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Toward Quality Mental Health Services in Canada: A Comparison of Performance Indicators across 5 Provinces Technical Report

Prepared by:
Wayne Jones
Amanda Butler

Mailing address:
Wayne Jones
Centre for Applied Research in Mental Health & Addiction (CARMHA)
Simon Fraser University, Harbour Centre
Suite 2400 - 515 W. Hastings St.,
Vancouver, B.C. V6B 5K3
778-782-5217
(Contact: Wayne Jones: wjones@sfu.ca)

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1 Introduction

This document is the technical report describing the final results of the *Reporting Mental Health Performance across Canadian Provinces* project undertaken by a team of mental health and addictions scientists from five provinces and led by the Centre for Applied Research in Mental Health and Addictions (CARMHA). A summary document highlighting the main results of interest is available at <http://www.sfu.ca/carmha/publications.html>.

The project tested the feasibility of creating and reporting on a small number of mental health and addictions services performance indicators that could be compared across provinces. An initial set of seven measures was chosen based on the availability of reasonably comparable cross-province data as a 'proof of concept' for the collaborative process. To facilitate meaningful inter-provincial comparisons, consensus definitions and standardized analytic processes were developed.

Indicator specifications along with the planned approach to the data abstraction and analysis can be found in the document *Reporting Mental Health Performance across Canadian Provinces: Revised Final Indicator Specifications*. That document was prepared by the project's working group and outlined for each indicator:

- a specific measure to be used,
- a detailed data selection process for each indicator,
- a format for presentation of the results,
- a series of optional additional analyses that could be completed by some or all of the participants.

This report devotes a chapter to each indicator but notes that measurement challenges for one indicator precluded sound analysis and reporting.

1.1 Data Sources

Five provinces participated in this project: Quebec, Ontario, Manitoba, Alberta, and British Columbia. Each of these provinces required separate approaches to accessing data required for this project.

1.1.1 QUEBEC

Quebec does not currently have infrastructure to systematically coordinate applications for access to linked health administrative data or provide analytic support to researchers who may wish to use the data. For this project, data were accessed through the *Institut nationale de santé publique Québec* (INSPQ).¹ The INSPQ includes experts from health science, social sciences and humanities and they work with health and social service networks to develop public health

¹ INSPQ website: <https://www.inspq.qc.ca/en>

knowledge and skills. INSPQ has a specific mandate to support the provincial Minister of Health and Social Services in carrying out public health responsibilities. CARMHA worked with INSPQ to develop a contract and data request specific to this project.

1.1.2 ONTARIO

Data were accessed through the Institute for Clinical Evaluative Sciences (ICES). ICES is an independent, non-profit organization that undertakes research that informs the health system on a wide range of issues using linked health administrative data in Ontario. ICES provides analytic support, advice, and access to linked health administrative data and analytic tools.²

1.1.3 MANITOBA

Data were accessed through the Manitoba Centre for Health Policy (MCHP) at the University of Manitoba. MCHP houses the Manitoba Population Research Repository, which is a comprehensive collection of administrative, registry, survey, and other data related to the residents of Manitoba. MCHP acts as a steward of the information in the repositories for agencies and researchers.³

1.1.4 ALBERTA

In Alberta, a collaboration was set up between the University of Calgary, Alberta Health Services (AHS) Mental Health and Addictions Strategic Clinical Network (SCN) and the Alberta Strategy for Patient-Oriented Research Unit (ABSPORU) Data and Methods Platforms. ABSPORU is funded by Alberta Innovates and the Canadian Institutes for Health Research (CIHR). The data platform allowed for research access to, and analysis of, hospital, ER and physician billing data while protecting the security and privacy of records. Linkages and analytic approach were directed by the research team, but the dataset remained in an Alberta Health Services secure setting. The process was governed by the U. of Calgary Conjoint Health Research Ethics Board approval and data access agreements with AHS.

1.1.5 BRITISH COLUMBIA

Data were access through Population Data BC (PopData) at the University of British Columbia. PopData provides research access to individual-level de-identified longitudinal data on BC residents. PopData holds 19 data sets from 2 federal and 6 provincial sources covering health, population and vital statistics, demographics and life course, workplace, and childhood development. PopData facilitates access to one of the world's largest collections of health care, health

² ICES website: <http://www.ices.on.ca/DAS>

³ MHCP does not have a website of its own. Information about the data repository can be found here: http://umanitoba.ca/faculties/health_sciences/medicine/units/chs/departamental_units/mchp/resources/repository/index.html

services and population health data as well as education and training services on use of the data.⁴

1.2 Data Suppression

The specifications document did not provide guidelines for small cell data suppression. Each province followed their local policies with resulting variability in approach. Quebec data was rounded to the nearest 5. Ontario and Manitoba suppressed observed data where the cell size was between 1 and 5. For the latter, expected calculations where the cell size was between 1 and 5 were also suppressed. Alberta provided all the data to CARMHA for analysis with the understanding that small cell data would not be published in final reports. In British Columbia, cell sizes with between 1 and 5 observations could not be released from within the secure research environment although they were visible to the analysts working within that environment.

In many cases the variety of approaches had no impact, as the number of observations was sufficiently large. However, the inclusion of the 10 to 14 age category occasionally resulted in small cell sizes for this particular group. There were also other instances in which the cells for specific age groups were less than 5. In this report, where small cell sizes exist, only rates or proportions (not the actual counts) are reported.

1.3 Data Handling and Analysis

Each province was responsible for abstracting the data (following the methods in the specification document) and sending it to CARMHA for compilation into a standard format. Abstracting procedures differed by province and depended on the type of access to the data and software used by each provincial partner. While the specifications documents specified the format for the results, the software programs varied (Microsoft Word tables, Microsoft Excel tables, html tables). Data was compiled into Microsoft Excel tables by CARMHA. Plots of all the data (by province and between provinces) were generated using R,⁵ reading the data from the Excel tables.

A chapter-by-chapter initial review of the summary tables and plots was performed by the *Data Interpretation Working Group*.⁶ This process identified potential issues with the data and needed modifications to the presentation that have been incorporated into this report.

In this report results are presented in summary tables and plots. Statistical analyses, where appropriate, were performed using R, and are described in the

⁴ PopData website: <https://www.popdata.bc.ca/home>

⁵ R Core Team (2017). R: A language and environment for statistical computing. R Foundation for Statistical Computing, Vienna, Austria. URL <https://www.R-project.org/>.

⁶ All participating provinces had at least one participant in the group.

chapter in which they are presented. Plots were most often generated using R, although Microsoft Excel (2007) was used in some instances.

In order to adhere to the different confidentiality requirements that exist among provinces, final results are occasionally presented without all of the calculation steps as outlined in the specifications document. This occurred when small cell sizes led to data suppression. The presentation of final rates or proportions without the actual raw numbers used to calculate these has at least two consequences. A positive one is that it ensures that a reader cannot “back calculate” a result and determine the elements of a small numerator. A negative consequence is that, without cell size information, the reader has no way to judge if the differences between age group are simply random year-to-year variation that appear large because of small cell sizes or are based on a large number of cases and thus meaningful.

In order to assist with the interpretation of the indicators, we have calculated (but do not present⁷) the 95% confidence interval (CI) for some of the measures in each of the years within each age group. These intervals were examined to see if any one of the measures has a CI that does not overlap with the CI of the other two years. The lack of overlap necessarily means the proportions are statistically significantly different from each other (at the indicated CI range). However, it should be noted that the presence of an overlap does not necessarily mean that a statistical test of the difference between two proportions, for example, would not be significant (small overlaps of CIs can sometimes still be statistically significant when other tests are used). Given that the indicators in this report are essentially population measures, statistical tests of the differences are not required. We calculated the CIs as a way to convey whether the differences within an age group might be large enough to merit attention to aid in interpretation in certain chapters.

⁷ Tabulation of the CIs would produce an enormous amount of detail.

2 First treatment contact for a mental disorder or addiction is in an emergency department

2.1 Measure

The number of individuals treated in a hospital emergency department (ED) for a mental health and/or addiction (MHA) reason who have not been seen by any provider (hospital, general practitioner or psychiatrist) for a MHA reason in the previous two⁸ years

divided by

the number of individuals treated in a hospital ED for a MHA reason.

2.2 Data Selection Process

The selection was done separately for the fiscal years 2011/12, 2012/13, and 2013/14. The goal was to identify a data set consisting of the first ED visit for a MHA reason for an individual in the fiscal year and then identify those in the derived data set with no previous contact with the health care system for a MHA reason over a specified number of years.

