Stanford University

How AI Rescued Kidneys Before They Were Wasted – And Why That Mattered

What if we could predict when a kidney was at risk of going unused, and then intervene to save it in real time? A team at Stanford and MIT, backed by a grant from the Kidney Transplant Collaborative (KTC), took that idea from concept to reality – building an AI-powered toolkit that transformed how kidney offers are evaluated, routed and ultimately accepted.

Every year, roughly 1 in 5 recovered kidneys is discarded, despite over 90,000 patients still waiting for a transplant. Organ Procurement Organizations (OPOs) face intense time pressure, often relying on experience and intuition to expedite offers when an organ seems “hard-to-place.” But what if machine learning (ML) could do it faster and smarter?

Using historical data from the Organ Procurement and Transplantation Network (OPTN), the team developed a machine learning model that predicts kidney nonuse at various points in the offering process – including before recovery even happens. The model achieved an AUC of 0.91 just 3 hours post-recovery, outperforming conventional markers like KDPI by identifying risk patterns invisible to the human eye.

But this wasn’t just prediction – it was activation.

In collaboration with 12 OPOs, the researchers tested whether AI-powered recommendations could help staff decide when and how to expedite offers. The model highlighted behaviors – like simultaneous refusals by multiple centers – that signaled high discard risk. These insights helped OPOs trigger faster, more targeted rescue strategies to prevent organ loss.

The Stats

Beyond predictive triage, the team launched two companion tools:

- A transplant center dashboard for patients, showing center-level metrics like wait times and graft survival
- A targeting tool for OPOs, identifying centers most likely to accept “hard-to-place” organs based on real-world behavior

These innovations didn’t stay in the lab. Findings were shared with the UNOS Expeditious Task Force, and both HRSA and OPTN began exploring national adoption.

This project changed how we think about equity and efficiency in organ allocation. It proved that smart algorithms can extend the decision-making capacity of human coordinators – not replace them – and ensure that more kidneys are placed faster and with greater precision.

In an era where every viable organ counts, this wasn’t just innovation – it was intervention. And for patients still waiting, that could make all the difference.

For More Information

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