Spring 2022

# Evaluating Telehealth as a Means of Communicating with Living Donors and its Effect on Quality of Care

Ashley Anne Hamby RN MSN
*George Washington University*

GW Nursing

DOCTOR OF NURSING PRACTICE PROGRAM

# TITLE: Evaluating Telehealth as a Means of Communicating with Living Donors and its Effect on Quality of Care

**Ashley Anne Hamby, RN MSN**

**DNP PROJECT PRIMARY ADVISOR**

**& DNP PROJECT TEAM MEMBER(S): Cynthia L. Allen, PhD, APRN, FNP-BC; DNP Pearl Zhou, PhD, RN; Jennifer Verbesey, MD; Matthew Copper, MD; Gayle Vranic, MD; Beje Thomas, MD; Jess Vucci, and Toby Conlon**

**DATE: April 29, 2022**

The George Washington University

## Table of Contents

Abstract

***Background:*** Despite the advantages of living donor kidney transplantation (LDKT), there are barriers that potential donors face that make living donation less appealing. Research supports the use of telehealth as an effective method of enhancing access to care and building efficiencies.

***Aims/Objectives:*** To evaluate access to care, effectiveness, financial impact, and experience after implementing telehealth as a means of communicating with living donors.

***Methods:*** Utilizing a pretest-posttest design, an analysis was performed among medically cleared donors evaluated in-person between January 1, 2019 to December 31, 2019 (Control Group; N=64) and donors evaluated via telehealth (Zoom®) between January 1, 2021 to December 31, 2021 (Intervention Group; N=64). Mean outcome measures included referral date to evaluation date (access to care); evaluation date to medical clearance date (effectiveness); and estimated out-of-pocket costs related to travel and lost wages (financial impact). Telehealth Usability Questionnaires (TUQ) were used to evaluate healthcare provider/patient experience.

***Results****:* Retrospective analysis of 128 randomly selected donors showed that compared to in-person evaluations, telehealth donors were scheduled for an evaluation faster (51.67 days [SD: 18.92] vs 30.45 days [SD:14.29]; $p<0.001$); telehealth evaluations did not cause a significant delay in the time it took to clear donors for surgery; and out-of-pocket expenses for telehealth donors was significantly lower ($1029 [SD: $1331] vs $1875 [SD: $2022]; p=.006). In addition, TUQ scores from patients (N=64) and healthcare providers (N=12) revealed a high satisfaction rate with telehealth (Zoom®).

***Conclusion:*** The use of telehealth may improve access to care and alleviate the financial impact, making living donor evaluations more accessible and convenient for some interested individuals. Nevertheless, there is no best practice guidance available for living donor evaluations via

telehealth. Collaborative efforts are needed to advance regulatory policies and ongoing assessment is needed to ensure telehealth remains a safe and effective option for evaluating donors.

# Evaluating Telehealth as a Means of Communicating with Living Donors and its Effects on Quality of Care

This quality improvement study took place at a highly recognized university hospital and transplant center located in Washington D.C. specializing in adult kidney transplantation (≥ 18 years of age) and living kidney donation. As a nationally ranked Center of Excellence, our organization plays an active role in overcoming the barriers to transplantation. Kidney transplantation is the preferred treatment for end stage renal disease (ESRD) patients and is associated with increased quality of life and reduced morbidity and mortality compared with dialysis (Neipp et al., 2006). Despite strong evidence for improved quality of life and survival after transplantation, there is a large gap between the number of patients who need a kidney transplant and the number of available organs (Kucirka et al., 2012). As the national deceased donor waitlist continues to grow, the transplant community has supported living kidney donation as an advantageous solution to solving the organ shortage crisis, and additionally, has recognized the notable advantages a living donor kidney transplant (LDKT) offers recipients compared to a deceased donor transplant. Telemedicine practice has surged dramatically across transplant centers in the U.S. because of the COVID-19 pandemic in efforts to sustain access to kidney transplantation and maintain continuity of care with heightened public health consciousness. Telemedicine has allowed our transplant center to connect safely with our donors to ensure contact was uninterrupted, but it has also highlighted the positive impact Telehealth can have on addressing donor-reported barriers in access to kidney donation. Nonetheless, prospective evaluation is needed to determine whether reliance on telehealth for communication with donors affects quality of care including access to care, effectiveness, financial impact, and experience.

## Background and Significance

Per the Organ Procurement and Transplant Network (OPTN), there were almost 95,000 men, women, and children registered on the national transplant waitlist for a kidney transplant in 2019, but there were only 23,401 kidney transplants performed (16,004 transplants from deceased donors, and 7,397 transplants from living donors) (OPTN, 2020). Depending on what region of the country a patient lives, the average wait time for a deceased donor kidney transplant can be between 5 to 7 years (Saran et. al., 2017). The advantages of a living donor kidney transplant versus deceased donor transplantation are significant allowing for earlier transplantation and the greatest long-term survival (Garrick, 2007). Despite this, there are several barriers that potential living donors face that make living donation less appealing. Many donors incur out-of-pocket costs during evaluation, surgery, and recovery, including costs for travel, accommodation, and time off work, resulting in financial loss. Evidence across multiple studies demonstrate that up to 96% of donors have reported out-of-pocket costs with a range of $2,000-$8,000 (Tietjen et al., 2019). The transplant community continues to look for ways to improve living donor evaluation programs and advocate for the enactment of federally implemented living donation policies, which would decrease the financial obstacles that discourage individuals from donating and would significantly help address the organ shortage crisis.

### Living Donor Evaluation Process (In-person vs Telehealth)

#### In-person Evaluations

Prior to March 2020 before the pandemic, in-person evaluations were the standard of care and the only option available at our transplant center. Regardless of distance from Washington D.C., potential donors were scheduled for a *Full-Day* (~7:00 AM to 4:30 PM) in-person living donor evaluation including a fasting lab appointment, donor education class, one-on-one

consults, EKG/Stress Echo, Abdominal CTA, and a Chest X-ray. In-person living kidney donor evaluations took place twice weekly, on Wednesdays and Fridays. A max of 5 potential donors were scheduled for each session. If a donor was medically cleared, they would also be scheduled for an in-person pre-surgical consult/lab appointment 7-10 days prior to their scheduled surgery date. Furthermore, all donors are required to complete federally mandated follow-up visits at 1-week, 6-months, 1-year, and-2 years post donation. These follow-up requirements were also only scheduled as in-person appointments and resulted in most donors making at least four additional trips to the transplant center after their kidney donation surgery.

**Telehealth Evaluations**

After March 2020, to mitigate infection and spread of COVID-19, we transitioned in-person appointments to telehealth visits through the virtual platform, Zoom®. Potential donors are now scheduled for a *two-part* evaluation, planned consecutively on two separate days: (Part-1) a telehealth evaluation to complete donor education class and one-on-one consults with the living donor team (~8:30AM to 12:00PM), and (Part-2) a testing day at our hospital including fasting labs, EKG/Stress Echo, Abdominal CTA, and Chest X-ray (~8:00 M to 12:00PM). If the potential donor lives out-of-state, labs are completed at a Quest Diagnostics facility and diagnostic testing can be set up at a National Kidney Registry-affiliated transplant center close to where the potential donor lives, if there is a center near them. (The NKR is a nation-wide organization dedicated to increasing the number of kidney transplants from living donors and improving donor-recipient matches. There are 80+ transplant centers across the U.S. affiliated with the NKR helping to facilitate kidney transplants.) Telehealth living donor evaluations take place twice weekly, on Wednesdays and Fridays. On average, 5-6 potential donors can be booked for each session, but we frequently accommodate more because our evaluation capacity is not

affected by the amount of space available in the transplant clinic, which was often experienced with in-person evaluations. If a donor is medically cleared, they are also scheduled for an in-person pre-surgical consult/lab appointment 7-10 days prior to their scheduled surgery date at our hospital. Federally mandated donor follow-up visits at 1-week, 6-months, 1-year, and-2 years post donation are now being done though Telehealth as well.

## Needs Assessment

A SWOT Analysis was performed to identify organizational barriers and facilitators to successfully implement this quality improvement initiative. This activity is important to identify what the organization does well, and where improvements are needed to ensure the organization's success going forward. Living donation practice carries additional responsibilities for transplantation programs, given the potential risks to healthy donors undergoing a surgical procedure for the benefit of another person, and the risks of disease transmission to an immunosuppressed recipient. Efforts to develop, update, and follow best practices must be consistent to make sure living donor evaluations and LDKTs remain as safe as possible, and serve and support the best outcomes of donors and their recipients. To ensure the increased utilization of telehealth observed during the COVID-19 pandemic is not squandered, lessons from this period of deregulation need to be thoughtfully extracted. Some modifications, such as waiving components of HIPAA, were clearly intended for a crisis but can suggest areas in which sustained regulatory change could be beneficial. [See Appendix A: SWOT Analysis]

### Facilitators

Our transplant program consists of a multidisciplinary team of nationally recognized surgeons and medical specialists as well as transplant coordinators, social workers, and dieticians committed to guiding and supporting patients and their loved ones through the transplant process

and offering patients their best chance for recovery and an improved quality of life. We are a highly trusted transplant center in a very competitive market. Out of five transplant centers in the Washington D.C. area with living kidney donor programs, our program consistently outperforms its local competition. Not only that, we are one of the highest volume transplant programs in the United States and are also a national leader in paired kidney exchange and the management of recipient and donors who are incompatible. In 2020 alone, our organization completed 106 living donor surgeries during the COVID-19 pandemic.

Telehealth measures have been in place at our transplant center and have been utilized as the standard for evaluation since March 2020 (i.e., no resistance to change). Leadership and other stakeholders have been supportive of telehealth, however further evaluation was needed to assess the quality of care. Research shows that telehealth interventions offer an evidenced-based approach to providing patient education, timely communication, and linking dispersed healthcare teams. Many studies have also demonstrated that telehealth is cost-effective.

**Barriers**

The emergence of new telehealth-related capabilities and their integration into care-delivery systems presented exciting opportunities to enhance value-based clinical care, health promotion, and disease prevention. However, they can also present challenges as health professionals adapt to innovations in consumer technologies, integrate these solutions into clinical workflow, seek evidence-based guidance for decision making, and manage the evolving relationships between care teams and their patients. With reservations of added job responsibilities, a possible unwillingness of health professionals and/or support staff to deliver telemedicine services is a potential threat. Staff turnover could also be a concern as all new hires would need to be trained on telemedicine technologies, requiring additional time and resources.

Additionally, one of the most immediate threats is the possible reluctance of the patient population to use telemedicine services. Many may lack access to technologies, and even among those that have such access, there may be a lack of comfort in the use of such technologies (i.e., older age).

## Problem Statement and Project Purpose

The COVID-19 pandemic initially had profound impacts on all aspects of transplantation, and this impact was particularly notable for LDKTs. The pandemic was an unfortunate yet effective catalyst to address two major telemedicine roadblocks: consumer willingness to try new care delivery models and insurance coverage. Telemedicine allowed our transplant program to connect safely with our donors and ensure contact was uninterrupted. In fact, during the height of the COVID-19 pandemic, we performed more kidney transplants than any other hospital in the U.S., and successfully safeguarded all its transplant recipients and living organ donors, from contracting COVID-19 related to an evaluation, surgical, or hospital admission related activity. However, analysis was needed to determine whether reliance on telehealth for communication with donors affects quality of care. As a leading Living Donor Transplant program, it is our duty to continue to appraise additional means of decreasing obstacles to living donation while consistently providing the most economical and highest quality of care. To maintain momentum for telehealth services that has resulted from the COVID-19 pandemic, the U.S. cannot revert to pre-pandemic telehealth regulations. Neither can the U.S. simply adopt the changes because they lack nuance to support clinicians while ensuring safety and privacy for patients. Clinicians deserve access to a more complete body of evidence on telehealth care as they make important decisions with, and on behalf of, their patients. Patients cannot realize the benefits of telehealth if physicians are not incentivized to maintain telehealth practices after COVID-19. Telehealth faces

many legal and regulatory hurdles including large variations in rules, regulations, and guidelines for practice from state to state. This variability contributes to the confusion for providers engaged in the practice of telehealth and quality evaluation must be built into the telehealth process. The purpose of this study was to answer the following clinical question: Among potential living kidney donors, what is the influence of telehealth evaluations versus in-person clinic evaluations on quality of care including access to care, financial impact, effectiveness, and experience?

## Goal, Aims, and Objectives

The goal of this study was to evaluate the impact of using telehealth as the primary means of communicating with living donors during evaluations (and follow-up appointments) and its effect on quality of care versus in-person evaluations. To measure quality of care in a meaningful way, the objectives were chosen to align with national quality standards by using National Quality Forum (NQF) metrics. The 2017 NQF report, *Creating a Framework to Support Measure Development for Telehealth*, provides a measurement framework organized into four main domains: (1) access to care, (2) financial impact/cost, (3) effectiveness, and (4) experience (NQF, 2017). Quality of care crosses all these domains (e.g., untimely care represents poor-quality care, ineffective care represents low-quality care). The NQF report focuses on telehealth not as a new type of health care, but rather as a new method for delivering existing models of health care. The results were used to illuminate the benefits and/or harms of continuing donor telehealth evaluations long-term after the pandemic.

### Project Objectives

1. **Evaluate Access to Care**: Evaluating access to care addresses whether the use of telehealth services allows individuals to be evaluated for living kidney donation efficiently.

2. **Evaluate Effectiveness:** Evaluating effectiveness addresses the impact of telehealth on health outcomes. For this QI project, effectiveness refers to the capability of telehealth to successfully evaluate potential living donors and medically clear them for donation surgery.
3. **Evaluate Financial Impact:** The financial impact accounts for the estimated cost savings and benefits of telehealth such as a decrease in travel costs and less time lost at work (e.g., lost wages) for the donor.
4. **Evaluate Experience of Living Donors:** The experience of telehealth represents the usability and effect of telehealth on donors, and whether the use of telehealth results in a level of care the living donor expects.
5. **Evaluate Experience of Health Care Providers:** The experience of telehealth represents the usability and effect of telehealth on health care team members, and whether the use of telehealth results in a level of care the health clinicians expects.

**Aims**

1. **Aim #1:** Telehealth evaluations will improve *access to care* by decreasing the average timeframe (mean # of days) between the date of referral (DASH questionnaire submission date) to the donor's scheduled evaluation appointment, after 1 year of telehealth implementation.
2. **Aim #2:** Telehealth evaluations will maintain *effectiveness* by producing a similar timeframe (mean # of days) between the living donor's evaluation appointment and the date the living donor is deemed eligible for donation/cleared for surgery, after 1 year of telehealth implementation. (In other words, 2-part telehealth evaluations will not cause a

significant delay in the average time it takes to medically clear the donors for surgery, when compared to full day in-person evaluations.)

3. **Aim #3:** Telehealth evaluations will improve the *financial impact* experienced by living donors by decreasing the average (mean) out-of-pocket costs of travel and lost wages, after 1 year of telehealth implementation.
4. **Aim #4:** Potential living donors will report an overall positive *experience* with telehealth (Zoom ®) over a 10-week time-period. A "positive" experience will be presumed by a mean average score of ≤ 5.5 per question and mean average score ≤ 5.5 in each domain of (1) usefulness, (2) ease of use, (3) effectiveness, (4) reliability, and (5) satisfaction on a Telehealth Usability Questionnaire (TUQ) (7-point Likert scale).
5. **Aim #5:** Health care providers (including Surgeons, Nephrologists, Coordinators, and Social Workers) will report an overall positive *experience* with telehealth communications on a one-time survey distributed during the month of December 2021. A "positive" experience will be presumed by a mean average score of ≤ 5.5 per question and mean average score ≤ 5.5 in each domain of (1) usefulness, (2) ease of use, (3) effectiveness, (4) reliability, and (5) satisfaction on a Telehealth Usability Questionnaire (TUQ) (7-point Likert scale).

## Review of Literature

An appraisal of evidence was conducted to assess the influence of telehealth versus in-person clinic visits on access to care, financial impact, effectiveness, and experience. The George Washington University's librarian was consulted during the literature search to identify appropriate databases and search terms. Studies examining telehealth were first searched and identified from PubMed and CINAHL which were both accessed through the Himmelfarb Health

Sciences Library website. The keywords used in searching for appropriate studies were telehealth, telemedicine, quality of care, patient satisfaction, cost effective, access to care, and care effectiveness. Additionally, in PubMed, the search strategy included MeSH terms to capture all pertinent articles. The search details included: (telehealth appointment [MeSH Terms]) AND (in-person appointment [MeSH Terms]), (telemedicine [MeSH Terms]) AND (quality of care [MeSH Terms]), (telehealth [MeSH Terms]) AND (cost effective [MeSH Terms]), (telehealth [MeSH Terms]) AND (patient satisfaction [MeSH Terms]), (telemedicine [MeSH Terms]) AND (care effectiveness [MeSH Terms]). After an extensive database search was completed, a manual cross-referencing of appropriate articles was performed to find other applicable studies which led to exploring specific journal repositories including Wiley Online Library, JAMA Network, and Sage Journals for additional appropriate articles.

After duplicates were removed, ten journal articles were reviewed, including seven randomized control trials, two non-experimental, cross-sectional surveys, and one systemic review. All studies were published within the last ten years. A synthesis of the outcomes from the studies selected support findings from additional literature which shows a positive association between telehealth and access to care, effectiveness, financial impact, and experience. The studies selected showed a high level of evidence (7 out of 10 studies) and good quality ratings indicating consistent data and strong recommendations, which can be applied to most patients in most circumstances.

Overall, the findings from the selected studies suggest that telehealth offers tremendous potential to transform the healthcare delivery system by overcoming geographical distance, enhancing access to care, and building efficiencies. Regarding financial impact, Wilkinson et al. (2019), found travel burden was decreased for home telehealth participants with a savings of

58.2 miles per visit. Dixon et al. (2016) and Gonzalez Garcia et al. (2019) agreed that a telehealth intervention was likely to be cost-effective. Concerning effectiveness and access to care, Noel et al. (2020) reported that 100% of Telehealth patients found the intervention to be valuable, 98% if given the opportunity, reported they would continue using telehealth to manage their healthcare needs, and 94% reported the remote patient monitoring technology was useful. Additionally, Salisbury et al. (2016) found that compared with participants who received usual in-person care, participants who received the intervention (telehealth) reported reduced anxiety and improved access to health support and advice. Furthermore, according to Isautier et al. (2020), respondents perceived telehealth as moderately useful to very useful for medical appointments. Regarding experience, Wilkinson et al. (2019) found significantly higher satisfaction for telehealth interventions compared with usual in-person treatment. Soriano et al. (2018) stated 100% participants would recommend the telemonitoring system to a family member or a friend, should they need it. Additionally, 93.3% of physicians would intend to use telemonitoring when necessary, to provide health care to their patients, and 60.0% agreed to routinely use telemonitoring with their patients. Moreover, the findings from Press et al. (2020) suggest that patient-directed virtual education similarly improved the percentage of participants with correct technique compared with in-person education and Polinski et al. (2016) concluded that between 94%-99 % reported being “very satisfied” with all telehealth attributes. [See Appendix B: Evidence Table]

## EBP Translation Model

The Iowa Model-Revised: Evidence-Based Practice to Promote Quality Care (Iowa Model Collaborative, 2017), was selected because it is the organization’s theoretical evidence-based model of choice. The use of a singular model allows for a standardized process

improvement across the entire organization. The Iowa Model is intuitively understandable, and it has been used in numerous academic settings and health care organizations (Gawlinski & Rutledge, 2008). Additionally, The Iowa Model focuses on organization and collaboration, allowing nurses to target knowledge- and problem-focused triggers, encouraging personnel to question current nursing practices and determine whether care can be improved by using current research findings (Titler et al., 2001).

The Iowa Model's conceptual framework was used to guide this study for evaluating and infusing evidenced based research findings into patient care and includes the following steps: identify triggering issues and/or opportunities; state the clinical question or purpose; form a team; assemble, appraise, and synthesize body of evidence; design and pilot the practice change, integrate and sustain the practice change, and disseminate results (Iowa Model Collaborative, 2017). [See Appendix C: The Iowa Model-Revised: Evidence-Based Practice to Promote Quality Care Flow Diagram]

**Identify Triggering Issues and/or Opportunities**

Health care delivery shifted during the COVID-19 pandemic, with telehealth encounters sharply increasing. Availability and promotion of telehealth services have played a prominent role in increasing access to services during the public health emergency. With expanded access and improved reimbursement policies in place, as well as ongoing acceptability by patients and health care providers, telehealth has continued to serve as an important modality for delivering care. The pre-pandemic, in-person donor evaluation process was not cost-effective for donors and contributed to the donor's concerns about financial loss which may affect their decision to undergo evaluation, proceed with a donation, or their experience with the transplant process. In turn, to ease the financial burden of living organ donation, especially for donors who live out of

state, continuing telehealth practices following the pandemic may be viewed as just and ethically responsible. For any change to take place, barriers that could hinder its progress need to be identified. Information and skill deficit are common barriers to evidence-based practice. As previously indicated, A SWOT analysis was performed to identify organizational barriers and facilitators to successfully implement the quality improvement study. [See Appendix A: SWOT Analysis]

**State the Clinical Question or Purpose**

Among potential living kidney donors, what is the influence of Telehealth evaluations versus in-person clinic evaluations on quality of care including access to care, financial impact, effectiveness, and experience?

**Form a Team**

A powerful guiding coalition was developed with the creation of a Project Committee that included interested interdisciplinary stakeholders. The Project Committee was led by the DNP student (Living Donor Transplant Coordinator), and team members included Transplant Nephrologists, Clinical Operations Manager, the Director of Kidney Transplantation, and the Director of Living Donation Surge. Additional multidisciplinary team members were included in the committee to ensure all aspects of the quality improvement initiative were addressed to help drive the change analysis effort.