2.2.1 IDENTIFICATION OF THE INDICATOR DENOMINATOR

1. For a fiscal year select all records from the ED database where the ED discharge diagnosis is a MHA diagnosis and the ED date is in the fiscal year.
 - MHA diagnoses are any ICD10 Chapter V (F00 to F99) or ICD9 Chapter V diagnoses (290 to 319).
 - NOTE: flag ED visits with a diagnostic code of dementia (ICD10 F00 to F03, or ICD9 290 and 294) as the analysis is to be redone with these individuals dropped
2. Drop out so-called “problem”⁹ records, that is, records where:
 - a. Provincial identity number is invalid
 - b. Sex is missing
 - c. Not resident of province
 - d. Date of birth is missing or is such that the age is a negative number or greater than 125 at the time of service
 - e. ED visit indicator (NACRS field) is a planned visit
3. If there is more than one ED visit in the fiscal year for an individual, drop all but the first visit.
4. If the individual’s age at the time of the ED visit was less than 10, drop from the dataset.

⁸ Different periods of service use history were examined in additional analyses section.

⁹ If the identity number is invalid, the sex is missing, or the age is clearly wrong the record and its use is questionable. Out of province individuals’ home health care cannot be checked and thus these records were eliminated. A planned visit is not an emergency visit in the sense of this indicator.

The remaining data forms the data for the denominator.

2.2.2 IDENTIFICATION OF THE INDICATOR NUMERATOR

Start with the data set derived for the denominator.

1. For each record in the data set search the physician-billing data for **[two]**¹⁰ years prior to the ED visit date. Use the first diagnoses if province used more than one diagnosis. Drop out records with one or more MHA visits.
 - a. The time period to review should be 365 x **[2]** (or 730) days from the ED visit.
 - b. MHA diagnoses are the same as in the denominator: any ICD10 Chapter V (F00 to F99) or ICD9 Chapter V diagnoses (290 to 319).
2. For each record remaining in the numerator data set, search the hospital data for hospital discharge dates **[two]** years prior to the ED visit date. Drop out records where there is at least one hospital discharge with the most responsible diagnosis is MHA.
 - a. The time period to look review should be 365 x **[2]** (or 730) days from the ED visit.
 - b. MHA diagnoses are the same as in the denominator: any ICD10 Chapter V (F00 to F99) or ICD9 Chapter V (290 to 319) diagnosis.
3. For each record remaining in the numerator data set, search the physician-billing data for **[two]** years prior to the ED visit date. Drop out records where the billing physician is classified as a psychiatrist.
 - a. The time period to review should be 365 x **[2]** (or 730) days from the ED visit.
 - b. Classification systems will vary by province – for example in BC billing data psychiatrists can be identified by specialty code 03.

The remaining data forms the data for the numerator.

2.3 Data Sources and Notes

The NACRS (National Ambulatory Care Reporting System) is a national emergency department reporting structure established by CIHI that collects data at three different levels of detail (three being the most detailed). Regarding coverage for the 2014/15 fiscal year, the NACRS Data Quality Documentation report¹¹ indicated that:

There was 100% Level 3 ED coverage for Ontario and Alberta. Yukon and Prince Edward Island submitted Level 3 ED data, B.C. submitted Level 2 ED data, Saskatchewan submitted Level 1 and Level 2 ED data, and Nova Scotia and Manitoba submitted Level 1 and Level 3 ED data in 2014–2015. Fully coded diagnosis and intervention information might not be

¹⁰ The values in bold square brackets will change when a different service history period is used.

¹¹ CIHI. Data Quality Documentation, National Ambulatory Care Reporting System — Current-Year Information, 2014–2015. https://www.cihi.ca/sites/default/files/document/nacrs-dataquality_2014-2015_en.pdf. Last accessed March 29, 2017.

available for abstracts submitted at Level 1 or Level 2 by these provinces.
(P. 5)

Coverage is inconsistent across the country but CIHI data quality reports note that it is improving. Table 1 illustrates facilities reporting ED data relative to those reporting hospital separation data to the Discharge Abstracts Database (DAD).¹²

Table 1 Facilities Reporting to NACRS ED System Compared to Facilities Reporting Acute Separations to the DAD in 2014/15

Province	# Facilities Reporting ED Data to NACRS in 2014/15*	# Separate Facilities Reporting Data to DAD in 2014/15**
Quebec	0	0
Ontario	177	167
Manitoba	8	73
Alberta	108	95
British Columbia	29	80

* From Table 1 of CIHI's 2014/15 NACRS Data Quality Documentation Report

** From Table 1 of CIHI's 2014/15 DAD Data Quality Documentation Report

Clearly the coverage is lower than reporting to DAD in Manitoba and in British Columbia. In terms of data issues within the individual provinces, Quebec does not report to NACRS but collects its own ED data. Coverage is province wide and all ED visits (planned and unplanned) are included. Manitoba's data is collected by the Manitoba Centre for Health Policy using a different system than NACRS. Coverage is limited to specific hospitals and coding of MHA visits is based on the presenting complaint rather than a NACRS discharge diagnosis. Manitoba also does not have a data field indicating planned visits. Reporting of data to NACRS by British Columbia institutions is expanding. While only 29 of 80 facilities reported in 2014/15, this is higher than in previous years and hence, summary data over time will be based on a different number of facilities. No issues were reported with the Ontario or Alberta data for this indicator.

In the plots, the Y-axis has been set to a range that covers all provinces and as a result some plots have large areas of white space. Note that the Y-axis does not start at zero.

¹² CIHI Data Quality Documentation, Discharge Abstract Database — Current-Year Information, 2014–2015. https://www.cihi.ca/sites/default/files/document/dad-data-quality_14-15_en.pdf. Last accessed March 29, 2017.

2.4 Results

Results are summarized in five-year age groups beginning at age 10. They present the proportion of individuals treated in a hospital emergency department for an MHA-related reason who have not been seen by any other provider for a MHA reason in the previous two years. Results are presented here first by province and then combined.

For this indicator, there are three measures for each age group, one for each year. We have calculated (but do not present) the 95% confidence interval (CI)¹³ for the proportions in each of the years within each age group. These were examined to see if any one of the proportions had a CI that does not overlap with the CI of the other two years.

2.4.1 QUEBEC

Results are presented in Table 2 and plotted in Figure 1.

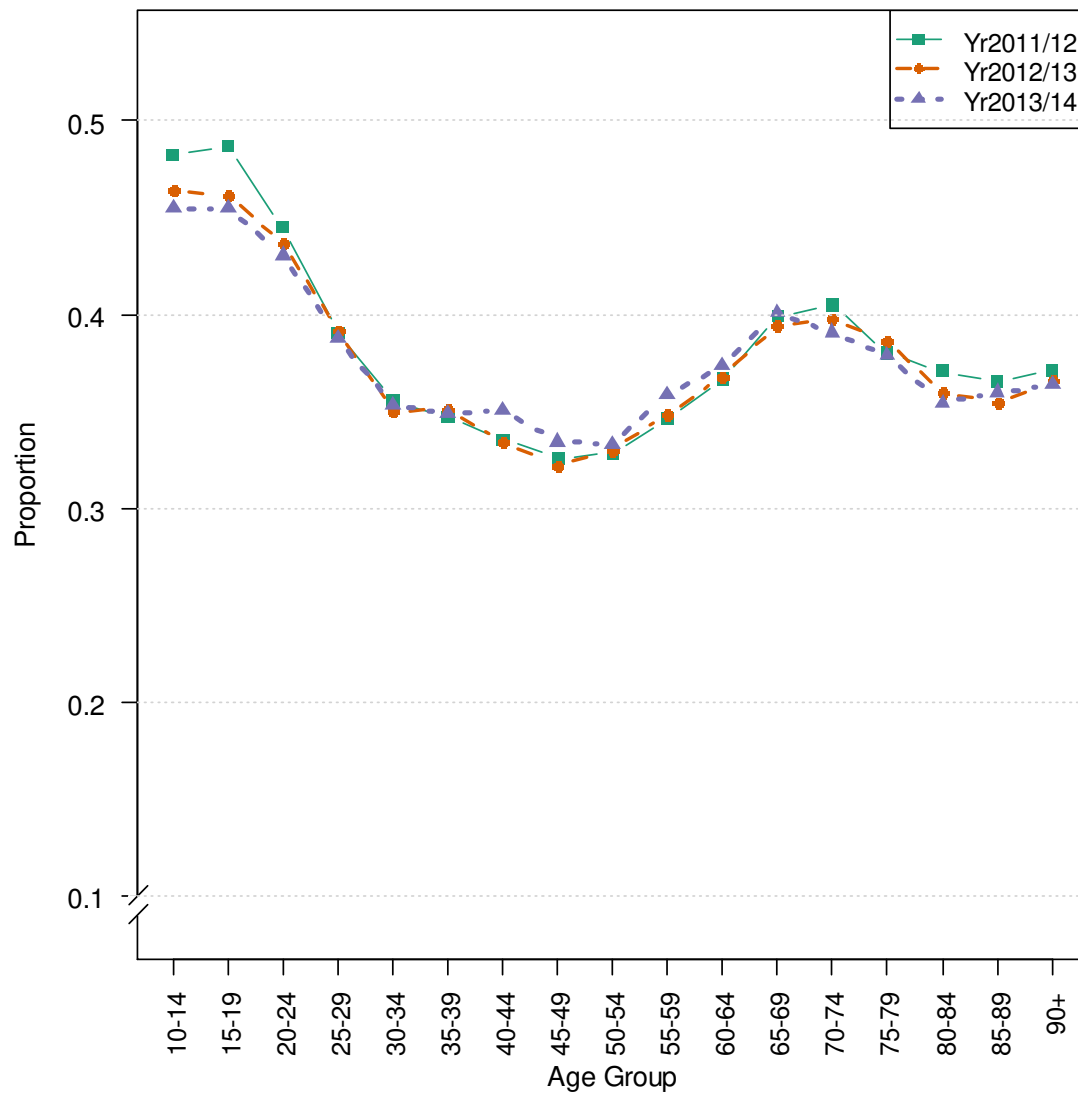
Table 2 First Mental Health or Addiction Contact is Emergency Department – Quebec

