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Sex Differences in Outcomes Following ED Discharge

Original Research

Sex Differences in Outcomes After Discharge from Alberta Emergency Departments for Asthma: A Large Population-based Study

Rhonda J. Rosychuk, PhD^{1,2}, Maria Ospina, PhD³, Jingbin Zhang, MSc⁴, Richard Leigh, MD,
PhD⁵, Andrew Cave, MB ChB⁶, Brian H. Rowe, MD, MSc^{7,8,9}

¹Department of Pediatrics, University of Alberta, Rm 3--524, Edmonton Clinic Health Academy
(ECHA), 11405 87 Avenue NW, Edmonton, Alberta T6G 1C9, Canada

²Women & Children's Health Research Institute, Rm 4--081, Edmonton Clinic Health Academy
(ECHA), 11405 87 Avenue NW, Edmonton, Alberta T6G 1C9, Canada

³Department of Obstetrics & Gynecology, University of Alberta, 5S 138 Lois Hole Hospital For
Women, Robbins Pavilion Royal Alexandra Hospital, 10240 Kingsway Avenue, Edmonton,
Alberta T5H 3V9, Canada

⁴R.A. Malatest & Associates Ltd., 10621 100 Ave NW, Edmonton, Alberta, T5J 0B3, Canada

⁵Departments of Medicine and Physiology and Pharmacology, University of Calgary, 4AC60
3330 Hospital Drive NW, Calgary, Alberta, T2N 4N1, Canada

⁶Department of Family Medicine, University of Alberta, 6--10 University Terrace, University of
Alberta, Edmonton, Alberta, T6G 2T4, Canada

⁷Department of Emergency Medicine, University of Alberta, 1G1.42 Walter Mackenzie Building, University of Alberta Hospital, 8440 112 Street NW, Edmonton, Alberta T6G 2B7, Canada

⁸Alberta Health Services, Seventh Street Plaza, 14th Floor, North Tower, 10030 107 Street NW, Edmonton, Alberta, T5J 3E4, Canada

⁹School of Public Health, University of Alberta, Rm 3--300, Edmonton Clinic Health Academy (ECHA), 11405 87 Avenue NW, Edmonton, Alberta T6G 1C9, Canada

Correspondence: Rhonda J. Rosychuk, Ph.D., P.Stat., PStat@(ASA), Department of Pediatrics, University of Alberta, Rm 3--524, Edmonton Clinic Health Academy (ECHA), 11405 87 Avenue NW, Edmonton, Alberta T6G 1C9 CANADA, e-mail: rhonda.rosychuk@ualberta.ca
ORCID ID: orcid.org/0000-0001-8019-5466

ABSTRACT

Objective: Asthma exacerbations frequently result in emergency department (ED) visits. While sex differences have been identified in some asthma studies, there is a paucity of literature on sex differences in the ED setting, especially population-based ones. This study examines sex differences in important outcomes of patients discharged from EDs for acute asthma in Alberta, Canada.

Methods: Alberta residents aged 2 to 55 years discharged from EDs with a primary diagnosis of asthma during 1999- 2011 were identified from administrative databases from a single-payer health care system for the entire geographic region of Alberta. Multivariable Cox regression

models analysed time to first follow-up physician or specialist visit and logistic regression models analysed the binary outcome of ED return within 30 days for asthma.

Results: There were 115,853 discharged patients analysed (40.4% and 59.1% female in pediatric and adult groups, respectively). Approximately 26% of patients revisited the ED during 1999--2011 and 5.1% did so within 30 days. Women had higher odds of a 30-day ED return after ED discharge than men (unadjusted odds ratio [uOR] = 1.26; 95% confidence interval [CI] 1.17-1.36). Time to first non-ED physician follow-up was shorter for girls (unadjusted hazard ratio [uHR] = 1.05; 95%CI 1.03-1.07) and women (uHR = 1.62; 95%CI 1.59-1.64) than for boys and men, respectively. Significant interactions between sex and age, socio-economic status, area of residence, and comorbidities were identified and changed the effect of sex on outcomes.

Conclusions: In conclusion, women return to EDs within 30 days of discharge for acute asthma more often than men. Time to first non ED physician follow-up for children and adults differed by sex. Multiple factors likely contribute to these differences; however, identifying these differences are critical to understanding the influence of sex on health behaviours and outcomes.

Key Words

Administrative Databases; Asthma, Epidemiology, Sex Differences.

BACKGROUND

Asthma is a common chronic respiratory disorder characterised by periods of reversible airflow obstruction in reaction to exposures to irritating stimuli. Its prevalence is estimated to be 8.1% in Canada in the population >12 years of age (1) and 8.8% in adults in the United States (2).