**Assemble, Appraise, and Synthesize the Body of Evidence**

A systematic literature review and quality analysis was completed to identify, evaluate, and summarize the findings of relevant studies regarding telehealth and quality of care. As discussed in the literature review section, the evidence supports the effectiveness of telehealth.

**Design and Pilot the Practice Change**

Designing the quality improvement study included determining inclusion/exclusion criteria, defining project implementation and comparison groups, outcome measurements, power analysis, and statistical analysis methods. To help combat the challenges faced when implementing change and to increase the likelihood of success, it was essential to identify an appropriate change model to provide a framework for maintaining the transformation. The change theory driving this study was Kotter's Eight Step Approach to successful organizational change (Kotter, 1996). The eight stages Kotter identified for managers to follow to implement successful change are: "establish a sense of urgency, create a powerful guiding coalition, develop a vision, communicate the vision, empower others to act on the vision, plan for and create short term wins, consolidate improvement, and produce more change, and institutionalize new approaches (Borkowski, 2016, p. 309)".

**Integrate and Sustain the Practice Change**

Since integration of telehealth to communicate with living kidney donors had already been accomplished at our organization prior to the start of this study, prospective evaluation was needed to determine whether reliance on telehealth affects quality of care for consideration of permanent adoption into practice. It is critically important for interventions to utilize reliable and valid transplant patient decision-making measures and knowledge instruments to accurately characterize intervention effects. Evaluation is essential to seeing the value and contribution of the evidence into practice. Evaluation will highlight the program's impact, but its consistency can only be assessed against an actual change occurring and having the desired effect (Pearson et al, 2007).

### Disseminate Results

The study results have been reviewed with academic peers at George Washington University and with leadership at our transplant organization. Telehealth practice methods will be shared with other living donor transplant programs to promote change, including publishing information about the study and its findings in a peer-reviewed transplant-focused journal. Additionally, the results can be shared with other similar clinical specialties to help address any knowledge gaps or hesitancies with implementing a telehealth evaluation program. Meanwhile, the Project Committee will continue to evaluate the practice change at our organization on a routine basis.

## Methodology

### Setting

A university hospital transplant center located in Washington D.C. specializing in adult kidney transplantation (≥ 18 years of age) and living kidney donation.

### Population

The target patient population were individuals who have expressed interest in living kidney donation by submitting a questionnaire through the National Kidney Registry (NKR) Donor Automated Screening & History (DASH) database (a comprehensive, online living donor workflow platform designed to streamline the living donor intake through to post-donation follow-up), have passed the initial screening process, and were scheduled for an evaluation to assess safety and ability to donate a kidney in accordance with policies and standards set forth by our transplant organization. Additionally, to measure the healthcare providers' prospective of in-person versus telehealth evaluations, a separate target population included members of the

healthcare team who have communicated with/evaluated donors in-person and through telehealth.

**Sample Size [N =128]**

Based on level of significance ($\alpha$=0.05), with 80% power, a moderate effect size (d=0.5), and a pre-post design with different subjects, a sample of 128 living donors was selected for data collection (64 for the control group and 64 for the intervention group).

**Inclusion Criteria**

Patient inclusion criteria included: (1) candidates ≥18 years old; (2) appeared for living donor evaluation (virtually through Zoom or in-person); (3) were able to provide informed consent; (4) completed the living donor evaluation and agreed to move forward with labs/testing; and (5) were able to speak and understand English. Healthcare provider inclusion criteria included: (1) those involved in the evaluation process of living donors including social workers, transplant coordinators, nephrologists/hepatologist, surgeons, and other healthcare specialists that are frequently required to evaluate/communicate with potential donors.

**Exclusion Criteria**

Exclusion criteria included: (1) significant neurocognitive disability; (2) inability to speak, hand understand English; (3) visual impairment and inability to complete self-administered questionnaires; (4) deemed an ineligible donor candidate at the time of evaluation or opt-out at the time of evaluation; and (5) self-described unwillingness or inability to participate in the research study. Healthcare Provider exclusion criteria included: (1) those not involved in evaluating/communicating with living donors.

## Tools/Instruments

### Zoom®

The virtual platform, Zoom®, is our transplant center's telemedicine platform of choice. Zoom® is a HIPAA compliant and secure platform that is safe, easy to use, and cost-effective. It provides consistent high-quality video, even in low-bandwidth environments, and offers multiple accessibility options including computer, tablet, and smart phone options.

### Telehealth Usability Questionnaire (TUQ)

A Telehealth Usability Questionnaire (TUQ) was adapted to specifically measure potential living donors' and healthcare providers' experience of using telehealth (Zoom®) for evaluations and follow-up appointments. The TUQ is a 21-question survey that measures five different components of telemedicine usability using a 7-point Likert scale with 1 indicating strongly disagree and 7 indicating strongly agree. Measured components include usefulness, ease of use, effectiveness, reliability, and satisfaction. The TUQ was selected because it been shown to have independent content validity and internal consistency (Langbecker et al., 2017; Layfield et al., 2020), it has been used in similar studies looking at telehealth in the context of Covid-19, and because it is readily adaptable to most settings. Use of the TUQ allows for comparison with other studies and increases generalizability of results. Although adaptation of any survey can reduce this benefit, this option is preferred to the creation of a novel survey (Langbecker et al., 2017), and the TUQ was intended to be modified to address varied telehealth systems (Parmanto, Lewis, Graham, & Bertolet, 2016). [See Appendix D: TUQ Survey for Living Donor and Health Care Professionals]

### REDCap®

The Telehealth Usability Questionnaire (TUQ) was adapted to an electronic format by utilizing REDCap® (Research Electronic Data Capture) which is a web application for building and managing online surveys and databases. REDCap® offers an easy-to-use and secure HIPAA-compliant method of flexible yet robust data collection, specifically geared to support online and offline data capture for research studies and operations. Data was collected from REDCap® and exported to password-protected Excel data spreadsheets for analysis.

## Methods for Evaluating Access to Care, Effectiveness, and Financial Impact

Data was collected from retrospective chart reviews to measure and analyze telehealth effects on donors' *access to care*, *effectiveness*, and *financial impact* after a 1-year time-period. Data was extracted from the National Kidney Registry DASH questionnaire database, OTTR (Organ Transplant Tracking Record; transplant patient /living donor specific EMR), social worker evaluation reports in the MedConnect EMR (Hospital/health system wide EMR), and any other medical record documentation to help estimate donors' travel costs, means of travel, PTO status, days required to take off work, and lost wages.

### Control Group (In-person Evaluations) [N =64]

For the control group, data was collected from a retrospective review of randomly selected donors who completed in-person evaluations between January 1, 2019 and December 31, 2019 and were medically cleared for donation (evaluation result in OTTR = "donated" OR evaluation phase in OTTR = "cleared for donation"). A total of 93 donors were identified that met inclusion criteria, of which 64 subjects were randomly selected using an excel-generated table of 64 random numbers between 1-93.

### Intervention Group (Telehealth Evaluations) [N =64]

For the intervention group, data was collected from a retrospective review of randomly selected donors who completed telehealth evaluations between January 1, 2021 and December 31, 2021 and were medically cleared for donation (evaluation result in OTTR = "donated" OR evaluation phase in OTTR = "cleared for donation"). A total of 85 donors were identified that met inclusion criteria, of which 64 subjects were randomly selected using an excel-generated table of 64 random numbers between 1-86.

## Methods for Evaluating the Experience of Living Donors and Health Care Providers

As stated previously, the Telehealth Usability Questionnaire (TUQ) was adapted to measure potential living donors' and healthcare providers' *experience* of using telehealth (Zoom®) for living donor evaluations (and follow-up appointments).

### Living Donor TUQ Survey Recruitment

Patients who completed a living donor telehealth evaluation through Zoom® between September 29, 2021 and December 10, 2021 (10-week time-period) and met inclusion criteria were invited to participate in the research study by completing a TUQ survey. As with most studies of these types, we were unable to blind or mask study personnel and/or participants regarding the study's objectives. However, the study was unknown at the time of the potential living donor's virtual evaluation. At the end of the donor's virtual visit, the Living Donor Transplant Coordinator informed the patient of the ongoing voluntary study and provided information for how to participate. The TUQ REDCap® survey included two parts: demographic questions (gender, race/ethnicity, and age) and the 21-question TUQ. Data collection was closed/completed once 64 surveys were submitted.

### Healthcare Provider TUQ Survey Recruitment

The healthcare provider telehealth survey was an adapted version of the TUQ, developed to measure provider attitudes toward telehealth as far as integration into the practice of evaluating living donors. To ensure anonymity, demographic questions were limited to type of provider (social worker/independent living donor advocate, surgeon, physician, transplant coordinator, nurse, or other). Providers with prior experience of evaluating living donors, both through telehealth and in-person, were emailed a link to complete a one-time TUQ REDCap® survey during the month of December 2021. Data collection was closed once all 11 eligible health care providers submitted their survey responses.

## Outcomes to be Measures

### Evaluating Access to Care

Data collection methods included a retrospective chart review of control group variables (in-person evaluations between January 1, 2019 to December 31, 2019; N=64) compared to a retrospective review of intervention group variables (telehealth evaluations between January 1, 2021 to December 31, 2021; N = 64). Data for analysis was obtained from the following electronic medical records: NKR DASH, OTTR (Organ Transplant Tracking Record), MedConnect EMR.

i. **<u>Outcome Measurement 1</u>: Average timeframe (# of days) from referral date (date of DASH questionnaire submission) to evaluation date**.

### Evaluating Effectiveness

Data collection methods included a retrospective chart review of control group variables (in-person evaluations between January 1, 2019 to December 31, 2019; N=64) compared to a retrospective review of intervention group variables (telehealth evaluations between January 1,

2021 to December 31, 2021; N = 64). Data for analysis was obtained from the following electronic medical records: NKR DASH, OTTR (Organ Transplant Tracking Record), MedConnect EMR.

ii. **<u>Outcome Measurement 1</u>: Average timeframe (# of days) from evaluation date to date donor is medically cleared for surgery.**

iii. **<u>Outcome Measurement 2</u>: Average timeframe (# of days) from referral date to o date donor is medically cleared for surgery.**

**Evaluating Financial Impact**

Data collection methods included a retrospective chart review of control group variables (in-person evaluations between January 1, 2019 to December 31, 2019; N=64) compared to a retrospective review of intervention group variables (telehealth evaluations between January 1, 2021 to December 31, 2021; N = 64). Data for analysis was obtained from the following electronic medical records: NKR DASH, OTTR (Organ Transplant Tracking Record), MedConnect EMR. Supplementary methods and/or data sources used for measuring outcomes and data analysis are included under the corresponding measurements below.

i. **<u>Outcome Measurement 1</u>: Total average estimated financial impact per donor based on (1) donor expected lost wages (if any), and (2) travel costs to the transplant center for evaluation, surgery, and/or follow-up appointments.**

a. ***Additional Sources/Methods Used for Data Collection and Analysis****:* Calculations were based on distance to transplant center and likely means of travel. Donor charts were reviewed for any possible financial impact including lost wages acquired from time taken off work for evaluation, surgery, and recovery (i.e., no reported PTO), and travel costs related to

airfare, hotel accommodations, meals/incidentals, we well as any other possible miscellaneous travel and/or out-of-pocket expenses. (Exact measurements were calculated from sum and analysis of additional outcome measures below.)

ii. **<u>Outcome Measurement 2</u>: Estimated financial impact of gas-related expenses per donor, if applicable.**

a. ***Additional Sources/Methods Used for Data Collection and Analysis***: Average out-of-pocket costs spent on gas were calculated based on the American Automotive Association's (AAA) 2019/2021 weighted average vehicle operating cost of 20.54 cents per mile (includes average cost of fuel, maintenance, repairs, and tires) (Your Driving Costs, 2021). This was multiplied by the donor's distance in miles to the transplant center for any trips made by car to/from transplant center for evaluation, surgery, and/or follow-up appointments. If a donor completed testing/labs locally at Quest Diagnostics or another National Kidney Registry (NKR) transplant center instead of traveling to our hospital in D.C., travel costs were appropriately recalculated based on distance (20.54 cents/per mile) from the donor's home address to the NKR center.

iii. **<u>Outcome Measurement 3</u>: Estimated financial impact of airfare-related expenses per donor, if applicable.**

a. ***Additional Sources/Methods Used for Data Collection and Analysis:*** According to the Bureau of Transportation Statistics, $308 is the 2019/2021 average cost of a roundtrip domestic U.S. flight (Hu, et al.

2021). Furthermore, a 2019/2021 average roundtrip international flight to/from the U.S. was estimated to cost $1368 (Abdella et al., 2021). Donors who live internationally or more than 500 miles from Washington D.C., were assumed to travel by plane to our transplant center for their evaluation (control group) and/or surgery (control group and intervention group).

iv. **<u>Outcome Measurement 4</u>: Estimated financial impact of hotel-related expenses per donor, if applicable.**

a. ***Additional Sources/Methods Used for Data Collection and Analysis***: For any donor living internationally or more than 500 miles from the transplant center, it was assumed the donor was required to stay in the D.C. area for their evaluation (~1 day), travel back to D.C. for their pre-op appointment (~1 day), and stay in the D.C. area after surgery until their 1-week follow-up appointment (~5 days). Documentation in OTTR and Medconnect was reviewed to look for anything that would indicate the donor stayed locally with a family member/friend or stayed in our organization's transplant apartment. If so, hotel accommodations were excluded from the donor's estimated travel costs.

b. ***Additional Sources/Methods Used for Data Collection and Analysis***: Hotel accommodations, including meals/incidentals are estimated to be $215 per day, which is based on the average 2019/2021 per diem rates for Washington D.C. and surrounding areas, according to the U.S. General Services Administration (U.S. General Services Administration, 2022).

v. **<u>Outcome Measurement 5</u>: Estimated financial impact from lost wages related to time off work (without PTO) for evaluation, pre-op, surgery, and/or follow-up requirements, if applicable.**

a. ***Additional Sources/Methods Used for Data Collection and Analysis***: Lost wages were included in a donor's estimated financial impact if they reported 1) "No PTO; time off not reimbursed" on their DASH questionnaire or 2) "No PTO; using vacation time" on their DASH questionnaire. Medical records were reviewed for any additional indications that a donor's income would be negatively affected by their evaluation and/or kidney donation.

b. ***Additional Sources/Methods Used for Data Collection and Analysis***: Estimated lost wages were calculated based on a 2019/2021 U.S. median hourly wage of $19.75 per hour (Bureau of Labor Statistics, 2022). Thus, a full day in-person evaluation OR telehealth evaluation plus ½ day testing day at our hospital was estimated to be 8 hours of lost wages, or $158 in per day. The following was also included in the total estimated financial impact for any donor identified to be negatively affected by lost income: $158/pre-op day, $158/per missed workday spent traveling to/from the transplant center for evaluation and/or surgery, $158/per missed workday for donors requiring an in-person 1-week surgical follow-up appointment, and $158/per day needed to take off work for surgery recovery (~14 days $2212/per donor without PTO).

### Evaluating Living Donor and Healthcare Provider Experience

Living Donor experience was measured based on responses from the TUQ from donors who completed a living donor telehealth evaluation through Zoom® between September 29, 2021 and December 10, 2021 (10-week time-period). Healthcare Provider experience was measured based on responses from a one-time TUQ distributed during the month of December 2021. All respondents answered questions based on a 7-point Likert Scale; strongly disagree (1) to strongly agree (7).

i. **<u>Outcome Measurement 1</u>: TUQ survey. A "positive" Living Donor experience was pre-determined to be a mean average score of ≤ 5.5 per question and mean average score ≤ 5.5 in each domain of (1) usefulness, (2) ease of use, (3) effectiveness, (4) reliability, and (5) satisfaction.**

ii. **<u>Outcome Measurement 2:</u> TUQ survey. A "positive" Healthcare Provider experience was pre-determined to be a mean average score of ≤ 5.5 per question and mean average score ≤ 5.5 in each domain of (1) usefulness, (2) ease of use, (3) effectiveness, (4) reliability, and (5) satisfaction.**

### Consent Procedure

Prior to the end of virtual clinic, the Living Donor Coordinator informed donors who met inclusion criteria of the ongoing study, provided information on how to participate in the study, and explained the consent process (this took about 2 -5 min per patient). Once virtual clinic was completed, potential donors were emailed a link to complete the voluntary REDCap® TUQ survey. The REDCap® TUQ survey link also contained an electronic consent that the participant was required to read and click "agree to participate in study" to access the TUQ survey questions. Otherwise, if the patient selected "do not agree to participate in study" after reading

the electronic consent, they were instructed to close their browser/ REDCap®. Donors were informed that their decision to participate/not participate would not affect their living donor evaluation in any way. To minimize the possibility of coercion or undue influence, participants were not required to provide personal health information (including their name, DOB, etc.) on the TUQ survey. Thus, the Living Donor Coordinator was unable to identify a particular participant by their survey submission. Participants were given an option to print the consent form for their records.

For the retrospective chart review aspect of this QI project, a full HIPPA waiver was authorized by the transplant organization's Internal Review Board. It would have been impractical to obtain each subject's authorization for use and/or disclosure of their health information using the standard written form of HIPPA Authorization and contacting subjects would have created additional risks with the collection of unnecessary identifiable information (i.e., phone number, email address, signature on a consent or HIPAA form, etc.).

**Risks/Harms**

This research did not involve more than minimal risk to subjects. Typically, a breach of confidentiality would be the primary risk associated with the medical record review/retrospective review process when accessing existing identifiable data. However, steps were implemented to minimize these risks, including safeguards to protect data and prevent a breach of confidentiality. The minimal risk to privacy was reasonable in relation to the important knowledge gained from this QI project.

**Project Timeline**

After an assessment of the "current state" was completed in Spring of 2021, the problem was diagnosed, evidence-based literature was shared with organizational leadership and

stakeholders, and a project team was assembled. The project proposal was submitted for approval from GWU faculty advisors, the hospital's Internal Review Board, and our transplant program's Clinical Director in August of 2021. After approval was secured, study implementation began in September 2021 followed by data collection, analysis, and project dissemination in early 2022. The entire project timeline, including project submission took place over a 13-month time frame. A Gantt Chart was created to outline important steps and sequence of events along the project timeline. [See Appendix E: Gantt Chart Outlining Project Timeline]

**Costs and Resources Needed**

While telehealth is a promising modality to improve patient care, large-scale implementation can be challenging in terms of budget including the cost of technology set-up and training providers in the use of virtual programs, which may deter many organizations from adopting virtual care options. However, this QI study utilized existing resources and the expenditures incurred for this project were minimal due to an already established telehealth infrastructure in place. Staff had already been trained to use telehealth methods (Zoom®) and the data extraction was completed by a salaried employee performing usual duties within the project site. Electronic surveys created through REDCap® is also a platform already in use and available for employees at our healthcare organization. Lastly, there was no financial incentive offered to participants for completing the survey nor was there additional compensation given to Project Committee members.

## Evaluation Plan

To effectively evaluate this QI study, a logic model was used. The logic model approach, utilized by the National Institute of Health (NIH), is a useful project tool that increases the probability of successful implementation (Hayes, Parchman, & Howard, 2011). The logic model

is also a cost-effective framework for processes of implementation and evaluation. The logic model demonstrates short, intermediate, and long-term outcomes and is appropriate for this QI study which too included short, medium, and long-term goals regarding evaluating the quality-of-care of telehealth versus in-person evaluations for living donors.

Focusing on short-term outcomes, baseline data was explored to understand the influence of telehealth evaluations versus in-person evaluations on living donor and healthcare provider experience. For intermediate outcomes, a clear understanding of the evaluation process and the financial/travel barriers that individuals face when considering donation, was required to evaluate access to care, effectiveness, and the financial impact of telehealth evaluations versus in-person evaluations. Moreover, evaluation of this QI study was conducted by compiling patient and provider feedback regarding telehealth evaluations versus in-person evaluations via data collected from the TUQ surveys. Feedback and data collection was shared with administrative leadership and stakeholders, and recommendations to modify and improve current practice have been made. These efforts will ultimately result in desired long-term outcomes which include providing high quality care for living donors and increasing community awareness about the benefits of telehealth. The sustainability of telehealth and the QI study's recommendations was confirmed using the logic model and disseminated to all interested parties. [See Appendix F: Logic Model]

## Data Analysis, Maintenance, and Security

Excel Spreadsheets and Statistical Package for the Social Sciences (SPSS) version 27 were used for data collection and analysis. Data collected from the retrospective chart reviews for the control group (randomly selected medically cleared donors, evaluated in-person between 01/01/2019-12/31/2019; N = 64) and intervention group (randomly selected medically cleared

donors, evaluated by telehealth between 01/01/2021-12/31/2021; N = 64), as well as data collected from REDCap® TUQ surveys, was entered into Excel Spreadsheets for data cleaning and scrutiny for data completeness, errors, and inconsistencies. Cleaned data was then transferred to SPSS, where the computation of key variables and study aims analysis was conducted. Data collection and data entry was done by the Living Donor Coordinator (DNP student) who reviewed data for accuracy. Data entry was then double-checked by another project team member. Data outliers were handled automatically by the SPSS statistical analysis program through computer-aided commands. Data analysis was conducted solely by the Living Donor Coordinator, then reviewed with Project Committee team members. Therefore, assessing inter-rater reliability was not required.

