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How many people need transplantation? Do doctors have enough time for transplants?

Every day an average of 79 people receive organ transplants, and 18 people die while waiting for transplants that don't happen because of shortage of donated organs (almost 20% or 1/5), and 1 donor can save up to 8 lives

But matching organs must be done very quickly, because some organs must be transplanted in a matter of hours:

Heart - from 4 to 6 hours

Lungs - from 4 to 6 hours

Kidneys - from 36 to 48 hours

Liver - from 12 to 15 hours

Most organ donors are people who suffer from head injuries that result in brain death. These head injuries may include a stroke, trauma after an accident or brain cancer that has not spread to other parts of the body.

Brain death occurs when blood and oxygen cannot flow to the brain, while the heart is still beating to provide blood and oxygen to other parts of the body. Patients with brain death usually require a ventilator or breathing machine to bring oxygen into the lungs.

In brain death, the organs remain functional and can be used for transplantation after a physician declares the patient dead. Because of the potential for conflict of interest, this physician may not be part of a transplant team.

Cardiac death is declared when the heart stops beating. Very few organ donations come from cardiac deaths. Lahey has chosen not to participate in cardiac death donations due

to the uncertainty of their success rates, since organs begin deteriorating as soon as the heart stops delivering oxygenated blood to the body.

To prevent illegal or immoral activities, the United Network for Organ Sharing (UNOS) typically doesn't allow the family of the deceased donor to choose who receives the organs. Instead, they are allocated to candidates on the UNOS waiting list, based on their medical characteristics.

There are rare instances when the family of the deceased donor may already have a friend or family member on the waiting list. In this case, if they are of compatible blood type, they may take part in "direct donation." This means the needed organ is directed specifically to that person, regardless of their status on the waiting list. The remaining organs will still follow the standard allocation process.

Also there's difference between deceased donors and the living ones:

Deceased donors can donate heart, intestines, kidneys, pancreas, liver, lungs (also veins, bones, skin and etc)

And living ones – kidney or portion of the liver, pancreas, lung or intestine (also skin and eye, peripheral or cord blood stem cells)

In 2017 Spain had the highest donor rate in the world at 46.9 per million people, followed by Portugal (34.0 per million), Belgium (33.6 per million), Croatia (33.0 per million) and the US (32.0 per million).

As of February 2, 2019, there were 120,000 people waiting for life-saving organ transplants in the US. Of these, 74,897 people were active candidates waiting for a donor. While views of organ donation are positive, there is a large gap between the numbers of registered donors compared to those awaiting organ donations on a global level.

Organ donation in Russia

Russian transplantology is quite far from first place in the world. The post-Soviet mistrust to social and medical service resulted in dramatic reduction of transplantations in some regions of Russia during the last 10 years. The level of organ donation depends on public trust and a proper form of the donation process. The reasons for the organ donation crisis are well known. First, it is the so-called "command form of organ donation" inherited from

the Soviet medical system. The longtime model of obtaining donor organs from deceased individuals caused negative public opinion. Organ donation was considered to be an activity that violated the dead and living rights.

As a result, we need new forms of professional collaboration between transplantologists and intensive care unit specialists. The northwest Region of Russia created the first model of transplant coordination in 2006. There were regional transplant coordinators (as a part of a procurement center) and local (hospitals) coordinators. During 2006, this initiative was emotional and enthusiastic; after 2007, this initiative received financial support from the local government. As a result, there is an increasing number and changing quality of organ donations. In 2007, the total number of organ donors in Saint Petersburg now is 8.7 per million compared with 2.5 per million in 2005.

But religious people can't accept organ donations, because they think when they resurrect - they won't be able to live without heart. Even nowadays you can meet people who don't trust doctors, and call them heretics just for taking donor's organs, even if they had an agreement. It is usual for Russia because government had hushed up organ transplantation for some time, and almost everyone kept alert for this kind of "medical treatment"

Kessler And Roth

Some years ago (In 2011-2012), Professor Judd B. Kessler and Alvin Roth set out to see whether changes in the management of organ waiting lists could motivate people and increase the number of donors. How - you would ask? They created a game "**One Brain and Two Kidneys**"

Kessler and Roth couldn't easily do an experiment with real organ donors, so they managed students play in a laboratory - that mimicked the decision to register as a donor. "*We chose not to describe the game in terms of organ donation, but we kept the same characteristics,*" - notes Kessler. For example, each player had an "**A**" unit representing a **brain** and two "**B**" units representing **kidneys**, although the words "brain" and "kidney" were not used.

In the experiment, subjects played the organ donation game in groups of 12. They earned money for every period that they had an active A unit and at least one active B unit. In

each period, there was a probability their A unit would fail (they would die from head trauma, making the organs available for transplant) or their two B units would fail (they would suffer from kidney failure).

Before subjects knew what would happen to their A and B units in that round, they were given an opportunity to register as a donor, so that if their A unit failed before their B units, their two B units could be transplanted to other people in the group. Agreeing to be a donor cost the subjects a small part of their monetary payout, regardless of whether a subject's A unit failed before his or her B units. *"We don't know exactly what the costs of registering as an organ donor are, so in the experiment we modeled them as a simple monetary cost, the same way we modeled the utility flow from being alive"* - says Kessler.

Subjects whose A unit failed were out of the game for that round and stopped earning money (died). Meanwhile, a subject who had a healthy A unit but whose B units had failed could survive for up to five periods without an active B unit. In these periods, they did not earn any money, resembling the costs of being sick and on dialysis. If they did not receive a B unit in those periods, they were out of the game for the round. If these subjects received a B unit from someone else in their group at some time during those five periods, however, they could start earning money again.