Asthma in Canadian children has increased from 3% in 1978 to 16% in 2000, mirroring world-wide increases (3). Asthma exacerbations are common and frequently result in health care utilisation and, if severe or after routine hours of care, emergency department (ED) presentations (4).

Asthma incidence, prevalence, and severity differ by sex (5). In children, the prevalence of physician-diagnosed asthma is higher among males until puberty and in adults the prevalence is higher among females (6, 7). During childhood, boys have a significantly higher risk of developing asthma than girls, with more exacerbations requiring hospitalizations and ED visits (8). Around puberty, there is a ***sex prevalence reversal*** in asthma and, after puberty, women exhibit a greater susceptibility to asthma compared to men (9, 10); they have exacerbations more frequently, with greater severity and need for admissions (8). Women also tend to have more symptoms of asthma than men (11-13). Asthma hospitalizations are substantially higher among boys (14); however, the hospitalization sex ratio reverses in adulthood. Hospitalization rates for asthma are consistently higher among women than in men, with a distinct peak occurring later in life (14-17). In a recent systematic review, female sex was the most commonly reported and statistically significant factor leading to an increased risk of relapse within 4 weeks of ED discharge for acute asthma (18). Other studies have not shown sex differences for ED visits (19),

repeat ED visits (20, 21), admissions (22), and mortality (23). Relatively few studies have been population-based.

In Canada, the majority (~90%) of patients with acute asthma can be treated in the ED and discharged, so the follow-up period is particularly important. We used population-based administrative databases over a 12-year period for an entire geographic region to evaluate sex differences in outcomes and follow-up of patients discharged from EDs in Alberta, Canada after asthma exacerbations. Identifying and understanding sex differences, if they exist, is important especially as we attempt to think critically about the influence of sex on health behaviours and outcomes.

METHODS

Study Protocol

This study used administrative data from Alberta, Canada during April 1, 1999, to March 31, 2011. This time frame represents the start date of the database that collects information on ED presentations to the date of the most recent data available for our data request in 2013. Alberta is a Canadian province with >4 million residents and a uniform single-payer health system –the Alberta Health Care Insurance Plan (AHCIP) –that provides medically necessary health care. The Government of Alberta is the custodian of all administrative databases used in our study. The University of Alberta Health Research Ethics Board – Health Panel approved this study (#Pro00049926) and waived consent.

The Morbidity and Ambulatory Care Abstract Reporting (MACAR, formerly known as ACCS (24)) system collects information on all ED presentations and services delivered within acute

care institutions in Alberta using the International Classification of Diseases diagnostic codes (ICD-9-CM (25) before April 2002; ICD-10-CA (26) for April 2002-present). Each unique service contains a unique patient identifier, ED visit start/end and dates/times, diagnosis, and disposition.

An asthma-related visit was defined as an ED encounter that resulted in a principal diagnosis of asthma (ICD-9 diagnostic codes 493.x [asthma all forms] or ICD-10 diagnostic codes J45.x [asthma all forms] in MACAR main diagnosis field). The study population was restricted to individuals aged ≥ 2 years and ≤ 55 years because of diagnostic uncertainty < 2 years of age (27) and to avoid contamination with chronic obstructive pulmonary disease (COPD) over 55 years of age.(28)

Demographic variables (AHCIP) were age (years) at ED presentation, sex (male, female), and geographic area of residence (five administrative zones). Data were grouped as pediatric (age 2--17 years, girls and boys) and adult (age 18--55 years, women and men). Health care premiums in Alberta were fully or partially subsidised until January 1, 2009, for individuals qualifying for social assistance and the last values on this variable were carried forward for 2010 and 2011. In addition, many First Nations individuals in Alberta have Registered status based on treaties (29), resulting in full premium subsidies. Combining these categories, two mutually exclusive groups were formed (subsidised and non-subsidised). Without a direct measure of socio-economic status (SES), the need for, and receipt of health care subsidies, is considered a valid proxy measure of SES (30). Three patients had unknown subsidy status and these were included in the non-subsidised category for regression analyses.

All ED presentations were assigned a disposition code according to the manner in which they left the ED, including discharged, left against medical advice or without being seen, admitted as an inpatient, transferred to another institution or death. Only the ED presentations with the dispositions “discharged” were used for this study.

Data on follow-up physician visits in non-ED settings within 365 days of the index ED presentation were extracted (Physician Claims File). Variables included date, physician specialty (grouped as respiratory or internal medicine [hereafter specialist], other), facility type (active treatment hospital, practitioner’s office, other), and four diagnoses (asthma, COPD, pneumonia/influenza, other). In Canada, internal medicine specialists largely do not provide primary care and since respiratory specialists are limited mainly to large volume and tertiary care centres, internal medicine specialists may also be the respiratory care providers in some of Alberta’s geographic regions. Physician visits to non-ED settings 365 days prior to the index ED visit (called prior claims) were extracted to determine the history of asthma and comorbidities (31), and to calculate the Charlson Comorbidity Index (Deyo coding scheme, DCCI) for adults (32). The DCCI is designed for use with ICD-9-CM data (codes used for diagnosis in the Physician Claims File) in administrative databases and it is a weighted sum of specific comorbidity code scores, with 0 indicating no comorbidities (32). The DCCI for adult patients was calculated and reduced to a dichotomous variable (≥ 1 or 0).

