Child Health Atlas

Burden of Disease Among Children and Youth in Ontario

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Child Health Atlas: Burden of Disease Among Children and Youth in Ontario

Final Report

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1. EXECUTIVE SUMMARY

Background

Asthma is the most common chronic respiratory disease affecting children and youth. Population-level data provide important information on the burden of childhood asthma, which may help to determine its overall impact on health care systems and direct health resource allocation and the development of targeted interventions.

Objectives

The purpose of this project was to assess the magnitude of the burden of childhood asthma in Ontario, Canada by describing among children aged 0 to 19 years between 2006 and 2016:

1. Overall (i.e., all-cause) health services use in children with asthma and the general child population;
2. Disease-specific health services use in children with asthma; and,
3. Geographical variation of health services use in children with asthma.

Methods

Health administrative data from Ontario, Canada were used to identify trends in health service utilization among children under 20 years of age from 2006 to 2016. These trends include emergency department (ED) visit rates, medical hospitalization rates, in-hospital surgery rates, and same day surgery rates. This report focuses on common diseases and surgical procedures affecting children with asthma.

Results

Overall rates of health service utilization in children with asthma remain high, with both ED visit rates and same day surgery rates being higher in those with asthma relative to the general child population in Ontario (Figures 4.1 to 4.4). For reasons unknown, the increasing trends in overall ED visit rates among children with asthma and the general child population in Ontario (Figure 4.1) are consistent with what others have reported in the province's pediatric and adult populations (1, 2). From 2006 to 2016, respiratory conditions have continually been within the top five causes of ED visits (Figure 5.1), hospitalizations (Figure 5.2), and in-hospital surgeries (Figure 5.3) among children with asthma. Asthma is consistently a top contributing condition to respiratory morbidity in children with asthma of all ages.

Age- and disease-specific rates of health services use from respiratory and digestive disorders generally decreased from 2006 to 2016 in children with asthma (Figures 6.1 to 7.2). However, ED visits and hospitalizations due to mental disorders increased over the 10-year observation period in the child asthma population, most notably in males and females 15 to 19 years (Figures 8.1 and 8.2). In 2016, rates of ED visits, hospitalizations, in-hospital surgeries and same day surgeries among children with asthma varied across the province, and tended to be highest in Local Health Integration Networks (LHINs) located in Northern Ontario (Figures 9.1 to 9.4).

Conclusions

Children and youth with asthma contribute a large burden to the Ontario health care system. Rates of health services use remain high in this population relative to the general child population, with respiratory conditions being top contributors to overall disease morbidity.

2. BACKGROUND

Respiratory diseases are among the most common diseases in Canada and contribute significantly to morbidity, mortality, and healthcare costs. The overall burden of respiratory diseases, including both chronic non-communicable diseases and acute respiratory infections, is disproportionately high in the pediatric population (3, 4). In Ontario, asthma remains the most common respiratory disease affecting children between the ages of 0 and 9 years. In 2014/15, children under 10 years of age had an asthma incidence rate of 17 per 1000 compared to 4 per 1000 in the general population, representing a 4-fold difference (5).

Population level estimates of morbidity and mortality attributable to other respiratory diseases are less common. Estimates of the comparative burden of respiratory diseases to other disease categories are largely based on asthma statistics, rather than all chronic and acute conditions affecting children. We aim to quantify the ***magnitude of the burden of childhood respiratory diseases*** in Ontario, Canada, by describing ***trends in health morbidity*** in those aged 0 to 19 between 2006 and 2016.

Considering epidemiological trends and health service utilization for respiratory diseases will help to determine their overall impact on the provincial health care system and will direct the allocation of health care resources. This work may also highlight areas where there are gaps in prevention and care, providing an evidence base for the development of targeted public health and clinical interventions.

3. METHODS

Data Sources

Ontario has a universal, single-payer health-care system that covers all physician and hospital services. Data was obtained from April 2006 to March 2017 from six different health administrative databases: (1) The Ontario Health Insurance Plan Database (OHIP) contains information on all fee-for-service billings for physician services rendered and for ED visits in Ontario, including diagnosis; (2) The Canadian Institute for Health Information Discharge Abstract Database (CIHI-DAD) records the primary diagnosis and up to 25 secondary diagnoses for all patients discharged from acute care hospitals in 2002 and later years; (3) The National Ambulatory Care Reporting System (NACRS) database contains data for hospital-based and community-based emergency and ambulatory care (such as day surgery and outpatient clinics); (4) The Ontario Asthma Surveillance Information System (OASIS) contains ongoing asthma surveillance statistics, including incidence, prevalence, and health services use for all individuals in Ontario; (5) The Ontario Registered Persons Database (RPDB) includes information on sex,

birth date, health card number, and residence postal code; and (6) The Vital Statistics Database (ORGD) contains specific and contributing causes of death and date of death. These databases were linked on an individual level using the ICES Key Number (IKN), an encrypted unique health card number given to all Ontario residents. This linkage allows for protection of the identities of individuals while examining their health services use across health administrative databases. These databases are housed at ICES (formerly the Institute for Clinical Evaluative Sciences) in Ontario, Canada.

Study Population

All children aged newborn to 19 years (inclusive) with a valid Ontario health card number and Ontario residence code were included. In this report, children were grouped according to those with asthma (i.e. asthma prevalence) and those in the general population. Children with asthma were identified as those who, from fiscal years 2006 to 2016, had at least one asthma hospitalization record or two asthma physician claims over two consecutive years (6, 7). Children with asthma and the general child population were then grouped into infants (under one year of age), one to four years, five to 14 years, and 15 to 19 years. Teenagers aged 15 to 19 years were further stratified by sex.

Classification of the Common Admissions and Surgical Procedures

Annual rates are calculated per 100 children per year. If there are multiple admissions per child in each fiscal year, they would be included in the calculation.

Diagnostic chapters, blocks, and categories from the International Statistical Classification of Diseases and Related Health Problems 10th Revision (ICD-10), were used to identify medical health care use. Canadian Classification of Health Interventions (CCI) codes were used to identify surgical procedures. For ED visits, the diagnosis of the main problem was used. Inpatient hospitalizations were examined by medical and surgical diagnoses separately. For medical hospitalizations, the most responsible diagnosis was used. For in-hospital surgery and same day surgery, the most responsible CCI code of the data was used.

ICD-10 chapters were used to classify general medical conditions; select ICD-10 categories were used to classify respiratory conditions; ICD-10 blocks were used to classify digestive and mental conditions; and CCI blocks were used to classify surgical procedures. This report focuses on five major respiratory conditions (asthma, influenza, pneumonia, bronchitis and bronchiolitis) and the top five common conditions responsible for medical admissions and surgical procedures among children.

Limitations

As was previously mentioned, the reporting period was from April 2006 to March 2017. Data on asthma for 2015 and 2016 may be incomplete due to the 2-year algorithm to identify case definition for asthma, and numbers are subject to change. Additionally, readmissions of individuals have not been separated out from first admissions. For conditions such as asthma, readmissions may account for a significant proportion of total admissions.