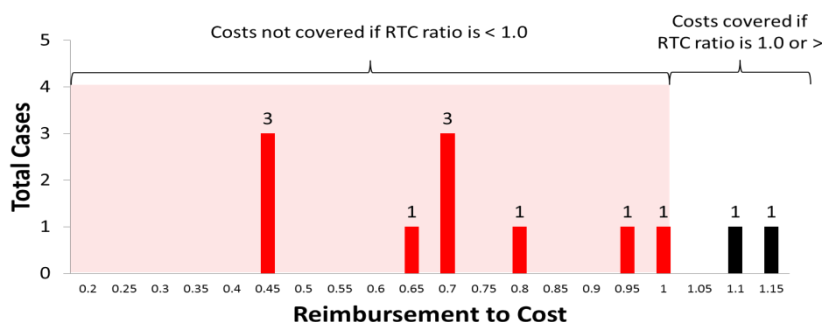


Fig. 3: RTC Summary

Implications/Relevance to Category: Our Division now has a tool to measure transplant costs and RTC on a consistent basis. Low and unfavorable RTC may be due to one or several of the following drivers: 1) high Division costs, 2) low medical group portion of case rate, 3) low reimbursement from specific payers, 4) disproportionate case rate distribution between medical group stakeholders (i.e. Cardiothoracic Surgery, Cardiology, Anesthesia, Pulmonary, and Pathology), or 5) payments not properly applied to transplant related accounts. Our Revenue Cycle team is championing the first action plan by reevaluating the methodology of case rate distribution among providers. The Division is not receiving the expected amount and the dated methodology may not be aligned with current costs. The next action plan includes improvement in the contracting process and incorporation of Division costs in proposal modeling. Partnering with the hospital contracting team will lead to consideration of all costs.

Since the Division previously considered commercial payment fixed and nonnegotiable, similar to Medicare and Medicaid reimbursement, validating whether case rates covered transplant costs was never a priority. However, based on our findings and probable causes for low commercial RTC, the Division is better equipped to advocate for increased revenue and profitability.

Scott Kihoi, MS, Rosalie Blaeuer, BSBA, Mark Valadez, BA, Jennifer Merrill, BS, Kate Kenemer, BA, Fred Tibayan, MD, Leasa Keene, Howard K. Song, MD, PhD

ABSTRACT C3-C

“ARE WE REALLY CAPTURING ALL OUR TRANSPLANT REVENUE AND MAXIMIZING OUR PROFITABILITY? ONE CENTER’S REVIEW OF INDIVIDUAL TRANSPLANT CASES AND OPPORTUNITIES FOUND.”

Debbie Mast, Financial and Database Manager, Stanford Healthcare, Palo Alto, California

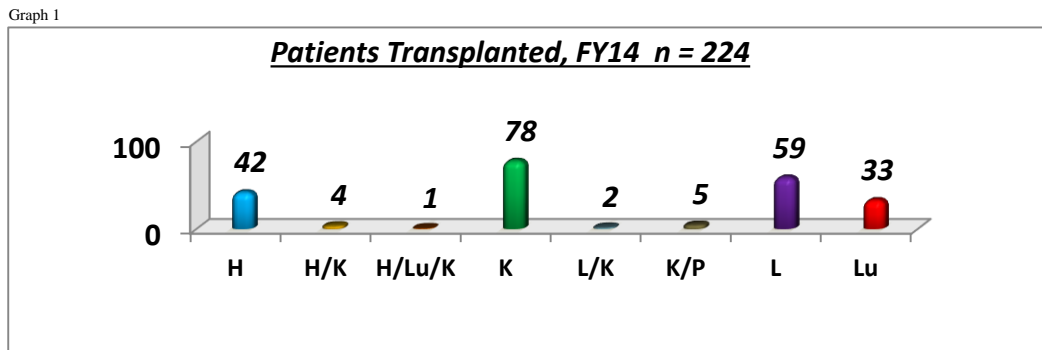
Situation: Our Transplant Center had not previously reviewed individual transplant cases to determine accurate reimbursement; ensuring our revenue capture was consistent with contracts. We were charged with assessing and analyzing each transplant case to determine cost, charge, expected revenue, actual revenue and profit & loss. Our program needed to determine if we had opportunities for improvement or whether we were appropriately meeting our revenue.

Approach: Our Financial Manager and Decision Support Manager worked together to create the parameters needed to accurately review each transplant case see Table 1. Additional team members were identified for the project based on needs: Transplant Financial Coordinators (TFC) - Payer discrepancies; Patient Financial Services (PFS) - billing questions; Compliance - admission concerns. Utilizing our transplant database, all pertinent patient information was extracted and entered into the reporting process. We agreed that we should also examine the payer from our transplant database compared to our Electronic Health Record (EHR). This was important as there are multiple registration areas within our facility allowing multiple users the opportunity to change or update coverage erroneously. Billing and payment to/from the proper payer could make an extraordinary impact in revenue.

Table 1

Last Name	First Name	MRN	Surgeon	TX Date	Payer Database	Organ	Payer EHR	TOTAL CHARGES	NET REV ADJ	NET REVENUE EXPECTED	ACTUAL PAYMENTS (TO DATE)	ACCOUNT BALANCE REMAINING	ACT DIR COST	ACT TOTAL COST	Cont Marging	P&L
XXX	YYYY	XXXX	Dr. Phil	9/23	BX/BS	H	BX/BS	\$1,681,896	\$877,933	\$1,030,754	\$877,933	\$0	\$274,546	\$384,724	\$603,387	\$493,209

A thorough review of all transplant cases in FY14 (see Graph 1) was completed.



At the end of each month, the Financial Manager provided the Decision Support Manager with the patients transplanted the prior month. This included not only the report parameters but also transplanting surgeon, admission and discharge dates, and hospital account number for the transplant admission so as to aid in the data analysis and extraction from the Decision Support system. Although initial review was underway almost immediately, an accurate and complete review of each case had a two to three month delay due to billing and collections.

On first review, we examined health plans to establish a match between the transplant program and EHR. The FC was responsible for confirming payer information in the event of differing coverage. This in turn was provided to PFS for resolution; or follow up with patient for any necessary Coordination of Benefit (COB) notifications. The next step was to do meticulous review of expected net revenue, actual payment, and balance remaining. If the expected did not match the balance remaining and no additional balance remaining, we collaborated with PFS to ascertain the reasons and resolve. Any necessary rebilling of accounts occurred as part of the process review.

Results: A variance was found in expected reimbursement based on contract for those patients who had pre-transplant hospital days which were paid at general services agreement see Table 2.

Table 2

HB Charges:	\$ 1,681,895.77
Less Non CR Charges:	\$ 585,874.46
Case Rate Charges:	\$ 1,096,021.31
Less Stop Loss:	\$ 575,000.00
Stop Loss Amount:	\$ 521,021.31
65% Rate:	\$ 338,663.85
Expected Payment - PIF:	\$ 568,663.85
Non CR Payment Amount:	\$ 309,269.14
Total Paid on HAR:	\$ 877,932.99

These variances, although determined to be accurate and valid, were reviewed for additional opportunities in the event other anomalies existed.

Moreover, in reviewing admission dates, we found seven admissions where the inpatient admission was captured the day following surgery. Protocols were put into place to ensure this does not happen again.

Additional reimbursement of \$101k has been received for one account where primary coverage paid; payment was reversed due to COB question, billing secondary coverage as primary. Communication between PFS and TFC enabled correction in COB. A second account had not been paid due to missing authorization, authorization provided and expected payment has been received in the amount of \$211k. Two additional accounts pending balances totaling \$450k were resubmitted for payment and revenue received. **Total additional revenue received to date for FY14 cases is \$762k.**

Five additional cases have been resubmitted to payers due to outstanding balances accumulating in the amount of \$933k; persistent follow-up on these five cases will continue until resolution.

Conclusion: Transplant programs wanting to ensure accurate revenue capture or increase revenue can make use of the resources within their organization by means of the approaches summarized above. Collaboration and engagement with Decision Support, Patient Financial Services, and Transplant Financial Coordinators are essential in the process for review and necessary adjustments. Also, review of the Electronic Health Record and Transplant Database (or optimal record-keeping tool within the transplant program) is critical in review of accurate coverage information. Communication is a key element to ensure a thorough review, notifications of non-payment instead of adjustment to bad debt, and diligent follow-up on all accounts.

The transplant team continues to monitor each transplant on a monthly basis to ensure accurate billing, admissions compliance, and most importantly revenue optimization.

ABSTRACT C3-D

OPTIMIZING KIDNEY TRANSPLANT REVENUES AND PATIENT ACCESS: A MULTI-FACTORIAL QUALITY APPROACH FOR KIDNEY TRANSPLANT

Lauren E. Kearns, MSN, RN-BC, Director, UNC Center for Transplant Care, Chapel Hill, NC

Situation:

In 2009, we initiated our first Six Sigma Green Belt Project to address lengthy “Referral to Wait List Time” for our Kidney Transplant program. Since then, our Kidney Local Quality Council (LQC) has aggressively addressed this process by implementing a number of successful Performance Improvement Projects (PIP’s) to meet short-term goals, and eliminate non-value added (NVA) time resulting delays and inefficiencies. While these projects focused on administrative processes, such as scheduling and improved methods of patient contact, further analysis revealed that delays were also negatively influencing the financial well-being of the transplant center due to low visit attendance rates, insufficient number of Nephrology and Transplant Surgery appointments, and barriers to patient access.

Approach: Guided by the multidisciplinary Kidney Local Quality Council, project interventions that supported positive financial outcomes are shown in Table 1.

Root Cause	Intervention	Financial Outcomes
1. Patients required to attend orientation class <u>before</u> starting scheduling evaluation, created a barrier to access. Previous analysis revealed “Referral to Orientation Class” phase as 2 nd longest in the process	1. Eliminated need for pre-requisite orientation class, scheduled orientation class on same day as Nephrology, Social Work, and Transplant Financial Coordinator (TFC) evals	1. ↑ hospital facility fee due to inclusion of patient education (Orientation Class); ↑ show rate (45% to > 75%), ↑ billable visits for Nephrology, Surgeon, ↑ access; ↑ referral response rate (30 % class attendance)
2. High rate of “No Show” and cancellations for nephrology; Literature indicates reminder phone calls to be a valuable intervention with good return on investment (time)	2. Pilot project for Nephrology appts_ Program Assistant calls patients 2 weeks before evaluation appointment to confirm/reschedule (in addition to automated phone reminders). Appt. letters faxed to Dialysis Center, if unreachable by phone	2. ↓ “No Shows” and cancellations; ↓ rescheduling time; ↑ show rate (45% to > 75%), ↑ billable visits for Nephrology, Surgeon, and Hospital Facility visits,
3. Not enough appointments to meet need in desired timeframe (2-3 weeks after referral)	3. Modified scheduling templates to ↑ new Nephrology& Surgery appointments; both services dd extra clinics over several months to eliminate backlog	3. Same as 2, plus ↑ access; ↑ documented productivity, ↓ backlog of pts waiting to be scheduled for evaluation

Findings:

Successful implementation of PIP’s not only decreased our Referral to Wait List Time by nearly 300 days (median), but ongoing analysis identified other Root Causes were negatively affecting kidney transplant financials. The team put in place interventions to increase visit availability, improve patient response rates, decrease “No Shows” and cancellations, and eliminate barriers to access. This led to increased number of completed evaluations completed, more patients seen, more billable visits, less rescheduling, (re-work) improved method to document nursing productivity, and overall improved financial performance and revenue optimization. Based on an average monthly visit volume (allowing for seasonal activity), and using the Medicare reimbursment rate as a minimum the overall increase to revenue (attributable to the Organ Acquisition Cost Center) is over \$230, 000. See Table 2.