Outcomes

Outcomes were time from discharge to first follow-up visit, ED return for asthma within 30 days of discharge, and death within 30 and 90 days of ED discharge. Death data were extracted within 90 days of an ED presentation (Alberta Vital Statistics).

Statistical Analysis

All ED presentations with a non-missing end date before March 31, 2011 that concluded in discharge were selected for inclusion (<4% had missing end dates). Only one presentation per individual was randomly selected for those with repeated ED presentations, forming a discharged subset.

Analyses were performed in R (33) and SAS (34). Data were summarised by sex (e.g., frequencies, mean). Follow-up visits were summarised by physician specialty, facility type, and diagnosis within 30 and 90 days of the ED visit. Deaths within 30 and 90 days of ED discharge were described by sex and cause of death. Chi-square tests were used to assess sex differences. A p-value (P) <0.05 was considered statistically significant.

Kaplan-Meier estimates provide the median times to first physician follow-up. Cox proportional hazard models for time to follow-up and logistic regression models for odds of ED asthma returns within 30 days of discharge were fit to compare sexes (i.e., 1 = ED return for asthma within 30 days of discharge, 0 = no ED return for asthma within 30 days of discharge). Hazard ratios (HRs) and odds ratios (ORs) with corresponding 95% confidence intervals (CIs) were reported. A pediatric indicator (1 = pediatric, 0 = adult) was included to allow the coefficient of sex to be different for pediatrics and adults. Basic models with a sex $\times$ pediatric indicator were constructed to provide unadjusted HRs (uHRs) and ORs (uORs). Multivariable models were

explored and interactions removed if not statistically significant at the 0.05 level. The predictor variables considered for the multivariable models were age, SES proxy, health area, prior asthma claim, and comorbidity indicator (main effects). Interactions of these variables with sex alone and with sex and pediatric indicator were considered in separate models and the highest order interaction terms with $P < 0.2$ were entered into the multivariable model. Interactions were removed one at a time if $P > 0.05$. Fiscal year was also added to the model to capture any trend over time. Main effects were retained regardless of statistical significance. Similarly, lower order interactions were retained if a higher order interaction was statistically significant. Adjusted HRs (aHRs) and ORs (aORs) were reported for 10-year age differences.

RESULTS

Patient characteristics

There were 295,799 ED presentations made for asthma during the 12 years (1.8% of all ED presentations for patients aged 2 to 55 years; 50.1% female), representing presentations by 128,220 individual patients (50.0% female). The majority of presentations ended in discharge (91.8%). The discharged subset, the cohort for the current analyses, had 115,853 patients/ED presentations comprised of 54,833 pediatric and 61,020 adult patients (40.4% girls vs. 59.6% boys; 59.1% women vs. 40.9% men; Table 1). Median ages at ED presentation for females and males were 8.0 and 7.0 years for the pediatric group, and 33.0 and 31.0 for adults, respectively. Approximately 25% of women, girls, and boys were from the subsidised group whereas 18% of men were subsidised. There were 45,983 (39.7%) patients (40.7% girls, 37.8% women) with a prior physician claim for asthma in the previous 365 days.

Follow-up visits with physicians and specialists

Among the 54,833 discharged pediatric patients, 27,580 (50.3%) had at least one follow-up visit within 30 days after discharge (51.4% girls vs. 49.5% boys; $P < 0.001$) and 39,648 (72.3%) had at least one follow-up visit within 90 days (73.5% girls vs. 71.5% boys; $P < 0.001$). For the 61,020 discharged adult patients, 33,979 (55.7%) had at least one follow-up visit within 30 days after discharge (62.9% women vs. 45.3% men; $P < 0.001$) and 46,774 (76.7%) had at least one follow-up visit within 90 days (83.7% women vs. 66.5% men; $P < 0.001$). Within 30 days, there were 58,527 follow-up physician visits in the pediatric group, with 1,838 (3.1%) of these visits to specialists, of which 741 (40.3%) were made by females (Table 2). For the adult group, there were 104,004 follow-up physician visits within 30 days, and 10,017 (9.6%) were made to specialists, of which 6,433 (64.2%) were made by females (Table 2). Girls and boys had similar follow-up visits to a specialist at 30 and 90 days (30 day: 3.0% girls vs. 2.4% boys; $P = 0.841$; 90 day: 3.2% vs. 3.0% boys; $P = 0.481$). Women had slightly fewer follow-up visits to a specialist than men both at 30 and 90 days post ED discharge (30 day: 9.1% women vs. 10.8% men; $P = 0.023$; 90 day 8.5% women vs. 10.6% men; $P < 0.001$).