**Protection of Human Subjects**

Data needed for outcome measurements was pulled from multiple databases including the NKR DASH questionnaire database, MedConnect, and OTTR. Specific patient identifiers were needed to ensure information was pulled from the correct corresponding medical record sources, however no personal health information such as DOB, name, medical record number, etc. was extracted or documented externally. The identified donor/retrospective research subject, and only the data needed and collected for research purposes, was immediately coded to minimize any chances that the data could be linked back to the research subject. The Living Donor Coordinator was responsible for the maintenance and security of all data related to this study. All collected data was maintained on a password protected computer utilizing secure, HIPPA compliant tools/instruments. There was no personal identifiable information shared and steps to protect human subjects and maintain confidentiality were taken. Additionally, participants were not required to provide Protected Health Information (PHI) when completing the electronic

REDCap® TUQ survey (PHI includes name, DOB, social security, etc.). Thus, limiting the recording of personal information to that which is essential to the research. Participants completing the REDCap® TUQ survey were also given the option of not disclosing information (such as age, race, financials, etc.) to protect their perceived privacy interests. After the study was complete and data analysis/evaluation concluded, the Living Donor Coordinator disposed all codes linking the data to individual subjects and Excel data sheets were permanently deleted and/or properly disposed/shredded with a healthcare facility approved shredding company.

**Data Analysis**

Descriptive statistics were used to examine the characteristics of subjects in the control group (in-person evaluations) and intervention group (telehealth evaluations) for comparison. Frequencies (N) and percentages (%) of categorical variables were tallied. Mean and standard deviation (SD) of continuous variables were calculated. The chi-squared test ($\chi 2$) was used to evaluate the distribution of categorical variables. Independent t-tests were conducted to assess for significant differences between the mean timeframe (# of days) from *referral date* (date DASH questionnaire was submitted) to *evaluation date*; *evaluation date* to *medical clearance date*; and *referral date* to *medical clearance date*.

Additionally, living donor and healthcare provider TUQ responses and demographics were analyzed. Descriptive statistics were used to examine demographic characteristics and were reported as frequencies (N) and percentages (%). The mean +/- standard deviation and percent (%) rate was calculated for each question in the TUQ survey. The mean +/- standard deviation was also calculated for each usability domain (*usefulness*, *ease of use*, *effectiveness*, *reliability*, and *satisfaction*). Comments and feedback were reviewed thoroughly for common themes that would suggest possible areas of opportunity and improvement.

An analysis was performed to measure the results of the pre-test (control group/in-person) and post-test (intervention group/telehealth) scores to assess if changes were identified from baseline and are related to the program intervention. Moreover, the broad analysis helped to generate recommendations for future study. All acquired data was utilized to its full potential to provide the most relevant associations and outcomes. There was no missing data identified during the analysis process, therefore incomplete data/surveys were not a limitation to the study's results. A $p$-value of $<0.05$ was considered statistically significant, indicating a less than a 5% probability the results occurred by chance and suggests with 95% certainty that the results are correlated with implementation of telehealth.

## Anticipated Findings

### Access to Care

Evaluating access to care addresses whether the use of telehealth services allows individuals to be evaluated for living kidney donation as effectively as in-person clinic evaluations. It was proposed that telehealth would improve the accessibility of living donation services which may otherwise be limited in availability due to distance to the transplant center and/or other logistical difficulties, while also reducing the time it takes to access living donor services.

### Effectiveness

Evaluating effectiveness addresses the impact of telehealth on health outcomes. Specifically, for this study's effectiveness refers to the capability of telehealth to successfully evaluate potential living donors and convert donors into medically cleared surgical candidates. An effective living donor evaluation is completed in as little time as possible and meets the needs of the donor candidate, the intended recipient, and the healthcare system. An ineffective

evaluation process can result in missed opportunities for preemptive transplants if the intended recipient's kidney disease progresses. If the intended recipient is approved for transplant but the evaluation of their living donor is delayed because of an ineffective healthcare process, this may cause anxiety and frustration for the recipient and the donor. It was proposed that telehealth evaluations would be equally effective in converting living donors to surgical candidates when compared to in-person evaluations.

**Financial Impact**

The financial impact to the patient accounts for the out-of-pocket costs donors face related to travel, hotel accommodations, miscellaneous costs, and lost wages from taking off work. It was proposed that telehealth would reduce the financial impact for donors compared to in-person evaluations and follow-up appointments. Potential cost savings and benefits of telehealth can be contributed to a reduction in the number of trips made to the transplant clinic for appointments and less time required to take off work (i.e., less wages lost).

**Experience**

The experience of telehealth represents the usability and effect of telehealth on patients and healthcare team members and whether the use of telehealth results in a level of care that the living donors and providers expect. It was proposed that potential living donors and healthcare providers would report an overall positive experience with telehealth communications. A "positive" experience was presumed by a mean total average of 5.5 or above in each domain of (1) usefulness, (2) ease of use, (3) effectiveness, (4) reliability, and (5) satisfaction on the Telehealth Usability Questionnaire (7-point Likert scale).

## Results

### Sample Characteristics of Retrospective Review

After a retrospective review, data was collected and analyzed from 128 living donor charts, 64 for in-person evaluations (control group) and 64 for telehealth evaluations (intervention group). The sample population (N=128) was predominantly female (N=84, 65%), non-Hispanic Caucasian (N=85, 66%), and between the ages of 26 to 55 (N=99, 77%). The telehealth and in-person groups were similar with regards to distribution of gender and ethnicities, however, a greater number of patients between the ages of 36-45 were evaluated by telehealth compared to in-person evaluations (N= 24, 37% vs N=11,17.2%) ($p$ = 0.32). The sample populations also did not differ significantly when comparing geographic location (Washington D.C., Maryland, Virginia, Other State, or Other Country/International). The majority of donors lived in Maryland (N=55, 42.9%) and Virginia (N=37, 28.9%). Overall, the total average distance to the transplant center was slightly higher in the control group (201.32 miles, [SD: 464.47] vs 99.59 miles, [SD: 314.41]), but the difference was not significant ($p$ = 0.149). [Refer to Table 1 for a complete overview of frequency distribution of demographic variables]

### Outcomes and Analysis: Access to Care

The average timeframe from referral date (date of DASH questionnaire submission) to evaluation date was calculated for each group (control vs. intervention) and comparative analysis was performed. Results show that potential donors being evaluated through telehealth were scheduled for an evaluation significantly faster than in-person evaluations. (51.67 days [SD: 18.92] vs 30.45 days [SD:14.29]; $p$<0.001). Aims analysis indicates expected outcomes were met. Telehealth evaluations decreased the average timeframe between the date of referral and the

donor's scheduled evaluation appointment, after 1 year of implementation. [Refer to Table 2 for a complete overview of outcome measure results.]

**Outcomes and Analysis: Effectiveness**

The average timeframe from evaluation date to medical clearance date for surgery was calculated for each group (control vs. intervention) and comparative analysis was performed. Results show there was not a significant difference in the timeframe it took a donor to be evaluated and cleared for surgery between in-person and telehealth evaluations (53.09 days [ SD: 41.27] vs 60.03 days [SD: 34.25]; $p$= .303). Additionally, the timeframe from referral date to medical clearance date was examined between the two groups, and even though the overall time frame from referral date to medical clearance date was about 14 days less for the telehealth evaluation group [90.48 days [SD:38.76] vs 104.77days [SD: 44.59]), this was not considered a significant difference ($p$= .055). Aims analysis indicates expected outcomes were met. Telehealth maintained evaluation effectiveness because it did not cause a significant delay in the time it takes to medically clear donors for surgery, after 1 year of implementation. [Refer to Table 2 for a complete overview of outcome measure results.]

**Outcomes and Analysis: Financial Impact**

It was determined that 91% (N=117) of the donors in the sample population had some sort of out-of-pocket costs related to gas, airfare, hotel accommodations, meals/incidentals, and/or lost wages. However, the total average estimated financial impact for donors completing telehealth evaluations was significantly lower than the in-person evaluation group ($1029 [SD: $1331] vs $1875 [SD: $2022]; $p$=.006). In addition to the estimated out-of-pocket costs outlined below, it was estimated the average donor spent $231(SD: $181.15) in miscellaneous expenses related to their evaluation, surgery, and/or recovery, including costs related to hiring a caregiver, parking,

personal care/pet care, other transportation (Uber/Taxi, etc.), and incidental medical costs. 84.4% (N=54) of in-person donors and 98.4% (N=63) of telehealth donors were determined to have similar out-of-pocket expenses related to gas ($65.45 [SD: $84.96] vs $54.85 [SD: $57.99]; *p*=.427). 17.2% (N=11) of in-person donors and 3.1% (N=2) of telehealth donors were identified as having out-of-pocket expenses related to hotel accommodations ($1075 [SD: $429.80] vs $1075 [SD: $0]; *p*=.091). 15.6% (N=10) of donors evaluated in-person and 7.8% (N=5) of telehealth donors were identified as having out-of-pocket expenses related to airfare. Even though it was estimated that the in-person group spent more on airfare than the telehealth group ($947.60 [SD: $716.53 vs $520.00 [SD: $474.04], the cost difference was not significant (*p* = .252). It was estimated that 34% (N=44) of the sample population were financially impacted from lost wages related to time off work (without PTO) for their evaluation, pre-op, surgery, and/or follow-up requirements. However, the donors completing a telehealth evaluation were significantly less affected and faced lower out-of-pocket costs related to lost wages ($2,174 [SD: $1,150] vs $3,400 [$142]; *p*= < .001). Aims analysis indicates expected outcomes were met. Telehealth evaluations improved the overall financial impact experienced by living donors by decreasing the average out-of-pocket costs of travel and lost wages, after 1 year of implementation. [Refer to Table 2 for a complete overview of outcome measure results.]

It is important to mention that our transplant center is a National Kidney Registry (NKR) Donor Care Network Center and can offer NKR Donor Shield benefits to our donors which provide a range of protections. Qualified individuals who donate through our hospital are eligible for lost wage reimbursement up to $1500 per week for up to 6 weeks and travel, lodging, & mileage reimbursement up to $2,000 for donors and their support person/travel companion. Per federal regulations, lost wage reimbursement is only available to donors with a valid US Social

Security Number (SSN) or Employee Identification Number (EIN), but for most individuals, the Donor Shield benefits are a huge financial relief when considering the out-of-pocket costs, they may/will incur throughout the donation process. However, these benefits are not offered at all transplant centers in the U.S. Collaborative efforts are needed from the transplant community and political leaders to advocate for healthcare policies and regulations that can help minimize out-of-pocket expenses for living donors and decrease obstacles to donation. Telehealth for living donor evaluations and care after donation is one option that has the potential to transform the healthcare delivery system by helping to overcome geographical distance, enhancing access to care, and reducing financial barriers.

**Outcomes and Analysis: Living Donor Experience**

Of the 64 potential donors that completed the TUQ survey, 53.1% (N=34) were female and 46.9% (N=30) were male, and the majority were non-Hispanic Caucasian (53.1%, N=34) and between the ages of 26 and 55 (68%, N=44). [Refer to Table 3 for a complete demographic data overview]. Expected outcomes were that patients would feel satisfied with telehealth and that the visits were just as efficacious as face-to-face visits. Donors rated their overall telehealth experience exceptionally high with a TUQ score of 6.30 out of 7 points (90.1%, SD = .11). Satisfaction scored the highest (average score 6.45, 92.1%) and reliability was rated the lowest (average score 6.17, 88.14%). The question with the lowest mean score was question 6 with a mean score of 5.78 (82.5%, SD = .62), which asked the respondent if it was easy to learn how to use Zoom®. The question asking if telehealth met the respondent's need to attend a living donor evaluation, question 18, had the highest mean score at 6.50 (92.8%, SD = 0.62). [See Appendix G: Living Donor TUQ Results and Data Analysis]

### Outcomes and Analysis: Healthcare Provider Experience

Of the 11 healthcare providers that completed the TUQ survey, 54.5% (N=6) were physicians, 27.2% (N=3) were 46.9% transplant coordinators/nurses, 9.10% (N=1) was a social worker, and 9.10% (N=1) specified they were "another type of healthcare provider". [Refer to Table 4 for a complete overview of respondent characteristics]. Expected outcomes were that healthcare providers would be satisfied with using telehealth Zoom® for evaluating living donors. The telehealth visits received an overall high average TUQ score of 6.56 out of 7 points (93.7%, SD = .17). Similar to living donor experience, satisfaction had the highest average score (6.66, 95.1%), and reliability and effectiveness were tied for the lowest average score (6.38, 91.4%). The question with the lowest mean score was question 11 with a mean score of 5.55 (79.2%, SD = 1.60), which asked the respondent if they are able to examine a donor as well as they can in-person. The question regarding if the respondent was overall satisfied with telehealth, question 21, had the highest mean score at 6.83 (97.6%, SD = 0.40). [See Appendix H: Healthcare Provider TUQ Results and Data Analysis]

## Discussion

### Review of Main Findings

Overall, the results of this QI study support the findings of other similar research studies, indicating telehealth may improve access to care and alleviate financial burden, making living donation more accessible and convenient. Donors evaluated via telehealth were scheduled for their evaluation on average 21 days faster and faced an average of $846 less in out-of-pocket expenses related to travel and lost wages. Evaluation effectiveness was mostly maintained with an evaluation date to clearance date timeframe averaging 7 days longer for a 2-part telehealth evaluation (virtual education/consult and separate testing day) compared to a full day in-person

evaluation. Even with this increase, the total overall timeframe from referral date to medical clearance date was still about 14 days less for the donors evaluated through telehealth, confirming the substantial effect telehealth has on access to care and its capability for evaluating donors efficiently. In addition, donors and health care providers reported high satisfaction with their telehealth experience, the majority agreeing it is equivalent to a traditional in-person visit, with quality and convenience driving this ranking.

**Limitations**

This study was conducted in a single project site with a homogenous patient sample, precluding the ability to generalize beyond this sample population. Although the sample size and sample characteristics are reflective of this patient cohort, it may not be consistent with individuals who have undergone living kidney donor evaluations at other transplant centers.

Methodologies used to assess out-of-pocket expenses for donors were chosen to calculate presumed estimates for the sole purpose of this study. The projected financial impact of the donors may be more or less than what was estimated as it is challenging to predict all the factors that may impact financial expenditures. Without tangible cost reports and genuine financial records from each donor, the true financial impact cannot be determined with estimated data alone.

**Implications for Practice**

The value of telehealth cannot be overemphasized. With continued efforts to decrease financial disincentives for living donation, telehealth has shown to be an effective tool that reduces donor out-of-pocket costs without compromising quality of care, as demonstrated by the results of this QI study. Anticipated institutional, provider, and patient barriers should not deter

other transplant program from implementing telehealth as an option for evaluating and communicating with living donors.

### Addressing Institutional Barriers

The initial expense of developing a telehealth infrastructure may seem daunting for some healthcare institutions, especially when faced with an inconsistent reimbursement model. However, in the long run, the ability to conduct seamless living donor evaluations and lower donor expenditures, while simultaneously facilitating more transplants is a win–win scenario.

### Addressing Provider Barriers

Provider hesitation may arise due to the inability to conduct a physical examination during a virtual evaluation. Feedback and comments reviewed from the Healthcare Provider TUQ survey responses communicated this as possible limitation to evaluating donors via telehealth. Importantly though, all potential donors complete physician consultations, diagnostic/laboratory testing, and a BMI and blood pressure are obtained as part of the extensive evaluation process. Testing results and additional information elucidated during the donor's telehealth evaluation can be used to make a tentative decision about the potential donor's eligibility, but an in-person consultation which includes a physical examination can be scheduled prior to official donation clearance if there are additional concerns. However, all donors are seen in-person at their pre-surgical consultation 7-10 days prior to surgery. Nonetheless, telehealth evaluations should not be seen as a complete replacement for in-person evaluations. Those with complicated surgical history and/or extensive medical/psychosocial history can be scheduled for an in-person evaluation if needed.

### Addressing Patient Barriers

Transplant centers that plan to launch a telehealth program need to have robust technical support, strong infrastructure for concurrent connections, identified super-users to troubleshoot provider, and support staff to address patient technological challenges in a timely manner. In general, it has been rare for technological issues to affect a donor candidate's ability to use telehealth services. Most individuals can access Zoom® on a computer, tablet, or on their cellphone through their cellular service provider. However, socioeconomic barriers that may limit patients' ability to use telehealth should always be carefully considered. During scheduling, potential donor candidates who report lack of internet access, computer equipment, or technical support can be scheduled for an in-person evaluation. Likewise, in-person evaluations are better suited for donors with limited/no high-speed internet access, who lack of understanding of technology, and/or express "uneasiness" with using an audiovisual platform/concern with privacy.

## Implications for Healthcare Policy

Telehealth is more visibly positioned as an important aspect of health-care delivery in the post COVID-19 health-care ecosystem. One of telehealth's most impactful benefits is to connect patients and doctors at a distance. But even with notable advantages, supportive infrastructure, and the advancement of regulatory policies are needed to sustain access to telehealth for living donor evaluations and care. Early in the pandemic, Congress took action to broaden the range of settings in which patients could receive telehealth, relaxed licensure requirements, eliminated geographical barriers, and amended reimbursement laws/regulations to allow payment parity. Although these significant pandemic-related changes in telehealth policy dramatically increased the use of telehealth-delivered services, these policy changes are temporary. Despite widespread

support from stakeholders, policymakers, and advocacy organizations, policy change recommendations remain mostly unaddressed. However, pressure is mounting as members of Congress in both political parties have introduced legislation to make many of the COVID-19 healthcare policy changes permanent.

Similar to findings obtained from this quality improvement initiative, much of the research conducted about telehealth has found that care provided through telehealth is comparable to in-person care without any difference in the ability to obtain necessary information, make a diagnosis, or develop a treatment plan (American Telehealth Association, 2015). However, there is currently no best practice guidance available for living kidney donor evaluations via telehealth and programs are left to formulate their own. Continued research and adoption are imperative to develop best practices and expand the evidence base needed to support legislative and healthcare policy change efforts if telehealth is to remain a viable complement to traditional modes of medical practice.

**Implications for Executive Leadership**

Few would argue that the extended reach of telehealth has had profound implications on expanding access to care, reducing financial disincentives, and enhancing convenience in living donor care. But another aspect to consider is that all Healthcare Provider TUQ respondents "agreed" or "strongly agreed" that telehealth (Zoom®) helps manage their clinic schedule efficiently and helps to complete the functions of their job, subsequently improving job satisfaction. Leaders and clinic directors should view telehealth not just as a tool for patient convenience, but as a way to expand our transplant program's capabilities, supplement its workforce, ease clinician burden, and more effectively deliver care to achieve organizational goals. As our administration considers the future role of telehealth at our transplant center, best

practices should be developed and implemented that emphasize its position as a long-term strategic asset with ongoing quality of care assessment. Executives should not interpret telehealth as a separate division, but instead recognize the need for a hybrid care model that uses telehealth as an integral part of patient care together with traditional living donor evaluation practices. A strong leadership infrastructure and buy-in from staff members have been the main reasons for our telehealth program's success thus far and will be integral to its sustainability.

**Implications for Quality/Safety**

The purpose of this QI study was to answer the following clinical question: Among potential living kidney donors, what is the influence of telehealth evaluations versus in-person clinic evaluations on quality of care including access to care, financial impact, effectiveness, and experience? During the COVID-19 pandemic, telehealth served as a powerful and safe alternative to our transplant center's traditional in-person evaluation method because it eliminated physical contact and mitigated the spread of the virus. But the results of this study show that the adoption of telehealth at our organization also reduced out-of-pocket costs for donors related to travel/lost wages, improved access to care, and maintained evaluation effectiveness compared to in-person evaluations. Even though quality evaluation will still be needed on a routine basis, the results of this study establish that telehealth should become a standard practice for delivering safe, high-quality healthcare in conjugation with in-person evaluations.

## Plans for Sustainability and Future Scholarship

Dissemination of these findings to appropriate audiences will be instrumental in moving this work forward and may allow for additional exploration of the results at other sites or multi-site studies with a larger number of participants. Targeted audiences include telehealth

conferences and publications, transplant/living donation conferences and publications, and DNP nursing conferences and publications.

As with in-person visits, a quality assurance plan will be implemented for telehealth visits to help sustain donor evaluation quality improvement efforts. It is recommended that our transplant center hold patient safety huddles during monthly staff meetings to discuss telehealth cases with both positive and negative patient safety outcomes. It is important for institutions to maintain good patient safety culture and ensure that healthcare providers have the opportunity to learn from what went right and what went wrong when conducting telehealth visits.

Future scholarship and research will involve additional quality improvement initiatives including creating a video tutorial about telehealth basics which can be shared with newly hired staff members and others that may need a "virtual evaluation etiquette refresher". The telehealth tutorial can provide awareness about basic telehealth communication best practices. Understanding such fundamentals, like regulating speech pattern or positioning the video camera, lighting, and location can make the experience more user-friendly for the patient and facilitate a smooth and effective virtual visit. Pre-and post-video analysis can be done to assess the tutorial video's success or lack thereof.

Furthermore, future scholarship will include developing and implementing a decision-making tool to determine which evaluation option would best serve a donor candidate (telehealth versus an in-person evaluation). The model would be implemented to further improve efficiency of the donor evaluation process. An algorithm can be constructed after additional exploration is conducted to identify certain conditions and patient characteristics that may make a particular evaluation option more appropriate than the other. Some patient examples have already been identified above that would make an in-person evaluation more suitable, but additional patient-

specific aspects should be identified and investigated including geographic location, language barriers, and/or visual/auditory impairments.

## Conclusion

As the national deceased donor waitlist continues to grow, the transplant community has supported LDKT as an effective answer to solving the organ shortage crisis, but concerns about potential financial loss can affect a person's decision to undergo evaluation or to proceed with donation. To ease the financial burden of living organ donation, the transplant community must adopt initiatives that will improve living donor evaluations by decreasing obstacles that are discouraging individuals from donating while also maintaining a high-level of quality care. The benefits of utilizing telehealth can be seen across diverse clinical settings, including evaluating living donor candidates and for donor follow-up care. Findings demonstrate telehealth does not harm or negatively affect quality of care but instead improves access to care and alleviates the financial burden for living donors. Furthermore, living donors and healthcare providers report an overall positive experience with telehealth finding it similar to the quality of care provided at an in-person evaluation. Maintaining the drive for change and the push for telehealth services resulting from the COVID-19 pandemic is paramount to increasing access to LDKT and reducing transplantation disparities. Nevertheless, telehealth should not be seen as a complete replacement for in-person evaluations which may be more suitable for donors with complicated surgical/psychosocial history, language barriers, or with-out high-speed internet access, etc.