Table 2. Billable Activity	Average Charge	Average Medicare Reimb. (Cost report)	RVU's	Annualized Inc. Visit Volume	Annualized Inc. Reimb.	Annualized Inc. RVU
Nephrology - Level 4 New Patient Office Visit (99205)	\$250	\$166	2.43	360	\$59,760	874.8
Surgery - Level 5 New Patient Office Visit (99205)	\$346	\$207	3.17	450	\$ 93,150	1426.5
Hospital Facility - Level II Nursing Care	\$177	\$96		810	\$77,760	NA
**Hospital Facility - Level III Nursing Care (incl. Level II, plus education)	\$213	\$96		810	\$77,760	NA
Total Annualized Revenue Inc.					\$230,670.00	

*Level II Nursing Visit includes vital signs, pain assessment & clinical data collection (reason for visit, allergy review, medication reconciliation, tobacco assessment, domestic violence assessment).

**Level III Nursing Care (incl. Level II, plus education)

Implications and Relevance: Transplant QAPI is a required program that typically focuses on clinical outcomes and processes. Clinicians are not generally trained to investigate financial issues, and frequently are uncomfortable with a direct financial focus. This series of projects led us to acknowledge the financial impact of our processes, and specifically identify interventions to decrease Non-value Added Administrative as well as improve financial performance. The routine inclusion of a financial goal or potential impacts as part of any Performance Improvement Project is best practice that can help decrease expenses and/or optimize revenues. We continue to work towards decreasing Referral to Wait List time, but now we also recognize that increasing visit capacity and access is key to this goal. We continue to monitor appointment visit attendances rates and Referral to Wait List metrics monthly. The reminder call pilot project was so successful in reducing No Shows for Nephrology patients that we extended that practice to Surgery patients with equal success. Even though there is no additional revenue reimbursement from Medicare, for enhanced Nursing Level visits, we are continuing to explore the impact of these higher level visits on productivity, and commercial billing.

Lauren E. Kearns, MSN, RN-BC, Zeynep Tulu, MS, MEMP, Emily Arnold, RN, BSN

CATEGORY 4

Transplant Center Initiatives to Increase Organ Donation

ABSTRACT C4-A

INCREASING ORGAN DONOR REGISTRATION THROUGH HOSPITAL-WIDE INITIATIVES

Jessica Melore, NewYork-Presbyterian/Weill Cornell, New York, NY

Purpose: Our state has one of the largest transplant waiting lists in the U.S. (10,600+ as of 1/16/15, OPTN), yet has the second lowest percentage of registered organ donors (23%, compared to 47% nationally). Our organization focused on engaging and educating our employee population and the public with the aim of improving donor registration rates during National Donate Life Month in April 2014.

Method: In collaboration with our Donor Council, our Marketing and Public Affairs teams, and our local OPO, we devised a multi-faceted month-long educational campaign, expanding upon our efforts in previous years. We introduced this strategic plan at a Key Personnel meeting with hospital leadership, incorporating a personal testimony from an employee who had received a transplant. We held training sessions for staff volunteers who would be manning donor registration tables. We extended our “tabling” events from 2 days to 1 week, securing a more heavily trafficked location in our cafeteria. We encouraged employees to engage in National Donate Life Blue and Green Day with a photo contest for teams and individuals, and offered blue and green cupcakes in the cafeteria. Our internal hospital magazine featured personal stories of fellow employees who had been touched by donation, and employees received a series of e-blasts dispelling common myths about organ donation, with links to register online. In addition, we offered a raffle contest for those who completed an educational questionnaire, and posted facts about organ and tissue donation on our intranet. Educational materials directed individuals to a dedicated website featuring stories of transplant recipients and living donors from our hospital and additional information.

Results: We increased our donor registrations 381.25%, from 16 registrations in April 2013 to 77 in April 2014. According to our local OPO, out of 98 hospitals in our service area, our transplant center contributed the largest percentage of donor enrollments during Donate Life Month (42% of 183 total enrollments).

Conclusion: Through a sustained campaign utilizing multiple communication channels and interpersonal elements, we were able to offer more opportunities for education and action. We helped personalize the topic of organ donation for staff with stories and testimonies from their peers, and further promoted engagement through the photo contest and our educational quiz. By varying our communication methods and expanding the number of donor registration opportunities, we were able to significantly increase our enrollments.

Jessica Melore, BA
Felicia Morales-Castro
Ellen Hawa, MSC.N., R.N.

ABSTRACT C4-B

Expanding the Lung Donor Pool Using Innovative technology, Dedicated Procurement Staff and Management Collaboration

Dr. Gail Frankle, DHN, RN, CPTC University of Minnesota Health, Minneapolis, MN

Purpose: Improve the availability of lungs to those awaiting transplant at our center. The average waiting time for lungs at our center is in the 75% percentile with an average wait time of 55.8 months. Patients in need of a lung transplant are often on a rapid decline in health status with a high mortality rate. Transplanted patients with end stage lung disease have a better long-term survival rate than those awaiting transplant with high potential waitlist mortality depending on blood type. We annually perform 40-50 lung transplants a year. Beginning in 2013 we began to develop a policy and model to allow for better utilization of lungs.

Method: With the addition of a new lung surgeon the team began to look at the long wait time and our organ acceptance rates. With the current system the surgeons feel they need to make a quick decision and may pass on offers because of limited time to review. Three phases were initiated.

- 1) For the last 6 months of 2013, a trial was done with the new surgeon only reviewing all lung offers for our center. He was the primary on for the whole 6 month period.
- 2) End of 2013 joining the Inspire and Expand trials for the Organ Care Center for lungs. All listed and to be listed patients were offered the trial if appropriate. All patients approached consented.
- 3) Beginning in 2014 a dedicated thoracic call team was put in place using three individuals with procurement background who took all first call offers and helped manage and optimize donors working with the OPO's who were making the offers.

Results: We concluded 2013 having transplant 40 patients and the first 6 months of 2014 have completed 23 transplants. In looking at the results for the three identified phases:

- 1) In comparing his acceptance and transplant rate to the previous method of rotating the surgeon on call, the center showed a dramatic change in acceptance and transplant rate doubling the number 13 first six months to 27 second 6 months.
- 2) Completed the first Inspire OCS in the Midwest in December 2013 with the recipient being discharged in 7 days post transplant. Also the center did the first two Expand OCS transplants in the world with one from a DCD donor and one from a Brain Dead donor with below standard criteria ABG's. Both recipients are doing well. We have now done a total of 11 successful OCS transplants.
- 3) Since the implementing the specialized call team we screened a total of 200 donor offers, accepted 43, and transplanted 23. Out of all the offers screened a total of 9 were transplanted elsewhere after we declined. Also implemented and being tested is a new scoring tool that we use for our center when we receive an offer and exceeds the current UNOS requirements.

Conclusion: Lung transplant patients at our center have seen shorter wait times and more lungs transplanted since the implementation of the OCS and even more important is the initiation of the thoracic procurement call team. Wait times have decreased putting the months to transplant in the 50% percentile with the time continuing to decline as we refine the process. Utilizing specialized procurement coordinators for organ screening is a valuable tool allowing for better workup and information on the donor before presenting to the team for review, optimizing utilization of the recipient fit and standardization of the process to utilize a two physician/surgeon turndown policy.

Dr. Gail Frankle, DHN, RN, CPTC

CATEGORY 5

Transplant Data: Analysis, Reporting and Research

ABSTRACT C5-A

IMPACT OF EDUCATIONAL ATTAINMENT ON KIDNEY TRANSPLANT OUTCOMES BY RACE

Albert Einstein College of Medicine, Montefiore Medical Center, Bronx, NY

Problem/situation: Educational attainment is strongly related to well-being, health status, and lower death rates from chronic and acute conditions. Little data is available examining the potential relationship between educational attainment and graft and/or patient survival following kidney transplantation. Additionally, some ethnic/racial groups experience disparities in graft and patient survival after kidney transplantation compared to whites; a differential effect of educational level within racial group has not been previously examined.

Methods/Practices/Interventions: We examined Scientific Registry Transplant Recipients data from Jan 2000 to Dec 2012 of adult, first-time, deceased-donor kidney-only recipients by four educational attainment levels (lowest: none/ through 8th grade; middle: high school or GED; high: some college/ technical school; highest: associate/ bachelor/ graduate degree) within race groups (white, black, Hispanic, and Asian) while adjusting for several potential confounders.

Findings/Solutions/Conclusions: Univariate analysis demonstrated significant associations ($p < 0.01$) of low educational attainment and reduced overall death-censored graft survival (DCGS) amongst whites and blacks while its association with patient survival was significant amongst whites, blacks and Hispanics but not Asians. On multivariate analysis of black KTX recipients, those with the lowest education level were associated with significantly worse DCGS (Table 1: aHR 1.27 95%CI 1.10-1.46) compared to those with the highest level; however, no significant association was seen amongst those with middle (aHR 1.06, 95%CI 0.98-1.15) or high education levels (aHR 1.03, 95%CI 1.03 (0.94-1.12)). Educational attainment was not consistently associated with DCGS in other race groups. Educational attainment was significantly associated with overall patient survival in a dose dependent fashion amongst whites (lowest level, aHR 1.23 95%CI 1.12-1.36; middle level, aHR 1.24 95%CI 1.18-1.30; high level, aHR 1.12, 95%CI 1.05-1.18) and blacks (lowest level, aHR 1.33 95%CI 1.17-1.51; middle level, aHR 1.19, 95%CI 1.10-1.28; highest level, aHR 1.08, 95%CI 0.99-1.18) with incremental improvements seen with increasing educational level; however, no association was seen in other race groups.

Low educational attainment correlates with poor graft outcomes amongst blacks and decreased patient survival amongst blacks and whites; but, neither outcome appears to be associated amongst Asian or Hispanic KTX recipients.

Implications/Relevance: The results suggest clinicians may be able to identify groups of patients at risk of inferior transplant outcomes based on their level of education and race. This may indirectly support the use of education programs as an intervention aimed at reducing disparities in many transplant programs.