Girls had statistically shorter estimated median times to first follow-up physician visit than boys (28 d, 95%CI: 27--29, $n = 22,131$ vs. 31 d, 95%CI: 30--32, $n = 32,702$; $P < 0.001$), however, the clinical significance of a 3-day difference to patients or clinicians is unclear. Conversely, women had an estimated median time to first follow-up visit that was 24 days shorter than men (16 d, 95%CI: 16--17, $n = 36,037$ vs. 40 d, 95%CI: 38--41, $n = 24,983$; $P < 0.001$). The uHRs were 1.05 (95%CI: 1.03-1.07) and 1.62 (95%CI: 1.59-1.64) for the pediatric and adult groups, respectively.

When adjusted by other variables (e-Table 1), interactions were present with sex. Interactions were present between sex and age ($P < 0.001$), SES proxy ($P = 0.001$), health area ($P < 0.001$), prior asthma claim ($P < 0.001$), and comorbidity indicator ($P = 0.022$) by age group. Non-subsidised girls aged 5 years, with or without prior asthma claims, had shorter times to the first follow-up in all health areas than boys, and longer times for those girls who were subsidised, without a prior claim, and aged 15 (Figure 1). Women had shorter times to first follow-up than men (Figure 2).

ED returns

Of the 115,853 patients discharged from ED, 15,164 (26.1%) females and 15,289 (26.5%) males had at least one asthma ED return between discharge and the study end, with 5.1% patients (total 5,891; 3,166 [53.7%] females) returning to the ED for asthma within 30 days of discharge. Girls had a slightly lower ED return rate than boys (6,068 [27.4%] vs. 9,423 [28.8%]; $P < 0.001$) whereas women had slightly higher ED return rates than men (9,096 [25.2%] vs. 5,866 [23.5%]; $P < 0.001$).

Women were more likely to return to the ED for asthma at 30 days than men (uOR = 1.26, 95%CI: 1.17-1.36) whereas no evidence of a statistically significant difference between girls and boys was found (uOR = 1.00, 95%CI: 0.92-1.08). When adjusted by other variables (e-Table 2), interactions were present between sex and age ($P = 0.029$), SES proxy ($P = 0.039$), and prior claim by pediatric indicator ($P = 0.033$). Older, non-subsidised girls without a prior claim were more likely to return to the ED than boys (aOR = 1.12, 95%CI: 1.02-1.23, Figure 3). Women

who were older and non-subsidised were more likely to return to the ED than men with those characteristics (Figure 4).

Deaths

There were 39 deaths (21 [53.8%] females) within 30 days of ED discharge, and 89 deaths (45 [50.6%] females) within 90 days of the discharge. No evidence of a difference in deaths between females and males was found at 30 days and 90 days after ED discharge for either the pediatric or adult group. Asthma was reported as the cause of death for few adults and no evidence of a statistically significant difference was found between the sexes.

DISCUSSION

This study examined acute asthma presentations to the ED by sex using a large population-based cohort from linked administrative health databases. Overall, more boys (59.6%) and women (59.1%) were discharged from the ED; a result that illustrates the age- and sex-related shift where the prevalence of asthma in childhood is significantly higher in boys than girls, and the reversal of the sex ratio after puberty (35-38). Explanations for this crossover in the literature include age- and sex-related changes in hormone levels (39, 40) and airway size (41).

We found that follow-up physician visits after ED discharge were more frequent in women compared to men, with time to first physician follow-up being shorter for girls and women compared to their male counterparts. The high use of health services by asthmatic women has also been observed in non-urgent asthma (42); women tend to visit general practitioners more frequently than men (12, 37) and are five times more likely to use oral steroids (43). It is unknown whether imbalances in follow-up physician care after an ED presentation are related to

differences in the progression or severity of asthma symptoms, or in patterns of health-seeking behavior (37). In contrast, while women had fewer specialist visits after ED discharge than men, boys and girls did not differ in their follow-up specialist visits. This latter result is consistent with some other findings (20); however, a noteworthy finding from this study was the longer times to follow-up outpatient care among teenage girls who were subsidised.

Girls with asthma in this study had a lower rate of ED returns than boys; a finding that agrees with reports that describe ED use for asthma exacerbations being up to three times more likely for boys than girls (44). Our results contrast with those of Schatz et al. (22), in which there were no significant differences between boys and girls in the total rate of asthma relapses within 48 hours of ED discharge; however, they acknowledged their study was not population-based and had evidence of selection bias and therefore, their results may not be generalizable.

