ABSTRACTS
CATEGORY 1

Cost reduction/Increase in work efficiency/Patient care safety programs
ABSTRACT C1-A

DEPARTMENTAL DASHBOARDS CAN BE A GOOD TOOL TO COMMUNICATE TRANSPARENCY OF TRANSPLANT LABORATORY OPERATIONS
Prakash Rao PhD, MBA, FACHE, HCLD, NJ Sharing Network, New Providence, NJ

Situation: Beginning in 2014, our transplant laboratory implemented departmental dashboards in an effort to promote transparency, visually display information needed to reach specific goals and objectives, communicate progress, and be a tool to aid in managerial decision-making.

Methods: Key performance indicators (KPI), specific to laboratory operations, yet supporting organizational goals were identified. Gauge values for each KPI’s dashboard were chosen. Dashboards were designed in an easily recognizable format clearly displaying the gauges. Quantified KPI are plotted on the dashboards and results are updated regularly. Dashboards are a focus at monthly “All Staff” meetings, available at any time via the organization intranet, and discussed daily at a managerial level. They are used by managers to closely monitor ordering/usage and used as a tool in monthly ordering task force meetings. Dashboard results are directly tied to each laboratory employee’s annual evaluation.

Findings: This study evaluated the impact of the departmental dashboards on transplant laboratory operations by measuring the (1) change in turn-around-time (TAT) and the (2) change in reagent expenses by comparing data acquired from April through June of 2015 to the same timeframe in 2014.

<table>
<thead>
<tr>
<th>Test</th>
<th>TAT (hours)</th>
<th># of Tests</th>
</tr>
</thead>
<tbody>
<tr>
<td>Complement Dependent Cytotoxicity Crossmatch (CDC)</td>
<td>4.38</td>
<td>4.44</td>
</tr>
<tr>
<td>Flow Cytometric Crossmatch (FXM)</td>
<td>4.78</td>
<td>4.94</td>
</tr>
<tr>
<td>Deceased Donor HLA Typing (DD HLA)</td>
<td>2.98</td>
<td>3.11</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Lab Department</th>
<th>Reagent Expenses</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Δ Q2-2015/Q2-2014</td>
</tr>
<tr>
<td>Blood Bank</td>
<td>↓ 19%</td>
</tr>
<tr>
<td>HLA</td>
<td>↓ 14%</td>
</tr>
<tr>
<td>DNA</td>
<td>↓ 35%</td>
</tr>
<tr>
<td>Antibody</td>
<td>↓ 1%</td>
</tr>
<tr>
<td>TOTAL LAB</td>
<td>↓ 8%</td>
</tr>
</tbody>
</table>
We observed: (1) Even though there was a significant increase in the number of tests performed [45-99%] the TAT only increased slightly [1-4%]. (2) All departments had a reduction in reagent expenses [1-35%] resulting in a total reagent expense reduction of 8% overall, despite increase in testing volume.

We also observed that since the dashboards have been implemented, the laboratory specialists appeared to take more ownership of their respective department. They focus efforts on being as efficient as possible and often will refer to the dashboards when communicating with upper management.

**Relevance:** Departmental dashboards have proven to be an effective tool for monitoring of laboratory TAT and expenses. Results displayed on the dashboards may be used as a tool to increase efficiency and reduce laboratory costs. Dashboards can be a universal aid to monitor operational efficiencies for all departments in an organization.

Misty Marchioni, Maria Garey, Donna King, Ijeoma Okere, Julien V. Napoleon, Helen LaCarrubba, Maria Aguilucho, Nancy Mata, Patricia Harris, Tess Lewis, David O‘Hara, Prakash Rao
Strategies for Effective Pretransplant Case Management
Andrea Tietjen, Saint Barnabas Medical Center, Livingston, NJ

Introduction:
As the incidence of ESRD increases, transplant centers of all sizes continue to grow, resulting in larger case loads, longer wait-times and an aging patient population. Add to this, the recent changes to the Kidney Allocation System (KAS), which impacts how wait-time is calculated and which patients are likely to receive an organ offer. Our center developed a system to assist our pre-transplant coordinators manage listed patients so that cases are periodically reviewed to ensure that the patient remains suitable for transplant and that the benefits of a transplant outweigh the risks, resulting in improved overall outcomes.

Purpose/Problem:
An analysis revealed that patient caseloads for listed patients had grown substantially and coordinators were struggling to manage and prioritize caseloads, in light of changes to the KAS, which resulted in patients with higher PRAs being offered organs, as compared to those with the longest wait-time. We realized the need to provide our staff with the necessary tools and guidelines to effectively review patients and maintain updated patient contact, medical, psychosocial and insurance information.

Method:
Policies, lists, reports, and benchmarks were created to increase efficiency by streamlining a review process, which resulted in consistent and cost-effective operations as well as improved patient care.

Lists of patients by blood group are distributed bi-monthly, allowing coordinators to facilitate re-evaluation and follow-up on incomplete testing or insurance issues. These lists are created from UNET data and are compiled to simulate which patients are most likely to receive an organ offer, which assists our team in prioritizing cases. Letters are automatically generated to notify patients, dialysis units and primary nephrologists of pending actions or procedures.

A multi-disciplinary team, Transplant Candidate Review Board (TCRB), meets monthly to review selected patients to determine their continued suitability for transplantation and as well as difficult cases languishing. Patient lists can be easily generated to ascertain if patients need re-evaluation or repeat testing due to abnormal findings, facilitating case coordination. Reports also prompt coordinators to
methodically and consistently review patients, per protocol, quickly and thoroughly so indications are not neglected.

**Conclusion/Results:**
A systematic approach utilizing our computer database and the methods above have allowed the maintenance of a highly audited list that is both critical and beneficial at the time of transplant. This process necessitated a reorganization of many pre-transplant elements including frequent patient reviews, re-evaluation strategies, and patient communications. This coordination has streamlined our workflow and eliminated costs, both in terms of time and duplicative procedures.

Our center identified a significant volume of waitlist patients with a PRA of 95% or higher. These patients were prioritized and reviewed during Q1 and Q2 – 2015. The following chart summarizes the patients prioritized for review and the status of such:

<table>
<thead>
<tr>
<th>Blood Group</th>
<th># of pts with PRA &gt; 98</th>
<th>Patients Evaluated</th>
<th>Patients Removed</th>
<th>Status 1 patients</th>
<th>Status 7 patients</th>
<th>Patients temporarily Do Not Call</th>
<th>Patients Transplanted</th>
<th>Expired</th>
</tr>
</thead>
<tbody>
<tr>
<td>O</td>
<td>56</td>
<td>56</td>
<td>5</td>
<td>29</td>
<td>2</td>
<td>12</td>
<td>8</td>
<td>0</td>
</tr>
<tr>
<td>A</td>
<td>39</td>
<td>39</td>
<td>7</td>
<td>20</td>
<td>0</td>
<td>6</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>B</td>
<td>17</td>
<td>17</td>
<td>2</td>
<td>9</td>
<td>0</td>
<td>2</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>AB</td>
<td>5</td>
<td>5</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>1</td>
</tr>
</tbody>
</table>

This review has not only allowed for expedited patient review but has also confirmed candidacy of patients receiving organ offers and resulted in the following year to date, compared to 2014:

- 93% increase in transplantation in this population
- 25% increase in organ offer acceptance
- 13% decrease in percentage of patients Listed Status 7
- 33% decrease in percentage of waitlist deaths
- Patient and Graft Survival above projected expected for this patient cohort, based on donor and recipient characteristics and volume

Our pre-transplant coordinators spent time handling incoming paperwork that passed across their desks or addressing immediate patient issues, preventing them from effectively managing caseloads and performing necessary patient reviews for those likely to be offered an organ per the new KAS guidelines. Our system prompts review, creates efficiency, improves productivity, maintains an accurate active list, prevents insurance issues, increases organ acceptance and total transplant volume and most importantly improves overall patient care by ensuring that organ offers are being accepted for appropriate candidates, leading to better short and long term patient outcomes.

Andrea Tietjen, MBA; Debbie Morgan, LCSW; Shamkant Mulgaonkar, MD
ABSTRACT C1-C

EARLY DISCHARGE AFTER KIDNEY TRANSPLANTATION: COMPLICATIONS, HEALTH CARE UTILIZATION, AND LONG-TERM CLINICAL OUTCOMES

Amit K. Mathur MD MS, Mayo Clinic Arizona, Phoenix, AZ

Problem: Reducing length of stay after kidney transplant is a shared goal among patients, providers, and hospitals to improve satisfaction and reduce costs. Our center has altered perioperative processes of care at several levels to reduce length of stay after kidney transplantation. We aimed to determine whether early discharge, on or before postoperative day two, was associated with decreased patient safety, defined by post-transplant complication rates, resource utilization, hospital readmission, and long-term clinical outcomes.

Methods: A retrospective single-center cohort study of 869 consecutive kidney transplants was performed from 2011-2014. We evaluated clinical and health care utilization differences between early discharge (postoperative day 2), normal discharge (postoperative day 3-7), and late discharge (postoperative day > 7) patients at 90 days. We created multivariate logistic and Cox models to assess the association between early discharge and complications, readmission, and patient and graft survival.

Results: 13.7% of all recipients were discharged early (n=117), of which 73 were living donor kidney recipients (62.4% of group). Major complications at 30 days were correlated stepwise with discharge status (Early 8.5%, Normal 16.2%, Late 50%, p<0.0001). The readmission rate was 35.1%, and but was not significantly different based on discharge status (Early 27.4%, Normal 35.7%, Late 43.6%, p=0.083). ER utilization within 90 days was similar in all groups (Early 39.2%, Normal 42.2%, Late 47.1%, p=0.69). Median outpatient clinic visits at 90 days was 11 visits (range 1-23), and was significantly lower in the early discharge group (p=0.006). Early discharge status was associated with significantly lower outpatient clinic utilization compared to non-early discharge groups (p=0.006). At 90 days after transplant, early discharge status alone was neither associated with hospital readmission (OR 0.68, 95% CI 0.44-1.04,
p=0.078), nor was it associated with increased ER utilization (OR 0.89, 95% CI 0.60-1.33, p=0.58). Late
discharge compared to normal was associated with 95% higher odds of ER utilization (OR 1.95, 95% CI
1.18-3.21, p=0.009). Graft and patient survival were similar based on discharge status on multivariate
analysis.

Implications: Early discharge after kidney transplantation was not associated with significantly higher
rates of complications, hospital readmissions, outpatient clinic or ER utilization. Care process
improvements to reduce initial length of stay after kidney transplant do not result in excess health care
utilization at three months and maintains patient safety in the critical postoperative period.

Submitted by:

Amit K. Mathur MD MS¹, Nitin N. Katariya MD¹, Adam Welu BS¹, James M. Chang MD¹, Danielle
Haakinson MD¹, Andrew L. Singer MD PhD¹, Hasan A. Khamash MD², Raymond Heilman MD², Harini
Chakkera MD², Janna Huskey MD², Winston Hewitt MD¹, Marie J. Maningo-Salinas PhD RN³, Elizabeth
J. Oakley MS⁴, Adyr A. Moss MD¹, Kunam S. Reddy MD¹

¹Transplant Surgery, Mayo Clinic, Phoenix, AZ ²Nephrology, Mayo Clinic, Phoenix, AZ, ³Nursing, Mayo
Clinic, Phoenix, AZ, ⁴Administration, Mayo Clinic, Phoenix, AZ
ABSTRACT C1-D

COLLABORATIVE CARE: RETURNING KIDNEY TRANSPLANT PATIENTS TO LOCAL NEPHROLOGISTS

Megan Podschlne, University of Michigan Transplant Center, Ann Arbor, MI
Stacy Brand, MBA, University of Michigan Transplant Center, Ann Arbor, MI

As part of our commitment to operationalize lean project initiatives, the purpose of this project was to increase referring physician satisfaction and to stabilize and grow our Kidney Transplant Program. We received verbal feedback from referring nephrologists stating that they were unsatisfied because their patients did not return for continued care following transplant surgery. Concerned that our referral base would be significantly compromised, we established a task force committee to develop a process to refer patients back to local nephrologists.

The goal of this group is to develop a process to return 80% of kidney transplant patients to their local nephrologist six months after transplant. This excludes patients who cannot be reached, have relocated, or are on hold for medical reasons. As a result, we hope to increase referring physician satisfaction. We developed a flow chart process that encourages a better partnership in care with referring nephrologists.

One of our keys to success involved identifying and involving key stakeholders for process implementation. We also needed to gain approval for an additional staff member to be devoted to the project. Once we had established accurate roles for group members, we held monthly meetings to discuss and amend the process.

Our referral back process has successfully referred back 49% of patients who had been transplanted in 2013-2014. An additional 7% are scheduled to return to their local nephrologist pending an additional visit with one of our transplant physicians and 10% have complications that require further care at our center. 12% of the patients have decided to continue seeking follow-up care at our center and do not want to return to their referring nephrologist. We will continue the process of referring back more recent transplant patients while communicating our
intentions of providing collaborative care with local nephrologists post-transplant. The committee will also continue to meet, analyze feedback, and develop action plans regarding our process. Outreach strategies including CME programs, expos at dialysis centers, and outreach clinics will increase availability and education for potential patients.

