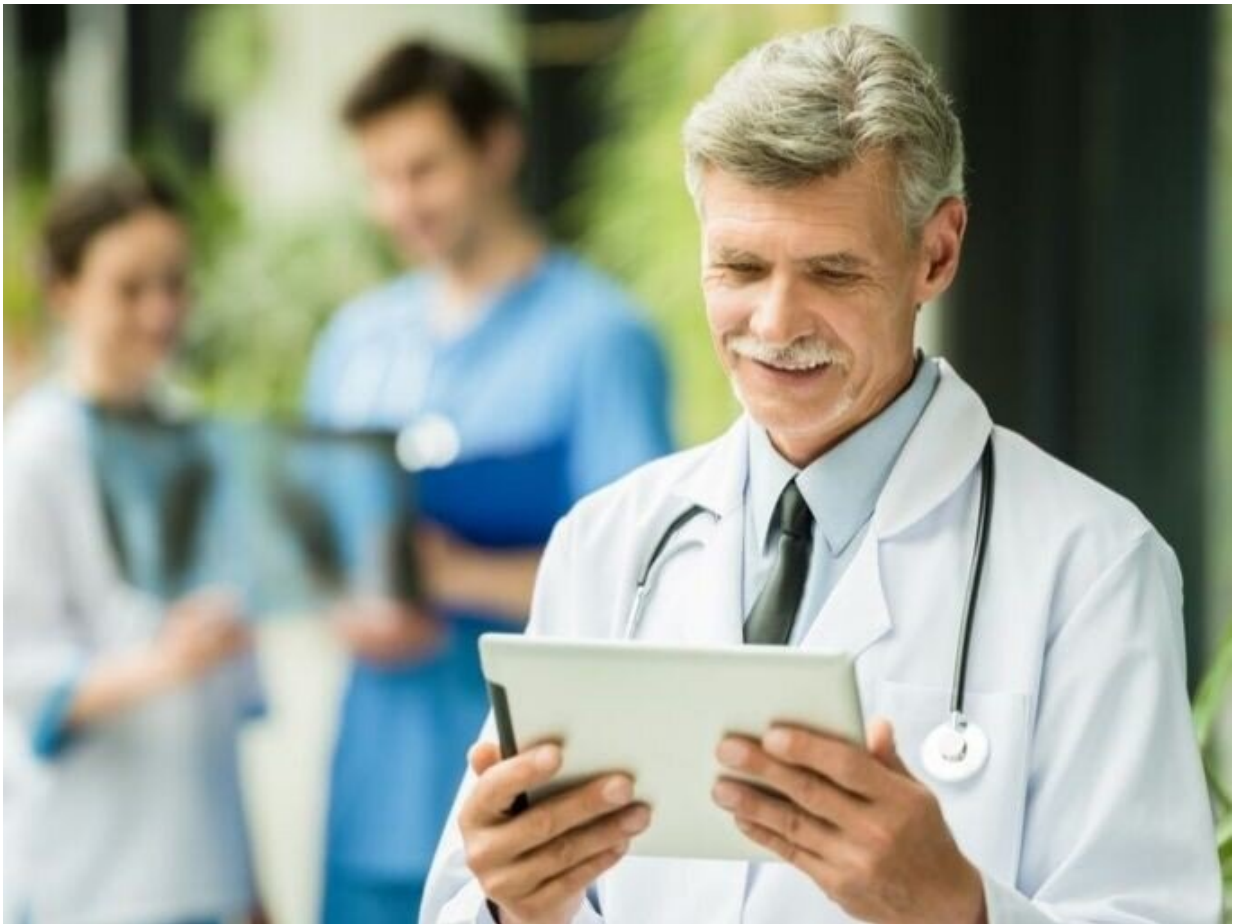


Predicting the risk of kidney transplant loss with artificial intelligence

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Credit: ParisTransplantGroup - LabsExplorer

Chronic kidney disease affects 1 out of 10 people worldwide and is

steadily increasing. When it reaches end-stage renal disease and endangers the lives of patients, dialysis or transplantation is required. Renal transplantation is the treatment of choice, offering a better quality of life and survival chances to patients. Unfortunately, due to the lack of available organs, approximately 55% of patients with end-stage renal disease are still treated by dialysis, representing an annual cost of €2.6 billion in France and \$42 billion in the U.S..

The survival of [kidney](#) transplants is therefore crucial. As emphasized by [regulatory agencies](#) including the U.S. Food & Drug Administration and the European Medicines Agency, there is a substantial need to develop a robust [tool](#) that can predict long-term graft survival. Indeed, over the past 20 years, long-term graft survival did not improve. Therefore, implementing this prediction tool in [clinical practice](#) would facilitate therapeutic interventions by guiding clinical decision-making and would also facilitate [clinical trials](#) in kidney transplantation.

So far, no algorithm predicting long-term graft survival has been validated in different countries, populations and clinical scenarios, nor in the setting of randomized controlled trials.

Researchers from the Paris Transplant Group (www.paristransplantgroup.org/) led by Professor Alexandre Loupy, looked at long-term patient data, and considered a wide variety of patient, donor and graft parameters. They thought that combining all these data into one prediction system with the use of artificial intelligence could lead to a robust integrative tool.

Today, this ambitious initiative has succeeded.

The [international consortium](#) created within this framework and coordinated by the Paris Transplant Group has just developed the first universal tool for predicting the risk of kidney graft loss, called the iBox.

Based on data easily available during patient follow-up after a kidney transplant, the tool generates probabilities of graft loss up to 10 years after patient evaluation. Tested on more than 7,500 patients, the predictions of this tool are highly reliable regardless of the health system, the clinical situation, the therapeutic intervention or the treatment of the patient.

"By optimizing medical decision-making, the use of the iBox could have a significant impact not only on the quality of life of each patient but also on the long-term survival of transplanted kidneys," explains Professor Alexandre Loupy, "This tool perfectly illustrates the potential of algorithms and artificial intelligence in the field of organ transplantation. It will be deployed at the end of 2019 in two Parisian transplant centers."

Apart from clinical use, the iBox could also contribute to the development of new treatments. Indeed, current clinical research in the field of kidney transplantation is limited. Unlike cancer treatments whose effectiveness can be evaluated over a shorter follow-up period, evaluating treatment effectiveness on graft survival requires trials that are years in duration.

The iBox should be able to significantly reduce the time—and therefore the cost—of these studies since it can provide an early-stage reliable prediction of the long-term [graft](#) survival. Thus, the iBox is emerging as a surrogate endpoint for the development of new clinical studies in kidney transplantation.

More information: Alexandre Loupy et al. Prediction system for risk of allograft loss in patients receiving kidney transplants: international derivation and validation study, *BMJ* (2019). [DOI: 10.1136/bmj.l4923](https://doi.org/10.1136/bmj.l4923)

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