Women in our study had higher ED return rates at 30 days than men and that finding agreed with results of a recent systematic review of ED relapse for adult patients with acute asthma at 28 days (18). Female sex has been described as a factor associated with asthma relapses, as have prior ED visits and admissions for asthma and recent treatment, particularly with oral corticosteroids (45, 46). No evidence of a statistically significant difference between girls and boys in the ED revisit rates for asthma was found.

Finally males typically have a higher mortality than females when considering all causes of death (47), but sex differences were not significant at 30 and 90 days after ED discharge in our study. No sex differences were found when asthma was reported as the cause of death; a result that is consistent with other reports in the literature (48).

Our results showed that women tend to have more ED returns, and that girls and women have shorter times to physician follow-up after discharge. These findings may indicate a greater severity in asthma symptoms and disease course compared to men. However, the potential role of other factors to account for these differences should be considered. For example, evidence from behavioural and social studies indicate that women are more likely to feel bodily discomfort than men and therefore, for the same degree of bronchial obstruction, they would exhibit more symptoms and asthma complaints (49). Because men would likely have a lower sensitivity to symptoms of bronchospasm, they may present later in the course of an asthma exacerbation. A blunted response to traditional anti-inflammatory treatments (e.g., systemic and inhaled corticosteroids) after discharge may also play a role in these findings. On the other hand, differences in health-seeking behavior between men and women can in turn influence the decision of seeking ED or non-ED care and further contribute to the sex differences in health care utilization patterns for asthma. While a myriad of other factors have been identified, their importance remains to be elucidated (50).

Certain study limitations should be noted. The use of administrative health data for the identification of asthma cases is not exempt from a degree of misclassification bias. The databases do not capture all acute asthma visits to the health care system, nor the “true” incidence of disease. Clinical information such as measurement of airflow obstruction (e.g., peak expiratory flow, forced expiratory volume in 1 second) and investigations (e.g., blood gasses, electrolytes, complete blood counts, and chest radiographs) are not recorded in these databases. In addition, Indigenous status in this study only denotes those with “treaty” status through registration with Health Canada, thus non-Registered First Nations and Métis were not considered for the SES

definition. Moreover, the clinical treatment received in the EDs across Alberta is likely to vary considerably, and this could impact these findings. Despite these limitations, the use of population-based databases provides a comprehensive analysis of sex differences that would be infeasible otherwise.

CONCLUSIONS

Sex differences in outcomes following ED discharge for an asthma exacerbation suggest the need to assess ED and primary care strategies for females with acute asthma. While the underlying cause for the sex differences in asthma is not well understood, it is an area of intense research. Until more is known, identifying these differences and informing patients about these disparities are important steps in understanding the influence of sex on health behaviours and outcomes.

DECLARATION OF INTEREST STATEMENT

In the past 3 years, Dr. Rowe has been involved in primary research funded by Merck and, CEMPR, and GlaxoSmithKline (GSK). He is not a member of any speaker's bureau or a paid consultant for any of these partners. The other authors declare no conflicts of interest.

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views of the Government of Alberta. Neither the government nor Alberta Health expresses any opinion in relation to this study.

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Table 1: Characteristics of Patients by Sex and Age Group

