

Canadian Cardiovascular Hospitalization Rates and Length of Stay

INTRODUCTION

Cardiovascular conditions are a leading cause of hospitalization in Canada. An examination of recent trends and variation in cardiovascular hospitalization rates across Canada will provide healthcare system managers, decision-makers and clinicians an opportunity to evaluate and compare national cardiovascular hospitalization rates. This is the first national study to examine regional variations in cardiovascular hospitalization rates and length of stay (LOS) across Canada.

METHODS AND DATA SOURCES

To identify Canadians hospitalized with the most responsible diagnoses of acute myocardial infarction (AMI), congestive heart failure (CHF), and angina and chest pain, hospital discharge data from the Canadian Institute for Health Information (CIHI) discharge abstract database and the CIHI hospital morbidity database for Quebec and Manitoba were used for fiscal 1994/95 through to 1999/00. Direct age- and sex- standardized hospitalization rates were calculated by province and health region to allow all regional rates to be directly comparable (Mausner and Bahn 1985). The 1991 Statistics Canada Census five-year age- and sex-specific regional populations provided the denominators for the hospitalization rate calculations. Health region definitions were those as defined by Statistics Canada.

To compare LOS across the country, “episodes of care” were created to account for inter-hospital transfers. These were defined as either a direct admission to an acute care hospital from which the patient was subsequently discharged home, or a continuous sequence of hospitalizations. For example, a hospital discharge and admission within the same day were considered to be part of the same episode of care.

This approach is similar to that used in the Ontario Hospital Report Card in 2001 (Ontario Hospital Association 2001). Adjustment was made for age, sex and whether or not an invasive cardiac procedure was performed during the episode of care. Regression analyses were performed separately for each fiscal year (from 1994/95 to 1999/00) and excluded cases with LOS beyond the 97.5 percentile to prevent extreme values from influencing the provincial estimates of differences in LOS for episodes of cardiovascular hospital care. The adjusted provincial average LOS is the observed average provincial LOS divided by the predicted average provincial LOS, then multiplied by Canada’s yearly average LOS.

Table 1.

	Average Decrease LOS in Canada	Adjusted Average LOS
AMI	10%	9.8 to 8.8 days
CHF	9%	10.9 days to 9.9 days
Angina	11%	6.7 days to 5.9 days
Chest	6%	3.2 days to 3.0 days

RESULTS

Trends in Cardiovascular Hospitalization Rates

Between 1994 and 1999, per capita hospitalization rates for AMI, angina and chest pain increased 6%, 8% and 11% respectively and decreased 7% for CHF in Canada.

Regional Variation in Hospitalization Rates (fiscal 1997/98 to 1999/00)

To produce a stable numerator for the regional variation analyses, three years (fiscal 1997/98, 1998/99 and 1999/2000) of data were combined and an average hospitalization rate per 100,000 population calculated.

For AMI, the national age- and sex-adjusted hospitalization rate among the regions was 250.4/100,000. For the AMI analyses, Newfoundland’s data was excluded, as its AMI coding did not rely exclusively on ICD-9 code 410. National age- and sex-adjusted hospitalization rates among the regions were: congestive heart failure, 255.9/100,000; angina, 302.1/100,000; chest pain, 176.1/100,000. Maps and actual rates for each health region are available at <http://www.ccort.ca/CVDHospitalizationsLOS.asp>, the Canadian Cardiovascular Outcomes Research Team (CCORT) website.

In general, eastern Canada had the highest cardiovascular hospitalization rates and western Canada had the lowest rates. Rural/remote regions had higher rates than urban regions. AMI hospitalization rates demonstrated the least amount of regional variation compared to the other cardiovascular conditions.

Length of Stay for Episodes of Cardiovascular Hospitalizations

Table 2 illustrates the comparison in the adjusted mean LOS for cardiovascular hospitalizations in Canada between fiscal 1994/95 and fiscal 1999/00. Length of stay for episodes of cardiovascular hospitalizations has been steadily decreasing since 1994.

Table 2: Adjusted* Mean Length of Stay for Cardiovascular Hospitalizations in Canada 1994/95 and 1999/00

	Acute Myocardial Infarction		Congestive Failure		Angina		Chest Pain	
	1994/95	1999/00	1994/95	1999/00	1994/95	1999/00	1994/95	1999/00
Nfld.	-	-	10.9	10.1	8.0	7.5	3.9	3.5
PEI	9.9	9.8	11.9	12.0	8.0	6.8	4.4	3.8
NS	10.3	9.6	12.9	11.4	7.7	7.0	4.2	3.6
NB	10.4	9.3	11.6	11.1	7.3	6.8	3.8	3.2
QC	11.2	9.7	12.8	10.9	8.1	6.5	4.2	3.7
Ont.	9.4	8.7	10.4	9.3	6.0	5.5	2.9	2.6
Man.	9.2	8.6	10.8	10.0	5.5	5.8	2.9	2.9
Sask.	11.3	8.1	11.6	9.5	7.9	5.3	3.5	3.0
Alta.	9.0	8.6	10.5	10.5	5.5	5.2	3.0	3.1
BC	8.3	7.5	9.4	8.9	4.9	5.1	2.5	2.4
Canada	9.8	8.8	10.9	9.9	6.7	6.0	3.2	3.0

* adjusted for age, sex, and cardiac procedures

In general, western Canadian provinces have shorter LOS compared to eastern provinces.

