

Paired Kidney Exchange increases Living Donor Kidney Transplantation

► In the United States, the Penn Transplant Institute is a leading center for paired kidney exchange for living donor kidney transplantation, a practice that increases the likelihood of successful outcomes and abbreviates the wait for a donor kidney in patients with end-stage kidney disease.

The outcomes of kidney transplantation are optimal when the procedure is performed from living donors with compatible blood and tissue antigens. Transplanted kidneys from living donors last years longer, on average, than grafts from deceased donors.

However, blood and tissue antigen compatibility is uncommon even among related individuals, which has limited living kidney transplantation until recent years. Most people with end-stage kidney disease, therefore, will eventually join the waitlist for a kidney from a deceased donor in the United States, where the average time until transplant from a deceased donor is now 3.6 years due to the shortage in organ donors.

Addressing the dual challenges of incompatibility and the shortage of deceased donor kidneys requires commitment and innovation with the kidney transplant community. To this end, at the Penn Transplant Institute, all potential kidney donors and kidney transplant candidates with living donors have the chance to enroll in the Paired Kidney Exchange (PKE) Program.

PKEs play a critical role in expanding access to kidney transplantation and thereby improving outcomes by increasing the available population of potential living donors for transplant candidates, which decreases or avoids altogether the need for dialysis.

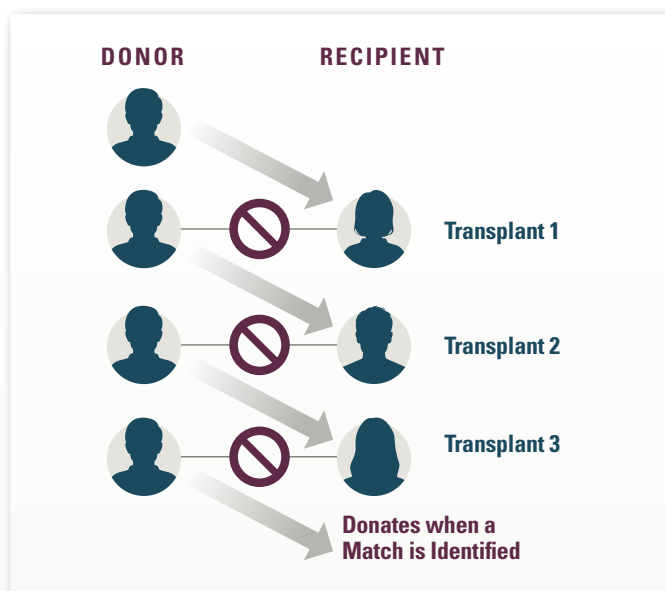
Most PKE exchanges at the Penn Transplant Institute, for example, take place within 4 months. The approach is also offered to compatible pairs who may choose to participate for a better age match or altruistic reasons.

Principles of Kidney Exchange

Paired kidney exchanges often occur as ‘chains’ initiated between a “non-directed” altruistic donor and a transplant candidate to whom he or she has been matched. The chain is generally continued simultaneously with that candidate’s paired donor repeating the process by donating to a another matched candidate participating in the PKE program. This series of events has a domino-like effect that produces a chain of transplants that can continue for as many compatible candidates with donors that exist in the PKE pool at that time. If there are no further matches identified, the donor of the last candidate transplanted can choose to begin a new chain as a “bridge” donor when the next matched candidate is identified (see Figure 1). If bridge donation is not desirable, then the donor can donate to a lucky candidate at the top of the deceased donor wait list (at a center participating in PKE), which extends access to living kidney donation and it’s associated advantages to someone without a donor.

At Penn, kidney transplant candidates and donors who are willing to participate in PKE must undergo a comprehensive medical evaluation. During the evaluation, the potential living donor will complete a series of tests and visits to determine if living kidney donation is safe and appropriate for the donor and recipient. Only when the team feels it is safe to proceed are the matches made and the donor and recipient surgeries scheduled.

The contact number for kidney transplant recipients and donors at the Penn Transplant Institute is 215.662.6200.



► **Figure 1:** Paired kidney exchange transplants initiated by an altruistic donor and ultimately resulting in the initiation of a subsequent, chain by a “bridge” donor.

CASE STUDY

At age 32, Mr. B had end-stage kidney disease. His uncle, Mr. C, offered to donate a kidney to him, and entered the Living Donor Kidney Program at the Penn Transplant Institute. During evaluation, he and his intended recipient were given the chance to take part in the Paired Kidney Exchange Program.