## References

Abdella, J. A., Zaki, N. M., Shuaib, K., & Khan, F. (2021). Airline ticket price and demand prediction: A survey. *Journal of King Saud University-Computer and Information Sciences*, *33*(4), 375-391.

American Telemedicine Association. (2015). Telemedicine's Impact on Healthcare Cost and Quality. *Washington, DC: American Telemedicine Association.*

American Kidney Fund (AKF). (2019). Living Donor Protection Act. Retrieved from http://www.kidneyfund.org/advocacy/living-donor-protection-act/

Borkowski, N. (2016). Organizational behavior in health care (3rd ed.). Burlington, MA: Jones and Bartlett

Bureau of Labor Statistics. (2022). Usual Weekly Earnings of Wage and Salary Workers, Fourth Quarter 2019. Retrieved from https://www.bls.gov/news.release/pdf/wkyeng.pdf

Dixon, P., Hollinghurst, S., Edwards, L., Thomas, C., Gaunt, D., Foster, A., ... & Salisbury, C. (2016). Cost-effectiveness of telehealth for patients with raised cardiovascular disease risk: evidence from the Healthlines randomised controlled trial. *BMJ open, 6*(8), e012352. http://dx.doi.org/10.1136/bmjopen-2016-012352

Garrick, R. (2007). Living-Donor Kidney Transplantation: A Review of the Current Practices for the Live Donor. *Yearbook of Medicine*, 230–231. doi: 10.1016/s0084-3873(08)70156-1

Gawlinski, A., & Rutledge, D. (2008). Selecting a model for evidence-based practice changes: a practical approach. *AACN Advanced Critical Care, 19*(3), 291-300.

Gonzalez Garcia, M., Fatehi, F., Bashi, N., Varnfield, M., Iyngkaran, P., Driscoll, A., Neil, C.,

Hare, D. L., & Oldenburg, B. (2019). A Review of Randomized Controlled Trials Utilizing Telemedicine for Improving Heart Failure Readmission: Can a Realist Approach Bridge the Translational Divide? *Clinical Medicine Insights: Cardiology*, *13*. https://doi.org/10.1177/1179546819861396

Hayes, H., Parchman, M. L., & Howard, R. (2011). A logic model framework for evaluation and planning in a primary care practice-based research network (PBRN). *The Journal of the American Board of Family Medicine, 24*(5), 576-582.

Hu, P., Schmitt, R. R., Schwarzer, J., & Moore, W. H. (2021). Transportation Statistics Annual Report 2021.

Iowa Model Collaborative. (2017). Iowa model of evidence-based practice: Revisions and validation. *Worldviews on Evidence-Based Nursing, 14*(3), 175-182. doi:10.1111/wvn.12223

Isautier, J. M., Copp, T., Ayre, J., Cvejic, E., Meyerowitz-Katz, G., Batcup, C., Bonner, C., Dodd, R., Nickel, B., Pickles, K., Cornell, S., Dakin, T., & McCaffery, K. J. (2020). People's Experiences and Satisfaction With Telehealth During the COVID-19 Pandemic in Australia: Cross-Sectional Survey Study. J*ournal of medical Internet research, 22*(12), e24531. https://doi.org/10.2196/24531

Kotter, J. P. (1996). Leading change. Boston: Harvard Business School Press.

Kucirka, L. M., Grams, M. E., Balhara, K. S., Jaar, B. G., & Segev, D. L. (2012). Disparities in provision of transplant information affect access to kidney transplantation. *American journal of transplantation: official journal of the American Society of Transplantation and the American Society of Transplant Surgeons, 12*(2), 351–357. https://doi.org/10.1111/j.1600-6143.2011.03865.x

Langbecker, D., Caffery, L. J., Gillespie, N., & Smith, A. C. (2017). Using survey methods in TELEMEDICINE AND COVID-19 AT A RURAL CLINIC 33 telehealth research: A practical guide. *Journal of Telemedicine and Telecare, 23*(9), 770-779. https://doi.org/10.1177/1357633X17721814

Layfield, E., Triantafillou, V., Prasad, A., Deng, J., Shanti, R. M., Newman, J. G., & Rajasekaran, K. (2020). Telemedicine for head and neck ambulatory visits during COVID-19: Evaluating usability and patient satisfaction. *Head and Neck, 42*(7), 1681-1689. doi:10.1002/hed.26285

National Quality Forum (NQF). (2017). Creating a framework to support measure development for telehealth. Washington, DC: National Quality Forum.

Neipp, M., Karavul, B., Jackobs, S., Meyer zu Vilsendorf, A., Richter, N., Becker, T., Schwarz, A., & Klempnauer, J. (2006). Quality of life in adult transplant recipients more than 15 years after kidney transplantation. *Transplantation, 81*(12), 1640–1644. https://doi.org/10.1097/01.tp.0000226070.74443.fb

Noel, K., Messina, C., Hou, W., Schoenfeld, E., & Kelly, G. (2020). Tele-transitions of care (TTOC): a 12-month, randomized controlled trial evaluating the use of Telehealth to achieve triple aim objectives. *BMC Fam Pract, 21*(27). https://doi.org/10.1186/s12875-020-1094-5

Nomura, A., Tanigawa, T., Muto, T., Oga, T., Fukushima, Y., Kiyosue, A., Miyazaki, M., Hida, E., & Satake, K. (2019). Clinical Efficacy of Telemedicine Compared to Face-to-Face Clinic Visits for Smoking Cessation: Multicenter Open-Label Randomized Controlled Noninferiority Trial. *Journal of medical Internet research, 21*(4), e13520. https://doi.org/10.2196/13520

Organ Procurement and Transplantation Network (OPTN). (2020). Data. Retrieved from https://optn.transplant.hrsa.gov/data/

Parmanto, B., Lewis, A. N., Jr, Graham, K. M., & Bertolet, M. H. (2016). Development of the Telehealth Usability Questionnaire (TUQ). *International journal of telerehabilitation, 8*(1), 3–10. https://doi.org/10.5195/ijt.2016.6196

Pearson, A., Field, J., & Jordan, Z. (2007). Evidence-based clinical practice in nursing and health care: assimilating research, experience, and expertise. Blackwell Publishing, Oxford

Polinski, J. M., Barker, T., Gagliano, N., Sussman, A., Brennan, T. A., & Shrank, W. H. (2016). Patients' Satisfaction with and Preference for Telehealth Visits. *Journal of general internal medicine, 31*(3), 269–275. https://doi.org/10.1007/s11606-015-3489-x

Press, V. G., Arora, V. M., Kelly, C. A., Carey, K. A., White, S. R., & Wan, W. (2020). Effectiveness of Virtual vs In-Person Inhaler Education for Hospitalized Patients With Obstructive Lung Disease: A Randomized Clinical Trial. *JAMA network open, 3*(1), e1918205. https://doi.org/10.1001/jamanetworkopen.2019.18205

Tietjen, A., Hays, R., McNatt, G., Howey, R., Lebron-Banks, U., Thomas, C. P., & Lentine, K. L. (2019). Billing for living kidney donor care: Balancing cost recovery, regulatory compliance, and minimized donor burden. *Current transplantation reports, 6*(2), 155–166. doi:10.1007/s40472019-00239-0

Titler, M., Kleiber, C., Steelman, V., Rakel, B., Budreau, G., Everett, L., & Goode, C. (2001). The Iowa Model of Evidence-Based Practice to Promote Quality Care. *Critical Care Nursing Clinics of North America, 13*(4), 497-509.

Salisbury, C., O'Cathain, A., Edwards, L., Thomas, C., Gaunt, D., Hollinghurst, S., Nicholl, J.,

Large, S., Yardley, L., Lewis, G., Foster, A., Garner, K., Horspool, K., Man, M. S., Rogers, A., Pope, C., Dixon, P., & Montgomery, A. A. (2016). Effectiveness of an integrated telehealth service for patients with depression: a pragmatic randomised controlled trial of a complex intervention. *The lancet. Psychiatry, 3*(6), 515–525. https://doi.org/10.1016/S2215-0366(16)00083-3

Saran, R., Robinson, B., Abbott, K. C., Agodoa, L. Y., Albertus, P., Ayanian, J., ... & Shahinian, V. (2017). US renal data system 2016 annual data report: epidemiology of kidney disease in the United States. *American journal of kidney diseases, 69*(3), A7-A8.

Soriano, J. B., García-Río, F., Vázquez-Espinosa, E., Conforto, J. I., Hernando-Sanz, A., López-Yepes, L., Galera-Martínez, R., Peces-Barba, G., Gotera-Rivera, C. M., Pérez-Warnisher, M. T., Segrelles-Calvo, G., Zamarro, C., González-Ponce, P., Ramos, M. I., Jafri, S., & Ancochea, J. (2018). A multicentre, randomized controlled trial of telehealth for the management of COPD. *Respiratory medicine, 144*, 74–81. https://doi.org/10.1016/j.rmed.2018.10.008

U.S. General Services Administration. (2022). *Per diem rates*. Retrieved from https://www.gsa.gov/travel/plan-book/per-diem-rates

Wilkinson, J., Spindler, M., Wood, S., Marcus, S., Weintraub, D., Morley, J., Stineman, M., Duda, J. (2016). High patient satisfaction with telehealth in Parkinson disease: A randomized controlled study. *Neurology Clinical Practice, 6*, 241-251. https://doi.org/10.1212/CPJ.0000000000000252

Yadav, A., & Singh, P. (2021). Telehealth Use by Living Kidney Donor Transplant Programs During the COVID-19 Pandemic and Beyond: a Practical Approach. *Curr Transpl, 8*, 257–262. https://doi.org/10.1007/s40472-021-00339-w

*Your Driving Costs.* (2021). Your Driving Costs. https://newsroom.aaa.com/wp-content/uploads/2020/12/2020-Your-Driving-Costs-Brochure-Interactive-FINAL-12-9-20.pdf

## Tables

**Table 1: Frequency distribution of demographic variables for in-person evaluations (control group) and telehealth evaluations (intervention group)**

| Variables | In-person Evaluations (N=64) | Telehealth Evaluations (N=64) | P-Value |
|---|---|---|---|
| **Gender, N (%)** | | | |
| Female | 40 (62.5%) | 44 (68.8%) | $p$ =.457 |
| Male | 24 (37.5%) | 20 (31.3%) | |
| **Age, N (%)** | | | |
| 18-25 | 2(3.1%) | 2 (3.1%) | $p$ = .032 |
| 26-36 | 15 (23.4%) | 18 (28.1%) | |
| 36-45 | 11(17.2%) | 24 (37.5%) | |
| 46-55 | 18 (8.1%) | 13 (20.3%) | |
| 56-65 | 14 (21.9%) | 7 (10.9%) | |
| 66-75 | 4 (6.3%) | 0 (0%) | |
| **Race, N (%)** | | | |
| African American/Black | 6 (9.4%) | 9 (14.1%) | $p$ =.134 |
| Asian/Pacific Islander | 4 (6.3%) | 3 (4.7%) | |
| Hispanic/Latino | 5 (7.8%) | 5 (7.8%) | |
| Native American/American Indian | 0 (0%) | 1 (1.6%) | |
| Other/Multi-Racial | 9 (14.1%) | 1 (1.6%) | |
| White | 40 (62.5%) | 45 (70.3%) | |
| **Where does the Donor live? N (%)** | | | |
| D.C. | 6 (9.4%) | 7 (10.9%) | $p$ = .612 |
| International/Other Country | 3 (4.7%) | 1 (1.6%) | |
| MD | 24 (37.5%) | 31(48.4%) | |
| Other State | 11 (17.2%) | 8 (12.5%) | |
| VA | 20 (31.3%) | 17 (26.6%) | |

**Table 2: Outcome measures and analysis for in-person evaluations (control group) and telehealth evaluations (intervention group)**

| Variables | In-person Evaluations (N=64) | Telehealth Evaluations (N=64) | P-Value |
|---|---|---|---|
| **Referral date to evaluation date, *days*, mean (SD)** | 51.67 (18.92) | 30.45 (14.29) | $p = < .001$ |
| **Evaluation date to cleared date, *days*, mean (SD)** | 53.09 (41.275) | 60.03 (34.253) | $p = .303$ |
| **Referral date to medical clearance date, days, mean (SD)** | 104.77 (44.59) | 90.48 (38.76) | $p = .055$ |
| **Average estimated financial impact per donor, *dollars*, mean (SD)** | $1875 ($2022.58) | $1029 ($1331.58) | $p = .006$ |
| **Estimated out-of-pocket expenses for gas per donor, *dollars*, mean (SD)** | $65.46 ($84.97) | $54.85 ($57.98) | $p = .427$ |
| **Estimated out-of-pocket expenses for hotel accommodations per donor, *dollars*, mean (SD)** | $1075.09 ($429.80) | $1075 ($0) | $p =< .091$ |
| **Estimated out-of-pocket expenses for airfare per donor, *dollars*, mean (SD)** | $947.60 ($716.52) | $520.00 ($474.046) | $p = .252$ |
| **Estimated lost wages per donor without PTO, *dollars*, mean (SD)** | $3,400 ($142) | $2,174 ($1,150) | $p = < .001$ |

**Table 3: Living donor TUQ frequency distribution of demographic variables**

| Variables | Frequency (N) | Percent (%) |
|---|---|---|
| **Gender, N (%)** | | |
| Female | 34 | 53.1% |
| Male | 30 | 49.9% |
| **Age, N (%)** | | |
| 18-25 | 7 | 11.5% |
| 26-36 | 17 | 27.9% |
| 36-45 | 12 | 19.7% |
| 46-55 | 12 | 24.6% |
| 56-65 | 8 | 13.1% |
| 66-75 | 2 | 3.3% |
| **Race, N (%)** | | |
| African American/Black | 14 | 21.9% |
| Asian/Pacific Islander | 5 | 7.8% |
| Hispanic/Latino | 5 | 7.8% |
| Native American/American Indian | 0 | 0% |
| Other/Multi-Racial | 6 | 9.4% |
| White | 34 | 53.1% |

**Table 4: Healthcare Provider TUQ frequency distribution of demographic variables**

| Variables | Frequency (N) | Percent (%) |
|---|---|---|
| **Healthcare Provider Role/Type** | | |
| Physician | 6 | 54.5% |
| Coordinator/Nurse | 1 | 9.1% |
| Social Worker | 3 | 27.2% |
| Other | 1 | 9.1% |

**Table 5: Data Collection/Evaluation and Analysis Methods Table**

**Aim # 1: Telehealth evaluations will improve access to care by decreasing the average timeframe (mean # of days) between the date of referral (DASH questionnaire submission date) to the donor's scheduled evaluation appointment, [over 1-year time-period]**

| Measure | Measure Type | Data Source | Sampling Method | Timing/Frequency |
|---|---|---|---|---|
| Average timeframe (# of Days) of living donor application submission to time of scheduled evaluation appointment | Outcome | OTTR and DASH systems | All living donor Applications (# of Living Donor Questionnaires Received) | Pre-intervention 1 year average/post-intervention 1 year average |
| **Standard Measure?** | No | | | |
| **Numerator** | Sum # of days between questionnaire submission and scheduled evaluation appointment of each questionnaire received | | | |
| **Denominator or Population** | All cleared donors (N=64) identified in retrospective review/comparative analysis: control group (in-person evaluations between January 1, 2019 to December 31, 2019; N=64) and intervention group (telehealth evaluations between January 1, 2021 to December 31, 2021; N = 64). | | | |
| **Exclusions** | Donor was not cleared for surgery | | | |
| **Calculation/Statistic(s)** | Mean (Average overall number of days between submission and evaluation) | | | |
| **Goal/Benchmark** | Average mean timeframe (# of days) between living donor application submission to scheduled evaluation appointment will be less with telehealth as standard of care versus pre-pandemic in-person evaluations (1-year average) | | | |

**AIM # 2: Telehealth evaluations will maintain effectiveness by producing a similar timeframe (mean # of days) between the living donor's evaluation appointment and the date the living donor is deemed eligible for donation/cleared for surgery, [over a 1-year time period]**

| Measure | Measure Type* | Data Source | Sampling Method | Timing/Frequency |
|---|---|---|---|---|
| Average timeframe (# of Days) between evaluation and medical clearance date | Outcome | OTTR | All living donor transplant evaluations/surgeries completed | Pre-intervention /post-intervention |
| **Standard Measure?** | No | | | |
| **Numerator** | Sum # of days between evaluation and medical clearance date | | | |
| **Denominator or Population*** ** | All cleared donors (N=64) identified in retrospective review/comparative analysis: control group (in-person evaluations between January 1, 2019 to December 31, 2019; N=64) and intervention group (telehealth evaluations between January 1, 2021 to December 31, 2021; N = 64). | | | |
| **Exclusions** | Donor was not cleared for surgery | | | |
| **Calculation/Statistic(s)** | (= Total Number of surgeries counted over 1 year time period) and (conversion rate = total # of total of living donor surgeries/total number of evaluations scheduled x 100) | | | |
| **Goal/Benchmark** | Maintain or increase the number of living kidney donation surgeries scheduled [over a 1-year time period] | | | |

**AIM # 3: Telehealth evaluations will improve the financial impact experienced by living donors by decreasing the average (mean) out-of-pocket costs of travel and lost wages, after 1 year of telehealth implementation. [over a 1-year time period]**

| Measure | Measure Type | Data Source | Sampling Method | Timing/Frequency |
|---|---|---|---|---|
| Donor reported costs of travel/time off work | Outcome | DASH questionnaire, literature review of living donor financial reports, EMR/SW evaluation notes, Donor verbal report during evaluation | 5 living donors per week selected randomly | Pre-intervention travel/time off work reported average over 1 year/ Post-intervention travel/time off work reported average over 1 year |
| **Standard Measure?** | No | | | |
| **Numerator** | Total # of hours off work reported, (lost wages), estimated cost of travel, and means of travel. | | | |
| **Denominator or Population** | All cleared donors (N=64) identified in retrospective review/comparative analysis: control group (in-person evaluations between January 1, 2019 to December 31, 2019; N=64) and intervention group (telehealth evaluations between January 1, 2021 to December 31, 2021; N = 64). | | | |
| **Exclusions** | None | | | |
| **Calculation/Statistic(s)** | Mean (Average Donor reported costs of travel/time off work) | | | |
| **Goal/Benchmark** | Improve financial impact by decreasing average donor reported costs of travel/time off work while using Telehealth compared to in-person evaluations [over a 1-year time period] | | | |

**AIM # 4: Living donors will report an overall positive experience with telehealth communications [Demonstrated from median total average results of all Telehealth Usability Questionnaires over a 1-year time period]**

| Measure | Measure Type* | Data Source | Sampling Method | Timing/Frequency |
|---|---|---|---|---|
| Living Donor Telehealth Usability Questionnaire (TUQ) | Outcome | Telehealth Usability Questionnaire (TUQ) using RedCap Survey method emailed to patient (results reported Anonymously) | 5 living donors per week selected randomly | Weekly x 1 year post intervention, with average score calculated after 1 year time period |
| **Standard Measure?** | Yes | | | |
| **Numerator** | Median score on survey using Likert Scale (0-7) | | | |
| **Denominator or Population*** ** | Randomly selected # of donors among all donors being evaluated | | | |
| **Exclusions** | None | | | |
| **Calculation/Statistic(s)** | Median Score | | | |
| **Goal/Benchmark** | Living donors will report an overall positive experience with a median total average of 5.5 or above in each domain of usefulness, ease of use, effectiveness, reliability, and satisfaction on a Telehealth Usability Questionnaire (7-point Likert scale). | | | |

**AIM # 5: Health Care Providers (Including Surgeons, Nephrologists, Coordinators, and Social Workers) will report an overall positive experience with telehealth communications [Demonstrated from median total average results of all Telehealth Usability Questionnaires over a 1-year time period]**

| Measure | Measure Type* | Data Source | Sampling Method | Timing/Frequency |
|---|---|---|---|---|
| Health Care Provider Telehealth Usability Questionnaire (TUQ) based on their experience with donor clinic on a particular day | Outcome | Telehealth Usability Questionnaire (TUQ) using RedCap Survey method emailed to patient (results reported Anonymously) | 2 healthcare providers/living donor team member per week selected randomly | Weekly x 1 year post intervention, with average score calculated after 1 year time period |

| | |
|---|---|
| **Standard Measure?** | Yes |
| **Numerator** | Median score on survey using Likert Scale (0-7) |
| **Denominator or Population*** ** | Randomly selected # of healthcare providers among all living donor team members |
| **Exclusions** | None |
| **Calculation/Statistic(s)** | Median Score |
| **Goal/Benchmark** | Healthcare providers will report an overall positive experience with a median total average of 5.5 or above in each domain of usefulness, ease of use, effectiveness, reliability, and satisfaction on a Telehealth Usability Questionnaire (7-point Likert scale). |

