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Title: Unplanned Hospital Readmissions in British Columbia.

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ABSTRACT

Unplanned hospital readmissions affect 9.1% of Canadian patients and cost more than \$1.8 billion per year. Hospital readmission rates are publicly reported in Canada and often interpreted as a marker of health system performance. Regrettably, British Columbia has one of the highest 30-day readmission rates nationwide (9.7%). This should motivate clinicians, hospitals, and health authorities to institute programs that monitor and prevent unplanned hospital readmissions.

Keywords: Hospital Readmissions, Discharge Planning, Quality Improvement

INTRODUCTION

In 2009, a landmark study found that nearly 20% of United States (US) Medicare beneficiaries were readmitted to hospital within 30 days, prompting hospital readmissions to become a major focus of healthcare quality improvement efforts[1]. Subsequent recognition of wide regional variability in readmission rates suggested that a proportion of hospital readmissions might be preventable if a focused effort was made to improve hospital and community care[1, 2]. A number of organizations in Canada, the United Kingdom, and the United States now recognize a high rate of unplanned hospital readmission as a marker of suboptimal health system performance[3].

According to the Canadian Institute of Health Information (CIHI), unplanned hospital readmissions afflict almost 200,000 Canadians annually[4]. Unfortunately, British Columbia's (BC) 2016 risk-adjusted 30-day readmission rate is significantly higher than the national average (9.7% versus 9.1%, respectively) (Figure 1)[5]. Vancouver Coastal Health has a readmission rate of 9.8%, which is the highest among BC's five health authorities and exceeds both national and provincial averages (Figure 2). These comparisons highlight an opportunity to improve the performance of BC's health system.

WHY DO HOSPITAL READMISSIONS MATTER?

Unplanned hospital readmissions are associated with patient discontent, increased healthcare costs, and increased risks for morbidity and mortality. Patient dissatisfaction may arise from the patients' perception that the readmission was preventable [6, 7]. Hospital readmissions cost Canadian taxpayers over \$1.8 billion per year, representing 11% of annual inpatient costs [4].

The average cost of a second hospitalization is often greater than the first (\$10,404 versus \$7,287 for medical patients)[4]. Hospital readmissions may be complicated by iatrogenic infection, venous thromboembolism, drug reactions, falls and pressure ulcers [8]. Large cohort studies have found the mortality rate after a hospital readmission to be 19% at 30 days and 39% at 1 year; the latter represents a three-fold increase in risk compared to patients who remained in the community after hospital discharge[9, 10].

WHAT ARE THE LIMITATIONS TO LOCAL TRACKING OF A HOSPITAL'S READMISSION RATES?

Hospital readmission rates are calculated by determining the proportion of discharged patients that are readmitted within a designated time frame (often within 30 days, although there is no clear biological justification for this choice)[11-13]. Eligibility criteria for the numerator and denominator often differ among institutions, making it difficult to compare hospitals' self-reported readmission rates. For example, planned readmissions (e.g. for elective surgery) are frequently excluded from the numerator, but only some hospitals exclude psychiatric and palliative discharges from the denominator. Hospital-based tracking programs also often fail to consider the 20% of readmissions that are known to occur at other hospitals[9]. Standardized reporting by CIHI overcomes many of these issues and facilitates equal comparisons between hospitals and regions by accounting for site-specific differences in patient age and comorbidity burden.

WHO IS AT RISK?

Patient risk factors for unplanned hospital readmission include male sex, advanced age, increased comorbidity burden, lower socioeconomic status and higher number of hospitalizations within the last 6 months[4]. The highest readmission risks are associated with medical conditions such as chronic obstructive pulmonary disease (COPD), heart failure, and pneumonia; about 20% of patients initially admitted for these conditions are readmitted within 30 days (Figure 3). Among surgical patients, undergoing colostomy or enterostomy confer the highest risk for readmission. The main independent readmission risk factor in any patient is having been hospitalized twice or more in the 6 months prior to the index admission. Hospital-specific risk factors for readmission is small patient volume (<2000 weighted cases annually) and rural location. Hospitals with a longer average lengths-of-stay have lower risk-adjusted readmission rates. On average, discharging a patient at least 1 day earlier than the national expected length-of-stay increases the relative risk of readmission by around 40%[4]. The cumulative influence that these competing forces have on cost to the healthcare system remains controversial[14, 15].