We intend on surveying referring physician to measure an increase in satisfaction. This will show the effectiveness of our Referral Back Process and ultimately encourage physicians to refer an increased number of patients to our facility.

Megan Podschnle, BA; Stacy Brand, MBA; Gina Bergmooser, RN, MSN; Bernice Mathews, RN, MSA; and Amy Smith, RN, BSN; University of Michigan Transplant Center, Ann Arbor, MI
(Submitted for Poster Presentation at the University of Michigan Health System’s Get to the Root Cause Quality Month Poster Session, Ann Arbor, MI)
ABSTRACT C1-E

USING LEAN SIX SIGMA AND LIVE SIMULATION TO IMPROVE PATIENT FLOW IN AN OUTPATIENT LIVER TRANSPLANT CLINIC

Tony Manry, MS, MBA, Boston Children’s Hospital, Boston, MA

Problem/Situation:
Our institution is well regarded for its use of Live Simulation and Lean Six Sigma to improve clinical efficiencies, patient safety, and quality. Previous work at our institution has shown these methodologies can be used together to improve efficacy of the quality improvement process by combining tools such as live simulation, process mapping, and failure mode effects analysis. This work looked at the effectiveness of adding live simulation to this toolkit to address patient wait times in a multidisciplinary liver transplant clinic. Patients in the liver transplant clinic must see a large number of providers in succession, including a hepatologist, surgeon, nurse coordinator, nurse practitioner/fellow, social worker, nutritionist, and pharmacist. Additional services may include infectious disease, financial counseling, and interpreter services. Historically, patients have experienced long waiting times during clinic appointments, associated with decreased patient satisfaction. Cumulative effects of long wait times across frequent pre- and post-transplant appointments may have broader implications, including decreased school performance and parental employment opportunities. Our objective was to decrease the overall length of appointments, improve patient satisfaction and decrease the cumulative time away from school and work by adding live simulation to the Lean Six Sigma tools to improve patient wait times.

Approach/Methods/Practices/Interventions:
A team of Lean Six Sigma experts, simulation specialists, and clinical experts adhering to standard Lean Six Sigma DMAIC methodologies took a unique approach to addressing a complex problem of decreasing patient waiting time in a multidisciplinary clinic. Standard Lean Six Sigma tools included value stream mapping, visual management system, standard work and balancing work loads. A four-hour live simulation exercise with the entire multidisciplinary team facilitated by a simulation specialist was carried out within the designated clinic space using live patient volunteers. Three rounds (1 baseline and 2 testing solutions) were completed during the four hour session, with team debriefs after each round. Changes to clinic workflow were made based on the results of the simulation sessions.

Findings/Solutions/Conclusions:
Compared to baseline, the average per patient waiting times decreased by 40% (Figure 1) and value add percentage (time with clinician/overall time in clinic) increased 30% (Figure 2). The total number of completed appointments increased 6% (Figure 1) over the same period illustrating the hypotheses that removing inefficiencies from the clinic process will potentially decrease patient in-clinic waiting time and increases access to care.
Implications/Relevance:
A combination of Lean Six Sigma and Live Simulation appears to be an effective method for improving patient flow through a multidisciplinary clinic, decreasing patient waiting time and increasing value-added time. Although not studied, live simulation was felt to increase provider engagement and influence cultural changes surrounding clinician behaviors and practice.

Authors:
Tony Manry, MS, MBA, Laura O’Melia, RN, MSN, CPNP, Kathryn Garrigan, RN, MSN, CPNP, Scott Elisofon, MD

ABSTRACT C1-F

UTILIZING LEAN METHODOLOGIES TO AUTOMATE THE TRANSPLANT COST REPORT
Cathyann Feher RN, MSN, Lehigh Valley Health Network, Allentown, PA

Situation: The creation of the transplant Medicare cost report is a tedious time consuming task of data collection. The transplant financial counselor’s time was spent processing claims and preparing the supporting documentation for the cost report, instead of with direct patient care. Through the implementation of multiple lean methodologies and collaboration with a third party administrator to automate the claims processing and streamline workflows, the financial counselor has increased availability to provide direct patient interactions.

Approach: Lean methodology was applied to the manual process of creating the Transplant Cost Report. The two day Kaizen event included Value Stream mapping prepared by the frontline, administrative, financial and clinical representatives. Each decision point in the process was analyzed based on value added criteria. Twenty-five areas for streamlining/automation were identified and prioritized for the preparation of the Transplant Medicare Cost Report.

A third party administrator department joined the team to assist in the automation of patient eligibility, in network and out of network claims, automated report generation, OACC patient identification cards and the ability to field calls from patients and/or providers as necessary in reference to OACC rules.

Findings / Conclusions: The lean principles provided the structured approach to accomplish this daunting task. It was the collaboration and commitment of the team member’s determination to accomplish the charter mission. The challenges of staff transitions, technology support, and available time were conquered to decrease the manual data entry of fourteen spreadsheet logs down to five. Financial counselor is now able to devote her time to patient care and overtime was eliminated. Our Electronic Medical Record (EMR) network transition has been a challenge to complete our automation tasks, however full transplant EMR conversion is planned for 2016 with subsequent interfaces. The timeline below demonstrates the transition from a manual data entry to an automated process with the assistance of the third party administrator providing the claims processing, adjudication and report writing.
**Implications/Relevance:** Collaboration, dedication and perseverance has been the key to the success of the project. The Lean Methodologies provided the framework. Through automation, overtime hours have been reduced and increase in patient contact by the financial counselor. Third party administrators created specific OACC financial reports including comprehensive details required as source data for the OACC Medicare Cost report. These monthly reports are utilized by administration in the budgeting and overall program decision making process.

Cathyann Feher, RN, MSN

Patrick Kincaid, MBA

Denise Mitchell

Deb Bianco

Marybeth McMennamin, BA

Elyse Kernan
ABSTRACT C1-G

ALL ABOARD: IMPROVING ACCESS TO EVALUATION
Dianne Sodt-Davitt RN, BS, Duke University Health System, Durham, North Carolina

Problem/ Situation: improve access and efficiency of the evaluation of patients in ESRD for kidney transplant consideration.

Methods/ Practices/ Interventions: Developed evaluation focused clinics to manage 10 evaluations in one day visit. Efforts to improve our preparation in leading to these clinics with record and interview review. Increase partnership with dialysis units and community nephrologist in screening and testing prior to visit. We have moved to a group education model that allows for improved time utilization of coordinators, and utilization of health professionals in the clinic setting. This model has improved evaluation appointment access that runs parallel to sustained growth. These changes have improved utilization of our providers and patient’s time with utilization of a patient tracking tool to monitor time patients have a provider in the exam room engaged in the visit. We have performed patient satisfaction surveys to ensure that this approach in a positive experience to our patients and meeting the needs and expectations of our patients.

Findings/ Solutions/Conclusions:

FY 11- 651 New referrals
   433 Evaluations
FY 12 - 739 New referrals
   411 Evaluations
Referral – eval median time 102 days.
FY 13- 776 New referrals
   464 Evaluations * 1/2014 new clinic started
Referral – eval median time 119 days.
FY 14  819 New referrals
   492 Evaluations
Referral – eval median time 112 days
FY 15 - 806 New referrals
   546 Evaluations
Referral – eval median time in days—84

FY 16- 433 YTD New referrals (866 annualized)

288 evaluation (576 annualized)

Referral- Eval median time in days—62 YTD for the first 2 quarters.

In January 2014 we launch our new format with 6 patient evaluation clinics. This was through partnership in a clinic area that services many departments and is not dedicated to serving our transplant patients. We stationed one of our own staff to greet and act as a liaison to the patients to guide them through the day. This employee was able to facilitate managing our 6 assigned rooms and ensure providers were run smoothly through each room to face time was maximized. This same person severed as the initial contact to the patient in the scheduling process, initial contact, review of the day, and gained commitment to the appointment. They also performed the reminder 1 week prior to decrease no show. As we have been able to decrease referral to evaluation time our no show rates have declined. We have been able to capture the point of contact and enthusiasm of the pending evaluation. The scheduled patient then arrives with a familiar person and contact. We were gradually able to increase volume to 10.

In July 2014 we expanded to 2 clinics with 10 appointments per session, with this proven model we then moved this to 2 donor evaluation clinic monthly.

In July 2015 we expanded to 3 clinics with 10 appointments per session. On average 13 clinic sessions are available per month. 2 dedicated to donors, 11 dedicated to recipients. We are able to offer appointments within the 2 weeks to patients who can arrive with caregivers.

**Implications/relevance:** These results have been achieved without incremental staff but improved utilization of current staff and time. The clinics run on time and smoothly to provide a comprehensive day and ability for the multidisciplinary team to discuss patients in real time in the staff room and have a comprehensive approached to any additional testing. Improving access to our patients and response to evaluation allows us to improve our waitlist additions and volume of transplants. These principles can be applied to any clinic situation; all of this was achieved without additional staff or space. This growth was not dependent on gaining additional resources but has allowed us to reach new heights and sustain this growth. These changes have created capacity in our clinics to be responsive to our increase in referrals.
ABSTRACT C1-H

THE DIGITAL INTERN: AN AUTOMATED TOOL DESIGNED TO IMPROVE ORGAN DONATION RATES AND REDUCE MANAGEMENT VARIABILITY.
Joshua E. Medow MD, MS, FAANS, FACS, FNCS, University of Wisconsin School of Medicine and Public Health, Madison, WI

Introduction
Critical care units are responsible for an enormous number of cost saving, metric driven initiatives and at the same time that they are expected to provide optimal patient care. Busy ICUs and organ procurement organization staff are often overwhelmed by the workload of managing critically ill patients. Physicians have to ration their time to each patient based on need. When there are conflicting needs it may be a difficult choice for physicians to give organ donors that necessary level of attention. Neurocritical care and informatics physicians alongside biomedical engineers developed the Digital Intern to tackle this problem head-on. The software was embedded into the electronic medical record (EMR) to directly communicate orders to allied health professionals. This allows organ procurement coordinators, bedside nurses, respiratory therapists, and physicians to aggressively manage cardiac death and brain death donors. It includes comprehensive ordersets, comfort care algorithms for pain and agitation, and prioritizes therapies to reduce costs. It also provides a framework to study outcomes based on reviewing medication or parameters changes in the organ donor population.

Methods
The number of organs recovered and the cost to recover them from the standpoint of critical care time billed were compared between the control year and the treatment year when the Digital Intern was operational. Separately, pain and agitation management algorithms were studied to better assess this important management issue.

Results
The organs recovered per donor (excluding research) were 2.83 in the control year and 3.54 in the treatment year. The results were statistically significant (p<0.0359). In the control year the critical care hours billed averaged 5.9 per donor and 2.3 in the treatment year. These results were statistically significant (p<0.001). Cost savings averaged $2685 per donor. Additionally, the comfort care algorithms used in donor and non donor patients measured by the validated Quality of Dying and Death (QODD) survey showed a statistically significant improvement in pain control and comfortable breathing (p .0002 and .0033 respectively) as compared to no algorithm use.

Conclusions
The Digital Intern is designed to manage complex patients where simple PRN orders wouldn’t be effective and detailed PRN orders might be too confusing to follow. It is fast, effective, and efficient. It improves end of life care and provides a framework for studying changes that otherwise are not available due to practice variability. In doing these things the Digital Intern improves value based care delivery by decreasing therapies, medication, and physician charges and reducing variation in laboratory and imaging utilization.

Joshua E. Medow, MD MS FAANS FACS FNCS
ABSTRACT C1-I

LABELING INCIDENT LEADS TO ENHANCED PATIENT SAFETY PRACTICES WHEN SHIPPING LIVE DONOR KIDNEYS IN KIDNEY PAIRED DONATION.

Janet Hiller, RN, MSN, CTCC, Johns Hopkins Hospital, Baltimore, MD

Problem: A live donor kidney recovered at an east coast transplant center was packaged and shipped to a west coast transplant center for a Kidney Paired Donation (KPD). When the kidney arrived, it was noted that the United Network for Organ Sharing Identification (UNOS ID) on the label of the box and on the label attached to the kidney was different from the UNOS ID that was communicated to the west coast transplant center. Communication between transplant surgeons and coordinators allowed verification that the kidney shipped to the west coast center was the correct kidney and it was transplanted successfully.

Intervention: An investigation revealed a number of points in the live donor kidney shipping process where safety issues arose: A second UNOS ID had been obtained by the data coordinator at the east coast hospital after the first UNOS ID was obtained prematurely. The second UNOS ID was not communicated to the transplant coordinator, the original and incorrect UNOS ID number was emailed to the OPO when request for assistance with packaging was made, the OPO coordinator filled out the labels for the kidney with the original and incorrect UNOS ID number, the labels on the box and the kidney were not double-checked with the chart prior to the kidney leaving the OR and the courier service did not have an UNOS ID number on the invoice to verify they were picking up the correct kidney.