**Table 6: Data Dictionary Table (Living Donor TUQ Survey)**

| Data Element | Data Label | Data Type | Definition/Purpose | Data Values & Coding |
|---|---|---|---|---|
| Record ID | record_id | Alpha-numeric | System generated unique identifier | Alpha-numeric |
| Donor gender | ldgender | Categorical | Self-identified gender | 1, Male; 2, Female; 3, Transgender; 4, Other; 5, Prefer Not to Say |
| Donor Race/ethnicity | ldrace | Categorical | Self-identified race | 1, White; 2, Hispanic or Latino; 3, Black or African American; 4, Native American or American Indian; 5, Asian/Pacific Islander; 6, Other. |
| Donor Age | adage | Categorical | Self-identified age range | 1, 18-25; 2, 26-35; 3, 36-45; 4, 46-55; 5, 56-65; 6, 66-75; 7, 76-85 |
| LD TUQ Question 1 | tuq_1 | Categorical | Telehealth improves my access to Living Kidney Donation services (including virtual evaluations and virtual post- | 1: Strongly disagree<br>2: Disagree<br>3: More or less disagree<br>4: Undecided<br>5. More or less agree<br>6. Agree<br>7. Strongly agree |

| | | | | |
|---|---|---|---|---|
| | | | donation follow-up appointments) | |
| LD TUQ Question 2 | tuq_2 | Categorical | Telehealth saves me time traveling. | 1: Strongly disagree<br>2: Disagree<br>3: More or less disagree<br>4: Undecided<br>5. More or less agree<br>6. Agree<br>7. Strongly agree |
| LD TUQ Question 3 | tuq_3 | Categorical | Telehealth is a cost-saving option to complete my living donor evaluation. | 1: Strongly disagree<br>2: Disagree<br>3: More or less disagree<br>4: Undecided<br>5. More or less agree<br>6. Agree<br>7. Strongly agree |
| LD TUQ Question 4 | tuq_4 | Categorical | I am more likely to attend, and not reschedule or miss, a Telehealth appointment compared to an in-person appointment. | 1: Strongly disagree<br>2: Disagree<br>3: More or less disagree<br>4: Undecided<br>5. More or less agree<br>6. Agree<br>7. Strongly agree |
| LD TUQ Question 5 | tuq_5 | Categorical | It was simple to use the Telehealth system (Zoom®) for my living donor evaluation. | 1: Strongly disagree<br>2: Disagree<br>3: More or less disagree<br>4: Undecided<br>5. More or less agree<br>6. Agree<br>7. Strongly agree |
| LD TUQ Question 6 | tuq_6 | Categorical | It was easy to learn how to use Zoom® | 1: Strongly disagree<br>2: Disagree<br>3: More or less disagree<br>4: Undecided<br>5. More or less agree<br>6. Agree<br>7. Strongly agree |
| LD TUQ Question 7 | tuq_7 | Categorical | The way I was able to interact virtually with the living donor team through Telehealth (Zoom®) was pleasant, | 1: Strongly disagree<br>2: Disagree<br>3: More or less disagree<br>4: Undecided<br>5. More or less agree<br>6. Agree<br>7. Strongly agree |
| LD TUQ Question 8 | tuq_8 | Categorical | I like using Telehealth (Zoom®), | 1: Strongly disagree<br>2: Disagree<br>3: More or less disagree<br>4: Undecided<br>5. More or less agree<br>6. Agree |

| | | | | |
|---|---|---|---|---|
| | | | | 7. Strongly agree |
| LD TUQ Question 9 | tuq_9 | Categorical | I could hear the living donor team members clearly using Telehealth (Zoom®). | 1: Strongly disagree<br>2: Disagree<br>3: More or less disagree<br>4: Undecided<br>5. More or less agree<br>6. Agree<br>7. Strongly agree |
| LD TUQ Question 10 | tuq_10 | Categorical | I felt I was able to express myself effectively to the healthcare providers and living donor team members when being evaluated virtually/through Telehealth. | 1: Strongly disagree<br>2: Disagree<br>3: More or less disagree<br>4: Undecided<br>5. More or less agree<br>6. Agree<br>7. Strongly agree |
| LD TUQ Question 11 | tuq_11 | Categorical | I was easily able to ask questions and talk to the living donor team members including the doctors, social worker, and my coordinator during my virtual/Telehealth evaluation. | 1: Strongly disagree<br>2: Disagree<br>3: More or less disagree<br>4: Undecided<br>5. More or less agree<br>6. Agree<br>7. Strongly agree |
| LD TUQ Question 12 | tuq_12 | Categorical | Using Telehealth, I could see and understand the living donor education PowerPoint presentation as well as if it were presented in-person. | 1: Strongly disagree<br>2: Disagree<br>3: More or less disagree<br>4: Undecided<br>5. More or less agree<br>6. Agree<br>7. Strongly agree |
| LD TUQ Question 13 | tuq_13 | Categorical | I was able to do everything I wanted to do for my Telehealth appointment. | 1: Strongly disagree<br>2: Disagree<br>3: More or less disagree<br>4: Undecided<br>5. More or less agree<br>6. Agree<br>7. Strongly agree |
| LD TUQ Question 14 | tuq_14 | Categorical | I think completing the living donor education and consults through Telehealth were the same as if I were | 1: Strongly disagree<br>2: Disagree<br>3: More or less disagree<br>4: Undecided<br>5. More or less agree<br>6. Agree |

| | | | | |
|---|---|---|---|---|
| | | | completing them in-person. | 7. Strongly agree |
| LD TUQ Question 15 | tuq_15 | Categorical | I received assistance with any problems I experienced with Zoom®, including help with set-up and/or technical difficulties. | 1: Strongly disagree<br>2: Disagree<br>3: More or less disagree<br>4: Undecided<br>5. More or less agree<br>6. Agree<br>7. Strongly agree |
| LD TUQ Question 16 | tuq_16 | Categorical | I felt comfortable communicating with the living donor team members using the Telehealth. | 1: Strongly disagree<br>2: Disagree<br>3: More or less disagree<br>4: Undecided<br>5. More or less agree<br>6. Agree<br>7. Strongly agree |
| LD TUQ Question 17 | tuq_17 | Categorical | If I made a mistake using Telehealth (Zoom®), I could recover easily and quickly. | 1: Strongly disagree<br>2: Disagree<br>3: More or less disagree<br>4: Undecided<br>5. More or less agree<br>6. Agree<br>7. Strongly agree |
| LD TUQ Question 18 | tuq_18 | Categorical | Telehealth met my need to attend an evaluation for living kidney donation. | 1: Strongly disagree<br>2: Disagree<br>3: More or less disagree<br>4: Undecided<br>5. More or less agree<br>6. Agree<br>7. Strongly agree |
| LD TUQ Question 19 | tuq_19 | Categorical | Telehealth is an acceptable way to complete a living donor evaluation including education and consults with the living donor team healthcare providers. | 1: Strongly disagree<br>2: Disagree<br>3: More or less disagree<br>4: Undecided<br>5. More or less agree<br>6. Agree<br>7. Strongly agree |
| LD TUQ Question 20 | tuq_20 | Categorical | I would use Telehealth again. | 1: Strongly disagree<br>2: Disagree<br>3: More or less disagree<br>4: Undecided<br>5. More or less agree<br>6. Agree<br>7. Strongly agree |
| LD TUQ Question 21 | tuq_21 | Categorical | Overall, I am satisfied with my Telehealth/virtual | 1: Strongly disagree<br>2: Disagree<br>3: More or less disagree<br>4: Undecided |

| | | | | |
|---|---|---|---|---|
| | | | living donor evaluation. | 5. More or less agree<br>6. Agree<br>7. Strongly agree |
| Additional Comments | ld_comments | Text | Please include any additional thoughts or comments here. | |

**Table 7: Data Dictionary Table (Healthcare Provider TUQ Survey)**

| Data Element | Data Label | Data Type | Definition/Purpose | Data Values & Coding |
|---|---|---|---|---|
| Record ID | Record_IDhp | Alpha-numeric | System generated unique identifier | Alpha-numeric |
| Healthcare Provider Role | Hp_role | Categorical | Healthcare Provider Role | 1, Physician<br>2, Coordinator<br>3, Social Worker<br>4, Other |
| HCP TUQ Question 1 | tuq_1hp | Categorical | I like using Telehealth to complete the functions of my job. | 1: Strongly disagree<br>2: Disagree<br>3: More or less disagree<br>4: Undecided<br>5. More or less agree<br>6. Agree<br>7. Strongly agree |
| HCP TUQ Question 2 | tuq_2hp | Categorical | Telehealth (Zoom®) helps me manage my clinic schedule efficiently. | 1: Strongly disagree<br>2: Disagree<br>3: More or less disagree<br>4: Undecided<br>5. More or less agree<br>6. Agree<br>7. Strongly agree |
| HCP TUQ Question 3 | tuq_3hp | Categorical | Telehealth is a cost-effective option for potential living donors undergoing an evaluation and for completing post-donation follow-up requirements. | 1: Strongly disagree<br>2: Disagree<br>3: More or less disagree<br>4: Undecided<br>5. More or less agree<br>6. Agree<br>7. Strongly agree |
| HCP TUQ Question 4 | tuq_4hp | Categorical | Telehealth improves patient access to transplant and living donation healthcare services. | 1: Strongly disagree<br>2: Disagree<br>3: More or less disagree<br>4: Undecided<br>5. More or less agree<br>6. Agree<br>7. Strongly agree |
| HCP TUQ Question 5 | tuq_5hp | Categorical | Zoom® is a simple system and easy to navigate. | 1: Strongly disagree<br>2: Disagree<br>3: More or less disagree |

| | | | | |
|---|---|---|---|---|
| | | | | 4: Undecided<br>5. More or less agree<br>6. Agree<br>7. Strongly agree |
| HCP TUQ Question 6 | tuq_6hp | Categorical | It was easy to learn how to set up and use Telehealth (Zoom®). | 1: Strongly disagree<br>2: Disagree<br>3: More or less disagree<br>4: Undecided<br>5. More or less agree<br>6. Agree<br>7. Strongly agree |
| HCP TUQ Question 7 | tuq_7hp | Categorical | The way I am able to interact with my patients through Zoom® is pleasant. | 1: Strongly disagree<br>2: Disagree<br>3: More or less disagree<br>4: Undecided<br>5. More or less agree<br>6. Agree<br>7. Strongly agree |
| HCP TUQ Question 8 | tuq_8hp | Categorical | I like using telehealth (Zoom®). | 1: Strongly disagree<br>2: Disagree<br>3: More or less disagree<br>4: Undecided<br>5. More or less agree<br>6. Agree<br>7. Strongly agree |
| HCP TUQ Question 9 | tuq_9hp | Categorical | I can hear my patients clearly using the Telehealth system (Zoom®). | 1: Strongly disagree<br>2: Disagree<br>3: More or less disagree<br>4: Undecided<br>5. More or less agree<br>6. Agree<br>7. Strongly agree |
| HCP TUQ Question 10 | tuq_10hp | Categorical | I can communicate with donors effectively when using the Telehealth system (Zoom®). | 1: Strongly disagree<br>2: Disagree<br>3: More or less disagree<br>4: Undecided<br>5. More or less agree<br>6. Agree<br>7. Strongly agree |
| HCP TUQ Question 11 | tuq_11hp | Categorical | When using Telehealth (Zoom®), I can examine a donor as well as if we met in person. | 1: Strongly disagree<br>2: Disagree<br>3: More or less disagree<br>4: Undecided<br>5. More or less agree<br>6. Agree<br>7. Strongly agree |
| HCP TUQ Question 12 | tuq_12hp | Categorical | Individuals completing Telehealth evaluations | 1: Strongly disagree<br>2: Disagree<br>3: More or less disagree<br>4: Undecided |

| | | | | |
|---|---|---|---|---|
| | | | understand the education and information provided and can make an informed decision about living donation, just the same as if their education/evaluation was completed in-person. | 5. More or less agree<br>6. Agree<br>7. Strongly agree |
| HCP TUQ Question 13 | tuq_13hp | Categorical | I can do everything I want to do during Telehealth donor appointments (charting, physical examinations, screen sharing, playing power point presentations, etc.) | 1: Strongly disagree<br>2: Disagree<br>3: More or less disagree<br>4: Undecided<br>5. More or less agree<br>6. Agree<br>7. Strongly agree |
| HCP Question 14 | tuq_14hp | Categorical | I find Telehealth evaluations are comparable to the quality of care delivered during in-person evaluations | 1: Strongly disagree<br>2: Disagree<br>3: More or less disagree<br>4: Undecided<br>5. More or less agree<br>6. Agree<br>7. Strongly agree |
| HCP TUQ Question 15 | tuq_15hp | Categorical | I feel I have sufficient IT support for Telehealth visits. | 1: Strongly disagree<br>2: Disagree<br>3: More or less disagree<br>4: Undecided<br>5. More or less agree<br>6. Agree<br>7. Strongly agree |
| HCP TUQ Question 16 | tuq_16hp | Categorical | Technical difficulties sometimes happen during Telehealth (Zoom®) appointments, but they are typically easy to resolve and do not prevent me from evaluating my patient(s). | 1: Strongly disagree<br>2: Disagree<br>3: More or less disagree<br>4: Undecided<br>5. More or less agree<br>6. Agree<br>7. Strongly agree |
| HCP TUQ Question 17 | tuq_17hp | Categorical | Whenever I make a mistake using the Telehealth system (Zoom®), I can | 1: Strongly disagree<br>2: Disagree<br>3: More or less disagree<br>4: Undecided<br>5. More or less agree |

| | | | | |
|---|---|---|---|---|
| | | | recover easily and quickly. | 6. Agree<br>7. Strongly agree |
| HCP TUQ Question 18 | tuq_18hp | Categorical | Telehealth meets my needs when evaluating individuals for living donation and those needing post-donation follow up care. | 1: Strongly disagree<br>2: Disagree<br>3: More or less disagree<br>4: Undecided<br>5. More or less agree<br>6. Agree<br>7. Strongly agree |
| HCP TUQ Question 19 | tuq_19hp | Categorical | Telehealth is an acceptable way to evaluate and educate potential living donors. | 1: Strongly disagree<br>2: Disagree<br>3: More or less disagree<br>4: Undecided<br>5. More or less agree<br>6. Agree<br>7. Strongly agree |
| HCP TUQ Question 20 | tuq_20hp | Categorical | I am open to the continued use of Telehealth (Zoom®) for living donor evaluations and follow-up visits. | 1: Strongly disagree<br>2: Disagree<br>3: More or less disagree<br>4: Undecided<br>5. More or less agree<br>6. Agree<br>7. Strongly agree |
| LD TUQ Question 21 | tuq_21hp | Categorical | Overall, I am satisfied with using Telehealth (Zoom®) to evaluate living donors. | 1: Strongly disagree<br>2: Disagree<br>3: More or less disagree<br>4: Undecided<br>5. More or less agree<br>6. Agree<br>7. Strongly agree |
| Additional Comments | ld_comments | Text | Please include any additional thoughts or comments here. | |

**<u>Table 8</u>: Data Dictionary Table (Interventional Data Collection Form/Telehealth Living Donor Evaluations)**

| Data Element | Data Label | Data Type | Definition/Purpose | Data Values & Coding |
|---|---|---|---|---|
| Subject Identifer | Record_IDhp | Alpha-numeric | System generated unique identifier | Alpha-numeric |
| Donor gender | ldgender | Categorical | Self-identified gender | 1, Male; 2, Female; 3, Transgender; 4, Other; 5, Prefer Not to Say |
| Donor Race/ethnicity | ldrace | Categorical | Self-identified race | 1, White; 2, Hispanic or Latino; 3, Black or African American; 4, Native American or |

| | | | | |
|---|---|---|---|---|
| | | | | American Indian; 5, Asian/Pacific Islander; 6, Other. |
| Donor Age | adage | Categorical | Self-identified age range | 1, 18-25; 2, 26-35; 3, 36-45; 4, 46-55; 5, 56-65; 6, 66-75; 7, 76-85 |
| Location of Donor (District of Columbia, Virginia, Maryland, other state, other country) | ldlocation | Categorical | Does the donor live in the District of Columbia, Virginia, or Maryland? | 1, DC; 2, Maryland; 3, Virginia; 4, Other State; 5, Another Country/International |
| Timeframe (LDQ to Eval) | LDQ_to_eval | Numeric, Continuous | (# of days) from DASH questionnaire submission to time of scheduled virtual evaluation appointment | Actual Numeric Value |
| Timeframe (Eval to Clearance Date) | Eval_to_clear | Numeric, Continuous | Timeframe (# of days) from virtual evaluation appointment date to date deemed eligible for donation/cleared for surgery | Actual Numeric Value |
| Timeframe (Referral to Clearance Date) | Ref_to_clear | Numeric, Continuous | Timeframe (# of days) from referral to date deemed eligible for donation/cleared for surgery | Actual Numeric Value |
| Take off work for testing/labs | ldtakeoffwork2 | Categorical | Did the donor take off work to complete labs and diagnostic testing? | 1, Yes; 0, No |
| PTO | ldpto | Categorical | If they took off work, are they able to use PTO? | 1, Yes; 0, No; 3, I did not have to take off work/this does not apply to me |
| Testing at affiliated NKR Center | NKR | Categorical | Did the donor/will the donor complete testing at affiliated NKR center as a Remote Donor? | 1, Yes; 0, No |
| Plane, Train, etc. Travel | Travel_LD | Categorical | Did the donor travel by plane/train to to complete their evaluation testing? | 1, Yes; 0, No |

| | | | | |
|---|---|---|---|---|
| Hotel | Hotel_LD | Categorical | Did the donor stay in a hotel while completing their evaluation testing? | 1, Yes; 0, No |
| Total Donor reported estimated Costs for Eval | Totalcost | Numeric, Continuous | Donor reported estimated costs related to their virtual/Telehealth evaluation | Actual Numeric Value |
| Distance to travel to Transplant Center | Distance_LD | Numeric, Continuous | Distance to travel to transplant center (in # of Miles) if donor were to complete in-person evaluation | Actual Numeric Value |
| Hours to travel to Transplant Center | Time_LD | Numeric, Continuous | Time (in # hours) it would take donor to travel to transplant center for in-person evaluation | Actual Numeric Value |
| Time, effort, and/or financial burden | burden_1 | Categorical | Would it be a greater burden for donor to travel D.C. to complete a full day in-person eval compared to current virtual evaluation and testing practices? | 1, Yes; 0, No |
| Estimated Costs if they were required to travel to Washington D.C. | EstimatedCosts | Numeric, Continuous | Estimated costs if they were required to travel to Washington D.C. to complete a full day in-person living donor evaluation? | Actual Numeric Value |
| Hotel for living donor nephrectomy surgery | ControlHotel_Surgery1 | Categorical | Did the donor stay in a hotel for their living donor nephrectomy surgery? | 1, Yes; 0, No |
| Plane Travel for living donor nephrectomy surgery | Plane_Surgery | Categorical | Will the donor travel by plane for their living donor nephrectomy surgery? | 1, Yes; 0, No |

**Table 9: Data Dictionary Table (Control Group Data Collection Form/In-person Living Donor Evaluations)**

| Data Element | Data Label | Data Type | Definition/Purpose | Data Values & Coding |
|---|---|---|---|---|
| Subject Identifer | Control_ID | Alpha-numeric | Excel unique identifier | Alpha-numeric |
| Donor gender | Control_ldgender | Categorical | Self-identified gender from EHR | 1, Male; 2, Female; 3, Transgender; 4, Other; 5, Prefer Not to Say |
| Donor Race/ethnicity | Control_ldrace | Categorical | Self-identified race from EHR | 1, White; 2, Hispanic or Latino; 3, Black or African American; 4, Native American or American Indian; 5, Asian/Pacific Islander; 6, Other. |
| Donor Age | Control_adage | Categorical | Self-identified age range from EHR | 1, 18-25; 2, 26-35; 3, 36-45; 4, 46-55; 5, 56-65; 6, 66-75; 7, 76-85 |
| Location of Donor (District of Columbia, Virginia, or Maryland?) | Control_ldlocation | Categorical | Does the donor live in the District of Columbia, Virginia, or Maryland? | 1, DC; 2, Maryland; 3, Virginia; 4, Other State; 5, Another Country/International |
| Timeframe (LDQ to Eval) | ControlLDQ_to_eval | Numeric, Continuous | (# of days) from DASH questionnaire submission to time of scheduled in-person evaluation appointment | Actual Numeric Value |
| Timeframe (Eval to Clearance) | ControlEval_to_clear | Numeric, Continuous | Timeframe (# of days) from virtual evaluation appointment date to date deemed eligible for donation/cleared for surgery | Actual Numeric Value |
| Scheduled for surgery | Control Surgery_LD | Categorical | Scheduled for surgery/Did individual donate their kidney? | 1, Yes; 0, No |
| Take off work for testing/labs | Controlldtakeoffwork2 | Categorical | Did the donor take off work to complete labs and diagnostic testing? | 1, Yes; 0, No |
| PTO | Controlldpto | Categorical | If they took off work, are they able to use PTO? | 1, Yes; 0, No; 3, I did not have to take off work/this does not apply to me |

| | | | | |
|---|---|---|---|---|
| Testing at affiliated NKR Center | ControlNKR | Categorical | Did the donor/will the donor complete testing at affiliated NKR center as a Remote Donor? | 1, Yes; 0, No |
| Plane, Train, etc. Travel | ControlTravel_LD | Categorical | Did the donor travel by plane/train to complete their evaluation testing? | 1, Yes; 0, No |
| Hotel | ControlHotel_LD | Categorical | Did the donor stay in a hotel while completing their evaluation testing? | 1, Yes; 0, No |
| Donor reported Costs for Eval | ControlTotalcost | Numeric, Continuous | Donor reported costs related to their virtual/Telehealth evaluation and donation | Actual Numeric Value |
| Distance to travel to Transplant Center | ControlDistance_ LD | Numeric, Continuous | Distance to travel to transplant center (in # of Miles) if donor were to complete in-person evaluation | Actual Numeric Value |
| Hours to travel to Transplant Center | ControlTime_LD | Numeric, Continuous | Time (in # hours) it took donor to travel to transplant center for in-person evaluation | Actual Numeric Value |
| Hotel for living donor nephrectomy surgery | ControlHotel_Sur gery | Categorical | Did the donor stay in a hotel for their living donor nephrectomy surgery? | 1, Yes; 0, No |
| Plane Travel for living donor nephrectomy surgery | ControlPlane_Sur gery | Categorical | Did the donor travel by plane for their living donor nephrectomy surgery? | 1, Yes; 0, No |

