

Informing Primary Care Changes in Alberta: Continuity and Potential Impacts on Acute Care

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Appendix 1: Methods

Continuity measure

The Practitioner Claims file, which includes billing data for healthcare practitioners (primarily physicians) that are reimbursed by Alberta Health, was used to calculate continuity. The continuity measure was based on the Usual Provider of Care (UPC) index (Pollack et al. 2016), which is calculated as the number of visits to the most frequently attended care provider divided by the total number of visits to any care provider. For instance, patients who attend the same clinic four times in the assessment period but had seen a different physician once when their usual physician was away (e.g., vacation) would have provider continuity assessed at only 75%, whereas continuity would be 100% based on a clinic continuity measure. Thus, the UPC was calculated based on the individual primary care provider, as well as at the family practice clinic level, for patients who had at least three visits to a primary care provider. The UPC measure was then categorized as high ($\geq 80\%$), moderate (50%–79%) and low ($< 50\%$), to align with continuity reporting published by the Health Quality Council of Alberta (2019). The UPC was not calculated for patients with fewer than three visits, as the measure would not be stable with a very limited number of visits. However, these patients were retained in the analysis as a separate group. The analysis used the low continuity patient group as a reference for comparisons with patients with fewer than three visits, medium continuity or high continuity.

Study population

Data were extracted from the Discharge Abstract Database (DAD) (Canadian Institute of Health Information 2019) for Alberta residents 18 years and older who were discharged to home after their first (i.e., index) acute care inpatient discharge between April 1, 2016 and March 31, 2017. Patients who were discharged to other facilities that provide care or died within 30 days were excluded. Mortality was not included as an outcome, as the majority of studies that have found associations between

mortality and continuity have monitored this outcome in specific patient populations and over much longer periods (often years), and the potential impact of continuity on all-cause mortality is questionable (Pereira Gray et al. 2018). Continuity was assessed in the three years prior to hospitalization (April 1, 2013–March 30, 2016); thus, the sample was further restricted to patients who were continuously registered with the Alberta Health Care Insurance Plan during that period, leaving a total of 180,657 patients in this analysis.

Assessment of outcomes

Data for length of stay and unplanned readmissions were obtained from the DAD, and emergency department visits data were obtained from the National Ambulatory Care Reporting System (NACRS) database (Canadian Institute for Health Information 2019). Other factors that may have influenced associations between continuity and outcomes were examined, including age, sex, emergency and inpatient use in the six months prior to the index admission, index admission type (elective or urgent), rural–urban continuum areas, health status (based on the Clinical Risk Grouper [CRG]; Carreras et al. 2013) and history of medication use (Pharmaceutical Information Network database). The rural–urban continuum areas define populations based on multiple criteria, such as population density and travel patterns, and were derived by aggregating patient postal code information (Alberta Health Services and Alberta Health 2017).

Statistical analyses

Logistic regression models were used to examine associations between continuity and the three outcomes and adjust for potential confounding factors. Associations were examined using adjusted odds ratios, which account for factors that may have influenced the associations of interest. Because obstetric cases may present a unique group of patients with a specific course of care, separate models were also run to examine if the associations changed after exclusion of these patients.

In addition, we wished to examine if associations varied by health status; thus, the analytic models were also stratified by patient health status. For this analysis, the CRG categories were pooled to ensure sufficient sample size. In cases where associations varied considerably across the stratified models, additional analyses were performed to assess statistical significance (Knol et al. 2011; Rothman and Greenland 1998).

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