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## Adverse changes in key chronic kidney disease care outcome metrics since the onset of the COVID-19 pandemic: experience from an established provincial renal program



**To the editor:** The onset of the coronavirus disease 2019 (COVID-19) pandemic has resulted in a profound disruption to existing clinical services including chronic kidney disease (CKD) management.<sup>1</sup> In the province of British Columbia (BC), Canada, following the onset of the pandemic, dramatic changes in health care delivery occurred after declaration of a state of emergency in March 2020, including direction from the Provincial Health Officer to shift away from in-person care for all but urgent or emergent services;<sup>2</sup> this change applied to patient interactions with clinicians, surgical procedures, and access to ancillary services such as laboratory and other diagnostics. Through the pandemic, these changes have evolved to reintegrate some in-person care as restrictions were eased,<sup>2</sup> but care delivery remains in large part virtual and materially different from what it was before the pandemic.

In BC, a robust structure for multidisciplinary nondialysis CKD care exists including a collaborative structure with provincial oversight of all multidisciplinary kidney care clinics (KCCs) in the province, established clinical pathways, and previously defined key performance and outcome metrics that are monitored on an ongoing basis.<sup>3</sup>

Analytic methods are described in the [Supplementary Methods](#). A total of 15,708 patients were included in the analysis and three 9-month periods were analyzed. The period from July 1, 2019, to March 31, 2020, was defined as the pre-pandemic period, April 1, 2020, to December 31, 2021, was defined as the “early” pandemic period, and January 1, 2021, to September 30, 2021, was defined as the “later” pandemic period. Trends in the metrics examined are shown in [Figure 1](#).

Across the 3 periods, the mean estimated glomerular filtration rate at KCC registration was relatively unchanged, between 32 and 33 ml/min per 1.73 m<sup>2</sup>. Following the onset of the pandemic, rates of pre-emptive transplant trended downward from 26 patients in the prepandemic period to 24 in the early pandemic and 19 in the later pandemic period. The proportion of patients who started dialysis without prior KCC exposure increased between the prepandemic and later pandemic periods from 37.9% (95% confidence interval [CI]: 34.1%–41.7%) to 45.5% (95% CI: 41.7%–49.3%) as did the proportion of patients who had been enrolled in a KCC but started dialysis treatments without completion of treatment modality education and selection, which over the same periods

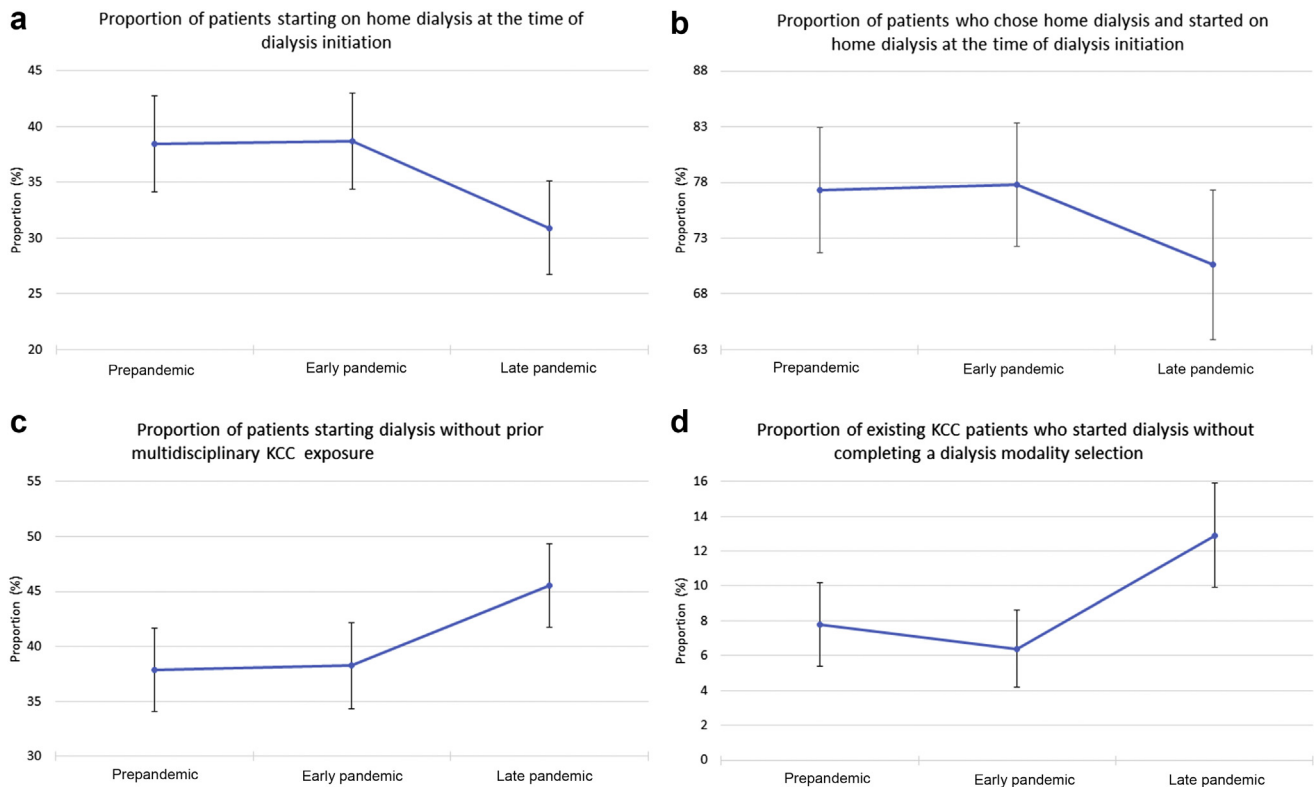
increased from 7.8% (95% CI: 5.5%–10.2%) to 12.9% (95% CI: 9.9%–15.9%), with a larger change between the early and later pandemic periods for both metrics ([Figure 1](#)).

