

# Application of digital technology and artificial intelligence in nephrology

Citation for published version (APA):

Chaudhuri, S. (2023). *Application of digital technology and artificial intelligence in nephrology*. [Doctoral Thesis, Maastricht University]. Maastricht University. <https://doi.org/10.26481/dis.20230622sc>

## Document status and date:

Published: 01/01/2023

## DOI:

[10.26481/dis.20230622sc](https://doi.org/10.26481/dis.20230622sc)

## Document Version:

Publisher's PDF, also known as Version of record

## Please check the document version of this publication:

- A submitted manuscript is the version of the article upon submission and before peer-review. There can be important differences between the submitted version and the official published version of record. People interested in the research are advised to contact the author for the final version of the publication, or visit the DOI to the publisher's website.
- The final author version and the galley proof are versions of the publication after peer review.
- The final published version features the final layout of the paper including the volume, issue and page numbers.

[Link to publication](#)

## General rights

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal.

If the publication is distributed under the terms of Article 25fa of the Dutch Copyright Act, indicated by the "Taverne" license above, please follow below link for the End User Agreement:

[www.umlib.nl/taverne-license](http://www.umlib.nl/taverne-license)

## Take down policy

If you believe that this document breaches copyright please contact us at:

[repository@maastrichtuniversity.nl](mailto:repository@maastrichtuniversity.nl)

providing details and we will investigate your claim.

## Application of Digital Technology and Artificial Intelligence in Nephrology

Sheetal Chaudhuri

1. Digital technologies and artificial intelligence (AI) solutions when implemented at a point of care for End Stage Kidney Disease (ESKD) patients can assist in identifying who is at risk of poor clinical outcome or in need of intervention from an interdisciplinary team of nurses and social workers. *This thesis*
2. ESKD patients who receive tailored behavioral health interventions from the social workers see improvements in patient reported outcomes such as depressive symptoms, sleep quality, and psychological stress. *This thesis*
3. Remote monitoring applications can help to decrease hospitalizations and increase the time on modality for patients dialyzing at home using peritoneal dialysis. *This thesis*
4. Advancements in cloud-based solutions allow AI applications to make real time predictions of complications such as drop in relative blood volume during dialysis for ESKD patients. *This thesis*
5. ESKD patients can often experience subtle changes in vital signs, nutritional markers, and inflammatory markers starting around 14 days before testing positive for COVID-19. *This thesis*
6. AI applications can be leveraged during a pathogen outbreak for early detection of a disease risk such as in the COVID-19 pandemic. *This thesis*
7. Clinicians using digital technologies and AI should use these applications as a decision support tool aiding, but not replacing their clinical judgement. *This thesis*
8. Global data from dialysis providers across different populations can offer a comprehensive view of health conditions and treatment patterns, afford the ability to conduct generalizable research, and permit the design of scalable methods to improve patient care and inform global healthcare policy. *This thesis*
9. Traditional statistical approaches and advanced AI approaches have their strengths and weaknesses, the choice between traditional statistics versus machine learning methods depends on the specific goals of the analysis, the nature of the data, and the resources available. *This thesis*
10. Digital technologies and AI solutions should not introduce preference towards certain groups of patients based on their social attributes. *Health inequities and the inappropriate use of race in nephrology. Nature reviews, Nephrology vol. 18,2 (2022). doi:10.1038/s41581-021-00501-8*
11. Digital technologies and AI solutions must be secure and compliant with all applicable healthcare regulations. *Privacy protections to encourage use of health-relevant digital data in a learning health system. npj Digit. Med. 4, 2 (2021). doi.org/10.1038/s41746-020-00362-8*