**Appendix A: SWOT Analysis**

| | **Helpful to Achieving Objectives** | **Harmful to Achieving Objectives** |
|---|---|---|
| **Internal Origin** (Attributes of the organization) | **Strengths**<br>• Team Unity/Self-Organization<br>• Dedicated Team Members<br>• Expertise/ Highly recognized<br>• Telehealth infrastructure currently in place | **Weaknesses**<br>• Staff Turn-over<br>• Healthcare provider and healthcare staff workload |
| **External Origin** (Attributes of the organization) | **Opportunities**<br>• Duty to appraise additional means of decreasing obstacles to living donation as a reputable transplant center<br>• Sustain the use of telehealth in response to the Covid-19 pandemic to help improve overall care, rather than just driving more use of telehealth as an end to itself | **Threats**<br>• Competition<br>• Reluctance of patients to use telehealth<br>• Government Regulations<br>• Safety |

## Appendix B: Evidence Table

| Article # | Author and Date | Evidence Type | Sample, Sample Size, Setting | Findings That Help Answer EBP Question | Observable Measures | Limitations | Evidence Level, Quality |
|---|---|---|---|---|---|---|---|
| **1** | Dixon et al., 2016 | Randomized Controlled Trial | Sample/Setting: Adults with a 10-year CVD risk ≥20%, as measured by the QRISK2 algorithm, with at least 1 modifiable risk factor. Participants aged between 40 and 74 on the date of invitation were recruited from 42 general practices in or near Bristol, Sheffield and Southampton, England. The mean age of participants in the trial was 67.2 years, of whom 80% were male, and 99% of all participants were of white ethnicity.<br><br>Sample Size: The trial recruited a total of 641 participants: 325 were randomized to receive the intervention and 316 received usual care in the control arm. | Cost-effectiveness measured by net monetary benefit at the end of 12 months of follow-up, calculated from incremental cost and incremental quality-adjusted life years (QALYs). Productivity impacts, participant out-of-pocket expenditure and the clinical outcome were presented in a cost-consequences framework. | Participants randomized to usual care (in-person) reported higher mean per patient private healthcare costs than in the intervention arm (telehealth), but lower out-of-pocket expenditure than intervention participants.<br><br>There is evidence to suggest that the Healthlines telehealth intervention was likely to be cost-effective at a threshold of £20 000 per QALY (27,659.90 USD). | The recruitment rate of the trial was relatively low. This would possibly affect the generalizability of the findings, although it is unclear whether low reluctance was due to lack of interest in telehealth or unwillingness to participate in research. | Level of Evidence: I<br>Quality Rating: B |
| **2** | Gonzalez Garcia et al., 2019 | Systematic Review | The authors inspected the references of guidelines and searched PubMed for randomized controlled trials published over the past 10 years on the use of telemedicine for reducing readmission in heart failure.<br><br>N= 12. A total of 12 RCTs were eligible and included in this review. In total, 2321 patients were included in the chosen studies, with an average age of 73 years and approximately 43% female | Telemedicine and digital health technologies hold great promise for improving clinical care of heart failure. However, inconsistent and contradictory findings from randomized controlled trials have so far discouraged widespread adoption of digital health in routine clinical practice. This review study was done to summarize the study outcomes of telemedicine in the clinical care of patients with | The outcomes of 6 RCTs supported in general the use of telemedicine to reducing readmission in HF.<br><br>The costs and cost-savings of the telemedicine intervention were specified in 2 of the 5 studies and in 1 of them it was concluded that the costs of the integrated technology-based management were more expensive than usual care although the cost of adverse events was significantly lower. | The authors did not adopt an overarching definition of telemedicine.<br><br>None of the studies identified addressed the level of literacy of the participants, that is, the magnitude of use or the grade of acceptance of technologies such as computers or smartphones. | Level of Evidence: II<br>Quality Rating: B |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | | heart failure and readmissions. | | | |
| **3** | Isautier et al., 2020 | Non-experimental; Cross-sectional survey | Sample: In total, 1369 participants who were aged ≥18 years and lived in Australia were recruited via targeted advertisements on social media (ie, Facebook and Instagram).<br><br>Of the 1369 respondents who completed the June survey, 596 (43.5%) reported using telehealth services since the start of the pandemic. Respondents who used telehealth services were slightly older, more likely to be female, and had higher levels of education. | This study aimed to compare participants' perceptions of telehealth consults to their perceptions of traditional in-person visits and investigate whether they experienced any barriers to using telehealth services. | The majority of respondents (n=369, 61.9%) stated that their telehealth experience was "just as good as" or "better than" their traditional in-person medical visit experience. On average, respondents perceived telehealth as moderately useful to very useful for medical appointments after the COVID-19 pandemic ends (mean 3.67, SD 1.1).<br><br>Respondents perceived that telehealth would be moderately useful to very useful for medical appointments after the COVID-19 pandemic. This suggests that telehealth may be a viable long-term option for health care delivery. | While the study sample was large and diverse, it was not statistically representative of the Australian population, consisting of a higher proportion of females, higher level of education, and potentially higher levels of digital literacy than the general population. | Level of Evidence: III<br>Quality Rating: B |
| **4** | Noel et al., 2020 | Randomized Controlled Trial | Sample Size: 451 patients were assessed for eligibility for the trial. 102 patients met inclusion criteria for study participation, gave informed consent, and were enrolled in the study prior to discharge. 45 patients were randomized to the TTOC group while 57 patients received the standard of care.<br><br>Sample: the study arms were balanced by characteristics as there | This is a 12-month randomized controlled trial, evaluating the use of telehealth (remote patient monitoring and video visits) versus standard transitions of care with the primary outcomes of hospital readmission and emergency department utilization and secondary | Compared with the standard of care, Telehealth patients were more likely to have medicine reconciliation ($p = 0.013$) and were 7 times more likely to adhere to medication than the control group ($p = 0.03$). Telehealth patients exhibited enthusiasm ($p = 0.0001$), and confidence that | Participants might not be representative of general population: Patients were excluded if they had physical limitations prohibiting the use of the telehealth equipment, were uninsured (who received referrals elsewhere for | Level of Evidence: I<br>Quality Rating: B |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | were no statistically significant differences between the groups in regard to demographics including gender, race and education (Table 1). The average age at enrollment was 65 years.<br><br>Setting: This study was performed by the Family and Internal Medicine Departments at Stony Brook Medicine, which is a 603-bed teaching institution on the northern part of Long Island, New York | outcomes of access to care, medication management and adherence and patient engagement. | Telehealth could improve their healthcare ($p = 0.0001$). Telehealth showed no statistical significance on emergency department utilization ($p = 0.691$) nor for readmissions ($p = 0.31$). 100% of Telehealth patients found the intervention to be valuable, 98% if given the opportunity, reported they would continue using telehealth to manage their healthcare needs, and 94% reported that the remote patient monitoring technology was useful. | follow up care), if involved in another research study, were pregnant or actively trying to conceive, or if admitted for a primary psychiatric diagnosis. | |
| **5** | Nomura et al., 2019 | Randomized Controlled Trial | Sample Size/Sample: The study randomized 115 participants with nicotine dependence: 58 were allocated to the telemedicine (internet-based video counseling) arm and 57, to the control (standard face-to-face clinical visit) arm. Mean age 55; 81% male<br><br>Setting: Multicenter trial in Japan | This study aimed to evaluate the efficacy and feasibility of a telehealth smoking cessation support program compared with the standard face-to-face clinical visit program among patients with nicotine dependence. | The application of telemedicine using internet-based video counseling as a smoking cessation program had a similar "continuous abstinence rate" from weeks 9 to 12 as that of the standard face-to-face clinical visit program. The efficacy of the telemedicine-based smoking cessation program was not inferior to that of the standard visit–based smoking cessation program. | Concluding the efficacy of telemedicine in a 3-months trial could be difficult. Further trials lasting longer than 3 months might be needed to confirm the long-term efficacy telemedicine. | Level of Evidence: I<br>Quality Rating: B |

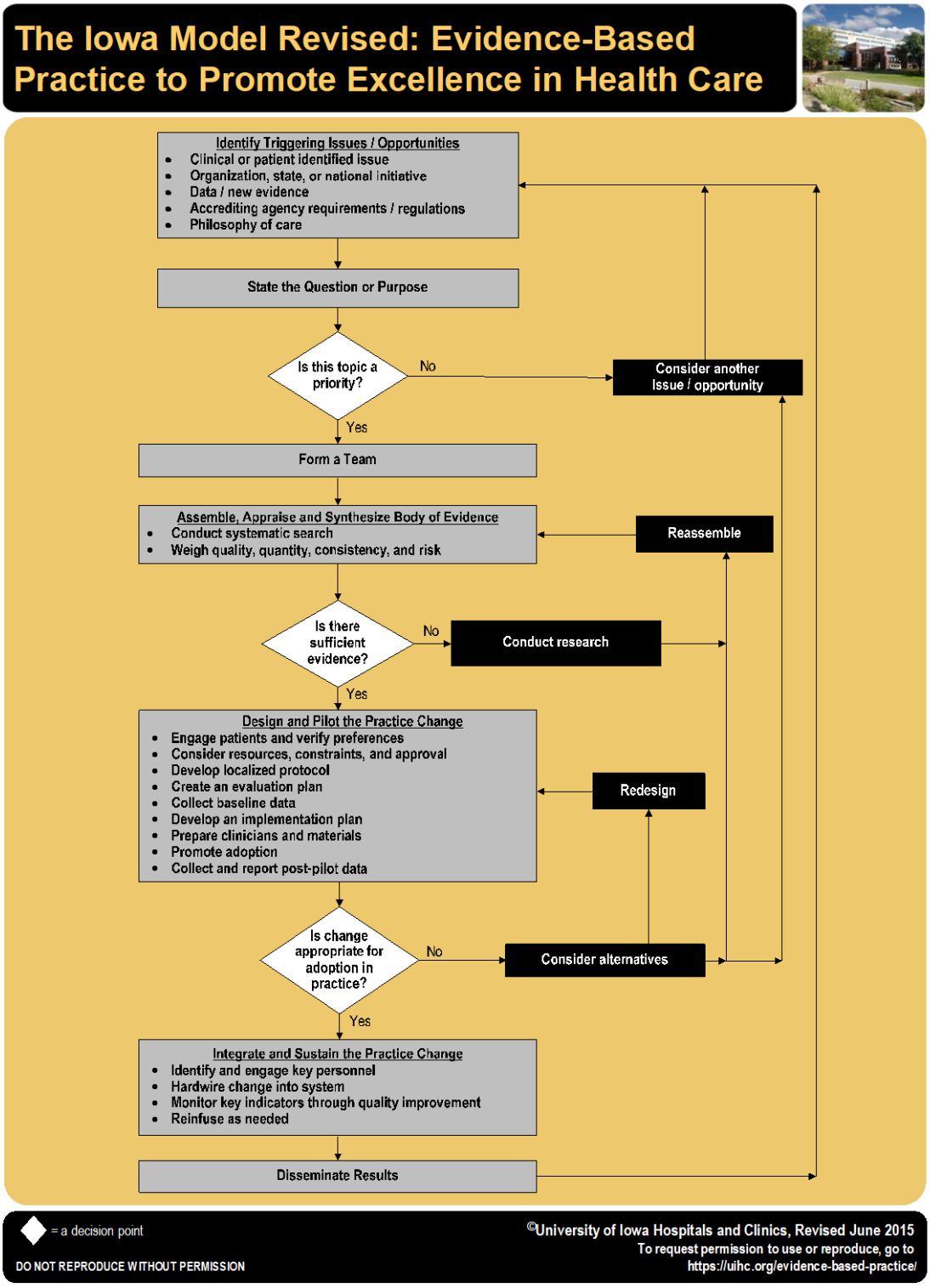
| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **6** | Polinski et al., 2016 | Non-experimental; Cross-sectional survey | Setting: Eleven CVS minute clinics in California and Texas<br><br>Sample Size: 1734 completed a post telehealth survey<br><br>Sample: Patients who were 18 years of age or older; 70 % were women. The study sample was compared with the CVS MinuteClinic general adult population and the U.S. adult population 18 years and older. | Patients rated their satisfaction, quality of care, convenience, and overall understanding of their telehealth appointment. Patients ranked telehealth visits compared to traditional ones: better (defined as preferring telehealth), just as good (defined as liking telehealth), or worse. | Between 94 and 99 % reported being "very satisfied" with all telehealth attributes. One-third preferred a telehealth visit to a traditional in-person visit. An additional 57 % liked telehealth. Predictors of liking telehealth were female gender (OR = 1.68, 1.04–2.72) and being very satisfied with their overall understanding of telehealth (OR = 2.76, 1.84–4.15), quality of care received (OR = 2.34, 1.42–3.87), and telehealth's convenience (OR = 2.87, 1.09–7.94) | The survey instrument was created by the pilot program evaluation team and was not tested for reliability or validity prior to use.<br><br>Data on the number of patients who were invited to take the survey and who refused were not available, and the pilot program team could not assess a precise survey response rate or the comparability of survey responders and non-responders regarding their telehealth experiences. | Level of Evidence: III<br>Quality Rating: B |
| **7** | Press et al., 2020 | Randomized Controlled Trial | Sample Size: Enrolled participants were randomized to virtual (n = 61) or in-person (n = 60) educational interventions.<br><br>Sample: Among 118 participants (59 in each group), most were black (114 [97%]) and female (76 [64%]), with a mean (SD) age of 54.5 (13.0) years. Hospitalized adult patients aged 18 years or older with physician-diagnosed asthma or COPD were eligible.<br><br>Setting: Participants were recruited from an urban academic | To assess whether the virtual teach-to-goal intervention is noninferior to an in-person teach-to-goal intervention.<br><br>A noninferiority design was chosen because the objective was to assess whether virtual education is as effective but not more effective than in-person teaching for initial education. | Correct technique increased similarly before vs after education in virtual (67%; range, 2%-69%) and in-person (66%; range, 17% to 83%) groups, although the difference after intervention exceeded the noninferiority limit (–14%; 95% CI lower bound, –26%). When adjusting for baseline inhaler technique, the difference was equivalent to the noninferiority limit (–10%; 95% | The study population primarily comprised urban, underserved, black patients and the intervention was developed using direct feedback from this population. Therefore, generalizability to clinical and home settings across diverse populations and geographies needs testing | Level of Evidence: I<br>Quality Rating: B |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | hospital and were similar to participants in previous studies evaluating efficacy of interventions tested in this study | | CI lower bound, –22%).<br><br>The findings suggest that patient-directed virtual education similarly improved the percentage of participants with correct technique compared with in-person education. | in future head-to-head comparisons. | |
| **8** | Salisbury et al., 2016 | Randomized Controlled Trial | Setting: Participants were recruited from 43 general practices in three areas of England.<br><br>Sample: To be eligible, participants needed to have access to the internet and email, a Patient Health Questionnaire 9 (PHQ-9) score of at least 10, a confirmed diagnosis of depression, and aged 18 years or older.<br><br>Sample size: 609 participants were randomly assigned, with 307 assigned to intervention plus usual care (telehealth) and 302 assigned to usual care alone (in-person treatment). A total of 516 (85%) participants were retained until the final 12-month follow-up assessment. | Outcomes measured were quality of life (EQ-5D-5L); satisfaction with treatment received and with amount of support received (patient satisfaction); perceived access to care; self-management skills and self-efficacy (HeiQ); use of telehealth interventions; and perceptions of care coordination (Haggerty). | Compared with participants who received usual care alone (in-person), participants who received the intervention (telehealth) reported reduced anxiety, improved access to health support and advice, greater satisfaction with the treatment and the amount of help they received, and improvements in self-management attitudes and skills. | Only a small proportion of those patients sent information about the trial expressed interest in participating. | Level of Evidence: I<br>Quality Rating: B |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **9** | Soriano et al., 2018 | Randomized Controlled Trial | Setting: Patients were recruited through five Madrid hospitals<br><br>Sample: Inclusion criteria for study subjects were: Aged 50–90 years old with a diagnosis of COPD. Participants had a mean ± SD age of 71 ± 8 years and 80% were men, and all demographic and clinical characteristics were evenly distributed by group including education level.<br><br>Sample Size: Overall, 237 COPD patients were screened, and 229 (96.6%) were randomized to telehealth (n = 115) or routine in-person practice (n = 114), and 169 completed the full follow-up period | Principal objective was to estimate the effectiveness of a Telehealth in managing patients with severe-very severe COPD when compared to Routine Clinical Practice (RCP).<br><br>Secondary objectives included estimating the efficiency (cost/effectiveness, cost/utility) of telehealth in managing severe-very severe COPD patients compared with routine in-person practice, and to evaluate patient and clinician satisfaction with the telehealth strategy. | Participants overall level of satisfaction was scored at 8.6 ± 1.07 points out of a maximum 10 points. Without exception, all participants (100%) would recommend the tele monitoring system to a family member or a friend, should they need it. Additionally, physicians also responded to a questionnaire, a large majority agreed or strongly agreed with positive statements regarding the telehealth. 93.3% of physicians would intend to use tele monitoring when necessary to provide health care to their patients, and 60.0% agreed to routinely use tele monitoring with their patients. | There was reduced formal coordination with Primary Care; Likely there was a learning curve with telehealth evident in patients and their doctors during the year. | Level of Evidence: I<br>Quality Rating: B |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **10** | Wilkinson et al., 2016 | Randomized Controlled Trial) | Setting: VA-based subspecialty Parkinson's Disease clinic.<br><br>Sample/Sample size: Eighty-six men (50 in the satellite clinic arm and 36 in the home telehealth arm) were recruited.<br><br>There were no significant demographic differences at baseline between control and intervention individuals in either arm.<br><br>At the conclusion of the study, 30 individuals had dropped out: 11 had died and 19 withdrew. Reasons for withdrawal in the telehealth groups related to technical issues, relocation of clinical care, change in frequency of visits to annually, and preference for in-person care. | Focused on patient satisfaction as the primary endpoint, as well as clinical outcomes, patient travel burden, and health care utilization, using clinical video telehealth vs usual in-person care. | Study participants completed a Patient Assessment of Communication of Telehealth (PACT) 6 question questionnaire. Results showed:<br>▪ There were no significant differences in overall (aggregate) patient satisfaction (telehealth vs. in-person care)<br>▪ Significantly higher satisfaction for telehealth interventions compared with usual in-person treatment.<br>▪ For convenience related to distance to travel, satisfaction was significantly higher in telehealth intervention groups.<br>▪ Telehealth patients also reported equal or improved overall communication, addressing of clinical concerns, and overall quality of visit compared with in-person visits.<br>▪ Travel burden was decreased for home telehealth participants with a savings of 58.2 miles per visit. | The small sample size may have decreased power to detect more between-group differences, particularly in the home telehealth arm because enrollment did not reach the goal of 50 participants.<br><br>Recall bias may have affected patient questionnaire responses. Thus, although the evidence is encouraging, larger long-term studies will be needed to guide program development and growth, with emphasis on cost-effectiveness, quality, and utilization. | Level of Evidence: I<br>Quality Rating: B |

**Appendix C: The Iowa Model Revised: EBP to Promote Excellence in Health Care**




(Iowa Model Collaborative, 2017)

*Used/reprinted with permission from the University of Iowa Hospitals and Clinics, copyright 2015. For permission to use or reproduce, please contact the University of Iowa Hospitals and Clinics at 319-384-9098.*