A number of improvements were made to the Live Donor Kidney Shipping Policy. 1. The transplant coordinator will verify the UNOS ID number in UNET on the morning of the surgery. 2. A new Confirmation Form for the Shipment of Living Donor Kidneys was developed. This form requires verification of the donor UNOS ID and donor and recipient ABO’s by the transplant surgeon who flushes the kidney prior to shipment and the transplant coordinator. 3. A formal Verification of Request Form for flushing and packaging assistance was designed to be used with the local OPO to avoid miscommunication through email. 4. A transplant coordinator will complete the label on both the outside of the kidney box and the label attached to the container which holds the kidney. 5. The courier service picking up the kidney must have the UNOS ID on the invoice to confirm they are receiving the correct kidney.
Conclusions: This labeling incident occurred due to a number of factors and involved a number of entities within the transplant program. Implementation of the new process has proceeded efficiently and has been tested successfully with three additional live donor kidneys being shipped to other transplant centers.

Relevance: The shipping of live donor kidneys by commercial means is regular practice between transplant centers involved in KPD. This transplant center has shipped 80 live donor kidneys since 2007. No untoward incidents involved with the shipping process had previously occurred. Despite this experience, this case study highlights the importance of every member of the transplant team in ensuring patient safety at all times. It also demonstrates that specific patient safety issues are inherent to KPD that are not present in any other transplant program. There are numerous ways patient safety can be compromised in this highly complex program. The incident described here is testimony to continually identify the potentially hazardous patient safety issues in the KPD process.

Additional authors:
Marvin C. Borja, MD
Jaclyn Bannon
Niraj Desai, MD
ABSTRACT C1-J

IMPROVEMENT OF THE KIDNEY TRANSPLANTATION PROCESS

Geraldine Zingraf, MS, MBA, RN, CNN, CCTC, Rush University Medical Center Transplant Program, Chicago, Il.

Purpose:

Ensuring that patients receive the appropriate evaluation prior to being placed on the United Network for Organ Sharing (UNOS) waitlist can be a time-consuming process. However, listing patients as soon as possible maximizes chances of being offered a kidney transplant. Further, for patients who are not yet on dialysis, workup time represents a lost opportunity to gain waiting time points. At our Center, our initial attention to reducing the duration of the evaluation process was only partially successful, with a decrease in mean evaluation-to-waitlist time from 287 days (2013) to 178 days (2014).

This project improved the efficiency and effectiveness of the pre-kidney transplant evaluation process. The former process was lengthy and involved many steps that added to the number of times a patient returned for testing. The goal was to reduce the number of days needed to place a patient on the kidney transplantation waiting list. Although the literature suggests that the average length of time for the evaluation process is similar to that of our Center’s kidney transplantation program, a further decrease in the number of days has the potential for reducing dialysis exposure and worsening of comorbid conditions. Thus, the key stakeholders determined a goal of 90 days for patient placement on the national kidney transplant wait list.

Method:

To achieve this goal, the workflow was redesigned to address the timing of patient activities, restructuring of the pre kidney transplant team and increasing usage of the transplant tracking software. Specific interventions are described below.

1. Added more clinic appointments to decrease time between referral and the initial evaluation visit.
2. Redesigned the clinic template to improve efficiency while still allowing evaluation by multiple disciplines.
3. Leveraged tools available in the electronic medical record.
4. Trained staff on the use of electronic appointment reminders, questionnaires and checklists.
5. Achieved financial approval for wait listing prior to the selection meeting.
6. Changed role of the transplant nephrologist from clinical documentation review to an actual patient visit.
7. Restructured the staffing of the Pre Kidney transplant team, utilizing Certified Medical Assistants.
8. Reassigned intake screening from pre-kidney RN coordinators to administrative staff.
Results:

Changes such as adding appointments, redesigning of the clinic template, use of the electronic medical record tools and staff training began in February, 2015. The remainder of the changes were initiated in July, 2015 resulting in a reduction in the mean evaluation to wait list time to 93 days by the end of 2015.

Conclusion:

One transplant center’s experience with improving the evaluation process may be duplicated at other transplant centers. We do expect the trend to remain at target. We would like to share our positive experience with other transplant coordinators and administrators to demonstrate that patient care process improvements are possible.

Geraldine Zingraf, MS, MBA, RN, CNN, CCTC, Robin Dreas, CMQ/OE, CQA, Jessica Ellison, BSN, RN, Edward Hollinger, MD, PhD, Elizabeth Carlson, PhD, RN
ABSTRACT C1-K

ADAPTING FMEA TO CONDUCT A THOROUGH ANALYSIS

Darren Flynn, MBA, PMP, LSS Master Black Belt, UNC Center for Transplant Care, Chapel Hill, NC

Problem: Every transplant QAPI program is mandated with maintaining the structure, policies, and procedures to prevent future negative events. A comprehensive approach will collect and analyze data from all involved systems to determine when in-depth analysis is required. At the top of the patient safety spectrum are those events that cause permanent harm or death to a patient. Most certainly these adverse events require the in-depth analysis to determine root cause and a course of action for prevention. At the lower end of the patient safety spectrum are the temporary harm and near miss events. With resource time at a premium, this lower end of the spectrum may receive less scrutiny. For example, near misses will often score low in a patient occurrence tracking system because ultimately, no harm was caused to the patient. It is important that all patient occurrences be evaluated evenly, regardless of the outcome. For centers with robust event reporting practices, the volume of patient occurrences can present a challenge for any QAPI team. Even a small volume of patient occurrences can generate substantial discussion and require valuable staff hours. Our center has utilized Failure Modes and Effects Analysis (FMEA) to reduce the time required to review all patient occurrences and still conduct a thorough analysis. This process enables us to find the not so apparent risks and to identify triggers and trends.

Approach: FMEA is a systematic approach for identifying risk and prioritizing risk events to maximize resource allocation on mitigating the most serious risks. This analysis tool is typically found in an engineering setting to evaluate a design, process, or product. There are different approaches to FMEA, but an example FMEA setup is pictured below.

<table>
<thead>
<tr>
<th>Process: Fixing a drink</th>
<th>Potential Failure Mode</th>
<th>Potential Failure Effect</th>
<th>S Severity of effect</th>
<th>P Probability of failure</th>
<th>D Detectibility</th>
<th>Risk Priority number</th>
<th>Recommended action</th>
</tr>
</thead>
<tbody>
<tr>
<td>What is the step?</td>
<td>What can fail at this step?</td>
<td>What impact will the failure have?</td>
<td>What is the severity of the failure effect?</td>
<td>What is the probability of occurrence for this failure?</td>
<td>How likely is the detection of this failure?</td>
<td>S X P X D</td>
<td>What action can be taken to mitigate the risk?</td>
</tr>
<tr>
<td>Open a can of soda</td>
<td>Tab breaks off</td>
<td>Inability to open soda can</td>
<td>9</td>
<td>1</td>
<td>10</td>
<td>90</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Soda squirts out</td>
<td>Soda creates a mess</td>
<td>5</td>
<td>5</td>
<td>10</td>
<td>250</td>
<td></td>
</tr>
</tbody>
</table>

The process steps are examined and failures at each step are theorized. The failure receives a rating for the overall impact of the failure, the probability of the failure occurring, and the ability of the user to detect if the failure has occurred. These scores are then multiplied to create a RPN (Risk Priority Number). The RPN for failures at every step in the process can then be used for comparison and prioritization. In this example, the step with the lower impact rating scores higher overall because it is more likely to occur. Both Failures are instantly detectable. By modeling a system after FMEA, our QAPI team set out to accomplish three main goals.
1. Fast track the most critical events to in-depth analysis
2. Provide thorough analysis to all patient occurrences from involved systems
3. Minimize the effort required to evaluate and prioritize patient occurrences for in-depth analysis

**Findings:** An example of our version of FMEA is below. A brief description of the patient occurrence is listed. Four questions are then asked about the occurrence to assess the probability, impact, detection, and what type of avoidance measure are in place. The team must select from one of 4 responses. These responses are tied to weighted values and are multiplied to determine the risk score. Table 1 shows the possible responses to each question.

<table>
<thead>
<tr>
<th>Adverse Event description</th>
<th>Probability</th>
<th>Impact</th>
<th>Detection</th>
<th>Avoidance</th>
<th>Risk score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Incorrect weight entered into pump verses weight in order causing a higher dose of heparin to be administered. (1)</td>
<td>2 - Possible but not probable</td>
<td>1 - Safety Concern</td>
<td>2 - There are indirect indicators</td>
<td>4 - No AMs for this</td>
<td>51.55</td>
</tr>
</tbody>
</table>

**Table 1**

<table>
<thead>
<tr>
<th>How likely is it that this event could occur again in the next month?</th>
<th>What is the highest level of patient impact this type of event can have before we first notice it occurred?</th>
<th>Which best describes our ability to detect this type of event?</th>
<th>Which best characterizes our avoidance measures (AM) for this type of event?</th>
<th>Risk score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Probability</td>
<td>Impact</td>
<td>Detection</td>
<td>Avoidance</td>
<td></td>
</tr>
<tr>
<td>1 - Unlikely</td>
<td>1 - Safety Concern</td>
<td>1 - There are direct indicators</td>
<td>1 - Strict AM compliance</td>
<td></td>
</tr>
<tr>
<td>2 - Possible but not probable</td>
<td>2 - Temporary Harm</td>
<td>2 - There are indirect indicators</td>
<td>2 - Inadequate AMs</td>
<td></td>
</tr>
<tr>
<td>3 - Most Likely</td>
<td>3 - Permanent Harm</td>
<td>3 - We depend on patient self report</td>
<td>3 - Trusted AMs not always followed</td>
<td></td>
</tr>
<tr>
<td>4 - Almost certainly</td>
<td>4 - Death</td>
<td>4 - It happens without warning</td>
<td>4 - No AMs for this</td>
<td></td>
</tr>
</tbody>
</table>

FMEA provides an objective platform for thorough analysis and robust discussion of patient occurrences. With a disciplined approach, this platform can reduce the effort needed to conduct the analysis. Use of the tool fosters a structured discussion and thorough assessment of each patient occurrence. Risk Scores above an agreed upon threshold with receive in-depth analysis.

**Implications:** The QAPI team was able to achieve the goals listed in the approach. The adaption of FMEA to support thorough analysis has produced efficiencies in the QAPI teams’ ability to review and prioritize all patient occurrences. These efficiencies have made it possible to utilize the tool in expanded settings. A Safety Huddle comprised of nursing resources from the involved systems is now conducted. Patient occurrences can be presented using the FMEA tool and additional insight for the QAPI team can be gained from this discussion.

Darren Flynn MBA, PMP, LSSMBB
CATEGORY 2

Quality assurance/Improvement/Transplant Pharmacoeconomics
ABSTRACT C2-A

CRYOPRESERVATION OF DONOR CELLS FOR FINAL LYMPHOCYTIC CROSSMATCH: A COMPARISON OF TWO METHODS
Prakash Rao PhD, MBA, FACHE, HCLD, NJ Sharing Network, New Providence, NJ

Situation: The cryopreservation of lymphocytes for flow cytometric crossmatching is of growing interest to organ transplant programs and organizations. Cryopreserved lymphocytes provide transplant laboratories immediate access to donor and/or patient cells, decreasing turn-around-time for crossmatches and potentially lowering cold ischemia time. The aim of this study was to determine to what extent selected isolation/cryopreservation methods influence the viability and flow cytometric crossmatch results (average recovery).

Methods: Ten blood collection tubes containing acid-citrate-dextrose were used to collect blood samples from 6 healthy test subjects. Each subject’s samples were then split into two groups of 5 tubes. One sample from each group was tested for viability and flow cytometric crossmatch (day 0 results).

The lymphocytes from the first group of each subject’s tubes were isolated using an immunomagnetic cell isolation system and manufacturer’s protocol. The cell pellet was resuspended in Phosphate Buffered Saline (PBS) at 1 mL/sample, and viability was checked and cell crossmatch was performed (day 0 results). The isolated cells in the remaining tubes are resuspended in cooled autologous plasma that had been mixed with dimethylsulfoxide (DMSO) to equal a final concentration of 10-15% DMSO. The samples were then immediately transferred to cryovials. The approximate procedure time was 45 minutes.

The lymphocytes from the second group of each subject’s tubes were isolated using density gradient separation. The samples were spun at 2000 RPM for 10 minutes in a centrifuge. The buffy coat was harvested and diluted with PBS at room temperature. Lymphocyte Separation Medium (LSM) was layered under the samples and the tubes were spun at 2200 RPM for 25 minutes in the centrifuge. The lymphocytes were then harvested, transferred to another tube, and mixed with PBS to volume of 15 mL. The samples were then centrifuged for 10 minutes at 2400 RPM to pellet the cells. The supernatant was discarded, PBS was added, and the samples were spun an additional time at 1200 RPM to remove platelets. The cell pellet was resuspended in PBS at 1mL/sample, and viability was checked and cell crossmatch was performed (day 0 results). Cooled freezing/thawing medium [RPMI 1640, L-glutamine (200mM), HEPES (pH 7.4, 1.0 M), Gentamycin (40 mg/mL), pre-filtered 20% Fetal Bovine Serum (FBS)] was added dropwise to the remaining tubes to equal a final concentration of 1-2 x 10^7. DMSO was added to yield a final concentration of 10%. The samples were immediately transferred to cryovials. The approximate time for this process was 1.5-2 hours.

The cryovials from both methods were placed in a freezing container and cooled at -80°C for a minimum of 4 hours. The samples were then transferred to storage in a Liquid Nitrogen freezer. One sample from each method was thawed in a water bath at 37°C at intervals of 15, 30, and 90 days. Freezing/thawing medium is added at the time
of thawing before another 2 rounds of washing via 10 minute centrifugation at 500 – 700 g, followed by resuspension in PBS. The viability of all samples was evaluated and the results of the sample’s flow cytometric crossmatch were compared to the freshly prepared sample.