Table 1. Outcomes by Educational attainment and Race*			
Education Level		DCGS	Patient Survival
Whites (n=40,455)	Frequency	aHR (95%CI)	aHR (95%CI)
Lowest	1,432	1.14 (0.99-1.31)	1.23 (1.12-1.36)
Middle	18,753	1.13 (1.05-1.21)	1.24 (1.18-1.32)
High	10,183	1.04 (0.96-1.12)	1.12 (1.05-1.18)
Highest	10,088	Reference	
Blacks (n=26,867)			
Lowest	1,037	1.27 (1.10-1.46)	1.33 (1.17-1.51)
Middle	14,092	1.06 (0.98-1.15)	1.19 (1.10-1.28)
High	7,172	1.03 (0.94-1.12)	1.08 (0.99-1.18)
Highest	4,566	Reference	
Hispanic (n=12,676)			
Lowest	4,011	1.03 (0.85-1.26)	1.12 (0.95-1.33)
Middle	5,701	1.10 (0.91-1.32)	1.16 (0.98-1.37)
High	1,769	1.08 (0.87-1.34)	1.16 (0.95-1.41)
Highest	1,195	Reference	
Asian (n=5,325)			
Lowest	382	0.86 (0.64-1.15)	1.11 (0.87-1.42)
Middle	1,846	0.99 (0.81-1.22)	1.20 (1.00-1.43)
High	1,193	0.80 (0.63-1.03)	1.06 (0.86-1.30)
Highest	1,904	Reference	
*Educational attainment is represented as follows: Lowest: no schooling or up to 8 th grade Middle: completion of high school or GED High: attended college or technical school Highest: received an associate/bachelor degree or has post college graduate degree			

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Presented elsewhere:

American Society of Transplant Surgeons

Winter Symposium Conference, Miami, Florida, January 14-17, 2015

ABSTRACT C5-B

ASSESSING DIFFERENCES IN LIVER TRANSPLANT LIST INCLUSION BASED ON PSYCHOSOCIAL FACTORS

Douglas R. Polster, M.S., Broward Health Medical Center, Fort Lauderdale, FL

Problem: Currently, approximately 16,000 individuals are awaiting donated livers to become available. Due to the limited availability and high demand of livers for transplantation, there is a need for a “fair” allocation of organs. Psychosocial evaluations are typically utilized by most transplant centers to help designate which patients receive organs in a process known as “transplant list inclusion.” Psychosocial evaluations aid in promoting fairness and equal access to organs. These evaluations improve the physician and transplant team’s ability to select patients likely to survive transplantation by screening for mental and behavioral health issues which may negatively affect outcomes. The goal of this pilot study is to assess for psychosocial differences, using the Millon Behavioral Medicine Diagnostic (MBMD) between two groups of transplant candidates: (1) those that were “cleared” for list inclusion and (2) those that were not “cleared.” This data will provide researchers and practitioners improved methodology for list inclusion, which ultimately is likely to reduce the discrepancy between the need for and limited availability of organs available for transplant.

Approach: All patients completed the MBMD during the standard transplantation evaluation. Exclusion criteria were: (a) moderate to severe cognitive impairment as determined by the Modified Mini Mental Status Exam (3MS) completed as part of the psychosocial evaluation, (b) Spanish speaking for the MBMD only, as it does not have a Spanish translation, (c) other non-English speaking languages (e.g., Creole), and (d) scores on the MBMD which indicate random or inconsistent responding. De-identified data (e.g., gender; age; race; patient responses; raw scores; scaled scores) was collected in a de-identified database. A total of 44 individuals were included in the study (38 were cleared for transplant, 6 were not cleared). The sample consisted of 28 males and 16 females with a mean age of 58 years old (SD = 7.6). Ethnicity was broken down as follows: 73% Caucasian, 18% Hispanic, 5% Caribbean, 2% African American, and 2% other.

Findings: A series of independent sample t-tests were employed to evaluate differences in average T-scores on all subscales of the MBMD between the two groups. A significant difference was found on the Denigrated scale ($t [32] = -2.074, p = .046$). An additional series of independent sample t-tests were conducted to examine differences in validity scales of Disclosure, Desirability and Debasement between the 2 groups. A significant difference was found on the Debasement scale ($t [32] = -2.402, p = .022$). Additionally, a series of chi squared analyses with odds ratios (OR) were employed to assess for relative risk of being excluded from the transplant list. Dependent variables were MBMD T-scores. Participants were analyzed by measure and were divided into 2 groups: (1) 2 or more elevated scores (e.g., T-scores over 70) on the MBMD, (2) less than 2 elevated T-scores on the MBMD. Relative risk of being excluded from the transplant list did not depend on group.

Implications: The significant differences on the Denigrated Scale (mean difference = 21.04) and the Debasement scale suggests that individuals who were not cleared for transplant list inclusion tend to focus on the most troublesome aspects of their lives, and tend to devalue themselves by reporting minor problems as more serious than objectively observed. The lack of significance in the relative risk evaluation may be due to the small sample size as well as the small number of patients rejected. The clinical implications of the results suggest that key differences exist between individuals cleared for transplant list inclusion and those who are not. This is relevant to future assessment procedures, “list inclusion” criteria formulation and also creates potential areas for intervention. Future studies must include a large sample of individuals who were not cleared for inclusion.

Douglas R. Polster, M.S., Elizabeth Machado, M.S., Micah Price, Psy.D, and Toni Richardi, Psy.D.

ABSTRACT C5-C

PRE-TRANSPLANT MONITORING PROGRAM TO IMPROVE WAITLIST MORTALITY

Colleen Cook BSN, RN, CCTC, Hospital of the University of Pennsylvania, Philadelphia, PA

Purpose: Rates of waitlist mortality is a very real concern for liver transplant programs, in particular those in regions with higher MELDs at time of transplant. One example of this is a large, academic center with consistent liver transplant volumes > 110 but statistically significant higher than expected waitlist mortality and lower than expected transplant rates. The SRTR PSR pre-transplant metrics are utilized by some payors to direct patient referral for transplant and premier status for payor contracts. In addition, the OPTN recently proposed Composite Pre-Transplant Metric (CPM) to evaluate pre-transplant processes. This center determined it would need to examine current waitlist practices and implement changes. This process began in 2012.

Method: The first step of this process was to examine the composition of the transplant program's waitlist using SRTR data and UNOS. At the start of 2012 there were 487 patients' waitlisted for liver transplant, with nearly 65% having a MELD < 15 and little likelihood to be transplanted. A review of 2011 waitlist deaths (n=46 total) revealed that nearly 20% of patients were listed with a MELD of >15 as of January 1, 2012. Based on this data, it was determined that listed patients with lower MELD scores had the largest impact on the program's higher than expected waitlist mortality. Our center approached this issue in two ways: 1) Deferred addition of patients to the UNOS waitlist until MELD was >15 unless patient was willing to accept donors from high risk categories; 2) Developed Pre-Transplant Monitoring Program (PTM) for evaluated patients deferred for listing, which used the same clinical monitoring pathway was used to follow listed and non-listed patients, including lab monitoring, Hepatology care, cardiac clearance, health maintenance, etc. . If a PTM patient had an increase in MELD score or became symptomatic, patient would be quickly added to the UNOS waitlist. The transplant surgeons, hepatologists and coordinators routinely reviewed patients on the active waitlist with low melds to identify patients appropriate for waitlist removal and some patients were transitioned to the PTM program.

Results: (Intervention October 2012)

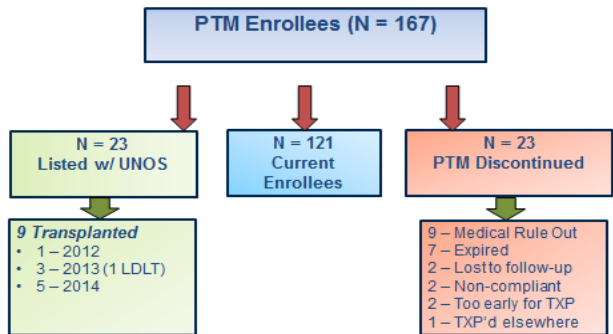
SRTR PSR Reports	Jan 2012	July 2012	Jan 2013	July 2013	Jan 2014	July 2014	Dec 2014
Waitlist Size	487	464	468	542	389	354	303
Deaths once Waitlisted	60	72	82	59	45	44	44
	1.42	1.72	1.79	1.35	1.08	1.06	1.21

■ Statistically Higher than Expected

From July 2012 – December 2013, 167 patients were enrolled in PTM program, 23 were eventually added to the waitlist and 9 were transplanted. In addition, 23 patients were removed from the PTM program, 7 due to death. There was no increase in deaths for patients in the transplant evaluation phase after implementation of the PTM program. PTM also resulted in improved to the program’s transplant rate and 65% reduction in median wait time to liver transplant (47 months to 16.4 months).

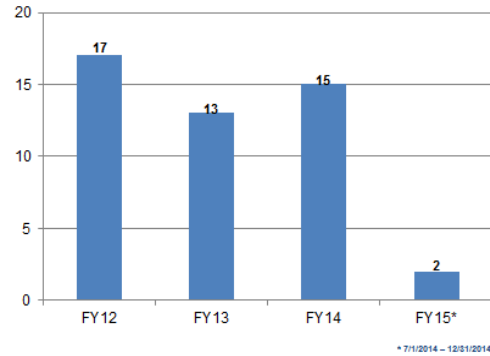
Results: Pre-Transplant Monitoring Program (PTM)

7/1/2012 – 12/13/2014



(Source: OTTR – accessed for updates 1/2/2015)

Pre-Transplant Deaths in Evaluation Phase



Conclusion: Liver transplant waitlist mortality can be improved by selective deferral of pre-transplant patients onto the UNOS waitlist and consistent clinical monitoring practices. PTM program was further validated in that the improved mortality rates have been maintained for 3 PSR cycles.

Implications/Relevance: SRTR data plays a significant role for each transplant center as it is utilized by patients, referring providers’, payers to evaluate each transplant center. This program could be adapted and implemented at other centers facing higher than expected waitlist mortality.

