

THE EMERGENCY DEPARTMENT COMPASS:

Children's Mental Health



The Emergency Department Compass: Children's Mental Health

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Disclaimer

This study is based in part on data provided by Alberta Health and Wellness. The interpretation and conclusions contained herein are those of the researchers and do not necessarily represent the views of the Government of Alberta. Neither the Government nor Alberta Health and Wellness express any opinion in relation to this study.

EXECUTIVE SUMMARY

From April 2002 to March 2007, the yearly number of Albertans (< 18 years of age) who visited the Emergency Department (ED) for any reason remained stable (232,078 in 2002/03 to 232,051 in 2007/08).

During this time frame, there were 30,656 ED visits for mental health reasons made by 20,956 distinct children and youth, with an average of 1.5 visits per child/youth. The majority of children/youth (75.2%) had only one visit during the six year period; however, 24.8% of children/youth had multiple mental health-related ED visits. More females than males presented for emergency mental health care. When groups based on an approximate measure for socio-economic status were examined, children and youth without social assistance (Registrant without Subsidy recipients) had lower ED mental health visit rates than those children and youth receiving some form of social assistance. The numbers of ED mental health visits varied by region. The absolute numbers of ED visits for mental health have increased while the rates standardized by population have remained relatively stable over the 6 year study period.

The peak months for mental health ED visits were generally May, while the fewest ED mental health visits were observed in July and August. Visits showed a large peak around 1:00 A.M., and this pattern was quite consistent across all fiscal years. The median length of time spent in the ED was about 3 hours. Admitted children/youth spent more time in the ED (median 3h 33m) than discharged children/youth (median 2h 53m). The large urban areas of the Capital Health and Calgary Health regions had ED visits with longer lengths of stay than other health regions in Alberta.

For children and youth discharged from the ED during a one year period (3,438; October 1, 2006 to September 30, 2007), numerous follow-up visits in non-ED settings at different intervals occurred. Of the 3,438 children/youth, 2,566 (74.6%) had at least one follow-up visit within six months. Of these 2,566 children/youth, 819 (31.9%) had at least one follow-up visit within 7 days following the ED visit. Within 7 days of the end of the ED visit, 2,094 follow-up visits were recorded of which 70.2% were mental health-related. The majority of follow-up visits occurred in active treatment hospitals, and psychiatrists were the most common physician group visited.

Further study of the above mentioned trends is required in order to understand the factors associated with variation in the numbers of children and youth who seek ED and post-ED care for mental health reasons. The impressive findings are an overall increase in the number of presentations over the six year study period, relatively stable rates of presentation, and disparities based on age, gender, region, and socio-economic/cultural status. Better understanding these presentations can assist policy-makers in addressing specific groups for targeted programs to reduce the number of mental health crises in children and youth that require emergency care.

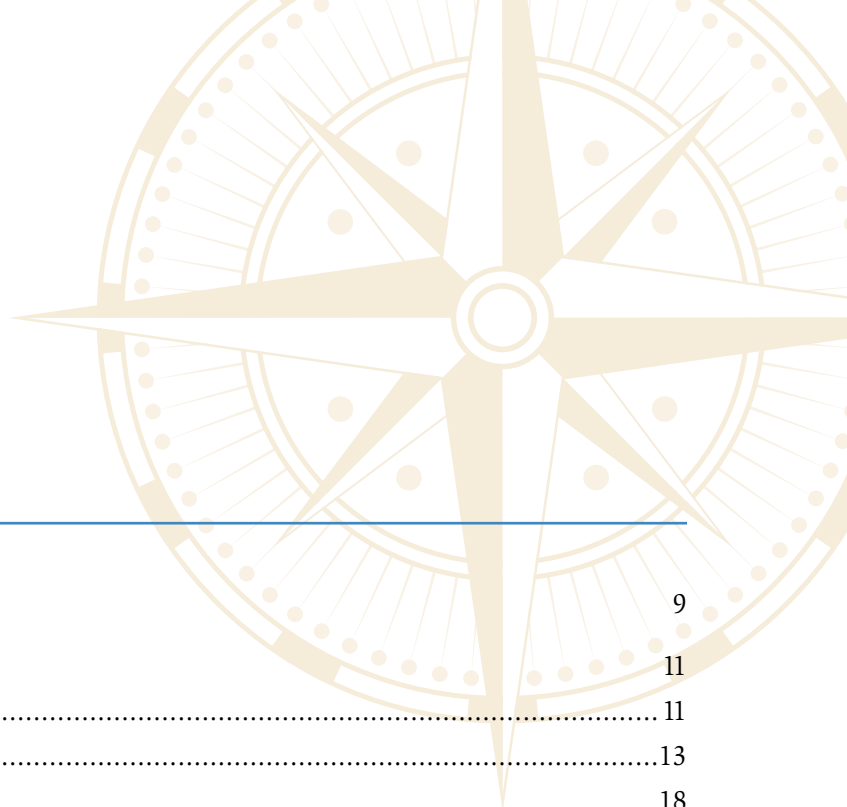


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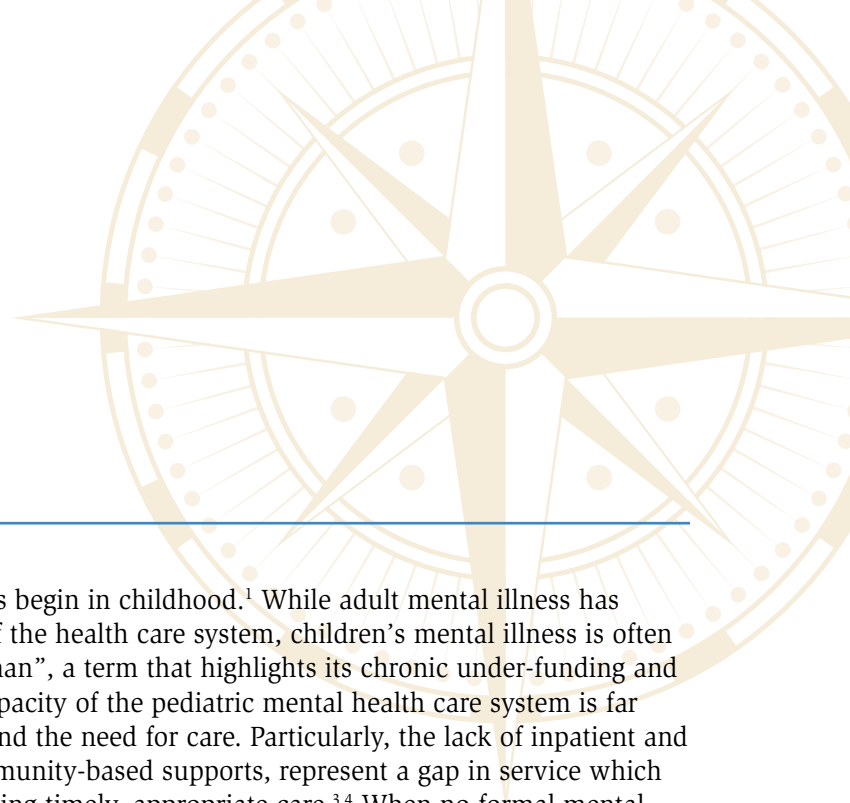
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List of Commonly Used Abbreviations

A	Aboriginal socio-economic proxy
ACCS	Ambulatory Care Classification System
AHCIP	Alberta Health Care Insurance Plan
AHS	Alberta Health Services
ATH	Active treatment hospital, including active treatment clinic
CC	Critical care
CI	Confidence interval
DSVR	Directly standardized visit rate
ED	Emergency Department
F	Female
GP	General/Family Practitioner
ICD	The International Classification of Diseases
ICD-10-CA	Canadian Institute for Health Information. The Canadian Enhancement of ICD-10, 2001
ICD-9-CM	International Classification of Diseases, 9th rev., 3rd edn. LA, 1989
IQR	Interquartile range
LAMA	Left against medical advice
LWBS	Left without being seen
M	Male
MHS	Mental health services
OR	Operating room
PED	Pediatrician
POFF	Practitioner's office
pSES	Socio-economic proxy
PSYC	Psychiatrist
R	Registrant without subsidy socio-economic proxy
RHA	Regional Health Authority
S	Government sponsored program socio-economic proxy
SD	Standard deviation
SE	Standard error
sRHA	sub-Regional Health Authority
W	Welfare socio-economic proxy
ys	Years



1 Introduction

Eighty percent of mental illnesses begin in childhood.¹ While adult mental illness has been considered the ‘orphan’ of the health care system, children’s mental illness is often described as the “orphan’s orphan”, a term that highlights its chronic under-funding and limited service options.² The capacity of the pediatric mental health care system is far exceeded by the prevalence of illness and the need for care. Particularly, the lack of inpatient and outpatient treatment options, and community-based supports, represent a gap in service which prevent children and youth from receiving timely, appropriate care.^{3,4} When no formal mental health care is available, children and youth are vulnerable to deterioration in their conditions, and the resulting acute illness can escalate to crises involving aggressive or risk-taking behaviours, acute- life-threatening behaviours, and severe emotional distress.⁵ In times of acute crisis, and with limited options for immediate and unscheduled mental health care, families seek help in emergency departments (EDs).

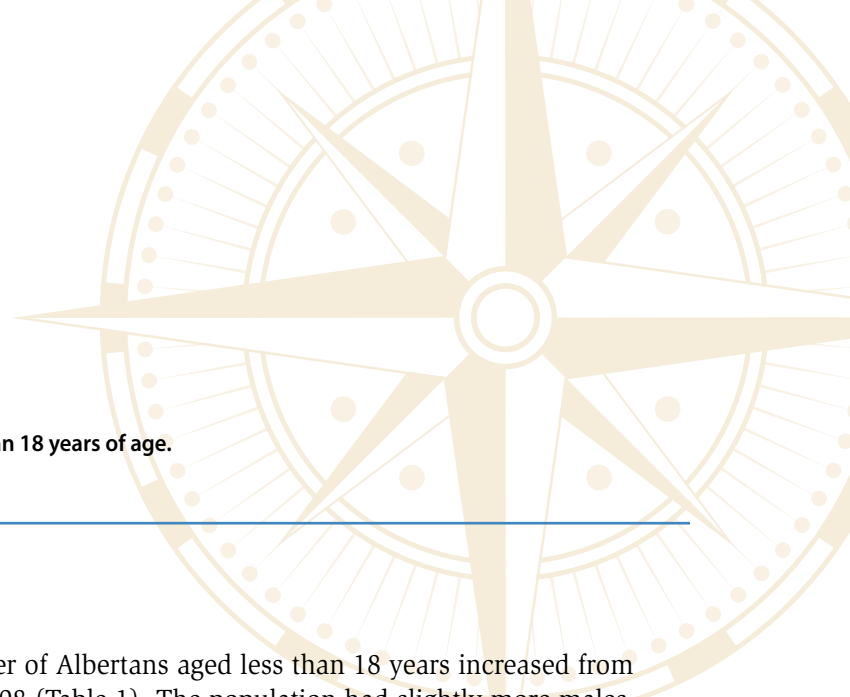
On any given day, EDs are used as a safety net by families hoping to access mental health care.⁶⁻¹¹ Despite the increased use of the ED for mental health care,⁶⁻¹³ there is outstanding critique of the lack of coordinated policies to address urgent child and youth mental health concerns in the ED, particularly in Canada.² If adequate follow-up care is not available, there is increased likelihood that the ED will be sought for additional care. More important, because the incidence of mental illness in children and youth in Alberta is rising proportionately to its increasing population, the severity of the service gap for mental health care will worsen, and the use of the ED for pediatric mental health care may increase.

This report can be used to assist health care planners in recommending policies and allocating resources effectively to accommodate anticipated increases in the prevalence of pediatric mental illnesses. Using province-wide health care data, this report describes the type and severity of mental health problems of children and youth as seen in Alberta EDs and the service outcomes of these children and youth following ED care. This report is based on data obtained during the 2002/03 to 2007/08 fiscal years from the Ambulatory Care Classification System (ACCS).¹⁴ The ED visits are reported from April 1, 2002, through March 31, 2008. Specifically, this report presents the epidemiology of ED visits for mental health across the province of Alberta by:

- Gender and age
- Diagnosis
- Socio-economic group
- Region
- Time and date
- Follow-up visits to physicians after ED care

These data can be used to identify:

- The most prevalent types of acute pediatric mental health conditions seen in the ED
- Differences between child and youth groups (for example, differences between socio-economic groups or gender)
- Health care service utilization trends for acute pediatric mental health conditions
- ED wait times, treatment times, and wait times for physician services following ED care
- Trends in visit rates and follow-up visit rates



2 Results

All results are provided for children/youth aged less than 18 years of age.

Alberta Population

During the reporting period, the number of Albertans aged less than 18 years increased from 774,149 in 2002/03 to 812,491 in 2007/08 (Table 1). The population had slightly more males than females (48.7% females, 51.3% males in 2007/08). In 2007/08, 76.5%, 14.7%, 2.7%, and 6.0% were from the Registrant without Subsidy, Government Sponsored Program, Welfare, and Aboriginal groups, respectively. There were more people in the 10-14 age group from 2002 to 2008 (27.9% for the 10-14 age group compared to 17.9% for the 15-17 age group in 2007/08).

In each Regional Health Authority (RHA), the population stayed stable from 2002 to 2008. The population in the Calgary Health region (R3) was slightly larger than that of the Capital Health region (R6) (35.4% in Calgary and 29.7% in Capital in 2007/08), and both had populations substantially larger than the non-major urban regions. Calgary Health (R3) region had a population near 290,000 and Capital Health region (R6) had a population of about 240,000, as of March 31, 2008. Northern Lights Health region (R9) had the smallest population size (23,915 in 2007/08).

More details on the population can be found in Appendix D.

TABLE 1 Demographic information for Albertans (<18 years of age) by fiscal year. Counts and percentages (%) are provided by sex, age group, socio-economic proxy (pSES) and Regional Health Authority (RHA).