	Pediatric		Adult	
	Female	Male	Female	Male
Number, n (%)	22,131 (40.4)	32,702 (59.6)	36,037 (59.1)	24,983 (40.9)
Age at ED presentation (years)				
Mean (SD)	8.5 (4.9)	7.5 (4.4)	33.6 (10.7)	32.5 (10.4)
Median (1 st Qu, 3 rd Qu)	8 (4.0, 13.0)	7.0 (4.0, 11.0)	33.0 (24.0, 43.0)	31.0 (23.0, 41.0)
Socio-economic proxy at fiscal year end, n (%)				
Subsidised	5,664 (25.6)	7,743 (23.7)	9,770 (27.1)	4,571 (18.3)
Non-subsidised	16,466 (74.4)	24,958 (76.3)	26,267 (72.9)	20,411 (81.7)
Unknown	1 (0.0)	1 (0.0)	0 (0.0)	1 (0.0)
Zone of residence at fiscal year end, n (%)				
North	4,445 (20.1)	6,180 (18.9)	8,193 (22.7)	5,294 (21.2)
Edmonton	5,613 (25.4)	8,617 (26.4)	10,629 (29.5)	7,555 (30.2)
Central	3,970 (17.9)	5,436 (16.6)	6,705 (18.6)	4,442 (17.8)
Calgary	5,977 (27.0)	9,286 (28.4)	7,072 (19.6)	5,212 (20.9)
South	2,122 (9.6)	3,180 (9.7)	3,432 (9.5)	2,475 (9.9)
Missing	4 (0.0)	3 (0.0)	6 (0.0)	5 (0.0)
Deyo-Charlson Comorbidity Index				
Mean (SD)	NA	NA	0.5 (0.7)	0.5 (0.7)
Median (1 st Qu, 3 rd Qu)	NA	NA	0.0 (0.0,1.0)	0.0 (0.0,1.0)
Comorbidities, n (%)				
Congestive Heart	9 (0.0)	17 (0.1)	152 (0.4)	102 (0.5)
Failure				
Cerebrovascular	34 (0.2)	41 (0.1)	156 (0.4)	95 (0.4)
Disease				
Diabetes	65 (0.3)	88 (0.3)	1,196 (3.5)	589 (2.6)
Renal Failure	17 (0.1)	31 (0.1)	124 (0.4)	78 (0.4)
Lymphoma/Cancer	213 (1.0)	292 (0.9)	625 (1.7)	285 (1.1)
Rheumatoid Arthritis	24 (0.1)	26 (0.1)	438 (1.2)	120 (0.5)
Peptic Ulcer Disease	49 (0.2)	55 (0.2)	380 (1.1)	206 (0.8)
Prior Physician Claim for Asthma, n (%)				
Yes	9,000 (40.7)	14,413 (44.1)	13,608 (37.8)	8,962 (35.9)
No	13,131 (59.3)	18,289 (55.9)	22,429 (62.2)	16,021 (64.1)

n = count; NA = not applicable; Qu = quartile; SD = standard deviation;

Table 2: Characteristics of Follow-up Visits by Sex and Age Group

Days Since ED Discharge								
	Pediatric n (%)				Adult n (%)			
	30		90		30		90	
	F	M	F	M	F	M	F	M
Total Follow-up Visits	24,328	34,199	55,350	75,454	70,895	33,109	179,530	78,018
Specialty								
Respiratory or Internal	741 (3.0)	1,097 (3.2)	1,747 (3.2)	2,269 (3.0)	6,433 (9.1)	3,584 (10.8)	15,263 (8.5)	8,288 (10.6)
Medicine								
General	14,853 (61.1)	19,502 (57.0)	33,602 (60.7)	42,245 (56.0)	45,638 (64.4)	20,049 (60.6)	111,878 (62.3)	45,881 (58.8)
Practitioner								
Pediatrician	5,179 (21.3)	8,700 (25.4)	10,990 (19.9)	18,436 (24.4)	213 (0.3)	109 (0.3)	589 (0.3)	262 (0.3)
Other	3,555 (14.6)	4,900 (14.3)	9,011 (16.3)	12,504 (16.6)	18,611 (26.3)	9,367 (28.3)	51,800 (28.9)	23,587 (30.2)
Facility Type								
Active	7,776 (32.0)	10,599 (31.0)	17,487 (31.6)	23,675 (31.4)	24,295 (34.3)	13,697 (41.4)	60,913 (33.9)	31,233 (40.0)
Treatment Hospital								
Practitioner's Office	15,937 (65.5)	22,833 (66.8)	36,332 (65.6)	50,021 (66.3)	42,593 (60.1)	17,752 (53.6)	107,826 (60.1)	42,763 (54.8)
Other	615 (2.5)	767 (2.2)	1,531 (2.8)	1,758 (2.3)	4,007 (5.6)	1,660 (5.0)	10,791 (6.0)	4,022 (5.2)
Diagnosis								
Asthma	7,564 (31.1)	12,089 (35.3)	13,706 (24.8)	21,557 (28.6)	13,018 (18.4)	6,750 (20.4)	22,402 (12.5)	12,824 (16.4)
COPD	NA	NA	NA	NA	1,747 (2.5)	930 (2.8)	3,026 (1.7)	1,811 (2.3)
Pneumonia and Influenza	934 (3.8)	1,253 (3.7)	1,492 (2.7)	1,906 (2.5)	1,917 (2.7)	1,149 (3.5)	2,847 (1.6)	1,878 (2.4)
Other	15,472 (63.6)	20,383 (59.6)	39,509 (71.4)	51,213 (67.9)	54,213 (76.5)	24,280 (73.3)	151,255 (84.3)	61,505 (78.8)

F = female; M = male; n = count; NA = not applicable; Qu = quartile; SD = standard deviation;