Age	2011/12			2012/13			2013/14		
	# with no MHA contact in previous 2 Years	# with a MHA ED Visit in fiscal Year	Proportion Whose 1st Contact was ED	# with no MHA contact in previous 2 Years	# with a MHA ED Visit in fiscal Year	Proportion Whose 1st Contact was ED	# with no MHA contact in previous 2 Years	# with a MHA ED Visit in fiscal Year	Proportion Whose 1st Contact was ED
10-14	1,318	2,734	0.48	1,385	2,983	0.46	1,460	3,210	0.45
15-19	4,381	8,999	0.49	4,170	9,030	0.46	4,236	9,312	0.45
20-24	4,402	9,894	0.44	4,450	10,187	0.44	4,505	10,465	0.43
25-29	3,658	9,378	0.39	3,556	9,087	0.39	3,582	9,240	0.39
30-34	3,431	9,651	0.36	3,359	9,603	0.35	3,371	9,539	0.35
35-39	2,926	8,429	0.35	3,030	8,635	0.35	3,089	8,861	0.35
40-44	2,813	8,381	0.34	2,689	8,054	0.33	2,729	7,786	0.35
45-49	3,201	9,823	0.33	2,974	9,230	0.32	2,970	8,883	0.33
50-54	3,018	9,192	0.33	3,019	9,148	0.33	3,115	9,353	0.33
55-59	2,449	7,078	0.35	2,511	7,209	0.35	2,706	7,545	0.36
60-64	2,061	5,617	0.37	2,041	5,546	0.37	2,213	5,921	0.37
65-69	1,950	4,888	0.40	2,009	5,098	0.39	2,088	5,208	0.40
70-74	1,866	4,609	0.40	1,843	4,635	0.40	1,916	4,903	0.39
75-79	2,015	5,301	0.38	2,034	5,261	0.39	2,017	5,323	0.38
80-84	2,238	6,040	0.37	2,256	6,277	0.36	2,286	6,452	0.35
85-89	1,915	5,243	0.37	1,993	5,624	0.35	2,102	5,843	0.36
90+	1,236	3,331	0.37	1,390	3,798	0.37	1,486	4,084	0.36
Total	44,878	118,588	0.38	44,709	119,405	0.37	45,871	121,928	0.38

Percentages range between 32% and 49%, with the higher percentage being in the younger age groups. The same general pattern over the ages was observed over the three years. In the 15 to 19 age group, the 95% CI for a proportion in a year does not overlap with the 95% CI for the proportions in the other years.

¹³ CIs were taken from the results of the R function “prop.test”.

Figure 1 Plot of Proportion Where First Contact is ED – Quebec



2.4.2 ONTARIO

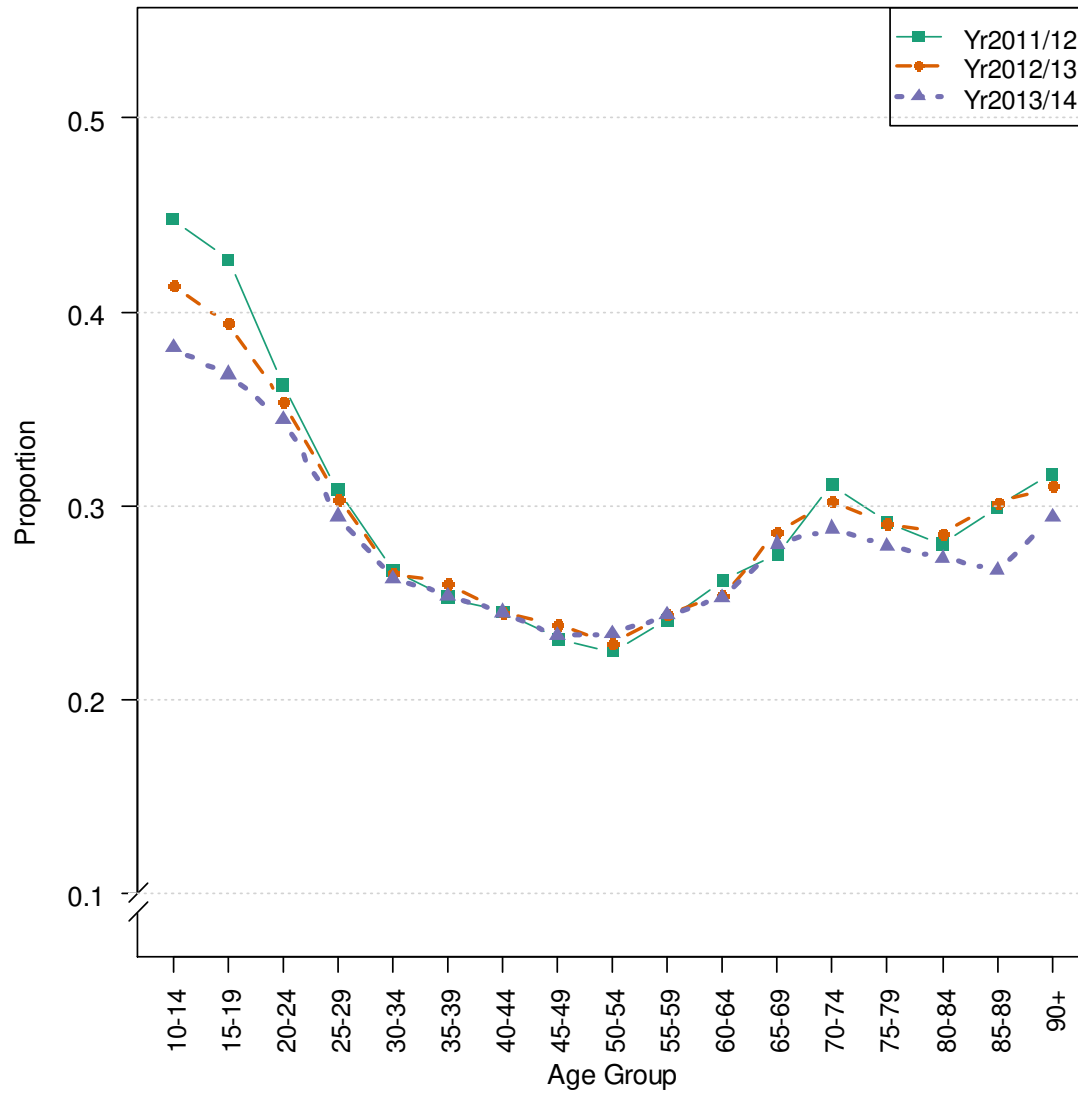
Results are presented in Table 3 and plotted in Figure 2.

Table 3 First Mental Health or Addiction Contact is Emergency Department - Ontario

Age	2011/12			2012/13			2013/14		
	# with no MHA contact in previous 2 Years	# with a MHA ED Visit in fiscal Year	Proportion Whose 1st Contact was ED	# with no MHA contact in previous 2 Years	# with a MHA ED Visit in fiscal Year	Proportion Whose 1st Contact was ED	# with no MHA contact in previous 2 Years	# with a MHA ED Visit in fiscal Year	Proportion Whose 1st Contact was ED
10-14	2,085	4,655	0.45	2,193	5,305	0.41	2,066	5,417	0.38
15-19	7,606	17,818	0.43	7,387	18,732	0.39	7,280	19,791	0.37
20-24	5,904	16,287	0.36	5,904	16,705	0.35	6,063	17,611	0.34
25-29	3,842	12,463	0.31	3,862	12,721	0.30	3,928	13,337	0.29
30-34	2,837	10,654	0.27	2,873	10,831	0.27	2,944	11,223	0.26
35-39	2,463	9,746	0.25	2,567	9,883	0.26	2,537	10,015	0.25
40-44	2,492	10,162	0.25	2,395	9,776	0.24	2,353	9,607	0.24
45-49	2,542	11,005	0.23	2,559	10,709	0.24	2,368	10,175	0.23
50-54	2,248	10,008	0.22	2,273	9,922	0.23	2,354	10,063	0.23
55-59	1,767	7,331	0.24	1,869	7,665	0.24	1,857	7,630	0.24
60-64	1,360	5,205	0.26	1,369	5,395	0.25	1,394	5,519	0.25
65-69	991	3,609	0.27	1,144	3,993	0.29	1,161	4,142	0.28
70-74	892	2,872	0.31	966	3,199	0.30	926	3,213	0.29
75-79	820	2,816	0.29	854	2,935	0.29	867	3,106	0.28
80-84	786	2,805	0.28	841	2,944	0.29	871	3,194	0.27
85-89	665	2,221	0.30	720	2,392	0.30	669	2,508	0.27
90+	358	1,133	0.32	454	1,462	0.31	470	1,598	0.29
Total	39,658	130,790	0.30	40,230	134,569	0.30	40,108	138,149	0.29

Percentages range between 22% and 45%, with the higher percentage being in the younger age groups. The same general pattern over the ages was observed over the three years. There are three instances where the 95% CI for a proportion in a year does not overlap with the 95% CI for the proportions in the other years within a specific age group (ages 10 to 14, 15 to 19, and 20 to 24).