	FISCAL YEAR					
	02/03	03/04	04/05	05/06	06/07	07/08
n	774,149	773,336	774,422	782,725	801,086	812,491
Sex						
Female	377,452 (48.8)	377,012 (48.8)	377,499 (48.7)	381,652 (48.8)	390,383 (48.7)	396,052 (48.7)
Male	396,697 (51.2)	396,324 (51.2)	396,923 (51.3)	401,073 (51.2)	410,703 (51.3)	416,439 (51.3)
Age Group						
00-04	194,911 (25.2)	196,104 (25.4)	198,871 (25.7)	205,785 (26.3)	218,032 (27.2)	228,243 (28.1)
05-09	210,261 (27.2)	208,723 (27.0)	206,883 (26.7)	206,546 (26.4)	209,644 (26.2)	212,480 (26.2)
10-14	230,458 (29.8)	229,393 (29.7)	227,377 (29.4)	226,653 (29.0)	227,270 (28.4)	226,400 (27.9)
15-17	138,519 (17.9)	139,116 (18.0)	141,291 (18.2)	143,741 (18.4)	146,140 (18.2)	145,368 (17.9)
pSES						
Aboriginal	47,491 (6.1)	47,970 (6.2)	48,432 (6.3)	48,761 (6.2)	48,950 (6.1)	49,145 (6.0)
Registrant without Subsidy	611,507 (79.0)	602,473 (77.9)	599,882 (77.5)	608,438 (77.7)	604,884 (75.5)	621,595 (76.5)
Government Sponsored Programs	94,369 (12.2)	101,329 (13.1)	104,709 (13.5)	105,843 (13.5)	127,320 (15.9)	119,744 (14.7)
Welfare	20,782 (2.7)	21,564 (2.8)	21,399 (2.8)	19,683 (2.5)	19,932 (2.5)	22,007 (2.7)
RHA						
R1	40,190 (5.2)	40,090 (5.2)	39,775 (5.1)	39,612 (5.1)	40,484 (5.1)	41,248 (5.1)
R2	24,431 (3.2)	24,490 (3.2)	24,610 (3.2)	24,806 (3.2)	25,356 (3.2)	25,707 (3.2)
R3	265,046 (34.2)	267,352 (34.6)	269,528 (34.8)	275,838 (35.2)	282,728 (35.3)	287,838 (35.4)
R4	75,430 (9.7)	75,146 (9.7)	74,720 (9.6)	75,015 (9.6)	76,391 (9.5)	77,020 (9.5)
R5	27,458 (3.5)	26,804 (3.5)	27,043 (3.5)	26,892 (3.4)	27,531 (3.4)	27,761 (3.4)
R6	231,324 (29.9)	230,518 (29.8)	229,698 (29.7)	231,549 (29.6)	237,679 (29.7)	241,140 (29.7)
R7	50,998 (6.6)	49,288 (6.4)	49,152 (6.3)	48,510 (6.2)	48,713 (6.1)	48,589 (6.0)
R8	37,338 (4.8)	37,306 (4.8)	37,239 (4.8)	37,741 (4.8)	38,753 (4.8)	39,161 (4.8)
R9	21,843 (2.8)	22,230 (2.9)	22,572 (2.9)	22,641 (2.9)	23,305 (2.9)	23,915 (2.9)
Missing	91 (0.0)	112 (0.0)	85 (0.0)	121 (0.0)	146 (0.0)	112 (0.0)

R1=Chinook Regional Health Authority, R2=Palliser Health Region, R3=Calgary Health Region, R4=David Thompson Regional Health Authority, R5=East Central Health, R6=Capital Health, R7=Aspen Regional Health, R8=Peace Country Health, R9=Northern Lights Health Region

ED Visits for Mental Health

General

From 2002 to 2008, the yearly number of visits to the ED for any reason decreased from 419,116 (2002/03) to 400,591 (2007/08) for Albertans less than 18 years of age. On the other hand, mental health-related ED visits increased from 4,865 in 2002/03 to 5,208 in 2007/08, accounting for over 1% of the total visits per year (Table 2) Over all six fiscal years, 30,656 ED visits for

A child/youth <18 years visits an Alberta ED every 103 minutes for a mental health emergency.

mental health were made by 20,956 distinct children/youth, with an average of 1.5 visits per individual (median 1, Interquartile Range (IQR) 1 to 1, max 52). Most children and youth (15,766, 75.2%) had only one mental health-related visit during the six year period, while 24.8% of children and youth had multiple mental health-related visits. For the majority of ED visits (86.9%), the mental health diagnosis was reported as the first diagnosis.

TABLE 2 Number of ED mental health visits and distinct children/youth by diagnosis for each fiscal year and all years.

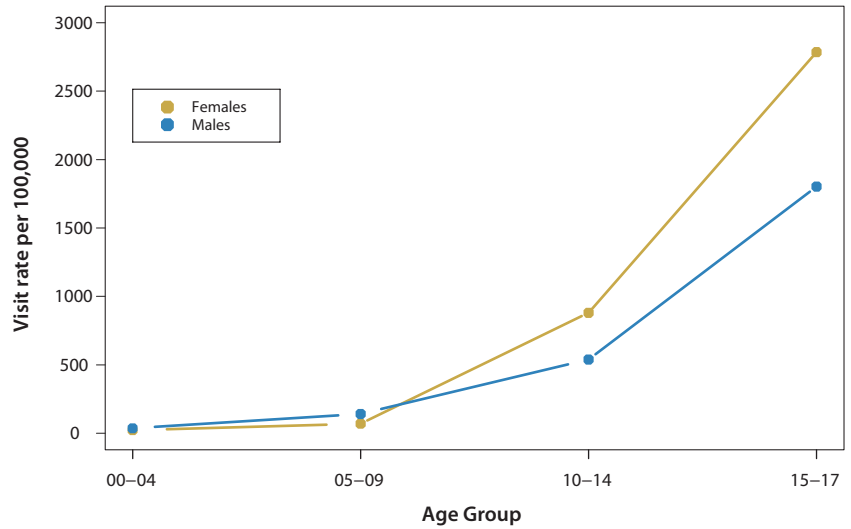
	02/03	03/04	04/05	05/06	06/07	07/08	All
Any Diagnosis (Children/youth <18 years)							
Visits	419,116	434,931	409,423	406,041	395,947	400,591	2,466,049
Children/youth	218,323	222,951	214,990	215,091	214,772	217,496	1,303,623
Mental Health Diagnosis Only (Children/youth <18 years)							
Visits	4,865	4,917	5,105	5,274	5,287	5,208	30,656
Children/youth	3,865	3,902	4,126	4,157	4,176	4,117	20,956

Age and Gender

Of the 30,656 mental health-related ED visits, 62.3% (19,109 visits) were made by youth in the 15 to 17 age group. Visits by females (58.5%) exceeded visits by males (41.5%) overall (17,943 vs. 12,713). While the ED mental health visit rates in the younger age groups were similar for males and females, rates were smaller for males than for females in the older age group. For the 15-17 age group, the rates were 2,784.5 per 100,000 for females and 1,802.8 per 100,000 for males (Figure 1) in 2007/08.

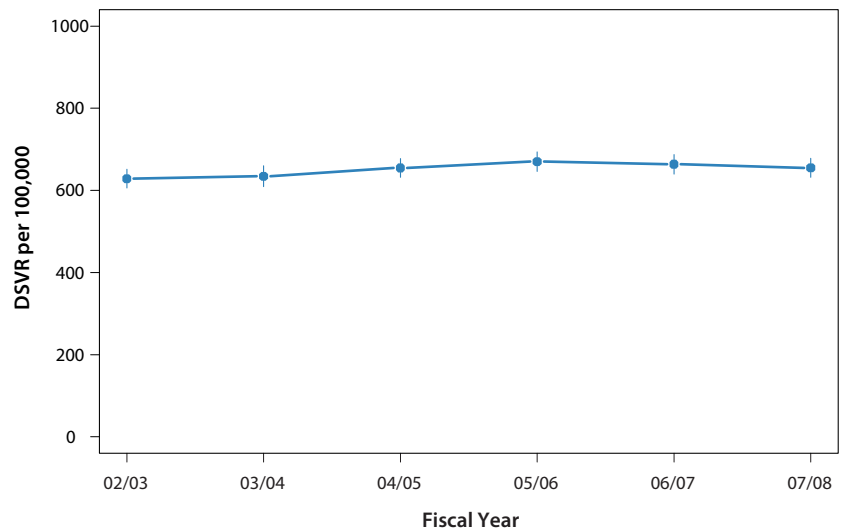
Females aged 15 to 17 were ≈ 2 times more likely to visit the ED for a mental health emergency than males.

FIGURE 1
Age group and gender specific ED mental health visit rates per 100,000 population, 2007/08.



The gender and age group directly standardized visit rates (DSVRs) stayed relatively constant over time, 628.4 per 100,000 in 2002/03 and 654.9 per 100,000 in 2007/08 (Figure 2).

FIGURE 2
Gender and age group directly standardized visit rates (DSVRs) per 100,000 population and 95% confidence intervals for each fiscal year.



Special Populations

Children and youth were grouped *a priori* into four socio-economic proxy (pSES) categories. In 2007/08, the majority of ED mental health visits (57.3%, 2983/5208) were made by children/youth not receiving social assistance (Registrant without Subsidy group) (Table 3). Nearly one fifth of the visits (20.9%) were made by 804 children/youth (19.5%) in the Government Sponsored Program group. The Welfare group represented 7.1% of the ED mental health visits, while the Aboriginal group had 14.7% of the ED mental health visits. In 2007/08, the Aboriginal, Welfare, and Government Sponsored Program groups had disproportionately more ED visits than the general, pediatric ED population (Figure 3). Similar patterns were seen in each of the other years.

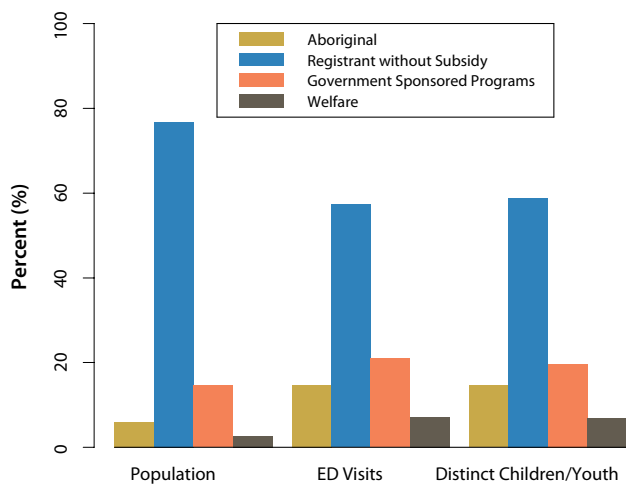
Aboriginal & Welfare groups had **≈ 4 times more** visits for mental health than expected based on population.

TABLE 3 Frequency and percentage (%) of ED mental health visits by pSES for each fiscal year and all years combined.

	02/03		03/04		04/05		05/06		06/07		07/08		All	
ED Visits														
n	4,865		4,917		5,105		5,274		5,287		5,208		30,656	
A	581 (11.9)		627 (12.8)		725 (14.2)		740 (14.0)		791 (15.0)		766 (14.7)		4,230 (13.8)	
R	3,121 (64.2)		3,079 (62.6)		3,174 (62.2)		3,222 (61.1)		3,136 (59.3)		2,983 (57.3)		18,715 (61.0)	
S	830 (17.1)		911 (18.5)		896 (17.6)		996 (18.9)		1,018 (19.3)		1,088 (20.9)		5,739 (18.7)	
W	333 (6.8)		300 (6.1)		310 (6.1)		316 (6.0)		342 (6.5)		371 (7.1)		1,972 (6.4)	

A=Aboriginal, R=Registrant without Subsidy, S=Government Sponsored Programs, W=Welfare

FIGURE 3 Population, ED mental health visits, and distinct children/youth by pSES, 2007/08.

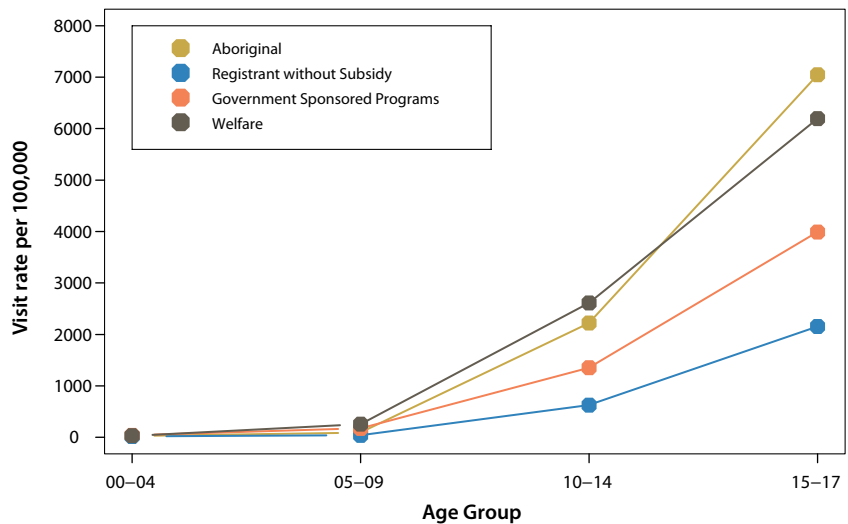


The visit rates per 100,000 population for the different pSES groups varied (Figure 4) by age group and gender. The Registrant without Subsidy and Government Sponsored groups had substantially lower ED visit rates than the other two groups. In 2007/08, the rates were 2,155.5 per 100,000 for females aged 15-17 and 1,323.5 per 100,000 for males aged 15-17 for the Registrant without Subsidy group. In all four groups, the older age group had higher visit rates for males and females than younger age group (age group 15-17: 6,194.2 per 100,000 for females and 4,140.3 per 100,000 for males in the Welfare group and 3,992.0 per 100,000 for females and 2,440.5 per 100,000 for males in the Government Sponsored group).

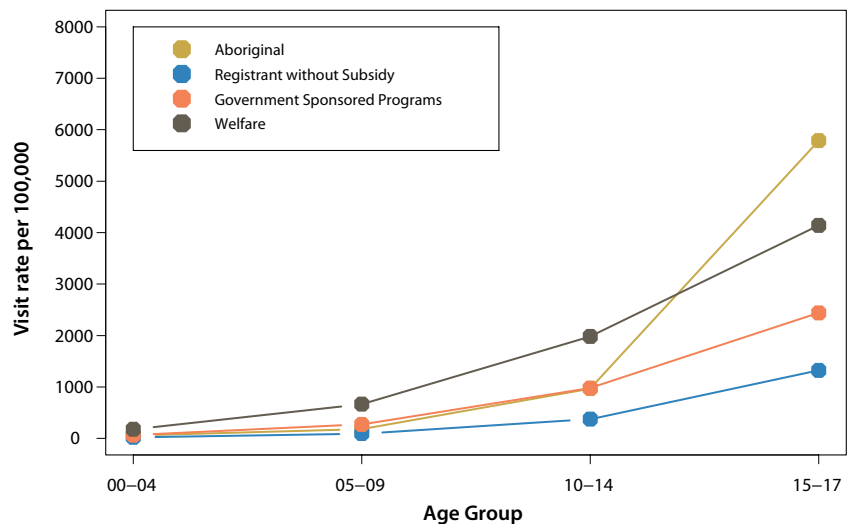
Across all socioeconomic groups, youth aged 15 to 17 years had **higher ED visit rates** for mental health.

FIGURE 4
Age-specific ED mental health visit rates per 100,000 population by pSES, 2007/08.

(a) Females



(b) Males



In 2007/08, Aboriginal and Welfare groups had over 3 times higher adjusted ED visit rates for mental health than the Registrant without Subsidy group.

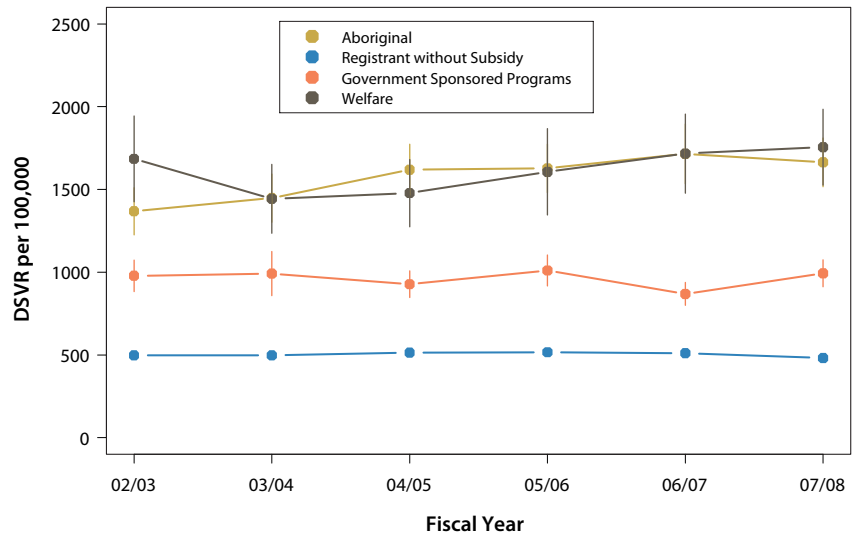
The directly standardized visit rates (DSVRs) also differed considerably (Figure 5) by pSES group for each year ($p < 0.001$ in each year). The DSVRs for the Government Sponsored group were similar over time: 978.1 per 100,000 in 2002/03 and 992.9 per 100,000 in 2007/08. The Registrant without Subsidy group had rates of 497.6 per 100,000 in 2002/03 and 481.4 per 100,000 in 2007/08. Children and youth from the Aboriginal and Welfare groups had the largest DSVRs. The Aboriginal group rates were 1,368.0 per 100,000 in 2002/03 and 1,664.0 per 100,000 in 2007/08. Similarly, the Welfare group rates were 1,684.7 per 100,000 and 1,755.2 per 100,000 in the same years.

