

Fact Sheet

Chronic Kidney Disease and Kidney Failure

Thirty Years Ago

- One third of diabetic patients were destined to develop kidney failure.
- Two lifesaving renal replacement therapies, dialysis and renal transplantation, developed through fundamental National Institutes of Health (NIH) research in the 1960s, were increasingly available; however, neither was ideal.
- Dialysis left patients feeling washed out and unable to work. Patients suffered from disabling bone disease, dementia caused by aluminum intoxication, and severe fatigue from uncontrollable anemia. High cardiovascular disease death rates limited life expectancy.
- Some patients were lucky enough to get a kidney transplant, which greatly improved their quality of life and life expectancy. However, transplantation was not common, and acute rejection resulted in transplantation failure rates of 30 to 50 percent.
- No methods were available to screen diabetic patients for early signs of kidney injury, so preventive treatments were not possible.
- Few treatments for kidney disease were available, and the importance of controlling of blood sugar and blood pressure was not recognized.
- Kidney failure was increasing at epidemic rates. Through the 1980s and 1990s, the number of patients developing end-stage kidney failure nearly doubled each decade.
- Transplantation is widely available, although limited organ availability has resulted in longer waiting times.
- Transplant failure due to acute rejection is much less common, with one year success rates exceeding 90 percent.
- Kidney disease can be detected earlier by standardized blood tests to estimate renal function and monitoring of urine protein excretion. New drugs better control blood pressure and slow the rate of kidney damage by about 50 percent. An NIH education campaign informs patients and their doctors about the importance of early detection of kidney disease.
- As a result of improved treatment, the number of new dialysis patients has stabilized, and indeed has begun to fall.
- The savings to Medicare for each patient who does not progress to dialysis is estimated to be \$250,000 per patient. Overall estimated Federal savings from recent improvements in preventing kidney disease is approximately \$1 billion per year.
- Currently the NIH spends \$425 million on kidney disease research. The Medicare program spends approximately \$19 billion for care of the 450,000 U.S. patients with end-stage kidney failure. This represents 6 percent of Medicare expenditures.

Today

- With good care, fewer than 10 percent of diabetics develop kidney failure.
- Management of anemia and bone disease has markedly improved the quality of life of dialysis patients. Dialysis dementia due to aluminum toxicity no longer occurs.
- High cardiovascular death rates in dialysis patients remain a problem.

Tomorrow

- The continued development and testing of new detection strategies, therapies, and community education will result in fewer people developing advanced kidney disease and kidney failure, requiring less need for dialysis and transplantation. The NIH is conducting research that will help us realize these benefits for patients.

- As additional advances become available, there will be a decrease in the number of diabetics with kidney disease. Because kidney disease often runs in families, the NIH has launched two genetic studies of diabetic kidney disease to identify genetic markers that might predict who will get kidney damage, identify key disease pathways, and new drug treatment strategies. These genetic studies will yield clues about how to intervene earlier in disease progression and to intervene more precisely and effectively.
- We want to extend the success in people with diabetes to other common causes of kidney injury such as high blood pressure, glomerulonephritis and cystic disease, and to learn how to control the accelerated cardiovascular disease, the main cause of death in kidney patients. Ongoing longitudinal studies will determine new risk factors for accelerated cardiovascular disease, and permit individualized prevention strategies.
- If caught sufficiently early, it may be possible to restore lost kidney function using therapies that are more precise. A more aggressive management of diabetes, high blood pressure, and drugs that target kidney fibrosis may give patients additional years of life without dialysis.
- For those patients who need dialysis, NIH is studying whether more frequent dialysis allows them to have a more normal life. The NIH is also studying better drugs to prevent clotting and dysfunction of the dialysis access that patients use to hook up to a dialysis machine.
- Despite our best immunosuppressant therapies, patients with kidney transplants still lose their transplanted kidney due to chronic rejection. Better strategies to maintain the function of transplanted kidneys and prevent chronic scarring are likely to emerge from on-going basic research and improved imaging methods.
- The best hope for reducing the human and economic costs of end-stage renal disease lies in prevention. The NIH's kidney disease public education activities are especially targeting minority populations—who continue to be disproportionately affected by kidney disease—and health care professionals, as we seek to bridge the gap between scientific evidence and clinical practice.