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*(Molly Bruns / Heights Staff)*

# BC Economists Develop First Four-Way Liver Exchange

By Lucy Freeman

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Boston College economics professors Tayfun Sönmez and M. Utku Ünver pioneered a matching system for the world's first four-way liver transplant exchange program, which enabled two successful four-way exchanges within the past year.

"In the first year, we gave transplants to 15 people," Sönmez said. "In the last three weeks, we have given transplants to 14 people, and that includes one four-way exchange. And so far, both four-way exchanges—which happened to be the largest liver exchanges in the world—were carried out in our program."

Sönmez and Ünver established the program at the Liver Transplant Institute at İnönü University in Malatya, Turkey. The professors began designing the new liver transplant system in 2015 after working on a successful kidney transplant program for 12 years prior.

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According to Sönmez, the matching procedure for liver transplants is more complicated than for kidney transplants because the liver has both a left and a right lobe. While donating the left lobe typically results in fewer complications, it is sometimes not large enough for the recipient's body. Donors must be blood-type compatible with the recipient for both kidney and liver transplants, but in kidney transplants, a donor can give an entire kidney—as opposed to a portion of the organ.

The economists' four-way liver exchange works to expand the number of potential donors by pairing recipients with donors who are blood-type compatible donors and have the optimal amount of liver to donate, according to Sönmez. The two said with the new exchange system, they are able to maximize the number of patients who can receive organs because instead of being paired with one donor, patients can be matched with several potential donors.

"Suppose I'm a patient, and I'm blood type A and I have a living donor who happens to be blood type B . . . so my donor is unable to donate to me, in this case, because of blood type incompatibility," Sönmez said. "Suppose you're also in the same situation, except you are blood type B and you happen to have an A donor . . . what this technology does is it removes incompatibility by a trade of donors. So basically, your donor donates to me, my donor donates to you, and now we have a compatible match."

Ünver said one complication of the four-way liver exchange is that all organ harvesting and donating procedures must be performed on the same day, and at the same time and place, to eliminate potential complications, such as a donor becoming unable or unwilling to donate after their co-registered patient receives a transplant.

According to Ünver, the ability for medical centers to coordinate so many procedures at once is an important aspect of the exchange program.

"All of this has to be arranged at the same time to minimize all the unforeseen risks," Ünver said. "Even the donor can die the next day, who knows right? So they have to be done at the same time, so you need a large team of doctors to be able to arrange a four-way liver exchange because now you need eight operations going on at the same time—four for the patients, four for the donors."

Sönmez and Ünver said one of their goals for the future is to expand the program into the United States. Sönmez said he and Ünver are hopeful that the United Network for Organ Sharing (UNOS) will use their liver exchange as a guide for liver transplants in the United States.

"UNOS, the United Network for Organ Sharing, the party which allocates transplant organs in the U.S., they started a pilot liver exchange program this March, actually, so we are hoping that our interaction with the center in Malatya, Turkey could provide a blueprint for them as well," Sönmez said.

The professors said they are aiming to expand the program so transplants can be coordinated through multiple medical centers, instead of being performed at just one.

"So one important aspect of this kind of coordination is coming up with this mutual language communication system, this trust within the system, so these kinds of exchanges can be done," Ünver said. "So that's the goal for the future. Right now, we are doing this in one center, hopefully in places like the U.S. or even in Turkey, this [program] reaches multiple centers."

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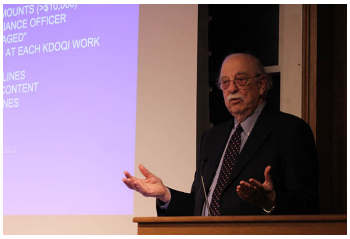
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