No evidence of a statistically significant difference was found between the latter two groups ($p > 0.1$ in each year).

More details on the ED visit demographics can be found in a numerical companion available at www.EDCompass.net.

FIGURE 5

Gender and age group directly standardized visit rates (DSVRs) per 100,000 population by pSES and 95% confidence intervals for each fiscal year.



Triage Level

As the mandatory reporting of triage level has changed over time, the number of records with triage level recorded has increased over time (Table 4, Figure 6). By 2007/08, nearly 1% (40/5208) of ED visits for mental health reportedly required resuscitation, while 17.2%, 42.6%, 23.8%, and 6.6% were classified as emergency, urgent, semi-urgent, and non-urgent, respectively.

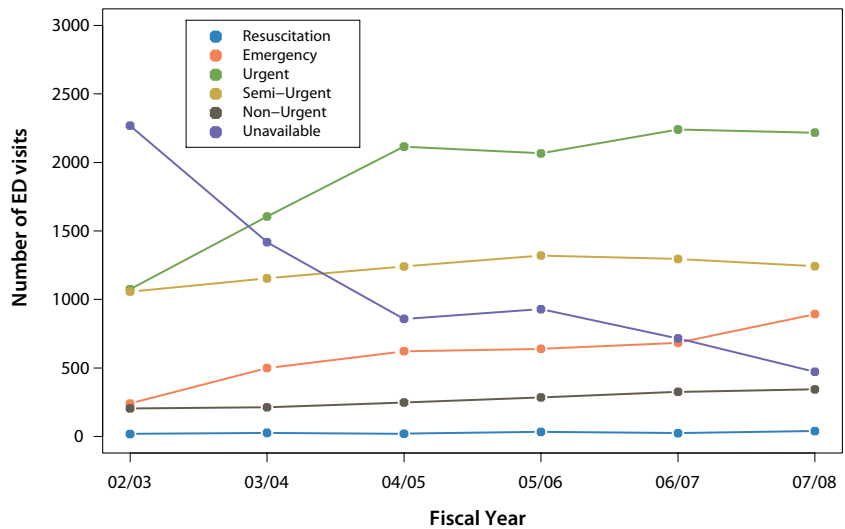
61%
of all ED mental health visits
were triaged as
urgent or semi-urgent.

More details on the ED visit demographics can be found in a numerical companion available at www.EDCompass.net.

TABLE 4 Frequency and percentage (%) of ED mental health visits by triage level for each fiscal year and all years combined.

	02/03	03/04	04/05	05/06	06/07	07/08	All
ED Visits							
n	4,865	4,917	5,105	5,274	5,287	5,208	30,656
Resuscitation	19 (0.4)	27 (0.5)	21 (0.4)	34 (0.6)	25 (0.5)	40 (0.8)	166 (0.5)
Emergency	241 (5.0)	500 (10.2)	622 (12.2)	640 (12.1)	684 (12.9)	893 (17.2)	3,580 (11.7)
Urgent	1,075 (22.1)	1,605 (32.6)	2,115 (41.4)	2,066 (39.2)	2,240 (42.4)	2,217 (42.6)	11,318 (36.9)
Semi-Urgent	1,057 (21.7)	1,154 (23.5)	1,241 (24.3)	1,320 (25.0)	1,296 (24.5)	1,242 (23.8)	7,310 (23.8)
Non-Urgent	205 (4.2)	213 (4.3)	248 (4.9)	285 (5.4)	326 (6.2)	344 (6.6)	1,621 (5.3)
Unavailable	2,268 (46.6)	1,418 (28.8)	858 (16.8)	929 (17.6)	716 (13.5)	472 (9.1)	6,661 (21.7)

FIGURE 6
ED mental health visits by triage level.



Triage and Initial Physician Assessment Timing

Initial physician assessment time was based on the time an ED encounter had the initial assessment from a physician in the ED. The median duration from triage time to ED mental health visit end time was 3h 58m (IQR 2h 20m to 6h 25m, 6,991 ED visits). The median duration from triage time to initial physician assessment time was 1h 34m (IQR 49m to 2h 42m, 2,460 ED visits).

There were no substantial differences in duration from triage time to initial physician assessment time by gender, social-economic proxy groups, or age groups. Longer durations were seen in the most urban regions of Alberta (Calgary R3: median 1h 44m, IQR 55m to 2h 50m, 1,978 ED visits; Capital R6: median 2h 13m, IQR 1h 21m to 3h 52m, 26 ED visits). Note that there were relatively few records in the Capital Health region that had both the triage time and the initial physician assessment time reported.

Shorter durations were seen for the more urgent triage levels (Resuscitation: median 3m, 13 ED visits; Emergency: median 57m, 449 ED visits; Urgent: median 1h 46m, 1,401 ED visits; Semi-

Longer wait times from triage to initial physician assessment were recorded for the Calgary and Capital Health Regions.

Urgent: median 1h 44m, 526 ED visits; Non-Urgent: median 1h 2m, 63 ED visits). ED visits with a diagnosis of adult personality disorders had the longest median duration of 2h 31m (25 ED visits). ED visits resulting in discharge had a median time of 1h 37m (IQR 52m to 2h 41m, 1,932 ED visits).

More details on triage and initial physician assessment timing can be found in a numerical companion available at www.EDCompass.net.

Visit Timing

Time of visit was based on the start date and time of the ED encounter. ED mental health visits showed some variation throughout each year, recording a minimum of 298 ED visits in July 2003 and a maximum of 539 ED visits in May 2006. During the 2007/08 fiscal year, the month with the lowest number of ED visits recorded was August 2007 (349 visits) while the highest number of ED visits occurred in May 2007 (534 visits). From 2002 to 2008, the summer months tended to have fewer visits, while May and November showed more definite peaks (Figure 7).

The volume of ED mental health visits was quite stable over the days of the week. The most visits were observed on Fridays in 2005/06 (815 ED visits, 15.5%), while the fewest visits were on Sundays in 2003/04 (661 ED visits, 13.4%, Figure 8).

After 9am, the volume of visits for mental health increased steadily until 1am.

The hour of the day was missing for 171 (0.6%) of the 30,656 ED visits. Mental health visits were less frequent during the early morning hours. The visit patterns were very similar for different years. In 2007/08, 348 ED visits (i.e., 6.7% of all visits) occurred during 4:00 A.M. to 9:00 A.M., the lowest visit volume. After 9:00 A.M., the volume increased until 1:00 A.M. From 1:00 A.M. onward, the visit numbers declined quickly (Figure 9). When specific health regions were considered, all had similar patterns (Figure 10).

FIGURE 7
ED mental health visits by month for each fiscal year.

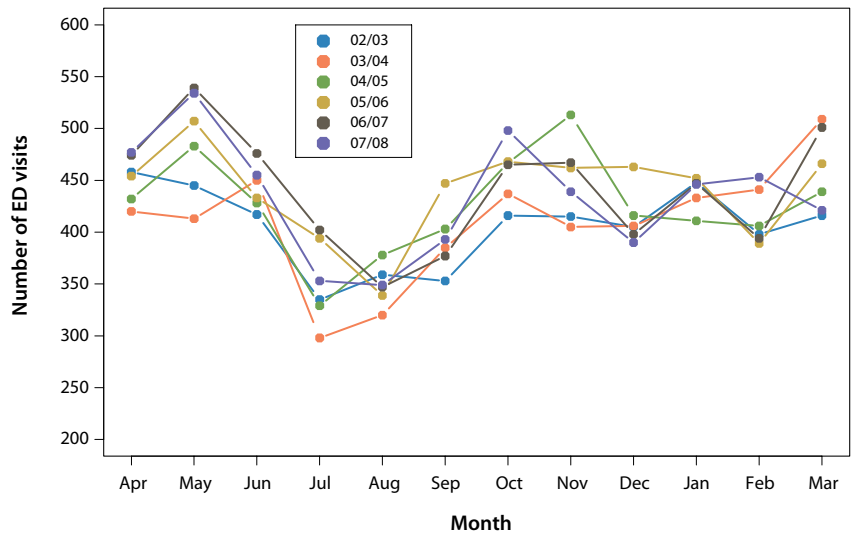


FIGURE 8
ED mental health visits by day of week for each fiscal year.

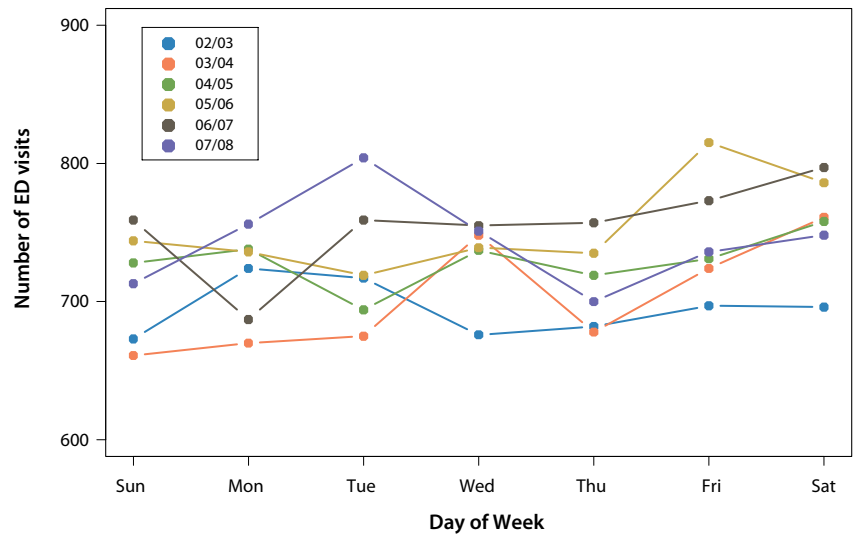
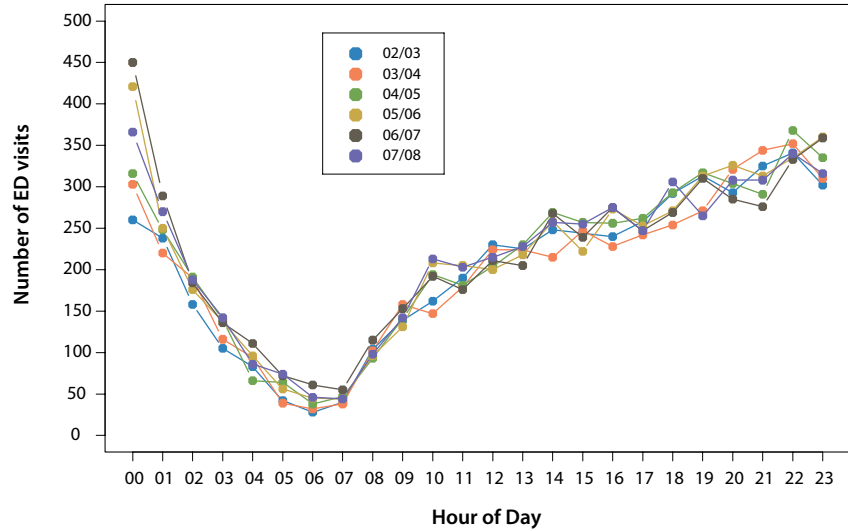


FIGURE 9
ED mental health visits by hour of the day for each fiscal year.

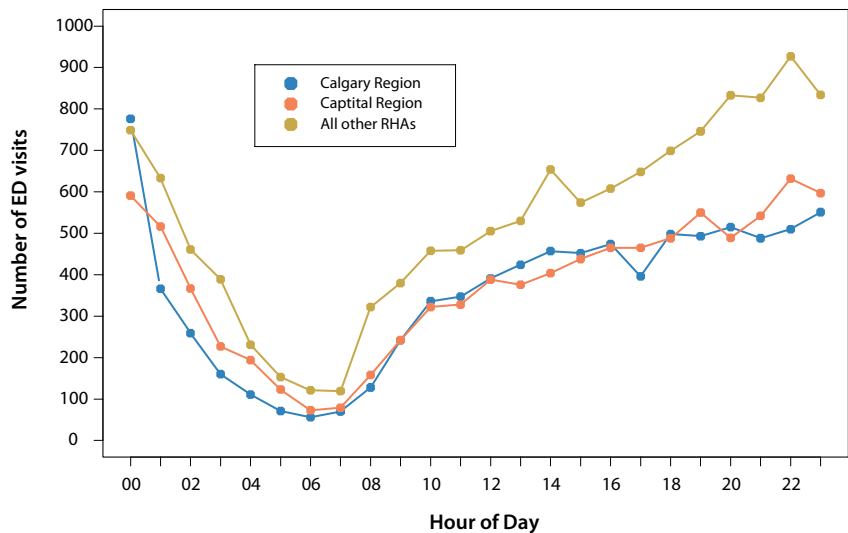


There were 1,076 (3.5%) ED mental health visits that had recorded either the start time and/or the end date/time as missing. Twenty ED visits reportedly had the same start and end time (i.e., 0 duration). Of the remaining 29,560 ED visits, the median time was 2h 58m (IQR 1h 27m to 5h 25m). Discharged children and youth had a median ED visit time of 2h 53m (IQR 1h 25m to 5h 10m, n = 23,904 visits), whereas admitted children and youth had a median ED visit time of 3h 33m (IQR 1h 38m to 6h 36m, n = 4,095 visits).

Duration in the ED differed by region.

The median ED mental health visit times were 3h 25m (IQR 1h 57m to 5h 50m) in Capital Health region (R6, 9,003 ED visits), 4h 5m (IQR 2h 27m to 6h 33m) in the Calgary Health region (R3, 8,207 ED visits), and 1h 57m (IQR 59m to 4h 5m) in all other RHAs Combined (12,348 ED visits).

FIGURE 10
ED mental health visits by hour of the day for selected regions, 2007/08.



For discharged children/youth, the median ED visit times were 3h 22m (IQR 1h 56m to 5h 41m) for the Capital Health region (R6, 7,658 ED visits), 3h 47m (IQR 2h 17m to 5h 54m) for the Calgary Health region (R3, 6,552 visits) and 1h 49m (IQR 0h 56m to 3h 50m) for all other RHAs combined (9,705 ED visits). Admitted children/youth had median times of 4h 11m, 6h 10m and 2h 2m for the Capital Health region (727 ED visits), Calgary Health region (1,253 ED visits), and all other RHAs combined (2,119 ED visits), respectively (Table 5, Figure 11).

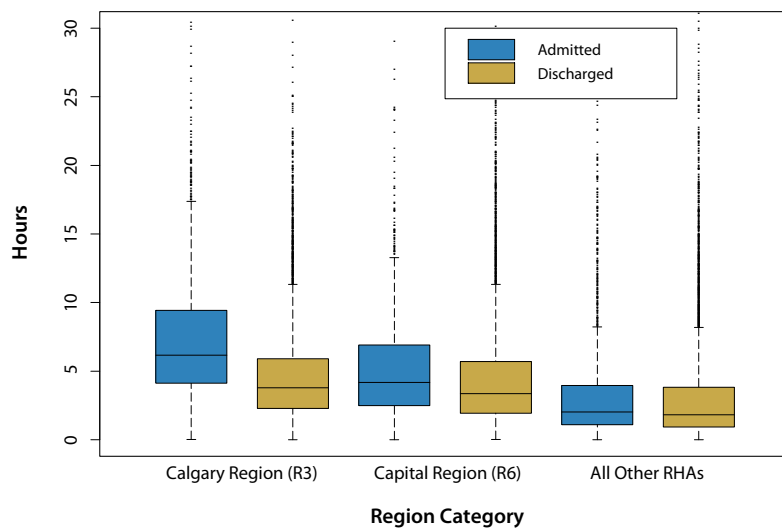
More details on visit timing and duration can be found in a numerical companion available at www.EDCompass.net.