Colleen Cook BSN, RN,CCTC, Stacey Doll MPA, George Makar, MD, MSCE, Dawn Drazek BSN, RN, CCTC, Rebecca Farrell BSN, RN, CCTN,

ABSTRACT C5-D

TEIDI TRACKING-IMPLEMENTING TEIDI RESULTS INCREASES UNOS COMPLIANCE BY 100%

Swanzeta R. Nciweni, John Hopkins Comprehensive Transplant Center, Baltimore, MD

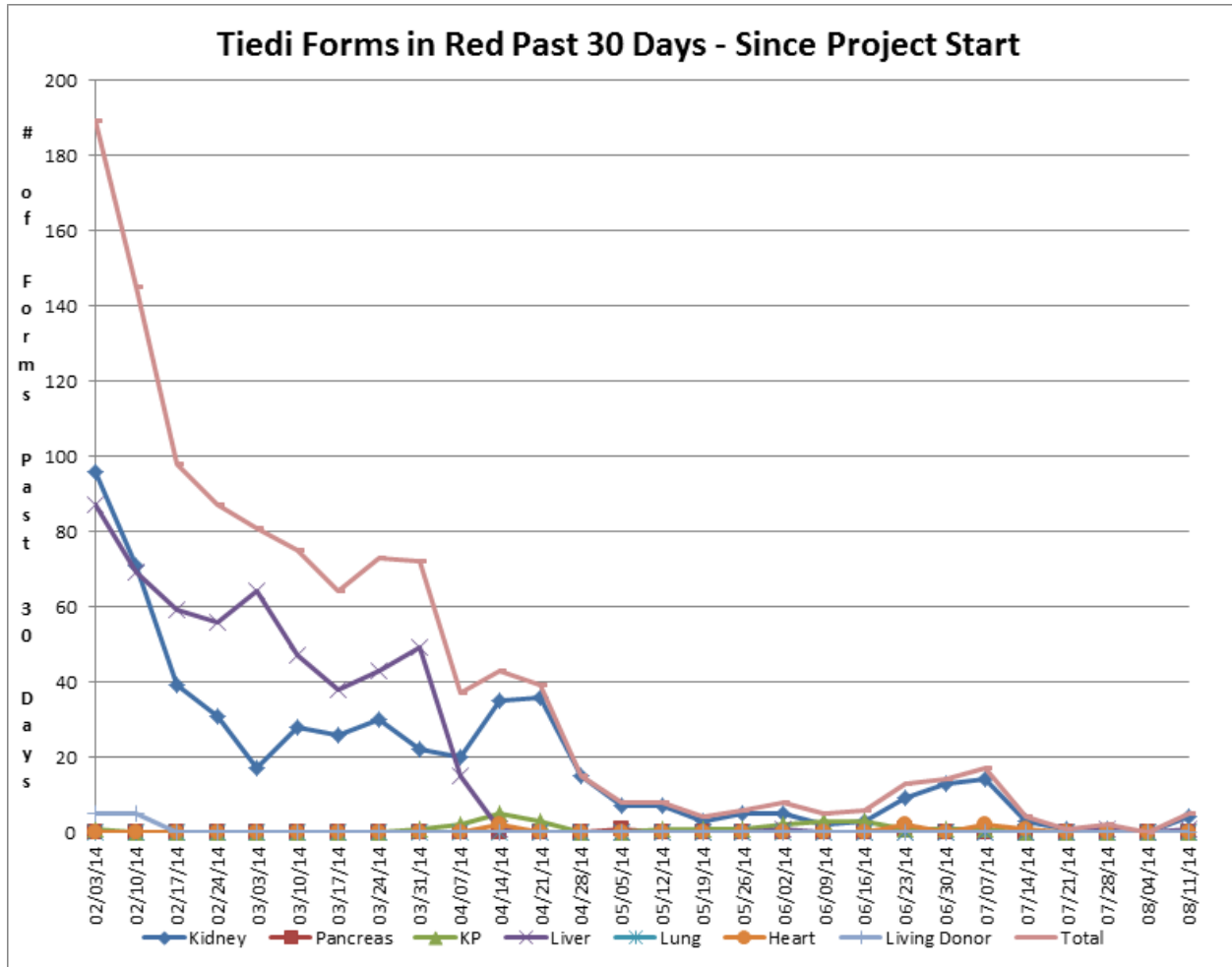
Purpose: Clinical data submission of Teidi forms to United Network of Organ Sharing (UNOS) is directly related to regulatory compliance. In accordance with UNOS compliance policies, timely and accurate data submission is a key component for all health care facilities supporting organ transplantation. Therefore, *data compliance* weighs heavily on medical institutions handling sensitive, regulated and high-value information. With our internet-driven society, it is imperative that time sensitive data reporting is emphasized by the movement towards effective UNOS compliance “tracking” methods. Thus any delay in the data reporting to UNOS, will not only affect deadlines, it hinders the completeness, and usefulness of registry data, and can ultimately impact OPTN policy decisions. Outstanding Teidi forms are color coded in **red** which is an indication that UNOS forms have fallen beyond the required thirty-day compliance standard and OPTN regulations.

In 2013, The Transplant Center (TC) experienced an increase in outstanding UNOS forms. Through its relational databases, The TC developed a weekly monitoring report called the “Teidi Tracking.” The Teidi Tracking tool illustrates the essential information of all non-compliant UNOS forms.

Methods: In an effort to improve accurate, timely data submission, the TC used the “Teidi Tracking tool” on a weekly basis to monitor the average past due forms. A line graph is used to display real time illustrations of UNOS data collection. The graph displays each organ group and the number of outstanding forms beyond thirty-days. Transplant data staff is then able to *track* UNOS forms before they exceed the deadline. Moreover, frequent interval review of all forms that are approaching “non-compliant” status, allow data staff to recognize deficiencies and inconsistencies, and validating the integrity of the data. From January 2014, the TC averaged less than 75% compliance with UNOS data form submission. But when the Teidi Tracking tool was implemented, a weekly report was generated displaying each organ group and the number of days each UNOS form was past due. The data staff reviewed the report and gathered the information for completion and data submission. Tracking forms weekly, allowed the TC to take a best practice approach to compliance and UNOS Teidi form management.

Results: After implementing the tracking tool as a guide to measure the weekly range of outstanding UNOS forms, by June 2014, the TC’s UNOS forms compliance increased significantly. In 2014, the Centers for Medicare Services (CMS) released its annual Compliance Report and The TC’s Kidney, Liver, Heart, Lung, and Pancreas reports were 100% compliant with UNOS Teidi form standards.

Conclusion: The Teidi Tacking tool provides oversight and management of data abstraction and data quality assurance processes for clinical data registries. The results show a great advantage by providing a common tool to illustrate the progress of UNOS forms.



Swanzeta R. Nciweni, MA

Kindly provided by the Johns Hopkins Comprehensive Transplant Center and Swanzeta R. Nciweni

ABSTRACT C5-E

OUTCOMES OF KIDNEY TRANSPLANT RECIPIENTS ON DUAL ANTIPLATELET THERAPY

Paul Donald Bailey III, Medical student: 4th year. Montefiore Medical Center, Bronx, NY

Problem/ Situation: Kidney transplant (KTX) recipients often have comorbidities that require anti-platelet therapy with 1 or 2 agents, most commonly acetylsalicylic acid and/or clopidogrel. Many programs will not transplant patients taking dual anti-platelet therapy until at least one of the anti-platelet agents have been discontinued because of the potential risk of bleeding. This may result in prolonged waiting times and/or reduced access to transplantation. Other programs, will perform kidney transplantation in the setting of dual anti-platelet therapy if the anti-platelet agents can be temporarily withheld perioperatively. This study examines short-term outcomes of patients receiving single or dual agent anti-platelet therapy at the time of transplantation.

Approach: A retrospective cohort study of consecutive adult living- and deceased-donor kidney-only recipients at a single center between 10/3/11 and 9/3/14 was performed to evaluate outcomes between kidney transplant recipients receiving single-antiplatelet therapy with acetylsalicylic acid (ASA), dual-antiplatelet therapy (DUAL) with ASA and clopidogrel or no antiplatelet therapy (NONE) at the time of transplantation. Exclusions were patients on warfarin therapy, (n=19) or heparin (n=2) at the time of transplant, and those on clopidogrel alone (n=7).

The primary outcome was at least one blood transfusion during or within 5 days of transplantation. Secondary outcomes were: reoperation for bleeding, delayed graft function (DGF, defined as dialysis within 1 week post-transplantation), length of stay (LOS) > 6 days (median value), 30 day rehospitalization from day of transplant hospitalization discharge, and overall graft failure following transplantation (defined as allograft nephrectomy, re-transplantation, return to chronic dialysis, or death). Univariate associations between exposure groups were examined using the Chi-Square tests for categorical variables and t-tests for continuous variables whose distributions approximated normality. The survival distribution for overall graft failure was examined with Kaplan-Meier curves and compared using the log-rank test. Logistic regression models were fit to estimate the Odds Ratios (OR) and 95% confidence intervals (95%CI) for exposure groups for perioperative blood-transfusion with variables included in the model if associated with the outcome at an α level of 0.05. Time to outcome was defined as time from the date of transplant until date of outcome, censored for loss to follow-up and end of study period (10/31/14).

Findings/Solutions/Conclusions: Compared to the NONE group, the DUAL and ASA recipients were significantly older (50.5 ± 14.6 , 62.4 ± 7.0 , 58.5 ± 9.6 , years $p < 0.01$), more likely to be male (51.2%, 67.4%, 78.3% $p < 0.01$), diabetic (28.9%, 69.6%, 61.5% $p < 0.01$), or have cardiovascular disease (12.4%, 100%, 38.5%, $p < 0.01$), and less likely to have received a previous solid organ transplant (12.9%, 4.4%, 3.7%, $p = 0.02$), or receive ATG induction therapy (56.5%, 34.8%, 34.1%, $p < 0.01$), respectively. Also, relative to NONE the DUAL and ASA groups were more likely to receive a kidney from an older donor (41.5 ± 15.6 , 47.7 ± 17.3 , 47.9 ± 16.7 $p < 0.01$) and somewhat less likely to receive a living donor kidney (18.7%, 8.7%, 14.8% $p = 0.07$). Other baseline characteristics were similar between the groups.

The overall incidence of blood transfusion was 34.6% within 5 days of kidney transplantation. Perioperative blood transfusion was administered in 27.8% of patients in the NONE group, 52.2% of cases in the DUAL group, and 42.2% of cases in the ASA group ($p < 0.01$) suggesting an association of ASA and DUAL with blood transfusion on univariate analysis (Table 1).

Antiplatelet therapy, either as DUAL or ASA alone, was not associated with reoperation for bleeding, DGF, length of stay > 6 days, 30-day readmission, or overall graft failure. Renal artery or vein thrombosis was not seen in the DUAL group and occurred in 1 and 2 patient in the ASA and NONE groups respectively. On multivariate analysis including all factors associated with blood transfusion at and alpha level of <0.05, only increasing recipient age remained a significant independent risk factor for blood transfusion; whereas, neither ASA, nor DUAL was associated with blood transfusion relative to NONE (Table 2).

Implications/Relevance: Kidney transplant recipients on one or two antiplatelet agents are not at higher risk for blood transfusion when compared to those on not taking anti-platelet agents after adjusting for other risk factors for transfusion. Additionally, reoperation for bleeding, delayed graft function, length of stay, 30-day re-hospitalization, and overall graft survival are not impacted by antiplatelet agent utilization. Our findings suggest that restriction of access to transplantation due to dual pre-transplant antiplatelet therapy usage is not necessary when post-transplant cessation of antiplatelet therapy is allowable.

