*Research*

# Mortality trends among Canadian patients receiving dialysis

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In this issue, 2 groups report on the outcomes of patients receiving dialysis in Canada. Given the intricacies of providing dialysis care, one would not expect easy answers from any evaluation. Using the Canadian Organ Replacement Register, investigators from both groups identify some potential improvements and, not surprisingly, some significant challenges. First, the good news. In an analysis restricted to patients aged 65 or older at dialysis inception, Jassal and colleagues report that survival improved from 1990 to 1999, despite increased comorbidities.[1] Tonelli and colleagues, however, report that living far from an attending nephrologist is associated with decreased survival.[2] Even when age and burden of comorbidity were accounted for, the authors found a stepwise increase in mortality with increasing distance, an association that was especially marked for death from infectious causes.

Even though dialysis treatment for end-stage renal disease has been saving the lives of countless patients for almost 50 years, patients receiving renal replacement therapy continue to report suboptimal quality and quantity of life. Although the term "dialysis" has broad recognition among the general public, few have direct experience with this therapy. The most recent data from the Canadian Organ Replacement Register show that over 5000 new patients began renal replacement therapy in 2004.[3] This corresponds to an annual incidence of about 1.5 new cases per 10 000 population, or 5 cases per 10 000 km$^2$ of total land mass. At this juncture, dialysis is widely available in the developed world, and it is invariably required by more and more patients as the population pyramid shifts in many countries. However, care of patients receiving dialysis is very resource intensive and costly. In the United States, dialysis accounts for 6.7% of all Medicare expenditures among those aged 65 or more. Optimal provision of renal replacement therapy continues to present formidable challenges to patients, family members, health care professionals and policy makers. To date, most of the large trials including patients with end-stage renal disease have focused on "hard" outcomes like death and cardiovascular disease, and the results have been disappointingly neutral. Patient-perceived quality of life has rarely been used as a primary consideration. This is surprising, especially when one considers the financial costs of renal replacement therapy and the ambivalence felt by many patients who are considering these therapies.

**Key points of the article**

- Since 1990, mortality has declined among Canadian patients receiving hemodialysis
- Increased distance from an attending nephrologist was associated with higher mortality, especially for death from infectious causes
- The potential effect of mode of vascular access for dialysis is unknown

A number of questions are worth considering before accepting that mortality depends on the era of dialysis initiation and distance from an attending nephrologist: Could case definition vary with era and distance from attending nephrologists? Could lead-time bias be present? Do these associations reflect phenomena occurring in the general population without being intrinsic to the dialysis population? Are threshold values apparent in the data? Does predialysis care account for the findings? Could the findings reflect differences in the use of vascular access?

Over the last decade, clinical research on chronic kidney disease has shifted more and more toward prevention and slowing disease progression. Specialized disease-management programs are considered standard of care in most countries for moderate to severe chronic kidney disease. Although proof is lacking, there is a strong feeling that earlier case identification and targeted care can have beneficial effects on disease progression and transition to renal-replacement therapy. Once again, it is tempting to speculate that the findings of Jassal and colleagues and Tonelli and colleagues reflect this shift in practice.

The findings about increased mortality with increased distance from an attending nephrologist are troubling, especially in a country that prides itself on equal access to health care. Tonelli and colleagues speculate that the reduced frequency of "sit-down" rounds could be partly responsible for their findings. Telemedicine and other electronic tech-

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nologies should be able to address this situation at a relatively modest cost. The type of vascular access used for hemodialysis is a potentially important, but unknown, variable in both studies. The observation that death from infectious causes was almost 2-fold higher among patients who lived more than 300 km from their nephrologist was especially striking. The use of central venous catheters for dialysis has been implicated as the predominant cause of serious bacterial infections in other hemodialysis populations, and it is tempting to speculate that the inability to prepare a functioning arteriovenous fistula may underlie some of the geographic disparities.[4] Solutions to problems of this sort probably depend on both human and financial resources, given that early identification of progressive kidney disease, seamless infrastructure and actively engaged surgical and radiological services are required for the timely creation of the best possible type of vascular access. Although much further research is needed, especially in the context of the general population, these studies suggest that the interfaces between prevention and treatment of end-stage renal disease, primary care, internal medicine, interventional medicine and specialist nephrology care need urgent attention.

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