TABLE 5 Duration of ED mental health visits by admission or discharge status for children/youth (<18 years of age). Median (Med), 25th percentile (25th), 75th percentile (75th) are provided.

	Capital (R6)			Calgary (R3)			All Other RHAs		
	Med	25 th	75 th	Med	25 th	75 th	Med	25 th	75 th
Admitted									
Duration time	4h 11m	2h 30m	6h 55m	6h 10m	4h 7m	9h 26m	2h 2m	1h 6m	3h 58m
Discharged									
Duration time	3h 22m	1h 56m	5h 41m	3h 47m	2h 17m	5h 54m	1h 49m	0h 56m	3h 50m

FIGURE 11

Duration of ED mental health visits by admission or discharge status. The lower, middle, and upper boundaries of the boxes are the 25th percentile, median, and the 75th percentile, respectively. The y-axis is truncated at 30 hours.



Outcomes

The vast majority of ED visits resulted in discharge (Table 6, Figure 12). For example, in 2007/08, 4,142 (79.5%) ED visits from 3,482 children/youth resulted in discharge. There were 696 admissions to other areas of the ED facility (13.4% of ED visits) involving 645 children/youth. In addition, 11 ED visits (by 11 children/youth) resulted in admission to critical care areas or operating rooms. Transfer to another facility was the outcome of 139 visits. There were 210 visits with the status of left against medical advice, and 2 visits were coded as expired in ambulatory care service.

14%
of mental health visits resulted
in admission from the ED.

More details on disposition can be found in a numerical companion available at www.EDCompass.net.

FIGURE 12
ED mental health visits resulting in discharge (disposition=1, 2) or admission (disposition=4, 5) for each fiscal year.

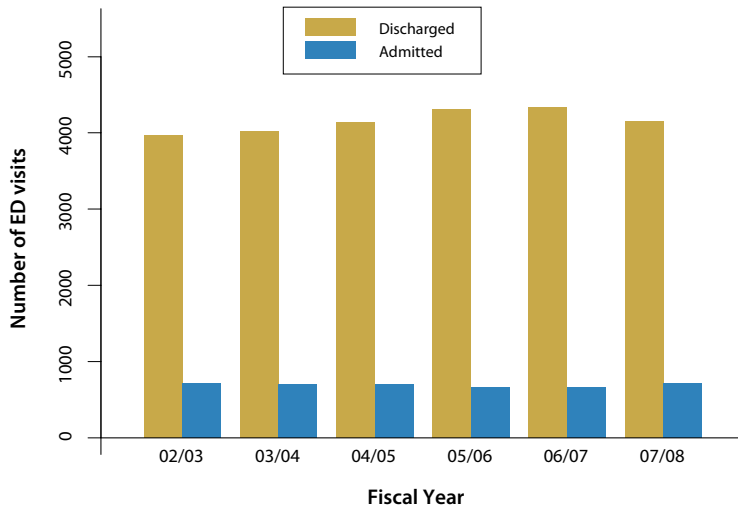


TABLE 6 Frequency and percentage (%) of ED mental health visits by disposition for each fiscal year and all years combined.

	02/03	03/04	04/05	05/06	06/07	07/08	All
n	4,865	4,917	5,105	5,274	5,287	5,208	30,656
Discharged							
1	3,962 (81.4)	4,023 (81.8)	4,134 (81.0)	4,295 (81.4)	4,308 (81.5)	4,142 (79.5)	24,864 (81.1)
2	0 (0.0)	0 (0.0)	0 (0.0)	22 (0.4)	24 (0.5)	6 (0.1)	52 (0.2)
Admitted							
4	23 (0.5)	14 (0.3)	11 (0.2)	16 (0.3)	13 (0.2)	11 (0.2)	88 (0.3)
5	690 (14.2)	691 (14.1)	689 (13.5)	647 (12.3)	653 (12.4)	696 (13.4)	4,066 (13.3)
Transferred							
6	155 (3.2)	155 (3.2)	144 (2.8)	117 (2.2)	107 (2.0)	139 (2.7)	817 (2.7)
Expired							
7,8	- (0.0)	- (0.0)	- (0.0)	- (0.1)	- (0.0)	- (0.0)	13 (0.0)
Left Before Completion of Care							
3	32 (0.7)	32 (0.7)	124 (2.4)	170 (3.2)	172 (3.3)	210 (4.0)	740 (2.4)
9,0	- (0.0)	- (0.0)	- (0.0)	- (0.0)	- (0.2)	- (0.0)	12 (0.0)

1=Discharged, 2=Discharged from program or clinic, 3= Left against medical advice, 4=Admitted to CCU or OR, 5=Admitted to other area of own facility, 6=Transferred to another acute care facility, 7=Expired in ambulatory care service, 8=Dead on arrival to ambulatory care service, 9=Left without being seen, 0=No doctor available

Repeat Visits

Of children and youth with a mental health emergency, the majority visited the ED only once.

The majority of children and youth (75.2%) visited the ED only once for mental health reasons from 2002 to 2008 (Table 7). The remaining children/youth generally visited the ED less than ten times during the six year period. Fewer than 0.4% of children and youth (n = 74) visited the ED more than ten times.

TABLE 7 Frequency and percentage (%) of ED mental health visits per child/youth.

	Number of ED Visits						
	1	2	3	4	5	6-10	>10
Children/youth	15,766 (75.2)	3,203 (15.3)	1,033 (4.9)	442 (2.1)	221 (1.1)	248 (1.2)	74 (0.4)

Regional Variation

At the time the data were collected, Alberta had nine Regional Health Authorities (RHAs) responsible for the delivery of health care services. These nine RHAs were further subdivided into 70 sub-Regional Health Authorities (sRHAs). After 2009 and the creation of Alberta Health Services (AHS), five AHS zones were proposed and have not been finalized at the time of this report. The approximate boundaries of these zones correspond to combinations of the sRHAs. More details of the geographic boundaries can be found in Appendix A.

Of the 30,656 ED mental health visits reporting both sRHA of residence at end of fiscal year and sRHA of facility where ED visit was made, 42.1% (12,907 visits) had the same sRHA for both residence and ED facility. When RHA is examined, 89.4% (27,393 visits) had the same RHA for both residence and ED facility.

Aspen Regional Health had **≈ 2 times higher** adjusted visit rate than Calgary in 2007/08.

The gender and age group directly standardized visit rates (DSVRs) stayed relatively stable for most regions from 2002 to 2008 when the Alberta population from the 2002/03 fiscal year is used as a reference (Table 8, Figure 13). East Central Health region (R5), Capital Health region (R6) and the Calgary Health region (R3) had the lowest DSVRs. These were lower than the overall provincial rate of 654.9 ED visits per 100,000 individuals (< 18 years) in 2007/08 (Figure 14). Most of

the other RHAs had higher DSVRs than the provincial rate. The RHA with the highest rate in 2007/08, Aspen Regional Health region (R7), had about two times the standardized rate of ED visits of the Calgary Health region.

More details on regional variation can be found in a numerical companion available at www.EDCompass.net.

TABLE 8 Gender and age group directly standardized visit rates per 100,000 population by zone and RHA for each fiscal year.

		02/03	03/04	04/05	05/06	06/07	07/08
All Alberta		628.4	634.3	654.6	670.0	663.6	654.9
AHS Zone and Regional Health Authority of Residence							
South	R1 Chinook Regional Health Authority	540.3	568.1	662.5	552.0	690.7	730.6
	R2 Palliser Health Region	582.5	617.9	693.2	725.5	650.6	771.4
Calgary	R3 Calgary Health Region	508.3	496.6	533.1	543.0	560.8	533.7
Central	R4 David Thompson Regional Health Authority	755.5	762.3	777.3	923.3	808.3	809.0
	R5 East Central Health	538.2	792.9	541.7	573.0	596.7	573.1
Edmonton	R6 Capital Health	675.5	699.3	657.6	653.5	604.2	597.9
North	R7 Aspen Regional Health	819.2	757.3	938.8	978.4	1,080.9	1,077.2
	R8 Peace Country Health	844.2	709.9	823.0	916.0	791.6	869.0
	R9 Northern Lights Health Region	623.9	681.0	844.3	722.4	987.7	800.2

FIGURE 13
Gender and age group directly standardized visit rates (DSVRs) per 100,000 population and 95% confidence intervals by RHA for each fiscal year.

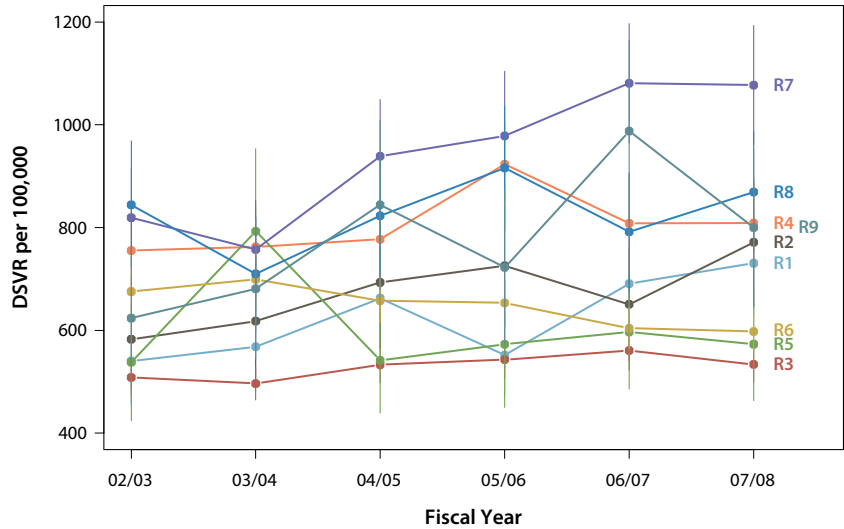
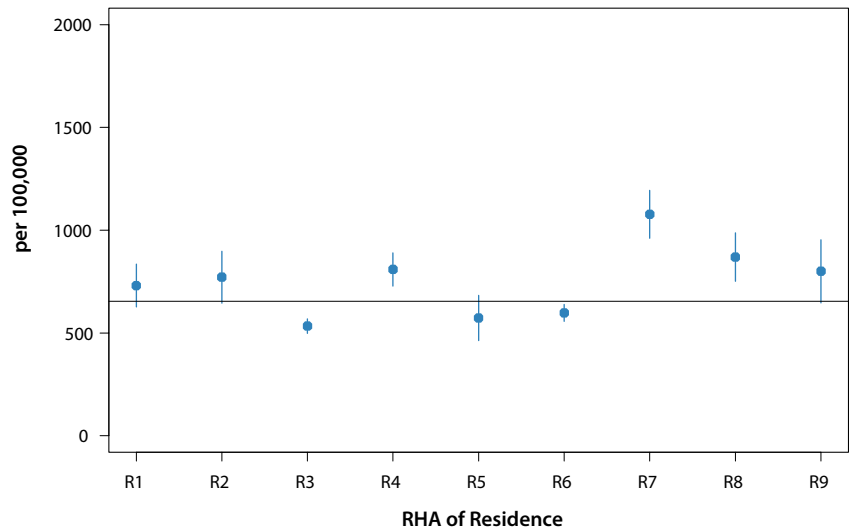


FIGURE 14
Gender and age group directly standardized visit rates (DSVRs) per 100,000 population and 95% confidence intervals by RHA, 2007/08.



Diagnosis Groups

From 2002 to 2008, the number of ED mental health visits by diagnosis groups remained relatively stable (Figure 15).

The absolute numbers and proportion of ED visits with diagnoses of substance use (F10-F19) or neurotic/stress-related disorders (F40-F43) increased over time (Table 9). Relatively few ED mental health visits were associated with schizophrenia/psychotic-related disorders (F20-F29), behavioural syndromes (F50, F55, F59) and disorders of adult personality (F60-F69).

The gender and age group directly standardized visit rates (DSVRs) per 100,000 by year and ED diagnosis are provided in Figure 16. Variability was seen over time and diagnosis. In 2007/08, the highest rate, 181.3, was for neurotic/stress-related disorders (F40-F43). Substance use (F10-F19) and mood disorder (F30-F39) diagnoses had the next highest rates of 169.4 and 109.8 per 100,000, respectively.

More details on diagnostic variation can be found in a numerical companion available at www.EDCompass.net.

FIGURE 15
ED mental health visits by diagnosis group and fiscal year.

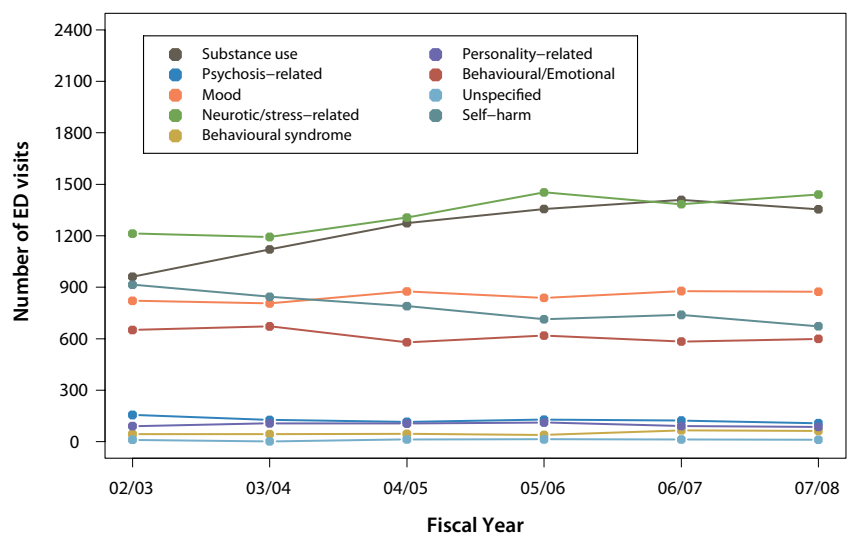


FIGURE 16
Gender and age group directly standardized visit rates (DSVRs) per 100,000 population by diagnosis group and 95% confidence intervals for each fiscal year.

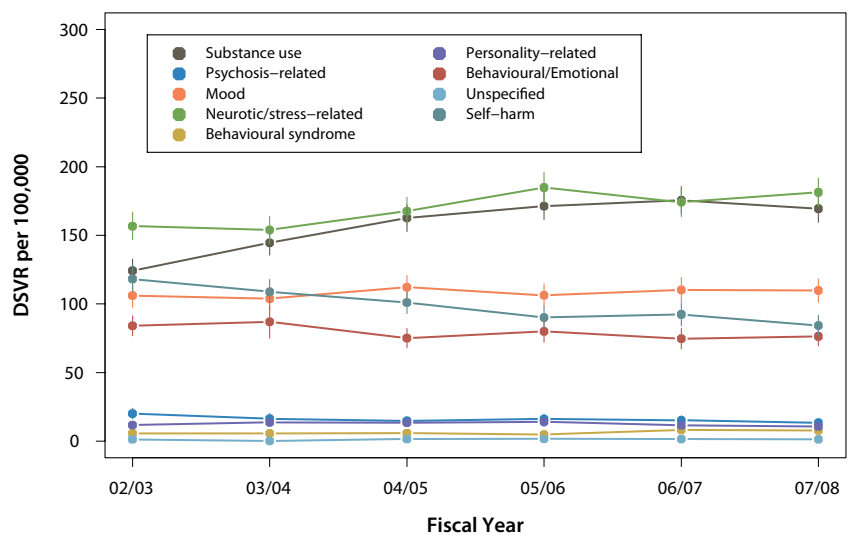


TABLE 9 Frequency and percentage (%) of ED mental health visits by diagnosis group for each fiscal year and all years combined.