Outcome (%)	ASA N=135	Dual N=23	None N= 209	P-value
Blood Transfusion	42.2	52.2	27.8	<0.01
Reoperation for Bleeding	1.5	0.0	1.0	0.79
Delayed Graft Function	51.1	52.2	47.9	0.81
Length of Stay > 6 days	36.3	34.8	31.1	0.60
30 Day Readmission	33.6	21.7	26.8	0.30
Overall Graft Failure	7.4	4.4	7.7	0.85

Table 1

Characteristic	Univariate		Multivariate	
	Odds Ratio	95% Confidence Interval	Adjusted Odds Ratio	95% Confidence interval
ASA vs. None	1.90	1.21-3.00	1.42	0.86-2.34
Dual vs. None	2.84	1.19-6.79	1.87	0.75-4.66
Recipient DM	1.97	1.27-3.05	1.34	0.83-2.17
ECD vs Living	2.70	1.34-5.41	1.61	0.65-4.01
SCD vs Living	1.23	0.65-2.34	0.99	0.50-1.96
Donor Age	1.02	1.01-1.04	1.00	0.98-1.02
Recipient Age	1.04	1.02-1.06	1.02	1.00-1.05

Table 2

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ABSTRACT C5-F

OUTCOMES OF KIDNEY TRANSPLANTS FROM DONOR WITH RHABDOMYOLYSIS

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Purpose: Rhabdomyolysis is a common cause of acute renal failure affecting nearly 10-15% of hospitalized patients, with most restoring their normal renal function within 10-14 days; however, utilization of kidneys from these donors may be diminished for fear of an additive deleterious effect with ischemia reperfusion injury, which occurs in the process of kidney transplantation. Given the current shortage of donors, means to expand donor criteria are constantly being examined. Donors with rhabdomyolysis have been utilized; however there is a paucity of empiric data on outcomes.

Method: A retrospective cohort study of consecutive adult kidney-only deceased-donor transplants at a single institution between October 2011-December 2014 was conducted to evaluate overall graft survival and delayed graft function of recipients receiving kidneys with donor creatine phosphokinase (CPK) levels < 1000 (n=170) vs. ≥1000 (n=98). A separate analysis was also conducted to examine outcomes with extremes of CPK including < 1000 (n=170) vs. 1000-10,000 (n=83) vs >10,000 (n=15; range 50001-20,278). Exclusions were recipients with missing donor CPK.

Results: Of 268 deceased-donor recipients, 37% received a kidney from a donor with CPK > 1000. Donors with low and high CPK values were similar in terms of age and race. Recipient characteristics between those that received high and low CPK kidneys were similar in terms of age, race, gender, diabetes mellitus, induction agent, prior solid organ transplant, BMI, and cardiac disease. The prevalence of younger donors (37.3 vs. 46.1, p <0.0001) and donors with elevated peak serum creatinine levels (2.7 vs. 1.6, p <0.0001) was significantly higher in the high CPK group relative to the low CPK group respectively (Table 1). On Kaplan-Meier analysis, overall graft survival (p=0.54) and delayed graft function (61.5% vs. 51.5%, p=0.1179) were similar between the two groups. A separate analysis analyzing three CPK strata was performed in order to examine the magnitude of a potential effect with higher levels of CPK. In this analysis there were no differences in overall graft survival (Figure 1) or delayed graft function (51.5%, 61.5%, 66.7%, p=0.2671) between the CPK <1000, CPK 1000-10,000, and CPK > 10,000 groups.

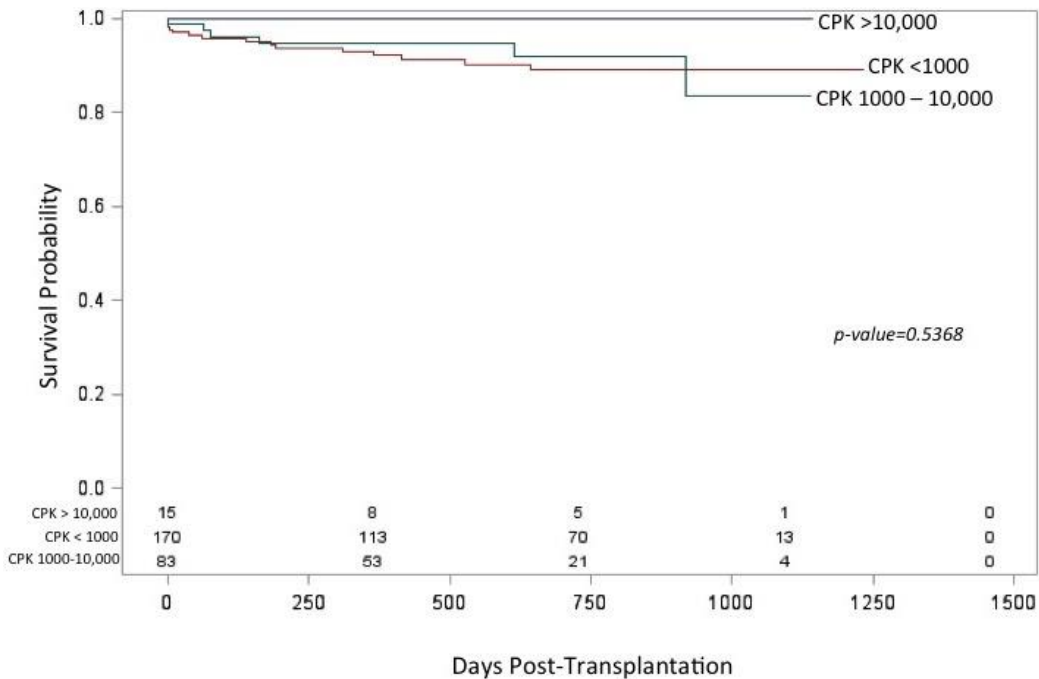
Conclusion: Kidney transplantation from donors with elevated pre-recovery CPK is not a risk factor for poor graft outcomes, suggesting that donor CPK should not be a contraindication to kidney utilization.

Ravi N. Kapadia MD^{1,*}, Liise K. Kayler MD, MS^{1,2}

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2. Montefiore Einstein Center for Transplantation

Table 1			
Characteristic (mean ± SD or %)	CPK <1000 (n=170)	CPK >1000 (n=98)	<i>p-value</i>
Recipient			
Age (years)	53.5 ± 15.3	50.6 ± 17.6	0.1576
Race - black	42.1	46.9	0.4420
Male gender	63.7	57.1	0.2848
Diabetes Mellitus	42.1	36.8	0.4079
Thymoglobulin Induction	48.5	49	0.9444
Prior solid organ transplant	16.4	11.2	0.2483
Body mass index >35 (kg/m ²)	9.5	8.3	0.7382
Cardiac disease	29.7	30	0.9597
Donor			
Age (years)	46.1 ± 16.8	37.3 ± 16.8	<0.0001
Race - black	17	20.4	0.4806
Male gender	55.6	60.2	0.4583
Expanded Criteria Donor (ECD)	30.4	17.4	0.0182
Donor peak serum creatinine (mg/dL)	1.6 ± 0.9	2.7 ± 1.6	<0.0001
Delayed Graft Function	51.5	61.5	0.1179
Post Op Follow-Up (Days)	598 ± 383	507 ± 332	0.0508

Figure 1



ABSTRACT C5-G

LIVING OR DECEASED DONOR KIDNEY TRANSPLANTATION: A COMPARISON OF OUTCOMES FROM A NATIONAL PRIVATE HEALTH PLAN

Charlotte Wu, MBBS, MS, Optum, Golden Valley, MN

Purpose: The advantages of living versus deceased donor transplantation are now readily apparent as it reduces long wait times and achieves better long-term patient and graft survival. Our hypothesis is that the improved patient and graft survival seen with living donor transplants are a result of shorter wait times and fewer complications during all phases of the transplant period, resulting in a lower total cost of healthcare when compared to deceased donor transplants. This study compares the two donor types from an economic perspective.

Method: We developed a comprehensive database of transplant recipients with health insurance coverage under a large national commercial health plan. We extracted kidney transplant recipients' medical claims data from the time of their transplant evaluation and followed all evaluated cases through the end of the observation time period of September 30, 2014 or termination of coverage. We estimated time from listing to transplant and graft and patient survival with Kaplan-Meier methods, comparing living (LD) vs deceased donor (DD) recipients. We also calculated total paid medical expenses at different time periods around transplantation for those with 1 year follow up after transplant discharge.

Results: We followed 7,890 adult kidney transplant referrals with commercial medical insurance for transplant evaluation between January 2010 and April 2014. Of these referrals, 3,599 were listed and 1,398 transplanted. The estimated 25th percentile of Time to Transplant (TT) from listing was 73 days for LD and 778 days for DD. Results of a proportional hazard model suggest that at any given time LD recipients have an over 10 times higher chance of transplantation than DD recipients after adjusting for demographics, geographical location, and comorbidity (aHR=10.377, 95% CI [9.217, 11.698], $P < 0.0001$). Among all transplanted cases, 63% were LD (N=977), which was higher than the national rate of 35% reported by the SRTR. Estimated 1-year graft survival was 98.5% for LD and 94.5% for DD which was statistically significant ($P < 0.0001$). One-year patient survival rates were 99.1% and 97.9% for LD and DD respectively ($P = 0.1030$). Proportional hazard model results show that the hazard of graft failure for LD is half of DD after risk-adjusting for demographics, pre-transplant comorbidity, and dialysis time (aHR=0.509, 95% CI [0.267, 0.957], $P = 0.0371$). Post-transplant complication rates in kidney dysfunction, urinary tract infection, wound infection, and pneumonia trended lower in LD recipients. Of the 1,002 patients with complete 1 year post-transplant follow up (N=666

for LD, N=336 for DD), total medical paid amounts on average for LD and DD recipients were \$33,733 vs. \$47,925 (P=0.008) during evaluation, \$71,455 vs. \$115,900 (P<0.0001) during waitlist, \$88,585 vs. \$88,744 (P=0.9548) during transplant admission and \$45,365 vs. \$59,362 (P=0.0124) during 1 year post-transplant discharge.

Conclusion: Living donor transplant recipients of a commercially insured population showed higher transplant rates, better graft and patient survival, and lower rates of post-transplant complications than deceased donor recipients. This is consistent with findings from studies in single center or other countries. In addition, we also found significant financial advantage of a living donor transplant both pre- and post-transplant which may derive from the shorter time to transplant, less dialysis expense and fewer complications pre-transplant and fewer complications post-transplant.

