CAPITAL

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Easing the Kidney Shortage

Renal Donors Swap Recipients If Blood Types Don't Match; Cheating on Priority Lists

As of noon yesterday, 58,470 people in the U.S. were waiting for a kidney transplant. Most won't get one this year. There aren't enough donated kidneys to go around. Surgeons transplanted just 15,129 kidneys last year.

Now a band of transplant surgeons and economists are trying to fix that by creating a moneyless market for exchanging kidneys.

Most transplanted kidneys come from a person who has died, a supply that grows slowly because of ignorance about the need for donations or grieving relatives' reluctance. But a kidney taken from a live donor works better, and almost everyone has a spare. As techniques improve for removing healthy kidneys and for suppressing the body's tendency to reject a transplant, doctors increasingly turn to kidneys from living donors, usually relatives. Last year, 43% of kidneys transplanted in the U.S. came from living donors, up from 28% a decade ago.

But a biological barrier often blocks a transplant from a relative. In about a third of all would-be pairs, blood types are incompatible. In others, the sick person has antibodies that can initiate a rejection of the donated organ. It's heartbreaking "to have the treasure of the live donor and then have that not go forward because of a biological obstacle," says Massachusetts General Hospital transplant surgeon Francis DelMonico.

Occasionally, transplant centers spot a way out: One New England father with blood type A couldn't donate a kidney to his daughter with blood type B. So he gave a kidney to a teenager with blood type A, and the teenager's sister gave a kidney for the man's daughter. New England's transplant centers have done six such exchanges. Baltimore's Johns Hopkins University has done seven.

In the past year, Hopkins also has done two exchanges that involved three transplants each, an undertaking that requires six operating rooms and 60 medical professionals. In New England, Washington, D.C., and elsewhere, would-be donors unable to give a kidney to a loved one instead have given a kidney to a stranger. The loved one, in turn, is rewarded by being moved up on the waiting list for a dead person's kidney.

Such swaps occur, though, only when the right combination appears or a flurry of e-mails among transplant centers produces the right mix. A highly organized system alerts transplant centers when a dead person's kidney is available; there isn't any system for a man who can't give to, say, his wife, but wants to advertise his willingness to make a swap. Hopkins transplant surgeon Robert Montgomery figures that 2,000 or more people could get transplants each year if there were a national database of such donors.

Transplants are expensive: Johns Hopkins says the cost is roughly $120,000 when everything is included. Medicare usually foots the bill for patients without private insurance, though it doesn't pay that much. Buying or selling a kidney in the U.S. is

illegal.

AP/Wide World Photo

Donors, recipients and relatives involved in three-way kidney transplant at Johns Hopkins Hospital in Baltimore last year

Lawyers and ethicists, after substantial deliberation, decided a few years ago that kidney swaps like those done in Boston and Baltimore are acceptable. And doctors agree on some simple rules: The donor must travel to the hospital where the recipient is; participants may keep identities private if they choose; all operations in a swap begin simultaneously to avoid anyone backing out halfway through the swap.

While the doctors were working all this out, Harvard economist Alvin Roth, a specialist in designing moneyless markets like the one that matches medical residents to teaching hospitals, was pondering the problem. He proposed to a visiting protégé, Utku Ünver of Istanbul's Koc University, that the two teach a course using kidneys as an example. Thinking about kidney donors and recipients, it turned out, was similar to thinking about the way colleges allocate dorm rooms, a problem Mr. Ünver and colleagues had studied.

The result was an article published in the Quarterly Journal of Economics last month by the two men and a colleague from Koc, Tayfun Sönmez, that describes how to structure a kidney exchange to identify potential swaps among a large pool of people with rules that make it very hard for anyone to cheat.

Cheating is an issue in transplants. In Chicago, for instance, cardiac doctors have been accused by local prosecutors of overstating the severity of patients' illnesses to move them up on the priority list for hearts. And rules, such as those that depend on how long one has been waiting for an organ, don't always anticipate human cleverness; rules had to be changed, for instance, when doctors began to put babies on waiting lists for heart transplants before they were born.

FOR MORE INFORMATION

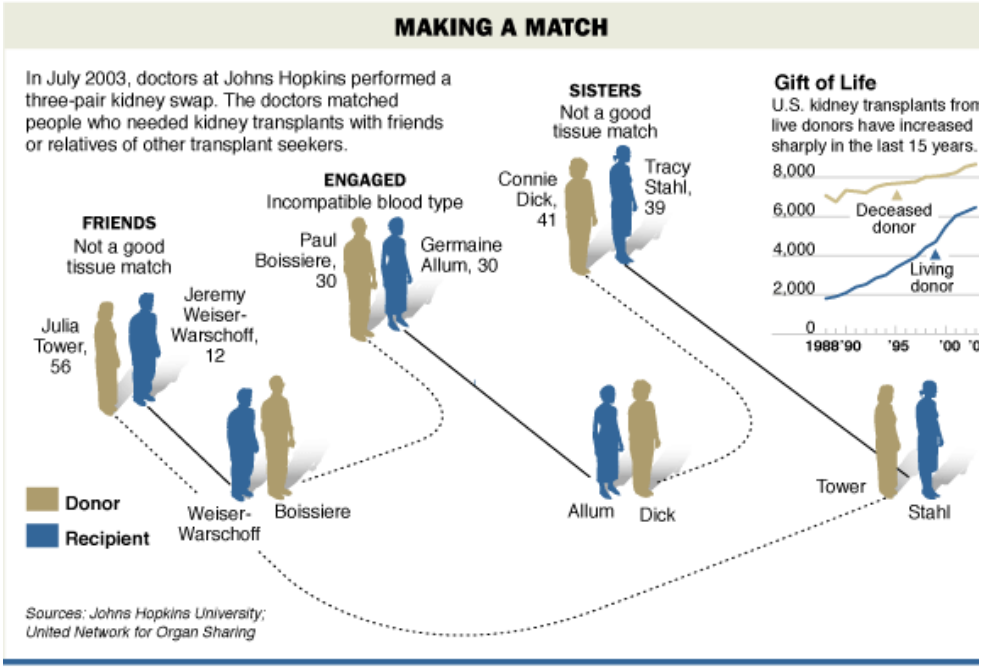
Learn more about organ donation, from the United Network for Organ Sharing, the New England Organ Bank, the Kidney Foundation and Johns Hopkins University and Health System.

The economists' premise is simple: Don't expect anyone to do anything that isn't in his or her self-interest. As long as a computer can identify the one kidney in the pool that best suits a patient, the system is foolproof, the economists say.

Massachusetts General's Dr. DelMonico admits to some skepticism when the economists approached him last fall. But the collaboration has blossomed over the past few months. Dr. DelMonico handles the intricacies of forging a consensus among the 14 transplant centers in New England and finding money to support a computerized system to implement the economists' design.

Harvard tissue-typing specialist Susan Saidman, meanwhile, is working to perfect a computer system to simplify the process of checking to be sure potential recipients don't have antibodies that could cause them to reject an otherwise suitable donor's kidney.

The most compelling moment so far came when Dr. Saidman gave the economists details on 45 pairs in which the would-be donor was unable to give a kidney to the intended recipient. Even though each of the 45 had a donor willing to spare a kidney, all were stuck waiting for the right person to die. With swaps involving two kidneys, the economists found, eight transplants were possible. If swaps involving three kidneys were possible, then 11 transplants were possible.



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