

Application of digital technology and artificial intelligence in nephrology

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Valorization

We showed several examples of how data collected in Electronic Medical Record (EMR) can be utilized to build applications for patients with kidney disease. Artificial Intelligence (AI) techniques can allow for large datasets to be leveraged with minimal efforts. We have shown several examples in this thesis of how such applications can be developed and implemented at the point of care for End Stage Kidney Disease (ESKD) patients. AI and digital applications can be developed and integrated within EMR caring for ESKD as well as Chronic Kidney Disease (CKD) patients.

From a patient's perspective, AI based applications can help provide proactive care by identifying problems before they occur throughout their journey as a CKD or ESKD patient. Digital applications keep the patients engaged in their personal care. Further, digital applications and AI models can be developed to incorporate genomic. Proactive and personalized care can improve the overall quality of life for ESKD and CKD patients. As shown in **chapters 3 and 5**, AI models can reduce health care resource utilization and remote monitoring applications can prolong the length of stay for peritoneal dialysis patients. Additionally, timing of when the predictions are made and how they are integrated in the clinical workflow is of utmost importance, such frameworks have been discussed in chapters 4 and 7.

From a dialysis provider's perspective, offering proactive and personalized care can help lower the overall cost of care. AI based risk models can be used to negotiate contracts with governments, private insurance companies and providers by identifying high risk ESKD patients and designing cost saving clinical interventions around such high-risk patients. In the United States, ESKD Seamless Care Organization (ESCO) was such an attempt to allow nephrologists, dialysis providers and other partners to test a new care delivery paradigm aimed at improving clinical outcomes and patient experience under a shared savings structure.

Lastly, from a clinician's perspective, the AI and digital applications can be viewed as a decision support tool that will help them guide their clinical decisions. It is not meant to replace the clinical judgement of a medical professional; however, it is meant to aid them in the process of providing care. AI applications can identify patterns in vast amounts of data and derive insights that are not often comprehensible to a human brain. If successfully adopted in medical practice, this can reduce the time it takes to care for patients. Thus, such applications have the potential to help the clinicians and reduce their overall burn out and turn over.

In summary, AI and digital applications harness vast amounts of clinical data that is currently being collected across EMRs. Mining clinical data using advanced method and

AI application can help improve communication, make smarter decisions, and improve the overall efficiency in providing care for patients suffering from kidney disease.