**Findings:** The average of the percent viability and percent recovery of T and B cells for the samples processed by each method were evaluated. Based on these results, it is apparent that both methods yielded viable T and B cells at 15, 30, and 90 days post cryopreservation. There were no significant differences in viability or T and B cell recovery between the methods. The method using density gradient separation was twice as long as the method using the immunomagnetic cell isolation system.

Joanna Szafran, Tess Lewis, Misty Marchioni, Donna King, Ijeoma Okere, Prakash Rao
ABSTRACT C2-B

PRACTICAL APPROACH TO MANAGE AND TRACK TRANSPLANT PROGRAM COMPLIANCE WITH UNOS AND CMS

Robin McIlwaine, MS; University of Rochester Medical Center, Rochester, NY

PURPOSE: Transplant programs are expected to comply with myriad of regulations. Compliance is reviewed by two different government agencies on an ongoing basis. In order to ensure program compliance with UNOS policies and CMS regulations, our hospital secured an independent reviewer from the Compliance Office to audit each program quarterly. This system was implemented in 2004 following a difficult UNOS audit where inconsistencies in team member adherence to policies and regulations were identified. This system ensures ongoing compliance for our programs as staff members and regulations/policies change.

METHODS: Transplant programs (heart, liver and kidney/pancreas) are audited on a rotating basis. The review is structured to mimic an onsite UNOS/CMS audit and includes review of paper and electronic patient records. As new policies are implemented by UNOS, they are added to the audit protocol.

Transplant program audits consist of evaluating the following parameters:

<table>
<thead>
<tr>
<th>All Programs</th>
<th>Heart</th>
<th>Kidney/Pancreas</th>
<th>Liver</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Two ABOs to list</td>
<td>• Status 1A listings are reviewed to verify the listing is appropriate based on medical documentation*</td>
<td>• Evidence of a nutrition evaluation prior to listing</td>
<td>• Review lab reports/values used to calculate MELD</td>
</tr>
<tr>
<td>• Listing and removal letters</td>
<td>• Review of the reported Mechanical Circulatory Support devices for each patient removed from the waitlist*^</td>
<td>• LD recipients o Added to the waitlist</td>
<td>• Status 1 listings documentation to support listing and adherence with internal listing checklist*</td>
</tr>
<tr>
<td>• ABO verification donor and recipient prior to incision*</td>
<td>• Adherence with internal documentation expectations regarding UNOS status listing</td>
<td>• Assigned UNOS ID prior to surgery*^</td>
<td>• HCC/Exception documentation to support listing and adherence with internal listing checklist</td>
</tr>
<tr>
<td>• Timely removal from the waitlist*</td>
<td></td>
<td>• Accuracy of reported dialysis start date or GFR when listed</td>
<td></td>
</tr>
<tr>
<td>• Multiple listing option notification</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Informed consent for increased risk organs*^</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Ongoing patient notification of the latest SRTR data*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Required viral testing for increased risk organs *^</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Vessel discard log and discard process</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
PARAMETER reviewed at 100%. All other parameters are reviewed on a random sample of patients selected from the program’s current waiting and removal list.

NEWLY added parameters

RESULTS: Audit results are presented in an executive summary and include a score reflecting compliance for each reviewed parameter. The scores are displayed in a dashboard which allows for a quick view of ongoing compliance. The dashboard contains data from the previous 6 audits (example Figure 1) and provides management and staff an immediate understanding of where the program is maintaining compliance (green) vs. areas where the team needs to monitor (yellow) or implement corrective action (red).

Figure 1: Example Liver Transplant Compliance Audit Dashboard

<table>
<thead>
<tr>
<th>Delistings -txp</th>
<th>Delistings -deaths</th>
<th>Accuracy of lab values</th>
<th>Listing letters</th>
<th>Removal letters</th>
<th>Evaluated Letters</th>
<th>ABO verification</th>
<th>Increased Risk</th>
<th>SRTR - newly listed</th>
<th>SRTR - prior to transplant</th>
</tr>
</thead>
<tbody>
<tr>
<td>100%</td>
<td>100%</td>
<td>99%</td>
<td>100%</td>
<td>67%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>80%</td>
<td>67%</td>
<td>100%</td>
<td>89%</td>
<td>50%</td>
<td>80%</td>
<td>89%</td>
</tr>
</tbody>
</table>

(Green = low risk) (Yellow = medium risk) (Red = high risk and need for improvement)

The results are shared in a meeting with the Transplant Program leadership. The meetings allow for discussion of the findings, analysis of trends and consideration for corrective action. Each program then relays the findings to their staff and where necessary, implements a corrective action measure or plans a process improvement strategy. Formal written reports are sent to hospital senior leadership to keep them abreast of any findings. The compliance officer reports this information for review and discussion at the monthly Transplant Quality Council meeting.

CONCLUSION: Ongoing, regularly scheduled internal audits of transplant programs have been effective in timely identification and management of issues. Audit findings have generated new policies (vessel discards); revised forms (ABO compatibility); updated processes (letter templates) and added audit parameters (increased risk organ offers and associated testing on recipients that receive the organs). This audit process has been useful as an ongoing education tool for the transplant program staff and it provides regular feedback to leadership on transplant program performance. Furthermore, routine onsite reviews by UNOS/CMS have been easier to manage due to early identification and corrective action of issues.

Robin McIlwaine, MS; Leah Bryan, RN, BS, CCTC, M. Katherine Dokus, MPH, Nancy Metzler, BBA
ABSTRACT C2-C

TOO MUCH OF A GOOD THING? REGULATORY REQUIREMENTS FOR TRANSPLANT CENTERS AND OPOS
Dina Steinberger, University of Wisconsin Transplant Program, Madison, Wisconsin

Problem/Situation
Transplant centers and organ procurement organizations (OPOs) across the United States are highly regulated to maintain compliance with standards of care to ensure patient safety and quality outcomes. Regulatory activity has increased in recent years, which has required transplant centers and OPOs to enlist resources to maintain all components of regulatory compliance. An integrated transplant center and OPO set to investigate the changes in regulatory volume and impacts to operations. This presentation will provide participants collective information about the volume of regulatory requirements, in order to properly resource their programs to maintain regulatory compliance.

Approach/Methods
The transplant center and hospital-based OPO collaborated to document each regulatory agency, requirement, and timeframe (Figure 1). Records were reviewed to determine the dates of all past surveys and desk audits for the transplant center and OPO, and timelines were created to visually display increased regulatory activity over the past ten years. Stakeholders involved with transplant and OPO regulations were asked to estimate the monthly time spent on regulatory activities. The data reporting team documented the steps required each cycle for outcomes reporting. To analyze the quantitative volume increase of regulatory activity by the United Network of Organ Sharing (UNOS), the following metrics were analyzed: number of notices communicated by UNOS regarding policy and bylaw changes, number of pages of documents for review communicated by UNOS regarding policy and bylaw changes, volume of policy and bylaw changes from UNOS, volume of proposals communicated by UNOS for public comment, number of pages of proposal documents for review for public comment by UNOS.

Findings/Conclusions
An effective regulatory oversight function is paramount to fostering public trust and patient safety in the organ donation and transplantation system. While the regulatory system must continually adapt to the changing healthcare environment, it must also weigh the associated burden and cost associated with implementing additional policy changes are proportionate with the intended outcomes achieved. By a conservative estimate, 446 hours (on average) are required each month by various transplant and OPO stakeholders to ensure regulatory compliance is maintained (Figure 2). The frequency of UNOS notices regarding policy and bylaw
changes has nearly doubled in the past two years. The volume of policy and bylaw changes, as measured in total pages, increased 34% comparing the three year average from 2007-2009 to 2012-2014. While the total frequency and volume of policy changes were measured, the work required to review and operationalize each change varies significantly depending on the item. Additionally, proposals can be just as resource-intensive for programs, in order to thoroughly understand the proposed changes, how the changes will impact the program, participate in the policy making process and regional meetings, and provide public comments.

**Figure 2: Regulatory Roles and Responsibilities**

<table>
<thead>
<tr>
<th>Role</th>
<th>General Responsibilities</th>
<th>Monthly Time Commitment (Hours)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chief Operating Officer</td>
<td>Provide executive leadership from a hospital-wide perspective. Report significant accomplishments/concerns to Executive Council.</td>
<td>1</td>
</tr>
<tr>
<td>Physician Champions (Chairs, Medical and Surgical Directors)</td>
<td>Provide medical and surgical leadership to Transplant team. Serve as physician liaison and advisor to medical staff regarding certification requirements, recommendations, improvement efforts, survey preparations, etc.</td>
<td>10 (one hour per champion)</td>
</tr>
<tr>
<td>Transplant and OPO Directors</td>
<td>Operationalize standards, lead gap analyses, and interpret policies. Provide administrative leadership during site visits. Coordinate audit activity. Maintain current knowledge of regulatory updates, changes, and proposals. Provide leadership to data reporting team.</td>
<td>40</td>
</tr>
<tr>
<td>QAPI Program Director</td>
<td>Develop and execute FQAPI plan and update according regulatory updates, changes, and proposals. Lead gap analysis and implementation of process improvements. Coordinate QAPI audit activity.</td>
<td>40</td>
</tr>
<tr>
<td>Quality Analyst</td>
<td>Support QAPI Program Director and improvement activities. Coordinate gap analysis for QAPI standards. Assist with regulatory site visit preparation.</td>
<td>60</td>
</tr>
<tr>
<td>Clinical Managers</td>
<td>Provide expertise on organ-specific regulations and internal processes. Work with directors and content experts to update internal policies and procedures to ensure continuous compliance. Lead and participate in improvement projects. Assemble documentation for site visits/audits.</td>
<td>35 (5 hours per manager)</td>
</tr>
<tr>
<td>Data Reporting Team</td>
<td>Maintain compliance of TIEDI, DDR, PTR, and imminent/eligible form completion. Define data fields and lead data validation and analysis activities. Coordinate semi-annual SRTR reporting process. Stay informed of UNet programming changes and communicate implications to leadership.</td>
<td>240</td>
</tr>
<tr>
<td>Administrative Support</td>
<td>Provide regulatory administrative support to managers and directors. Coordinate internal policy changes as directed. Submit UNOS applications for changes in directorships. Arrange survey logistics</td>
<td>20</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td><strong>446</strong></td>
</tr>
</tbody>
</table>

**Figure 3: Volume of UNOS Policy Notices**

**Figure 4: Volume of UNOS Policy Proposals**

**Implications/Relevance**

This presentation will provide participants with a greater understanding of how regulatory activity for transplant centers and OPOs has increased in recent years, and how this increase has impacted an integrated OPO and transplant center’s ability to mobilize appropriate resources to maintain pace with the operationalizing the changes. The information provided will help transplant and OPO leaders understand the resource implications of regulatory compliance, and provide a framework for the development of their specific regulatory programs. Case studies will be highlighted to provide real examples where changes in policy or data requirements have impacted operations.

Dina Steinberger, PA-C, MPH, Elizabeth Strutz, MSIE
THE ROLE OF A DIALYSIS LIAISON: BRIDGING THE GAP BETWEEN THE TRANSPLANT CENTER AND THE DIALYSIS UNIT

Lisa B. Yoder, RN, BSN, CCTC
The Methodist J.C. Walter Jr. Transplant Center, Houston Methodist Hospital, Houston, TX

Problem: Our transplant center’s steady increase in the number of patients on the kidney waitlist, combined with the exponential growth in the dialysis community from an estimated 20,000 patients in 1980 to over 114,000 in 2012, has resulted in an increase in coordinator workload and an increase in evaluation process lengths. We also experienced an impact on our ability to maintain and document consistent communication with dialysis centers regarding our pre kidney transplant patients that aligns with regulatory compliance. The role of dialysis liaison was created to bridge the gap between the transplant center and the dialysis units.

Methods: In June 2013, a dialysis liaison role was created and implemented for an RN to provide continuity of care for the patient with a focus on increased communication with dialysis units. Individualized patient lists for each dialysis unit are emailed on a bi-monthly basis to 175 dialysis units and changes are sent back to the liaison for amendments. The dialysis liaison sets appointments with the social worker to review and update each patient on their list in all pre transplant phases: referral, evaluation and active or inactive listing. While at the unit, annual chair side visits are performed and documented in our transplant EMR by the liaison for those patients who are listed for kidney transplant as active or inactive status. The patient updates allow for more current information about health, financial and social status and any issues that are discovered can be addressed sooner with the multidisciplinary team. Being at the dialysis center provides the liaison opportunity for further education with the patient and dialysis center staff. The liaison Referring physician lists are mailed out on a quarterly basis to their office for review and correction.

Transplant center EMR documentation for chairside visit
Findings: A survey was sent to the dialysis unit social workers and designated transplant personnel to assess the impact of the dialysis liaison role on improving the communication and continuity of care between the dialysis centers, patients and transplant center. The results of the survey showed that 81% of the social workers had interacted with the liaison. Of those 81% of social workers, 79.4% of them noted an increase in patient satisfaction with the transplant center and 91.2% of them noted an improved communication with the transplant center. Our transplant center’s annual dashboard data was reviewed, which shows a steady decline in the process length from evaluation to Medical Review Board since the addition of the dialysis liaison role.