DISCUSSION AND CONCLUSIONS

Key Observations – Cardiovascular Hospitalization Rates

1. An overall decline was observed in the hospitalization rates for CHF, whereas an increase was observed in the rates for AMI, angina and chest pain across the country.
2. More regional variation in hospitalization rates was found for CHF, angina and chest pain than was found for AMI, perhaps reflective of AMI being a non-discretionary admission, and having well-developed and disseminated guidelines emphasizing the need for hospitalization and treatment of all cases of AMI (Cairns et al. 1994; Ryan et al. 1999).

Plausible explanations for regional variations in cardiovascular hospitalization rates are related to factors such as physician supply and practice styles, bed supply per capita, access to ambulatory care, community and institutional resources, the prevalence of effective primary and secondary prevention programs, incidence of risk factors for cardiovascular disease and the socio-economic status of various health regions (Basinski 1999; Anderson 1996).

Recommendations

For regions with higher than expected hospitalization rates, a number of strategies to decrease hospitalization rates may be considered.

1. CHF hospitalization rates may be decreased through the establishment of multidisciplinary ambulatory CHF clinics and greater patient education and counselling, along with increased use of therapies such as ACE inhibitors and beta-blockers.

2. Angina and chest pain hospitalization rates could be reduced through the development of short-stay chest pain evaluation units and/or use of chest pain risk-stratification instruments (Lee et al. 2003).
3. Reduction of AMI hospitalization rates would require attention to both community-based primary prevention programs focused on traditional risk factors (e.g., smoking, hypertension, diabetes, etc.) along with maximal use

of secondary prevention medications (e.g., aspirin, beta-blockers, ACE inhibitors, statins) and cardiac rehabilitation programs.

Key Observations – Length of Stay

1. Length of stay for all these conditions has gradually decreased throughout the 1990s, suggesting more efficient utilization of acute hospital resources is occurring.
2. The lower adjusted LOS in western Canada suggests that greater efficiencies in utilization of hospital resources might be possible in eastern Canada.

Possible explanations for provincial differences in mean LOS include differences in underlying population characteristics, access to cardiovascular monitoring/interventions, acute-bed, rehabilitation and home care availability, practice patterns and severity of illness.

Recommendations

The next step will be to use this information for dialogue among provincial policy-makers, regional health authorities, hospital administrators, clinicians and researchers to develop strategies to evaluate the appropriateness of cardiovascular hospitalization rates across the country, as well as gather additional data to better understand the factors contributing to the regional variation. Ongoing monitoring of hospitalization rates and LOS for cardiovascular conditions has importance for both clinical and economic reasons.

About the Author

Dr. Ruth Hall is a CCORT (Canadian Cardiovascular Outcomes Research Team) post-doctoral fellow at the Institute for Clinical Evaluative Sciences (ICES).

ICES is an independent, non-profit organization that conducts research on a broad range of topical issues to enhance the effectiveness of healthcare for Ontarians. Internationally recognized for its innovative use of population-based health information, ICES research provides evidence to support health policy development and changes to the organization and delivery of healthcare services.

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Announcement from the Canadian Health Economics Research Association (CHERA)

Broadening the Mandate of CHERA/ACRES to CAHSPR/ACRSPS

Background: The healthcare landscape of Canada has undergone dramatic transformations in the past decade, with important implications for research and decision-making in health services, health economics and health policy domains.

There has been a growing need for a broad-based interdisciplinary health services and policy research association to support practitioners, users and students of health research to enhance their research capacity and career development. In response to this, a new membership-based health services and policy research association will be launched in November 2003 at the CIHR Institute for Health Services and Policy Research conference.

The new association, called the Canadian Association for Health Services and Policy Research/Association Canadienne pour la Recherche sur les Services et les Politiques de la Santé (CAHSPR/ACRSPS) will replace the Canadian Health Economics Research Association/Association Canadienne pour la Recherche en Economie de la Santé (CHERA/ACRES). The aim will be to enhance research capacity within both the research and "research user" communities.

"The CHERA board and membership strongly endorsed the organization's evolution towards a more broad-based association," says the University of Toronto's Dr. Peter Coyte, president of CHERA's board of directors. "We welcome new members – both individual and organizational – and we look forward to promoting interdisciplinary work towards meeting the challenges facing healthcare in Canada."

Members: CAHSPR/ACRSPS is inclusive of a variety of research and policy foci, including health economics, health services research, health policy, healthcare administration, epidemiology, behavioural science, sociology, anthropology, geography, medicine, nursing, law and political science. Consequently, the new association has a broader mandate than its predecessor, CHERA/ACRES, which focused on health economics and policy analysis.

Services: The new association will provide a range of services to its membership, including:

- Hosting national research and policy conferences
- Providing information, networking and communication services to its members and the research community in general
- Hosting a repository of Canadian health services and policy research
- Supporting a Canadian health services and policy research journal
- Supporting the development of a national database of health services and policy researchers.

Governance: The board would represent the makeup of the membership at the individual level with care taken to ensure appropriate geographic, gender, linguistic and discipline balance.

Health Economics Focus: The Canadian Health Economics Study Group would serve as an organizational structure within the new organization to allow for a specialized focus on health economics issues.

For more information on becoming a member, visit www.chera.ca or email chera.acres@utoronto.ca.