**Appendix D: Telehealth Usability Questionnaire (TUQ) for Living Donor and Health Care Professionals**

| **Telehealth Usability Questionnaire TUQ for Living Donors** (*Adapted for use) | |
|---|---|
| **Question** | **Answers** |
| 1. What is your gender? | 1, Male; 2, Female; 3, Transgender; 4, Other; 5, Prefer Not to Say |
| 2. What is your race/ethnicity? | 1, White; 2, Hispanic or Latino; 3, Black or African American; 4, Native American or American Indian; 5, Asian/Pacific Islander; 6, Other. |
| 3. What is your age? | 1, 18-25; 2, 26-35; 3, 36-45; 4, 46-55; 5, 56-65; 6, 66-75; 7, 76-85 |
| 4. Telehealth improves my access to Living Kidney Donation services (including virtual evaluations and virtual post-donation follow-up appointments) | 1: Strongly disagree<br>2: Disagree<br>3: More or less disagree<br>4: Undecided<br>5. More or less agree<br>6. Agree<br>7. Strongly agree |
| 5. Telehealth saves me time traveling. | 1: Strongly disagree<br>2: Disagree<br>3: More or less disagree<br>4: Undecided<br>5. More or less agree<br>6. Agree<br>7. Strongly agree |
| 6. Telehealth is a cost-saving option to complete my living donor evaluation. | 1: Strongly disagree<br>2: Disagree<br>3: More or less disagree<br>4: Undecided<br>5. More or less agree<br>6. Agree<br>7. Strongly agree |
| 7. I am more likely to attend, and not reschedule or miss, a Telehealth appointment compared to an in-person appointment. | 1: Strongly disagree<br>2: Disagree<br>3: More or less disagree<br>4: Undecided<br>5. More or less agree<br>6. Agree<br>7. Strongly agree |
| 8. It was simple to use the Telehealth system (Zoom®) for my living donor evaluation. | 1: Strongly disagree<br>2: Disagree<br>3: More or less disagree<br>4: Undecided<br>5. More or less agree<br>6. Agree<br>7. Strongly agree |

| | |
|---|---|
| 9. It was easy to learn how to use Zoom® | 1: Strongly disagree<br>2: Disagree<br>3: More or less disagree<br>4: Undecided<br>5. More or less agree<br>6. Agree<br>7. Strongly agree |
| 10. The way I was able to interact virtually with the living donor team through Telehealth (Zoom®) was pleasant, | 1: Strongly disagree<br>2: Disagree<br>3: More or less disagree<br>4: Undecided<br>5. More or less agree<br>6. Agree<br>7. Strongly agree |
| 11. I like using Telehealth (Zoom®), | 1: Strongly disagree<br>2: Disagree<br>3: More or less disagree<br>4: Undecided<br>5. More or less agree<br>6. Agree<br>7. Strongly agree |
| 12. I could hear the living donor team members clearly using Telehealth (Zoom®). | 1: Strongly disagree<br>2: Disagree<br>3: More or less disagree<br>4: Undecided<br>5. More or less agree<br>6. Agree<br>7. Strongly agree |
| 13. I felt I was able to express myself effectively to the healthcare providers and living donor team members when being evaluated virtually/through Telehealth. | 1: Strongly disagree<br>2: Disagree<br>3: More or less disagree<br>4: Undecided<br>5. More or less agree<br>6. Agree<br>7. Strongly agree |
| 14. I was easily able to ask questions and talk to the living donor team members including the doctors, social worker, and my coordinator during my virtual/Telehealth evaluation. | 1: Strongly disagree<br>2: Disagree<br>3: More or less disagree<br>4: Undecided<br>5. More or less agree<br>6. Agree<br>7. Strongly agree |
| 15. Using Telehealth, I could see and understand the living donor education PowerPoint presentation as well as if it were presented in-person. | 1: Strongly disagree<br>2: Disagree<br>3: More or less disagree<br>4: Undecided<br>5. More or less agree<br>6. Agree<br>7. Strongly agree |

| | |
|---|---|
| 16. I was able to do everything I wanted to do for my Telehealth appointment. | 1: Strongly disagree<br>2: Disagree<br>3: More or less disagree<br>4: Undecided<br>5. More or less agree<br>6. Agree<br>7. Strongly agree |
| 17. I think completing the living donor education and consults through Telehealth were the same as if I were completing them in-person. | 1: Strongly disagree<br>2: Disagree<br>3: More or less disagree<br>4: Undecided<br>5. More or less agree<br>6. Agree<br>7. Strongly agree |
| 18. I received assistance with any problems I experienced with Zoom®, including help with set-up and/or technical difficulties. | 1: Strongly disagree<br>2: Disagree<br>3: More or less disagree<br>4: Undecided<br>5. More or less agree<br>6. Agree<br>7. Strongly agree |
| 19. I felt comfortable communicating with the living donor team members using the Telehealth. | 1: Strongly disagree<br>2: Disagree<br>3: More or less disagree<br>4: Undecided<br>5. More or less agree<br>6. Agree<br>7. Strongly agree |
| 20. If I made a mistake using Telehealth (Zoom®), I could recover easily and quickly. | 1: Strongly disagree<br>2: Disagree<br>3: More or less disagree<br>4: Undecided<br>5. More or less agree<br>6. Agree<br>7. Strongly agree |
| 21. Telehealth met my need to attend an evaluation for living kidney donation. | 1: Strongly disagree<br>2: Disagree<br>3: More or less disagree<br>4: Undecided<br>5. More or less agree<br>6. Agree<br>7. Strongly agree |
| 22. Telehealth is an acceptable way to complete a living donor evaluation including education and consults with the living donor team healthcare providers. | 1: Strongly disagree<br>2: Disagree<br>3: More or less disagree<br>4: Undecided<br>5. More or less agree<br>6. Agree<br>7. Strongly agree |

| | |
|---|---|
| 23. I would use Telehealth again. | 1: Strongly disagree<br>2: Disagree<br>3: More or less disagree<br>4: Undecided<br>5. More or less agree<br>6. Agree<br>7. Strongly agree |
| 24. Overall, I am satisfied with my Telehealth/virtual living donor evaluation. | 1: Strongly disagree<br>2: Disagree<br>3: More or less disagree<br>4: Undecided<br>5. More or less agree<br>6. Agree<br>7. Strongly agree |
| 25. Please include any additional thoughts or comments here. | Open ended answer/ Comment |

| **Telehealth Usability Questionnaire for Healthcare Providers**<br>**(*Adapted for use)** | |
|---|---|
| **Question** | **Answer Options** |
| What is your role on the living donor team? | 1, Physician 2, Coordinator 3, Social Worker 4, Other |
| I like using Telehealth to complete the functions of my job. | 1: Strongly disagree<br>2: Disagree<br>3: More or less disagree<br>4: Undecided<br>5. More or less agree<br>6. Agree<br>7. Strongly agree |
| Telehealth (Zoom®) helps me manage my clinic schedule efficiently. | 1: Strongly disagree<br>2: Disagree<br>3: More or less disagree<br>4: Undecided<br>5. More or less agree<br>6. Agree<br>7. Strongly agree |
| 1. Telehealth is a cost-effective option for potential living donors undergoing an evaluation and for completing post-donation follow-up requirements. | 1: Strongly disagree<br>2: Disagree<br>3: More or less disagree<br>4: Undecided<br>5. More or less agree<br>6. Agree<br>7. Strongly agree |
| Telehealth improves patient access to transplant and living donation healthcare services. | 1: Strongly disagree<br>2: Disagree<br>3: More or less disagree<br>4: Undecided<br>5. More or less agree |

| | |
|---|---|
| | 6. Agree<br>7. Strongly agree |
| Zoom® is a simple system and easy to navigate. | 1: Strongly disagree<br>2: Disagree<br>3: More or less disagree<br>4: Undecided<br>5. More or less agree<br>6. Agree<br>7. Strongly agree |
| It was easy to learn how to set up and use Telehealth (Zoom®). | 1: Strongly disagree<br>2: Disagree<br>3: More or less disagree<br>4: Undecided<br>5. More or less agree<br>6. Agree<br>7. Strongly agree |
| The way I am able to interact with my patients through Zoom® is pleasant. | 1: Strongly disagree<br>2: Disagree<br>3: More or less disagree<br>4: Undecided<br>5. More or less agree<br>6. Agree<br>7. Strongly agree |
| 2. I like using telehealth (Zoom®). | 1: Strongly disagree<br>2: Disagree<br>3: More or less disagree<br>4: Undecided<br>5. More or less agree<br>6. Agree<br>7. Strongly agree |
| 3. I can hear my patients clearly using the Telehealth system (Zoom®). | 1: Strongly disagree<br>2: Disagree<br>3: More or less disagree<br>4: Undecided<br>5. More or less agree<br>6. Agree<br>7. Strongly agree |
| 4. I can communicate with donors effectively when using the Telehealth system (Zoom®). | 1: Strongly disagree<br>2: Disagree<br>3: More or less disagree<br>4: Undecided<br>5. More or less agree<br>6. Agree<br>7. Strongly agree |
| 5. When using Telehealth (Zoom®), I can examine a donor as well as if we met in person. | 1: Strongly disagree<br>2: Disagree<br>3: More or less disagree<br>4: Undecided<br>5. More or less agree<br>6. Agree |

| | |
|---|---|
| | 7. Strongly agree |
| 6. Individuals completing Telehealth evaluations understand the education and information provided and can make an informed decision about living donation, just the same as if their education/evaluation was completed in-person. | 1: Strongly disagree<br>2: Disagree<br>3: More or less disagree<br>4: Undecided<br>5. More or less agree<br>6. Agree<br>7. Strongly agree |
| 7. I can do everything I want to do during Telehealth donor appointments (charting, physical examinations, screen sharing, playing power point presentations, etc.) | 1: Strongly disagree<br>2: Disagree<br>3: More or less disagree<br>4: Undecided<br>5. More or less agree<br>6. Agree<br>7. Strongly agree |
| 8. I find Telehealth evaluations are comparable to the quality of care delivered during in-person evaluations | 1: Strongly disagree<br>2: Disagree<br>3: More or less disagree<br>4: Undecided<br>5. More or less agree<br>6. Agree<br>7. Strongly agree |
| 9. I feel I have sufficient IT support for Telehealth visits. | 1: Strongly disagree<br>2: Disagree<br>3: More or less disagree<br>4: Undecided<br>5. More or less agree<br>6. Agree<br>7. Strongly agree |
| 10. Technical difficulties sometimes happen during Telehealth (Zoom®) appointments, but they are typically easy to resolve and do not prevent me from evaluating my patient(s). | 1: Strongly disagree<br>2: Disagree<br>3: More or less disagree<br>4: Undecided<br>5. More or less agree<br>6. Agree<br>7. Strongly agree |
| 11. Whenever I make a mistake using the Telehealth system (Zoom®), I can recover easily and quickly. | 1: Strongly disagree<br>2: Disagree<br>3: More or less disagree<br>4: Undecided<br>5. More or less agree<br>6. Agree<br>7. Strongly agree |
| 12. Telehealth meets my needs when evaluating individuals for living donation and those needing post-donation follow up care. | 1: Strongly disagree<br>2: Disagree<br>3: More or less disagree<br>4: Undecided<br>5. More or less agree<br>6. Agree<br>7. Strongly agree |

| | |
|---|---|
| 13. Telehealth is an acceptable way to evaluate and educate potential living donors. | 1: Strongly disagree<br>2: Disagree<br>3: More or less disagree<br>4: Undecided<br>5. More or less agree<br>6. Agree<br>7. Strongly agree |
| 14. I am open to the continued use of Telehealth (Zoom®) for living donor evaluations and follow-up visits. | 1: Strongly disagree<br>2: Disagree<br>3: More or less disagree<br>4: Undecided<br>5. More or less agree<br>6. Agree<br>7. Strongly agree |
| 15. Overall, I am satisfied with using Telehealth (Zoom®) to evaluate living donors. | 1: Strongly disagree<br>2: Disagree<br>3: More or less disagree<br>4: Undecided<br>5. More or less agree<br>6. Agree<br>7. Strongly agree |

## Appendix E: Gantt Chart Outlining Project Timeline

| Tasks | Apr 2021 | May 2021 | Jun 2021 | Jul 2021 | Aug 2021 | Sep 2021 | Oct 2021 | Nov 2021 | Dec 2021 | Jan 2022 | Feb 2022 | Mar 2022 | Apr 2022 | May 2022 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Current State Assessment | | | | | | | | | | | | | | |
| Assembling a project team | | | | | | | | | | | | | | |
| Share evidence-based literature to leadership and stakeholders | | | | | | | | | | | | | | |
| Project Proposal Approval | | | | | | | | | | | | | | |
| Secure Internal Review Board and Clinical Director Approval | | | | | | | | | | | | | | |
| Project Implementation | | | | | | | | | | | | | | |
| Perform data collection and analysis | | | | | | | | | | | | | | |
| Share feedback and data collection with leadership and stakeholders | | | | | | | | | | | | | | |
| Make recommendations to modify and improve current practice | | | | | | | | | | | | | | |
| Project completion and submission | | | | | | | | | | | | | | |

## Appendix F: Logic Model

**Problem Statement**: Telemedicine has allowed our transplant center to connect safely with our donors during their most vulnerable time and ensured that contact with them was uninterrupted during the COVID-19 pandemic. It became evident that in-person evaluation and follow-up process was cost effective for donors. However, prospective evaluation was needed to determine whether reliance on telehealth for communication with donors affected quality of care.

**Goal**: To evaluate the impact of using telehealth as the primary means of communicating with living donors during evaluations (and follow-up appointments) and its effect on quality of care versus in-person evaluations.

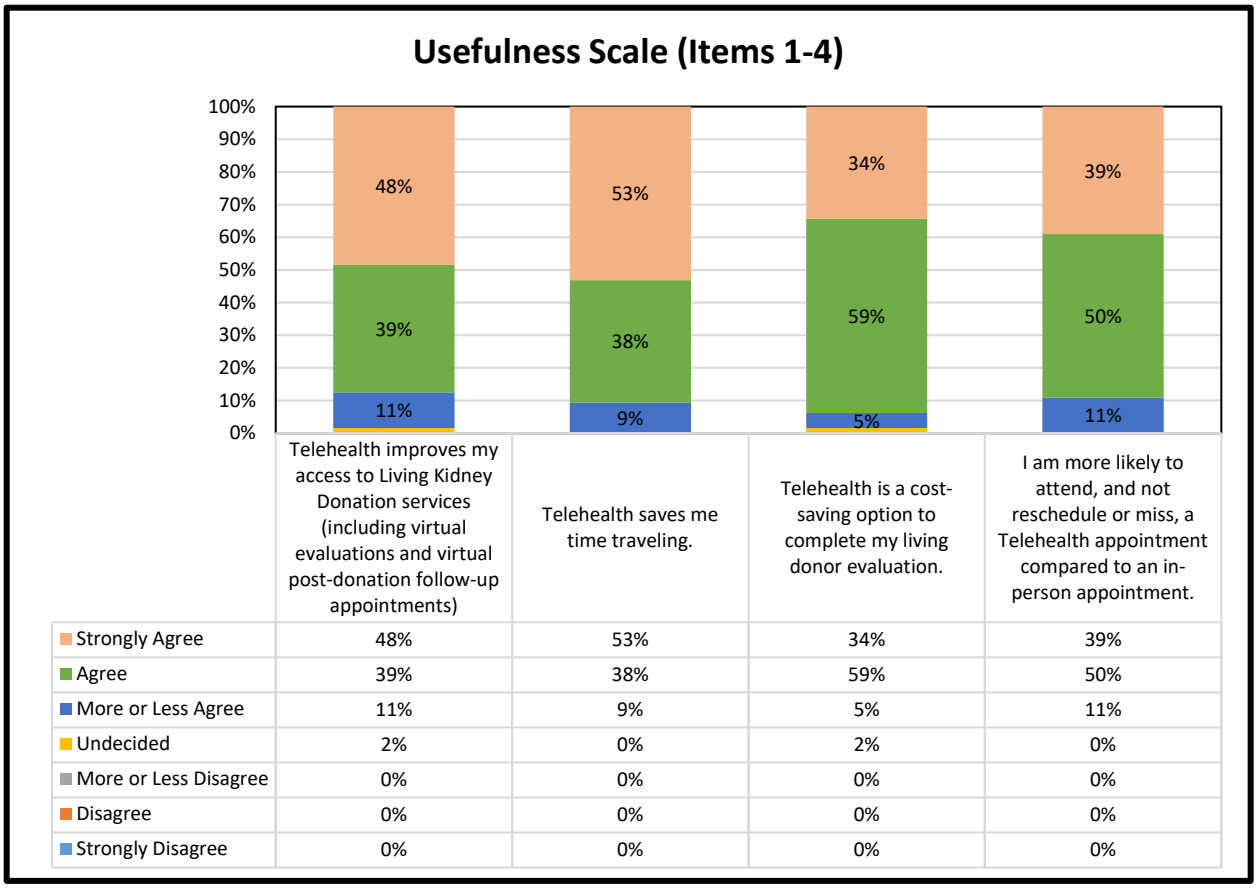
<table>
<tr><th colspan="2">Inputs</th><th colspan="2">Outputs</th><th colspan="3">Outcomes</th></tr>
<tr><th>Staff Time</th><th>Activities</th><th>Participation</th><th>Short-Term</th><th>Intermediate</th><th>Long-Term</th></tr>
<tr><td>Telehealth Infrastructure (Zoom®)</td><td>Conduct Living Donor Evaluations</td><td># of Living Donors participating in Evaluations</td><td>Living donors will Report an Overall Positive Experience with Telehealth Communications</td><td>Telehealth Evaluations will Improve Access to Living Donation Services</td><td>Increased Community Awareness Regarding the Benefits of Telehealth</td></tr>
<tr><td>Data collection and analysis platforms: REDCap®, OTTR, NKR DASH, and Medconnect EMR</td><td>Collect Data and Analysis</td><td># of Healthcare providers</td><td rowspan="5">Healthcare Providers will Report an Overall Positive Experience with Telehealth Communications</td><td rowspan="2">Telehealth Evaluations will Improve the Financial Impact on Living Donors</td><td rowspan="5">Telehealth Evaluations will Provide Overall High Quality of Care for Living Donors and</td></tr>
<tr><td>Outlook/Email access to send survey to donors/healthcare providers</td><td rowspan="4">Create and Distribute Electronic Surveys</td><td># of Days Between Scheduled Evaluation Date and Clearance Date</td></tr>
<tr><td>NKR DASH questionnaires</td><td># of Living Donors Cleared for Surgery</td><td rowspan="3">Telehealth will Maintain Evaluations Effectiveness</td></tr>
<tr><td></td><td># of TUQ surveys completed</td></tr>
<tr><td></td><td># of days between NKR DASH questionnaire submission and scheduled evaluation date</td></tr>
<tr><td></td><td></td><td>Estimated Donor Out-of-Pocket Costs of Travel, Lost Wages, etc.</td><td></td><td></td><td></td></tr>
<tr><td colspan="3">Assumptions</td><td colspan="3">External Factors</td></tr>
</table>

| | |
|---|---|
| ➢ Barriers to living donation are due to anticipated cost of travel and time off work<br>➢ Stakeholders will be engaged<br>➢ Staff/identified team members will be receptive and enthused to participate in the program<br>➢ There will be adequate time allotted to complete and evaluate the project<br>➢ Our transplant center will be financially stable to initiate and continue with the study<br>➢ Implementation of the study will produce long term benefits for our organization/living donors. | ➢ Reluctance of patients to use telehealth<br>➢ Management practices<br>➢ Work unit climate including staff turn over<br>➢ Tasks and individual skills<br>➢ Individual needs and values |

## Appendix G: Living Donor TUQ Results and Data Analysis

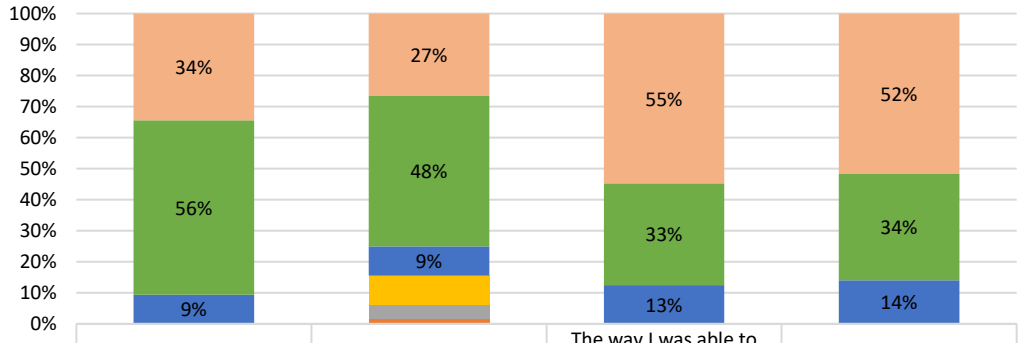
| Telehealth Usability Questionnaire (TUQ) for Living Donors (*Adapted for use) (N =64) | | | |
|---|---|---|---|
| Answers are based on a 7-point Likert scale: (1) Strongly disagree, (2) Disagree, (3) More or less disagree, (4) Undecided, (5) More or less agree, (6) Agree, (7) Strongly agree | | | |
| **Item** | | **Median Score** | **Range 1-7** |
| **Usefulness Scale (Items 1-4)** | | **6.33 (0.04)** | **(4.0-7.0)** |
| 1. | Telehealth improves my access to Living Kidney Donation services (including virtual evaluations and virtual post-donation follow-up appointments) | 6.34 | (4.0-7.0) |
| 2. | Telehealth saves me time traveling. | 6.44 | (5.0-7.0) |
| 3. | Telehealth is a cost-saving option to complete my living donor evaluation. | 6.27 | (4.0-7.0) |
| 4. | I am more likely to attend, and not reschedule or miss, a Telehealth appointment compared to an in-person appointment. | 6.28 | (5.0-7.0) |
| **Ease of Use Scale (Items 5-8)** | | **6.21 (0.29)** | **(6.0-7.0)** |
| 5. | It was simple to use the Telehealth system (Zoom®) for my living donor evaluation. | 6.25 | (5.0-7.0) |
| 6. | It was easy to learn how to use Zoom® | 5.78 | (2.0-7.0) |
| 7. | The way I was able to interact virtually with the living donor team through Telehealth (Zoom®) was pleasant, | 6.42 | (5.0-7.0) |
| 8. | I like using Telehealth (Zoom®), | 6.38 | (5.0-7.0) |
| **Effectiveness (Items 9-13)** | | **6.35 (0.08)** | **(4.0-7.0)** |
| 9. | I could hear the living donor team members clearly using Telehealth (Zoom®). | 6.41 | (5.0-7.0) |
| 10. | I felt I was able to express myself effectively to the healthcare providers and living donor team members when being evaluated virtually/through Telehealth. | 6.38 | (4.0-7.0) |
| 11. | I was easily able to ask questions and talk to the living donor team members including the doctors, social worker, and my coordinator during my virtual/Telehealth evaluation. | 6.27 | (5.0-7.0) |
| 12. | Using Telehealth, I could see and understand the living donor education PowerPoint presentation as well as if it were presented in-person. | 6.44 | (5.0-7.0) |
| 13. | I was able to do everything I wanted to do for my Telehealth appointment. | 6.28 | (5.0-7.0) |
| **Reliability (Items 14-17)** | | **6.17 (0.16)** | **(5.0-7.0)** |
| 14. | I think completing the living donor education and consults through Telehealth were the same as if I were completing them in-person. | 6.38 | (3.0-7.0) |
| 15. | I received assistance with any problems I experienced with Zoom®, including help with set-up and/or technical difficulties. | 5.98 | (3.0-7.0) |

| | | | |
|---|---|---|---|
| 16. | I felt comfortable communicating with the living donor team members using the Telehealth. | 6.13 | (4.0-7.0) |
| 17. | If I made a mistake using Telehealth (Zoom®), I could recover easily and quickly. | 6.20 | (4.0-7.0) |
| **Satisfaction (Items 18-21)** | | **6.45 (0.04)** | **(5.0-7.0)** |
| 18. | Telehealth met my need to attend an evaluation for living kidney donation. | 6.50 | (5.0-7.0) |
| 19. | Telehealth is an acceptable way to complete a living donor evaluation including education and consults with the living donor team healthcare providers. | 6.42 | (5.0-7.0) |
| 20. | I would use Telehealth again. | 6.41 | (5.0-7.0) |
| 21. | Overall, I am satisfied with my Telehealth/virtual living donor evaluation. | 6.45 | (5.0-7.0) |



