NephroCAGE
German-Canadian consortium on AI for improved kidney transplantation outcome

Motivation The German-Canadian consortium NephroCAGE is cooperating to demonstrate the added value of artificial intelligence (AI) using the concrete clinical example of kidney transplantation. Inadequate kidney function requires regular dialysis or, alternatively, a kidney transplantation. However, suitable donor organs are rare: in Germany, for example, there are more than 7,000 patients on a waiting list, and in Canada more than 3,000. Even after a transplant, there is a risk of complications that can lead to severe restrictions in kidney function or, in the worst case, even total loss of the organ.

Goal The consortium partners are creating a learning AI system to match organ donors and recipients even more precisely in advance (matching) preventing risks in kidney transplants. To this end, clinical centers of excellence in both nations are contributing transplant data from the last ten years. They will be analyzed using AI learning techniques and combined together with a novel matching algorithm to create clinical prognostic models for kidney transplant patients. By using a federated learning approach, where the algorithms are executed at the location of the data, data protection is maintained and sensitive health data from both nations can serve as a common basis for clinical prognosis models for the first time.

Intended Outcomes As a result, a clinical demonstrator will be created to support the exploitation of the medical and technical innovations in the care context and serve as a basis for commercialization and follow-up projects.

Expected Impact By combining clinical transplant data from German and Canadian centers of excellence, a cross-population database is created. The use of clinical prognostic models will help physicians to identify possible risks after kidney transplantation even earlier and enabling a quicker treatment. By testing a new matching procedure that determines the compatibility of donor and recipient in even greater detail, the risk of organ rejection can be reduced and the quality of life of recipients improved.

Tags Learning systems, artificial intelligence, clinical prediction models, federated learning, matching algorithm, organ donation, nephrology, health

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2 YEARS DURATION

March 2021 – February 2023

10 PARTNERS

Canadian: The University of British Columbia, McGill University Health Centre, CHUM Montréal, Genome Canada, Genome BC, Genome Quebec

German: Hasso-Plattner-Institut für Digital Engineering gGmbH (project coordination), Pirche AG, Charité – Universitäts-medizin Berlin, Karlsruher Institut für Technologie

€ 1.4 MILLION FUNDING

The total project costs are € 1.7 million, of which € 1.4 million will be funded.

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