![Evaluation to Listing Process Lengths (days)](image)

The UNOS data on patients delisted from our transplant list between 2011 and 2014 revealed an increase in delistings due to “patient too ill” from 6.15% to 17.19%. This finding is a direct result of the dialysis liaison role implementation in June 2013 which has allowed closer review of all patients listed at our center. The close collaboration of the dialysis liaison and our pre transplant coordinators who work with patients in the evaluation phase and once they are listed has improved the efficiency and decreased the work load of all team members and has helped meet documentation for regulatory compliance.

Implications: Since the addition of the dialysis liaison in 2013, we are able to more closely follow patients and document findings in collaboration with the dialysis units and our multidisciplinary transplant team. This role has allowed our program to move patients through the evaluation and listing process in a shorter time frame as well as updating status changes on the kidney wait list. Dialysis social workers are able to receive updated lists on their patients’ status as well, again by improved communication and adherence to regulatory compliance by all.

Julie Corkrean, RN, BSN, CCTC, Charlotte Roach, RN, BSN, CCTC, Lisa B. Yoder, RN, BSN, CCTC
ABSTRACT C2-E

CHALLENGES ASSOCIATED WITH FOLLOW-UP OF RECIPIENTS OF PHS/CDC HIGH RISK ORGANS AT A HIGH VOLUME KIDNEY TRANSPLANT PROGRAM
Meredith J. Aull, Pharm.D., New York-Presbyterian/Weill Cornell Medical Center, NY, NY

Problem/Situation: Transplant centers utilizing PHS High Risk organs are required to develop a policy for post-transplant testing of recipients of these organs. The 2013 PHS Guideline for Reducing Transmission of HIV, HBV, and HCV Through Solid Organ Transplantation provides transplant centers with guidance on the timing and recommended tests to be performed in the post-transplant period.

Approach: In August 2014, our transplant program reviewed our follow-up testing of recipients of PHS/CDC High Risk organs, and found the testing to be inconsistent between providers. We then developed a standardized follow-up testing protocol based on the 2013 PHS Guidelines (Table 1), to include newly transplanted patients, as well as a plan to catch-up on testing for past patients who were outside of the 3- and/or 12-month testing windows.

<table>
<thead>
<tr>
<th>Time Period &amp; Recommended Testing</th>
<th>3 months post-transplant</th>
<th>12 months post-transplant</th>
<th>Catch-Up Testing</th>
</tr>
</thead>
<tbody>
<tr>
<td>HIV NAT</td>
<td>X</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>HCV NAT</td>
<td>X</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>HBV NAT</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>HBsAg</td>
<td></td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Anti-HBs</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Anti-HBc</td>
<td></td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

Follow-Up Process for Recipients of PHS High Risk Organs:
A tracking system (spreadsheet) was developed to monitor the above testing, and all patients who had received a PHS High Risk organ between July 1, 2011 and August 31, 2014 (n=38) were entered, as well as the results of any testing that was previously performed. New patients receiving a PHS High Risk organ are added as they are transplanted. Post-transplant providers utilize the spreadsheet to identify patients needing orders for follow-up testing to be placed into the outpatient electronic record.

Findings/Solutions/Conclusions:
A total of 45 transplant recipients were due for follow-up testing since the above process was implemented; 41 of 45 (91.1%) have had HIV NAT and HCV NAT testing, while 38/45 (84.4%) have had HBV NAT testing. Three patients have had no follow-up testing (2 non-compliant with follow-up and 1 expired). One patient’s HIV NAT (HIV-1 LOAD RNA/PCR) revealed a viral load of < 20 copy/mL but detectable, while another patient had a HCV NAT (HCV PCR QUANT) result of 19 IU/mL (normal <= 15 IU/mL). Both test results were believed to be false positives due to the low viral load in an immunosuppressed patient, and repeat testing was ordered. However, after consulting with our OPO regarding these test results, we decided to err on the side of caution, and report the results through the OPTN Improving Patient Safety Portal. This triggered a series of events as shown in Figures 1a and 1b. Repeat testing for both patients was negative for infection and confirmed the first tests to be false positives. Figure 2 shows the false positive rate for HIV, HCV, and HBV NAT testing encountered to date at our transplant center.
Collaboration amongst clinical staff, administration, and the quality team is essential in creating a follow-up system that works for an individual transplant program. Incorporation of the follow-up process into the everyday workflow of assigned healthcare practitioners is essential to success. Viral load testing via PCR is generally not recommended as a screening test for infections such as HIV, HCV, and HBV due to the risk of false-positive results. However, this is the type of testing available at most transplant centers that is needed to meet NAT testing recommendations in the 2013 PHS Guidelines. Reporting of results that are suspected to be false positive is a resource-intensive process that requires careful consideration.

**Implications/Relevance:**
Transplant Centers utilizing PHS High Risk Organs for transplantation are required to develop post-transplant testing for their recipients. These testing protocols should address the potential for false positive nucleic acid testing (NAT) results, and centers should be able to develop a repeat testing strategy for cases where a false positive result is strongly suspected. Reporting of potential disease transmission to regulatory agencies is a resource-intensive process, thus centers should be able to use their clinical judgment in the decision to perform repeat testing prior to initiating the reporting process.

Meredith J. Aull, Pharm.D., Katherine Rhee, R.N., Marion Simonsen, Allison Hoffman, Eileen Kang, Sandip Kapur, M.D.
ABSTRACT C2-F

LIVING DONATION: IMPROVING PRACTICES IN DONATION FOLLOW-UP

Amy T. Sokolowski, MSN, RN, CCTC, Sentara Norfolk General Hospital, Norfolk, VA

**Purpose:** Follow-up for post living donors has become a priority in the transplant community. The Organ Procurement and Transplantation Network (OPTN) recognized areas for improvement in the submission of post-donation data. As a result, the OPTN established minimal data submission requirements pertaining to living donor follow-up at 6, 12, and 24 months for all transplant centers. Living donor follow-up information is crucial for understanding the risks and consequences of donation. Having accurate and complete data ensures that we are protecting donors from harm and fully informing them of the impact of donation. To meet these data submission requirements, a strategy was developed to facilitate an improved living donor follow-up process. This transplant program wants to fully contribute to the national follow-up data collection process and support the evaluation of donor safety.

**Method:** Our transplant program identified a sub-committee tasked with improving post-donation data submission. This performance improvement (PI) committee included transplant leadership, quality assessment personnel and transplant coordinators. It reviewed current post-donation follow-up workflows and developed strategies for improvement based on the requirements set by the OPTN, feedback from living donors and patient safety. These strategies included the use of home health for follow-up when a donor is unable to come to the transplant center, the development of a worklist/workflow for donor tracking, the involvement of the multidisciplinary team in donor follow-up education in the pre- and peri-operative phases, the use of a transplant coordinator for post-donation assessment and the scheduling of donors at the transplant center to control appointment wait times.

**Results:** From the implementation of the above strategies, our transplant program went from not meeting the data submission requirements to exceeding the data submission requirements in all three follow-up intervals. The new strategies were applied to all living donors at this transplant program. In 2013, this program’s data submission was at 59% for 6 months, 70% for 12 months, and 54% for 24 months. Following the implementation, our data submission was 94% at 6 months, 100% at 12 months, and 100% at 24 months in 2014 and 100% at 6 months, 91% at 12 months and 88% at 24 months for the first half of 2015.
Conclusion: The strategies developed by the performance improvement committee helped our transplant program exceed the post-donation data submission requirements for all three follow-up intervals. We hope that our transplant program’s approach may offer a different view for other transplant programs and allow for improvement in their data submission or follow-up process.

Amy T. Sokolowski, MSN, RN, CCTC
Patricia Bourassa, BSN, RN, CPHQ, Peggy Bradshaw, BSN, RN and Liza Bordeaux, BSN, RN
ABSTRACT C2-G

TRANSPLANT ADVERSE EVENTS: A PROCESS IMPROVEMENT APPROACH TO STANDARDIZING REPORTING AND ANALYSIS TO IMPROVE PATIENT SAFETY
DeAnna Heaney, Boston Children’s Hospital, MA

A. Problem/situation:
The transplant specialty is an ever evolving discipline that requires healthcare professionals to constantly be striving for excellence both clinically and within patient safety. As patient safety has come to the forefront of quality care in the last few years, the Center determined that a comprehensive reporting and monitoring system needed to be put in place to monitor transplant specific adverse events. The new system was intended to help healthcare providers fully understand the complexity of transplantation and the associated adverse events that could occur within and outside of the hospital setting. As a result of this new system, individual organ groups would have much more rigorous analysis of events and in-depth understanding of how to improve the quality of care within their own groups and across the center.

B. Approach:
In March 2015, the Center gathered a multidisciplinary team consisting of representatives from all 5 organ programs, Heart, Lung, Liver, Intestine, and Kidney to create a new reporting policy and a monitoring system for transplant specific adverse events. The events included events those that occurred within and outside of the hospital. From that meeting, the Center has worked diligently to improve the event review process for both regulatory purposes and to enhance patient safety. Each tier has required time periods for reporting events that occur. The time requirements are to ensure that cases are presented in or as close to real time as possible with access to the most relevant information. Within each tier, there is a different set of analysis tools that are required to complete the review. The Root Cause Analysis is comprised of a detailed timeline, Transplant Fishbone Tool, and a 5 Why’s exercise. The Mandatory and Optional Case Review is comprised of an abbreviated timeline with Transplant Fishbone Tool analysis. The below table shows the event classification under the tiered system:

<table>
<thead>
<tr>
<th>Serious Transplant Adverse Event</th>
<th>Root Cause Analysis must be initiated within 30 days of notification</th>
<th>1. Recipient death within the first year post-transplant. Graft loss within the first year post-transplant. Unintentional ABO blood group incompatible solid organ transplant, Donor derived disease transmission (excluding EBV, CMV, BK virus)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transplant Adverse Event</td>
<td>Mandatory Case Review must be presented at PTC within 60 days of notification</td>
<td>Recipient death and/or Graft Loss between 1-3 years post-transplant, Unplanned return to OR related to transplant, Any use of VAD/ECMO support that was unexpected after transplant. Post-transplant lymph proliferative disease, Waitlist death (active &amp; inactive candidates), Readmissions within 7 days after the transplant hospitalization discharge, Hospital reported safety events with a severity level 4 within 3 years post-transplant, Serious unexpected immunosuppression complications, such as CKI requiring dialysis in a non-renal transplant patients, and secondary malignancies, Surgical site infection directly related to a transplant surgery incision.</td>
</tr>
<tr>
<td>Optional Case Reviews</td>
<td>Readmission between 7-30 days of transplant hospitalization discharge, Patient death later than 3 years post-transplant, Graft loss later than 3 years post-transplant, Hospital reported safety events with a severity level 3 within 3 years post-transplant, Hospital reported safety events with a severity level of 0 (Near Miss) within 3 years post-transplant, Hospital reported safety events with a severity level 4 after 3 years post-transplant</td>
<td></td>
</tr>
</tbody>
</table>
It is important to note that any event that occurs within the transplant cycle (pre, peri, or post) has the ability to be reviewed under each of the tiers if the transplant team deems it necessary to improve the quality of care.

Once a transplant event occurs, it then enters the Event Reporting process sequence which carries the team from identification of the event through to sharing the analysis results at the center’s weekly multidisciplinary, multi organ transplant meeting. Please see the below process map for a depiction of the transplant adverse event process.

The Center has also created a novel, innovative automated Adverse Event Tracker through the hospital supported SharePoint site to automatically let users know when a case review or a root cause analysis is due, resulting in a more timely thorough review of events. Reviews occur at both the individual team level and with the entire Center.

C. Conclusion:
Since the new practice came into effect on April 7th, 2015, there have been 34 cases reviewed. Of those cases, over 75% have been reviewed within 1 month of the event occurrence. The detail and rigor of discussions surrounding cases have improved dramatically. The culture around event review has also improved drastically, with continuous dialogue surrounding events that allow for a more open platform and understanding within the multidisciplinary care teams and throughout the center as a whole.

Author 1: DeAnna Heaney
Author 2: Laura O’Melia, RN, MSN, CPNP
Author 3: Maureen Jonas, MD
Author 4: Matt Bittle
Author 5: Tony Manry, MS, MBA
Purpose: Thymoglobulin (Thymo) induction is given to prevent early rejection while initiating maintenance immunosuppression. Modification of dosing is common for multiple reasons. Our center recently underwent an induction protocol change with less restricting dose modifications for the adult kidney transplant alone (KTA) population with a goal of increasing adherence and simplifying the induction course. This was initiated after 2013 data showed the group receiving less Thymo than goal had a higher incidence of acute cellular rejection (AR) and the group receiving more than goal had a higher infection rate [ATC 2014].

Method: In 2013, protocol was 5 doses of Thymo at 1.25 mg/kg, goal 6.25 mg/kg. Doses were decreased by 50% for absolute lymphocyte count (ALC) < 0.2, held for ALC = 0 and adjusted for WBC and PLT per package insert, resulting in missed and partial doses. In 2015, protocol was changed to 3 doses of 2 mg/kg, goal 6 mg/kg. ALC is no longer used to determine dose and partial or held doses due to WBC or PLT count are given at a later date.