Both donor and transplant candidate agreed to the PKE option to shorten the wait for a kidney, if necessary. Subsequent testing showed that the pair were not a match, and they were enrolled in the PKE program.

Several weeks later, a transplant coordinator at the Institute contacted Mr. C and Mr. B about a potential paired kidney exchange. The coordinator explained that Mr. A, an altruistic donor, had been found compatible with Mr. B. and that a compatible recipient, Mrs. D, was found to be a match for Mr C's kidney.

The chain thus involved Mr. A donating a kidney to Mr. B, and Mr. C donating a kidney to Mrs. D. All four participants were found to be physically and psychologically prepared for transplant surgery. The four surgeries were scheduled to take place at Penn Medicine on the same day in separate operating rooms.

On the morning of the kidney exchange, Mr. A and Mr. C had surgery at the same time at Penn Medicine, and their kidneys were transplanted into Mr. B and Mrs. D, respectively, several hours later the same day.

All four patients recovered without incident and currently have functioning transplants.

Adding to the success of this exchange, Mr. E, the husband of Mrs. D, initiated a second chain of paired exchange kidney transplants two months later by donating a kidney to Mr. F, thus becoming an altruistic “bridge” donor to a new chain, paying forward his gift and making living kidney donor transplantation possible for other participants in paired kidney exchange.

FACULTY TEAM

The Penn Transplant Institute is home to kidney, liver, lung, heart, pancreas, uterine and hand transplantation programs, and is ranked among the top 10 multi-organ transplant centers in the country.

Transplant Surgeons

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Professor of Surgery

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Associate Professor of Surgery

Ali Naji, MD, PhD*

Professor of Surgery

Paige Porrett, MD, PhD*

*Surgical Director, Living Donor Kidney Transplant Program
Assistant Professor of Surgery*

Transplant Nephrologists

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*Medical Director, Kidney and Pancreas Transplant Program
Professor of Medicine*

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Associate Professor of Clinical Medicine

Simin Goral, MD

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Jatinder Kohli, MD

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Gail Eastman, MSN, CRNP, CCTC

Jordan Shaffer, PA-C

Transplant Surgery Advanced Practice Providers

Mary Kaminski, PA-C

Mary Cate Wilhelm, PA-C*

*Living Donor Team

Paired Kidney Exchange at Penn Medicine

The Penn Transplant Institute is now a leader in the effort to increase paired kidney exchanges for kidney transplantation. In partnership with the National Kidney Registry (NKR), a consortium of 72 transplant centers nationwide, the Penn Transplant Institute took part in a kidney exchange over a 40-day period that ultimately involved 28 donors and 28 recipients. The Living Donor Kidney Program at Penn Medicine is one of a select group of US centers designated as a Donor Care Network Center of Excellence within the NKR.

The US Department of Health and Human Services has awarded the Penn Transplant Institute's Kidney Transplant program a Silver Level Award. Penn is one of the few programs in the nation to receive this distinction, and the only transplant center in the region so awarded.

In addition to its partnership with the NKR, the Penn Transplant Institute is a member of the United Network for Organ Sharing (UNOS). We also participate in other registries such as the Alliance for Paired Donation and the UNOS Paired Donation Program, which maximize the chance at finding a match and achieving transplant with a living donor.

ACCESS

► Transplant Donor Evaluation

Penn Transplant Institute Kidney Transplant Program

Perelman Center for Advanced Medicine

3400 Civic Center Boulevard

West Pavilion, 2nd Floor

Philadelphia, PA 19104

► Transplant Recipient Evaluation

Penn Transplant Institute Kidney Transplant Program

Perelman Center for Advanced Medicine

3400 Civic Center Boulevard

West Pavilion, 2nd Floor

Philadelphia, PA 19104

Lancaster General Hospital-Suburban Pavilion

2106 Harrisburg Pike, Suite 310

Lancaster, PA 17601

Penn Medicine Princeton

Princeton Medical Center

5 Plainsboro Road, Suite 450

Plainsboro, NJ 08536

Penn Medicine Valley Forge

1001 Chesterbrook Boulevard

Berwyn, PA 19312

Penn Medicine Bucks County

777 Township Line Road, Suite 200

Yardley, PA 19067

Penn Medicine Cherry Hill

1865 Route 70 East

Cherry Hill, NJ 08003

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