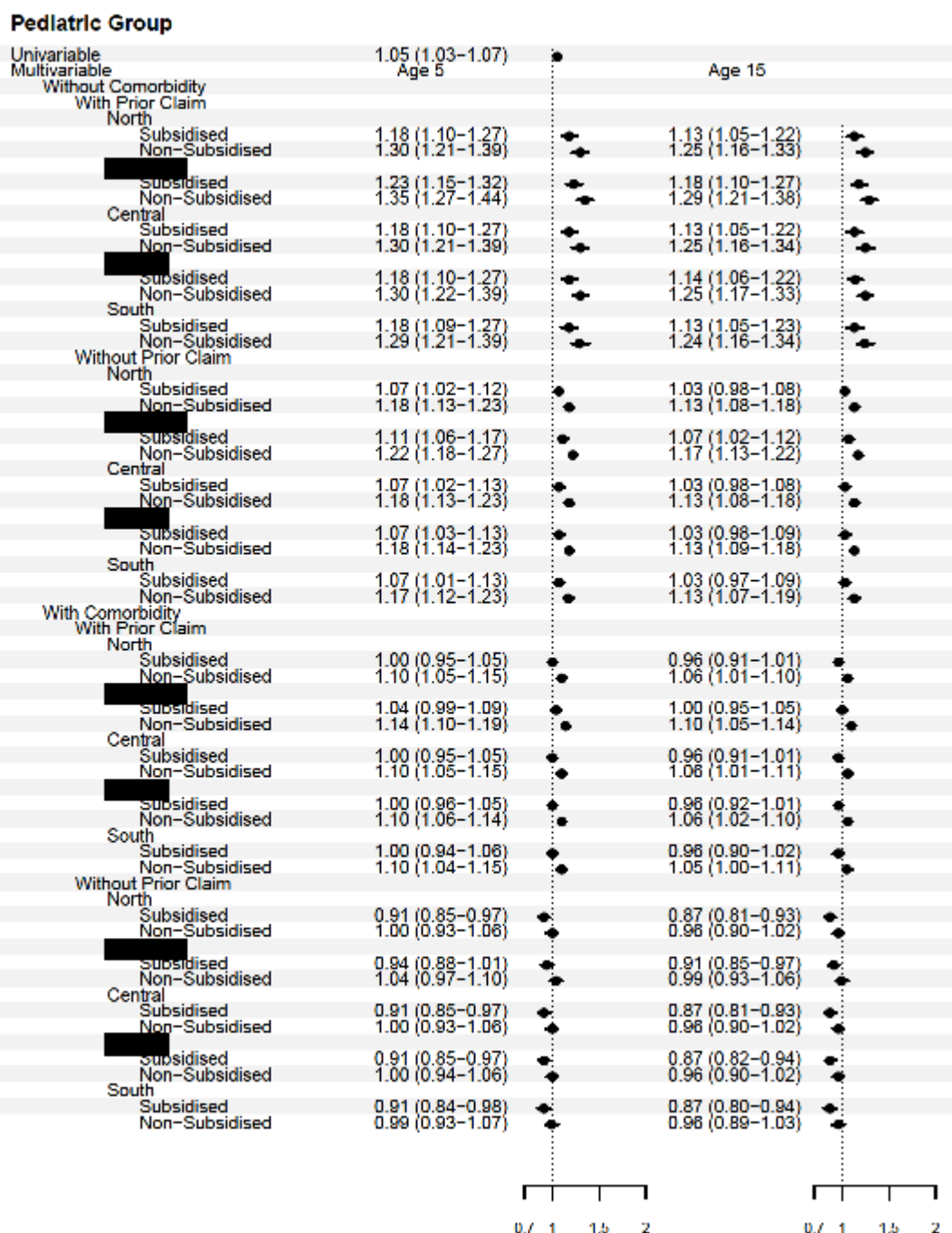


Figure 1: Hazard Ratios (HRs) and 95% Confidence Intervals (CIs) for the Time to First Follow-up Visit for the Pediatric Group (Univariable denotes the model with sex only.)

