

Administration of Emergency Medicine



EMERGENCY DEPARTMENT FLOW MEASURES FOR ADULT AND PEDIATRIC PATIENTS IN BRITISH COLUMBIA AND ONTARIO: A RETROSPECTIVE, REPEATED CROSS-SECTIONAL STUDY

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Abstract—Background: Evidence suggests emergency department (ED) overcrowding is associated with poor health outcomes. Children comprise 20–25% of general ED visits, yet few studies have examined the differential impact of ED overcrowding on pediatric and adult populations. **Objective:** The primary objective of this study was to compare flow measures, such as wait time to see a physician, length of stay (LOS), and rate of patients leaving without being seen by a physician (LWBS) between adults and children in British Columbia and Ontario, clustered by province, and then stratified by acuity level during the study period. **Methods:** We conducted a retrospective,

repeated cross-sectional study using administrative data from all community EDs in Ontario and 10 EDs in the Vancouver Lower Mainland, British Columbia. Visits from January 1, 2008 and December 31, 2012 were included. **Results:** Visit volumes increased 13.9% per year in British Columbia and 2.2% per year in Ontario, with a more pronounced rise in adult visits. Both groups displayed a shift toward higher-acuity presentations. Adults spent more time in the ED compared to children (36 to 53 min longer), and were more likely to be admitted. Children consistently spent a greater portion of their visit awaiting assessment compared to adults. **Conclusions:** In the context of system incentives to reduce overcrowding, ED LOS and the LWBS rate did not significantly change for either children or adults, despite increased visit volume and acuity. Our findings suggest that measures to improve patient flow might have provided EDs with the means to meet increased demands on departmental resources. © 2017 Elsevier Inc. All rights reserved.

Keywords—emergency medical services; health policy; health care delivery; pediatrics

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INTRODUCTION

Emergency department (ED) overcrowding has been recognized as a serious health care problem in North America for the last 2 decades (1). According to the

Canadian Association of Emergency Physicians' position statement on ED overcrowding, ED volumes have remained relatively stable over time, but the issue of overcrowding remains unaddressed (2). A survey conducted with 158 ED directors across Canada revealed that overcrowding—defined in this particular study as wait time (WT) exceeding 2 h to see a physician—was a major or severe problem affecting the ED within the last year for 62% of respondents; 35% of the surveyed directors reported at least one daily episode of overcrowding within the last 2 months (1). Studies of overcrowding in EDs, addressing mainly the adult population, have shown several implications for patient safety, particularly in instances when timely diagnosis and treatment are required to prevent further deterioration. Periods of ED crowding have been shown to delay completion of medication orders for asthma, administration of antibiotics for pneumonia, time to thrombolysis in acute myocardial infarction, and computed tomography scan orders for stroke (3). In addition, patients presenting to the ED during particularly crowded periods face a greater risk of mortality and prolonged inpatient hospital stays relative to those receiving care during less crowded shifts (4,5).

Despite the fact that up to 90% of pediatric ED visits occur in general EDs rather than in pediatric emergency departments (PEDs), and that children make up 20–25% of all general ED visits, relatively little is published on the outcomes of children cared for in general EDs (6). Moreover, children are often excluded from research conducted in general EDs (6). To date, only one study, conducted in 1996 at a general ED, compared WTs to be seen by a physician between adults and children within the same triage level (7). For the 2% of pediatric visits triaged to the highest level of acuity, children were seen slightly faster than adults, but waited longer in the other lower triage categories (7).

With few studies examining differences in ED flow measures between children and adults in general EDs, this study's primary objective is to describe WT, length of stay (LOS), and the leaving without being seen (LWBS) rate for pediatric and adult patients seeking care in general EDs in two Canadian provinces. The secondary objective is to describe trends in ED utilization patterns, with regard to visit volume, acuity, and disposition.

METHODS

Study Design

We conducted a retrospective, repeated cross-sectional study using health administrative databases from all community EDs in Ontario and 10 EDs in the Vancouver Lower Mainland in British Columbia. The study was

approved by the participating health authorities in British Columbia, and by the Institute of Clinical Evaluative Sciences (ICES) in Ontario. A waiver of consent was granted for this study.

Study Setting and Population

All patient visits from January 1, 2008 and December 31, 2012 for both provinces were included. The EDs in British Columbia included in this study have annual visit volumes ranging from 40,000 to 70,000 each, and children account for 5% of their visits. One of the study sites is a Level 1 trauma and tertiary care academic hospital, while the others are all community general EDs. Each of the 10 British Columbia EDs belongs to one of three provincial health authorities. The Vancouver Lower Mainland is located in the southwest portion of British Columbia, with a 5000 km² surface area and a population of more than 2.5 million people, or nearly 60% of the province's total population.

The Ontario EDs included in our study reflect a range of ED settings, from small rural community EDs, to regional centers, and tertiary care or academic centers. Ontario is Canada's most populous province, with 13.6 million residents or approximately 40% of the country's total population. The number of included EDs from Ontario varied each year in relation to institutional closure, as well as some smaller institutions with variable participation in the National Ambulatory Care Reporting System (NACRS).

Study Protocol

Data from the 10 EDs in British Columbia were analyzed using aggregate, deidentified health authority administrative databases. For EDs in Ontario, encoded data from approximately 146 centers (availability of data varied between 144 and 147 centers from year to year without obvious trends or patterns) were analyzed at ICES using health care records collected by the Canadian Institute for Health Information through NACRS.

Key Outcome Measures

The primary objective of this study was to compare measures of flow or overcrowding, such as WT, LOS, and LWBS between adults and children, clustered by province, then stratified by acuity level as assigned at triage using the Canadian Triage and Acuity Scale (CTAS) during the study period (8,9).

Our secondary objective was to describe the trend in utilization in terms of volume and acuity of visits and their outcomes in terms of admission to hospital.

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