ARE HOSPITAL READMISSIONS PREVENTABLE?

About 25% of unplanned hospital readmissions are retrospectively determined to be preventable, but reliably effective and focused interventions to prevent them remain elusive [11, 16, 17]. Multi-component interventions have shown promise but are difficult to replicate[18, 19]. The largest and most effective readmission reduction effort to date is the ongoing Hospital Readmissions Reduction Program (HRRP) in the United States. Hospitals with higher-than-expected condition-specific 30-day readmission rates for US Medicare patients face financial penalties, and the introduction of this policy resulted in significant reductions in the 30-day readmission rate for both targeted and non-targeted conditions (with reductions from 24.1% to

22.5% and from 17.8% to 17.3%, respectively)[20]. However, recent analyses have found that the introduction of the HRRP was associated with an increase in the 30-day mortality rate after an admission for heart failure (from 7.2% to 8.6%).[21] Further debate over the merits of this program is inevitable. Local researchers think that the implementation of an HRRP-like policy in BC is unlikely, in part because global hospital budgets make such disincentives less effective[22].

HOW SHOULD PRACTITIONERS IN BC ADDRESS UNPLANNED HOSPITAL READMISSIONS?

Clinicians and administrators may consider tracking the local readmission rate, implementing context-appropriate interventions, and refining their approach with sequential Plan-Do-Study-Act (PDSA) quality improvement cycles[23]. Readmission risk prediction models such as the LACE index and the HOSPITAL score can be used to help identify patients at the highest risk of readmission[24-26]. Frameworks for developing hospital readmission reduction interventions are available from the Institute for Healthcare Improvement's State Action on Avoidable Rehospitalizations (STAAR) program and from the Care Transitions Program[27]. CIHI data can be used to compare progress with other hospitals, health authorities and provinces (Figure 4)[5].

CONCLUSION

Unplanned hospital readmissions are a major burden on healthcare systems in BC and nationwide. Given the poor outcomes and high costs associated with hospital readmissions, a concerted effort should be made to address this issue with parties at multiple levels, including frontline healthcare providers, hospital administrators, and policy makers.

FIGURES

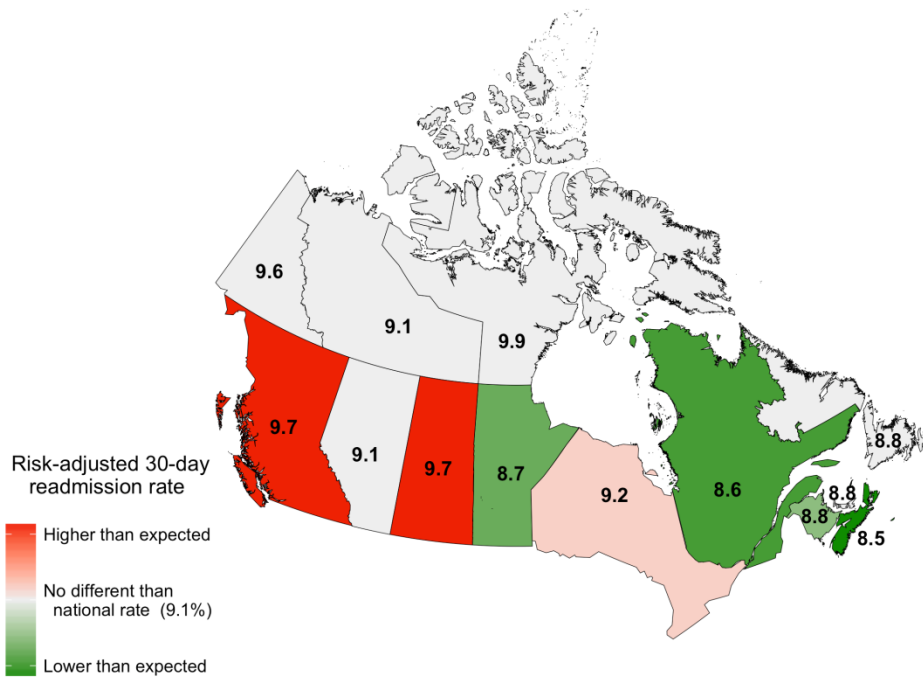


Figure 1: Risk-adjusted 30-day readmission rate by province/territory (2015/16)

Numbers denote readmission rates expressed in percent. Colours represent readmission rates significantly different than the national readmission rate; red corresponds to above-expected rates, grey to rates no different than expected, and green to below-expected rates. Figure created with R software (Vienna, Austria). Data obtained from CIHI[5].

