

Site of Care and Health Outcomes of Veterans Undergoing Maintenance Dialysis

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Dialysis care is a covered benefit for all veterans enrolled in the Department of Veterans Affairs (VA), and the majority of these enrollees can qualify for the Medicare ESKD program regardless of age (1). Because of the VA's limited dialysis capacity (74 clinics with outpatient dialysis capability) (2), most of the 13,000 veterans with ESKD who initiate dialysis each year do so in the community, financed mainly by either Medicare or the VA (1). Over the past decade, the proportion of veterans with ESKD turning to the VA for dialysis services has grown such that roughly half of all veterans with prevalent ESKD now rely on the VA to either directly deliver dialysis or, more commonly, to purchase their dialysis care in a non-VA setting (3).

Despite the increasing utilization of VA dialysis and expenditure trends, there is a paucity of data on whether the setting of dialysis care (VA versus non-VA) has an independent effect on patient outcomes. In a prospective study of 334 veterans with maintenance hemodialysis in 2001–2003, Hynes *et al.* (4) demonstrated that veterans receiving dialysis within the VA, as compared with private sector units, were generally sicker and incurred a higher number of and length of hospitalizations, but had no statistically significant difference in 1-year mortality. Similarly, in a different study of 1388 veterans receiving VA-financed chronic dialysis in two VA regions in 2007–2008, Wang *et al.* (5) found that veterans receiving dialysis exclusively in the VA were generally sicker and experienced higher number of and longer hospitalizations than veterans receiving outsourced dialysis. Wang *et al.* found that 1-year mortality among exclusive VA users (15%) was similar to exclusively outsourced veterans (13%), but was higher than dual-site dialysis users (8%; $P < 0.05$). Interpretation of the results of these two studies is constrained by their regional representativeness, relatively small size, blend of patients on incident and prevalent dialysis, and reliance on administrative VA data without access to Centers for Medicare and Medicaid Services (CMS) data.

In this issue of the *Clinical Journal of the American Society of Nephrology*, Streja *et al.* (6) report on differences in all-cause mortality and hospitalization within the first year after dialysis initiation in a recent national cohort of veterans starting dialysis in the VA (“insourced”) versus non-VA (“outsourced”) settings. Similar to previous reports by others (4,5,7), insourced veterans (10% of this cohort) were younger, nonwhite,

of lower socioeconomic means, and more urban when compared with outsourced veterans. In contrast to prior studies (4,5), insourced veterans in the study by Streja *et al.* had lower comorbidity burden by Charlson comorbidity index than outsourced veterans, and had higher proportions of diabetic kidney disease, mental and behavioral health disorders, and service-connected illnesses.

Streja *et al.* showed that insourced veterans had a significantly lower all-cause mortality compared with outsourced veterans (mortality per 100 person years: 21; 95% confidence interval, [95% CI], 20 to 22 versus 38; 95% CI, 37 to 38); in the analysis adjusted for socio-demographic and clinical differences, the hazard ratio was 0.87 (95% CI, 0.83 to 0.93). Importantly, a temporal trend analysis using cubic spline techniques illustrated that the association of dialysis initiation in the VA setting with lower risk of death was not only consistent over the 8 years of the study, but was steadily increasing, suggesting a growing disparity in mortality risk for outsourced veterans.

Streja *et al.* showed that their findings generally persisted in numerous sensitivity analyses. For instance, to evaluate the effect of change in dialysis provider after initiation, “as-is” sensitivity analyses were performed. The first censored the approximately 36% of veterans initially insourced for dialysis who transferred to outsourced settings within 30 days of dialysis initiation (compared with only approximately 3% vice versa). A second analysis censored patients at the time of their transfer. Both as-is analyses demonstrated the persistence of association between dialysis in the VA setting and lower risk of death.

Hospitalization was a secondary outcome. Consistent with other studies' (4,5), insourced veterans in the study by Streja *et al.* had a significantly higher rate of hospitalization than outsourced veterans, despite having similar admission diagnoses. Because most VA dialysis units are hospital-based, this may reflect proximity and easier access to hospital admission.