Charlotte Wu, MBBS, MS, Wade Bannister, PhD, Mark Schnitzler, PhD, Frank D Irwin, MD,
Anthony Bonagura, MD, Bart Laihininen, MPAS, MBA

ABSTRACT C5-H

IMPROVING DATA SUBMISSION TO THE TRANSPLANT INFORMATION ELECTRONIC DATA INTERCHANGE (TIEDI)

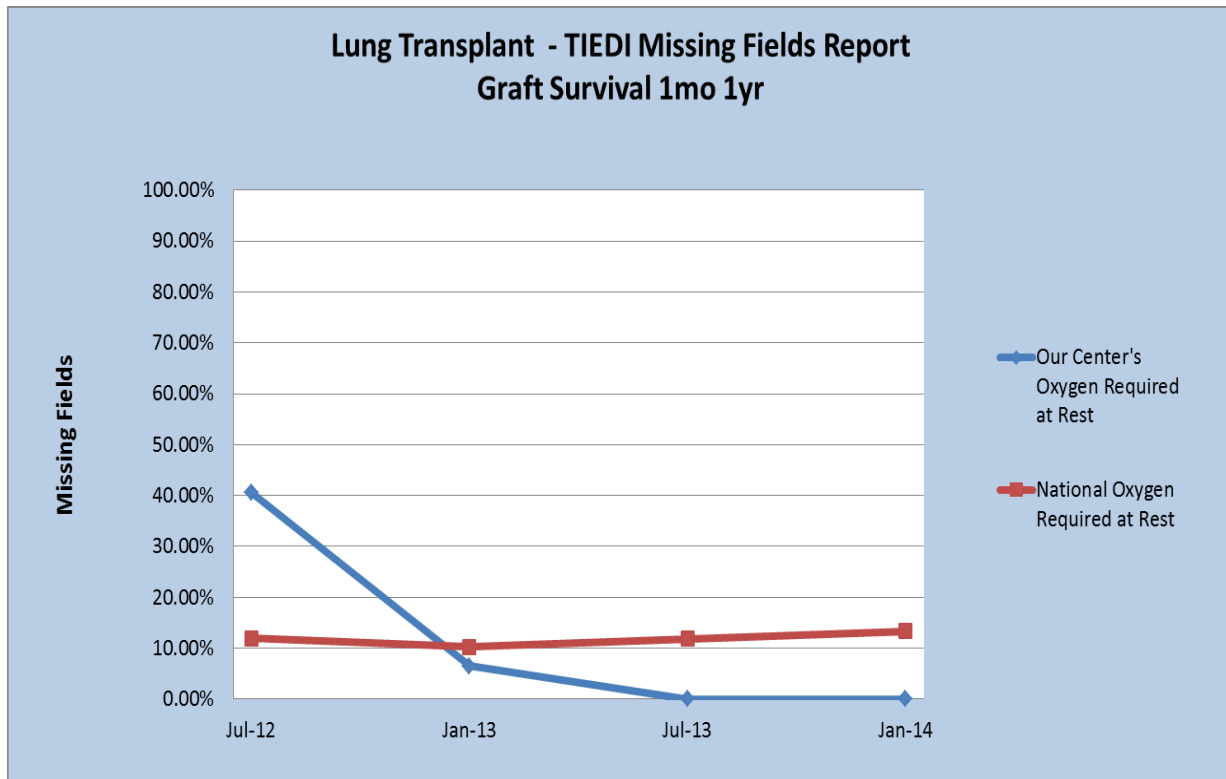
Tammy Gamble, RN, CPHQ, LSSGB, UAB Hospital, Birmingham, AL

Problem Statement: On a daily basis, we submit transplantation outcomes data to the United Network of Organ Sharing (UNOS). The Scientific Registry of Transplant Recipients (SRTR) is responsible for the analysis of the data and for disseminating program performance outcomes to the public. The outcomes are used by policy makers, insurance providers, transplant recipients, organ donors, donor families and referring physicians as they make decisions on the best place to seek care. Transplant programs use the reports for self-assessment and continuous quality improvement. We noted that we had a high rate of data fields either left blank or missing from the forms we were submitting. This missing data could affect the accuracy of our outcome calculations; therefore rendering a misrepresentation of performance. Our goals were to determine a source of record documentation for the missing items and decrease the number of missing data elements to improve the accuracy and completeness of the forms.

Approach: Multidisciplinary groups were formed for each organ group (kidney, pancreas, liver, heart and lung). The groups included members with management, clinical, informatics and performance improvement expertise. The groups utilized “missing data fields” reports to identify items of focus. Training was provided using tools provided by the SRTR and UNOS and stressed the importance of accurate and complete data entry as it affects the outcomes reflective of program performance. Field descriptions for each item on the form were used as reference as the groups determined the best place in the records to document and obtain the needed information. Special detail was paid to the data variables included in the risk models used to calculate expected outcomes. Each group developed a work-guide to be used as a reference for data entry and submission based on group consensus. Each time Data Entry Staff was unable to locate information to populate a TIEDI field; they conferred with the clinical team to get the information. Forms were not validated for submission with any field unanswered or unknown.

Findings: We followed the missing data fields report that we received every 6 months from SRTR to determine progress. Internal audits were ongoing throughout the project. These were done monthly for quality control related to completeness and accuracy. Audit results were addressed interdepartmentally for clarity and confirmation. Revisions made to the work-guides as the need was identified. Corrections were submitted to UNOS as needed to ensure accuracy and completeness of forms. The July 2012 baseline missing rate of “oxygen at rest” for lung transplant one year graft survival was 40.54%, decreasing to 6.52% in 6 months and then remained at 0% reaching below the national missing rate of 13.33%. Other indicators followed the same trend. As of the

July 2013 SRTR release, we were no longer provided missing data reports. At that point we began following the data integrity reports provided by SRTR. We would validate any outliers. Many of our physicians also participated in reviewing the data integrity reports and provided feedback. This project won a first place award at our center's National Healthcare Quality Week competition in the quality education category.



Relevance: As we follow our progress with the changes to our manual process, we are developing templates in our electronic medical record (EMR) to automate data collection, with a long term goal of having the ability to perform a direct data export from our EMR to UNOS.

Tammy Gamble, RN, CPHQ, LSSGB, Martha Tankersley, RN, MSN, CRNP

ABSTRACT C5-I

KDPI SCORE IS SIGNIFICANTLY OVERESTIMATED FOR PEDIATRIC EN-BLOC KIDNEYS

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BACKGROUND:

In 2009, Rao and colleagues published the paper proposing a Kidney Donor Risk Index model (KDRI) (Transplantation 2009;88:231-236), which has subsequently been adopted by the OPTN as part of the revised kidney allocation system effective December, 2014. In addition to the variables used in UNOS Kidney Donor Profile Index (KDPI) score, the analysis adjusted for degree of HLA mismatch, cold ischemic time, en-bloc transplant, and dual kidney transplant. When UNOS implemented allocation policy utilizing KDPI scores, it removed these variables which had been included in the multivariate regression without recalculating the model.

METHODS:

To evaluate the impact of omitting the en-bloc factor from the KDPI model, we compared the distribution of UNOS KDPI scores for 74 PEB transplants conducted at our center from 1/1/13-9/30/14, to what the scores would have been had they included the en-bloc covariate (-0.364) from the original Rao model. The highest possible KDRI based on KDPI integers was used to prevent underestimation from rounding. Because the KDRI coefficient reflects hazard ratio for graft failure to median, we could calculate the overstatement of risk directly. Finally, we compared how many kidneys would have been subject to additional consent and alternative allocation. Of note, this recalculation changes the KDRI scores of individual kidneys, which would require re-normalization of KDPI median and percentiles. Though given the very small number of en-bloc transplants, this effect is certainly nearly irrelevant.

RESULTS:

The 74 PEB transplants had a median KDPI of 82.5 (SD 9.33, Range 58-98). When each KDPI was recalculated to include the covariate for EB, the median KDPI was 50.5 (SD 13.8, Range 22-84). The mean difference in scores for each PEB was 30.5 (SD 4.9, Range 14-36). Distributions for the en-bloc kidneys under the UNOS system (fig. 1) and utilizing the original en-bloc coefficient (fig. 2) are shown. The adjustment to hazard ratio for graft failure for each is by definition .695 ($e^{-0.364}$), so the UNOS KDPI model overstates the GF risk by 44% ($1/(e^{-0.364} - 1)$) compared to the original model. 29 of 74 (39.2%) kidneys had KDPI greater than 85, which would have required additional consent under UNOS policy and would have been allocated regionally (potentially resulting in increased cold ischemic time) had they been transplanted after 12/4/14. After adjusting for EB, none of the kidneys had KDPI greater than 85.

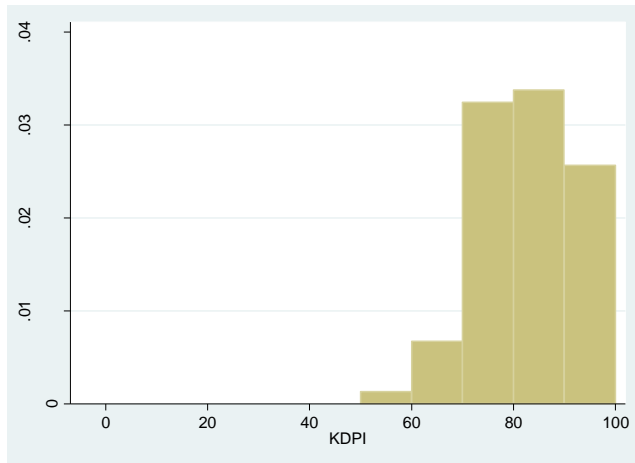


Fig. 1: Distribution of Pediatric En-Bloc Kidneys at a Single Center Under UNOS KDPI

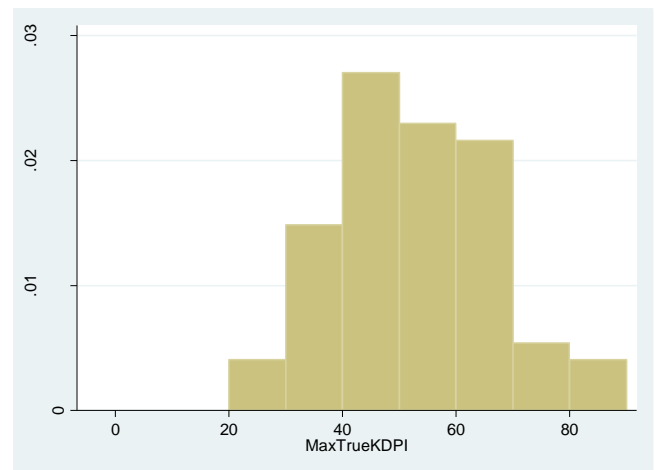


Fig. 2: Distribution of Pediatric En-Bloc Kidneys at a Single Center Adjusted For Original Coefficient

DISCUSSION:

Transplant centers such as ours have shown excellent outcomes with pediatric en-bloc transplants. This was reflected in the original KDRI score, which assigned a covariate predictive of significantly improved survival to such transplants. In removing that covariate without making any other adjustment to the model, the UNOS KDPI score for PEBs considerably overestimates the KDPI score, subjecting those transplants to additional list consent and alternative allocation. As a matter of policy, UNOS should consider addressing this issue by either re-calculating the KDPI scores for these transplants or not assigning a KDPI score, not requiring list consent equivalent to previous ECD kidneys, and not subjecting the kidneys to alternate allocation.