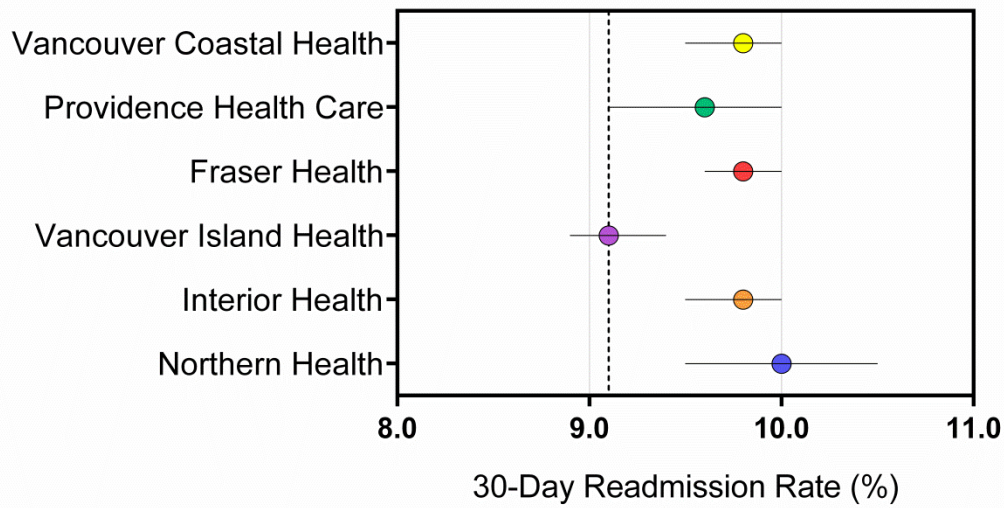


Figure 2: Risk-adjusted 30-day readmission rate by BC health authority (2015/16)

Readmission rates expressed as mean \pm 95% confidence intervals. Dashed line represents the national average (9.1%). Figure created with GraphPad Prism 7 (GraphPad Software Inc., La Jolla, California, USA). Data obtained from CIHI[5].

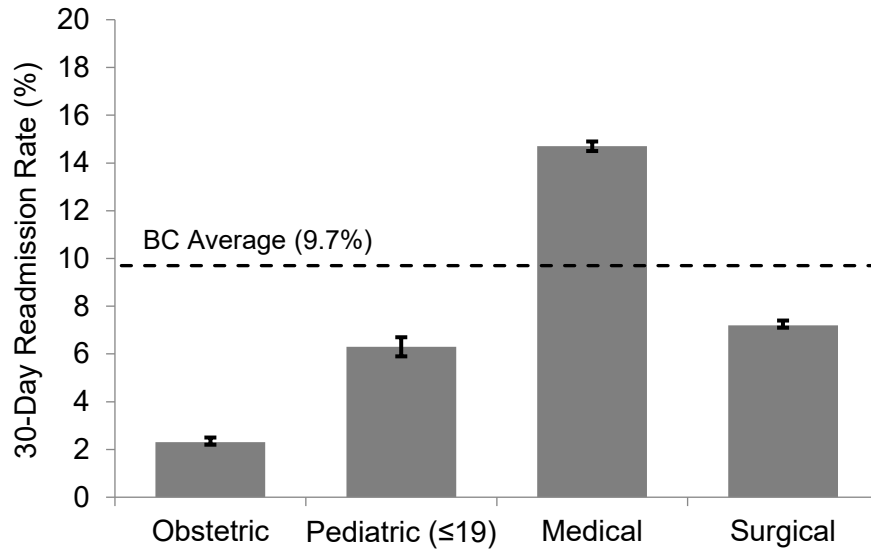


Figure 3: Program-specific 30-day readmission rate in British Columbia (2015/16)

Readmission rates expressed as mean \pm 95% confidence intervals. Figure created with Excel 2007 (Microsoft, Redmond, Washington, USA. Data obtained from CIHI [5].