Both the overall proportion of home dialysis starts and the proportion of patients who identified home dialysis as their modality of choice and started on either peritoneal dialysis or home hemodialysis as their incident dialysis modality decreased between the prepandemic and later pandemic periods from 38.4% (95% CI: 34.3%–42.8%) to 30.9% (95% CI: 26.7%–35.0%) and 77.3 (95% CI: 71.7%–82.9%) to 70.6 (95% CI: 63.9%–77.3%), respectively, with most of the decrease between the early pandemic and later pandemic period ([Figure 1](#)). The proportion of hemodialysis starts that occurred as an outpatient increased from the prepandemic value of 50.5% (95% CI: 45.0%–55.9%) to 53.3% in the early pandemic period (95% CI: 47.8%–58.8%) but then decreased in the later pandemic period to 45% (95% CI: 39.7%–50.3%).

Through ongoing monitoring of nondialysis CKD care metrics in our large provincial program, we have discovered substantial changes in key metrics for KCC multidisciplinary care, particularly those metrics related to the preparation for and transition to RRT treatment programs. These changes appear to be more pronounced as more time has elapsed since the onset of the pandemic.

Although we cannot draw attribution from these observational data, there have been many changes to multidisciplinary CKD care that may have influenced these metrics. One substantial item to consider is that the pandemic has brought a dramatic departure from the traditional, evidence-informed multidisciplinary clinic service delivery model to a relatively uncharted territory of virtual or hybrid kidney care delivery brought on by necessity rather than as a planned, informed, and evaluated change to service delivery. In addition, there were missed or deferred KCC appointments or interactions, reduced access to other care providers, and ancillary services such as dialysis access procedures, deferral of laboratory testing, and other monitoring diagnostics that was an explicit recommendation early in the pandemic.<sup>1</sup>

There are also potential reasons why these impacts may have increased as more time since the pandemic onset has elapsed. This may include a continually growing backlog of access to all the above clinical services and/or cumulative clinician and patient fatigue. Specifically, considering the increasing change noted in transitions from CKD care to dialysis modalities, it is possible that those who transitioned earlier in the pandemic had pre-existing transition plans established and were better able to execute them, whereas new cohorts of incident patients who came into KCC care and continued through their trajectories after the changes to KCC service delivery occurred did not have such plans in place and faced challenges establishing them. In this way, the impact of changes in care delivery and transition planning may take longer to completely manifest given the longitudinal and longer-term nature of CKD care.



**Figure 1 | Trends in chronic kidney disease outcome metrics before and following onset of the coronavirus disease 2019 (COVID-19) pandemic.** (a) Proportion of patients starting on home dialysis (peritoneal or home hemodialysis) at the time of dialysis initiation, (b) proportion of patients who chose home dialysis and started on home dialysis at the time of dialysis initiation, (c) proportion of patients starting dialysis without prior multidisciplinary kidney care clinic (KCC) exposure, and (d) proportion of existing KCC patients who started dialysis without completing a dialysis modality education and selection. Prepandemic = July 1, 2019, to March 31, 2020; early pandemic = April 1, 2020, to December 31, 2021; and later pandemic = January 1, 2021, to September 30, 2021.

There are limitations to our analysis. Specifically, we cannot attribute the changes we observed to any one or cluster of the above hypothesized factors as the capture of those factors is not standardized. Although limitations to this analysis exist, we do observe substantial changes in important KCC care metrics during the pandemic despite BC's fortunate position as a relatively resource-rich jurisdiction with a well-established network of CKD care provision. Further investigation will be needed to explore the underlying causes and potential targets for intervention responsible for these adverse changes in key CKD metrics. In the interim, it is important for CKD care providers to be aware of the potential unintended consequences of a changing CKD service delivery model and to be vigilant with oversight of key CKD outcome metrics as the pandemic and the changes it has brought to the previous established and proven paradigm of multidisciplinary clinic care continues.

**SUPPLEMENTARY MATERIAL**  
[Supplementary File \(Word\)](#)  
[Supplementary Methods.](#)

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*Kidney International* (2022) **101**, 1081–1082; <https://doi.org/10.1016/j.kint.2022.02.007>

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