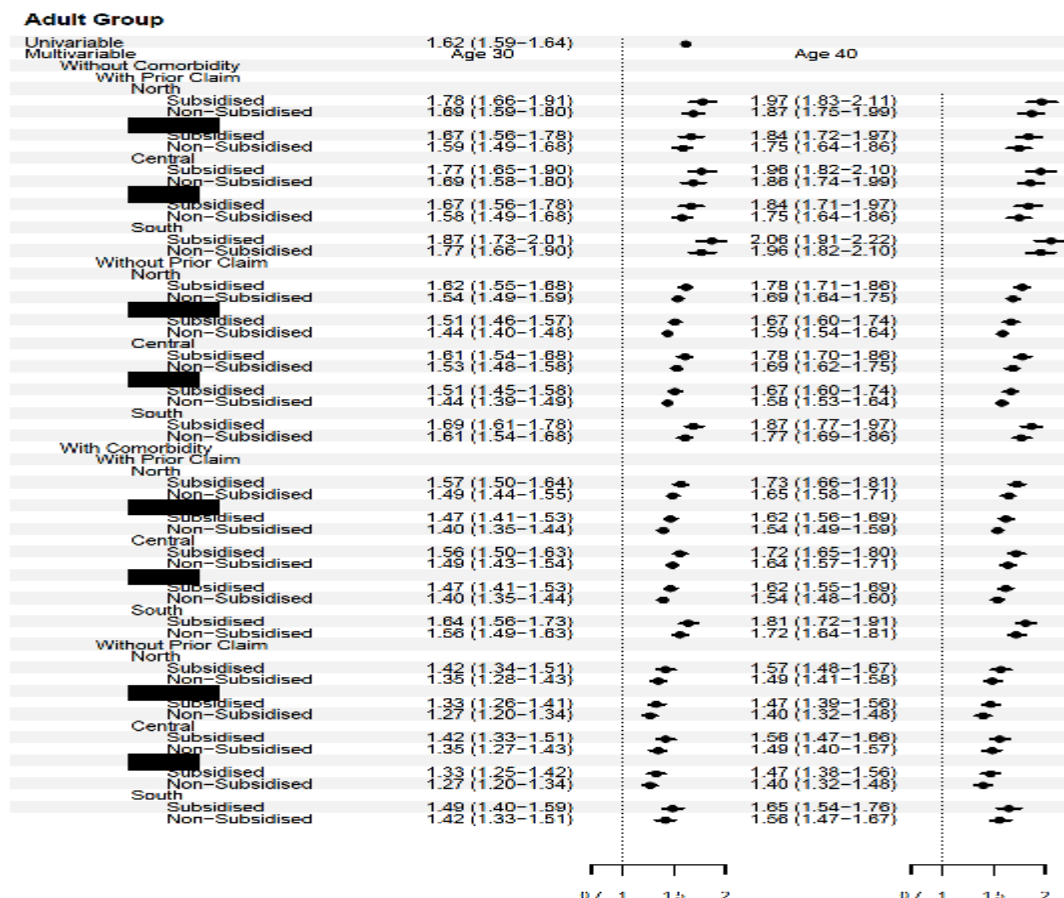


Figure 2: Hazard Ratios (HRs) and 95% Confidence Intervals (CIs) for the Time to First Follow-up Visit for the Adult Group (Univariable denotes the model with sex only.)

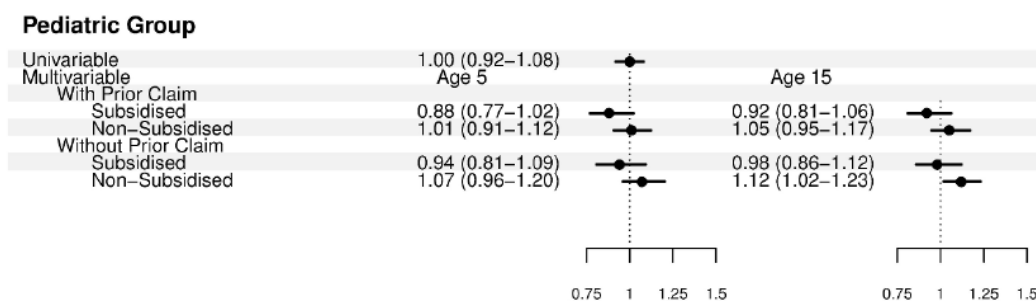


Figure 3: Odds Ratios (ORs) and 95% Confidence Intervals (CIs) for Return to the ED at 30 Days for the Pediatric Group (Univariable denotes the model with sex only.)

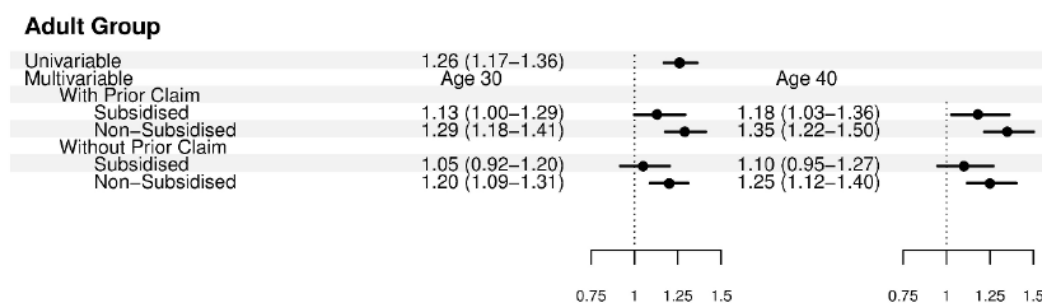


Figure 4: Odds Ratios (ORs) and 95% Confidence Intervals (CIs) for Return to the ED at 30 Days for the Adult Group (Univariable denotes the model with sex only.)