	02/03	03/04	04/05	05/06	06/07	07/08	All
ED Visits							
n	4,865	4,917	5,105	5,274	5,287	5,208	30,656
Substance use	962 (19.8)	1,121 (22.8)	1,273 (24.9)	1,356 (25.7)	1,409 (26.7)	1,354 (26.0)	7,475 (24.4)
Psychosis-related	- (3.2)	- (2.6)	- (2.3)	- (2.4)	- (2.3)	- (2.1)	759 (2.5)
Mood	821 (16.9)	806 (16.4)	876 (17.2)	838 (15.9)	878 (16.6)	874 (16.8)	5,093 (16.6)
Neurotic/stress-related	1,213 (24.9)	1,193 (24.3)	1,306 (25.6)	1,453 (27.6)	1,384 (26.2)	1,440 (27.6)	7,989 (26.1)
Behavioural syndrome	- (0.9)	- (0.9)	- (0.9)	- (0.8)	- (1.2)	- (1.2)	304 (1.0)
Personality-related	- (1.9)	- (2.2)	- (2.1)	- (2.1)	- (1.7)	- (1.7)	593 (1.9)
Behavioural/Emotional	651 (13.4)	672 (13.7)	579 (11.3)	618 (11.7)	584 (11.0)	599 (11.5)	3,703 (12.1)
Unspecified	- (0.2)	- (0.0)	- (0.3)	- (0.3)	- (0.2)	- (0.2)	64 (0.2)
Self-harm	915 (18.8)	845 (17.2)	790 (15.5)	714 (13.5)	739 (14.0)	673 (12.9)	4,676 (15.3)

Follow-up Visits for the Subset Discharged from the ED

Follow-up visits were defined as visits a child/youth made to a physician in a non-ED setting within six months of the ED visit, as captured in the Physician Claims database. Only the most recent year of ED data (October 1, 2006 to September 30, 2007) were used to summarize the follow-up visits after discharge from the ED. Between October 1, 2006, and September 30, 2007, there were 3,438 children/youth (1,463 male) discharged from the ED and these data formed our discharged subset (i.e., 3,438 index visits). Of the 3,438 children/youth, 509 (14.8%), 654 (19.0%), 233 (6.8%), and 2,042 (59.4%) were from the Aboriginal, Government Sponsored, Welfare, and Registrant without Subsidy groups, respectively.

Nearly one quarter of children/youth had at least one follow-up within 7 days of ED discharge.

Of the 3,438 children/youth in the discharged subset, 2,566 had at least one follow-up visit within 180 days. In the seven days following the ED visit, 70.2% were primarily for mental health (1,471 follow-up visits, Table 10). At 30 days, there were 6,868 follow-up visits and at 180 days, there were 29,598 follow-up visits. Nearly one third of the children/youth with a follow-up visit within 180 days had had at least one follow-up visit within 7 days following the ED visit (819/2566, 31.9%). There were more follow-up visits from females than males at each time frame (at 180 days: 10,993 for males, 18,605 for females).

The Welfare group represented 6.8% of the children/youth in the discharged subset but had 8.0% and 7.9% of the follow-up visits at 30 and 180 days, respectively.

TABLE 10 Frequency and percentage (%) of follow-up visits for the discharged subset (3,438) at 7, 14, 30, 90 and 180 days after ED visit.

	DAYS SINCE ED VISIT END DATE									
	7		14		30		90		180	
n (follow-up)	2,094		3,643		6,868		16,761		29,598	
Age Group										
00-04	14	(0.7)	26	(0.7)	44	(0.6)	103	(0.6)	173	(0.6)
05-09	121	(5.8)	220	(6.0)	368	(5.4)	946	(5.6)	1,713	(5.8)
10-14	583	(27.8)	995	(27.3)	2,034	(29.6)	5,053	(30.1)	9,075	(30.7)
15-17	1,376	(65.7)	2,402	(65.9)	4,422	(64.4)	10,659	(63.6)	18,637	(63.0)
Sex										
Female	1,290	(61.6)	2,299	(63.1)	4,346	(63.3)	10,255	(61.2)	18,605	(62.9)
Male	804	(38.4)	1,344	(36.9)	2,522	(36.7)	6,506	(38.8)	10,993	(37.1)
pSES										
Aboriginal	161	(7.7)	298	(8.2)	597	(8.7)	1,643	(9.8)	2,760	(9.3)
Registrant without Subsidy	1,366	(65.2)	2,307	(63.3)	4,327	(63.0)	10,236	(61.1)	18,284	(61.8)
Government Sponsored Programs	428	(20.4)	764	(21.0)	1,393	(20.3)	3,551	(21.2)	6,209	(21.0)
Welfare	139	(6.6)	274	(7.5)	551	(8.0)	1,331	(7.9)	2,345	(7.9)
Diagnosis										
Mental Health	1,471	(70.2)	2,464	(67.6)	4,573	(66.6)	10,822	(64.6)	18,202	(61.5)
Non-Mental Health	578	(27.6)	1,099	(30.2)	2,143	(31.2)	5,530	(33.0)	10,603	(35.8)
Missing	45	(2.1)	80	(2.2)	152	(2.2)	409	(2.4)	793	(2.7)
Physician Type										
General Practitioner	707	(33.8)	1,234	(33.9)	2,328	(33.9)	5,472	(32.6)	9,600	(32.4)
Pediatrician	94	(4.5)	188	(5.2)	348	(5.1)	838	(5.0)	1,412	(4.8)
Psychiatrist	1,113	(53.2)	1,920	(52.7)	3,669	(53.4)	9,050	(54.0)	15,785	(53.3)
Other	180	(8.6)	301	(8.3)	523	(7.6)	1,401	(8.4)	2,801	(9.5)
Facility Type										
Active Treatment Hospital	1,196	(57.1)	2,017	(55.4)	3,885	(56.6)	9,242	(55.1)	15,683	(53.0)
Mental Health Services	63	(3.0)	108	(3.0)	228	(3.3)	681	(4.1)	1,551	(5.2)
Practitioner's Office	808	(38.6)	1,458	(40.0)	2,616	(38.1)	6,444	(38.4)	11,594	(39.2)
Other	27	(1.3)	60	(1.6)	139	(2.0)	394	(2.4)	770	(2.6)

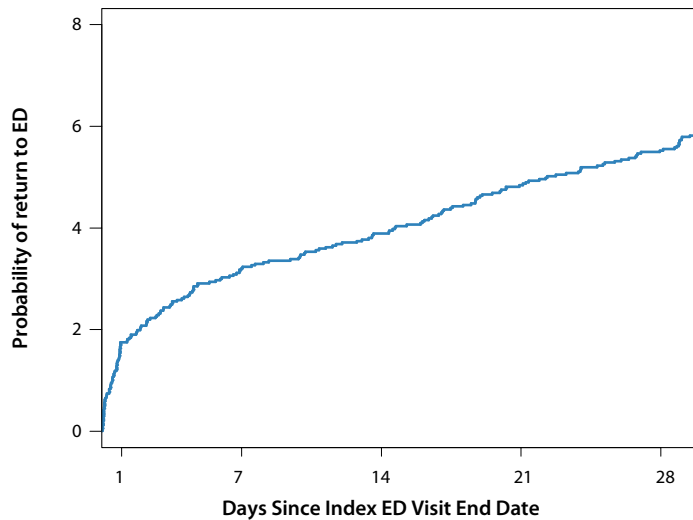
Psychiatrists were the most common physician group seen, accounting for 53.2%, 53.4%, and 53.3% of the follow-up visits at 7, 30, and 180 days after an ED visit, respectively. The follow-up visits at 7 days were mostly in active treatment hospitals or clinics (57.1%), and practitioners' offices (38.6%).

3%
of children and youth
returned for a
mental health-related ED visit
within 7 days.

Of the 3,438 children/youth in the discharged subset, 409 children/youth (11.9%) had a repeat ED visit during the first 180 days. At 7 days after the index ED visit, about 3.2% (111/3438) of children/youth had returned to the ED for another visit (Figure 17). The pSES groups differed ($p < 0.001$) for children/youth. For the Aboriginal group, 3.5% (18/509) of children/youth had returned to the ED within seven days of the index ED visit. For the Welfare group, 2.6% (6/233) of children/youth had returned within the same time frame.

FIGURE 17
Time to next ED mental health visit for the discharged subset (3,438) and by pSES.

(a) All



(b) pSES

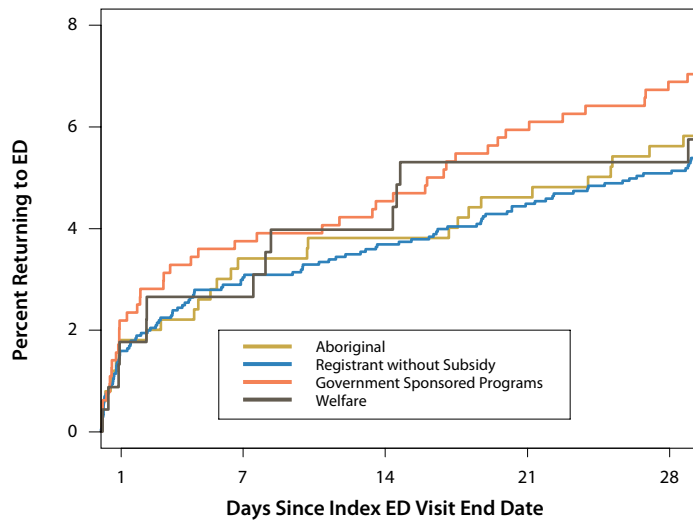
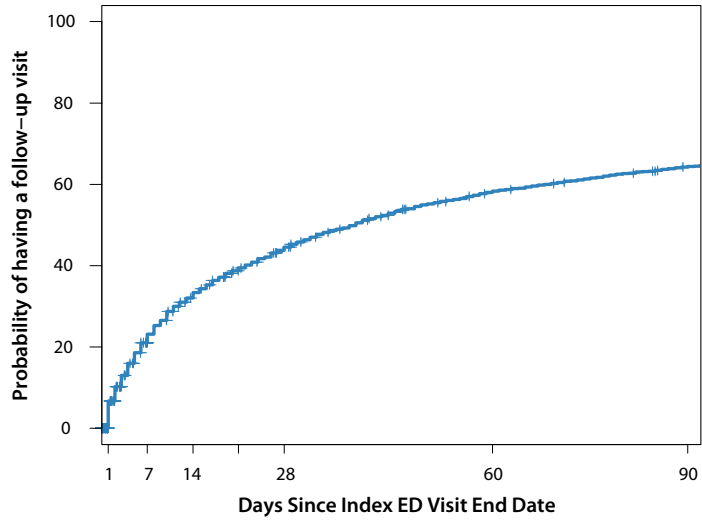


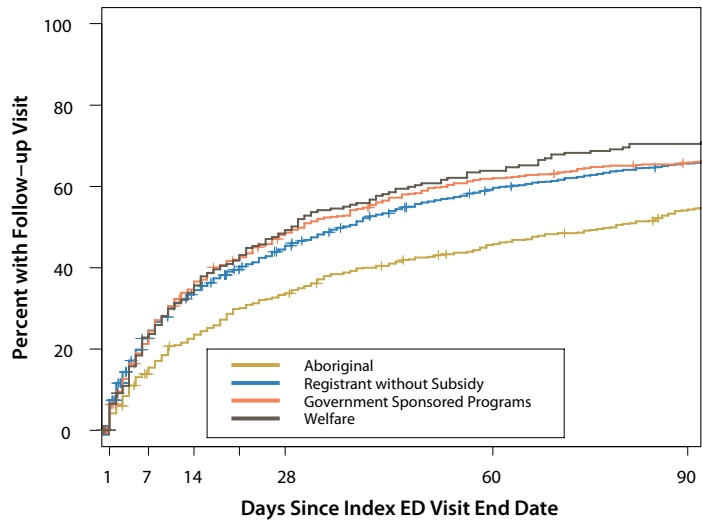
FIGURE 18

Time to first follow-up visit for the discharged subset (3,438) and by pSES. The plus signs denote children/youth whose time to follow-up visit is censored.

(a) All



(b) pSES



At seven days after the index ED visit, approximately 76.9% (2644/3438) of children/youth had yet to have a non-ED follow-up visit (Figure 18). The estimated median time to the first follow-up visit was 39 days. Differences were seen in the four pSES groups ($p < 0.001$). The Registrant without Subsidy and the Government Sponsored Program groups had similar patterns with estimated median times of 37 and 31 days, respectively. The Aboriginal group had the largest estimated median time of 79 days. Conversely, the estimated median time for the Welfare group was 29 days. Seven days after the ED visit end date, about 23.7% of children and youth in the Welfare group had had a non-ED follow-up visit.

24%
of Welfare recipients had a
follow-up visit within
7 days of ED discharge.

The time to return to ED (Figure 19) and the time to first follow-up visit (Figure 20) both showed differences by ED diagnosis group ($p < 0.001$ for each outcome). Within 7 days of the index ED visit, fewer than 10% of children/youth had returned to the ED. The personality-related, psychosis-related, mood, and self-harm diagnosis groups had slightly higher proportions returning to the ED at 7 days than the other groups. At 90 days, the unspecified group had the largest proportion returning, whereas the substance use, behavioural syndrome, and neurotic/stress-related diagnosis groups had the lowest return rates. For the time to first follow-up visit (Figure 20), the behavioural syndrome (median 10 days) and psychosis-related diagnosis (median 10 days) groups had the shortest estimated median times while the substance use had the longest time (median 82 days). Statistically significant differences among RHAs were not observed for the time to return to ED (Figure 21) and the time to first follow-up visit (Figure 22). The estimated median time to first follow-up visit ranged from 32 to 57 days.

At 90 days, post-ED discharge,
the highest proportion
of children and youth
returning to the ED was those
who received a diagnosis of
'unspecified condition'.

More details on follow-up visits after the index ED visit can be found in a numerical companion available at www.EDCompass.net.

FIGURE 19
Time to next ED mental health visit for the discharged subset by ED visit diagnosis group.

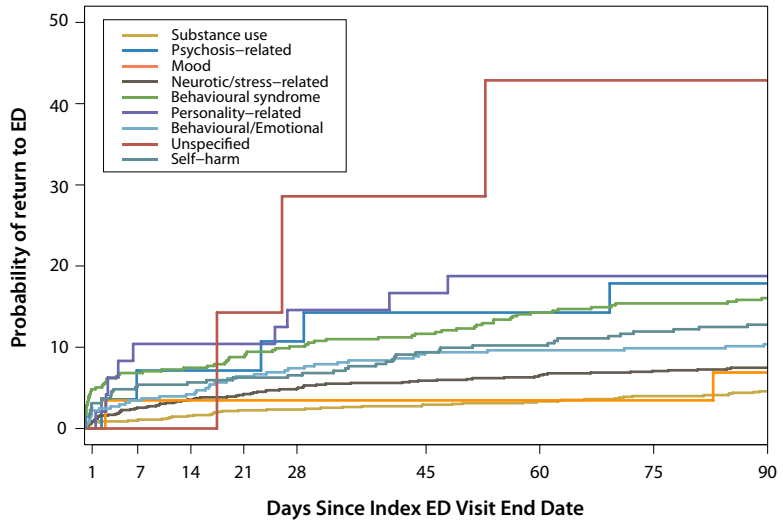


FIGURE 20
Time to first follow-up visit for the discharged subset by ED visit diagnosis group. The plus signs denote children/youth whose time to follow-up visit was censored.