AUTHORS:

Luke Preczewski, Brian Gallay, MD, Kathie Howes, Nancy Iovenette, Annette Needham, DNP, Richard Perez, MD

ABSTRACT C5-J

MANAGING YOUR SRTR RISK ADJUSTMENT DATA - A PROCESS IMPROVEMENT

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Purpose: Twice a year the Scientific Registry of Transplant Recipients (SRTR) releases the “Data Integrity Report for Draft Program-Specific Reporting.” The report, a spreadsheet workbook, is generated individually for each transplant center/organ combination. Within a workbook separate spreadsheets for each cohort list every patient and their exact set of covariates to be used in the next iteration of risk-adjusted outcomes assessment. We make use of this report not only to rectify cases of missing or out of range data, but also to verify that cohort size, transplant date, number of events, and event dates match those extracted from our center’s local transplant database. Additionally we have developed a process to review comprehensively each patient’s risk model covariates shown in the Data Integrity Report, thus enabling appropriate corrections to assure risk adjustment for a cohort is being fully attained.

Method: Two distinct processes are employed to maximize use of the Data Integrity Report. In the first one statistical software was programmed to extract patient name, MRN, transplant date, and event dates from our local database. Forming the same cohorts as the SRTR, these data are then output to a spreadsheet and sorted. Applying the same sort criteria to the corresponding cohort from the Data Integrity Report allows columns of information from the local data to be copied and placed strategically into the SRTR’s spreadsheet.

For the second process statistical software was programmed to extract each patient’s covariate information for a specific cohort within an SRTR Data Integrity Report. Using the United Network for Organ Sharing (UNOS) Patient ID as a common key, covariates were then merged with non-clinical items such as patient identifier, age, etc. from our local database. Output from the statistical program was controlled in such a manner first to list patient identifiers, followed by the covariates sorted according to the level of impact they convey. Rendered into a spreadsheet, this report was then formatted making advantageous use of font size, boldface lettering, and pagination in such a manner that one patient’s information is printed per page. A committee of clinical personnel then reviewed each case, comparing covariate information that stemmed from the SRTR to that available in local medical records.

To detect the impact of changing covariate information in this second process, statistical software was programmed to emulate the SRTR’s risk adjustment model. Using data obtained monthly from UNOS, we calculated expected number of events before and after covariate adjustments had occurred to specific cohorts.

Results: Inserting patient name and MRN obtained from our local database into the marginally identified data from the SRTR made it much easier for personnel to research cases. Similarly, placing locally obtained variables such as transplant and event dates beside their counterparts in the Data Integrity Report allowed for quick, accurate comparisons. By using this simple yet effective copy-and-paste method the SRTR’s color coding scheme, which highlights missing or out of range data values, was retained. This data examination process revealed differences that needed to be researched and corrected either locally or in UNET. For our transplant center these have included: Incorrect transplant date, inaccurate event dates, differences in overall event count, and unequal cohort sizes due to inappropriate inclusion or exclusion of a patient.

The comparison of patient covariate information in the Data Integrity Report to that stored in local electronic medical records revealed significant differences in some cohorts. In one example it was found that 40 percent of patients in a 1 year graft survival cohort had covariate information that required updating. This finding clearly showed the need to have clinicians review each case - and has led to ongoing development and implementation of “covariate check lists” based on data dictionaries available through UNOS UNet Tiedi and the SRTR’s “Secure Site.”^{1,2} Given the time-consuming task of reviewing an entire cohort’s data in one meeting, expectations are being included in Managers’ and Quality Analysts’ job descriptions and annual appraisals to engage in real-time validation of data being entered via the UNOS TCR and TRR forms in UNET.

Underscoring the potential to impact program assessment, our before and after run of the emulated SRTR risk-adjustment model showed expected number of events had incrementally increased for the specific cohorts to which covariate changes had been applied.

Conclusion: With a streamlined approach and color-coding clearly identifying missing or out of range data, the new SRTR “Data Integrity Report” is a great improvement over the old “Missing Data Report.” A few simple enhancements can make it much more user friendly, and its consistent use can help centers drive missing or out of range data down to minimal levels. Given that the SRTR is apparently in the process of removing the sometimes advantageous “missing” categories from risk-adjustment models,³ it clearly behooves centers to make advantageous use of all means available to have complete and accurate data.

Utility of the Data Integrity Report does not end with simply rectifying missing or out of range data, but can be extended to validate covariate information on a patient-by-patient basis. It seems likely, given our own center’s experience and similar findings noted by Gillespie et al.,⁴ that this area is fertile ground for data improvement that could lead to better risk adjusting throughout the entire transplantation network.

1. Once logged in to UNet through the UNOS Portal (<https://portal.unos.org/>) navigate to Tiedi, click on “Help,” choose “Online Help” from the drop down menu, and then from the column of choices appearing on the left part of the page click on “Tiedi record field descriptions” which will reveal all the frequently used forms (such as TRR - Transplant Recipient Registration).
2. From the SRTR’s Secure Site select the “Center Home & Reports” tab (it usually is the default page displayed after logging in). A link at the bottom of the page titled “A guide to the primary source of risk-adjustment 1-year model covariates is available here” will be apparent.
3. See page 4 from the Minutes of the February 13th, 2014 SRTR Technical Advisory Committee, available online at http://www.srtr.org/stac/pdf/SRTR_STAC_2014_Minutes.pdf - accessed by the author on January 15th, 2015.
4. See Gillespie et al., Database Comparison of the Adult-to-Adult Living Donor Liver Transplantation Cohort Study (A2ALL) and the SRTR U.S. Transplant Registry, available online at <http://onlinelibrary.wiley.com/doi/10.1111/j.1600-6143.2010.03039.x/full> - accessed by the author on January 15th, 2015.

Austin Gregg, MS

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ABSTRACT C5-K

Analysis of Transplant Survival Data and Improving Patient Survival Outcomes

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Purpose: Transplant Survival Outcomes is an area that Transplant Centers should study at all times with the goals of understanding risk factors, causes for adverse events, graft failures and deaths and implementing interventions to improve quality of life, patient care and eventually survival outcomes. The challenge is in determining the best combination of tools to apply and in what optimal sequence to identify root causes and to target solutions. There are several different analysis methods/tools that we have used to study Transplant outcomes. In this abstract, we discuss the use of Data Analyses methods/ tools such as SRTR Risk Adjustment Statistical Model/ survival spreadsheets; Comparative Effectiveness Analysis and Six Sigma DMAIC Methodology to Improve Transplant Survival Outcomes.

Method:

1) SRTR Risk Adjustment models and survival spreadsheets provide centers with useful tools. These models have risk factors identified based on national transplant data analysis. We will give examples of how we used SRTR survival spreadsheets. We present three scenarios:

- a) The risk factor your center is interested in studying is already a risk factor in the model. For example, if your center wants to study the impact of recipient age, ECD and DCD Kidney donors and recipient BMI. By removing “other” type (i.e. in the spreadsheet marking as “0”), you can get O, E, p values for the factors/patient population that you want to study. We used this type of analysis for specifically studying Age >70, ECD, DCD and BMI. We were interested in studying whether our survival data would have improved if we had declined these specific patient/donor populations.

	Deceased Donor Recipients			Living Donor Recipients			TOTAL			Current Criteria				Proposed Criteria			
	N of Txp	O	E	N of txp	O	E	N of Txp	O	E	O-E	O/E	p-value	Flagging	Mean HR	Probability HR > 1.20	Probability HR > 2.50	Flagged by Proposed Criteria
SRTR Jan 14 2.5 yr Cohort																	
ALL	103	6	7.04	70	3	2	173	9	8.99	0.01	1.00	0.543	FALSE	1.00	23.60%	0.00%	FALSE
ALL- DD Rec (N=5) ≥ 70	98	4	6.47	70	3	2	168	7	8.43	-1.43	0.83	0.736	FALSE	0.86	12.40%	0.00%	FALSE
ALL- DD(N=5) and LD (N=3) Rec ≥ 70	98	4	6.47	67	2	1.8	165	6	8.29	-2.29	0.72	0.834	FALSE	0.78	7.50%	0.00%	FALSE
ALL	103	6	7.04	70	3	2	173	9	8.99	0.01	1.00	0.543	FALSE	1.00	23.60%	0.00%	FALSE
ALL- ECD donors (N=17)	86	4	5.31	70	3	2	156	7	7.27	-0.27	0.96	0.59	FALSE	0.97	22.10%	0.00%	FALSE
ALL- DCD (N=20)	83	6	5.25	70	3	2	153	9	7.2	1.8	1.25	0.298	FALSE	1.2	45.50%	0.20%	FALSE
ALL	103	6	7.04	70	3	2	173	9	8.99	0.01	1.00	0.543	FALSE	1.00	23.60%	0.00%	FALSE
ALL- DD BMI>35 (N=12)	91	6	6.17	70	3	2	161	9	8.12	0.88	1.11	0.424	FALSE	1.09	33.20%	0.00%	FALSE
ALL- DD (N=12) and LD (N=7) BMI>35	91	6	6.17	63	2	1.8	154	8	7.92	0.08	1.01	0.536	FALSE	1.01	25.01%	0.00%	FALSE

- b) The risk factor you are interested in is in the model, however you want to study the factor differently. For example, you want to study BMI for Lung Transplant patients. BMI is already a risk factor in the model, however in the model, BMI has a cutoff of 20 and carries the same risk above 20. When we used the model and survival worksheet to study BMI, BMI –as categorized in the model- did not represent itself as a risk factor. However, there is literature suggesting that BMI should be categorized and analyzed as “Underweight (<18.5)”, “Normal (18.5-25)”, “Overweight (25-30)” and “Obese (>30)”. We then organized the raw BMI data accordingly, and we identified underweight and obese categories as significant risk factors. This data/result helped us in patient selection review and revision.
- c) The risk factor you are interested in studying is not in the model. In this case, you can add this factor to the spreadsheet. By keeping or removing patients, you can study the survival data for patient population who carry the added risk factor. For example, our hypothesis was that Socio-Economic Status (SES) was a risk factor for our patient population. We added SES as a risk factor to the model. Our analysis showed that we had only transplanted patients with higher SES (SES > median), we would have significantly higher survival outcomes. See below for SES data analysis example. This finding provided us with tools (more education, fundraising, solid

caregiver plan) that we've put in place to help better prepare patients from lower SES to become successful transplant candidates.