Figure 2 Plot of Proportion Where First Contact is ED – Ontario



2.4.3 MANITOBA

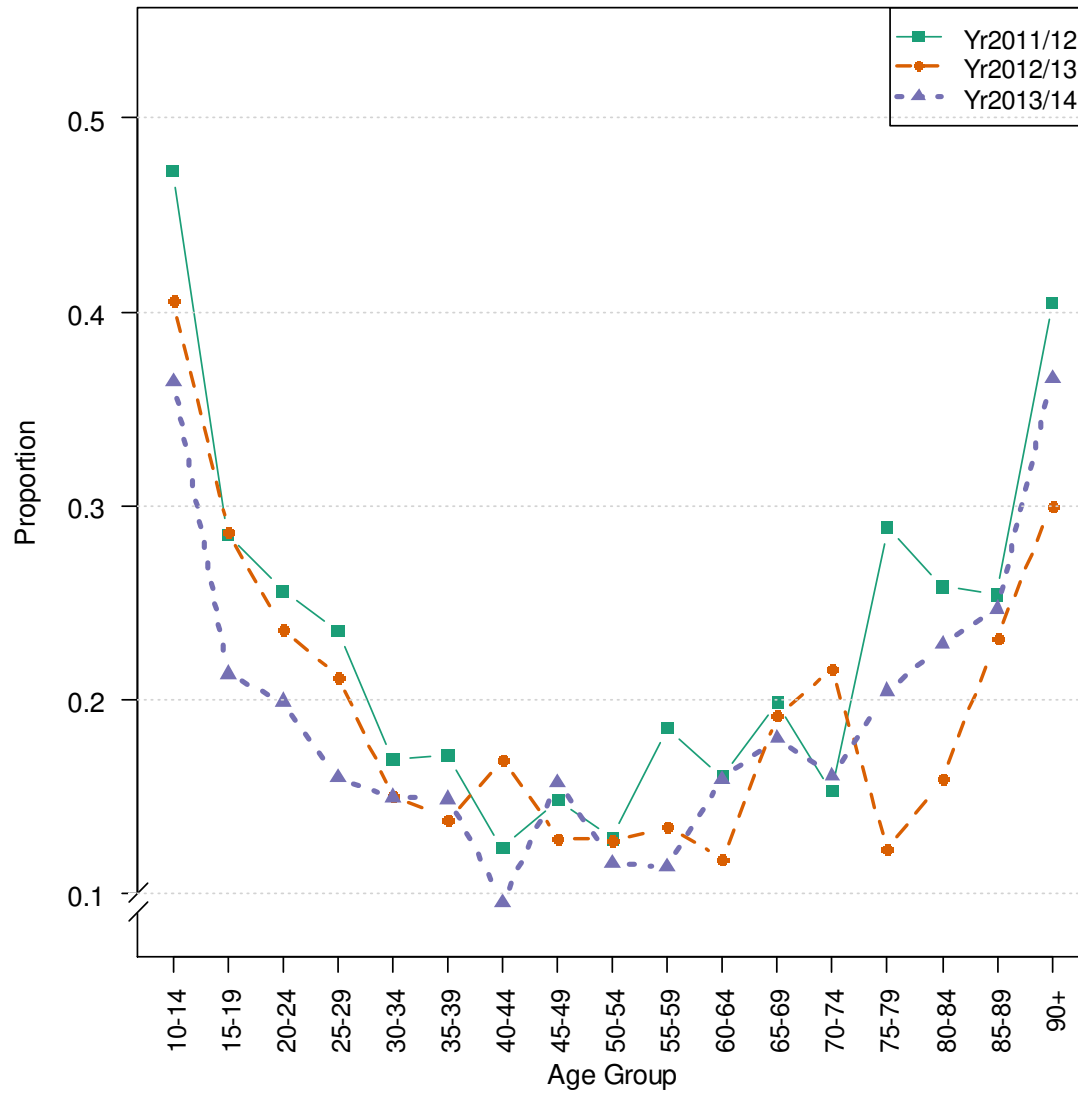
Results are presented in Table 4 and plotted in Figure 3.

Table 4 First Mental Health or Addiction Contact is Emergency Department – Manitoba

Age	2011/12			2012/13			2013/14		
	# with no MHA contact in previous 2 Years	# with a MHA ED Visit in fiscal Year	Proportion Whose 1st Contact was ED	# with no MHA contact in previous 2 Years	# with a MHA ED Visit in fiscal Year	Proportion Whose 1st Contact was ED	# with no MHA contact in previous 2 Years	# with a MHA ED Visit in fiscal Year	Proportion Whose 1st Contact was ED
10-14	17	36	0.47	15	37	0.41	24	66	0.36
15-19	176	617	0.29	191	666	0.29	165	774	0.21
20-24	220	859	0.26	221	936	0.24	190	955	0.20
25-29	159	676	0.24	160	756	0.21	116	727	0.16
30-34	107	632	0.17	96	641	0.15	104	696	0.15
35-39	91	533	0.17	84	608	0.14	88	592	0.15
40-44	65	529	0.12	96	568	0.17	54	568	0.10
45-49	84	567	0.15	75	585	0.13	84	535	0.16
50-54	66	515	0.13	60	471	0.13	59	511	0.12
55-59	65	351	0.19	48	358	0.13	47	414	0.11
60-64	40	250	0.16	31	263	0.12	44	277	0.16
65-69	27	136	0.20	32	167	0.19	36	200	0.18
70-74	14	92	0.15	22	102	0.22	22	137	0.16
75-79	26	90	0.29	12	98	0.12	20	98	0.20
80-84	24	93	0.26	17	107	0.16	29	127	0.23
85-89	17	67	0.25	16	69	0.23	19	77	0.25
90+	17	42	0.40	12	40	0.30	19	52	0.37
Total	1,215	6,085	0.20	1,188	6,472	0.18	1,120	6,806	0.16

Percentages range between 10% and 47%, with the higher percentage being in the younger age groups. The same general pattern over the ages was observed over the three years. There are four instances where the 95% CI for a proportion in a year does not overlap with the 95% CI for the proportions in the other years within a specific age group (ages 15 to 19, 20 to 24, 25 to 29, and 40 to 44).

Figure 3 Plot of Proportion Where First Contact is ED – Manitoba



2.4.4 ALBERTA

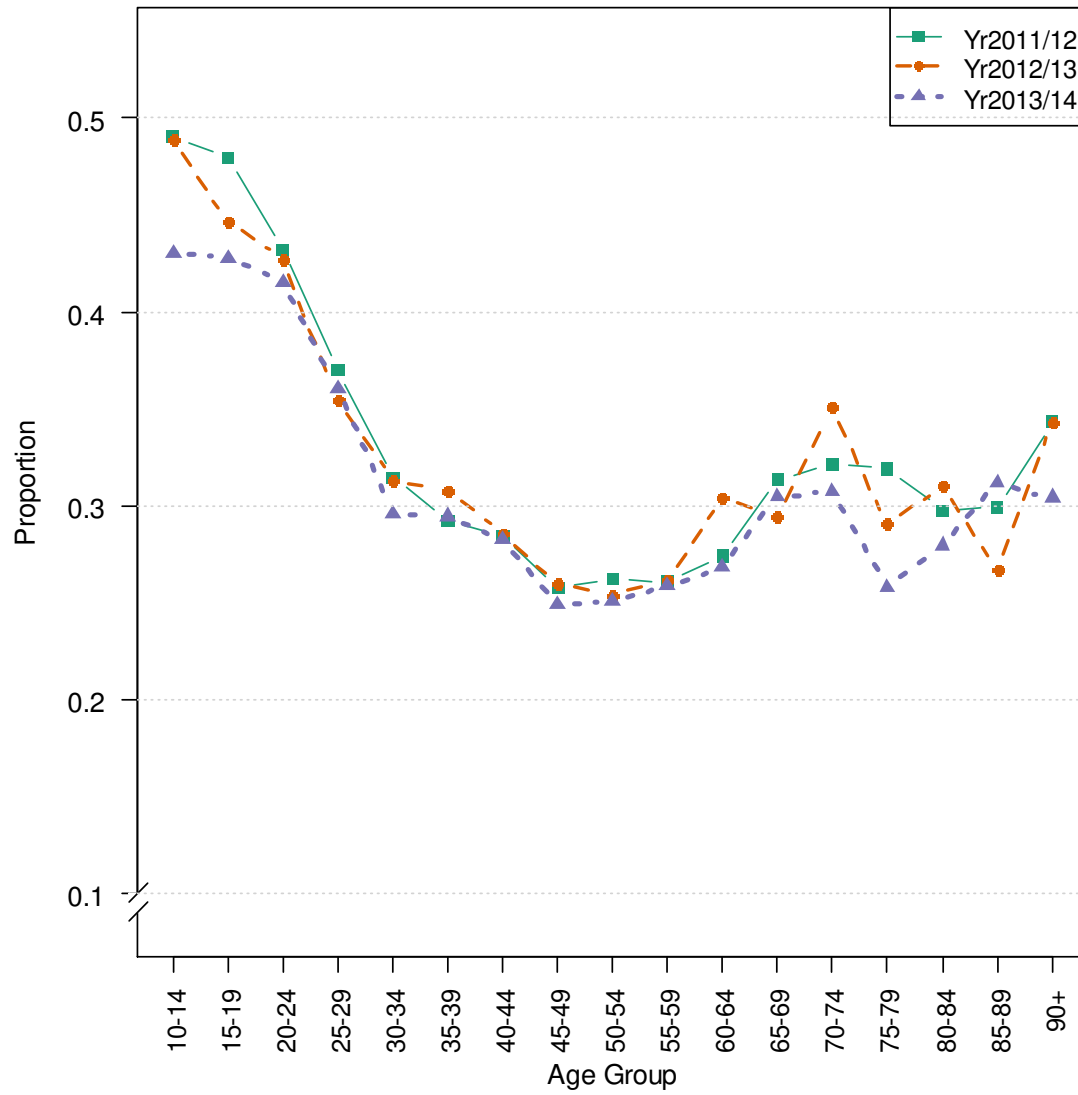
Results are presented in Table 5 and plotted in Figure 4.

