

## WINNER CATEGORY 1 - FINANCE

## USE OF SIX SIGMA TO IMPROVE THE HLA BILLING PROCESS RESULTING IN SUBSTANTIAL RECOVERY

William Maixner, MHA, VCU Health Hume-Lee Transplant Center, Richmond, VA

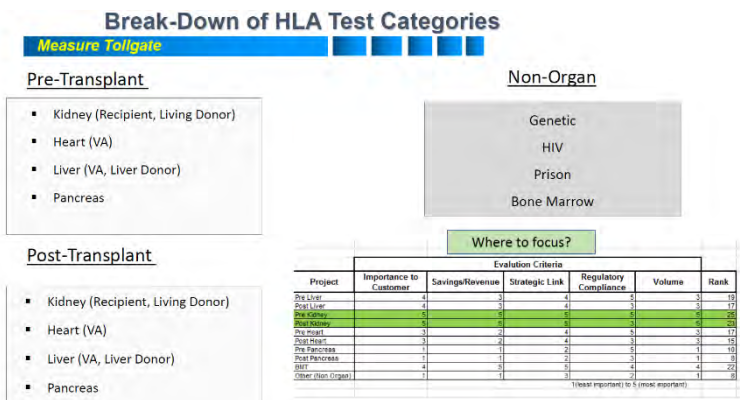
**Purpose:** The tissue-typing lab (HLA) is mission critical for our solid organ and bone-marrow operations. Financial and operational sustainability is imperative to ensure long-term success of our transplant center. After implementation of a new administrative service line structure, a deep dive was conducted on HLA finances to identify opportunities for improvement. It was noted that from FY 16 to FY 18, there was a large decrease in net income. Our goal was to use six sigma processes to identify the issue, implement changes, and sustain outcomes.

**Method:** A six sigma project was created titled, “Improvements in Revenue Collection of the HLA Lab”. The six sigma methodology was followed – Define, Measure, Analyze, Improve, and Control.

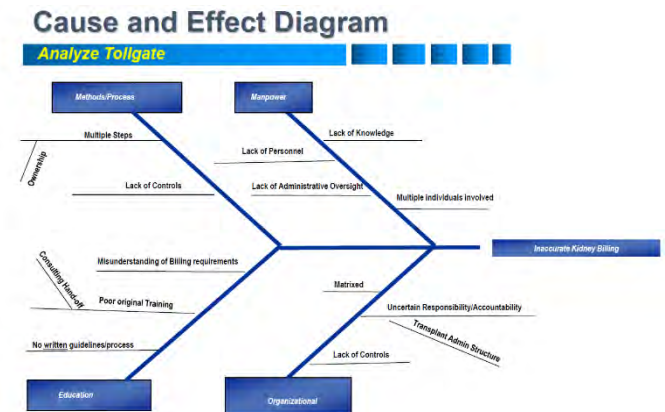
A team was created to include HLA lab personnel and leadership, transplant center leadership, and financial experts.

Examples of process included process mapping (SIPOC), prioritizing, and cause and effect diagrams (Figures 1 and 2).

### Figure 1



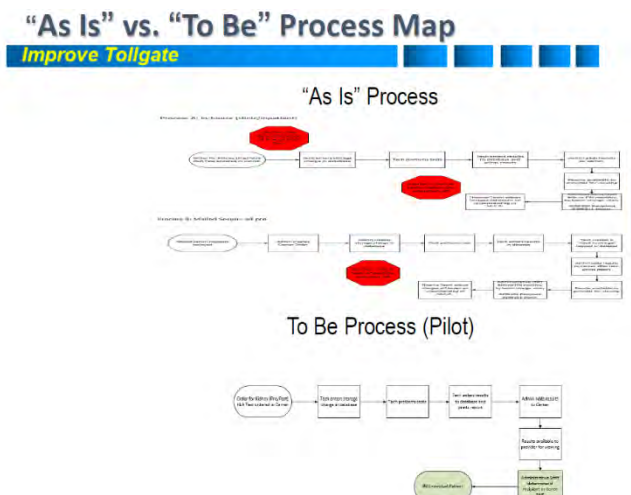
**Figure 2**



**Results:** Through use of six sigma methodology, the team was able to identify that renal billing was the major contributor to difference in revenue from FY 16. After detailed investigation, the team found that after changes made in late FY 15, all kidney tests (including pre commercial and post) were not being billed due to misunderstanding of billing rules. Liver and heart tests, though smaller volume, were billed correctly.

