Podcast Interview: Alvin Roth

PNAS: I’m your host, Paul Gabrielsen, and welcome to Science Sessions. Imagine that someone you love is one of the 99,000 people in the U.S. who need a potentially life-saving kidney transplant. You might gladly give them one of your kidneys to save their life, but if your kidney is incompatible with your loved one, the transplant cannot proceed. Will your loved one then have to wait for a deceased donor kidney to become available, and risk becoming one of more than 3,000 people every year who die while waiting for a transplant? Or is there another option? Alvin Roth, an economist at Stanford University, realized that many such pairs of incompatible patients and donors may exist, and that they may be able to help each other. I spoke with Roth, a member of the National Academy of Sciences, by phone to discuss how principles of economics can save the lives of people who need kidney transplants.

PNAS: So, what is the outlook like for someone who needs a kidney transplant?

Roth: Good question. So, the outlook is not so good. People live around 5 years on dialysis, I mean, there’s a lot of variance. Dialysis is no fun, and it’s not a great treatment. Over time it gets worse. So people on dialysis need transplants, and there aren’t enough organs. If you have a live donor that’s compatible with you, they might give you a kidney right away and you would be spared dialysis. So, if you didn’t have a living donor, you would just wait on the regional list for deceased donor organs, which can be many years in length. And that’s where kidney exchange comes in. You could be in that situation, you love someone enough to give them a kidney, but they can’t take your kidney, and I’m in the same situation. But now, you could give a kidney to my patient and I can give a kidney to your patient, we’d have exchanged kidneys and arranged it so that each kidney patient could get a kidney that they were compatible with.

PNAS: And to that end, you helped found one of the first kidney exchange programs, the New England Program for Kidney Exchange, in 2004. So let’s say I have a kidney that I’d like to donate and I sign up into one of these exchanges. Can you walk me through the process?

Roth: Okay, so that depends. One critical difference – when you say you have a kidney you’d like to donate, is whether or not you have an intended recipient.

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non-simultaneously, and that allows the chains to become very long. So, the first non-directed donor chain had 20 people in it, because there were 10 nephrectomies and 10 transplants. Not every chain is long. The important thing is the chains can be non-simultaneous.

**PNAS:** So, you’ve actually attended one of these nephrectomies in Cincinnati. Can you tell me what that experience was like and why you decided to go?

**Roth:** Well, so, I had gone there to give a seminar on kidney exchange, and as it happened, the day of my seminar, they were doing one of our exchanges. A surgeon named Steve Woodle said to me, why don’t you just come and watch, and I thought, what a great idea! And I was a little – I had some trepidation, I worried that I would feel ill or something, but it turns out it’s just so interesting to watch and to listen to them talk about what they’re doing that I didn’t have to worry about that. And the nephrectomy I saw is what’s called a hand-assisted laparoscopic nephrectomy, and what that means is the surgeon is working through pretty small incisions, he’s working with a camera and a video screen, so you can watch, in detail, what he’s doing with his equipment, and he’s assisted by a surgeon who inserts his hand through a slightly larger incision, and the two of them work as a team, the surgeon doing the cutting asks the assistant to put tension on different tissues, and you see all this on a video screen. And finally, it’s like a magic trick, the kidney comes out in the surgeon’s hand.

**PNAS:** So, what is the future of kidney exchange?

**Roth:** For kidney exchange, we’re still doing lots of things on how to make the exchanges work better, and some of those have to do with how surgeries are organized, some of them have to do with how payments are organized. Eventually, I hope that in a hundred years, my grandchildren and yours will think of transplantation as an outdated barbarity, they’ll say to you, “So tell me again grandpa, you used to cut an organ out of one person and sew it into a sick person and that was modern medicine?” I hope that advances in medicine will eventually give a better solution. That doesn’t mean that we can’t keep moving ahead now, because for the time being there are lots of people waiting on the waiting list, and many of them die while waiting.

**PNAS:** Thanks for listening. You can find more podcasts at pnas.org.