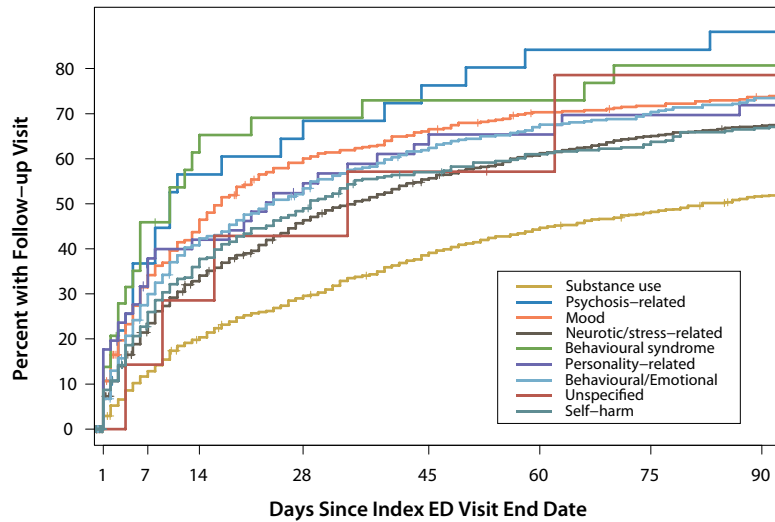
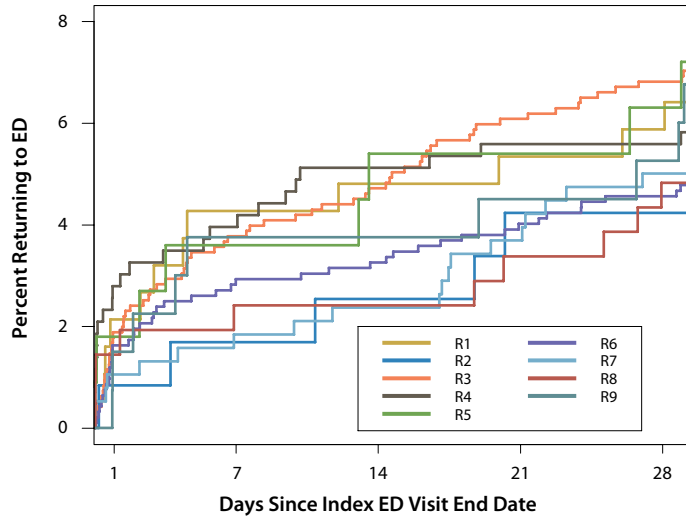
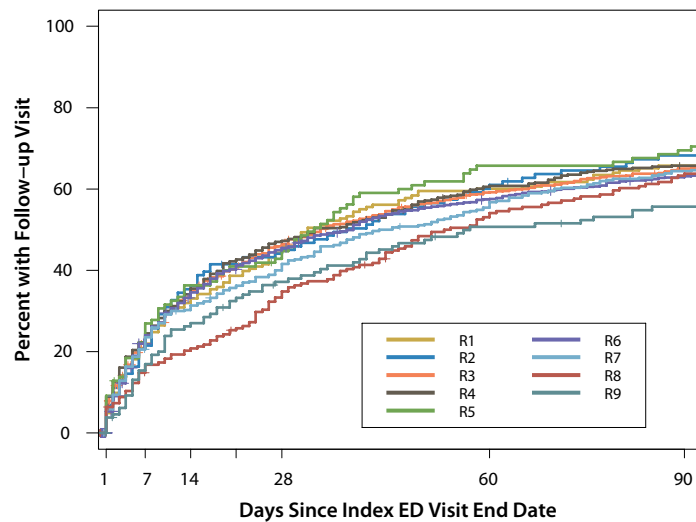


FIGURE 21
Time to next ED mental health visit by RHA for the discharged subset (3,437).

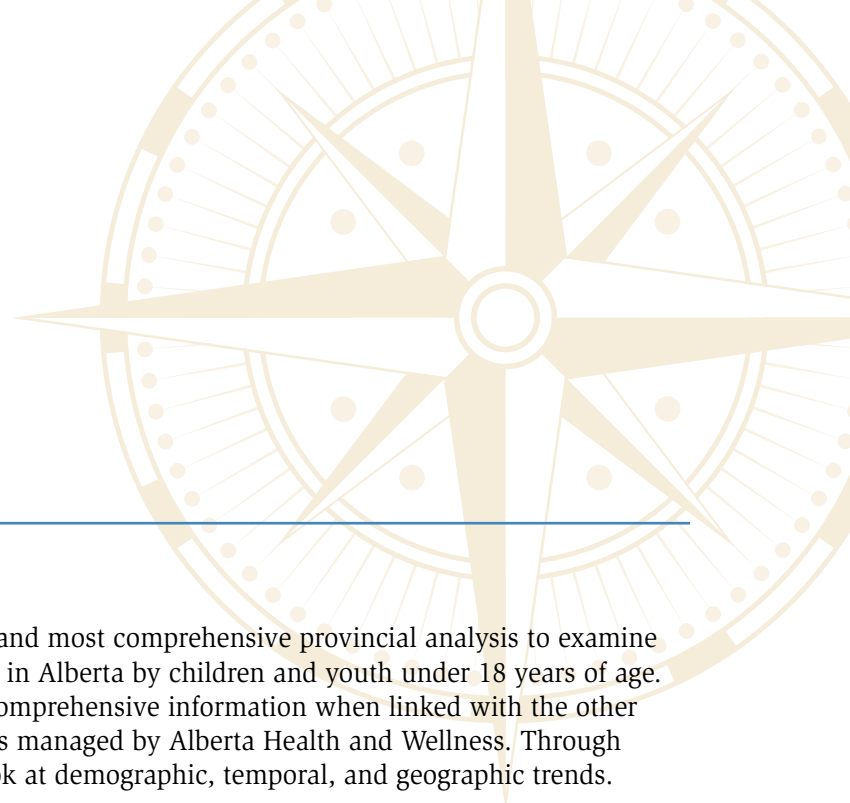


R1=Chinook Regional Health Authority, R2=Palliser Health Region, R3=Calgary Health Region, R4=David Thompson Regional Health Authority, R5=East Central Health, R6=Capital Health, R7=Aspen Regional Health, R8=Peace Country Health, R9=Northern Lights Health Region

FIGURE 22
Time to first follow-up visit by RHA for the discharged subset (3,437). The plus signs denote children/youth whose time to follow-up visit was censored.



R1=Chinook Regional Health Authority, R2=Palliser Health Region, R3=Calgary Health Region, R4=David Thompson Regional Health Authority, R5=East Central Health, R6=Capital Health, R7=Aspen Regional Health, R8=Peace Country Health, R9=Northern Lights Health Region



3 Discussion

This report provides the largest and most comprehensive provincial analysis to examine mental health-related ED visits in Alberta by children and youth under 18 years of age. The ACCS database provides comprehensive information when linked with the other administrative health databases managed by Alberta Health and Wellness. Through these data sources, we were able to look at demographic, temporal, and geographic trends.

This report has several key findings.

Although the total number of ED pediatric visits decreased from 2002 to 2008, the number of ED visits for mental health increased, as did the overall population of children and youth in the province. The overall rates of ED mental health visits remained relatively stable over the years.

This report provides additional data regarding important populations who visit the ED for mental health reasons. Notable was the increase in rates of presentation to the ED for substance use and neurotic/stress-related disorders, and that presentation for substance use had the lowest rate of follow-up. Visit rates were particularly high amongst youth in the 15-17 age group who were Aboriginal or who were Welfare recipients. As age increased, the differences amongst the ED visit rates for the different socio-economic groups became more pronounced for both females and males. Amongst Aboriginal children and youth, visits for substance use and intentional self-harm represented 35.8% and 17.5% of their total ED mental health visits, respectively, which were higher compared to all other pSES groups.

Standardized ED visit rates, adjusting for different age group and gender distributions, generally remained the same from 2002/03 to 2007/08. The rates were highest in the Aboriginal and Welfare groups. In 2007/08, rates were lowest in the two largest and most urbanized areas of the province and the East Central Health region. The difference between the regions with the lowest rate (e.g., Calgary with 533.7 per 100,000), and the highest rate (1,077.2 per 100,000 in Aspen Regional Health) could point to availability of alternative sources of care other than the ED in these regions, or the severity of mental health concerns in these regions. Methods of diagnosis and/or distribution of high-risk populations must also be considered.

This report spans six fiscal years. The pattern of mental health-related ED visits showed an association with age, gender, the time of day, and month of year. Older adolescents had more mental health-related ED visits than young children. Females also had more ED mental health visits at the higher age groups. ED mental health visits occurred mainly during the late evening early morning hours. Spring months had the largest numbers of ED mental health visits.

Overall, the median time in the ED for these children/youth was 3 hours (IQR 1h 27m to 5h 25m). These times were about twice as long as children and youth presenting with asthma during a comparable time period. The median time for asthma-related ED visits was 1h 37m (IQR 49m to 3h 10m).^{15,16} The longer times for ED mental health visits may reflect the complexity of mental health issues. While these ED visits may have been longer, the children and youth presented for mental health reasons tended to have fewer repeat presentations than those presenting for asthma (75.2% with only one ED mental health visit during six years compared to 60.0% with only one ED asthma visit).^{15,16} In addition, nearly 90% of the asthma-related ED visits resulted in discharge, whereas about 82% were discharged when the ED visit was mental-health related.

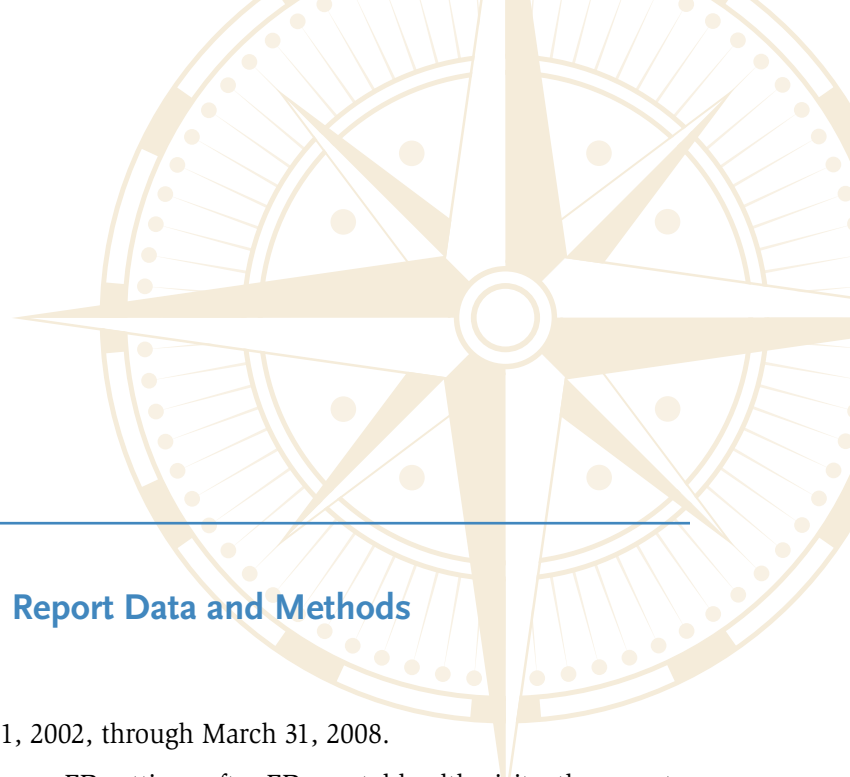
We examined follow-up visits to a physician after an ED visit for a subset of children and youth discharged from the ED during one year. The follow-up visits were made in non-ED settings for a variety of reasons and at different intervals. About 70.2% of follow-up visits in the seven days after ED visits were mental health-related. Psychiatrists were the most common physician group seen. The majority of children and youth did not have a follow-up visit to a physician (which is the only practitioner group that could be tracked with the available data sets) within the first seven days after discharge from the ED. Of those with a follow-up visit, only about 32% of children and youth had any follow-up visit within seven days. The Welfare group represented 6.8% of the children/youth in the discharged subset but had 8.0% and 7.9% of the follow-up visits at 30 and 180 days, respectively.

4 Conclusion

This report describes the epidemiology of mental health-related visits to Alberta EDs from 2002 to 2008. Ongoing study of these trends is required in order to understand the associated factors relating to these variations. The key findings of the data in this report are an overall increase in the number of presentations during the study period, relatively stable rates of presentation during the study period, and the disparities in presentations based on age, gender, pSES, region, and cultural status. Understanding these presentations can assist policy-makers in addressing specific groups for targeted programs to reduce the number of mental health crises in children and youth requiring emergency care.

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APPENDICES

APPENDIX A - Information on Report Data and Methods

Report Period

The report period for ED visits is April 1, 2002, through March 31, 2008.

When examining visits to physicians in non-ED settings after ED mental health visits, the report period of the ED visits is October 1, 2006, to September 30, 2007, and the visits to physicians in non-ED settings are available until March 31, 2008. This time period was chosen to provide one year of ED visits and to allow six months of follow-up data after the last potential ED mental health visit. Specifically, if a child's ED mental health visit was on September 30, 2007, then the last date of follow-up possible would be March 31, 2008.

Data Description

The ACCS database was developed as a flexible and integrated system for tracking the use of ambulatory care visits within government-funded facilities in Alberta. For example, clinic visits, ED visits, and services delivered within acute care institutions in Alberta are included in this database; however, acute care visits to walk-in clinics, doctor's private offices and private facilities are not required to be reported. In addition, deaths are not recorded in this database unless they originated from an Alberta ED.

Although the ACCS tracks a variety of outpatient services, the data used in this report include only services defined as emergency or general emergency. All ED encounters in this province are entered into computerized abstracts that constitute the majority of records within the ACCS system. Using a uniform protocol, trained and supervised medical records nosologists code each chart using ICD-10-CA (April 1, 2002 onward) at each ED in the province.

Each ACCS record represents a service characterized by a combination of a personal health number (unique to each Alberta resident), a management information systems (MIS) code used to classify the type of service provided used and the date of visit.

Demographic data were obtained by linking the children/youth in the ACCS to the children/youth in an annual Alberta Health Care Insurance Plan (AHCIP) cumulative registry file. The cumulative registry file includes all persons registered under the provincial health insurance plan at any time in a given year (in this case, the 2002/03 to 2007/08 fiscal years). This file includes persons who may have been in the province for only part of the year. Visitors to EDs who were not registered with the Alberta health care insurance plan were not included in this report. The demographic information includes: age, gender, health region of residence and, socio-economic proxy. These demographic data were also provided for all members of the Alberta population.

In addition to the ED visit information, subsequent visits to physicians in non-ED settings, hereafter called follow-up visits, were obtained by linking the children/youth in the ACCS to the children/youth in the Physician Claims database. All follow-up visits to physicians within 180 days (6 months) after a child/youth's ED visit start date were provided. The maximum date for the follow-up visits in the extracted data set is September 30, 2008. Since physicians have up to six months to submit their claims and we wanted to examine follow-up physician visits within 180 days of the ED visit, the end date for follow-up visits is March 31, 2008. Up to three diagnosis ICD-9 codes were provided for each follow-up visit. Table 11 provides a list of the data fields and sources used in this report.