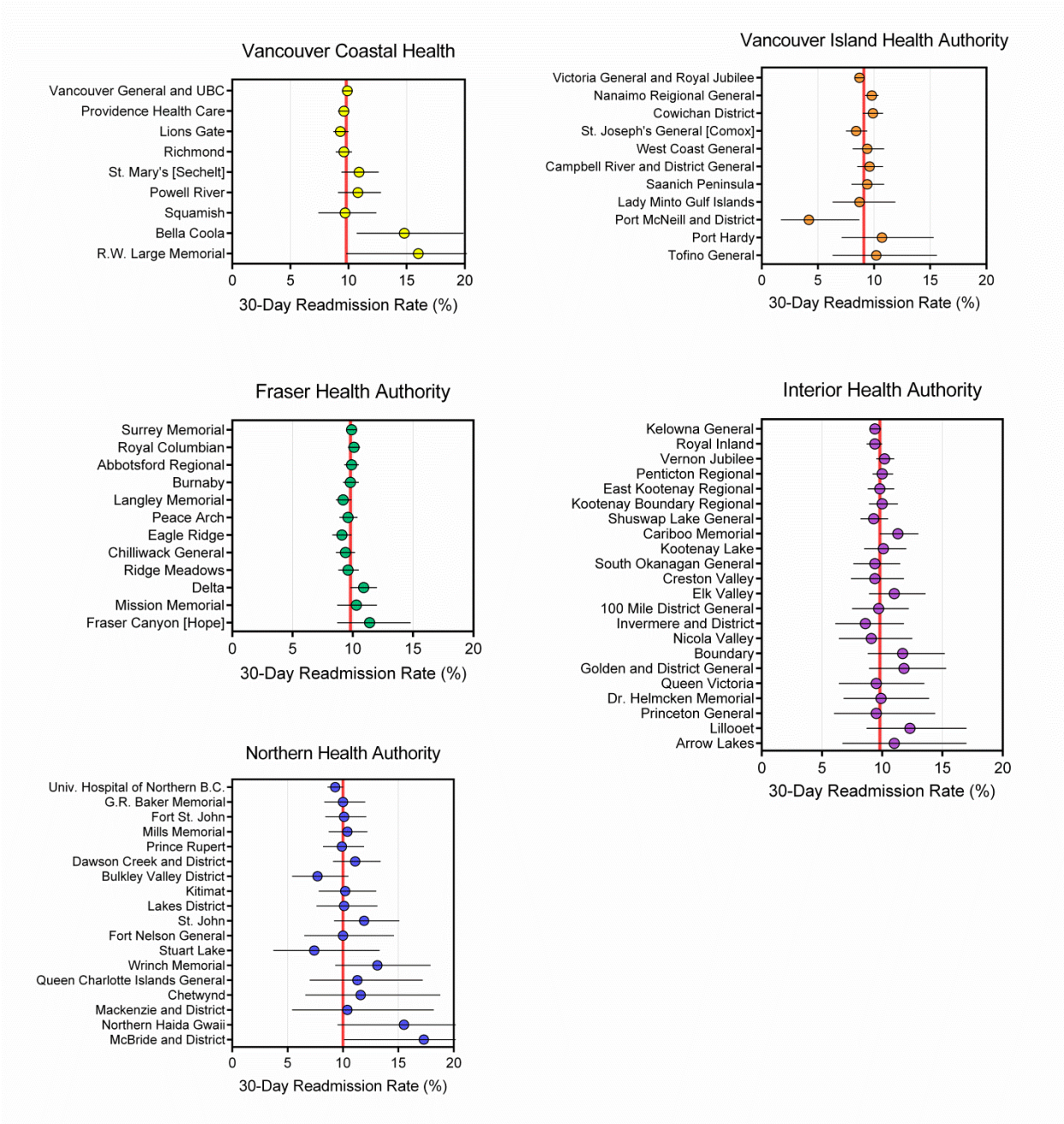


Figure 4: Risk-adjusted 30-day readmission rate by BC hospital (2015/16)

Readmission rates expressed as mean \pm 95% confidence intervals. Vertical red line represents average readmission rate within specified health authority. Figure created with GraphPad Prism 7 (GraphPad Software Inc., La Jolla, California, USA). Data obtained from CIHI [5].

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