Table 5 First Mental Health or Addiction Contact is Emergency Department – Alberta

Age	2011/12			2012/13			2013/14		
	# with no MHA contact in previous 2 Years	# with a MHA ED Visit in fiscal Year	Proportion Whose 1st Contact was ED	# with no MHA contact in previous 2 Years	# with a MHA ED Visit in fiscal Year	Proportion Whose 1st Contact was ED	# with no MHA contact in previous 2 Years	# with a MHA ED Visit in fiscal Year	Proportion Whose 1st Contact was ED
10-14	801	1,634	0.49	911	1,863	0.49	927	2,155	0.43
15-19	2,444	5,096	0.48	2,470	5,531	0.45	2,619	6,124	0.43
20-24	2,153	4,987	0.43	2,373	5,553	0.43	2,398	5,775	0.42
25-29	1,731	4,676	0.37	1,684	4,751	0.35	1,871	5,191	0.36
30-34	1,262	4,013	0.31	1,348	4,307	0.31	1,385	4,681	0.30
35-39	1,032	3,531	0.29	1,094	3,554	0.31	1,113	3,781	0.29
40-44	1,017	3,577	0.28	977	3,422	0.29	977	3,460	0.28
45-49	888	3,448	0.26	900	3,469	0.26	857	3,445	0.25
50-54	836	3,194	0.26	784	3,093	0.25	834	3,324	0.25
55-59	574	2,202	0.26	618	2,359	0.26	616	2,384	0.26
60-64	396	1,445	0.27	446	1,466	0.30	452	1,686	0.27
65-69	335	1,068	0.31	337	1,145	0.29	362	1,189	0.30
70-74	266	827	0.32	296	843	0.35	289	941	0.31
75-79	263	824	0.32	242	833	0.29	226	876	0.26
80-84	256	860	0.30	255	823	0.31	265	949	0.28
85-89	197	659	0.30	177	662	0.27	237	760	0.31
90+	148	431	0.34	159	463	0.34	159	523	0.30
Total	14,599	42,472	0.34	15,071	44,137	0.34	15,587	47,244	0.33

Percentages range between 25% and 49%, with the higher percentage being in the younger age groups. The same general pattern over the ages was observed over the three years. There are two instances where the 95% CI for a proportion in a year does not overlap with the 95% CI for the proportions in the other years within a specific age group (ages 10 to 14 and 15 to 19).

Figure 4 Plot of Proportion Where First Contact is ED – Alberta



2.4.5 BRITISH COLUMBIA

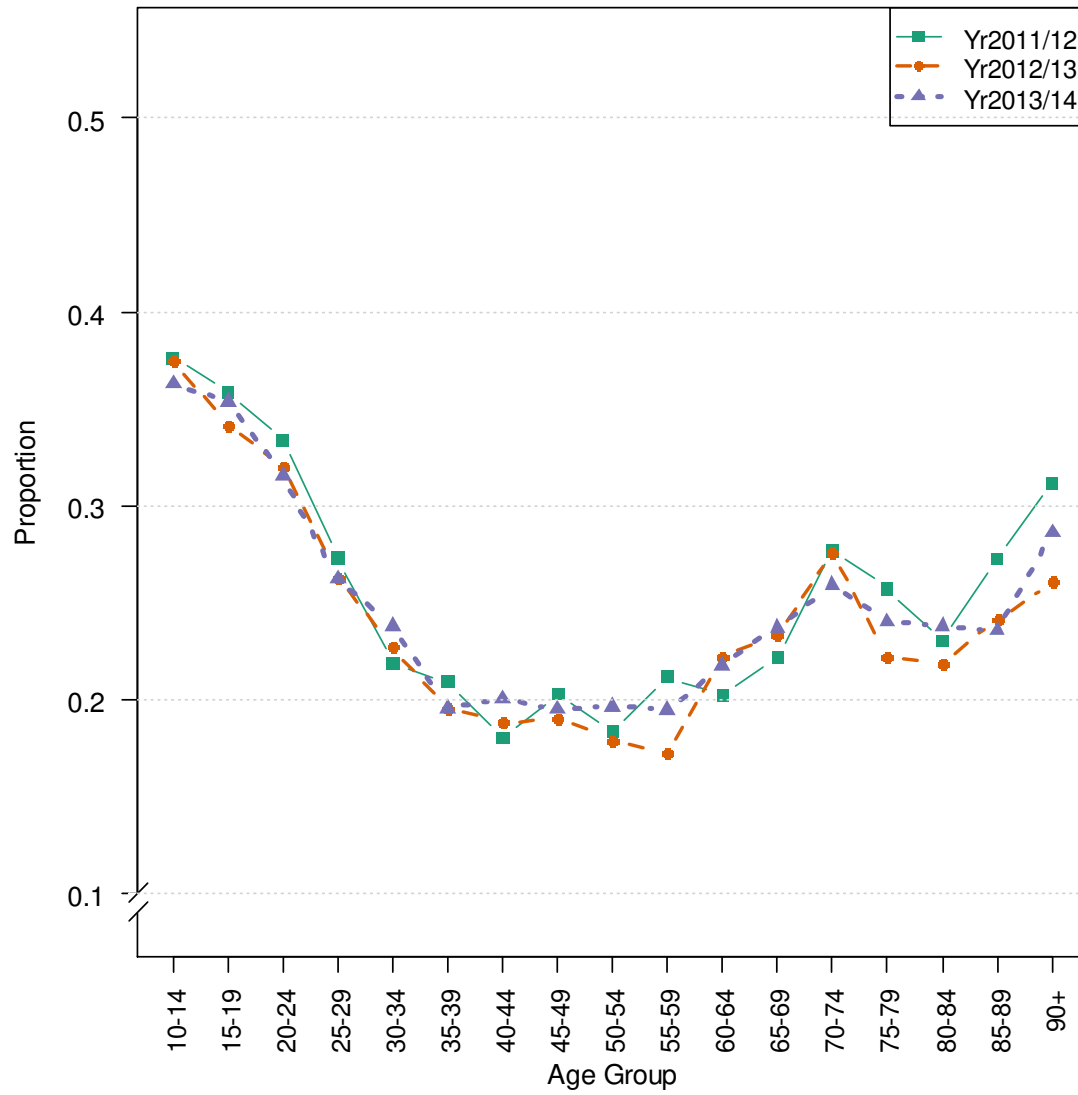
Results are presented in Table 6 and plotted in Figure 5.