In mapping our billing processes, we were able to cut certain steps and adjust those with the largest potential impact. In doing so, we altered our renal billing process to appropriately bill and maximize revenue opportunity (Figure 3).

### Figure 3



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Based on initial realization and annualization, we estimate realization of up to \$2 million in previously missing revenue (Figure 4).

**Figure 4**

HLA Laboratory Billing Process Enhancement			
		Kidney Charges Only 8 months actual	Annualized
Post-Transplant Charges- Amount Estimated at 10% of Total Charges*			
		\$ 797,067	\$ 1,195,601
Pre-Transplant Charges Amount		\$ 7,103,607	\$ 10,655,410
Charges written-off to Institutional Account (Not Billed)**		\$ 7,900,674	\$ 11,851,011
Post-Transplant			
	Estimated Payment (25% liq; All Payors)	\$ 199,267	\$ 298,900
Pre-Transplant: Charges			
	Medicare Portion 73%	\$ 5,185,633	\$ 7,778,449
	All Other Payors Portion 27%***	\$ 1,917,974	\$ 2,876,961
Pre-Transplant: Estimated Payments (historical reimbursement rates)			
	All Other Payor Portion 27% (60% Liq)	\$ 1,150,784	\$ 1,726,176
Total Estimated Annual Net Increase (Non-Medicare + All Payor)			
			\$ 2,025,077
*Estimate correlates with actual charge data from January and February 2019		** Adjusted for \$700K to account for full February 2019 month	
		*** Split 73/27 Based on Medicare Usable Organs 2018	

**Conclusion:** Overall, the use of six sigma was important to identifying and improving the billing practices in the HLA lab. New work flows include continued effort and attention in constantly evaluating and improving our HLA lab business practice.

Importantly, due to the team-based framework, HLA leadership and transplant program administration teams are jointly and fully engaged. Our next steps will include the creation of a dedicated HLA lab finance team, application of the six sigma process to HLA billing of bone-marrow transplant tests, and continued development of financial best-practices.

Reflecting on the entire project, there is recognition that similar six sigma methodologies should be applied on a broader scale within our transplant center.

William Maixner, MHA; Luke McKinley, MBA; Adrian Thompson, BS; Pamela Kimball, PhD; Marlon F. Levy, MD, MBA

## WINNER CATEGORY 2 - QAPI & SAFETY

### MULTIDISCIPLINARY RESPONSE TO DONOR ABO DISCREPANCY-RELATED ADVERSE EVENT

Victoria Hunter, BSN, RN-C, CCTC, Nebraska Medicine, Omaha, Nebraska

**Problem:** Potential organ donors are screened for hemodilution using Food and Drug Administration-approved algorithms to recognize potential false-negative infectious disease marker (IDM) tests. Organs from donors that meet hemodilution criteria are classified as increased risk for transmission of infectious diseases. However, assessment of hemodilution is not uniformly applied to non-infectious testing including ABO determination.

**Practice:** ABO determination is performed using two methods, forward and reverse typing. Like IDM tests, reverse typing identifies antibodies in a donor's serum (anti-A or anti-B), and may be falsely negative due to hemodilution following large volume infusion with either crystalloids or colloids. In contrast, forward ABO determination uses commercial antisera to identify whether donor specimens contain red blood cells (RBCs) with A and/or B sugars on their surface. Forward testing can also be influenced by hemodilution in donors who are transfused with large amounts of O-blood (if the donor is non-O). Current practice does not distinguish between blood product and other intravenous fluids as a source of hemodilution. Though massive blood transfusion of Type O-RBCs is known to result in an ABO discrepancy in subsequent testing, there are no widely accepted practices to assess hemodilution for ABO typing in the setting of organ donation.

**Findings:** We experienced a case of ABO discrepancy after massive blood transfusion resulting in hyperacute rejection and allograft loss. The donor was a 51 female blood group A, as determined by pretransfusion blood group testing. Prior to organ allocation, she received 21 units of type O packed RBCs within a 24-hour period and progressed to brain death. When authorization for organ donation was obtained, two hemodiluted and one non-hemodiluted samples were run for blood typing. The ABO report resulted as forward O, reverse A discrepancy. Allocation match runs were generated with O blood type. Both kidneys and the liver were recovered. The right kidney was allocated within the local center to a blood type O recipient and within 6 hours developed hyperacute rejection and graft loss. The left kidney was allocated to a nonlocal zero mismatch blood type A recipient, who fared well. The local liver recipient, also blood type O, was treated with plasma exchanges and usual immunosuppression and maintained good graft function.

**Conclusion/Relevance:** ABO discrepancy following blood transfusion is a rare event which can result in catastrophic outcomes. Hemodilution assessment should be applied to ABO typing, especially when no pre-transfusion specimen is available. Following this event, a formal root-cause analysis was convened involving the OPO, transplant hospital, and transfusion medicine team. Through this collaborative effort, specific guidelines were formalized for donor ABO assignment in the presence of discrepant base-typing. Our guidelines now recommend consultation with transfusion medicine when ABO discrepancy is suspected, and the OPO staff reviews any available donor records for pre-transfusion specimens. If the discrepancy cannot be resolved, a match run sequence with the more restrictive blood type is used for allocation. We have used this ABO discrepancy event as an opportunity for joint process improvement between the OPO and the transplant hospital. Efforts should be made to standardize these practices as organ sharing revisions will result in hospitals and OPOs working more frequently with new partners outside of historic Donor Service Area boundaries.

Victoria Hunter, BSN, RN-C, CCTC, Arika Hoffman MD, Sue Miller RN, CCTC, Scott Koepsell MD, PhD, Clifford Miles MD, Nebraska Medicine, Omaha, Nebraska, Kyle Herber, Live On Nebraska.

### CHANGING POST-TRANSPLANT CARE WITH TELEMEDICINE

Abhinav Rastogi, MBA, MIS, Temple University Hospital, Philadelphia, PA

**Overview:** In the ever-changing world of healthcare we are constantly looking for innovative strategies to improve patient care and population health, while also reducing cost. In 2018, we implemented a telemedicine program for Lung Transplant recipients with this purpose in mind. By simply logging a set of daily symptoms and vitals online, patients are instantly connected with their healthcare providers. When symptoms change from baseline, providers are alerted in an online portal, allowing same-day care intervention.

Overall, our program population saw a significant reduction in hospital LOS when compared to non-intervention patients, and fewer admissions post-enrollment. Simultaneously, we were able to better balance the workload of our transplant coordinators and staff by identifying and triaging patients in need of clinical intervention.

**Problem:** As a high volume lung transplant center, our institution was facing excess patient days and high readmission rates. We had become a destination transplant center with patients nationwide. The physical distance inevitably created a gap between patient and provider communication. Communication is particularly important in organ transplant recipients, as they can be highly unstable. We began looking for a simple solution to supplement the traditional methodology for managing patients; by immediately alerting providers of concerning symptom changes.

Prior to this initiative, providers relied heavily on patient phone calls and office visits for health status updates post-procedure. However, with a large volume of out-of-state patients, urgent office visits are not always feasible. Early intervention in patients who need highly skilled, complex care is critical to positive outcomes – not only on a patient care level, but on a cost saving level as well. The question became; how can we become more connected with our patients' health, sooner?

**Intervention:** Our Lung Transplant app provides a new way to gain insight into patients' day to day health by presenting daily vitals and symptoms in an organized portal and, more importantly, by creating alerts (Figures 1.1, 1.2) whenever a change from baseline is detected. This insight gives providers a unique opportunity to reach out to patients experiencing symptoms, potentially allowing us to intervene with medication, office visits, or planned hospital admissions prior to the point of becoming acutely ill. This ultimately helps reduce hospital admissions, ER visits, and LOS – effectively reducing healthcare costs.

Our initiative began in January 2018 with the enrollment of 50 lung transplant recipients - which has grown to 167 patients. Participants are enrolled into the program post-transplant and are instructed to submit a daily digital "Check-In" through an application on their smartphone, tablet, or PC. Patients report 10 disease-specific symptoms and vitals each day, which are algorithmically compared to a personal baseline. If a change from baseline is detected, our lung transplant nurse coordinators are alerted. The coordinators then triage and contact patients to arrange proper care; from administration of antibiotics, to urgent clinic visits.

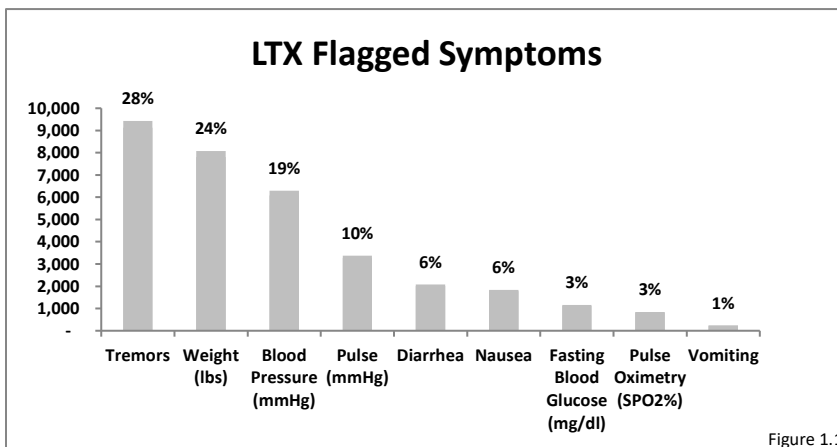
**Results:** Since program start, this population has submitted a total of 29,757 daily check-ins. 19,576 (66%) of these depicted a change in one or more LTX specific symptoms, with 10% of all check-ins flagging for medical intervention. Average program compliance rate was 73%; 80.1% excluding outlier patients who were frequently hospitalized or technologically challenged. Technology issues were mitigated by allowing patients that were uncomfortable with technology to call in their symptoms.

A comparative analysis was done comparing a subset of patients enrolled into the telemedicine program to lung transplant recipients at our facility who were not enrolled (Figure 2.0). The Tele-health group spent less time in the hospital overall, with an average LOS of 9.3 vs. 11.5 days respectively. Tele-health patients had nearly twice as many clinic referrals because they were more connected with the transplant team. This communication also

## WINNER CATEGORY 3 - CLINICAL, OPERATIONS & INNOVATIONS

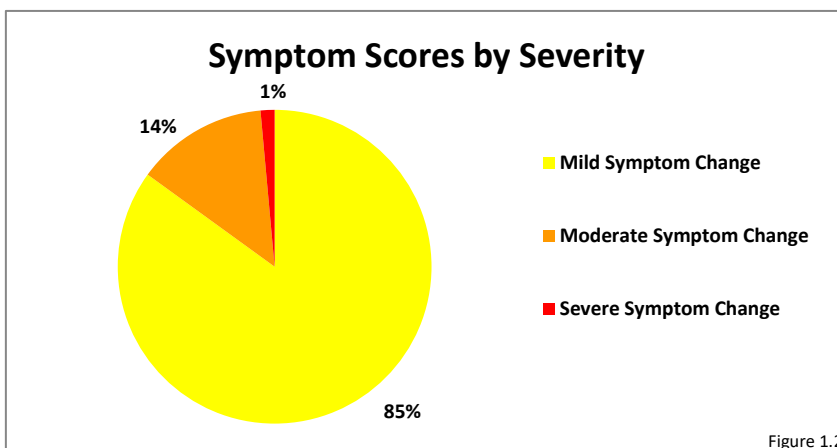
helped avoid unplanned ER visits, and patients were direct admitted if needed. Tele-health patients saw an average of 1 less admission per patient compared to the control group, 2.7 v. 3.7 respectively. This group also spent less time in the ICU compared to the Control group; about 6% fewer ICU days. Tele-health patients saw an 87% discharge-to-home rate, compared to 75% of Control group patients, suggesting a reduction in the cost of care continuation post discharge. Additionally, we have seen a reduction in unnecessary calls to patients who did not require an intervention.

**Relevance:** Better outcomes can be achieved when patients are more connected with their healthcare providers. The risk of not talking to patients in a timely manner is huge at our facility – we receive between 200-350 calls per day, with 2.5 FTEs. The abandonment ranges from 8-20% and average call time is 2.5 minutes. This initiative helps to relieve excess phone calls, allowing staff to triage patients based on acuity – resulting in a more manageable workload for the staff and more timely delivery of care.



Compared Metric	Tele-Health Group	Control Group
# of Patients	103	218
# of Admissions	275	813
Patient Days	2,554	9,356
Average LOS	9.3	11.5
% ICU Days	9%	15%
% routine discharge	87%	75%
% clinic referrals	28%	15%

Figure 2.0



Abhinav Rastogi, MBA, MIS

Nicole Patlakh, BS

## WINNER CATEGORY 4 - STRATEGY & MARKETING

### INCREASING PATIENT REFERRALS FOR TRANSPLANT THROUGH A COMBINED OUTREACH/REFERRAL/SCHEDULING COORDINATOR POSITION

Janine Vallen, RN, MSN, CCTN, APN-C, Virtua Our Lady of Lourdes Transplant, Camden, NJ

**Problem:** Our Transplant Center is a medium size program and we have been seeking ways to grow for many years. However, our referral base, waitlist, and number of patients in evaluation had remained consistent. Moreover, we are located close to a number of larger centers who fall under a separate OPO. Despite this, our referral base showed that patients, local nephrologists and dialysis units were not optimizing on the opportunity for their patients to be multi-listed as well as choose a transplant program that was closest in proximity to their home.

**Interventions:** For growth, we identified that we needed to apply our referral data to our outreach efforts, streamline and ease the process of health care provider or patient self-referral, and establish target dates to ensure that patients were scheduled for visits efficiently, but within a timeframe that would allow us to gather as much data and records to complete a thorough evaluation. To accomplish the above and overall increase our number of referrals, in October of 2017 we created the position **Outreach/Referral/Scheduling Coordinator**. This staff member performs all patient scheduling and manages all of our referral data. In addition, duties include:

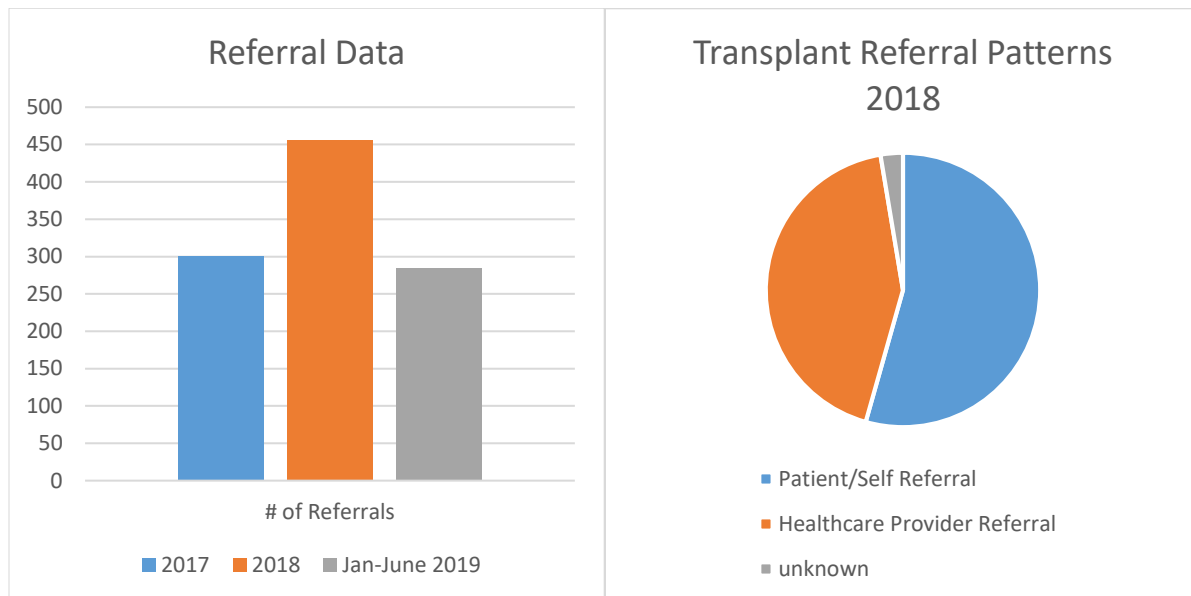
- **Plans Outreach based on review of the following:**
  - Targets dialysis units whom we receive little, or no referrals from
  - Targets dialysis units which the covering nephrologists we receive little or no referrals from
  - Focus on larger units that have a greater PD and home HD population
  - Conducts lobby days
  - Arranges focused educational luncheons with our coordinators and Transplant Nephrologists
  - Provides patient updates to the dialysis units, extracting information from our EMR
- **Easing the Process of Initiating a Referral**
  - Routinely sends out program flyers, contact information, and referral forms to nephrology offices and dialysis units
  - Promotes self-referral with dialysis staff as often their work demands may affect the time they have to complete a referral form
  - Establishes that email, fax, and phone are means of communication.
- **Scheduling and Screening**
  - Follows up on referrals within 24 hours
  - Performs a comprehensive health screen on phone and obtains as much data/records in preparation for the visit while applying our center's criteria
  - Provides an overview of transplant education, multi-listing, and the benefits of living-kidney donor transplants to encourage any potential donors to attend visit
  - Schedules patient after 2 weeks but within 4 weeks for an appointment to allow time for receiving records and any transportation issues to be addressed



## WINNER CATEGORY 4 - STRATEGY & MARKETING

- Addresses any transportation needs with dialysis staff and social worker as many of our patients have Medicaid and our center exceeds the 20-mile restriction for transportation. Educates on appeal process.

**Results:** An increased in referral base by 40%, increased number of dual listings, increase in self-referrals, and decreased number of immediate rule outs at the time of the evaluation appointment. The feedback we have gotten from the dialysis and referring nephrologist community are we are providing superior communication as well as efficiency in our turn around for scheduling an appointment. As our referral patterns have increased, and with providing good communication and efficient workflow, we had contact with our local Renal Network on our initiatives. They are now providing us monthly data on which of the dialysis units in our surrounding area have patients listed for transplant. We are then able to compare those numbers to our data of established patients at the same centers to look at how many patients are choosing elsewhere. For those units, we are educating the staff to encourage their patients to multi-list. We are finding that once we are getting those patients to our center, they meet with staff and realize our center's proximity to their home, that they are sometimes changing their primary transplant center. This in addition has contributed to an increase in our referrals.



**Relevance:** Making outreach efforts data driven and having a dedicated person to encompass the importance of establishing relationships with the dialysis and nephrology community, leads to more referrals. The creation of a staff position that provides an ongoing method of communication, promotes patient self-referral, and works with an acceptable response time is the support that the dialysis community needs to fulfill their responsibility of educating and referring patients for transplant, thus increasing patient access to transplant.

Janine Vallen, RN, MSN, CCTN, APN-C/Michelle Preziosa

## WINNER CATEGORY 5 - REGULATORY

### IMPROVING REGULATORY READINESS THROUGH A COMPLIANCE DASHBOARD

Jenna Lawson, MS, Vanderbilt University Medical Center, Nashville, TN

**Purpose:** After our center's last CMS site survey in June 2016, we received a conditional-level citation, which was the result of missing staff documentation in transplant phases of care. Prior to the survey, only transplant coordinator regulatory metrics were tracked, and these metrics were reviewed at quarterly organ-specific QAPIs (Quality Assessment Performance Improvement presentations). In addition, this information was easy to overlook among all of the other elements presented and staff engagement with regulatory readiness was low. In order to be compliant with regulatory requirements, a new process was needed that both monitored all transplant center staff metric compliance and improved staff engagement.

**Methods:** A compliance dashboard was developed in May 2017 (Figure 1). Instead of reporting out on each organ's regulatory compliance individually during quarterly QAPIs, the compliance dashboard was designed to show all organs' compliance with regulatory metrics in a given month at the same time. New metrics were added, including documentation requirements for pharmacy, nutrition, and social work departments. The compliance dashboard was sent out monthly via email to all transplant center staff and administration, as well as hospital quality and leadership teams.

**Results:** The compliance dashboard was a success, both in terms of improvement in regulatory metric compliance and staff engagement in regulatory readiness. By looking at all metrics for all organs in a given month at the same time, it was much easier to identify regulatory deficiencies or trends that were beginning to occur, and act on them quickly and appropriately. For example, at the beginning of 2019 a new metric was added – clear documentation of a listed patient's primary diagnosis. In January of 2019, kidney's compliance with this metric was only 6%. However, as staff realized this was a deficiency almost immediately, compliance increased the next month to 71%, followed by 85% in March, and reaching 100% in April. Additionally, there were many gaps in knowledge regarding regulatory readiness and what is required of us to remain in compliance with both CMS and UNOS. Through the dashboard, these gaps were able to be identified and remedied. Transplant center staff enjoyed participating in "healthy competition" with their coworkers in other organs, and we saw improved engagement and buy-in from all organ programs. The compliance dashboard has been published monthly since May 2017 and continues to be a useful tool for identifying regulatory issues or deficiencies. The dashboard has become even more effective over time, as metrics that are consistently at 100% have been removed (for example, waitlist removal within 24 hours post-transplant). Also, new metrics such as HCV NAT+ consent and Medicare Time Sheet compliance have been added as needed (Figure 2).



## WINNER CATEGORY 5 - REGULATORY

**Conclusion:** Following our last CMS site survey, there was limited staff engagement in regulatory readiness and room for improvement in metric compliance. Developing and publishing the compliance dashboard has both improved compliance with regulatory metrics as well as increased staff buy-in through healthy competition among organ groups, ultimately improving our center's regulatory readiness.

Jenna Lawson, MS; Lindsay Smith, MSN, RN

Figure 1: May 2017 Compliance Dashboard

PHASE	METRIC	PROGRAM							
		HEART	LUNG	LIVER	KIDNEY KP	LIVING DONOR	PED HEART	PED LIVER	PED KIDNEY
PRE TRANSPLANT	Number of patients	2	3	16	22	6	4	3	3
	2 ABOs prior to listing	100%	100%	100%	100%	100%	100%	100%	100%
	Patient notification letters	100%	100%	100%	100%	100%	100%	100%	100%
	Updated informed consent	100%	100%	100%	100%	95%	100%	100%	100%
	Patient selection forms	100%	100%	100%	100%	100%	100%	100%	100%
	Pharmacy screen	100%	100%	100%	100%	100%	100%	100%	100%
	Nutrition screen	100%	100%	94%	100%	100%	100%	100%	100%
TRANSPLANT	Number of patients	8	3	9	14	6	0	2	1
	OR ABO verification	75%	100%	100%	75%	100%	100%	100%	100%
	Waitlist removal < 24 hours	100%	100%	100%	100%	100%	100%	100%	100%
	Average removal time (hrs)	6.62	4.66	8.56	35.22	-	-	7.58	15.82
	Social Work	100%	100%	100%	100%	100%	100%	100%	100%
	Pharmacy	100%	100%	100%	100%	100%	100%	100%	100%
	Nutrition	100%	100%	100%	100%	100%	100%	100%	100%
DISCHARGE	Number of patients	8	3	9	14	6	0	2	1
	Coordinator education / planning	100%	100%	100%	100%	100%	100%	100%	100%
	Social Work	100%	100%	100%	93%	100%	100%	100%	100%
	Pharmacy	100%	100%	100%	100%	100%	100%	100%	100%
	Nutrition	100%	100%	100%	100%	100%	100%	100%	100%
	ILDA	-	-	-	-	100%	-	-	-
	PHS consent	-	-	-	-	100%	-	-	-
OTHER	Skin cancer education	88%	100%	89%	100%	-	-	-	-
AVERAGE OF ALL METRICS		98%	100%	99%	97%	95%	100%	97%	100%

**KEY**

At or above metric

Up to 10% below metric

More than 20% below metric

Figure 2: June 2019 Compliance Dashboard

PHASE	METRIC	PROGRAM							
		HEART*	LUNG	LIVER	KIDNEY KP	LIVING DONOR	PED HEART*	PED LIVER	PED KIDNEY
PRE TRANSPLANT (listed / approved patients)	Number of patients	3	2	10	31	6	4	2	1
	ABO verification documentation	100%	100%	70% <sup>ns</sup>	100%	100%	100%	100%	100%
	One discrete ABO in chart	100%	100%	90% <sup>ns</sup>	100%	100%	100%	100%	100%
	Informed consent	100%	100%	100%	100%	100%	100%	100%	100%
	SRTB outcomes form	100%	100%	90%	84%	100%	100%	100%	100%
	Selection committee doc.	100%	100%	90%	14%	100%	100%	100%	100%
	Selection forms - SRTB risk eq.	-	-	-	87%	-	-	-	-
TRANSPLANT	Number of patients	5	3	7	18	7	2	0	1
	OR ABO verification	100%	100%	100%	100%	100%	100%	100%	100%
	Surgical consent - HCV / NAT+	100%	100%	100%	100%	100%	100%	100%	100%
	Surgical consent - PHS inc. list	80%	100%	100%	100%	100%	100%	100%	100%
	PHS docs < 90 days (May/sep)	100%	100%	100%	100%	100%	100%	100%	100%
	Social work	100%	100%	100%	100%	100%	100%	100%	100%
	Pharmacy	100%	100%	100%	100%	100%	100%	100%	100%
DISCHARGE	Number of patients	5	3	7	18	7	2	0	1
	Coordinator education / planning	100%	100%	100%	100%	100%	100%	100%	100%
	Outpatient note	100%	100%	100%	100%	100%	100%	100%	100%
	Social work	100%	100%	100%	100%	100%	100%	100%	100%
	Pharmacy	100%	100%	100%	100%	100%	100%	100%	100%
	Nutrition	100%	100%	100%	100%	100%	100%	100%	100%
	ILDA	-	-	-	-	71%	-	-	-
TIME SHEET	Nursing (RN / NP / MA)	97%	100%	100%	90%	100%	100%	100%	100%
	PHS	97%	100%	97%	100%	100%	100%	100%	100%
AVERAGE OF ALL METRICS		96%	100%	96%	97%	98%	97%	100%	100%