The study by Streja *et al.* is notable for its very large sample size ($n=68,727$), its country-wide (United States) distribution, the use of multiple databases for ascertainment of patient baseline characteristics and outcomes (the VA, US Renal Data System, and CMS ESKD datasets), and the application of multiple robust sensitivity analyses to account for potential confounders.

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Regarding study limitations, although the authors adjusted for multiple baseline comorbid conditions and socio-demographic variables, other unmeasured residual confounders may influence patient placement and outcomes in the VA versus non-VA dialysis settings. These include veteran's institutionalization, functional status, residence's proximity to the nearest VA hospital and dialysis center, dialysis-setting preference, and extent of use of the VA beneficiary travel and collateral care. In addition, variables related to care after initiation of dialysis, such as temporal changes in comorbid conditions and intermediate dialysis laboratory and medication use, were not captured. The study population of Streja *et al.* was also limited to veterans with incident ESKD, therefore their results may not be generalizable to veterans with ESKD with longer dialysis vintage. Finally, no cause-effect relationship can be confirmed from such a retrospective observational analysis.

What might contribute to the lower mortality risk of insourced veterans reported by Streja *et al.*? First, although contrary to prior reports on patients on prevalent and incident dialysis (4,5), it is possible that outsourced veterans are sicker at dialysis initiation. A recent analysis conducted by Kurella Tamura *et al.* (8) provides insight on this matter. They found that receipt of pre-ESKD nephrology care in Medicare, compared with the VA setting, was associated with a significantly higher frequency of dialysis initiation and subsequent 2-year mortality. Differences in dialysis initiation were particularly pronounced among veterans aged 80 years or older and among patients with dementia or metastatic cancer. This suggests that less discriminant selection of patients for dialysis initiation occurs in non-VA settings. Although Streja *et al.* adjusted for specific and general indices of comorbidity, residual confounding by unmeasured severity of comorbidity cannot be excluded as a contributor to the higher mortality of outsourced veterans with incident ESKD.

Second, it is likely that the VA supports a more comprehensive pre-ESKD care. Streja *et al.* performed a sensitivity analysis restricting the study population to veterans who demonstrated prior use of the VA system (VA users) as reflected by at least one VA nephrology visit before initiation of dialysis. Limiting the cohort to VA users enabled a comparison of the effect of siloed outsourcing for dialysis among veterans who were otherwise engaged in the VA. Albeit a smaller group, a substantial association between dialysis initiation in the VA setting and lower risk of death persisted in the unadjusted and case-mix-adjusted models and trended toward significant in the fully adjusted model. That the mortality rate for outsourced VA users more closely approximated that of insourced veterans suggests that the lower mortality risk for insourcing veterans with ESKD is, in part, related to the VA services offered to veterans in the pre-ESKD period. The precise reason for the conferred lower risk of death in VA users is uncertain. As reported by Streja *et al.* (6), a higher proportion of VA users have an arteriovenous access at dialysis initiation, suggesting better pre-ESKD nephrology care. In addition, lower mortality risk among VA users may reflect advantages of VA treatment for discordant conditions (2).

Third, by receiving dialysis treatments within the VA's integrated health care system, veterans likely have better care coordination across inpatient and outpatient settings

and easier access to the VA's comprehensive collateral medical care and nondialysis resources (*e.g.*, beneficiary travel and pharmacy support). Streja *et al.* allude to the richer VA dialysis units' staffing levels as a possible contributor to the lower mortality risk of veterans dialyzed in the VA system (4). Further analysis with correlation of temporal trends in veteran survival with VA staffing ratios would strengthen this assertion.

The VA has implemented multiple initiatives to improve CKD and ESKD care for its veterans (2) that could potentially contribute to the lower mortality risk of insourced veterans. Nonetheless, the need for studies to elucidate the optimal setting for ESKD care delivery to veterans has never been greater. The study by Streja *et al.* is an important step in providing such critically needed information to federal policymakers and stakeholders. Considering the lower risk for death associated with VA dialysis, strategies for engaging outsourced veterans in the VA health care system as well as expanding internal VA dialysis capacity should be explored. Such strategies include maximizing existing clinic efficiency, expanding home dialysis, developing novel strategies for dialysis support, and/or adopting the VA's free-standing dialysis model, which has demonstrated cost-savings to the VA and lower mortality risk for veterans (10).

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Disclosures

None.

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