**Table 6 First Mental Health or Addiction Contact is Emergency Department
– British Columbia**

Age	2011/12			2012/13			2013/14		
	# with no MHA contact in previous 2 Years	# with a MHA ED Visit in fiscal Year	Proportion Whose 1st Contact was ED	# with no MHA contact in previous 2 Years	# with a MHA ED Visit in fiscal Year	Proportion Whose 1st Contact was ED	# with no MHA contact in previous 2 Years	# with a MHA ED Visit in fiscal Year	Proportion Whose 1st Contact was ED
10-14	189	502	0.38	261	697	0.37	308	849	0.36
15-19	698	1,946	0.36	963	2,820	0.34	1,131	3,199	0.35
20-24	755	2,263	0.33	1,004	3,134	0.32	1,141	3,616	0.32
25-29	549	2,010	0.27	705	2,684	0.26	859	3,277	0.26
30-34	360	1,647	0.22	533	2,351	0.23	675	2,840	0.24
35-39	308	1,476	0.21	407	2,083	0.20	484	2,479	0.20
40-44	291	1,616	0.18	409	2,178	0.19	472	2,355	0.20
45-49	320	1,580	0.20	427	2,245	0.19	462	2,370	0.19
50-54	268	1,462	0.18	366	2,052	0.18	452	2,302	0.20
55-59	233	1,102	0.21	272	1,580	0.17	363	1,867	0.19
60-64	162	802	0.20	269	1,211	0.22	306	1,407	0.22
65-69	129	582	0.22	214	918	0.23	275	1,161	0.24
70-74	114	412	0.28	190	690	0.28	236	911	0.26
75-79	106	412	0.26	159	717	0.22	212	883	0.24
80-84	91	395	0.23	163	747	0.22	204	858	0.24
85-89	100	367	0.27	149	618	0.24	200	849	0.24
90+	81	260	0.31	128	491	0.26	192	671	0.29
Total	4,754	18,834	0.25	6,619	27,216	0.24	7,972	31,894	0.25

Percentages range between 17% and 38%, with the higher percentage being in the younger age groups. The same general pattern over the ages was observed over the three years. There are no instances where the 95% CI for a proportion in a year does not overlap with the 95% CI for the proportions in the other years within a specific age group.

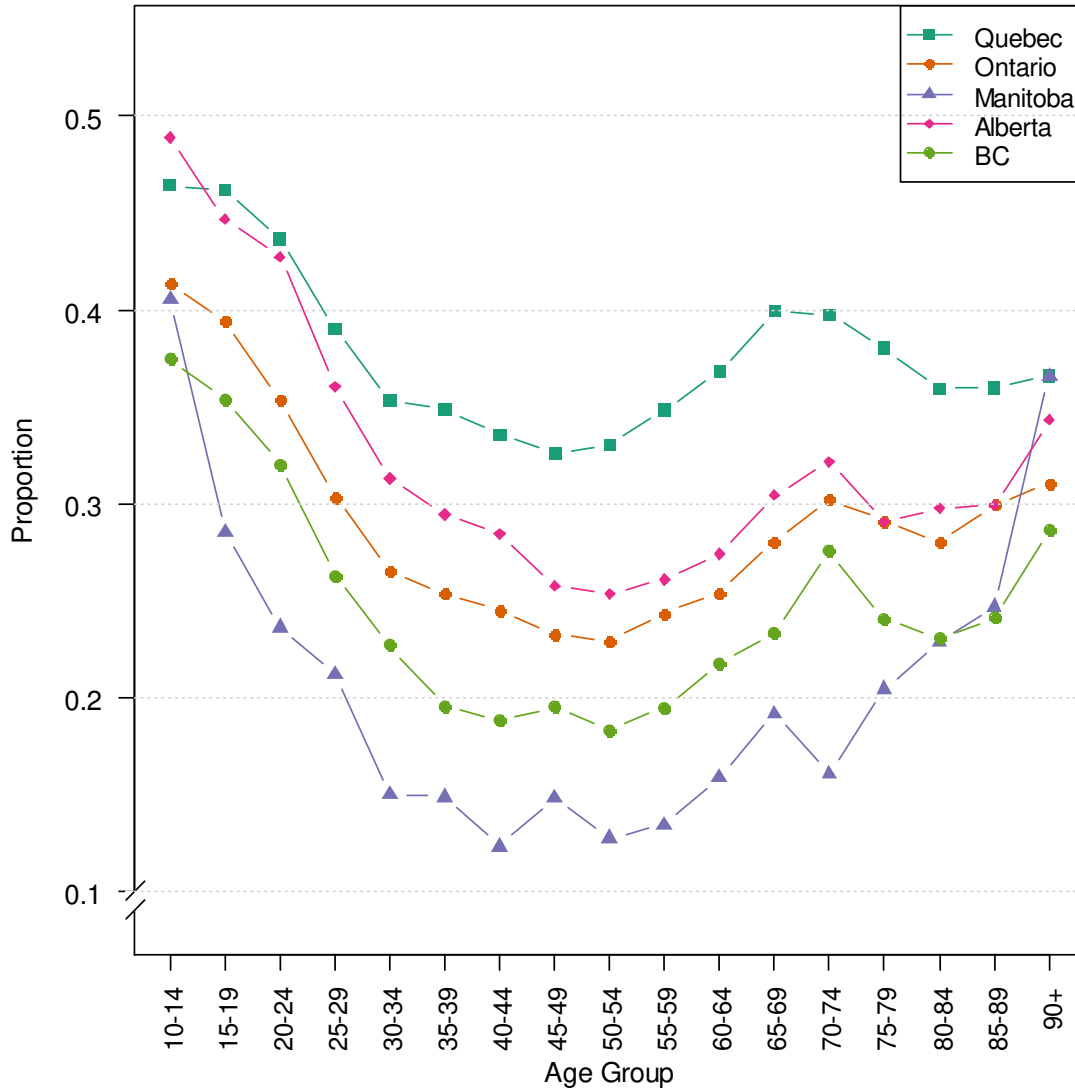
Figure 5 Plot of Proportion Where First Contact is ED – British Columbia



2.4.6 COMBINED DATA

The median proportion by age group for each of the individual provinces is plotted in Figure 6. While the proportions vary between the provinces the shape of the curves is generally the same.

Figure 6 ED First Contact – by Provincial 3-Year Medians



Younger age groups tend to have a higher proportion of individuals whose first MHA contact is through an ED room than older individuals, yet the relationship with age is not linear. All provinces show a drop with increasing age initially with a subsequent upswing starting at approximately the 55 to 59 age group.

2.5 Additional Analyses

2.5.1 CHANGE IN THE MHA CONTACT PERIOD FOR THE NUMERATOR

The above analysis was done using a two-year period as the criterion for assessing lack of prior health system contact for MHA reasons. Two other periods were examined: one year and three years. Data was available for three provinces.¹⁴

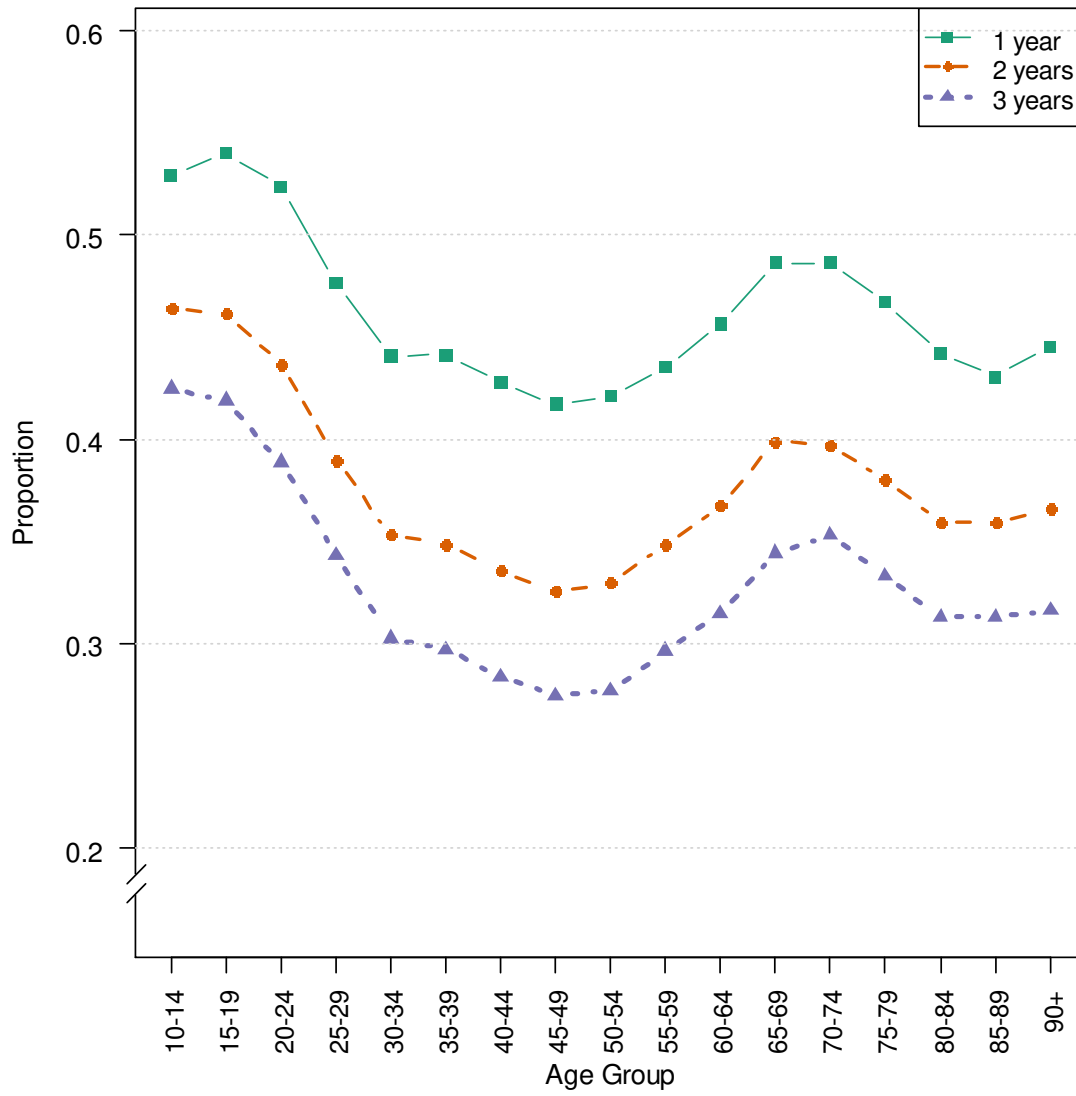
The data was summarized in the following manner. For each province, the median value was taken at each age group over the results for 2011, 2012, and 2013. See Figure 7.

