Early Prediction for Chronic Kidney Disease Detection: A Progressive Approach to Health Management

Define Problem / Problem Understanding

Social or Business Impact:

On a social level, early detection and prediction of CKD can lead to improved patient outcomes and quality of life. By identifying individuals at risk for CKD, healthcare providers can intervene early and slow the progression of the disease through lifestyle changes, medication management, and other treatments. This can help prevent the need for dialysis or kidney transplantation, which can be costly and life-altering for patients. Additionally, early prediction can also help reduce the overall burden of CKD on the healthcare system by reducing the number of hospitalizations and emergency room visit.

The best treatment of kidney disease is facilitated by early detection, when the disease can be slowed or stopped. Early treatment includes diet, exercise, medications, lifestyle changes, and treating risk factors like diabetes and hypertension. However, once kidneys fail, treatment with dialysis or a kidney transplant is needed. • Dialysis comes in two forms: hemodialysis (HD) or peritoneal dialysis (PD). Both forms remove wastes and extra fluid from your blood. Patients receive hemodialysis usually 3–4 times a week, either at home or at a dialysis center. During hemodialysis, your blood is pumped through a dialysis machine, where it is cleaned and returned to your body. With peritoneal dialysis, your blood is cleaned inside your body every day through the lining of your abdomen using a special fluid that is periodically changed. Peritoneal dialysis can be done at home, at work, at school, or even during travel. Home dialysis is an increasingly popular mode of treatment56, and is associated with better outcomes. • A kidney transplant places a healthy kidney into your body from a deceased donor or from a living donor, such as a close relative, spouse, friend, or generous stranger. A kidney transplant, however, is a treatment, not a cure. Antirejection and other medications are needed to maintain the transplant. Per the United States Renal Data System (USRDS), more than 22,000 (22,393) kidney transplants were performed in the United States in 2018.57 The active waiting list remains substantially larger than the supply of donor kidneys, which presents a continuing challenge.57 • Although it is very important for patients who are nearing the need for dialysis or kidney transplantation to be cared for by a nephrologist, in 2018, 38.8% of incident (newly occurring) KFRT patients (18–44 years) had received little or no pre-KFRT nephrology care.