A retrospective chart review of adult KTA recipients given induction immunosuppression per protocol from 1-12/2013 and 1-7/2015 was conducted. Outcomes included the number of dose adjustments, achievement of goal Thymo dose, biopsy proven AR and infection.

Results: 2013 data included 121 patients: 17.3% re-transplant, 52% deceased donor, 83% Caucasian and 64% male. 2015 data included 90 patients: 23.3% re-transplant, 53% deceased donor, 62% Caucasian and 56% male. No graft loss occurred secondary to rejection in either year.

When evaluating protocol adherence, 47% of patients in 2013 met the Thymo goal of 5.5-7 mg/kg as opposed to 96% in 2015(p<0.0001). 68% of 2013 patients had doses adjusted compared to 24% in 2015(p<0.0001).
The AR rate 30 days post transplant was 7.4% in 2013 and 3.3% in 2015. At 90 days post transplant the AR rate was 10.7% in 2013 and 6.7% in 2015.

The fungal and viral infection rate 90 days post transplant was 3.3% in 2013 and 1.1% in 2015.

**Conclusion:** Routine adherence to a protocol without unnecessary dosing adjustment is important to achieving goal Thymo induction. Compared to the 2013 population, AR and infection rates have decreased, although not significantly, despite having an ethnically diverse population, high re-transplant rate and an increased immunologic risk due to the change in kidney allocation. The new protocol is also beneficial as it does not require daily ALC labs or additional post discharge Thymo infusions.

BUILDING A TRANSPLANT QAPI PROGRAM FROM THE GROUND UP: Never Let a Serious Crisis Go To Waste
Gwen McNatt, PhD, RN, CNN, FNP-BC, Northwestern Memorial Hospital, Chicago Il

Problem:
When the SRTR PSRs were released in March 2014, our center was flagged for kidney patient and graft survival. This was followed by a second flagged cohort in June 2014 (see Table 1). We were soon under the scrutiny both the OPTN and CMS. Soon after, one of our two quality staff resigned and another died from a chronic illness. The quality program, which had always teetered too far toward quality control as opposed to quality improvement, was in ruins at the worst possible time. Quality minutes had not been kept or filed, dashboards had missing or inaccurate data, and the metrics were not meaningful or tied to factors contributing to poor outcomes. Factors that had been found in previous analyses had not been translated into process change or measured at all. It was a crisis. A famous politician once said “You never let a serious crisis go to waste.” It is also one of the hallmarks of a highly reliable organization to be resilient. We had an opportunity to rebuild our quality program to take it to the next level and we seized it.

Methods:

Call in the Calvary: We sought help from the hospital quality team. This group had been previously peripherally involved with our quality program but clearly, due to the dire nature of our crisis, AND the CMS survey focus on integration of the transplant quality program with the hospital, a closer alignment was needed.

Build a Team: With the assistance of the central quality staff, we made an overall assessment of the needs of our quality program. The central hospital quality group agreed to provide a full time quality leader to support the QAPI process (reporting to quality) and the transplant program committed two additional staff. We also secured data mining expert assistance from the hospital with the commitment to automate the collection and reporting of much of our dashboard data.

Get to the Root of the Problem: We adapted a case review approach form that was found on the Transplant Center Quality Tool Box (Transplant Quality Resource Guide and Tools – Organ Donation Alliance) to guide the analysis of every patient and graft loss that had occurred in the past 4 years. The cases were reviewed by the entire multidisciplinary team in weekly mandatory meetings and a contributing factor matrix was developed. We tested the potential impact of controlling some of the most frequently occurring factors using the filter function on SRTR data tables to see if eliminating those related losses would have changed our outcomes relative to the expected. Patients aged 70 and greater emerged as the most important risk factor (see Table 1), but we developed interventions for all of the identified factors.

Make a Game Plan: From the matrix, improvement plans for each factor were developed and vetted by the multidisciplinary quality committee. Our most intensive efforts involved assessment of the elderly and post transplant care. These plans naturally formed the metrics for our dashboard and measurement was built into each improvement plan (see Table 2). Having the multidisciplinary team
involved in each step also facilitated “buy in” by the clinical staff and physicians. Everyone understood why each improvement was necessary.

**You can’t Manage it if you Don’t Measure It:** Building a dashboard (Table 2) with reliable data that does not require manual collection required some major lifting from our data stewards as well as our data coordinator who assisted them and validated each query but the results were worth the effort. Every process improvement must be measured both for process compliance and outcome impact. Is the intervention really being carried out and is it improving outcomes?

Table 2. Selected Portions of Dashboard Derived from Case Reviews

<table>
<thead>
<tr>
<th>Type</th>
<th>Measure</th>
<th>Target</th>
<th>% Compliance</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Immunosuppression in the Elderly</strong></td>
<td>Patients &gt; 65 who receive campath</td>
<td>&lt;10%</td>
<td>5%</td>
</tr>
<tr>
<td><strong>Outcome</strong></td>
<td>Readmission post-transplant due to neutropenia (patients &gt; 65)</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td><strong>Management of the Elderly</strong></td>
<td># patients listed &gt; 65</td>
<td>Monitor Trend</td>
<td>8%</td>
</tr>
<tr>
<td><strong>Process</strong></td>
<td># patients transplanted &gt; 65</td>
<td>Monitor Trend</td>
<td>11%</td>
</tr>
<tr>
<td><strong>Process</strong></td>
<td>Medical &amp; Psychosocial re-evaluation within 6 months of transplant (patients &gt; 65)</td>
<td>100%</td>
<td>76%</td>
</tr>
<tr>
<td><strong>Process</strong></td>
<td>Cardiology appointment within 1 year of transplant (patients &gt; 65)</td>
<td>&gt;95%</td>
<td>90%</td>
</tr>
<tr>
<td><strong>Process</strong></td>
<td>TUG/MoCA at TOED and Interval Clinics (patients &gt; 65)</td>
<td>&gt;95%</td>
<td>90%</td>
</tr>
</tbody>
</table>

**Results and Conclusions:**

**How Did that Turn Out for You?** Table 3 summarizes our results in terms of overall outcomes from the most recent December 2015 PSR. The process of rebuilding the quality program required that both the hospital quality team and the transplant program leadership work together and objectively assess the needs for quality and compliance, design a plan to meet that need, and commit to the effort required to build a data-driven quality plan that truly would improve patient outcomes. Our effort produced a quality plan and dashboard that is meaningful, tied to the root causes of poor outcomes and measures progress in the improvement of those outcomes. We have built a solid, cohesive team with strong ties to both the clinical program and the central hospital quality structure, extending all the way to the Board. Our efforts bought us a release from OPTN/UNOS supervision and we brought our outcomes into CMS compliance and avoided being placed in an SIA.

Table 3. Improvement in Outcomes

<table>
<thead>
<tr>
<th>Outcomes</th>
<th>June 2014 PSR</th>
<th>ADULT GRAFT SURVIVAL</th>
<th>December 2015 PSR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of transplants</td>
<td>541</td>
<td>Number of transplants</td>
<td>478</td>
</tr>
<tr>
<td>Observed</td>
<td>36</td>
<td>Observed</td>
<td>24</td>
</tr>
<tr>
<td>Expected</td>
<td>22.53</td>
<td>Expected</td>
<td>16.88</td>
</tr>
<tr>
<td>CMS Criteria</td>
<td>CMS Criteria</td>
<td>O-E</td>
<td>13.47</td>
</tr>
<tr>
<td>O/E</td>
<td>1.6</td>
<td>O/E</td>
<td>0.42</td>
</tr>
<tr>
<td>p-value</td>
<td>0.005</td>
<td>p-value</td>
<td>0.06</td>
</tr>
<tr>
<td>Large volume flag</td>
<td>True</td>
<td>Large volume flag</td>
<td>False</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ADULT PATIENT SURVIVAL</th>
<th>June 2014 PSR</th>
<th>ADULT PATIENT SURVIVAL</th>
<th>December 2015 PSR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of transplants</td>
<td>541</td>
<td>Number of transplants</td>
<td>425</td>
</tr>
<tr>
<td>Observed</td>
<td>20</td>
<td>Observed</td>
<td>8</td>
</tr>
<tr>
<td>Expected</td>
<td>10.63</td>
<td>Expected</td>
<td>7.72</td>
</tr>
<tr>
<td>CMS Criteria</td>
<td>CMS Criteria</td>
<td>O-E</td>
<td>9.37</td>
</tr>
<tr>
<td>O/E</td>
<td>1.88</td>
<td>O/E</td>
<td>1.04</td>
</tr>
<tr>
<td>p-value</td>
<td>0.007</td>
<td>p-value</td>
<td>0.508</td>
</tr>
<tr>
<td>Large volume flag</td>
<td>True</td>
<td>Large volume flag</td>
<td>False</td>
</tr>
</tbody>
</table>

**Implications/Relevance:**

**So What Does that Mean to Me?** CMS expects every transplant center to have a data-driven QAPI program based on real factors that have been demonstrated to be impacting outcomes and measuring the success of interventions designed to mitigate or eliminate those risk factors. They also expect that transplant quality be embedded within the hospital quality structure. We have demonstrated that this can be done with:
1) Cooperation and alignment with the hospital quality group 2) Well-designed quality staffing infrastructure 3) Multidisciplinary involvement 4) Systematic case review of each loss 5) Improvement plans and projects designed to address the factors found in the reviews 6) Measurement plans included in each improvement plan 7) The creation of a dashboard (automated where possible)
CATEGORY 3
Revenue management/Optimizing profitability
BACKGROUND:

While performing an internal review, it was discovered that many of the Mechanical Circulatory Support (MCS) supply charges were not captured on patient claims. In current state, there was not a standardized process to review new implant charges prior to submitting claims for payment. The results of these missed charges led to a significant loss of revenue for the program. It was estimated that we were losing at least a half million dollars or more between not capturing the charge for all of the devices, equipment or supplies.

METHOD:

In 2015, the MCS program created the role of the MCS Financial Analyst. The purpose of this role was to bridge the gap between the VAD team and the finance department, to ensure proper charges were captured in order to maximize the program’s reimbursement. Initially, the MCS Financial Analyst conducted a thorough review of all MCS charges for the prior year. The results of this review highlighted departments that needed additional training and education. A task force was then assembled that included members from the OR Staff, MCS Financial Analyst, EMR specialists, the MCS and CVOR managers along with the manager of Medical Audit. The EMR specialists created a Do Not Bill (DNB) work queue to ensure that the bill was not submitted prior to review by the MCS Financial Analyst.

After reviewing all implant charges for the prior calendar year, it was found that the biggest area missing charges were occurring in the CVOR. The staff in the CVOR were re-educated on the importance of these entries and the financial impact on the program and organization. We also decided to begin reviewing all readmissions for any patient in our MCS program to ensure proper charges for equipment usage, exchanges and supplies have been accounted for on the claim for maximum reimbursement. Insurance companies allow a defined period of time when a hospital can resubmit charges missed during the admission. This time period varies depending on the insurance company. Medicare will allow resubmission up to 1 year after the discharge whereas most private insurance companies will only allow 90 days for resubmission.
Results:

Our program chose to resubmit all missed charges, including ones that were past the resubmission period. After completion of resubmitting all charges and receiving revenue from all implants, the total revenue recovered by the program was $501,171.93. Prior to submission for payment, all MCS charges are now reviewed by the MCS Financial Analyst. This process has enabled the program to ensure the efficiency of all charges being captured, therefore increasing profitability.

Conclusion:

The addition of the MCS Financial Analyst to our MCS program has proven to be beneficial to the financial viability of the program. Implementation of this process improvement plan has improved the programs operational margin and aided in a smooth and efficient review of all MCS cases. We are currently in the process of adding the review of Extracorporeal Membrane Oxygenation (ECMO) charges to the bill review process.

Dawn Walker, BSHA, Christine Fricke, MA.
ABSTRACT C3-B

FINANCIAL MANAGEMENT OF POST-IMPLANT LEFT VENTRICULAR ASSIST DEVICE EQUIPMENT

Chi Huang, MS-HSM, Barnes-Jewish Hospital, St. Louis, MO

Problem: As a large volume Transplant Center implanting Left Ventricular Assist Devices (LVAD), annual growth in LVAD volume has led to challenges with accurately tracking and billing for LVAD equipment in our post-implant LVAD patient population. Our goal was to develop a model to ensure that every piece of equipment being ordered and provided to a patient upon discharge and during post-implant management is being appropriately billed for and within timely hospital billing guidelines.

Method: The stakeholder team was composed of department management, LVAD RN Coordinators and a newly hired LVAD Equipment Coordinator. To identify the problem areas, the team constructed a process flow map highlighting gaps and opportunities in the existing process and identified that there was not a standard work process from the initial equipment order requisition to when the patient was provided equipment. Within the current state analysis, the biggest area of opportunity discovered was that charging for LVAD equipment was the responsibility of the RN coordinators, who often prioritize patient care activities over billing duties. Each RN Coordinator had a different process and would only begin billing duties after discharge bedside patient education. We also identified that in the scenario where a patient died before bedside education and discharge took place, the used equipment was not billed for.