The results are the same for all three provinces. The pattern observed with the two-year observation period is preserved in the one- and three-year period. A higher proportion of ED first visits is evident when a one-year history is compared to a two-year history. The two-year history is higher than the three-year history. The difference between one and two year histories is greater than the differences between the two and three year histories.

¹⁴ Data for BC was not analyzed because the number of institutions reporting to NACRS was increasing over this period resulting in a confound between the time and reporting rates.

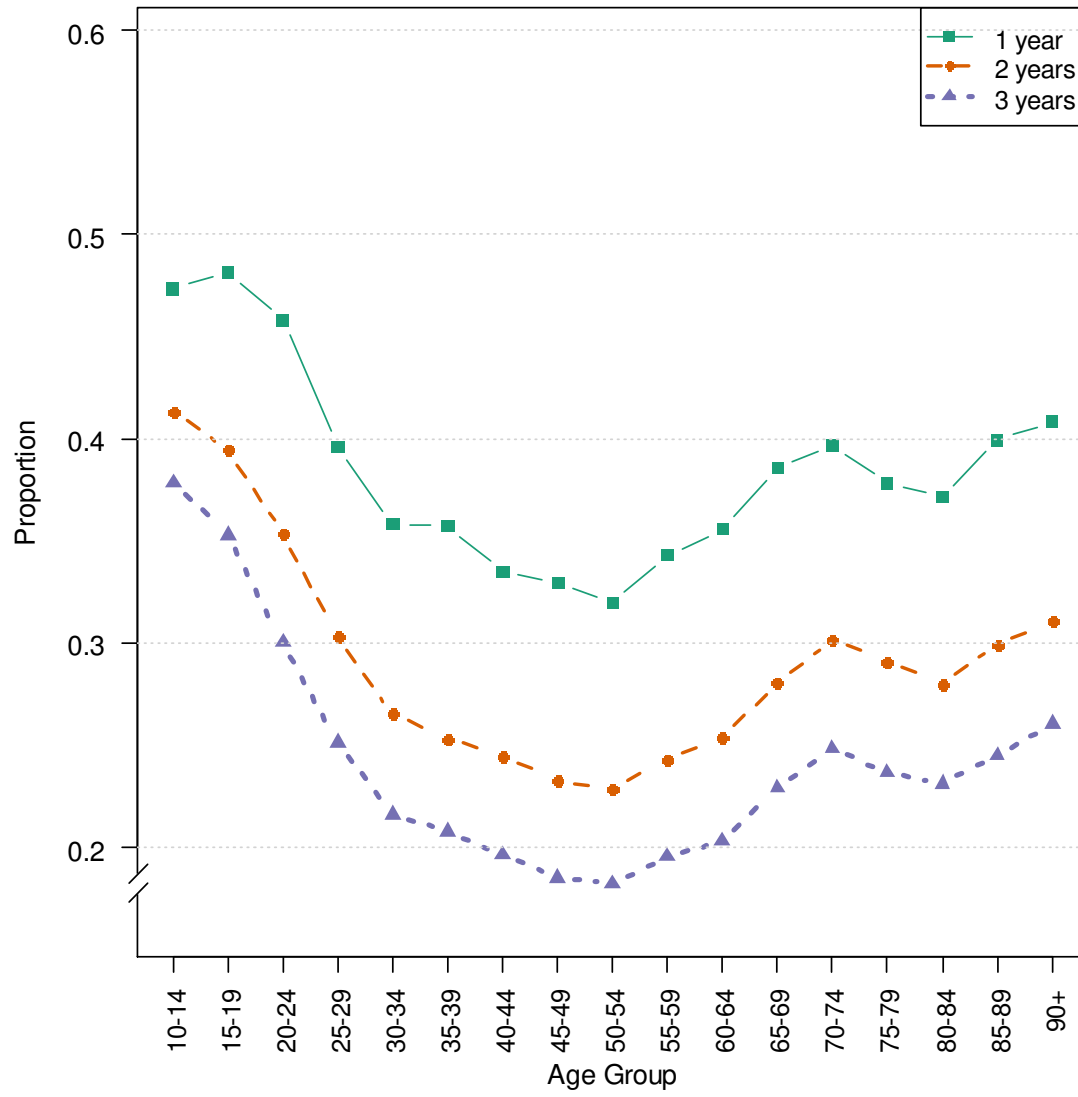
Figure 7 Differences Introduced by Varying the Time Span for First Contact

Quebec



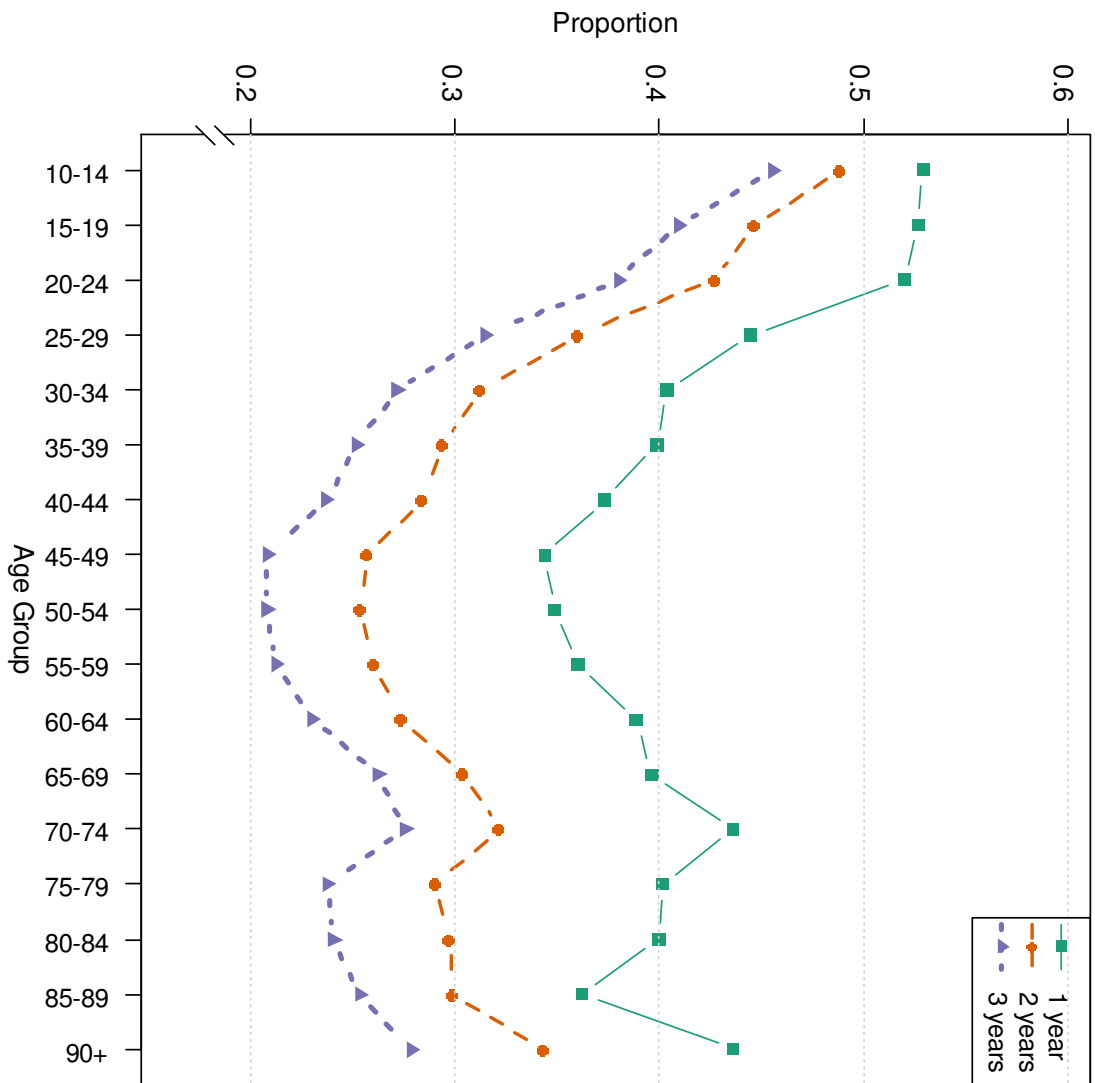
cont.