The screenshot shows an Excel spreadsheet with the following data points highlighted:

- SES variable added to Lung model** (Red box)
- Counting Economic Factor** (Circled cell)
- Expected Survival:** 82.57
- Expected Events:** 4.64
- Observed Survival:** 92.59
- Observed Events:** 2
- P-Value (2-sided):** 0.311
- One-sided P-Value:** 0.159
- Observed/Expected:** 0.43
- Observed-Expected:** -2.64

2) Comparative Effectiveness Analysis (CEA): This is an analysis method, also requested by CMS, that is commonly used for survival data analysis. This type of analysis includes a) Literature review; b) Statistical analysis; c) for transplant, use of SRTR survival spreadsheet. The CEA is concluded with application in your center, and ends with what kind of actions the center will take to improve outcomes. At our center, we used CEA methodology to study Primary Graft Dysfunction (PGD) in Lung Transplant patients. PGD is a severe form of ischemia/reperfusion acute lung injury. Literature review identified PGD as a major cause of early morbidity and mortality after. We continued by collecting PGD data and doing correlation data analysis to understand the impact of PGD on survival for our patient population. Use of SRTR spreadsheets and adding PGD as an additional risk factor provided us the same result that we got from literature review and statistical data analysis: PGD was a risk factor for our patient population. We ended the CEA analysis with an action plan on how to prevent PGD. Since implementation, PGD rate at our center is below the national PGD rate.

3) Lean Six Sigma DMAIC Methodology (Define-Measure-Analyze- Improve and Control): At our center, we utilized Six Sigma DMAIC Methodology to supplement both our SRTR risk adjustment tools & Comparative Effectiveness Analysis techniques. This methodology allowed us to determine true root causes at an actionable level. With the goal of improving lung transplant survival outcomes, we used following processes which included advanced problem clarification techniques: the collection of the "Voice of the Customer" (VOC) and the "Voice of the Process" (VOP). The VOC data collection tools (i.e. surveys, interviews etc.) and process mapping included in DMAIC methodology allowed us to gather data on process related issues/problems which we would not be able to collect with any other discrete or continuous data collection/analysis. For example, in our study, VOC data enabled us to identify both patient and staff education as areas that have room for improvement. As a result, we created patient and staff clinical pathways for transplant admission. DMAIC also provides VOP data collection and analysis techniques with advanced statistical tools. We were able to reach to possible causes through statistical analysis. We then further analyzed these possible causes using intuitive techniques such as the "5 Whys" and Ishikawa diagrams to delve further into the problem and we were able to reach to root cause: fungal infections. At this point, we launched targeted teams: ID, pharmacy, Pulmonology and Surgery at solvable problem(s), which included pre-emptive anti-fungal therapy. In the last one year, at our center we've achieved 0% invasive fungal infection rate.

Results: At our center, we use different statically analysis methods/tools regularly to study patient outcomes. By utilizing SRTR spreadsheets, statistical analyses, CEAs and DMAIC, we were successful in identifying root causes and risk factors for our patient populations and as a result, we were able to put in interventions that resulted in improved outcomes. While our lung transplant survival used to be lower than expected, currently we are at the expected level.

Conclusion: Although Transplant survival analysis is complex as there are many possible risk factors, centers can study their own risk factors by using several different tools. When researchers/analysts can use these analysis tools/methods correctly, and when the analyses are carried out carefully and methodically, centers can learn more about their own patient population and the risk factors they carry, therefore can take right steps in improving outcomes.

Zeynep Tulu, MS, MEMP, CSSBB; Tom Caffey, MBA, CSBB, CQE

ABSTRACT C5-L

THE DIFFERING EFFECT OF GENDER ON PATIENT-REPORTED SYMPTOMS OF ANXIETY, DEPRESSION, AND MENTAL HEALTH-RELATED QUALITY OF LIFE IN PATIENTS TRANSPLANTED FOR ALCOHOLIC LIVER DISEASE

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Situation: Alcohol abuse is one of the most common causes of end-stage liver diseases in the United States. Although around 17% of liver transplant recipients have the diagnosis of alcoholic liver disease (ALD), few studies have comprehensively evaluated its relationship to patient-reported outcomes. Our aim was to test the effect of pre-transplant ALD on patient-reported symptoms of anxiety and depression and on mental and physical health-related quality of life in liver transplant recipients.

Approach: Patient-reported outcomes were assessed before and after liver transplantation using the Beck Anxiety Inventory (BAI), Center for Epidemiological Studies Depression Scale (CES-D), and the mental (MCS) and physical component summary (PCS) summary scales of the Short Form 36 Health Survey. Data were analyzed using four multivariable linear mixed effects models that adjusted for age, gender, etiology of liver disease, re-transplantation, and time post-transplant. Interaction effects tested whether gender was associated with differing outcomes in patients with and without ALD.

Findings: 502 adults (54±10 years, 67% male) transplanted between 2003 and 2014 completed 1,521 longitudinal assessments. Total follow-up time averaged 25 months (range: <1 to 131) and 24% of the patients had ALD. Beck Anxiety Inventory, CES-D and PCS scores improved significantly after transplantation (all $p < 0.001$); MCS scores remained stable and within general population norms. There was no relationship between ALD and the patient-reported outcomes (all ALD main effects $p \geq 0.212$). However, statistically significant gender by ALD interaction effects indicated that men transplanted for ALD had increased probability of mild symptoms of anxiety ($p = 0.018$) (Figure 1) and depression ($p = 0.040$) (Figure 2) compared to women, while these outcomes were comparable for men and women without a history of ALD. A similar interaction effect was observed for MCS ($p = 0.020$) (Figure 3) but not PCS ($p = 0.660$) (Figure 4), with values averaging within or near general population norms.

Implications: Men with ALD are at increased risk for having mild symptoms of anxiety and depression after liver transplantation. Ongoing assessment over time should be a routine focus of postoperative care in these patients with attention to change in clinical symptoms and level of patient insight.

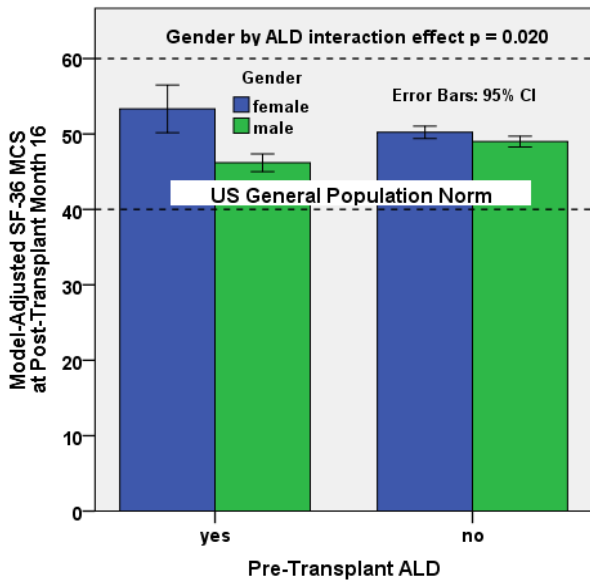
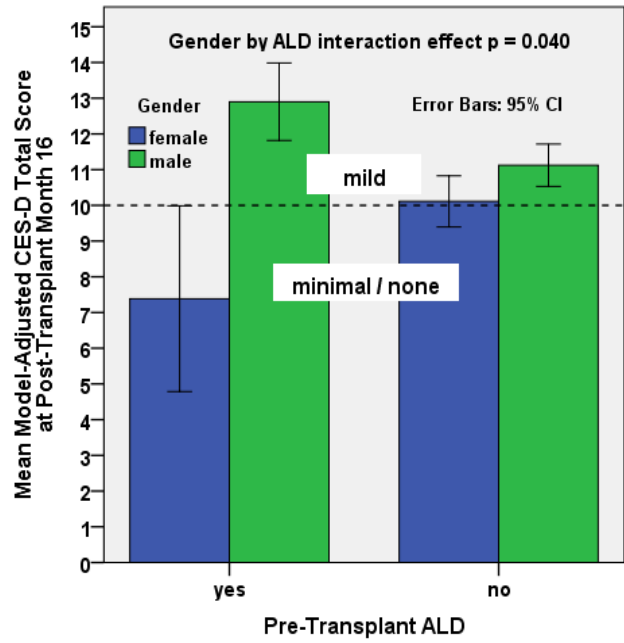
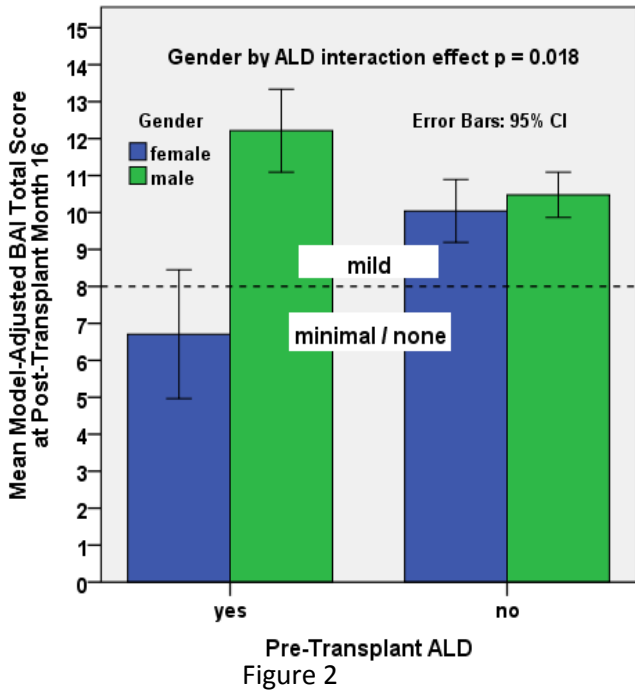


Figure 4

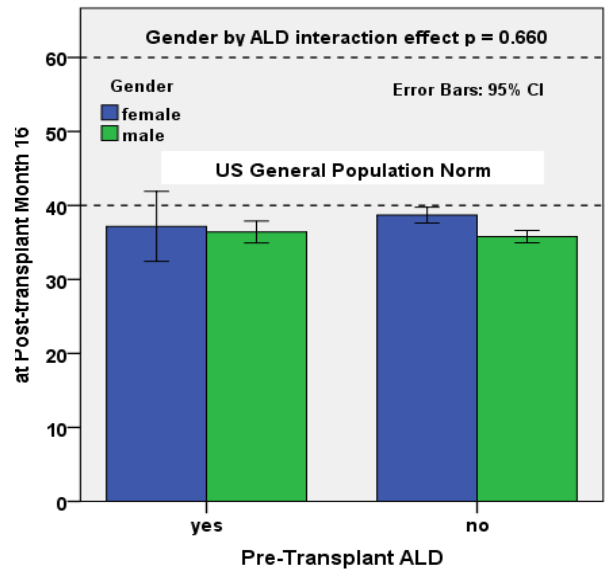


Figure 4

Laura Butler, MSN, MMHC; Clark Kensinger, MD; Lesley Omary, MD; Karen Starr MSN, APRN-BC, LADAC, MAC; Seth Karp, MD; Ed Zavala, MBA; Irene Feurer, PhD