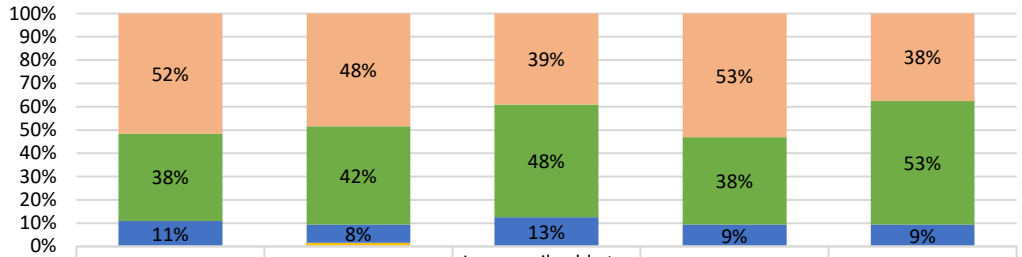

| | Telehealth improves my access to Living Kidney Donation services (including virtual evaluations and virtual post-donation follow-up appointments) | Telehealth saves me time traveling. | Telehealth is a cost-saving option to complete my living donor evaluation. | I am more likely to attend, and not reschedule or miss, a Telehealth appointment compared to an in-person appointment. |
|---|---|---|---|---|
| Strongly Agree | 48% | 53% | 34% | 39% |
| Agree | 39% | 38% | 59% | 50% |
| More or Less Agree | 11% | 9% | 5% | 11% |
| Undecided | 2% | 0% | 2% | 0% |
| More or Less Disagree | 0% | 0% | 0% | 0% |
| Disagree | 0% | 0% | 0% | 0% |
| Strongly Disagree | 0% | 0% | 0% | 0% |

## Ease of Use Scale (Items 5-8)



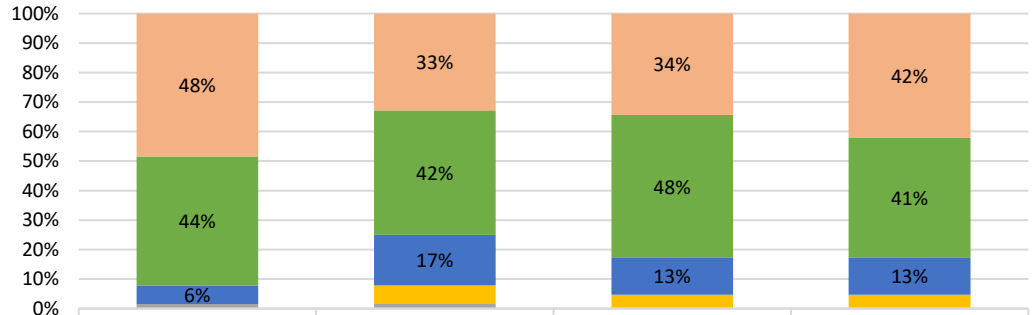

| | It was simple to use the Telehealth system (Zoom®) for my living donor evaluation. | It was easy to learn how to use Zoom® | The way I was able to interact virtually with the living donor team through Telehealth (Zoom®) was pleasant, | I like using Telehealth (Zoom®), |
|---|---|---|---|---|
| Strongly Agree | 34% | 27% | 55% | 52% |
| Agree | 56% | 48% | 33% | 34% |
| More or Less Agree | 9% | 9% | 13% | 14% |
| Undecided | 0% | 9% | 0% | 0% |
| More or Less Disagree | 0% | 5% | 0% | 0% |
| Disagree | 0% | 2% | 0% | 0% |
| Strongly Disagree | 0% | 0% | 0% | 0% |

## Effectiveness Scale (Items 9-13)



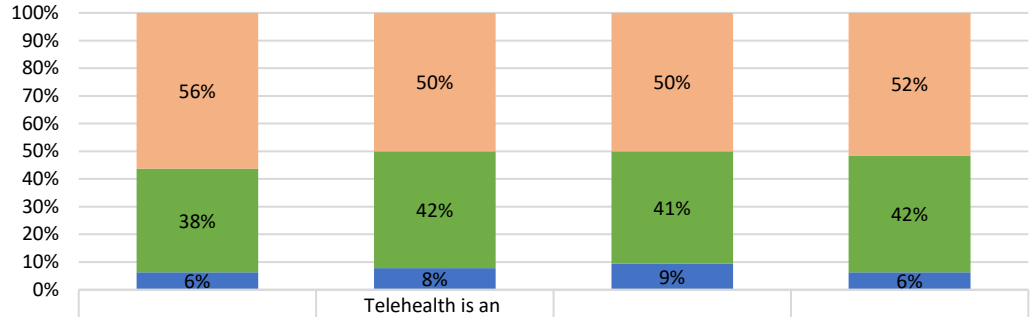

| | I could hear the living donor team members clearly using Telehealth (Zoom®). | I felt I was able to express myself effectively to the healthcare providers and living donor team members when being evaluated virtually/through Telehealth. | I was easily able to ask questions and talk to the living donor team members including the doctors, social worker, and my coordinator during my virtual/Telehealth evaluation. | Using Telehealth, I could see and understand the living donor education PowerPoint presentation as well as if it were presented in-person. | I was able to do everything I wanted to do for my Telehealth appointment. |
|---|---|---|---|---|---|
| Strongly Agree | 52% | 48% | 39% | 53% | 38% |
| Agree | 38% | 42% | 48% | 38% | 53% |
| More or Less Agree | 11% | 8% | 13% | 9% | 9% |
| Undecided | 0% | 2% | 0% | 0% | 0% |
| More or Less Disagree | 0% | 0% | 0% | 0% | 0% |
| Disagree | 0% | 0% | 0% | 0% | 0% |
| Strongly Disagree | 0% | 0% | 0% | 0% | 0% |

## Reliability Scale (Items 14-17)




| | I think completing the living donor education and consults through Telehealth were the same as if I were completing them in-person. | I received assistance with any problems I experienced with Zoom®, including help with set-up and/or technical difficulties. | I felt comfortable communicating with the living donor team members using the Telehealth. | If I made a mistake using Telehealth (Zoom®), I could recover easily and quickly. |
|---|---|---|---|---|
| Strongly Agree | 48% | 33% | 34% | 42% |
| Agree | 44% | 42% | 48% | 41% |
| More or Less Agree | 6% | 17% | 13% | 13% |
| Undecided | 0% | 6% | 5% | 5% |
| More or Less Disagree | 2% | 2% | 0% | 0% |
| Disagree | 0% | 0% | 0% | 0% |
| Strongly Disagree | 0% | 0% | 0% | 0% |

## Satisfaction Scale (Items 18-21)

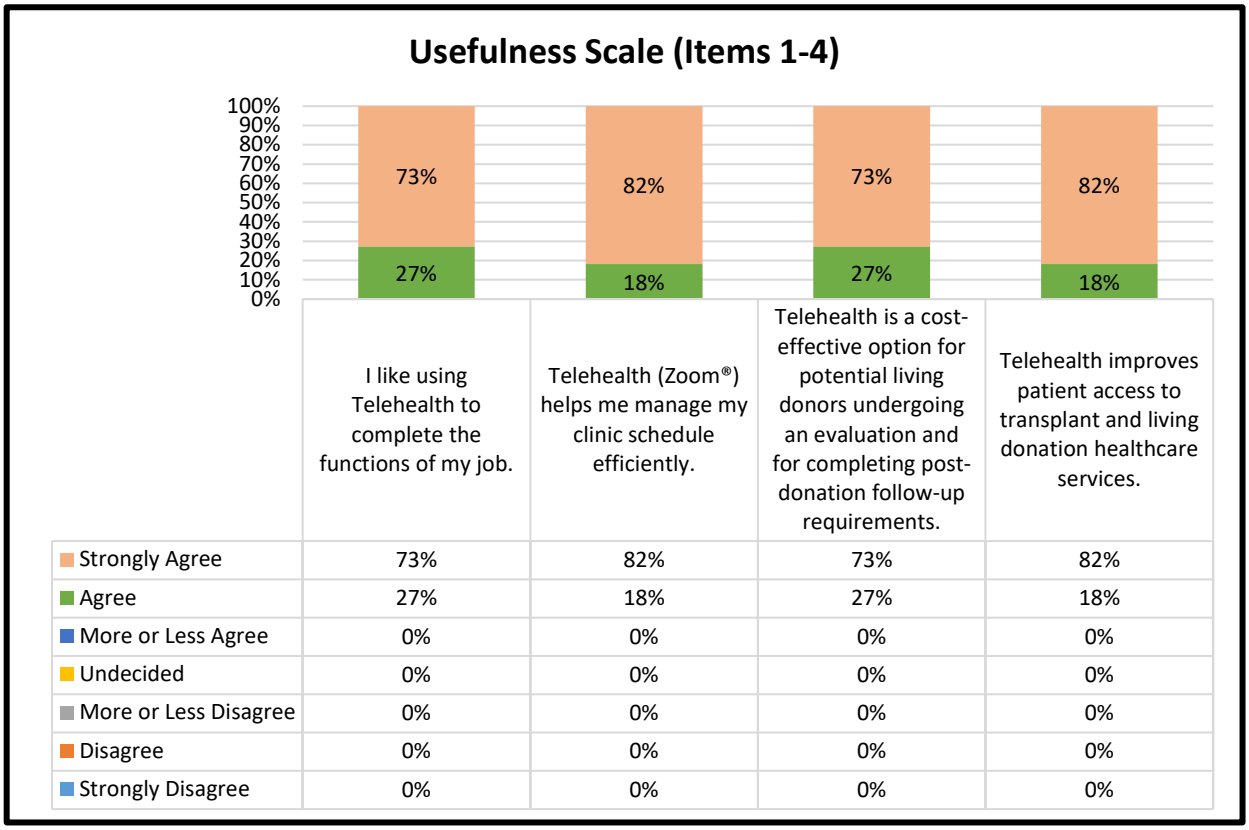



| | Telehealth met my need to attend an evaluation for living kidney donation. | Telehealth is an acceptable way to complete a living donor evaluation including education and consults with the living donor team healthcare providers. | I would use Telehealth again. | Overall, I am satisfied with my Telehealth/virtual living donor evaluation. |
|---|---|---|---|---|
| Strongly Agree | 56% | 50% | 50% | 52% |
| Agree | 38% | 42% | 41% | 42% |
| More or Less Agree | 6% | 8% | 9% | 6% |
| Undecided | 0% | 0% | 0% | 0% |
| More or Less Disagree | 0% | 0% | 0% | 0% |
| Disagree | 0% | 0% | 0% | 0% |
| Strongly Disagree | 0% | 0% | 0% | 0% |

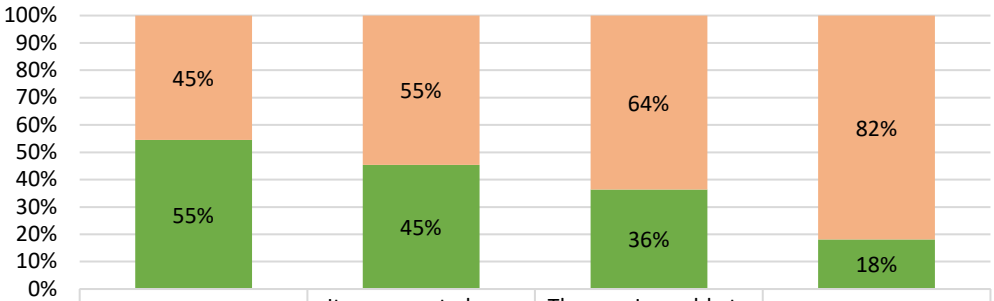
## Appendix H: Healthcare Provider TUQ Results and Data Analysis

| **Telehealth Usability Questionnaire (TUQ) for Healthcare Providers (*Adapted for use) (N =11)** | | | |
|---|---|---|---|
| Answers are based on a 7-point Likert scale: (1) Strongly disagree, (2) Disagree, (3) More or less disagree, (4) Undecided, (5) More or less agree, (6) Agree, (7) Strongly agree | | | |
| **Item** | | **Mean Score (SD)** | **Range 1-7** |
| **Usefulness Scale (Items 1-4)** | | **6.68 (0.05)** | **(6.0-7.0)** |
| 1. | I like using Telehealth to complete the functions of my job. | 6.73 | (6.0-7.0) |
| 2. | Telehealth (Zoom®) helps me manage my clinic schedule efficiently. | 6.82 | (6.0-7.0) |
| 3. | Telehealth is a cost-effective option for potential living donors undergoing an evaluation and for completing post-donation follow-up requirements. | 6.73 | (6.0-7.0) |
| 4. | Telehealth improves patient access to transplant and living donation healthcare services. | 6.82 | (6.0-7.0) |
| **Ease of Use Scale (Items 5-8)** | | **6.62 (0.16)** | **(6.0-7.0)** |
| 5. | Zoom® is a simple system and easy to navigate. | 6.45 | (6.0-7.0) |
| 6. | It was easy to learn how to set up and use Telehealth (Zoom®). | 6.55 | (6.0-7.0) |
| 7. | The way I am able to interact with my patients through Zoom® is pleasant. | 6.64 | (6.0-7.0) |
| 8. | I like using telehealth (Zoom®). | 6.82 | (6.0-7.0) |
| **Effectiveness (Items 9-13)** | | **6.38 (0.50)** | **(3.0-7.0)** |
| 9. | I can hear my patients clearly using the Telehealth system (Zoom®). | 6.73 | (6.0-7.0) |
| 10. | I can communicate with donors effectively when using the Telehealth system (Zoom®). | 6.64 | (6.0-7.0) |
| 11. | When using Telehealth (Zoom®), I can examine a donor as well as if we met in person. | 5.55 | (3.0-7.0) |
| 12. | Individuals completing Telehealth evaluations understand the education and information provided and can make an informed decision about living donation, just the same as if their education/evaluation was completed in-person. | 6.73 | (6.0-7.0) |
| 13. | I can do everything I want to do during Telehealth donor appointments (charting, physical examinations, screen sharing, playing power point presentations, etc.) | 6.27 | (5.0-7.0) |
| **Reliability (Items 14-17)** | | **6.38 (0.04)** | **(5.0-7.0)** |

| | | | |
|---|---|---|---|
| 14. | I find Telehealth evaluations are comparable to the quality of care delivered during in-person evaluations | 6.36 | (5.0-7.0) |
| 15. | I feel I have sufficient IT support for Telehealth visits. | 6.45 | (6.0-7.0) |
| 16. | Technical difficulties sometimes happen during Telehealth (Zoom®) appointments, but they are typically easy to resolve and do not prevent me from evaluating my patient(s). | 6.36 | (6.0-7.0) |
| 17. | Whenever I make a mistake using the Telehealth system (Zoom®), I can recover easily and quickly. | 6.36 | (6.0-7.0) |
| **Satisfaction (Items 18-21)** | | **6.66 (0.14)** | **(6.0-7.0)** |
| 18. | Telehealth meets my needs when evaluating individuals for living donation and those needing post-donation follow up care. | 6.55 | (6.0-7.0) |
| 19. | Telehealth is an acceptable way to evaluate and educate potential living donors. | 6.55 | (6.0-7.0) |
| 20. | I am open to the continued use of Telehealth (Zoom®) for living donor evaluations and follow-up visits. | 6.73 | (6.0-7.0) |
| 21. | Overall, I am satisfied with using Telehealth (Zoom®) to evaluate living donors. | 6.82 | (6.0-7.0) |

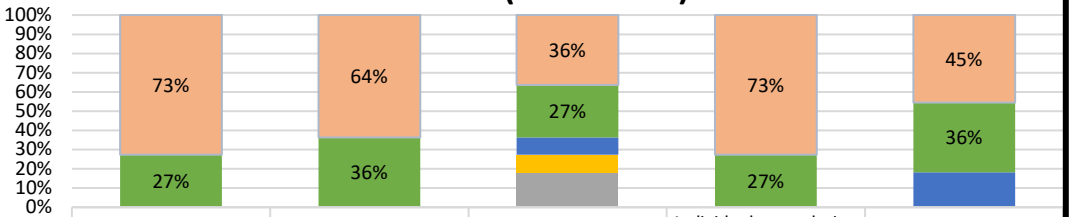


## Ease of Use Scale (Items 5-8)



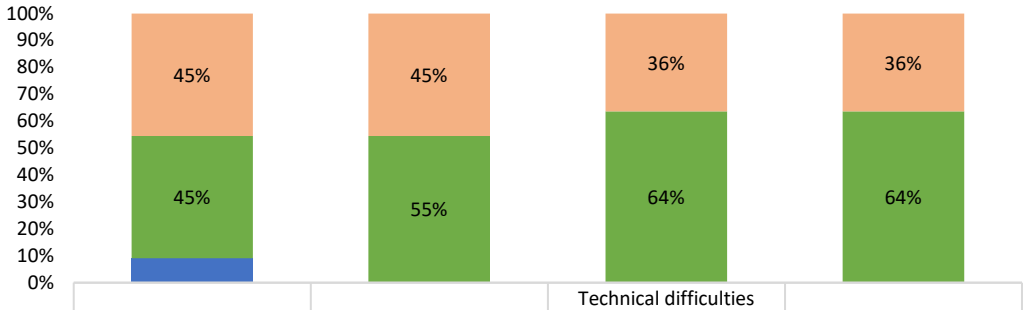

| | Zoom® is a simple system and easy to navigate. | It was easy to learn how to set up and use Telehealth (Zoom®). | The way I am able to interact with my patients through Zoom® is pleasant. | I like using telehealth (Zoom®). |
|---|---|---|---|---|
| Strongly Agree | 45% | 55% | 64% | 82% |
| Agree | 55% | 45% | 36% | 18% |
| More or Less Agree | 0% | 0% | 0% | 0% |
| Undecided | 0% | 0% | 0% | 0% |
| More or Less Disagree | 0% | 0% | 0% | 0% |
| Disagree | 0% | 0% | 0% | 0% |
| Strongly Disagree | 0% | 0% | 0% | 0% |

## Effectiveness Scale (Items 9-13)



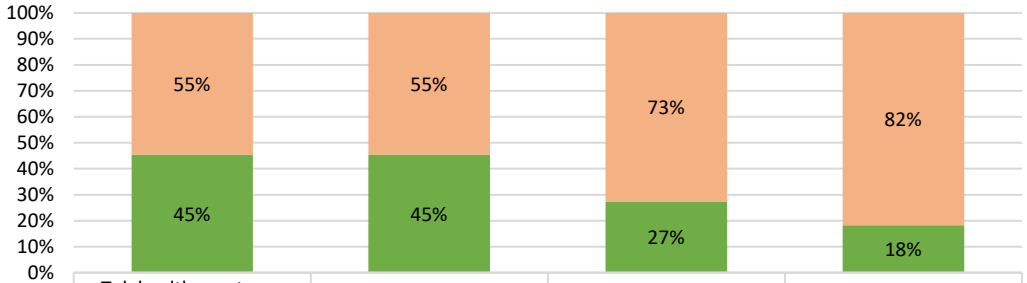

| | I can hear my patients clearly using the Telehealth system (Zoom®). | I can communicate with donors effectively when using the Telehealth system (Zoom®). | When using Telehealth (Zoom®), I can examine a donor as well as if we met in person. | Individuals completing Telehealth evaluations understand the education and information provided and can make an informed decision about living donation, just the same as if their education/evaluation was completed in-person. | I can do everything I want to do during Telehealth donor appointments (charting, physical examinations, screen sharing, playing power point presentations, etc.) |
|---|---|---|---|---|---|
| Strongly Agree | 73% | 64% | 36% | 73% | 45% |
| Agree | 27% | 36% | 27% | 27% | 36% |
| More or Less Agree | 0% | 0% | 9% | 0% | 18% |
| Undecided | 0% | 0% | 9% | 0% | 0% |
| More or Less Disagree | 0% | 0% | 18% | 0% | 0% |
| Disagree | 0% | 0% | 0% | 0% | 0% |
| Strongly Disagree | 0% | 0% | 0% | 0% | 0% |

## Reliability Scale (Items 14-17)




| | I find Telehealth evaluations are comparable to the quality of care delivered during in-person evaluations. | I feel I have sufficient IT support for Telehealth visits. | Technical difficulties sometimes happen during Telehealth (Zoom®) appointments, but they are typically easy to resolve and do not prevent me from evaluating my patient(s). | Whenever I make a mistake using the Telehealth system (Zoom®), I can recover easily and quickly. |
|---|---|---|---|---|
| Strongly Agree | 45% | 45% | 36% | 36% |
| Agree | 45% | 55% | 64% | 64% |
| More or Less Agree | 9% | 0% | 0% | 0% |
| Undecided | 0% | 0% | 0% | 0% |
| More or Less Disagree | 0% | 0% | 0% | 0% |
| Disagree | 0% | 0% | 0% | 0% |
| Strongly Disagree | 0% | 0% | 0% | 0% |

## Satisfaction Scale (Items 18-21)




| | Telehealth meets my needs when evaluating individuals for living donation and those needing post-donation follow up care. | Telehealth is an acceptable way to evaluate and educate potential living donors. | I am open to the continued use of Telehealth (Zoom®) for living donor evaluations and follow-up visits. | Overall, I am satisfied with using Telehealth (Zoom®) to evaluate living donors. |
|---|---|---|---|---|
| Strongly Agree | 55% | 55% | 73% | 82% |
| Agree | 45% | 45% | 27% | 18% |
| More or Less Agree | 0% | 0% | 0% | 0% |
| Undecided | 0% | 0% | 0% | 0% |
| More or Less Disagree | 0% | 0% | 0% | 0% |
| Disagree | 0% | 0% | 0% | 0% |
| Strongly Disagree | 0% | 0% | 0% | 0% |