In the creation of the future state for ordering and billing for LVAD equipment, the following interventions and solutions were put into practice:

- A report was created to capture all outbound LVAD equipment order requisitions and is now owned by the Business Manager to reconcile with the monthly budget report
- The recently hired LVAD Equipment Coordinator role is now solely responsible for all LVAD equipment billing, and documents patient equipment in a newly created Access Database that serves as a data repository for all patient equipment activity.
- LVAD equipment was categorized as primary and secondary. The primary equipment is always provided and charged to patients immediately after patient implant. The secondary equipment is determined through patient education by the RN Coordinator and communicated to and charged for by the LVAD Equipment Coordinator.
- Business Manager meets monthly with LVAD Equipment Coordinator to audit order requisitions and revenue capture.

Findings: The implementation of changes to the LVAD equipment management work flow immediately addressed gaps in the process and helped to achieve measurable success in our identified project goals. 100% of LVAD equipment orders can now be reconciled to their
corresponding budget expense using the new reporting tool. Secondly, prior to implementation of the future state, only 78% of annual LVAD equipment charges were being accurately billed. After 6 months of post-implementation analysis, 100% of LVAD equipment is now being captured and billed, this grew our LVAD operational revenue by 22%. This success is largely driven by having one person manage the billing process, and the audit process we implemented to review monthly charges by patient. Prior to implementation of the future state, 77.5% of monthly charges resulting from LVAD equipment were considered late (after 5-days from date of service). After implementation, late charges dropped to 2.7%. Lastly, implementation of the LVAD Charge Access Database has now also provided the department the ability to query and troubleshoot any equipment issues, which previously was not possible.

Figure 1.0 on the lower left shows average quarterly revenue trending over 5 quarters. After implementation of the equipment management model in Q2 of 2015, average revenue increased by 22%. Figure 2.0 on the lower right shows quarterly late charge %. After implementation of the equipment management model in Q2 of 2015, late charges dropped to 2.7%.

**Implications:** Having a dedicated individual who owns the LVAD equipment process has tremendously helped our transplant program to better manage the process of billing and tracking LVAD equipment in our post-implant patient population. Our experience with implementing a LVAD equipment management model has helped us grow monthly equipment revenue, reduce late charges, and have allowed our RN coordinators to focus more on patient care activities. To ensure sustained results, monthly audits of equipment logs against revenue reports is critical.

Abstract Authors: Chi Huang, MS-HSM; Katie Glass; Gregory Richardson, RN; Danyelle Hoff, BSN, RN; Christy Kay, BSN, RN; Denise Manker, BSN, RN
Situation: All Kidney initial evaluation services are billed to the Organ Acquisition Cost Center (OACC) with no charges generated or billed to payers. Both recipient and donor professional charges are manually reviewed by transplant team weekly via excel spreadsheets; facility charges reviewed monthly via paper. A review of the Kidney Transplant Program in 2011 made the following recommendation: team should modify the pre-transplant billing procedures for hospital services to allow direct billing to non-Medicare payers, if permitted by contract, while still capturing charges for the cost report. The review completed of the 2010 Medicare Cost report would have the following significant reimbursement opportunities of $1,016,352. The Kidney Transplant Program needs to increase revenue while also capturing all services for the cost report; at the same time maintaining compliance with billing of donor services. Additionally, we are not comprehensively capturing OACC charges for other organ programs. Also, due to multiple registration areas, with a guarantor flagging system in place, the potential for donors to be erroneously billed is prominent due to the fact that guarantors can be removed or changed for each service rendered. Patient-centered care is critical and this must include all aspects of care including the financial obligations, billing, and in some cases, anonymity of the donors.

Approach: With the successful integration of our Transplant database with our Electronic Health Record (EHR) we were able to begin creation of Work Queues (WQ) to capture all active patients for “bundling” and reviewing charges. Rules need to be created to confirm all active recipient and donors are within scope of the WQ’s. In order for charges to be reviewed and moved within the charge WQ the patients need to be “bundled”. Bundling is the process in which the financial coordinator links the active patient to their transplant coverage and contract terms, allowing for moving of charges; also allowing Patient Financial Services (PFS) to follow the transplant contracts within the EHR. Once charges are in the charge work queue see Table 1 they need to be moved to the applicable area to be billed. Charge Coordinators (CC) are responsible for relating a charge to a bundled patient within the charge WQ see Tables 2-4. Charges are reviewed by line item, not by service or date. In this manner, each charge can be individually identified as to whether it is or is not transplant-related and whether it belongs under OACC.

Reports were also created to track Medicare OACC charges, commercial payor charges, and full charges for cost reporting. This is reviewed monthly by the transplant team and the cost report team to ensure services are captured and reported, have complete information needed, and can withstand auditing review.
Charges: Bundled (related to transplant) – Commercial or Medicare (OACC) or transplant-related (not OACC); Not related to bundled - (non-transplant related charges).

The financial manager reviews charge WQ’s see Graph 1 and 2 daily to ensure compliance with managing of charges.

Graph 1: 7 Day History of charges
Graph 2: 7 Day History of charge sessions

The transplant manager, CC’s, PFS billers, and IT team meet weekly to review work make any adjustments needed in the rules to capture only the active pre-transplant patients.

Results: After successful integration of transplant patient information into our EHR, we have been able to review all line item charges for our recipients and donors, culminating in accurate capture of all services for the cost report, significant decrease in erroneous billing see Table 5 (results are reviewed and tracked in our Active Daily Management), and increased revenue to the kidney transplant program with services billed to payers.

Table 5

<table>
<thead>
<tr>
<th>Program</th>
<th>Target</th>
<th>Actual</th>
<th>% Exceed</th>
<th>Actual</th>
<th>% Exceed</th>
<th>Actual</th>
<th>% Exceed</th>
<th>Actual</th>
<th>% Exceed</th>
<th>Actual</th>
<th>% Exceed</th>
<th>Actual</th>
<th>% Exceed</th>
<th>Actual</th>
<th>% Exceed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nov-1 patient received bill in error due to Research Studies. Resolved.</td>
<td>Dec-1 patient received bill for services prior to EOC. Resolved.</td>
<td>Jan-1 patient received bill for donor service after case closed-need Epic resolution</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The volume of charges is significant see Table 6; however, CC’s are successful in keeping the workflow consistent and timely as they work through the charges daily.

Table 6

<table>
<thead>
<tr>
<th>Week</th>
<th>Workqueue Type &amp; Pll</th>
<th># read WQ</th>
<th># read MNT</th>
<th># read MNT</th>
<th># read KPR</th>
<th># read MNT</th>
<th># read MNT</th>
<th># read MNT</th>
<th># read MNT</th>
</tr>
</thead>
<tbody>
<tr>
<td>05/20</td>
<td>Charge Review Bill</td>
<td>9090</td>
<td>1210</td>
<td>9090</td>
<td>5,855,708</td>
<td>9090</td>
<td>1210</td>
<td>9090</td>
<td>5,855,708</td>
</tr>
<tr>
<td>05/20</td>
<td>Current Donor Referral</td>
<td>9090</td>
<td>1210</td>
<td>9090</td>
<td>5,855,708</td>
<td>9090</td>
<td>1210</td>
<td>9090</td>
<td>5,855,708</td>
</tr>
<tr>
<td>05/20</td>
<td>Charge Review Bill</td>
<td>17</td>
<td>22</td>
<td>17</td>
<td>5,855,708</td>
<td>17</td>
<td>22</td>
<td>17</td>
<td>5,855,708</td>
</tr>
<tr>
<td>05/20</td>
<td>Current Donor Referral</td>
<td>17</td>
<td>22</td>
<td>17</td>
<td>5,855,708</td>
<td>17</td>
<td>22</td>
<td>17</td>
<td>5,855,708</td>
</tr>
<tr>
<td>05/20</td>
<td>Charge Review Bill</td>
<td>17</td>
<td>22</td>
<td>17</td>
<td>5,855,708</td>
<td>17</td>
<td>22</td>
<td>17</td>
<td>5,855,708</td>
</tr>
<tr>
<td>05/20</td>
<td>Current Donor Referral</td>
<td>17</td>
<td>22</td>
<td>17</td>
<td>5,855,708</td>
<td>17</td>
<td>22</td>
<td>17</td>
<td>5,855,708</td>
</tr>
</tbody>
</table>

The transplant programs are capturing all charges for cost reporting, billing to commercial payers, and ensuring donors are not erroneously billed for donation services through this collaborative process with the transplant team, special billing, and IT services. Reports have been created to show charges billed to commercial payers, Medicare, and total charges for the cost report. These reports are reviewed monthly by the programs and cost report staff to validate correct data and reporting needs.

Conclusion: After a 20+ year history of billing all kidney pre-transplant evaluation services to OACC, this program has been able to successfully capture charges and bill appropriately to commercial payers while still capturing all costs for cost reporting (Commercial and Medicare). Whereas we were previously missing charges for the cost report, we can now capture all services through the review process of all services rendered to our patient population. Implementation of this project to all organ programs has enabled us to gather correct information and produce a comprehensive cost report. In addition, donors are no longer receiving bills and both patient and employee satisfaction has risen. Transplant programs with an integrated EHR can successfully implement this process to ensure accountability and success within their programs with the potential to increase revenue.

Deborah A. Mast
CATEGORY 4

Transplant Data: Analysis, Reporting and Research
ANALYSIS OF THE IMPLEMENTATION OF ACCEPTING “A2” AND “A2B” KIDNEYS FOR “B” RECIPIENTS

Prakash Rao PhD, MBA, FACHE, HCLD, NJ Sharing Network, New Providence, NJ

**Situation:** Beginning December 4, 2014, as part of the UNOS new Kidney Allocation System (KAS), blood group “B” patients who meet criteria established by the program became eligible to receive offers from “A2” or “A2B” kidney donors. This change was implemented to increase blood group “B” patients’ chance of transplant since it was observed that blood group “B” patients demonstrated increased wait times.

**Methods:** We performed a retrospective analysis dating from the time of the new KAS through June of 2015 on patients associated with one transplant program. The data was compared to the same time frame from the previous year (December 4, 2013 through June 2014).

This study evaluated the impact of the implementation of accepting “A2” and “A2B” kidneys for blood group “A” and “B” recipients by measuring the change in the number of (1) transplant program’s patients listed in UNOS, (2) blood group “AB” recipients transplanted, (3) blood group “A” recipients transplanted, (4) blood group “B” recipients transplanted, (5) blood group “AB” and “A” recipients receiving “A2” or “A2B” kidneys, (6) blood group “B” recipients receiving “A2” or “A2B” kidneys, (7) Anti-A2 titers were documented.

**Findings:** Table below demonstrates changes observed with KAS implementation.

<table>
<thead>
<tr>
<th>Recipients Blood Group</th>
<th>“AB”</th>
<th>“A”</th>
<th>“B”</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Prior to KAS</td>
<td>With KAS</td>
<td>Prior to KAS</td>
</tr>
<tr>
<td>Transplant program’s patients listed on UNOS</td>
<td>22</td>
<td>23</td>
<td>189</td>
</tr>
<tr>
<td>Recipients transplanted</td>
<td>0</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Transplanted with “A2” or “A2B”</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

- 20% meeting KAS eligibility
- 7 were participating in the KAS program
- all KAS participating recipients
Implications: We observed (1) no change in the number of blood group “AB”, “A”, or “B” patients the transplant center listed on UNOS, (2) (3) Neither blood group “AB” nor “A” were disadvantaged by the new program (4) an increase in the number of blood group “B” transplants, (5) most blood group “AB” and “A” recipients received “A1” kidneys (6) the majority of the blood group “B” transplants were from “A2” or “A2B” donors; 70% of the blood group “B” patients that were transplanted were eligible participants in the new program, (7) 71% of the post-transplant Anti-A2 titers stayed the same or dropped; in general, Anti-A2 titers in B patients tended to be low, making it less likely to require high levels of desensitization for pre and post-transplant care.

Donna King, Bridget Figueiredo, Adena Osband, Misty Marchioni, Prakash Rao
ABSTRACT C4-B

PATIENT ASSESSMENTS OF HOSPITAL CARE AND KIDNEY TRANSPLANT OUTCOMES: A CROSS-SECTIONAL ANALYSIS OF 200 U.S. KIDNEY TRANSPLANT CENTERS

Amit K. Mathur MD MS, Mayo Clinic Arizona, Phoenix, AZ

Problem: Patients use hospital report cards to select transplant centers. We evaluated whether consumer assessments of hospital quality correlate with short and long term kidney transplant center performance.

Study Design: CMS uses the Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) to publicly report patients’ perspectives on hospital care. We merged 2012 SRTR kidney transplant (n=200 centers), HCAHPS and American Hospital Association survey data. Center performance was determined by variation in observed-to-expected (O/E) ratios for one month and one year graft failure. We used multivariate regression to determine whether HCAHPS measures correlate with center performance, after risk-adjusting for structural characteristics and volume.

Results: Center-specific graft failure varied significantly (30 day O/E range: 0-4.1). At 30 days, compared to average centers, cleanliness (OR 1.26, p=0.001), patient recommendation (OR 1.18, p=0.005) and high overall ratings (OR 1.11, p=0.036) predicted high performance. Poor nursing-patient communication (OR 0.70, p=.030), lower cleanliness (OR 0.67, p<0.001), poor overall ratings (OR 0.79, p=0.038), and no recommendation (OR 0.68, p=0.019) correlated with average/ low performance. There was no significant correlation between HCAHPS measures and 1-year outcomes.