The report is based on a research project that was approved by the University of Alberta Health Research Ethics Board.

TABLE 11 Data fields used in this report.

Variable	Source
Diagnostic Information for ED Visit	ACCS
Disposition Status for ED visit	ACCS
Start/End Dates/Time of ED visit	ACCS
Triage Level	ACCS
Date/Time of Triage	ACCS
Date/Time of Initial Physician Assessment	ACCS
Age	AHCIP, ACCS
Gender	AHCIP, ACCS
Health Region of Residence	AHCIP
Socio-economic Proxy	AHCIP
Date of Follow-up Visit	Physician Claims
Diagnostic Information for Follow-up Visit	Physician Claims
Physician Specialty at Follow-up Visit	Physician Claims
Facility Type at Follow-up Visit	Physician Claims

Diagnostic Information for ED Visit

Diagnostic information in the ACCS consists of a main ambulatory diagnosis field, and nine additional diagnostic fields for ICD-10-CA codes.

Disposition Status

All patients entering an ED are given a disposition according to the manner in which they are separated/released from the ambulatory service facility. Disposition codes are provided in Table 12.

Discharged and admitted subgroups were created by defining discharged as disposition 1 or 2 and admitted as disposition 4 or 5.

TABLE 12 Disposition codes and definitions.

Code	Definition
1	Discharged – visit concluded.
2	Discharged from program or clinic - will not return for further care. (This code refers only to the last visit of a service recipient discharged from a treatment program at which he/she has been seen for repeat services.)
3	LAMA – Left against medical advice. (Intended care not completed.)
4	Service recipient admitted as an inpatient to Critical Care Unit or OR (Operating Room) in own facility.
5	Service recipient admitted as an inpatient to other area in own facility.
6	Service recipient transferred to another acute care facility (includes psychiatric, rehabilitation, oncology, and pediatric facilities).
7	DAA – Service recipient expired in ambulatory care service.
8	DOA – Service recipient dead on arrival to ambulatory care service.
9	LBWS – Left without being seen. (Not seen by a professional service provider.)
0	No doctor available. (Service recipient was asked to return later.) <i>Introduced in 2006/07.</i>

Date of ED Visit

The start date is the month and day of the year the ED service was started. The end date is the month and day of the year the ED service ended.

Time of ED Visit

The start time is the time the ED service was started. The end time is the time the ED service ended. Missing end times were either not entered or entered as 23:59. For analytical purposes, time of visit was reduced to hour of visit. The number of visits for a given hour represents the number of visits between the start of that hour and the hour following less one minute (for example, 11:00-11:59).

Age

The age is the age of the child/youth at the date of the ED service. It is calculated as the age in years based on the birth date in the cumulative registry file and the ED visit date. When the birth date is not available in the cumulative registry file, the birth date recorded in the ACCS is used. If there is an inconsistency in the reporting of birth date from both data sources, the cumulative registry file birth date is used. Age categories are formed by grouping ages into 5 year intervals (0-4, 5-9, 10-14, and 15-17).

Gender

The gender is reported in the cumulative registry file. Almost all Albertans are coded as having either a male (M) or female (F) gender. When the gender is not available in the cumulative registry file, the gender reported in the ACCS is used.

Health Region of Residence






The health region of residence is reported according to which Regional Health Authority (RHA) the child/youth lived at the end of the fiscal year. In 2003, the province was divided into nine RHAs. These nine RHAs were further divided into 70 sub-Regional Health Authorities (sRHAs). Prior to 2003, the province was divided into 17 regions.¹⁷ In 2009, all RHAs were combined to form Alberta Health Services and subsequently, five zones were proposed. These zones have not been finalized at the time of this report. The approximate boundaries of these zones correspond to combinations of the sRHAs.

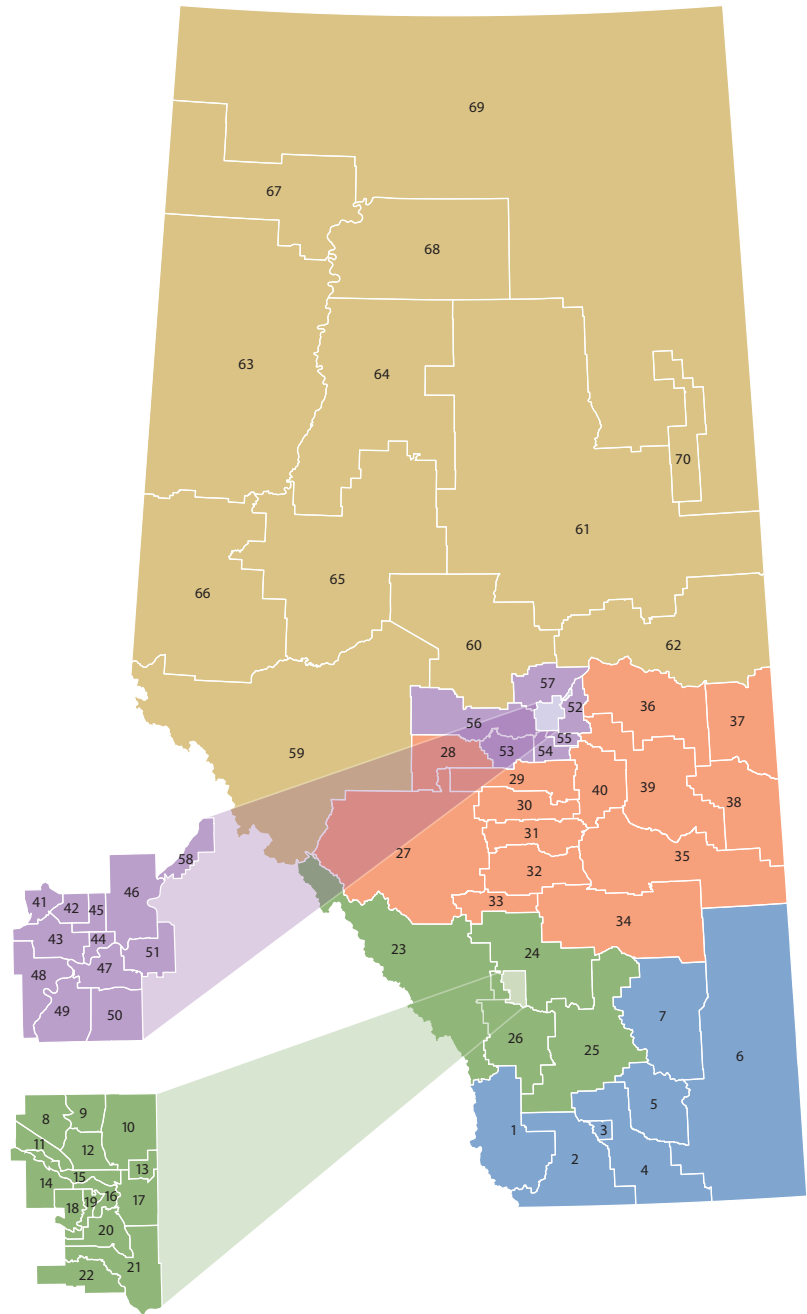
Alberta Health and Wellness uses postal code information and the geographic boundaries of the sRHAs to provide the sRHA of residence for each child/youth in the data file for analysis purposes. Figure 23 shows the sRHA boundaries, RHA names, and approximate boundaries of the new AHS zones. The sRHA codes and names and AHS zones are provided in a numerical companion available at www.EDCompass.net.

FIGURE 23

Alberta sub-Regional Health Authorities and zones.

- | | |
|-------|---|
| 1-5 | Chinook Regional Health Authority (R1) |
| 6-7 | Palliser Health Region (R2) |
| 8-26 | Calgary Health Region (R3) |
| 27-35 | David Thompson Regional Health Authority (R4) |
| 36-40 | East Central Health (R5) |
| 41-58 | Capital Health (R6) |
| 59-62 | Aspen Regional Health Authority (R7) |
| 63-66 | Peace Country Health (R8) |
| 67-70 | Northern Lights Health Region (R9) |

- | | |
|---|----------|
|  | North |
|  | Edmonton |
|  | Central |
|  | Calgary |
|  | South |



Socio-economic Proxy (pSES)

Healthcare in Alberta is funded by the Alberta government and financed in part (until January 1, 2009) through health care insurance premiums. Residents with lower incomes or on social services (e.g., welfare) were eligible for subsidies for these health premiums. As a result, the subsidy level can be used as a proxy measure for socio-economic status. In addition, many Aboriginal children/youth in Alberta have “Treaty” status based on treaties between their First Nation bands and the Federal Government. These treaties entitle health care at no cost for any member of the First Nation band that signed the treaty (for further definition of “Treaty” status, please see reference to Indian and Northern Affairs Canada¹⁸). Consequently, the subsidy level variable combines data from a number of different fields into a single field with four possible categories: “Aboriginal–with Treaty status” (A), “Welfare” (W), “Government Sponsored Programs” (S), and “Registrant without Subsidy” (R). The Welfare category represents children/youth in families who are receiving income support and health benefits from the province of Alberta because they do not have sufficient resources to meet basic needs (e.g., food, shelter). Albertans with lower incomes who receive partial or full subsidies for their healthcare insurance premiums or those receiving disability benefits comprise the Government Sponsored Programs group.

The four groups are mutually exclusive: each child/youth is a member of only one group at the end of a fiscal year. A child/youth registered in the AHCIP is considered an Alberta resident and one of the four groups would apply.

Triage Level

Triage level represented the urgency of ED care required by the child/youth. The availability of this variable depends on the year and region of the reporting ED. Prior to April 31, 2004, this field was optional to report. In subsequent years, the field became mandatory for urban hospitals (as of April 1, 2004), for regional hospitals (as of April 1, 2005), and for all rural hospitals (as of April 1, 2006). Table 13 provides the triage levels.

TABLE 13 Triage level codes and definitions

Code	Definition
1	Resuscitation
2	Emergency
3	Urgent
4	Semi-Urgent
5	Non-Urgent
Blank or 9	Unavailable

Triage Date

The triage date is the day, month, and year when the child/youth was triaged in the ED. This field is optional for most EDs, but mandatory for urban hospitals to report since April 1, 2006.

Triage Time

The triage time is the time a child/youth was triaged in the ED. This field is optional for most EDs, but mandatory for urban hospitals to report since April 1, 2006.

Date of Initial Physician Assessment

Date of initial physician assessment is the date on which the child/youth received the initial assessment from a physician in the ED. This field is available since April 1, 2006, and was optional to report.

Time of Initial Physician Assessment

Time of initial physician assessment is the time when a child/youth received the initial assessment from a physician in the ED. This field is available since April 1, 2006 and, is optional to report.

Date of Follow-up Visit

The month, day, and year a child/youth visited a physician in a non-ED setting is defined as the follow-up visit date. The follow-up visit must occur within six months (180 days) of a child/youth's ED visit end date to be included in the data set. The latest date for the follow-up visits was March 31, 2008. To enable six months of follow-up of children/youth making ED visits, a cut-off date of September 30, 2007, for ED visits is used in the follow-up visit analyses.

Diagnostic Information for Follow-up Visit

Diagnostic information in the Physician Claims file consisted of three diagnostic fields. These diagnostic fields used ICD-9 codes only.

Physician Specialty

The Physician Claim file provided the specialty of the physician involved in the follow-up visit. For the purposes of this report, four physician specialty codes are used (Table 14).

TABLE 14 Physician specialty codes and definitions.

Code	Definition
GP	General Family Practitioner
PED	Pediatrician
PSYC	Psychiatrist
Other	All other categories

Follow-up Facility Type

The follow-up facility type is the type of facility that provided the follow-up service. This information is provided by the Physician Claim file. Four categories of facility are used in this report (Table 15).

TABLE 15 Facility codes and definitions.

Code	Definition
ATH	Active Treatment Hospital, including Active Treatment Clinic and Ambulatory Care Centre
MHS	Mental Health Services
POFF	Practitioner's Office
Other	All other categories

Case Definition

Up to 10 ambulatory care diagnoses are used to identify cases. Distinct children/youth are identified using a personal health number (PHN). A case is any Alberta resident who makes at least one visit to an ED for mental health from 2002 to 2008.

The cases are identified based on ICD-10-CA codes. To be considered a mental health visit, the primary diagnostic field contains the ICD-10-CA codes listed in Table 16. For intentional self-harm, additional diagnostic fields are considered. In the case that an ED visit does not contain any of the F codes in the primary field and the additional diagnostic fields contained both accident codes (X40, . . . , X49 [inclusive], any V code, W65, . . . , W74) and self-harm codes, then the ED visit is examined to confirm classification as a mental health visit.

TABLE 16 Diagnostic ICD-10-CA codes for the case definition of mental health.

Short Title	ICD Classification	Code	Sub-classifications
Substance use	Mental and behavioural disorders due to psychoactive substance use	F10.x F11.x F12.x F13.x F14.x F15.x F16.x F17.x F18.x F19.x	Mental and behavioural disorders due to use of alcohol Mental and behavioural disorders due to use of opioids Mental and behavioural disorders due to use of cannabinoids Mental and behavioural disorders due to use of sedatives/hypnotics Mental and behavioural disorders due to use of cocaine Mental and behavioural disorders due to use of other stimulants Mental and behavioural disorders due to use of hallucinogens Mental and behavioural disorders due to use of tobacco Mental and behavioural disorders due to use of volatile solvents Mental and behavioural disorders due to multiple drug use and other psychoactive substances
Psychosis-related	Schizophrenia, schizotypal and delusional disorders	F20.x F21.x F22.x F23.x F24.x F25.x F28.x F29.x	Schizophrenia Schizotypal disorder Persistent delusional disorders Acute and transient psychotic disorders Induced delusional disorder Schizoaffective disorders Nonorganic psychotic disorders Unspecified nonorganic psychosis
Mood	Mood disorders	F30.x F31.x F32.x F33.x F34.x F38.x F39.x	Manic episode Bipolar affective disorder Depressive episode Recurrent depressive disorder Persistent mood disorders Other mood disorders Unspecified mood disorder
Neurotic/ stress-related	Neurotic, stress-related and somatoform disorders	F40.x F41.x F42.x F43.x	Phobic anxiety disorders Other anxiety disorders Obsessive-compulsive disorder Reaction to severe stress, and adjustment disorder
Behavioural syndrome	Behavioural syndromes associated with physiological disturbances and physical factors	F50.x F55.x F59.x	Eating disorders Abuse of non-dependence-producing substances Unspecified behavioural syndromes associated with physiological disturbances and physical factors
Personality-related	Disorders of adult personality and behaviour	F60.x F61.x F62.x F63.x F64.x F65.x F66.x F68.x F69.x	Specific personality disorders Mixed and other personality disorders Enduring personality changes, not attributable to brain damage and disease Habit and impulse disorders Gender identity disorders Disorders of sexual preference Psychological and behavioural disorders associated with sexual development and orientation Other disorders of adult personality and behaviour Unspecified disorder of adult personality and behaviour

Short Title	ICD Classification	Code	Sub-classifications
Behavioural/Emotional	Behavioural and emotional disorders with onset usually occurring in childhood and adolescence	F90.x F91.x F92.x F93.x F94.x	Hyperkinetic disorders Conduct disorders Mixed disorders of conduct and emotions Emotional disorders with onset specific to childhood Disorders of social functioning with onset specific to childhood and adolescence
Unspecified	Mental disorder, not otherwise specified	F99	Mental disorder, not otherwise specified
Self-harm	Asphyxiation, Intentional self-harm	T71 X60-X69 X70-X84	Asphyxiation Intentional self-poisoning Intentional self harm by specific means

To determine mental health-related follow-up visits, ICD-9 diagnostic codes are used. Either the first diagnostic field had to match at least one of the ICD-9 codes in Table 17 or any additional diagnostic field had to match the intentional self-harm category for the follow-up visit to be classified as a mental health follow-up visit.