The organ allocation rule, which determines how B units are distributed within the group, was the variable of interest that Kessler and Roth manipulated in the experiment.

In the control condition, B units were distributed by a first-come, first-served waiting list, as is the standard in the United States nowadays. Those who had been waiting the longest (and were closest to the five-period deadline) received B units first. Then any remaining B units were given to people who had been waiting slightly less long, and so on down the list.

In the priority condition, B units were given first to subjects who had agreed to be donors at the beginning of the round. Essentially, the organ allocation rule had a priority group made up of people who had paid the cost of registering as a donor. Within that group, subjects received B units on a first-come, first-served basis. But only if all subjects who were registered donors had received B units did any non-registered donors get one, even if that meant a non-donor was about to expire in the next round.

When Kessler and Roth introduced this priority policy, either at the beginning of the game or somewhere in the middle, willingness to pay the cost of donation shot up over 100%, to between 70% and 80% of subjects registering to donate.

The researchers introduced two other conditions — which gave either a discount or a rebate for agreeing to donate — in an attempt to figure out why the priority rule was working. The discount and the rebate conditions provided monetary incentives to register as a donor that were calibrated to be the same size as the monetary benefit of having priority. When subjects had experience with the game, these monetary incentives worked just as well as giving priority to donors, suggesting that the priority rule worked explicitly through the new incentive to be a donor. *“In the laboratory, we were able to replicate the extensive increase in donations due to the priority rule with other treatments that also lowered the cost of donation by a similar magnitude,”* notes Kessler. Current U.S. law prevents the use of payments and rebates for donation outside of the lab, *“but changing the allocation of deceased donor organs may be a real possibility.”*

“As additional people study this topic, we hope that it will get more widely discussed in the academic sphere and then in the policy sphere as well. Increasing donation rates either because of the priority rule we write about, or because of some other policy change, would be a great accomplishment. We are interested in the mechanisms of the incentives and how they work. We have no direct policy proposition in mind.” – Says Kessler.

One aspect of their study not discussed in their article are the rules surrounding implementation of a priority program — specifically, how to prevent gaming of the system. *“An example of gaming would be if your doctor said to you, ‘You have kidney disease so go register as an organ donor, and tomorrow we will put you on the waiting list.’ That is serious gaming,”* says Kessler. *“Rules would have to be built in that don’t allow that. Israel, for example, has a three-year waiting period — you only get priority if you have been a registered donor for three years. But if some people don’t have access to registering, or aren’t as informed about the change in policy, that could prevent adoption of this kind of approach. We don’t want to penalize people who don’t know what the rules are.”*

Already, certain safeguards are in place for many donor transactions: For example, those who receive organs must be healthy enough to benefit from the transplant. Also, in some cases, children who need transplants get priority treatment. And finally, in a move sure to raise ethical issues, a committee reviewing the country’s organ-transplant system is already looking into giving younger, healthier patients waiting for kidneys preference over older, sicker ones.

“But these are not issues that we deal with explicitly,” says Kessler. “What we have noticed, however, is that people who are organ donors seem to be motivated by the good they think the organs will do. So one direction for future research would be to analyze whether giving people certain information — such as how many lives could be improved through the donor registration program — can make a difference in the number of donors.”

Kessler also notes that while major organs like kidneys, livers and hearts are the ones typically associated with transplants, other organs and tissues — including corneas, bone, ligaments, cartilage and tendons — can also be recovered and transplanted.

Kessler and Roth describe other approaches besides their own that have been considered as ways to increase organ donation. One is the idea of cash payments for organs, although, as they write in their paper, “proposals to introduce monetary payments for organs are constrained by concerns about the morality and ethicality of such practices.” Consequently, “repugnance towards cash markets for organs limits their feasibility.”

Another proposal that has received a good deal of attention would change the current “opt in” registration method used in the United States to an “opt out” system in which “*everyone is presumed to be a donor unless he or she actively indicates otherwise,*” says Kessler. A third option, called “mandated choice,” would require everyone — through such procedures as applying for a driver’s license — to specifically indicate whether they wish to be a donor or not.

But Kessler and Roth go on to argue in their paper that “attempts to increase organ donation rates by changing the default organ registration status would surely generate more organ donor registrations, since those who do not take any explicit action would automatically be registered as donors. However, such a policy may weaken the link between the registration decision and the legal clarity of the potential donors’ last wishes. Under current United States gift law, changing the default status is likely to have legal consequences that could be detrimental to organ retrieval.”

Singapore, Spain and many other European countries all have an opt-out system.

Looking at broader applications of their research, Kessler and Roth consider the issue of when one can provide incentives to get people to support a public good. “We thought of the pool of registered organ donors as a type of public good,” Kessler says. “In public good settings, you generally cannot exclude people from taking advantage of what is offered. For example, we can’t exclude people from getting the benefits of national security. Another example would be National Public Radio: NPR is a public good because

everybody has the opportunity to enjoy it. In public good settings, it is often hard to get individuals to contribute, which is why we tax people.”

What the priority rule does, according to Kessler, is turn a “pseudo public good into something that looks more like a club good. We say that there will be preferential treatment for people who agree to contribute. So for a community swimming pool, there might be special hours for people who pay to help fund the pool. For organ donors, there may be preferential treatment for those who agree to register. To the extent that those incentives provide preferential use of the public good, you can increase contributions.”

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