Conclusions: The association between hospital consumer assessments of hospital care and center performance after kidney transplantation is very limited. More specific metrics oriented to capturing transplant patient perspectives may be valuable in further defining transplant quality.
Submitted by:

Amit K. Mathur MD MS¹², Apurba Chakrabarti MD³, Kyle Sheetz MD³, Nitin N. Katariya MD¹, Andrew L. Singer MD PhD¹, Winston Hewitt MD¹, Raymond L. Heilman MD⁴, Hasan Khamash MD⁴ Kunam S. Reddy MD¹, Adyr A. Moss MD¹

¹Division of Transplant Surgery, Department of Surgery, Mayo Clinic Arizona, Phoenix, AZ USA ²Robert D. and Patricia E. Kern Center for the Science of Health Care Delivery ³Section of Transplantation Surgery, Department of Surgery, University of Michigan, Ann Arbor, MI, USA, ⁴Division of Nephrology, Department of Medicine, Mayo Clinic Arizona, Phoenix, AZ USA
THE IMPACT OF INTRA-OPERATIVE AND POST-OPERATIVE PRACTICES ON LUNG TRANSPLANT OUTCOMES
Amanda Jones, MSN, RN, CNS, CPHQ & Alexandra Wittenberg, MHA, Cedars-Sinai Medical Center, Los Angeles, CA.

Problem/Situation: In 2013, our lung transplant program began to investigate factors leading to lower than expected patient and graft survival rates identified through internal review and SRTR PSR’s. Discussions with program leaders identified certain intra-operative and post-operative practices that may have been inconsistent with best practice. In 2014, these practices were altered with the anticipation that they would result in positive patient outcomes. The purpose of our project was to assess current practices in quantifiable terms and determine the impact of these changes on patient outcomes. Our goal is to use this data to implement and sustain these changes to optimize patient outcomes.

Methods: Under the direction of a new surgical director in 2014, the program began to focus its efforts on changing aspects of intra-operative and post-operative care. Changes in these areas included: decreased use of CPB and sternotomy approach, increased epidural use, decreased time between end of surgery and epidural insertion, and early extubation.

In 2015, the team collected data on these variables, separating patients into two cohorts, one representing patients transplanted prior to program changes (July 1, 2011 - December 31, 2013), and a second cohort representing patients transplanted after the changes (January 1, 2014 - May 31, 2015).

Trends were observed and evaluated within and between the two cohorts. Statistical comparisons between response and explanatory variables were made using correlation analysis. For patient outcomes, OLS and multiple logistic regression models determined independent factors associated with LOS and 1-year patient survival. Kaplan Meier Analysis was used to predict survival rates for patients who had not yet reached 1-year post-transplant.

Findings: Beginning in 2014, we decreased the use of CPB and sternotomy approach, decreased time between end of surgery and epidural insertion, decreased the time between end of surgery and extubation, and increased epidural use.

Results from the analyses included:

- Use of CPB, sternotomy approach, and longer times to extubate are associated with increased LOS;
- Use of epidurals is associated with decreased LOS;
- The odds of surviving 1-year post-transplant are 8.2 times greater if a non-sternotomy approach is used (p <.10, excluding patients who have not yet reached 1-year post-transplant);
- Kaplan Meier results show 1-year survival increases after 2012, with a 90.2% survival rate projected for 2014.
Implications/Relevance: This project confirmed the efficacy of the changes made to CBP, surgical technique, epidural use, and extubation time and their association with decreased LOS and 1-year survival. As a result, we will use this data to drive discussions and improvements surrounding patient care practices throughout all phases of transplant. Furthermore, this information will aid clinicians in the selection and management of lung transplant patients while optimizing outcomes.

Conclusion: The practice changes made have had a positive impact on patient outcomes, and we continue to evaluate our program to sustain change and optimize patient and graft survival.

Amanda Jones, MSN, RN, CNS, CPHQ, Alexandra Wittenberg, MHA, Derek Sampson, Cedars-Sinai Medical Center, Los Angeles, CA
ABSTRACT C4-D

MULTIPLE LISTING INCREASES ACCESS TO HEART, LUNG, LIVER, AND KIDNEY TRANSPLANTATION

Submitting Author:
Raymond Givens, MD, PhD
Advanced Heart Failure/Transplant Fellow
Columbia University Medical Center
New York, NY

Problem: United Network for Organ Sharing (UNOS) policy allows solid organ transplant candidates to be listed at multiple centers simultaneously. As not all candidates have the resources needed for multiple-listing, this policy may advantage wealthier patients.

Approach: Among adult first-time, single-organ candidates in the UNOS database between January 1, 2000 and December 31, 2013 who had a recorded waitlist outcome, we identified 33,928 patients waiting for heart (HT), 24,633 for lung (LuT), 103,332 for liver (LiT) and 223,644 for kidney transplantation (KT). We used propensity score matching to address imbalances among baseline covariates and conducted competing risk analyses of waitlist outcomes.

Findings: The proportion of multiple-listed patients (ML) was 2.0%, 3.4%, 6.0% and 12.0% among HT, LuT, LiT and KT candidates, respectively. Regardless of organ type, ML candidates were younger than single-listed (SL) patients (mean age 52 ± 1 vs. 54 ± 1), more likely to be insured privately (58.9% vs 51.1%) and less likely by Medicaid (5.8% vs 10.3%), and lived in ZIP codes with higher median incomes ($93,081 ± $12,772 vs $67,690 ± $9,205); all p-values <0.0001. ML patients had proportionally higher functional status in addition to organ-specific indicators of lower acuity at initial listing. Across all organs, ML patients had longer waiting times at their initial listing centers but higher eventual transplant rates (OR [95% CI] = 1.23 [1.03-1.47], 1.56 [1.31-1.86], 1.57 [1.49-1.66] and 2.01 [1.95-2.07] for HT, LuT, LiT and KT, respectively) and lower rates of death while waiting (0.66 [0.50-0.87], 0.83 [0.67-1.03], 0.63 [0.58-0.68] and 0.53 [0.51-0.55]). Differences in waitlist outcomes between ML and SL patients were maintained after propensity score matching across all organs and in some cases were greatly accentuated. There were no consistent differences in post-transplant outcomes.

Implications: Multiple listing is a rational response to organ shortage and long waiting times but appears to advantage patients with means to utilize it rather than the most medically needy. The UNOS multiple listing allowance should be reconsidered.

Authors: Raymond C. Givens, MD, PhD; P. Christian Schulze, MD, PhD and Donna M. Mancini, MD
ABSTRACT C4-E

Expanding the Lung Donor Pool- One Center’s 24 Month Look at How Innovative Technology, Dedicated Procurement Staff and Teamwork Transformed Lung Transplantation and Patient Outcomes

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

Purpose: In 2013 the average waiting time for lungs at our center is in the 75% percentile with an average wait time of 55.8 months. We annually perform and average of lung transplants a year through 2013. In 2013 we began to develop a policy and model to allow for better utilization of lungs. Beginning in 2014 the addition of innovative technology (OCS), a dedicated procurement staff, new protocol and extensive lean work to improve processes yielded a dramatic decrease in wait time in the first year by to 27.9 months and ending of the second year at 2 months.

Method: With all these changes the team tracked each phase of the process from referral through post transplant. Data collected over the 24 months’ post changes were compared to those prior to the changes. These areas’ included:

1) Time from referral to evaluation
2) Time from evaluation to selection/ listing
3) Time from listing to transplant
4) LAS scores at time of transplant
5) Length of stay
6) PGD
7) Reimbursement for OCS

Results: Our center concluded 2014 having transplanted 52 patients and 2015 having transplanted 57 patients. In comparison to pre implementation we saw:

1) Increased referrals media coverage of OCS, increased transplants lead to additions to the pre transplant coordinator staff, cutting the time by 40%
2) Presentations at selection increased from 1-2 a week to 5 a week. The number presented continues to increase as we decrease our wait time it is difficult to maintain the list.
3) Time from listing to transplant from 2 years to 2 months
4) LAS score at the time of transplant 35-42
5) Length of stay decreased from average 30-40 days to 7-28
6) PDG from 5-10 a year to 0
7) Full reimbursement for OCS.

Conclusion: Lung transplant patients at our center have seen significantly shorter wait times and are being transplanted before they become so sick that recovery is prolonged. This has lead to a decrease in length of stay and shorter rehab times. Over the 24-month period the team has refined organ screening tools allowing for better workup and information on the donor before presenting to the team for review, they have worked with our own OPO and others to help optimize donor lungs that otherwise would not have been transplanted. They have optimized utilization of the recipient fit by working the whole list on every case. Standardization of the process to utilize a two physician/surgeon turndown policy and report at each week’s selection meeting by call staff of offers/turndowns with team discussion.
ABSTRACT C4-F

ASSESSMENT OF TRANSPLANT PROGRAMS CONDUCTING A₂/A₂B DECEASED DONOR KIDNEY TRANSPLANTS TO BLOOD TYPE B RECIPIENTS

Irene K. Kim, MD, Cedars-Sinai Medical Center, Los Angeles, CA

Problem/Situation: The “Blood Types A, non-A₁ and AB, non-A₁B” blood type matching requirement of Organ Procurement and Transplant Network (OPTN) Policy 8.5.E. Allocation of Kidneys by Blood Type was borne from a Minority Affairs Committee (MAC)-sponsored variance that sought to, and achieved, increasing access to renal transplantation for blood type B candidates. Data released on May 22, 2015, indicated that there were 11,181 B candidates on the active renal transplant waiting list¹. As blood type B candidates on the national waiting list are more than 70% minority ethnic groups (i.e. African Americans, Asians, and Hispanics), and B candidates have historically had less access to deceased donor kidney transplantation, this initiative has the potential to increase the number of transplants and improve equity in access to transplantation¹. According to the six-month kidney allocation system (KAS) “Out-of-the-Gate” post-implementation monitoring report, 47 A₂/A₂B transplants had been performed compared to just 6 in the six-months prior to KAS implementation². The report concluded that, “Though small in absolute numbers, this increase is highly statistically significant (p<0.0001) and suggests that this aspect of the policy has already started to make a difference in access to transplants for blood type B candidates.”

However, there is concern that this new policy is vastly underutilized. A multi-committee workgroup formed under the auspices of the MAC to explore the reasons why this element of KAS is underutilized and provide solutions to increase program participation.

Approach: Six-month national post-implementation data on KAS was queried for A₂/A₂B eligibility status pre- and post- KAS. In addition, center participation was investigated in the nine-months pre- and post-KAS via OPTN data analysis.

Findings: Initial six-month data report indicates a slight increase in blood type B patients transplanted and statistically significantly increased utilization of A₂/A₂B subtype (p<0.0001); however, only 4% of active blood type B patients were registered as eligible to receive this type of transplant. Sixteen percent of candidates were registered in UNET℠ as not eligible, <1% expired, and 79% were unknown status, indicating potentially large underutilization of the A₂/A₂B policy change. The percentage of centers participating increased from 4% in the nine months pre-KAS to 12% in the nine months post-KAS.

Conclusions/Solutions: Despite this mechanism for increased kidney transplantation for blood group B recipients, it appears that the majority of transplant centers are not utilizing this provision of KAS, thus potentially hindering earlier access to transplantation in blood group B candidates. Data from the variance demonstrated that utilization of the A₂/A₂B kidneys for blood group B recipients with low anti-A IgG titers had similar clinical outcomes as ABO-compatible recipients and robustly increased transplantation for blood group B kidney recipients in participating DSAs³.
The reasons for non-participation remain unclear, but the workgroup hypothesizes that potential reasons, including: lack of awareness of this provision, change fatigue (from KAS), lack of access to performing anti-A titers, concern for variability for anti-A titer testing among laboratories, administrative burden and/or lack of resources all may be limiting factors. The group seeks to validate the reasons via surveys that will be deployed to renal transplant programs this spring. Based on the results, the workgroup will develop a solution(s) to assist centers and increase participation.

Implications: The MAC has successfully sponsored a KAS-associated effort aimed at the “Blood Types A, non-A\textsubscript{1} and AB, non-A\textsubscript{1}B” requirement of OPTN Policy 8.5.E. Allocation of Kidneys by Blood Type. The MAC has provided an insightful assessment of transplant center participation in, and statistically significant impact of the procedure provision within the first six months’ implementation period. The assessment of impact will serve the transplant community well in drawing attention to a voluntary process with yet unrealized, but significant potential to improve access and transplant rates.

The assessment to-date will enable the MAC workgroup to further assess and develop appropriate resources that help centers overcome the barriers to participating in this program. With this initiative, it is the goal of MAC to increase the number of A\textsubscript{2}/A\textsubscript{2}B kidney transplants, improving access to transplant for this group of candidates.

Irene K. Kim MD, Kimberly Uccellini MS, MPH, Amber R. Wilk PhD, Meelie DebRoy MD, Jonathan Fisher MD, Hazel Hosey MSW, Robert Linderer, Clifford Miles MD, Anne Murphy MBA, FACHE, Beth Plahn RN, MHA, Sylvia Rosas MD, MSCE, Vaughn Whittaker MD, and Jerry McCauley MD, MPH

References:

