CATEGORY 3
CLINICAL OPERATIONS

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Primary Contact Person:
Gabriella Boulton

Email:
gabriella.boulton@nyulangone.org

Organization:
NYU Langone Health

Award Category:
Clinical, Operations

Title:
INNOVATION OUT OF NECESSITY: LAUNCHING AN INTERNAL TRANSPLANT MOBILE PHLEBOTOMY SERVICE TO ENHANCE PATIENT SAFETY IN THE MIDST OF COVID-19

Primary Author/Credentials/Organization/City/State:
Sharyn Kreitzer, MSW, NYU Langone Health, New York, NY
Gabriella Boulton, BA, NYU Langone Health, New York, NY

Problem/Situation:
Susceptibility to infection is a primary concern for all transplant patients due to the immunosuppression required to prevent organ rejection. Weekly blood work surveillance is essential to prevent, diagnose and treat rejection and/or infections. In March 2020, our hospital bore a heavy brunt of the virus surge with over 500 COVID positive patients hospitalized in early April. The presence of this highly contagious respiratory illness posed an urgent challenge in obtaining routine outpatient blood work on post-transplant patients without bringing them into the hospital.

The need to arrange home blood draws for patients was clear; however, no home care agencies or lab could service the specific needs of our transplant patients. Outside agencies experienced significant staffing shortages due to employees contracting or being exposed to COVID, while also being inundated with home visit requests from numerous other hospital systems. These barriers resulted in a 3-4 week delay from patient referral to visit. Additionally, agencies could not guarantee morning visits, which is important to obtain medication trough levels. Many agencies were costly to utilize - charging an average of $350 per blood draw. Lastly, labs processed at an outside agency would take 3-4 days to result and for these high-risk patients, potentially delaying essential treatment.

Several transplant specialty vendors began offering home blood draw services; however, these were limited to a bundled kit that could not be modified based on patient need. Additionally, the home blood draw service was only provided if ordered in conjunction with the vendors' testing kits, which the patient may or may not require.

It became necessary to create an internal mobile phlebotomy service that could meet all the needs of a multi-organ transplant program and respond quickly to changes or urgent requests. As we envisioned, an internal program could resolve many of the challenges outlined above by ensuring morning visits, resulting labs in a timely manner and interfaced directly to the patient's chart, save money, retain revenue, and enhance patient satisfaction.

Methods/Practices/Interventions:
We collaborated closely with the Outpatient Lab (OPL) to develop a workflow to ensure that samples collected from the patient at home were compliant for processing (labeled correctly, timely delivery, etc.). We created a checklist that outlined proper tubes for each test, supplies required for each visit, and instructions for specimen collection and drop-off. Three staff members volunteered (an RN, NP and MA) to serve as phlebotomists for these home blood draws. Due to decreased clinical operations, the volunteers were deployed from their regular duties with little impact to their programs. A shared encrypted spreadsheet was used as a centralized place for transplant coordinators to submit patient requests. Two Program Managers (PM) managed these requests by triaging referrals, coordinating transportation, creating personalized kits (requisitions and corresponding tubes) and dispatching the phlebotomists. Each day the phlebotomists were assigned a list of up to six patients who lived within the same county and were provided a driver to travel to each house. The driver was hired through the company contracted for organ procurement transport, and provided heighted safety and enabled multiple visits. Any issues posed by the clinical transplant team, the patient, the OPL, or the transport company were brought to the PM's attention. The PM's served as a central hub of coordination and communication, which allowed issues to be resolved quickly and enabled urgent requests to be honored.

Findings/Solutions/Conclusions:
As the chart below outlines - the mobile phlebotomy service afforded more personalized care to patients at a lower cost, while reducing risk of COVID-19 exposure by keeping patients out of the hospital and OPL:

Key Elements of Home Phlebotomy Services

	Transplant Mobile Phlebotomy	Private Phlebotomist	Transplant Vendors & Pharmacy Co.'s	Existing Home Service agencies and lab services
Cost*	Supplies = $860 Transportation = $5,000 **Total = $5,860**	Fee per visit = $350 **Total = $35,000**	Fee per visit = $395 **Total = $39,500**	Billed to patient insurance.
Schedule morning draws to obtain medication trough levels?	Yes	Yes	No	No
Wait time for services	1-2 Days	1-2 Days	2-3 Weeks	3-4 Weeks
Add on tests specific to patient's needs?	Yes	Yes	No	Yes
Provide service for dual organs?	Yes	Yes	No	Yes
Labs resulted within 24 hours?	Yes	Yes	No	No
Lab work & visits reimbursed to OPL?	Yes	Yes	No	No
Direct communication between patient and phlebotomist?	Yes	Yes	No	No

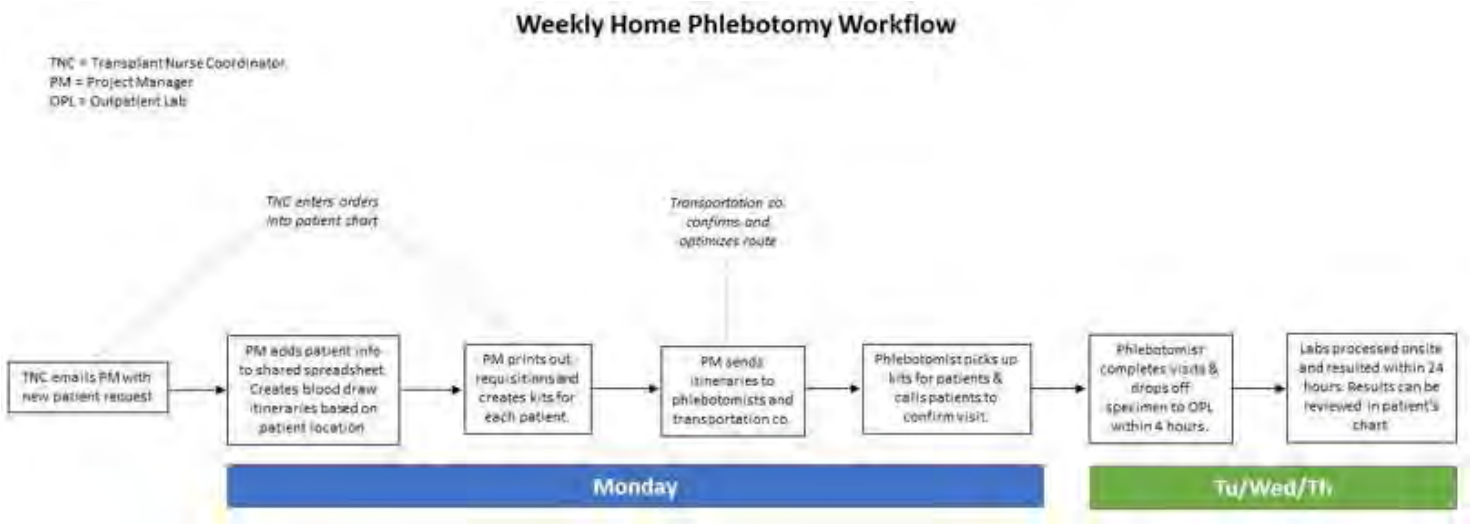
**Calculations based on 100 patient visits*

Implications/Relevance:

In addition to the clear benefits discussed, the close collaboration with OPL leadership and the transplant staff has strengthened interdepartmental relations and will create more opportunity for innovation in the future. The Transplant Institute is considering a permanent mobile phlebotomy service for patient populations such as prospective living donors and research participants. As the program evolves, the possibility of reimbursement for the Transplant Institute mobile phlebotomy service will be explored.

Primary Author/Co-Authors: Sharyn Kreitzer, Gabriella Boulton, Sheril Johnson-Locke

Figures/Charts/Tables:



Primary Contact Person:
Christina Wiggins, MBA, BSN, RN

Email:
cwiggins@augusta.edu

Organization:
AU Medical Center, Inc (GAMC)

Award Category:
Clinical, Operations

Title:
Reducing Post-Transplant Time to Stent Removal

Primary Author/Credentials/Organization/City/State:
Christina Wiggins, MBA, BSN, RN, AU Medical Center, Augusta, GA

Problem/Situation: During the kidney transplant procedure, a ureteral stent is placed to prevent surgical complications, such as ureteral stenosis and obstruction, which can lead to unfavorable outcomes and increased length of stay. Best practice is to remove the ureteral stent within 30-45 days of transplantation, preferably earlier.

Post-transplant staff schedule stent removal appointments with the urology clinic on the patient's behalf. Original practice was to generally schedule the appointment at the first post-operative outpatient clinic visit. In late 2018, transplant program staff identified issues with obtaining appointments within the 4-6 week post-operative period due to urology clinic availability. Days to stent removal was inconsistent, with many occurring outside the recommended post-operative period. In addition, some patients did not take prescribed prophylactic antibiotics prior to the stent removal appointment resulting in a need to reschedule.

Methods/Practices/Interventions: The transplant program formed a project team in February 2019 consisting of clinicians and staff involved in the stent removal scheduling process with an aim to achieve a 100% removal rate within 4 weeks of transplant, as medically eligible. The team reviewed data surrounding current stent removal practices, performed process mapping, and generated intervention ideas. Specific interventions implemented in April 2019 include:

- Immediately following transplant, the post-transplant secretary contacts the urology clinic to schedule a stent removal appointment immediately following the 30 day post-op transplant clinic visit and updates a Stent Removal task in the transplant database. At the same time, the post-transplant secretary generates a form letter with appointment time and provides to post-transplant nurse for use during discharge education.
- Prior to discharge, the post-transplant RN will perform transplant education and provide stent removal letter to patient.
- At the two week follow-up visit, the provider prescribes prophylactic antibiotics to the patient's preferred pharmacy and pharmacist provides counseling. In addition, the post-transplant RN ensures patient has return appointment on same day, prior to stent removal.
- On the day of stent removal, the patient presents to post-transplant clinic for visit prior to stent removal appointment. If patient has forgotten to take AM antibiotic dose, dose will be prescribed and administered from the on-site clinic pharmacy.
- On the day after stent removal, the post-transplant secretary marks the Stent Removal task done in the transplant database.
- On an ongoing basis, quality team monitors lists of transplanted patients and stent removal tasks within the transplant database to ensure consistent documentation.

Findings/Solutions/Conclusions: Within one month of implementing interventions, the transplant program experienced a marked decrease in time to stent removal as well as increased compliance.

- Median time from transplant to stent removal decreased from a median of 33.4 days to 28.93 days. See Figure 1.
- The percent of patients with stents removed earlier than 30 days post-op increased from 39% to 77%. See Figure 2.

Patient and staff satisfaction also increased. Combining clinic visit and procedure on the same day minimized trips to the hospital. In addition, patients who forgot to take prophylactic antibiotics (approx. 1 per month) received the medication in clinic, preventing stent removal delays and possible rescheduling. Furthermore, standardizing the process among staff allowed for less diffusion of responsibility and this process has become a logical routine workflow.

Implications/Relevance: Modification of this clinical operation improved patient safety at our organization. With increasing complexity in clinical physician order entry (CPOE) and electronic scheduling platforms combined with multiple needs for follow up after transplantation, a standardized and easy to follow process for ensuring stent removal was necessary. This straightforward approach minimized unnecessary steps in the process and provided some failsafe methods to improve on time stent removal procedures.

Primary Author/Co-Authors:
Christina Wiggins, MBA, BSN, RN; Joshua Clifton, BBA

References: N/A

Citations: N/A

Figures/Charts/Tables:

Figure 1: Median Transplant to Stent Removal Days

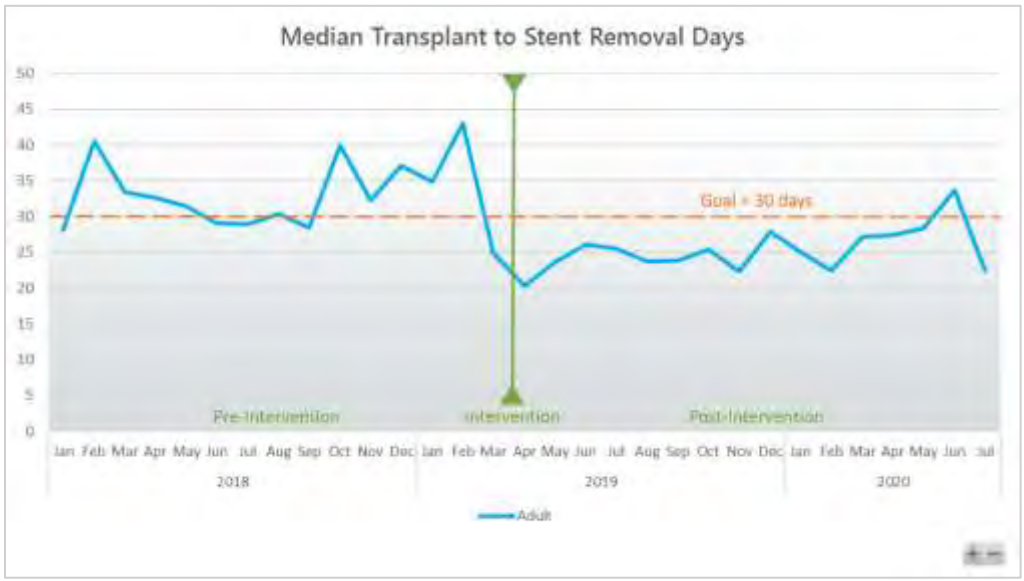
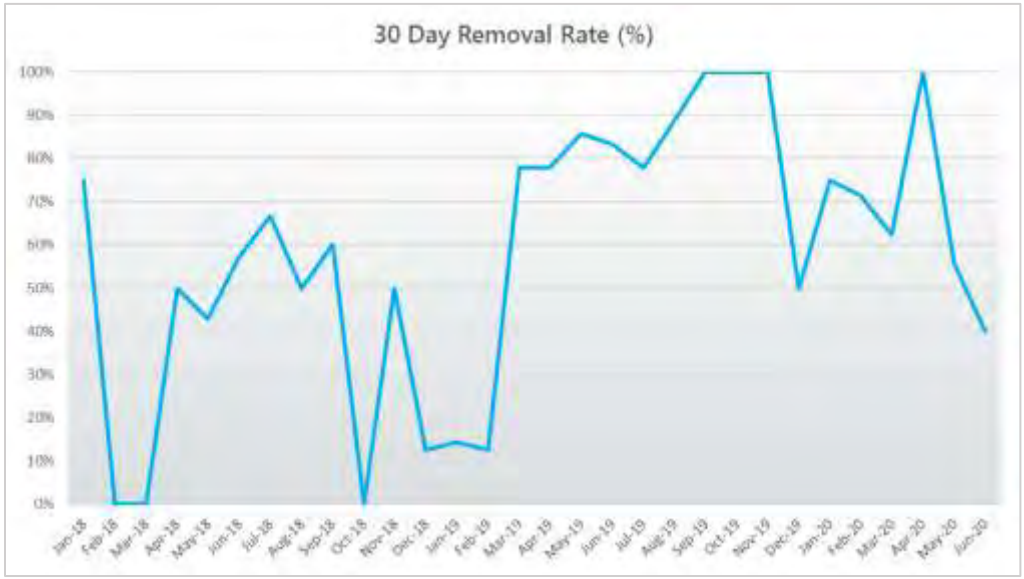


Figure 2: 30 Day Stent Removal Date (%)



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Primary Contact Person:
Anne Gabriel

Email:
anne.gabriel@cshs.org

Organization:
Cedars Sinai Medical Center, Los Angeles, CA

Award Category:
Clinical, Operations

Title: **Reducing Pre-operative Kidney Transplant Delays by Bypassing the Inpatient Unit**

Primary Author/Credentials/Organization/City/State: Anne Gabriel, BSN RN CCTC CPHQ, Cedars Sinai Medical Center, Los Angeles, CA

Problem/Situation: When an appropriate kidney match has been identified, a recipient arrives at the hospital and has historically been admitted to an inpatient unit for pre-surgical workup and preparation. It is imperative for the surgery to start on time to limit the cold ischemia time (CIT) of the organ, which has been shown to reduce the risk of graft failure and mortality (Ponticelli, 2005). Delays in coordination and transportation from the inpatient unit to the pre-operative unit were identified as factors which delay surgery start time and as areas of opportunities to improve the efficiency of the process.

Methods/Practices/Interventions: A multidisciplinary team including nursing leadership from multiple departments, representatives from admissions and ER registration, transplant coordinators, administrators, surgeons, anesthesiologists, and a process improvement expert met on a biweekly basis to understand the current process and identify opportunities for improvement.

A new process was established to admit patients directly to the pre-operative unit and bypass the inpatient unit. A preliminary process map was created to identify roles and delineate responsibilities for each process stakeholder from the time a kidney is accepted to the time the patient enters the operating room (Figure 1). The process map was revised to include the process changes during the night shift and on weekends. Admitting and pre-op order sets were written to default to 'stat' to facilitate efficient lab and x-ray results (Figure 2).

Findings/Solutions/Conclusions: Pre-intervention data collected from January 1 – August 21, 2019 revealed that only 19% (25 out of 133) of transplant patients bypassed the inpatient unit and went directly to the pre-operative unit before surgery. The majority of patients went to the inpatient unit first and spent an average of 7 hours there before being transferred to the pre-operative unit.

A new process was implemented in August 2019. From August 22 – July 30, 2020, 84% of kidney transplant patients (139 out of 165) went directly to the pre-operative area and bypassed the inpatient unit before surgery. Patient arrival time to In OR time decreased from 7 hours and 54 minutes pre-intervention, to 5 hours and 51 minutes post-intervention (a 2-hour reduction).

Prior to the new process a bed was 'occupied' and unavailable for about 7 hours before surgery, 1 hour while the patient was in the pre-operative unit, 4-7 hours during the procedure, and 2 hours in the post-anesthesia care unit (~15 hours total). In addition to increased efficiency, about 15 hours of inpatient bed time were saved per patient (~2,500 bed hours total).

Implications/Relevance: A multidisciplinary approach successfully reduced kidney transplant surgical delays. Effective interventions included a process designed to admit patients directly to the pre-operative unit, enhanced order sets to improve efficiency, and simplified admission workflows to streamline the coordination of care. An unanticipated benefit of the process improvement has been the contribution to available inpatient bed capacity during critically high census periods.

Primary Author/Co-Authors: Anne Gabriel, BSN, RN, Rusela DeSilva RN, MSN, Sarah Francis MA, MPH, Peachy Hain RN, MSN, NE-BC, FACHE, David Hildebrandt BSN, MBA, Elaine Suris RN, MSN, MBA, Lorraine Sdrales MD, Tsuyoshi Todo MD, Margaret Farrell, BSN, RN

Citations: The impact of cold ischemia time on renal transplant outcome. Ponticelli, Claudio E.
Kidney International, Volume 87, Issue 2, 272 – 275 https://doi.org/10.1038/ki.2014.359

Figures/Charts/Tables:

Figure 1 Deceased Donor Transplant Recipient Admission Process 6am – 6pm

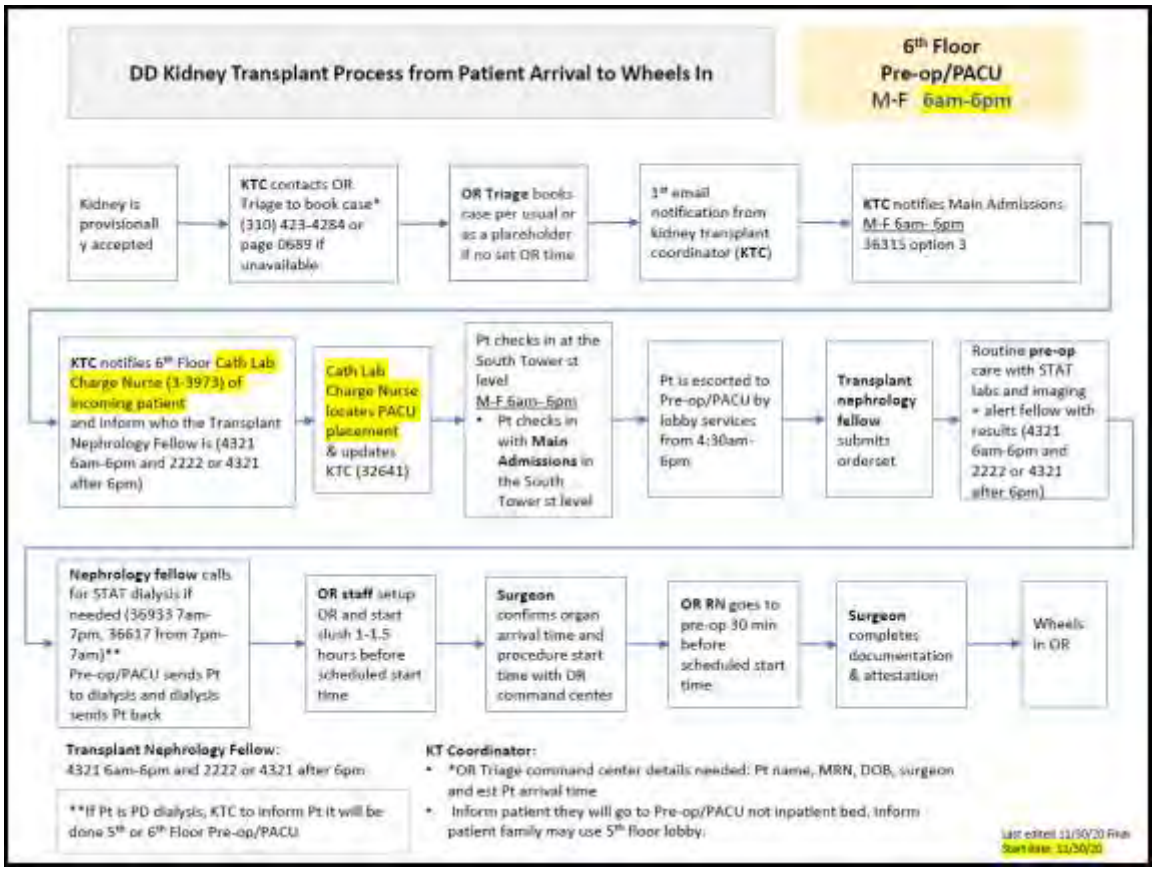
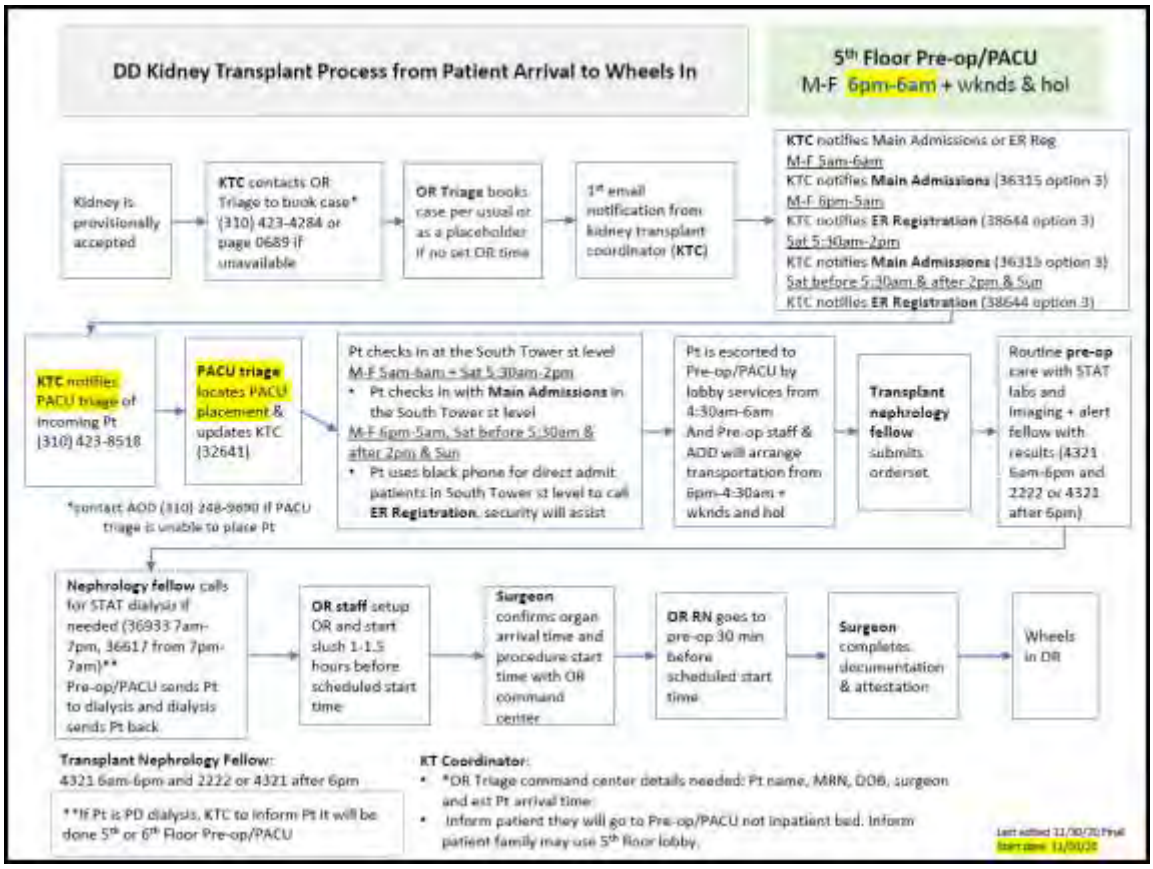


Figure 2 Deceased Donor Transplant Recipient Admission Process 6pm – 6am



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Primary Contact Person:
Taylor Goodman

Email:
tg24@buffalo.edu

Organization:
Erie County Medical Center

Award Category:
Clinical, Operations

Title:
ASSOCIATION OF PRE-TRANSPLANT PHOSPHATE WITH KIDNEY GRAFT OUTCOMES

Primary Author/Credentials/Organization/City/State:
Taylor Goodman, BS/Jacobs School of Medicine and Biomedical Sciences at the University at Buffalo/Buffalo, NY

Problem/Situation: High pre-transplant serum phosphate level is used as a criterion of non-adherence by some kidney transplant centers to evaluate candidate eligibility, but phosphate level is not always linked with clinical outcomes. Our aim is to study early clinical outcomes of kidney transplant (KTX) recipients stratified by pre-transplant phosphate level.

Methods/Practices/Interventions: This is a single-center retrospective study of adult isolated KTX recipients between 9/15/15-9/15/19 (n = 535) with recorded phosphate measurement < 1 year prior to KTX. Exclusions were death or graft loss prior to discharge (n=8) and loss to follow-up (n=2). The cohort was divided into 2 groups by most recent phosphate level (< 6 vs ≥ 6 mg/dl) based on the upper limit of normal. The primary outcome, time to all-cause graft survival, was compared using log rank and shown with Kaplan Meier curves. Secondary outcomes, including delayed graft function and serum creatinine > 2mg/dL at 3-6-and 12-months, were compared with Chi Square tests.

Findings/Solutions/Conclusions: Of 535 KTXs, 102 (19%) had pre-transplant phosphate levels ≥ 6 (Phos ≥6) and the remainder had levels < 6 mg/dl (Phos<6). Phos≥6 recipients were significantly more likely to be younger than 45 years (41% vs 21%), black (40% vs 28%), re-transplant (21% vs 12%), sensitized (43% vs 30%), requiring dialysis pre-KTX (93% vs 76%) publicly insured (66% vs 55%), receive lower KDPI scored kidneys of ≤ 20 (17% vs 8%), and receive a kidney from a younger donor (36.8 ± 14.2 vs 41.0 ± 15.3) relative to Phos<6 cases. There were no between-group differences in terms of all-cause graft survival (p = 0.8624) (Figure 1), DGF (43% vs 45%), and serum creatinine ≥ 2 mg/dl at 3m (20% vs 19%), 6m (17% vs 19%) or 12m (15% vs 16%).

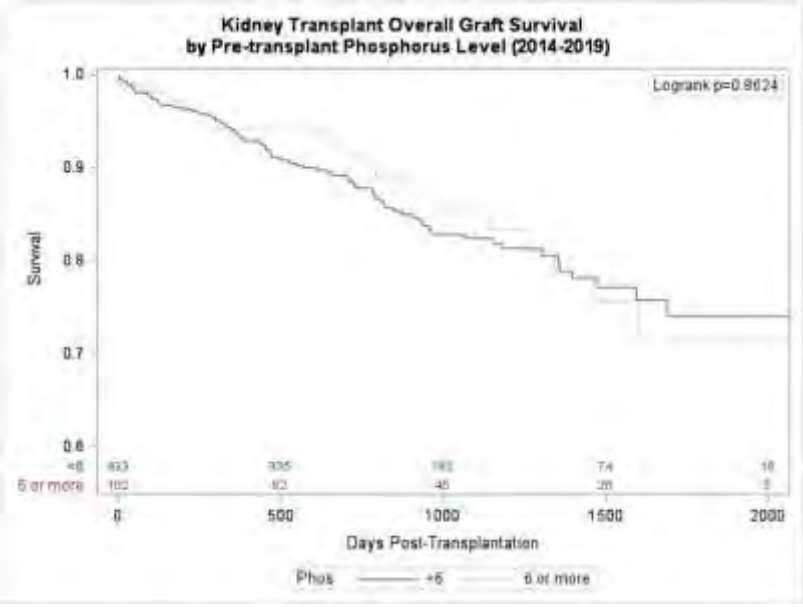
Implications/Relevance: High Pre-Transplant Phosphate levels are not associated with early post-transplant outcomes, suggesting low utility as a surrogate marker to predict non-adherence.

Primary Author/Co-Authors: Taylor Goodman BS, Jing Nei PhD, Katia Noyes PhD, MPH, Sophia Smith BA, Liise K. Kayler MD, MS

References:

Citations:

Figures/Charts/Tables:



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Primary Contact Person:
Albert Luong

Email:
aluong@ecmc.edu

Organization:
Erie County Medical Center

Award Category:
Clinical, Operations

Title:

Association of the Stanford Integrated Psychosocial Assessment for Transplantation with Early Hospital Readmission After Kidney Transplantation

Primary Author/Credentials/Organization/City/State:
Albert Luong[1], MD; Jing, Nie[2], PhD; Katia Noyes[3], PhD,MPH; Sophia Smith[4], BEc; Liise Kayler[5,6,7] MD,FACS,MS

Institution

[1]Transplant and Kidney Care Regional Center of Excellence, Erie County Medical Center, Buffalo, NY, USA

[2]Department of Epidemiology and Environmental Health, University at Buffalo School of Public Health and Health Professions

[3]Department of Epidemiology and Environmental Health, University at Buffalo School of Public Health and Health Professions

[4]Transplant and Kidney Care Regional Center of Excellence, Erie County Medical Center, Buffalo, NY, USA

[5]Department of Surgery, University at Buffalo, Buffalo, NY, USA

[6]Jacobs School of Medicine and Biomedical Sciences at the University at Buffalo, Buffalo, NY, USA

[7]Transplant and Kidney Care Regional Center of Excellence, Erie County Medical Center, Buffalo, NY, USA

Problem/Situation: Early hospital readmission (EHR) after kidney transplantation (KTX) is a quality metric and portends worse clinical outcomes. Psychosocial and behavioral factors pre-transplant are under-investigated as potential moderators of EHR. The Stanford Integrated Psychosocial Assessment for Transplantation (SIPAT) may be useful for EHR risk stratification.

Methods/Practices/Interventions: We performed a single-center retrospective cohort study of adult isolated KTX only recipients between 2014-2019 to examine the association of 30-day EHR with pre-transplant SIPAT scores and isolated psychosocial components of SIPAT. Exclusions were absence of recorded SIPAT score (n=73), graft failure during the index hospitalization (n=3), and death within 30 days of discharge (n=5). SIPAT scores were classified into 3 groups using 25th and 75th percentile cut-offs.

Findings/Solutions/Conclusions: Of 649 KTXs, the SIPAT score was <5 in 162 (SIPAT<5), 5-11 in 250 (SIPAT5-11), and ≥12 in 156 (SIPAT≥12). The SIPAT≥12 group (versus SIPAT5-11 and SIPAT<5) was significantly more likely to be Black (40%, 32%, 19%), re-transplant (91.7%, 86.4%, 81.5%), on dialysis> 3 years (34%, 26%, 18%), <college educated (62%, 47%, 39%), and receive a deceased-donor kidney (92.9%, 90.0%, 84%), respectively. There were no differences between groups in terms of length of stay (p=0.277), delayed graft function (p=0.365), or overall graft survival (p=0.285) [Figure 1]. On univariate analysis SIPAT≥12 was significantly associated with EHR (Odds radio [OR]= 2.44, 95% confidence interval [CI]:1.40-4.25), but not on multivariate analysis (aOR=1.57; 95% CI 0.91-2.70). Individual components of SIPAT that were associated with EHR, include knowledge of illness (p=0.005), psychopathology (p=0.036) and neurocognitive history (p=0.014). Pre-transplant SIPAT score ≥12 was found to be a risk factor for EHR on univariate analysis but not on multivariate analysis. Wide confidence intervals suggest that further investigation of SIPAT and EHR is warranted in a larger study.

Implications/Relevance: Early hospital readmission (EHR) after kidney transplantation (KTX) is a quality metric and portends worse clinical outcomes. Psychosocial and behavioral factors pre-transplant are under-investigated as potential moderators of EHR. The Stanford Integrated Psychosocial Assessment for Transplantation (SIPAT) may be useful for EHR risk stratification.

Primary Author/Co-Authors:

Albert Luong MD, Jing, Nie, PhD; Katia Noyes, PhD,MPH; Sophia Smith, BEc; Liise Kayler, MD,FACS,MS

References:

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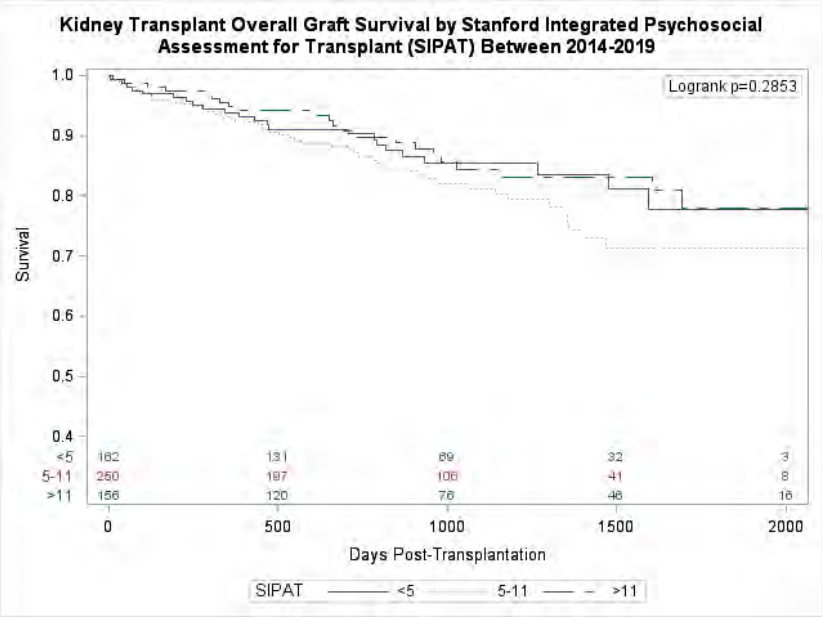
Citations: None

Figures/Charts/Tables:



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Primary Contact Person:
Sophia Smith

Email:
ssmith13@ecmc.edu

Organization:
Transplant and Kidney Care Regional Center of Excellence, Erie County Medical Center

Award Category:
Clinical, Operations

Title: KIDNEY TRANSPLANT EVALUATION AND LISTING: DEVELOPMENT AND PRELIMINARY EVALUATION OF MULTIMEDIA EDUCATION FOR PATIENTS

Primary Author/Credentials/Organization/City/State:
Sophia Smith BA, Transplant and Kidney Care Regional Center of Excellence, Erie County Medical Center, Buffalo, NY

Problem/Situation:

Patient knowledge gaps about the evaluation and waitlisting (evaluation-listing) process for kidney transplantation (KTX) leads to testing delays or non-completion, compromising transplant access. Knowledge gaps reported by patients include lack of clarity about where they are in the listing process,[1] belief they are already on the list,[2,3] unawareness that tests need to be repeated,[4] and lack of understanding of inactive status on the list.[5] In addition, knowledge gaps may also lead to negative perceptions of the transplant process and reduce motivation to complete testing.[5,6] There remains a need for effective educational tools that can be efficiently used by healthcare providers to present information to patients or that patients can access independently to understand the evaluation-listing process.

Methods/Practices/Interventions:

We developed 2 freestanding *animated* videos about the kidney transplant evaluation and waiting list process targeted to kidney transplant candidates and their caregivers. The 2 theory-informed educational animations were iteratively developed with input from experts in transplantation and communication, 20 KTX candidates or recipients, 5 caregivers, 1 anthropologist, 3 community advocates, and 36 dialysis or transplant providers. We then conducted an online pre-post study with 28 KTX candidates to measure both videos' acceptability and feasibility to improve evaluation-listing knowledge, understanding, and concerns.

Findings/Solutions/Conclusions:

Video Development. Of 25 patients who completed the cognitive interviews to inform video development, the age range was 27-69 years; 8 were male; 11 African American, 2 Asian, and 12 non-Hispanic white; 11 had completed some college; most had annual household incomes between $30,000 and $50,000 or less; 10 were potential kidney transplant recipients, 5 were caregivers, and 10 had received kidney transplantS. The following themes were identified from patient feedback about the videos: resources and support, caregiving, communication, and follow-through (Table 1). Patients identified messaging about the availability of resources and providers being there "to help you". Caregivers were described as helping to remember information and provide support. Communication topics emphasized were knowing the coordinator's contact information, reaching out, asking questions, and learning what to do. Follow-through was described as "conquering" test completion and addressing results that required further testing to "get on the list".

Video Evaluation. Of 28 patients who viewed the videos the median age was 57 years and approximately one third of participants were Black race, low income (< $30,000), < college educated, and employed. The videos were analyzed in a small one group, pre-post study. Compared with pre-exposure, the mean total knowledge score increased post-exposure by 38% (5.7 to 7.9, $P<0.001$). Pre-post exposure effect size knowledge increases were large across different levels of age, educational attainment, health literacy, dialysis /vintage, and technology access (Table 2). The frequency of positive responses increased pre-post viewing for understanding the evaluation process (25% to 61%;p=0.002) and waitlist placement (32% to 86%;p<0.001). Concerns about the participant determining whether or not they were on the waiting list placement reduced (32% to 7%;p=0.039) post exposure. After viewing the animations, >90% indicated positive ratings on trusting the information, comfort learning, and engaging.

Implications/Relevance:

Our findings suggest support for the acceptability of the educational animations and their feasibility in improving kidney transplant candidates' knowledge and understanding of the kidney transplant evaluation and listing process and reduces their concerns. In busy healthcare systems--in which health service providers have little time for education and patients have varying cognitive needs--innovative methods are needed to carry out health education using less supervision. Animations can be made available in clinics, on the internet, and to lay educators.

Primary Author/Co-Authors:
Sophia Smith BA, Beth Dolph PhD, Molly Ranahan PhD, Maria Keller MS, Renee Cadzow PhD, Thomas H. Feeley PhD, Liise K. Kayler MD, MS

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Figures/Charts/Tables:

Table 1. Themes and Representative Quotes of Messages Received from the Animations about Kidney Transplant Evaluation and Listing

Resources and Support: "It showed you everybody who will help you that you're not by yourself." **"**Use your resources that they give you." "Reach out to your social worker if she probably could plug you into whoever you need to talk to or what have you."
Caregiving: "When it said bring a family member or friend, definitely because it's a lot to process by yourself." "They will help you build up your support team."
Communication: "There's, you know, if you got any kinds of questions or any doubt on anything, you know, make sure you reach out, you know, because they will make it a lot smoother." "Saving the coordinator number. I think that is most important." "They'll tell you what you need to do to become active." "Any questions go to the coordinator and they will help you get ready."
Follow-through: "Make sure you do everything because it's a lot of steps, lot a tests you got to take, but um conquer before you, uh, you know, stress test, uh, you know, blood work, all that." "You got to make sure you got to do what you're supposed to do so you could be placed on that list because there's a lot of steps." "They'll call you and tell you and you try to fix it."

Table 2. Comparison of Participant Knowledge Scores Before and After Video Viewing

Knowledge (Range 1-7)	**Pre-test Mean ± SD**	**Post-test Mean ± SD**	**%** change	**Z score**	**Effect size (*r*) [1]**	**P value[2]**
Total Cohort (n= 28)	5.68±1.91	7.86±1.69	38%	4.2	0.57	<0.001
Education, less than college (n=10)	6.10 ±2.13	8.30 ±1.34	36%	2.6	0.57	0.120
Education, college level (n=18)	5.44±1.79	7.61±1.85	40%	3.4	0.57	0.012
High literacy/numeracy (n=19)	6.00±1.53	8.26±1.33	38%	3.8	0.61	0.012
Low literacy (n=9)	5.00±2.50	7.00±2.12	40%	2.0	0.48	0.504
Age ≥ 60 years (n=11)	5.91±1.87	7.82±1.72	32%	2.5	0.54	0.132
Age < 60 years (n=17)	5.53±1.97	7.88±1.73	43%	3.5	0.59	0.012
Dialysis- ≥ 1 year (n=13)	5.92±1.89	8.38±1.19	42%	3.1	0.61	0.024
Dialysis < 1 year (n=15)	5.47±1.96	7.40±1.96	35%	3.0	0.54	0.036
< Median technology access (n=12)	6.17±1.59	8.33±1.37	35%	3.0	0.60	0.036
≥ Median technology access (n=16)	5.31±2.09	7.50±1.86	41%	3.1	0.55	0.024
Attended transplant education (n=8)	6.00±2.07	7.63±2.33	27%	2.0	0.51	0.492
Did not attend transplant education (n=20)	5.55±1.88	7.95±1.43	43%	3.8	0.60	0.012

SD, standard deviation; IQR, interquartile range xx

[1]Wilcoxon Signed-Rank test Bonferroni correction for multiple comparisons

[2]Effect size, r = Z/N; r = Point biserial correlation. Interpretation: 0.10=small effect, 0.24=medium effect, 0.37 = large effect

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Primary Contact Person:
Nina Winterstein, MSW, LCSW

Email:
nina@healthnavigators.org

Organization:
Health Navigator Foundation

Award Category:
Clinical, Operations

Title:
Improving Well-Being for Heart Transplant Recipients: Implementation of a Patient Navigator Program

Primary Author/Credentials/Organization/City/State:
Nina Winterstein, MSW, LCSW, Health Navigator Foundation, San Francisco, CA

Problem/Situation: For heart transplant recipients and their caretakers, navigating the complexities of organ transplantation is a significant part of the transplant journey. This can include securing temporary housing near a regional transplant center, finding affordable and nutritious meals for a recovering immunocompromised patient, organizing increasingly complex medication regimens, completing necessary paperwork for disability, finding timely and reliable answers to care related questions in the immediate post-transplant period. Despite providers' efforts to treat all patients equitably, healthcare disparity exists, such that some patients experience inherent barriers to optimally navigate their healthcare due to socioeconomic inequities which may lead to worse health outcomes. We envisioned a program to provide equitable access to professional navigation services for all heart transplant patients regardless of their ability to pay. When surveyed at a single center, heart transplant recipients cited managing all their healthcare needs as a primary concern 83% of the time (n=23). To respond to this need, a patient navigator program was created. We aim to show that providing individualized navigator services following discharge from the hospital post heart transplant improves well-being for recipients.

Methods/Practices/Interventions: All heart transplant recipients were eligible for enrollment and offered navigation service prior to discharge. The program provided individualized interventions for 4-6 weeks following hospital discharge, at no cost to the recipient. Services included: immediate phone, email, or HIPAA compliant text access to a patient navigator team, personal escort to lab draws, tests and procedures, and navigator accompaniment to outpatient appointments. The program also provided: a medication organizer, vital sign and symptom log, meal delivery, local resource guide, caregiver support, translation services, social work support, peer networking, and community resource referrals. All recipients completed a pre and post-enrollment quality of life surveys as well as an exit interview about program services. We utilized a validated quality of life survey to collect descriptive data. (Forsberg, et al., 2012)

Findings/Solutions/Conclusions: In this single-center pilot study, 23 heart transplant patients enrolled in the program and completed a pre program survey. 19 recipients completed a post program survey after receiving navigation services. In this study, descriptive statistics pre program were compared with those post program. Pre program, the average quality of life reported was 47/100. 78% of patients reported they could not complete desired activities. Post program, 100% of patients reported their quality of life to be better than expected. 78% believed the program contributed to their success. Post survey analysis revealed 90% of participants would recommend this program to others.

Implications/Relevance: Results from this pilot study suggest an association of a positive impact of the patient navigator program, particularly in its ability to provide support meeting individual needs, cardiovascular team connection, and immediate access to a team member. Future work with a larger sample size is indicated to more fully assess the program's impact on quality of life. Preliminary data suggest implementation of a patient navigator program improves health and well-being for heart transplant recipients. In the future, we hope to expand our program to help a broader network of patients with critical illnesses

Primary Author/Co-Authors:
Nina Winterstein, MSW, LCSW, Krista Ramonas, MD, Deborah Franzon, MD

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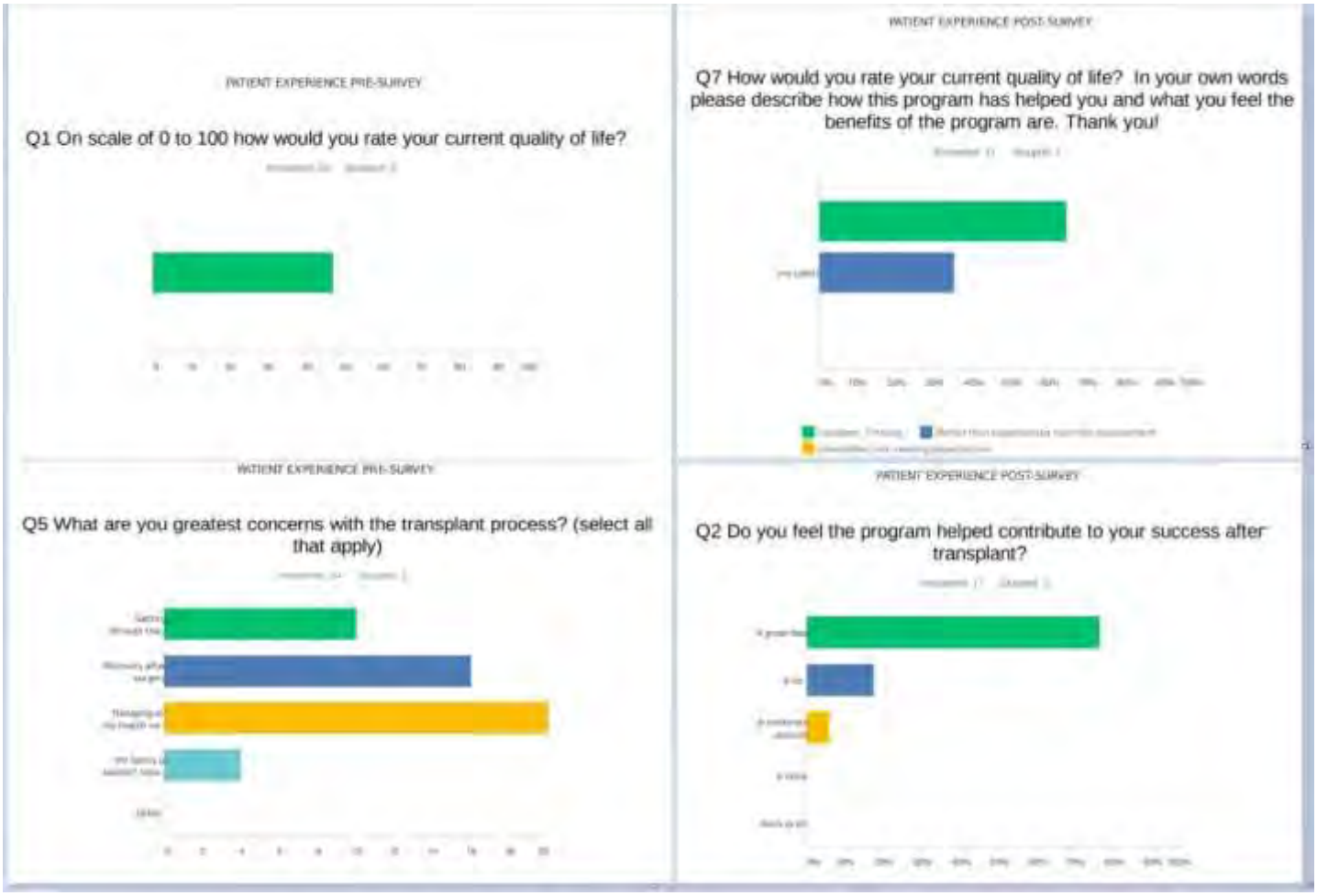
Findings/Charts/Tables:

Figure 1: Pre and Post Survey Charts



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Primary Contact Person:
Daniel Salib

Email:
dsalib@buffalo.edu

Organization:
Jacobs School of Medicine and Biological Sciences

Award Category:
Clinical, Operations

Title:
ASSOCIATION OF PRE-TRANSPLANT HbA1c WITH KIDNEY GRAFT OUTCOMES

Primary Author/Credentials/Organization/City/State:
Daniel Salib,BS, Jacobs School of Medicine and Biological Sciences, Buffalo NY

Problem/Situation: Elevated glycosylated hemoglobin **(**HbA1c) —a marker of poor blood glucose control--may indicate patient non-adherence. Transplant centers may insist on diabetes intervention prior to kidney transplantation (KTX) to influence post-transplant adherence and outcomes. This practice that may delay access to KTX unnecessarily if no correlation between HbA1c and early KTX outcomes exists.

Methods/Practices/Interventions: We retrospectively reviewed adult kidney-only transplant recipients with diabetes mellitus at our hospital between 09/15/2015-09/15/2019 that had an HbA1c within a year prior to KTX. Exclusions were death or graft loss prior to discharge (n=4) and loss to follow-up (n=1). HbA1c was dichotomized by the 80th percentile cut-off at ≥8%. The primary outcome was graft survival tested with logrank. Secondary outcomes were length of stay, delayed graft function, 30-day readmission and serum creatinine >2 at 3,6, and 12- months, tested with Chi-square.

Findings/Solutions/Conclusions: There were no between-group differences in terms of all-cause graft survival (p = 0.7844) (Figure 1), DGF (57% vs 56%), and elevated serum creatinine >2 at 3m (15% vs 22%), 6m (16% vs 21%), or 12m (11% vs 23%) respectively. It was concluded that pre-transplant HbA1c levels are not a significant predictor of all cause graft survival and secondary measures of transplant outcomes, suggesting that HbA1c is an insufficient tool to assess non-adherence.

Implications/Relevance: Using HBa1c as a marker for noncompliance in kidney transplant surgery has been a common practice with physicians. This has led to delays in the procedure due to physicians focusing on lowering these numbers in order to increase the chance of their patient's overall graft survival. While the number of participants in this project is now enough to draw such conclusions, this project was sufficient enough to begin to tell the story of how elevated HbA1c is not a true marker for patient noncompliance and should not cause a delay in transplant.

Primary Author/Co-Authors:
Daniel Salib BS[1] (Primary Author)

Jing Nie PhD[3], Katia Noyes PhD, MPH[3], Sophia Smith BA[1], Liise K. Kayler MD, MS[1,2,4]

[1]Jacobs School of Medicine and Biomedical Sciences at the University at Buffalo

[2]Department of Surgery, University at Buffalo

[3]Department of Epidemiology and Environmental Health, University at Buffalo School of Public Health and Health Professions

[4]Transplant and Kidney Care Regional Center of Excellence, Erie County Medical Center

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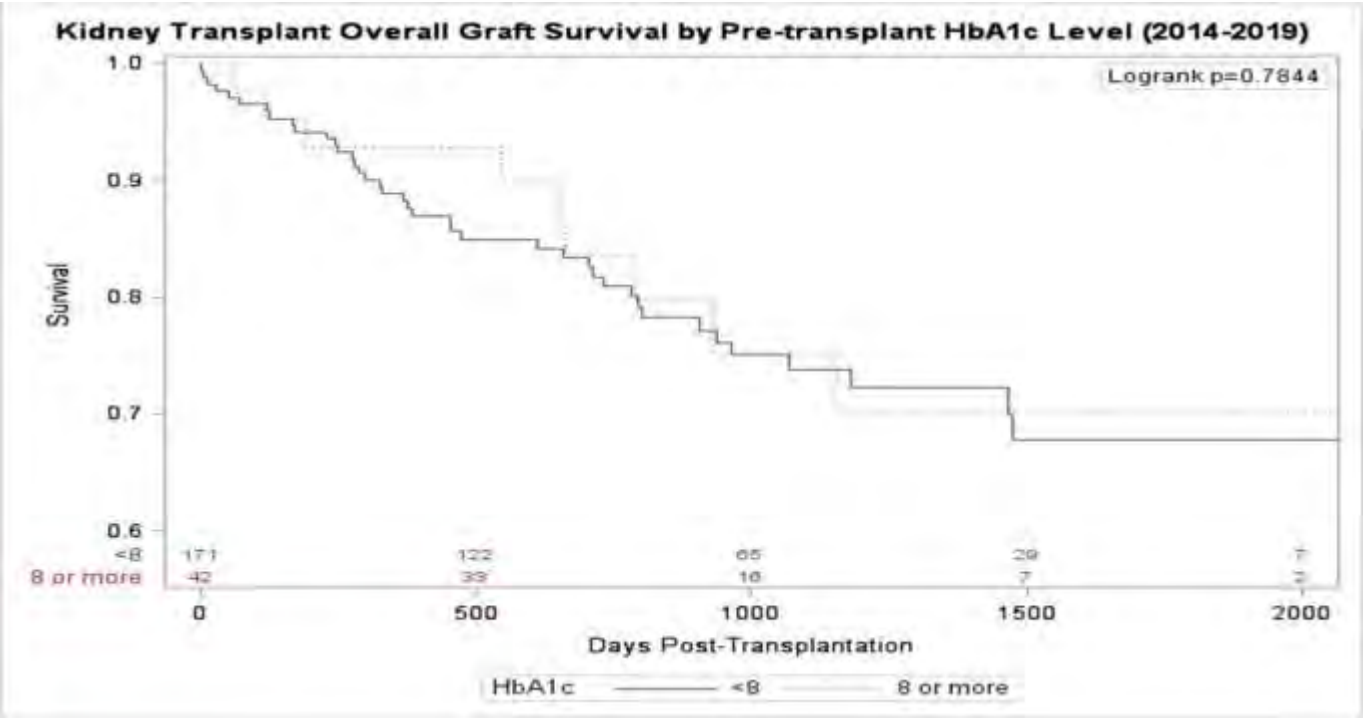

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Primary Contact Person:
Joshua Mattson

Email:
mattson.joshua@mayo.edu

Organization:
Mayo Clinic Florida

Award Category:
Clinical, Operations

Title:
Improvement on Transplant Rates Utilizing a Centralized Ex Vivo Lung Perfusion Facility: a Single Center Experience

Primary Author/Credentials/Organization/City/State:
Joshua L. Mattson, MBA, Operations Administrator, Mayo Clinic Florida, Jacksonville, Florida

Problem/Situation: Only 24% of organ donors are lung donors. Normothermic Ex Vivo Lung Prefusion allows the assessment of high-risk donor lungs [1] that could otherwise be discarded and not used for transplantation. Maintaining an EVLP program could be labor and cost intensive. Our lung transplant program participated in two clinical trial to evaluate the use of a centralized lung evaluation system (CLES) for EVLP. We report our single center experience.

Methods/Practices/Interventions: Our transplant center participated in clinical trials involving the use of centralized Ex Vivo Lung Perfusion Facility. We started utilizing this facility in 2015. The EVLP facility is located 736 miles from our transplant center. At facility dedicated specialist performed the EVLP procedure. Our transplant team had immediate and direct access to every detail of the procedure via a state- of- the-art video communication system and electronic charting systems.

Findings/Solutions/Conclusions: Our center referred a total of 35 single or bilateral lung grafts to be evaluated at the centralized EVLP facility. These 35 EVLP procedures resulted on 24 transplants, with a conversion rate (number of transplants/number of perfusions) of 69%. In addition, EVLP referrals were initiated as back up in another 12 cases that went directly to transplant from the donor site. In most of this last group of cases the retrieving team would not have travel to the donor's site based on the lung(s) condition at the time of referral if EVLP was not available as back up.

Our transplant rates between 01/01/2014 and 12/31/2014 were 76.5 per 100 person years (expected 103.9). The transplant rates between 01/01/2018 and 12/31/2019 were 254.3 per 100 person years (expected 220.8). This improvement on the transplant rates can be partially attributed to the availability of a centralized EVLP facility.

Implications/Relevance: EVLP is a technology that can increase the number of grafts available for transplant by allowing a more extensive evaluation of the lung graft(s) by the transplant team. Maintaining an EVLP facility could be cost and labor intensive. Having access to a centralized EVLP facility can allow transplant centers of different sizes increase their transplant rates and Organ Procurement Organizations (OPOs) donation rates.

Primary Author/Co-Authors: *Joshua L. Mattson, MBA & Jorge Mallea, MD, Mayo Clinic Florida*

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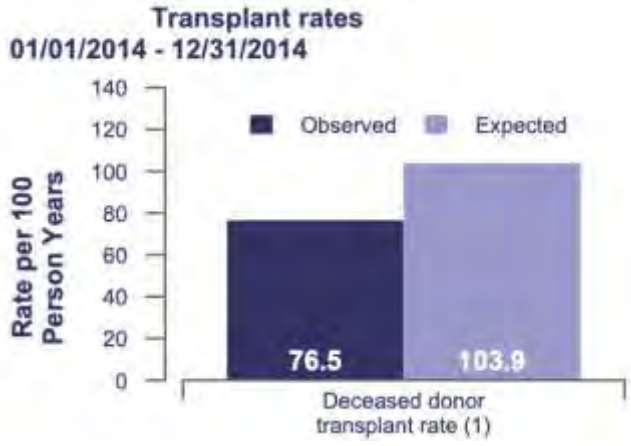

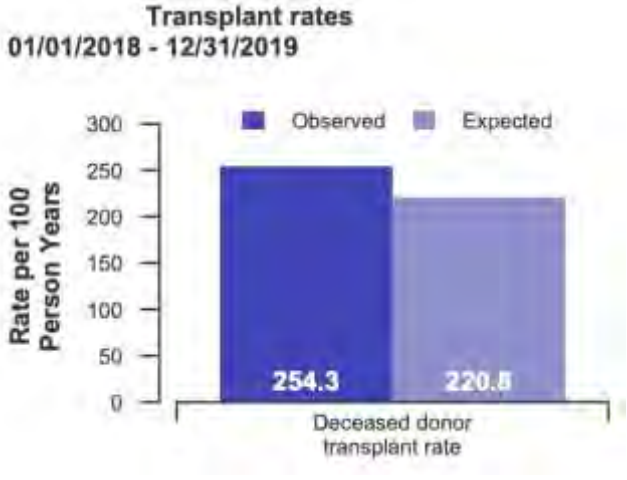

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Primary Contact Person:
Nicole M. Ali, MD

Email:
nicole.ali@nyumc.org

Organization:
NYU Langone Health

Award Category:
Clinical, Operations

Title:

Remote monitoring using mobile phlebotomy and donor-derived cell-free DNA in kidney transplant recipients during the COVID-19 pandemic.

Primary Author/Credentials/Organization/City/State:
Nicole M. Ali, MD; NYU Langone; New York, NY

Problem/Situation: The rapid shift to telemedicine and remote monitoring of kidney transplant recipients (KTRs) during COVID-19 aimed to mitigate exposure risk for this vulnerable population. dd-cfDNA is a well-established biomarker for surveillance of KTRs and is associated with allograft tissue injury, including immunological events such as acute rejection. We hypothesized that due to its high negative predictive value, dd-cfDNA could be used to risk stratify patients on a large scale, identifying those with increased risk of allograft injury and complement telehealth strategies implemented during the COVID-19 pandemic.

Methods/Practices/Interventions: Pilot program of KTRs enrolled into the mobile home phlebotomy from March – November 2020. dd-cfDNA was concomitantly performed with routine post-transplant laboratory studies at regular time intervals as per standard of care.

Findings/Solutions/Conclusions: 159 KTRs were enrolled in the mobile phlebotomy program with 1421 draws completed during the surveillance period. Patient demographics are summarized in Table 1. The median dd-cfDNA level was 0.21% (IQR 0.12 – 0.42%). 25 for-cause biopsies were performed in patients monitored with mobile phlebotomy. 12 patients had biopsy proven rejections paired with dd-cfDNA (1 borderline, 2 TCMR1A, 4 TCMR2A, 2 TCMR1B, 2 chronic active TCMR and 1 mixed AMR/TCMR). The median dd-cfDNA was 0.5% (IQR 0.2–3.26%) in patients with active rejection compared to 0.14% (IQR 0.12-0.56%) in patients with no rejection (p=0.03). There was no difference in serum creatinine between the two groups (p=0.3). The median dd-cfDNA levels in TCMR2A/1B and mixed AMR/TCR were 0.72 and 7.7% respectively.

Implications/Relevance: dd-cfDNA can optimize post-transplant care by identifying patients at risk of allograft injury and rejection. This analysis demonstrates the feasibility of mobile phlebotomy for routine surveillance in combination with telehealth strategies during the unprecedented COVID-19 pandemic. In addition, utilization of dd-cfDNA helped clinicians direct limited resources during the pandemic for allograft biopsies when paired with standard clinical markers such as creatinine.

Primary Author/Co-Authors: Nicole M. Ali, MD; Jake Miles, MD Vasishta Tatapudi, MD; Katarzyna Cartiera, RN; R. Montgomery, MD;

References:

none

Citations:

none

Figures/Charts/Tables:

Table 1: Patient demographics.

Median age (years)	59 (range: 22-79)
Gender	
Male	94 (59%)
Female	65 (41%)
Race	
African American	58 (36%)
White	52 (33%)
Asian	28 (18%)
Hispanic	16 (10%)
Other	5 (3%)
Transplant type	
Deceased donor	112 (70%)
Living donor	44 (28%)
Pancreas/kidney	3 (2%)
Median draws per patient	8 (IQR 5 -13)

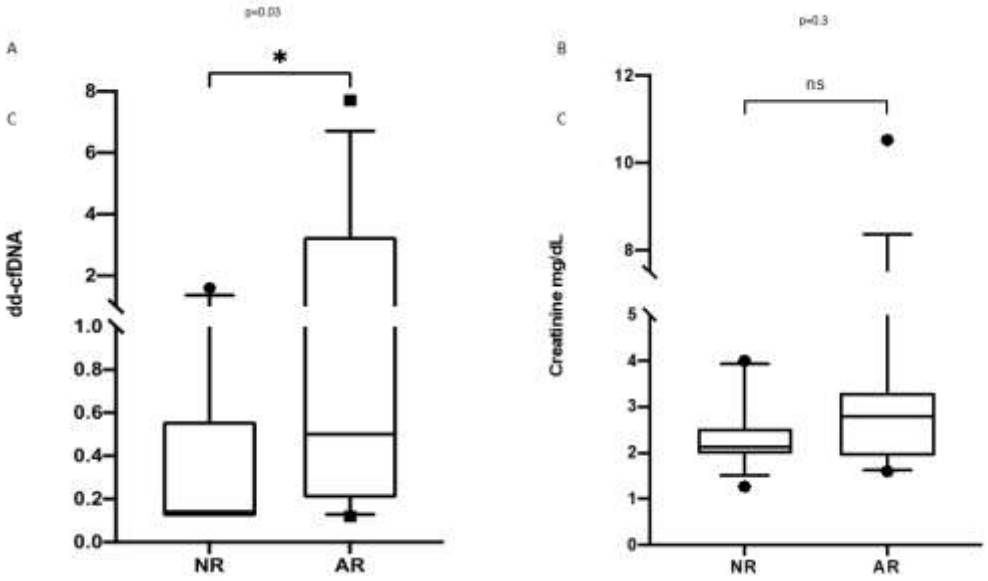

Figure 1:
A) Fraction of dd-cfDNA in no rejection (NR) versus active rejection (AR)
B) Serum creatinine in NR versus AR

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Primary Contact Person:
Patricia Hudson

Email:
pmhudson@tgh.org

Organization:
Tampa General Hospital

Award Category:
Clinical, Operations

Title:
INCREASING RECIPIENT DECEASED DONOR OPPORTUNITES: HEP C OR NOT HEP C, THAT IS THE QUESTION

Primary Author/Credentials/Organization/City/State:
Patricia Hudson, RN, BSN, CNN, CCTC Tampa General Hospital Transplant Institute Tampa. Florida

Problem/Situation: As the waiting list for deceased donor kidney transplantation continues to grow, how can the transplant program provide kidney transplant recipients all potential opportunities to receive a deceased donor kidney transplant in a safe and timely manner. All deceased donors are not equal as all kidney transplant recipients are not equal. As a high-volume program and with the loom of the change of the UNOS kidney allocation system, the transplant program needed to be proactive in assessing all potential deceased donors and making decisions to serve our recipients in innovative and progressive ways. Hepatitis C NAT positive donors historically have been utilized in transplantation of Hepatitis C actively infected recipients only. As Hepatitis C treatment modalities have evolved and proven to be effective in the cure of Hepatitis C, so has the ability to utilize Hepatitis C NAT positive donors in recipients naïve to the Hepatitis C virus.

Methods/Practices/Interventions: A multidisciplinary team was created that included Kidney Transplant Nephrologists, Kidney Transplant Surgeons, Transplant Hepatologists, Transplant Pharmacists, Manager, Kidney Transplant Coordinators and Transplant Financial Management. This team was created to assess, design, and implement a program in the use of Hepatitis C NAT positive donors in the appropriate kidney transplant recipients.

- Pre-Kidney Transplant
    - Exclusion criteria set for donors and recipients (see chart 1)
    - Universal consent to receive Hepatitis C NAT positive donor offers created for all organs in the program to utilize
    - Letter introducing the new program was sent to all recipients currently listed on the kidney transplant list
    - Educational class was created and held for those waitlisted recipients that met eligibility and were interested
    - Educational slides were added to the existing pre-kidney transplant evaluation educational class
    - Transplant providers began counseling eligible recipients during their clinic appointments
    - Recipient educated that the transplant program would cover the cost of Hepatitis C treatment medication if insurance authorization could not be obtained
    - Eligible recipients that signed the consent agreeing to receiving Hepatitis C NAT positive donor offers had their UNOS listings updated or were added to the list with this added criterion
- Time of Transplant
    - Donor call coordinator notifies the recipient at the time of the offer call if the donor is Hepatitis C NAT positive The recipient could decline the offer at this time without any negative impact
    - Upon admission for transplant, the recipient was re-educated on the risk and benefits of receiving a transplant from a Hepatitis C NAT positive donor. The recipient could decline the offer at this time without any negative impact
    - Recipient was consented to receive the transplant from a Hepatitis C NAT positive donor
    - Induction Immunosuppression with anti-thymocyte globulin (rabbit) or basiliximab
- Post Kidney Transplant
    - Maintenance Immunosuppression, opportunistic infection prophylaxis and BK protocol remain the same as other recipients
    - Check Hepatitis C PCR & Genotype day 4 then weeks 1,2,3,4,8,12,16,20,24
    - Hepatology consult during hospitalization and referral upon discharge
    - Assign to Hepatitis C registry
    - Start antiviral agents as soon as viral load is detected, insurance approved and when patient was able (sofosbuvir/velpatasvir or glecaprevir/pibrentasvir) for 12 weeks
    - Obtain following labs weekly while on antiviral agents CBC, CMP, Urine protein/creatinine, UA, CNI level/mTOR level

Findings/Solutions/Conclusions: Implementation of the Hep C NAT positive donor program has provided the kidney transplant program the opportunity to transplant 32 additional patients in a 19-month period. The average age of the recipients was 63 years with an average EPTS of 66. Majority of the recipients had a CPRA of 0 with 3 sensitized patients (CPRA 30, 39 & 70). The average waiting time for the recipients was decreased by 35 months. There was a total of 24 donors. The average age of the donor was 35.8 years with an average KDPI of 49. 5. Majority of the donors were donor after brain death (DBD) with only 2 donors being donor after cardiac death (DCD). Most kidneys were from local donors with 4 kidneys from import donors (2 kidneys from the same donor). All blood groups were able to be transplanted (see chart 2 for distribution). There were 2 graft failures, one from infarction and one from recurrent disease. The other 30 recipients have functioning grafts with the current average eGFR 67.5. There was a 100%

Hepatitis C transmission to the recipients. The average time for recipient viral load detection was 4 days. Hepatitis C Genotype distribution was: 23 recipients with 1a, 8 recipients with 3 and 1 recipient with 1b. The Hepatitis C cure rate with clearance of the virus is 97% with several patients still undergoing their treatment course.

Implications/Relevance: The ability for the transplant program to provide kidney transplants in timely, innovative, and safe ways to an ever-growing recipient population are ongoing concerns for the transplant center. As the transplant program continues to educate those eligible recipients with this option, we continue to add patients to UNOS with this criterion. Currently, 15% of those listed have agreed to receive kidney transplant offers from Hepatitis C NAT positive donors. Instituting this process has allowed the transplant program to expand the deceased donor pool and increase the chance to provide transplantation to more recipients. Being able to provide recipients with multiple deceased donor options, allows the recipient to make informed decisions regarding their treatment options of kidney transplant for their end stage renal disease.

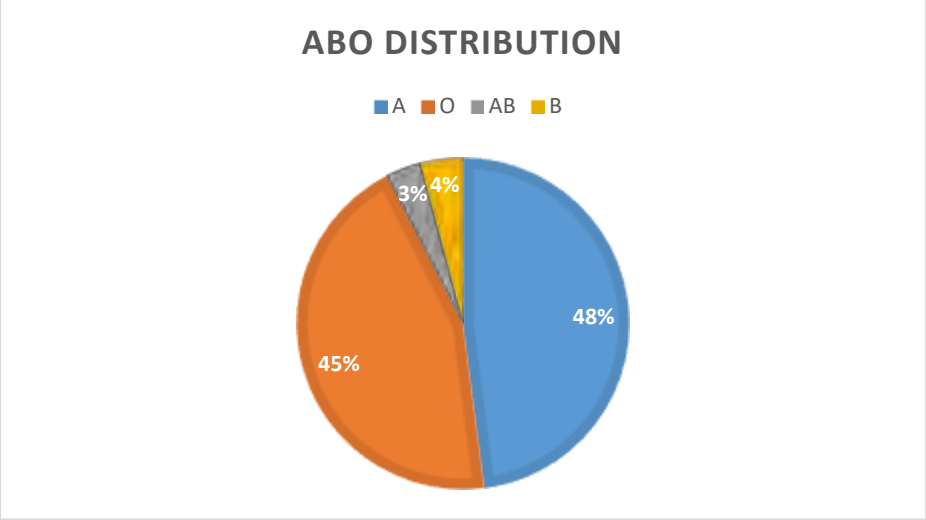
Primary Author: Patricia Hudson, RN, BSN, CCN, CCTC

Figures/Charts/Tables:

Chart 1: Donor and Recipient Exclusion Criteria

Donor Exclusion Criteria
• Co-infected • KDPI > 95 • DM
Recipient Exclusion Criteria
• Prior solid organ transplant (excluding kidney) • HIV + • Pediatrics • Recipients with living donors • Recipients who have accured wait time within one year of expected transplant (not applicable to highly sensitized) • Chronic liver disease • High chance of recurrence of FSGS or other GN • Out of State • Prior Hepatits C treatment (Hep C antibody +/ Hep C PCR -)

Chart 2: Recipient ABO Distribution



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Primary Contact Person:
Natalie Santiago Blackwell

Email:
nblackwell@tgh.org

Organization:
Tampa General Hospital

Award Category:
Clinical, Operations

Title:
Huddle Up: Implementation of tiered huddles to improve communication and expedite problem resolution

Primary Author/Credentials/Organization/City/State:
Natalie Santiago Blackwell RN, MSN, CCTC, Tampa General Hospital, Tampa, FL

Problem/Situation:

At a large transplant institute, the leadership team needed a more effective method to communicate and address daily barriers experienced by an interdisciplinary team of over 300 members. While the institute had several modalities of communication already in place, such as team meetings, town halls, and email notifications, the leadership team recognized there was an opportunity to more quickly identify and remove barriers in real time in order to provide safe, world-class patient care. To address these concerns, the institute implemented a daily tiered huddle process.

Methods/Practices/Interventions:

As part of the assessment for this project, the project leaders observed the hospital wide daily huddle process, as well as the morning huddle practice on the post-transplant inpatient unit. Parameters were established to have a daily, 15-minute huddle at 0945 am that included organ program managers, inpatient director, transplant institute leadership and ancillary team member representation. A tiered huddle structure was created (Figure 1) to identify a pathway to quickly escalate issues to the appropriate internal or external leaders in real time.

To build the agenda, the leadership group met to identify the most common daily barriers experienced by the team - diagnostic/testing barriers, patient access barriers, provider access barriers, and staffing issues- which were then converted to agenda items. The first static agenda item was safety concerns, followed by the 4 identified common barriers. The agenda also included accepted and potential donor offers reported by the Donor Center manager, as well as a report out on daily clinic operations. The huddle agenda was very scripted with time allotments for each report out to ensure the huddle did not exceed 15 minutes. Lastly, an email template was created that would be distributed daily to the entire transplant institute with a summary of that day's huddle report outs and discussions.

The huddle team did a trial, and then went live with the process in September 2019. Since that time, the transplant institute has huddled every weekday, and rarely exceeds the 15-minute timeframe. To assess the impacts of the huddle process, a survey was distributed to the teams before implementation and then 30 and 90 days after.

Findings/Solutions/Conclusions:

Prior to implementing the tiered huddle structured, 22.2% of team members surveyed reported experiencing daily barriers, at the 90-day assessment only 7.7% reported experiencing daily barriers (chart 1). Chart two demonstrates that post-implementation team members felt their direct managers and the institute leadership had a better awareness of their daily barriers. In addition, team members expressed they had a more global understanding of updates and issues across the institute. Based on the data collected, it is evident the huddle process has streamlined communication within the institute, removed barriers, and increased trust and confidence that the leadership team is listening and addressing the team's concerns.

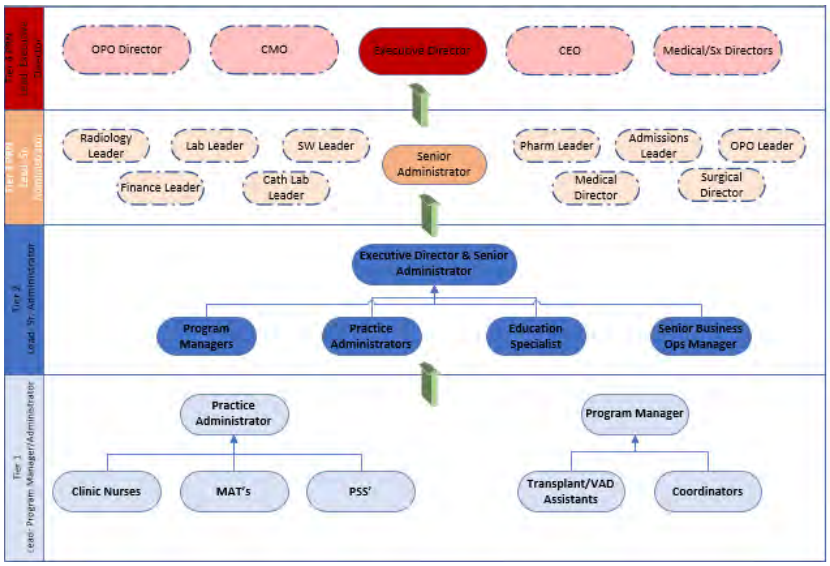
Implications/Relevance:

A daily huddle practice within a transplant program can improve communication and clinical operation efficiencies. Having this practice in place better prepared our program to address and rapidly implement hospital and transplant changes as a result of the Covid pandemic. In addition, having a structured forum to bring forward issues to leadership minimizes, and in some cases eliminates, ineffective lengthy email chains, delays in problem resolution, and unnecessary ad hoc meetings. The data supports this process can improve team member satisfaction, while ensuring a large multidisciplinary team is informed and aligned with a transplant program's goals and daily operations.

Primary Author/Co-Authors: *Natalie Santiago Blackwell RN, MSN, CCTC & Anderson Brabson MS, MHA*

Figures/Charts/Tables:

Figure 1



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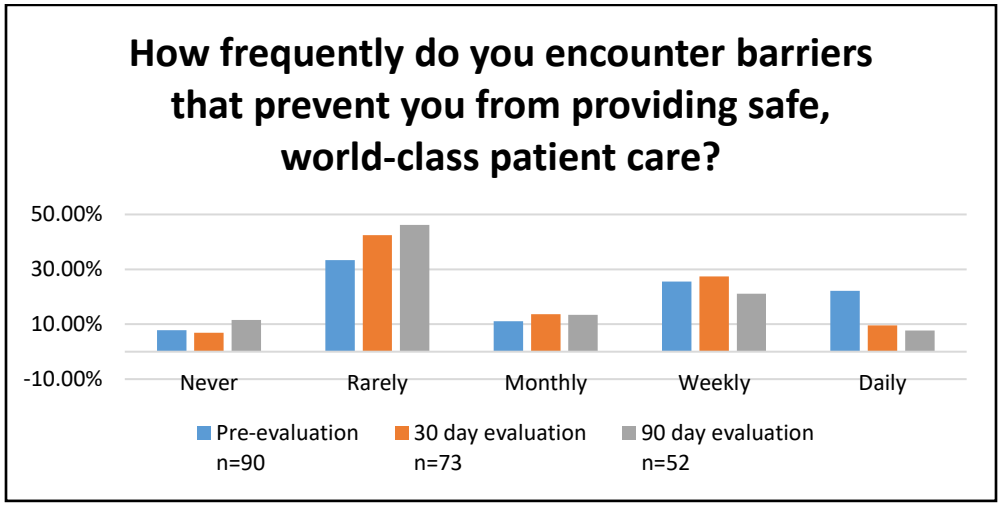

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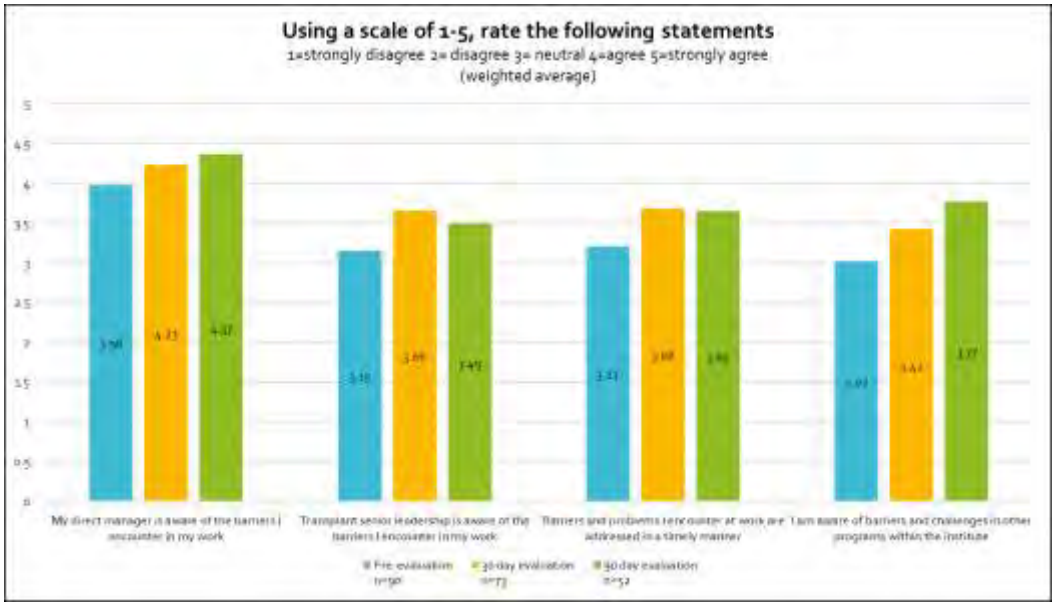

UNOS TRANSPLANT MANAGEMENT FORUM

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Primary Contact Person:
Kristi Caldararo

Email:
kristi.caldararo@jefferson.edu

Organization:
Thomas Jefferson University Hospitals

Award Category:
Clinical, Operations

Title:
Optimizing the use of Telemedicine in Kidney Transplant Program during the COVID-19 Pandemic

Primary Author/Credentials/Organization/City/State:
Kristi Caldararo/MHA/Thomas Jefferson University Hospitals/Philadelphia/PA

Problem/Situation: The COVID-19 pandemic has brought forth significant challenges in healthcare delivery. The need to care for immunocompromised transplant patients in the safety of their homes while observing social distancing, became imminent. Due diligence and thoughtful processes were warranted to prevent unwanted exposure in this high-risk population with multiple comorbid conditions.

Methods/Practices/Interventions: Telemedicine delivered through a HIPAA-compliant platform is an innovative care delivery model that brings accessible and personable healthcare to a patient's home. In response to the COVID-19 pandemic, our kidney transplant program rapidly adjusted workflows to successfully convert 98% of transplant clinics into telemedicine sessions. As per institutional guidance, we identified super users who ensured patients were "telemedicine ready" by providing real-time technical assistance and test-sessions prior to appointments. The ability to access a telemedicine platform through a simple mobile application increased patient participation by removing technological barriers and enabled seamless virtual patient and provider interaction. This rapid deployment of resources resulted in a dramatic institution-wide increase from <100 telemedicine visits/day to >3000 telemedicine visits/day. In transplant specifically, prior to COVID, telehealth visits were <1 per month. In contrast during COVID -19 pandemic, telehealth usage escalated to an average of 224 visits per month.

Findings/Solutions/Conclusions: We adopted an "agile listing model" for pre-transplant evaluations. This entailed virtual education and consenting followed by history taking and medication reconciliation by the transplant coordinator. From there, a telemedicine physician evaluation is conducted (including telemedicine physical examination, Table1) followed by social worker, dietician, and financial coordinator evaluations over a secure video conferencing platform. This model as expected has increased our inactive status 7 listings from 30% to 33% in a span of 6 weeks. However, this model will ensure that the "restart" process is smooth, with only the need for in-person physical exam for subsequent transition to active listing. The kidney transplant program is also orchestrating at-home phlebotomy for waitlisted and post-transplant patients. Additionally, we have utilized enterprise-wide infusion centers for fluids, electrolytes, transfusions, and hematopoietic growth stimulating factor administration needs, during this pandemic while observing strict sanitization, universal masking and physical distancing guidelines.

We have used telemedicine for potential live donors since 2016 with >60% telemedicine donor evaluations resulting in living kidney donation. To provide a complete virtual workup for donors, web links for educational videos are sent, followed by phone calls with the independent living donor advocate and the nurse coordinator to review the evaluation consent. Then, a telemedicine evaluation is completed by the transplant nephrologist and surgeon. A prerequisite step in this process includes evaluation by a primary physician locally. A provisional candidacy decision is made in our multidisciplinary meeting. Potential donors only have to travel to the transplant center one time, about 10 days prior to the provisional donation date to meet with various members of the team in person and complete final testing including imaging studies. This rapid virtual workup has helped make this process more financially feasible for donors by saving on travel, lodging, and childcare expenses.

A primary driver for telemedicine is the payment reform guidelines that were urgently put together under Coronavirus Aid, Relief, and Economic Security (CARES) Act which granted some leniency towards licensures and telemedicine reimbursements. Becker's Hospital Review reported Medicare telemedicine visits increased from 100,000/week to 300,000/week as of March 28, 2020 and the CMS Administrator called telemedicine a "clear example of untapped innovation". This pandemic was an unfortunate yet effective catalyst to address two major telemedicine roadblocks: consumer willingness to try new care delivery models and reimbursement challenges with virtual care. Telemedicine allowed us to safely connect with our patients uninterrupted, during their most vulnerable time.

Implications/Relevance: Across the nation, conversations have begun regarding the "second healthcare crisis" that we can expect post-COVID-19. This will be a result of healthcare that was not delivered because of cancelled surgical cases, closed preventative health clinics, and strong voluntary avoidance of healthcare institutions by patients unless necessary. As we collectively navigate this "new normal", we expect patients to be hesitant coming in for ambulatory visits as potential risk of contracting COVID-19 still looms. Our hybrid model of telemedicine and ambulatory visits is transferrable to other organizations and will enable us to provide the best health care not only to transplant patients, but to all consumers of the healthcare delivery system during these unprecedented times.

Primary Author/Co-Authors: Kristi Caldararo, MHA; Anju Yadav, MD; Pooja Singh, MD

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Figures/Charts/Tables:

Table 1. Art of observation: Physical exam tips on telemedicine:

- Vitals signs: Self-reported or observed on camera via a BP monitor, weight, temperature.
- General: Distressed, sick, healthy appearing, flushed, observe gait.
- Head, eyes, neck, and throat exam: Normocephalic, atraumatic. Camera lit nasopharyngeal exam, assess for oral ulcers, plaques, thrush. Check for equal and reactive pupils and external ocular movements.
- Lung exam: Respiratory rate, effort of breathing, intercostal retractions, use of accessory muscles, nasal flaring, paradoxical breathing, wheezing with breathing, coughing.
- Cardiac exam: BP monitor pulse check or if available "smart watch" for pulse, rhythm
- Abdominal exam: Distension, assess surgical incision for bruising, drainage, and integrity. Assess peritoneal catheter site. Look for umbilical or ventral hernia. Patient or family assisted palpation for tender points.
- Extremities: Color, ulcers, patients assisted exam of arteriovenous access (observed pulsations and self-reported thrill), evaluation of pedal edema with patient or family's help. Ask to remove shoes and socks to check feet and nail hygiene.
- Musculoskeletal: Assess for range of motion or joint swelling.
- Skin exam: Check for pallor, icterus, cyanosis, plethora. Assess for rash characteristics such as macular, papular, vesicular, or nodular. Pictures can be sent on HIPPA compliant portal.
- Neurological: Alert, awake, orientation. Assess for tremors
- Psychological exam: Mood, behavior, attention span, agitation, demeanor.

Primary Contact Person:
Heather Walther, MSN, RN

Email:
hbusch@hs.uci.edu

Organization:
UCI Health

Award Category:
Clinical, Operations

Title:
A NEW TRIAGE-BASED APPROACH TO MANAGING TRANSPLANT REFERRALS

Primary Author/Credentials/Organization/City/State:
Heather Walther, MSN, RN, UCI Health, Orange, CA

Problem/Situation: As the incidence of Chronic Kidney Disease in our population continues to rise, so does the need for increased numbers of individuals to be referred for kidney transplant evaluation. 110, 000 Americans are waiting for life-saving organs, the majority of which are waiting for kidneys; with staggering numbers such as these, it is challenging for kidney transplant programs to quickly and efficiently process the large numbers of kidney transplant patient referrals being received. With limited clinic space available for conducting transplant evaluation appointments, our organization identified a need to streamline and enhance the kidney transplant referral intake process in order to create increased efficiency and identify referrals that would meet requirements for expedition. With a backlog of hundreds of kidney transplant referrals and with no sign of referral volume declining in the near or distant future, the triage-based approach to managing transplant referrals was developed and implemented as a solution. A bi-monthly pre-transplant education class that could accommodate a larger number of patients was also implemented to allow for faster referral patient throughput. With a more efficient process in place and a transplant nurse coordinator dedicated to referral triage, the transplant program was able to catch up on referrals, schedule backlogged transplant evaluation appointments and keep up real-time on new incoming referrals.

Methods/Practices/Interventions: The transplant nurse coordinator dedicated to referral intake utilized the new triage-based referral management protocol and separated the incoming referrals into three buckets: expedite, routine plus and routine referrals (refer to Figure 1: Triaging patients for scheduling). The triage nurse coordinator was also responsible for identifying those referrals that were not candidates for transplant evaluation due to medical, psychosocial or financial criteria per the transplant program evaluation policies. Expedited referrals were identified as those patients that would be most likely to receive deceased donor organ offers quickly after being added to the waiting list due to extensive time on dialysis and/or those that had an identified living donor. Expedited referrals were given priority for scheduling of appointments with the transplant team in order to get them through the evaluation process more quickly. Routine plus and routine referrals were those patients which had less dialysis time accrued or those that just recently started dialysis and had none of the other identified factors that would make them an expedited candidate. A large bi-monthly pre-transplant education class that could accommodate up to 40 patients as compared to only 6 previously was implemented. All referral patients regardless of whether triaged as an expedite, routine plus or routine were eligible to be scheduled and attend education class as soon as possible. Due to limited clinic space availability, at least one appointment slot in each pre-transplant evaluation clinic was reserved for expedited referral patients. If at any time a referral patient's circumstances changed such as an identified living donor candidate coming forward, the patient would be re-triaged to an expedite referral.

Findings/Solutions/Conclusions: Prior to implementation of the new protocol in May 2019, the transplant program had over 350 new patient referrals backlogged along with the regularly incoming referrals that accumulated within that timeframe and who had not yet been triaged by a nurse coordinator. By January 2020, the 350 backlogged referral patients had attended the pre-transplant education class and had either been scheduled for a future appointment, attended their initial evaluation appointment with the transplant team, or had been ruled out by the triage nurse and made not a candidate. Another finding that was not anticipated but welcomed as a result of implementing the triage protocol was fewer cancellations and fewer no shows for both the larger bi-monthly education class and the transplant evaluation appointments. This created further efficiency as scheduled slots for clinic appointments had increased utilization. By utilizing the triage protocol the nurse coordinator along with administrative and financial coordinators facilitated the transplant program to begin scheduling all patient's real time as referrals came in.

Implications/Relevance: Keeping up with incoming transplant evaluation referrals is a challenge not just for this organization but for transplant centers across the nation. This triage-based protocol can be tailored to fit the needs of transplant programs both large and small in referral volume and can help to ensure that viable referral candidates are being evaluated. This triage-based approach to managing transplant referrals ensures that clinical operations for transplant programs are streamlined, the triage nurse and intake team can keep up on processing referrals real-time and ultimately this results in appropriate candidates being added more efficiently to the kidney waiting list.

Primary Author/Co-Authors:
Heather Walther, MSN, RN
Samantha Sulkoske, BSN, RN

Figures/Charts/Tables:

Figure 1: Triaging patients for scheduling

Expedite	Routine Plus	Routine
7+ years of dialysis time	4-6 years of dialysis time	<1-3 years of dialysis time
Identified potential living donor	No potential donors	No potential donors
Pre-emptive transplant	Not a pre-emptive transplant	Not a pre-emptive transplant
Untreated Hepatitis C	Does not have untreated Hepatitis C	Does not have untreated Hepatitis C
Simultaneous pancreas/kidney (SPK) transplant candidate	Not an SPK candidate	Not an SPK candidate
Will likely get an organ offer soon after listing	***Fall somewhere in the middle of Routine and Expedite – able to take blood typing into consideration as well, if available***	***Will likely be waiting several years on the waitlist after listing***

UNOS TRANSPLANT MANAGEMENT FORUM

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Primary Contact Person:
Kate Burnett

Email:
kate.burnett@unchealth.unc.edu

Organization:
UNC Health Center for Transplant Care

Award Category:
Clinical, Operations

Title:
Opening the Black Box: Building Workflows for Data Capture in Transplant Scheduling

Primary Author/Credentials/Organization/City/State:
M. Kate Burnett/BSN, RN, CCTC/UNC Health/Chapel Hill/NC

Problem/Situation: Our transplant programs include teams of specialized schedulers (TPAs) who collaborate with nurse coordinators (TNCs) to move patients through the continuum of transplant care. These patients require a variety of appointment types (ex. Procedural vs Clinic) at varying intervals based on indication and urgency (ex. ASAP vs Annual Routine). We struggled to determine the number of scheduling requests in process, to minimize inefficiencies and rework, and to easily facilitate communication between parties on the scheduling status. Team managers were not able to see the larger picture of work in progress (WIP) as it pertained to appointment scheduling for the program as a whole. We defined the following goals for the project:

- Standard Work: standardize the appointment scheduling workflow in the electronic health record (EHR)
- Communication: provide a streamlined, visible, close the loop communication method so that team members can quickly ascertain the status of an appointment scheduling request
- Visibility: provide visibility into the workload or WIP so that managers can make meaningful real time decisions to remove barriers and allocate resources appropriately.

Methods/Practices/Interventions: Our team identified the scheduling process as an improvement project that met the departmental goal of standard work and electronic health record (EHR) optimization. The chart below summarizes the variety of challenges determined in the pre intervention state analysis. The project scope was defined as starting with an appointment needing to be scheduled and ending when the appointment is attended or scheduling request withdrawn. Design included appointment rescheduling and all of the necessary communications between TPAs and TNCs.

Our proposed initial solution utilized the EHR checklist task and report capabilities to inform the workflow design. In the analysis and design phases, content expertise from stakeholders was instrumental in identifying pre intervention workflows and building future state workflows. In the build phase our project team, led by our clinical application specialist, worked closely with our colleagues in ISD Ambulatory Services to customize the EHR appointment task checklists and reports to drive the workflow. In the testing phase our stakeholders participated in testing the new workflows and EHR processes. The build and testing phases continued to cycle until we ultimately had a solution that was ready to be rolled out to the organ groups. Our transplant education coordinator created a training and rollout calendar that included transferring all currently requested appointments into the new checklist workflow. We intentionally trained each organ group separately (starting with our smaller groups) and each step brought more real time corrections/updates to the workflows and EHR build. We are currently in the maintenance phase for all organ groups, which has included limited updates and compiling a list of further optimization opportunities for a future update.

Findings/Solutions/Conclusions: The new standardized workflow provides a streamlined method for communication throughout the appointment scheduling process and instant visibility into the work for all stakeholders. The new process is a centralized place for TPAs and TNCs to manage and communicate around appointment requests. The report is visible to all team members and allows the workload to be triaged based on multiple variables such as number of attempts to reach patient, urgency of appointment, type of appointment, or the TNC or TPA assigned to appointment request.
The new workflow let us meet the original goals that prompted the project:

- Standardized workflow: allow the organ team managers to restructure work assignments based on workload fluctuation, cross training, and planning for coverage of expected and unexpected absences across all the organ groups.
- Communication: updates including orders, current status, number of attempted contacts, outcomes, and more can be communicated between the TNCs and TPAs within the context of the task.
- Visibility: data on the number of requests, attempted contacts, rescheduled requests, and compliance rates can now be seen via reports in the EHR.

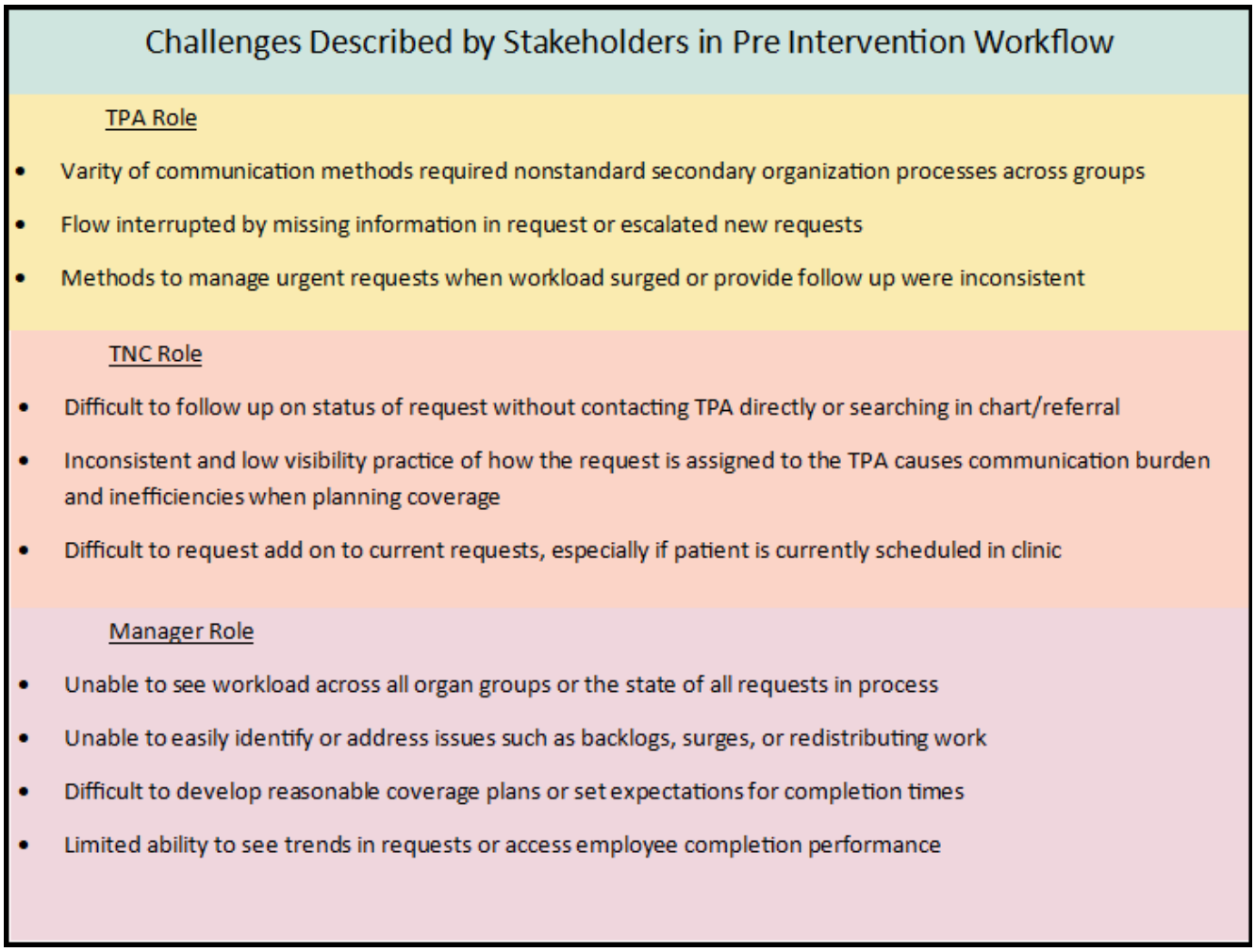
Implications/Relevance: This new workflow for appointment scheduling requests provides visibility and real time data allowing us to work to remove barriers and to effectively apply our staffing resources. Workflow design with a focus on data collection and reporting capabilities lays the groundwork for identifying opportunities for improvement projects in the future. Collaboration and buy in between all of the identified stakeholders, the project and leadership teams, and ISD Ambulatory Services is critical in successful outcomes of projects that include workflow and EHR solutions. In summary, this new workflow improves work efficiency

and job satisfaction to all stakeholders as they continue to work to provide a high quality of care for our patients throughout the continuum of the transplant process.

Primary Author/Co-Authors:

M. Kate Burnett, BSN, RN, CCTC; Ed Agnoli, BS; Abby Bryson, MBA; Jocelyn Crawford, M.Ed, CCC-SLP; Tricia DaSilva, BSN, RN; Latasha Degraffenreaidt; Sarah Duggins, BSN, RN, CCTC; Karen Stupp, BSN, RN, CCTC; Kelly Watson, BSN, RN, CPN; Megan Zink, BSN, RN

Figures/Charts/Tables:



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Primary Contact Person:
Laura Cartwright

Email:
Laura.Cartwright@unos.org

Organization:
United Network for Organ Sharing

Award Category:
Clinical, Operations

Title:
Transplant Community Use and Perceptions of Predictive Analytics at Organ Offer

Primary Author/Credentials/Organization/City/State:
Laura Cartwright/PhD, MPH /UNOS/Richmond/VA

Problem/Situation: Evaluating a deceased donor organ offer is a complex process requiring decision-makers to use a wide variety of information to estimate the risks and benefits of accepting an organ offer for their patient. Recent work has supported the idea that decision-makers could potentially benefit from a more scientifically rigorous approach to organ offer evaluation via clinical decision support (CDS) tools that provide some of these calculations[1,2].
During their March 2019 in-person meeting, the OPTN Ad Hoc Systems Performance Committee (SPC) came to a consensus on a prioritized list of new tools and resources to support the offer review and decision-making process. The SPC believes that CDS tools, in the form of predictive analytics within the match run, could improve offer acceptance, although evidence supporting this concept is currently limited.

Therefore, there is a need for tools to support clinical decision-making, and also a call from the transplant community for these tools. We conducted a survey to assess organ offer decision-makers' attitude and beliefs about the utility of predictive analytics being provided in UNet at the time of organ offer. This project received IRB approval (Pro00041626).

Methods/Practices/Interventions: The electronic survey was administered using REDCap and sent via email to the membership list of American Society of Transplant Surgeons (ASTS) and to UNOS Members listed as Transplant Coordinators, Administrators or Managers. Individuals who evaluate deceased donor organ offers were invited to participate. Survey responses were retrieved from REDCap through an application programming interface (API) and analyzed using R Studio. The survey was open from March 9 – April 3, 2020.

Findings/Solutions/Conclusions: A total of 222 respondents from 121 unique centers consented to and completed the survey. Responses were received from all 11 OPTN Regions. Slightly more than 40% of complete survey responses came from Transplant Coordinators, and more than a third were provided by Transplant Surgeons. Approximately 40% of complete responses came from participants who supported Kidney programs, and the majority of transplant surgeons were kidney surgeons (59.5%).

Only 56 (25.2%) survey respondents indicated they currently used a calculator or predictive analytics when making organ offer decisions. Slightly less than a third of transplant surgeons (n=27) indicated they currently used a calculator or predictive analytics. Of those who said they did use calculators or predictive analytics, the majority cited clinical indices or clinical calculators such as KDPI, EPTS, and MELD Score. Respondents were asked the reason they were not currently using predictive analytics in their practice, and the most common reason indicated was "None available to me" (n=76, 45.8%); only a few respondents indicated they did not trust predictive analytics (n=4, 2.4%).

Participants were asked to indicate how strongly they agreed or disagreed with statements about their current beliefs surrounding predictive analytics and factors that may influence future use. The majority of respondents indicated they believed PA could support better organ offer decision making (76%), that PA should be available to those making organ offer decisions (76%), and indicated they were more likely to use predictive analytics if they were incorporated in UNet (72%).

Twenty percent of respondents indicated they had concerns regarding UNOS incorporating predictive analytics into UNet. These concerns included increasing organ discards, accountability of centers for outcomes tied to PA, and model accuracy.

Implications/Relevance: Findings from this survey indicate that the use of predictive analytics is not pervasive in the field of transplant at this time. Respondents indicated they were most interested in predictions related to graft function and net benefit of transplant for their patient. Estimating time to an equal or better offer was reported to be the most difficult calculation to perform without access to PA tools.

The decision to not use predictive analytics appears to be driven by lack of access rather than an active decision to not implement them in programs for most respondents. Predictive analytics appear to be positively perceived by respondents of this survey, with the majority indicating they would use predictive analytics if they were available, and that they would like them available in UNet.

Primary Author/Co-Authors:

Laura A. Cartwright, PhD, MPH
Alesha Henderson, PhD, MA
Anne M. Zehner, MPH

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Citations:

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Figures/Charts/Tables:

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Primary Contact Person:
Sarah Taranto

Email:
sarah.taranto@unos.org

Organization:
UNOS

Award Category:
Clinical, Operations

Title: **Getting it Right the First Time: Tools, Tips, and Tricks to Navigate the TIEDI "Data Lock"**

Primary Author/Credentials/Organization/City/State: Sarah Taranto, UNOS, Richmond VA

Problem/Situation: In December, 2019 the OPTN Board of Directors approved the proposal from the Data Advisory Committee (DAC) to modify OPTN Data Submission policies (18.1). This includes both changes to the due dates and the implementation of a "data lock" on TIEDI forms. This policy is intended to improve both the timeliness and the quality of OPTN data. While OPOs submitted 99% of 2018 DDR forms by the due date, as shown in Figure 1, 15-35% of TIEDI forms at centers (TCR/TRR/TRF/LDR/LDF) were submitted after the OPTN due date and many centers only perform a quality review of these data twice a year, during the SRTR PSR review periods[1]. Once implemented, any data entry or modifications on the forms after the initial due date will require the extra step of manually "unlocking" the form. Centers, OPOs and histocompatibility labs need to modify their processes to successfully submit data and perform quality review within that "pre-lock" period. To assist members in successfully transitioning to these requirements, the DAC requested the OPTN develop new tools and dashboards along with educational offerings.

Methods/Practices/Interventions: These tools are designed, with input from a group of transplant professionals, for the purpose of helping coordinators, administrators and quality managers adopt these requirements into their data entry and quality review processes. The tools and education were released in advance of implementation of the "data lock", on September 9, 2020.

There are two distinct types of tools available to all OPTN members in the Data Services portal along with educational materials in UNOS Connect to guide both the newcomer and experienced manager in the tools.

- The Data Lock Preview reports are spreadsheets (Figure 2) reviewing all data elements on each TIEDI form type assisting staff with identifying missing and possible incorrect data on currently expected forms. These reports are based on the earlier "Data Validation" and "PSR Data" reports in the Data Services portal, modified to include all elements and forms, focused on forms not "locked", and updated at least weekly.
- The Data Lock Dashboard (Figure 3) allowing Administrators and Quality Managers to compare data quality (i.e. frequency of "unlocking" forms and entry of unknown/missing/incorrect responses) for specific data elements at their center to national results.

Once the policy and data lock are implemented, additional educational materials on submitting TIEDI forms and using the unlock function when necessary will be made available to members in UNOS Connect, UNOS's learning management system.

Findings/Solutions/Conclusions: Once implemented, the results of the policy will be closely monitored by the DAC and an initial review of the results will be presented here. The exact details of what is presented is dependent on the timing of the implementation of policy requirements. The metrics to be presented include the following:

- Number of members (broken down by transplant center, OPO and labs) utilizing the tools;
- Data submission compliance rates before and after implementation;
- Training sessions completed; and
- If policy is implemented prior to the meeting date, frequencies of changes following submission including reported reasons for change.

Initial results on the use of the tools (Figure 4) reveal that the spreadsheet reports were downloaded by a total of 130 unique institutions (centers, OPOs, histocompatibility laboratories.) and the kidney transplant center recipient report was the 4th most frequently downloaded OPTN report from 9/6/20-11/18/20. In addition to a review of the data results, this abstract will include the results and experience of how one transplant center incorporated these tools into their data submission and data quality review processes.

Implications/Relevance: The upcoming changes to OPTN data submission policies are significant and will require most transplant centers to make changes to their current processes. Tools and educational materials are available to help centers with the adjustment. Review of the available tools and presentation of one center's experience will assist attendees to both successfully meet these new requirements and improve the quality of their OPTN data.

Primary Author/Co-Authors: Sarah Taranto, Colleen O'Donnell Flores, MHA, Kimberly Uccellini, MS MPH, Neelam Singh, MBA, Kimberli Combs, M.Ed., John Beck, MSME, Tim Baker, Adam Bacigalupo

References: [1]OPTN public comment document for DAC proposal, https://optn.transplant.hrsa.gov/media/3102/dac_publiccomment_201908.pdf

Figures/Charts/Tables:

Figure 1.

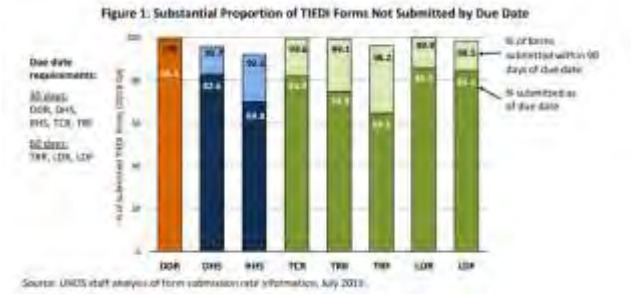
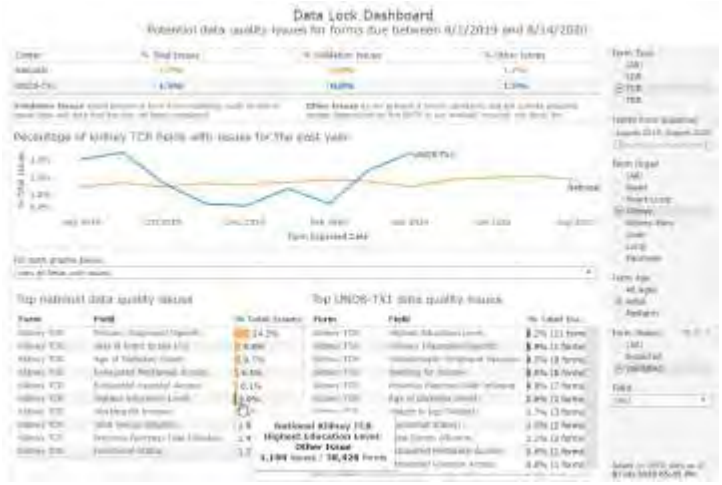


Figure 2.

Figure 3.



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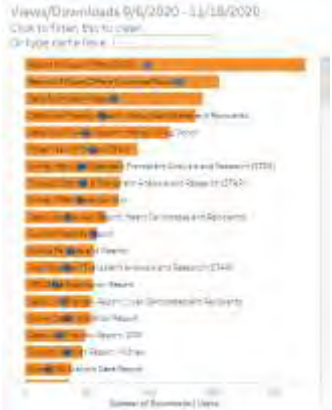

UNOS TRANSPLANT MANAGEMENT FORUM

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Primary Contact Person:
Dawn Eck

Email:
dawn.eck@vumc.org

Organization:
Vanderbilt University Medical Center

Award Category:
Clinical, Operations

Title:
Promoting Transplant Coordinator Recognition and Retention through Clinical Advancement Ladder

Primary Author/Credentials/Organization/City/State:
Dawn Eck, MSN, ACNP-BC, NEA-BC, MMHC; Vanderbilt University Medical Center, Nashville, TN

Problem/Situation:

Transplant Coordinators play a crucial role in the continuity of care for transplant patients, and directly affect outcomes for transplant patients. The transplant coordinator's role is unique in the ambulatory clinical space, and in our institution, transplant coordinators were not included in traditional institutional nursing advancement opportunities. Through staff engagement surveys, our coordinators indicated a desire for increased professional development opportunities and for recognition of high performers. We had also appreciated a decrease in retention rates. Nursing literature has associated clinical ladder advancement programs with increased with increased staff retention rates[1]. In order to increase nurse satisfaction and to increase retention of transplant coordinators, our transplant center developed a clinical advancement ladder for transplant coordinators in May, 2017.

Methods/Practices/Interventions:

A committee was created to design the advanced program structure in early 2017, which consisted of two nursing managers, the Administrative Director and Transplant Administrator. The nursing managers conducted information-gathering sessions with respective nursing teams to identify their perceptions of professional development. Also, the committee reviewed the institution's existing advancement program for non-transplant nursing staff. From this work, a set of advancement criteria was developed, as well as a comprehensive application process, including both self, peer, and manager evaluations.

The application process required coordinators to submit a letter of intent, meet with their managers to discuss criteria and timeframes for submission, and to complete a self-evaluation. Two peer reviews, as well as manager reviews, were also required to complete the application process. The committee reviewed each application, and then managers met with applicants to discuss the outcome. Criteria for advancement included demonstration of mentorship, excellence in service, high quality patient care, effective resource management, and innovation. Eligibility for advancement in the program required 2 years' of transplant coordinator experience. Successful advancement applicants were awarded a 5% salary increase, and Transplant Coordinator II designation in their job title.

Findings/Solutions/Conclusions:

The first Transplant Coordinator II applications were evaluated in July, 2017. Between July 1, 2017 and June 30, 2018, eleven transplant coordinators were promoted to Transplant Coordinator II (42.45% of total staff). As of June 30, 2020, a total of eighteen coordinators had advanced to Transplant Coordinator II, bringing the cumulative percentage of coordinators advancing to 47.76%. From the inception of the clinical advancement ladder, two coordinators were not promoted upon initial application. Both coordinators were approved upon repeat application.

Since July 1, 2017, seven transplant coordinators left the transplant center – three of those had been promoted to Transplant Coordinator II, four had not. Two of the four who had not been promoted transitioned to retirement.

Transplant Coordinator retention was 93.3% in fiscal year 2017, prior to creation of the clinical advancement ladder. Retention improved to 100% in fiscal year 2019, but dropped to 89.7% in fiscal year 2020.

Professional Development scores on employee engagement surveys improved from 3.77 in May 2017 to 3.96 in May 2018, and to 4.18 in 2020.

Implications/Relevance:

The reported cost of replacing experienced nurses is variable, with estimates of up to 1.3 times the salary of the nurse who is leaving[2]. Transplant coordinators are highly specialized, and onboarding can take up to one year or longer. There is no existing data specifically on the financial impact of transplant coordinator turnover. Implementation of a clinical advancement ladder can improve nurses' perception of their professional development, engagement, and have a positive impact on retention[1].

Our results demonstrated an increase in transplant coordinators' perception of professional development opportunities after implementation of a clinical ladder. However, we only realized a temporary increase in retention rates after the clinical ladder was implemented. Professional development is one component of overall nursing satisfaction and intent to stay. A comprehensive retention approach must be considered which includes not only professional development, but also competitive compensation and benefits, professional autonomy, positive physician relationships, presence of social support, and team integration.[2,3]

Primary Author/Co-Authors: Dawn Eck, MSN, ACNP-BC, NEA-BC, MMHC; Heather Odell, MSN, ANP-BC, NE-BC, MMHC; Marcia Sheegog, Deonna Moore, PhD, APRN, ACNP-BC

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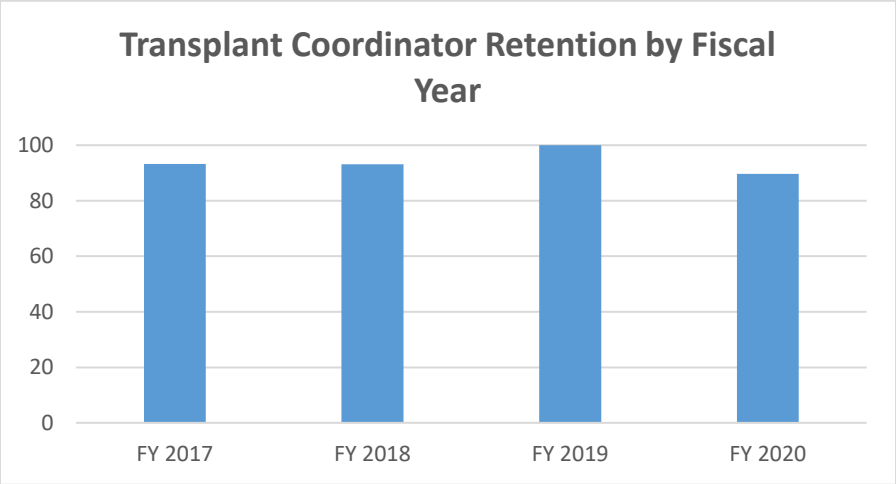
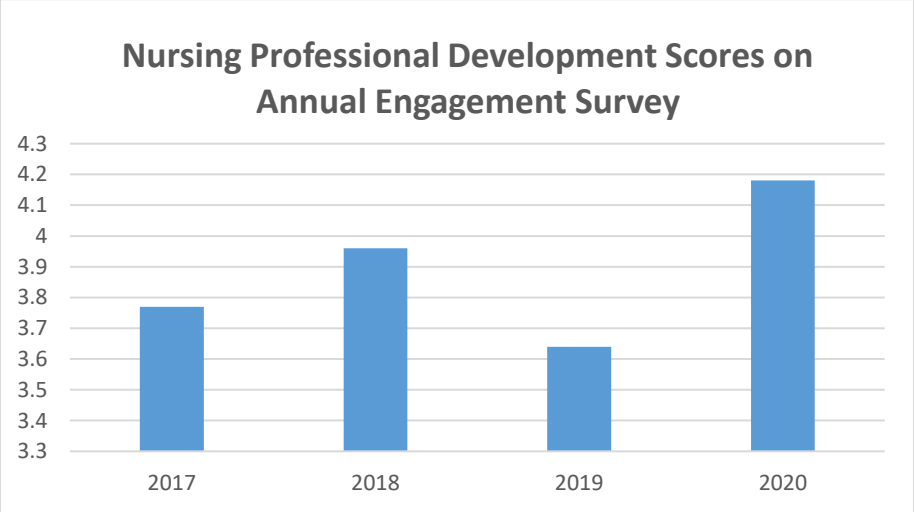
Figures/Charts/Tables:





UNOS TRANSPLANT MANAGEMENT FORUM

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Primary Contact Person:
Emily Hulburt Baker, RN

Email:
emily.hulburt@vcuhealth.org

Organization:
VCU Health

Award Category:
Clinical, Operations

Title:
Expansion of Remote Monitoring to Enhance Telehealth Capabilities

Primary Author/Credentials/Organization/City/State:
Emily Hulburt Baker/BS, RN/VCU Health/Richmond/VA

Problem/Situation: The SARS-CoV-2 (COVID-19) pandemic abruptly changed our ability to provide outpatient transplant surveillance using current protocols. Clinics closed immediately as hospitals struggled to minimize the risk of viral transmission. Telehealth was quickly implemented, and patients were asked to obtain labs at satellite locations. Unfortunately, gaps in our ability to provide usual level of care emerged. Not all patients had access to free standing labs in their communities. Additionally, this process did not completely mitigate the risk of exposure as some patients were unwilling to leave their homes. Although it was reasonable to delay routine surveillance for a short period of time, it was unclear when, or if we would be able to resume usual practices.

Therefore, we were tasked with finding an effective monitoring strategy that also mitigated patient risk.

Methods/Practices/Interventions: In March 2020, our heart transplant program located in an academic medical center in the mid-Atlantic region was asked to participate in a pilot mobile phlebotomy program. This program would send a phlebotomist to a transplant patient's home to perform gene expression profiling and donor-derived cell-free DNA testing, as well as routine transplant surveillance testing, including comprehensive metabolic panel, complete blood count, immunosuppression trough levels, viral PCR (BK/CMV/EBV), urinary protein/creatinine ratio (kidney transplant recipients) and NT-proBNP (heart transplant recipients). Their plan was to contract local phlebotomists and arranged for the specimens to be brought to an appropriate laboratory for processing.

Initial challenges centered around the process. Gene expression profiling samples must be processed and frozen within 3 hours, thus creating logistical issues, especially for patients who live remotely. Phlebotomist availability was limited by pandemic constraints. Blood draws needed to be timed to ensure trough levels were drawn appropriately. The hospital limited access to outside vendors, making delivery of offsite specimens problematic. Ordering through the electronic medical record presented its own challenge, requiring creative solutions.

Through regular communication and evaluation of the process, we managed these challenges and made appropriate adjustments. We compiled lists of laboratories that had been trained to process the samples. We solicited input from our patients to determine best practices. We created spreadsheets to group patients according to their time post-transplant and monitoring needs. This allowed us to collaborate and create a schedule for recurring visits based on our surveillance protocol.

Findings/Solutions/Conclusions: We were one of 11 centers to begin the pilot in March 2020. To date, 143 encounters occurred involving 41 patients, allowing us to monitor patients using telehealth without compromising our ability to incorporate routine transplant surveillance practices.

Ultimately, the success of this process was dependent on patient acceptance. Patient surveys conducted after blood draw encounters revealed positive experiences. "The appointment went well," "It was a good experience," and "I was very satisfied with the blood draw," illustrate overall patient satisfaction with the process.

Although this remote monitoring program was created specifically to mitigate risk during the COVID-19 pandemic, its use can continue when the pandemic is over. It will allow our program to extend surveillance capabilities, while providing patients with a secure monitoring option.

Implications/Relevance: The utilization of a remote monitoring system allows us to expand patient monitoring beyond traditional methods. In the absence of a global health crisis, there will always be patients who are unable to attend clinic, whether for transportation, financial or physical infirmity reasons. An effective remote monitoring system will have a meaningful impact on our ability to expand patient care beyond the physical clinic.

Primary Author/Co-Authors:

Emily Hulburt Baker, RN, Maureen Flattery, NP, Sarah Witthoefft, RN, Martha Lowe, RN & Inna Tchoukina, MD.

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