**KEY**

At or above metric

Up to 10% below metric

More than 10% below metric

\* = still have inconsistencies at time of audit

TIME SHEET	Finance	100%
	Social work	96%
	Pharmacy	96%
	Admin	100%

# WINNER BEST of the BEST

## ABSTRACT C2-I

### EARLY EXTUBATION IN LIVER TRANSPLANT PATIENTS

Susan Neill, BSN, RN, UT Southwestern Medical Center, Dallas, TX

**Problem/Situation:** Early extubation, defined as removal of the endotracheal tube in the operating room (OR) immediately after surgery, has been shown to contribute to a shorter, less complex post-operative course for liver transplant patients. A recognition was made that more liver transplant patients were appropriate candidates for early extubation at our transplant center. This opportunity would improve the quality of care by decreasing Intensive Care Unit (ICU) and post-transplant hospital length of stay (LOS) while also providing cost savings and increased bed availability for the transfer and admission of other critically ill patients.

**Evaluation:** Baseline ICU and post-transplant LOS data for 2017 liver transplant patients (N=50) at our center revealed a mean length of stay in the ICU of 3.5 days and post-transplant length of stay of 10 days. A comparison was made to provide background through the Scientific Registry for Transplant Recipients (SRTR) and Vizient Top 10 liver transplant centers by volume for 2017. The SRTR data revealed median time in the hospital after transplant to be 9 days for all transplant centers in the United States. The Vizient comparison group revealed a mean ICU LOS of 7 days.

**Interventions:** No standardized protocol was in place at our transplant center for early extubation of liver transplant patients. A "Liver Transplant Early Extubation Guidelines and Reference" document was created after an extensive literature review in collaboration with surgical leadership of the transplant center, liver transplant anesthesia and the operating room. The guideline ensured consistency and established parameters for safe, early extubation of liver transplant patients and provided a tool for the multi-disciplinary team to reach a collaborative decision for early extubation. Early extubations in liver transplant recipients increased to 58% in 2018 and 81% in the first half of 2019, a striking increase from the baseline of 6% of early extubations in 2017. We then compared the following outcomes: ICU LOS, post-transplant LOS, Model for End Stage Liver Disease (MELD) score at time of transplant and the direct medical costs of liver transplant recipients that were extubated in the OR between 1/1/2018 and 6/30/2019 versus those recipients that were not extubated in the OR in the same time period.

#### Results:

Table 1. Comparison of outcomes between liver transplant recipients that were extubated in the OR to those not extubated in the OR.

Liver transplant cohort 1/1/2018-6/30/2019 *	Extubated in the OR Mean (SD) N=88	Not extubated in the OR Mean (SD) N=47	P value
Lab MELD at time of offer	21.7 (9.8)	28.6 (11.5)	<0.001
LOS in the ICU, days	2.1 (2.3)	4.2 (6.3)	0.003
Total post-transplant LOS, days	5.8 (3.4)	11.2 (13.4)	<0.001

\* Multi-organ transplant and re-transplant patients were excluded from the data collection.

**Conclusions:** Early extubation of liver transplant patients at our transplant center led to noteworthy decrease in the ICU and post-transplant LOS. There were no post-operative respiratory complications or re-intubations in the patient population. A median direct cost savings of \$34,854 per case was achieved and over 250 patient bed days were freed for backfill patients. In conclusion, we found that protocolizing clinical practice has shown to help drive process improvement and improve communication between the multi-disciplinary teams.

Scott Bennett, MS; Zachary Davis, RN, BSN; Bailor Hardman, M.D.; Keith Murray, BSN, RN, CCRN-K; Susan Neill-Fogus, BSN, RN; Chen Shi, M.D.; Leonor Sosa, RN, APRN, AGACNP-BC; Parsia Vagefi, M.D.