TABLE 17 Diagnostic ICD-9-CA codes for the case definition of mental health.

Code	Classification
291.x, 292.x, 303.x, 304.x, 305.x	Mental and behavioural disorders due to psychoactive substance use
295.x, 297.x, 298.x	Schizophrenia, schizotypal and delusional disorders
296.x, 300.4, 311	Mood disorders
300.x (except 300.4, 300.9, 300.16), 308.x	Neurotic, stress-related and somatoform disorders
306.x, 307.x	Behavioural syndromes associated with physiological disturbances and physical factors
301.x, 302.x, 300.16	Disorders of adult personality and behaviour
309.x, 312.x, 313.x, 314.x	Behavioural/Emotional disorders
300.9	Unspecified mental disorder
980.x, 981, 986, 982.x, 987.x	Toxic effects of non-medicinal substances
E95.x, 994.7	Intentional self-harm

Data Analysis

Data were checked for inconsistencies. A summary of the cleaning procedure is provided in Appendix C.

Frequencies and percentages summarized categorical data such as number of ED visits from 2002 to 2008. Mean, standard deviation (SD), median, and interquartile range (IQR, 25th percentile to 75th percentile) summarized continuous data such as age at ED visit. Graphical summaries included bar charts for categorical data and line plots for data over time. The numeric and graphic summaries are provided for each fiscal year and all years combined as well as for different subgroups such as age group, gender, and socio-economic proxy (pSES). To maintain non-identifiability of individual children and youth, some counts were suppressed (denoted by '-') or categories combined.

Children and youth made multiple visits to the ED. When summarizing ED visit information, the number of visits and the number of children/youth were determined. If the summary involved mutually exclusive categories, such as male or female, then the number of distinct (unique) children/youth was reported. For information like disposition, the same child/youth may have multiple ED visits from 2002 to 2008 and each ED visit may have a different disposition. In this case, the number of children/youth by category was reported but the children/youth are not necessarily distinct.

For each fiscal year, the number of mental health ED visits per 100,000 population (age < 18) was calculated by age groups and gender for the full data set. These same calculations were made by pSES group. Note that the age information was only available for the population data at the end of the fiscal year whereas the age of a child/youth presenting to an ED was obtained at the day of the ED visit. Population data were not available for each day of the report period and hence, the fiscal year end population was used in all rate calculations.

Directly standardized visit rates (DSVRs) and associated standard errors (SEs)¹⁹ were calculated to adjust for differences in the gender and age distributions over time and over geography. The Alberta population in 2002/03 stratified by gender and age group was used as the reference population for DSVRs based on the whole group. The DSVRs were calculated by fiscal year, by pSES, and by RHA. The DSVRs have no intrinsic meaning but are a way to compare data to adjust for variation in gender and age distributions. Confidence intervals (CIs) were provided for DSVR estimates and statistical tests were used to compare DSVRs between pSES groups during the same fiscal year. A p-value (p) less than 0.05 was considered to be statistically significant.

To facilitate analyses with both the ED and follow-up visits, a subset of ED visits that concluded with a discharge (disposition 1 or 2) and had an ED visit end date between October 1, 2006, and September 30, 2007, was created. If a child/youth had more than one ED visit that concluded in discharge during this time frame, one ED visit was randomly selected to be the ED visit included in the discharged subset. This discharged subset included only one record per distinct child/youth and allowed our analyses to focus on follow-up visits after a specific ED visit. In addition, we were able to capture a full six months of follow-up visits following an ED visit. Since times are not known for the follow-up visits, the follow-up visit must have a date (month and day) that was after the ED visit. The follow-up visits were summarized for the 7, 14, 30, 90, and 180 days following the ED visit by the follow-up visit variables.

The discharged subset was also used to examine the time from the index ED visit to the next ED visit, as well as the time from the ED visit to the first follow-up visit. The time from the index ED visit end date to the next ED visit start date was calculated. If a child/youth did not have an ED visit after the index ED visit, the time calculated was based on the time from the index ED visit to the end of the report period (March 31, 2008). These children/youth's event times were censored at March 31, 2008. Similarly, the time from index ED visit to the first follow-up visit was calculated. If an ED visit had occurred before the first follow-up visit, the time was censored at the date of the ED visit. If a visit to the hospital had occurred before the first follow-up visit, the time is censored at the date of the hospital visit. If a child/youth did not have a follow-up visit before the end of the report period, the time was censored at the end of the report period (i.e., March 31, 2008). Kaplan-Meier curves were created to display the times to these events by different factors. Log-rank tests were provided to compare pSES groups.

There were some instances where data were missing or inconsistent. The population data included 236 records with missing sRHA of residence. These records were reported as missing throughout the region related population summary tables; but, were excluded from calculations when directly standardized rates for ED visits are computed. For the ED visit data, two visits by the same child/youth had no reported sRHA of residence. The regional summary tables contain this information; however, the regional DSVRs do not include these missing observations. Other inconsistencies were addressed by rules based on likely scenarios. Details are provided in Appendix C.

Splus²⁰ was the statistical software package used for data analysis.

APPENDIX B - Limitations

Children and youth experiencing mental health crises may seek alternatives to ED care. Hence, the data in this report do not capture all contacts with the health care system for mental health crises. The patterns seen could be related to differences in emergency service delivery and not systematic differences in illness distribution.

Aboriginal status was based on Treaty Status, which remains a proxy measure to identify children and youth as Aboriginal. Specifically, this would exclude Métis, Inuit, and other culturally Aboriginal people who do not have Treaty Status. In addition, Aboriginal children and youth may have alternative access to non-physicians following an ED visit.

The ACCS database provides limited information about disease management in the ED. Data from ACCS do not have the detailed information on treatments proposed and received compared to what may be recorded in the patient's chart. While we know some information about the triage level of the child/youth, these data are not available during the entire report period.

The follow-up visit information does not include non-Albertan and non-registered Albertans. Follow-up visits and ED visits outside the province are not captured, and we could not capture data for follow-up visits that were associated with non-physician services (e.g., psychologists, other community mental health services).

APPENDIX C - Data Cleaning Details

Data were checked for internal inconsistencies. When a child/youth had multiple ED visits, age, gender, disposition, ED visit start and end dates/times, and triage and physician assessment dates/times were examined. An age inconsistency was identified if for two ED visits, the difference in ages reported at the fiscal year end was not the same as the difference in the years of the ED visits. No such inconsistencies were found.

A gender inconsistency was identified if a child/youth had more than one gender. While some children/youth may actually switch genders, for the purposes of analysis the most prevalent gender or the gender at first visit was used for gender inconsistencies. One such inconsistency was found.

A disposition inconsistency was identified if a child/youth, prior to his/her last ED visit, had died on arrival to ambulatory care service (disposition = 8) or in ambulatory care service (disposition = 7). No such inconsistency was found.

Multiple inconsistencies were possible for the start and end dates and times of ED visits. For example, a child/youth could have had two ED visits and the visits may be the same or overlapping (i.e., start date of the second ED visit is recorded before the first ED visit ends). These were not practical scenarios and we applied rules to deal with such inconsistencies as follows:

1. **Case 1: Two ED visits by the same child/youth are identified with exactly the same ED visit start and end date and time.**
 - a. *Rule a:* If dispositions and diagnosis are also the same, then randomly keep one ED visit and delete the other.
 - b. *Rule b:* If dispositions are the same, but one ED visit has more diagnosis fields recorded than the other, then the ED visit with more diagnosis fields noted down is kept. If the diagnosis differs in some fields, then all diagnosis are combined to make a new ED visit, and the new one is kept while the two old ones are abandoned.
 - c. *Rule c:* Dispositions are different. If the two ED visits are recorded to have dispositions 6 and 1 or 3 and 1, then the one with disposition 1 is kept. If the two ED visits are recorded to have disposition 5 and 1, then the hospitalization data file is checked to see if there is any visit to the hospital right after the ED visit, if yes, then the ED visit with disposition 5 is kept, otherwise the one with 1 is chosen.

- 2. Case 2: Two ED visits by the same child/youth, with one of the ED visit time lies within the other.**
 - a. *Rule a:* If one ED visit is recorded with disposition 3 and the other 1, then the one with disposition 3 is kept while the other one deleted.
 - b. *Rule b:* If the two ED visits are recorded with disposition 5 and 1 or 6 and 1, and the visit time of the ED visits that have disposition 5 or 6 lies within the other ones, then the end time of the ED visit with disposition 1 is changed to be one minute ahead of the other visit. Both visits are then kept.
 - c. *Rule c:* If it is not any of the cases described in Rule a or b, then the ED visit with longer length of stay is kept.

- 3. Case 3: Two ED visits by the same child/youth, with the end time of the earlier ED visit be after the start time of the later visit while it does not belong to case 1 or 2.**
 - a. *Rule a:* If one ED visit is recorded with disposition 3 and the other 1, then the one with disposition 3 is kept while the other one deleted.
 - b. *Rule b:* If the earlier ED visit has disposition 6 and the later 5, then the hospitalization data file is checked to see if there is any record of visit that happened right after the ED visit. If there is, then the ED visit with disposition 5 is kept while the other deleted.
 - c. *Rule c:* If the two ED visits have the same dispositions, then the earlier ED visit is revised in that the end time is changed to be the end time of the later visit to be kept and the later visit is removed.

Inconsistencies in start and end dates/times were identified for 676 ED visits made by 584 children/youth. After the rules were applied, 20 ED visits by 20 children/youth were acceptable for analysis.

The relationships amongst the ED visit start time, triage time, and initial physician assessment time were also reviewed for inconsistencies. There were two ED visits whose triage date and time were after the ED visit end date and time. They were excluded for calculation of the duration from triage time to ED end time. There were also 21 cases where the ED start date and time were after the initial physician assessment date and time, while 5 cases were identified to have the ED visit end date and time before the initial physician assessment date and time. These inconsistencies were left untreated as no calculations were done based on them. Additionally, 8 ED visits were recorded to have a triage date/time earlier than the initial physician assessment date/time. These cases were left unchanged except when it came to the calculation of duration from triage time to initial physician assessment time the durations were set to be 0.

APPENDIX D - Population Demographics

The appendices display tables and figures of detailed information. Totals (n) are provided. Frequencies are provided for each category as well as the percentage in brackets (%).

TABLE 18 Population by age group for each fiscal year.

	02/03	03/04	04/05	05/06	06/07	07/08
n	774,149	773,336	774,422	782,725	801,086	812,491
00-04	194,911 (25.2)	196,104 (25.4)	198,871 (25.7)	205,785 (26.3)	218,032 (27.2)	228,243 (28.1)
05-09	210,261 (27.2)	208,723 (27.0)	206,883 (26.7)	206,546 (26.4)	209,644 (26.2)	212,480 (26.2)
10-14	230,458 (29.8)	229,393 (29.7)	227,377 (29.4)	226,653 (29.0)	227,270 (28.4)	226,400 (27.9)
15-17	138,519 (17.9)	139,116 (18.0)	141,291 (18.2)	143,741 (18.4)	146,140 (18.2)	145,368 (17.9)

TABLE 19 Population by gender for each fiscal year.

	02/03	03/04	04/05	05/06	06/07	07/08
n	774,149	773,336	774,422	782,725	801,086	812,491
F	377,452 (48.8)	377,012 (48.8)	377,499 (48.7)	381,652 (48.8)	390,383 (48.7)	396,052 (48.7)
M	396,697 (51.2)	396,324 (51.2)	396,923 (51.3)	401,073 (51.2)	410,703 (51.3)	416,439 (51.3)

TABLE 20 Population by pSES for each fiscal year.

	02/03	03/04	04/05	05/06	06/07	07/08
n	774,149	773,336	774,422	782,725	801,086	812,491
A	47,491 (6.1)	47,970 (6.2)	48,432 (6.3)	48,761 (6.2)	48,950 (6.1)	49,145 (6.0)
R	611,507 (79.0)	602,473 (77.9)	599,882 (77.5)	608,438 (77.7)	604,884 (75.5)	621,595 (76.5)
S	94,369 (12.2)	101,329 (13.1)	104,709 (13.5)	105,843 (13.5)	127,320 (15.9)	119,744 (14.7)
W	20,782 (2.7)	21,564 (2.8)	21,399 (2.8)	19,683 (2.5)	19,932 (2.5)	22,007 (2.7)

A=Aboriginal, R=Registrant without Subsidy, S=Government Sponsored Programs, W=Welfare

FIGURE 24
Population by age group and gender,
2007/08.

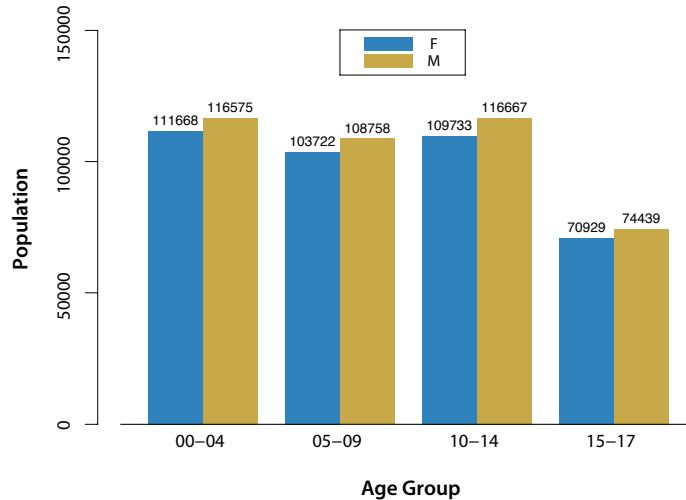


TABLE 21 Population by residential RHA for each fiscal year.

	02/03	03/04	04/05	05/06	06/07	07/08
n	774,149	773,336	774,422	782,725	801,086	812,491
R1	40,190 (5.2)	40,090 (5.2)	39,775 (5.1)	39,612 (5.1)	40,484 (5.1)	41,248 (5.1)
R2	24,431 (3.2)	24,490 (3.2)	24,610 (3.2)	24,806 (3.2)	25,356 (3.2)	25,707 (3.2)
R3	265,046 (34.2)	267,352 (34.6)	269,528 (34.8)	275,838 (35.2)	282,728 (35.3)	287,838 (35.4)
R4	75,430 (9.7)	75,146 (9.7)	74,720 (9.6)	75,015 (9.6)	76,391 (9.5)	77,020 (9.5)
R5	27,458 (3.5)	26,804 (3.5)	27,043 (3.5)	26,892 (3.4)	27,531 (3.4)	27,761 (3.4)
R6	231,324 (29.9)	230,518 (29.8)	229,698 (29.7)	231,549 (29.6)	237,679 (29.7)	241,140 (29.7)
R7	50,998 (6.6)	49,288 (6.4)	49,152 (6.3)	48,510 (6.2)	48,713 (6.1)	48,589 (6.0)
R8	37,338 (4.8)	37,306 (4.8)	37,239 (4.8)	37,741 (4.8)	38,753 (4.8)	39,161 (4.8)
R9	21,843 (2.8)	22,230 (2.9)	22,572 (2.9)	22,641 (2.9)	23,305 (2.9)	23,915 (2.9)
Missing	91 (0.0)	112 (0.0)	85 (0.0)	121 (0.0)	146 (0.0)	112 (0.0)

R1=Chinook Regional Health Authority, R2=Palliser Health Region, R3=Calgary Health Region, R4=David Thompson Regional Health Authority, R5=East Central Health, R6=Capital Health, R7=Aspen Regional Health, R8=Peace Country Health, R9=Northern Lights Health Region

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