Ontario



cont.

Alberta



2.5.2 DROPPING DEMENTIA CASES

The analysis was rerun eliminating dementia cases (ICD10 F00 to F03, or ICD9 290 and 294). Data was provided by two provinces (Quebec and Ontario) and is plotted in Figure 8 and Figure 9.

As would be expected, both provinces show almost no difference in ages less than 65 between the ED results with or without dementia. After this age, the proportion of ED MHA cases without a MHA contact in the previous two years is slightly higher in both provinces. The similar shaped curve, however, suggests that the pattern observed in older age groups cannot be solely attributed to dementia diagnoses.

Figure 8 Plot of Proportion Where First Contact is ED with and without Dementia – Quebec

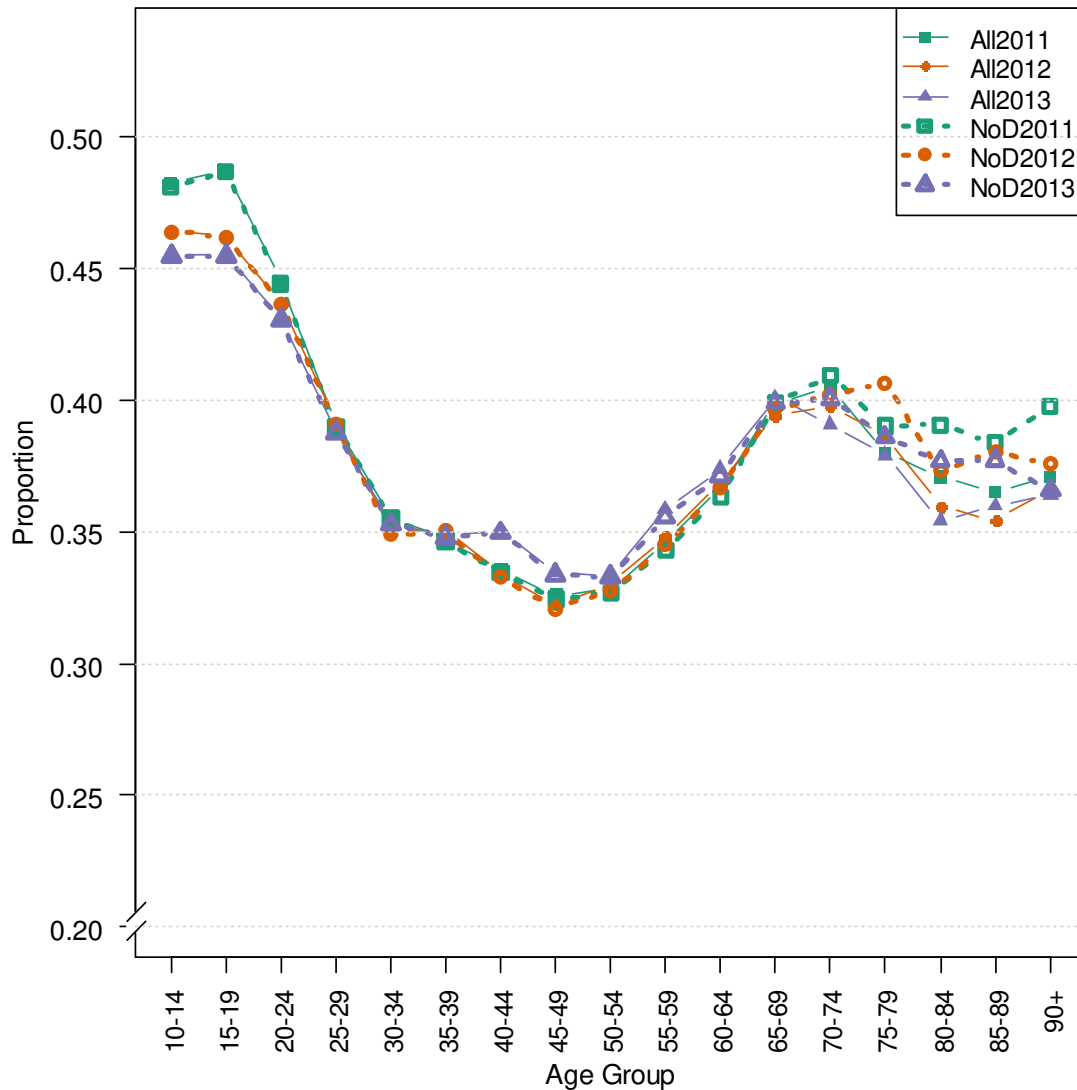
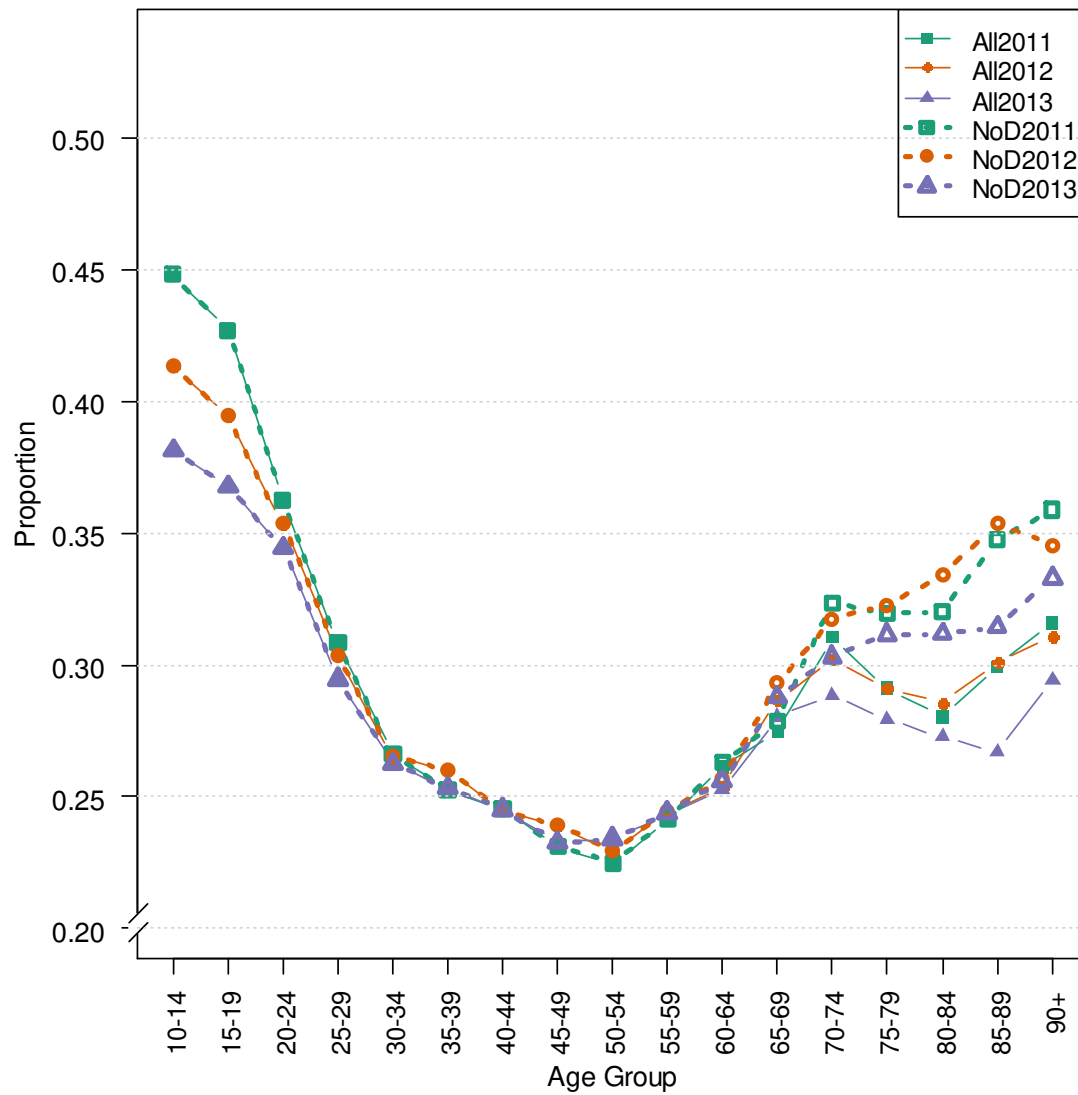


Figure 9 Plot of Proportion Where First Contact is ED with and without Dementia – Ontario



2.5.3 ADDITIONAL SOURCES OF MHA TREATMENT

This analysis was not performed.

3 Mortality of people diagnosed with a mental disorder or addiction

3.1 Measure

The number of deaths in the mental illness and addiction population of a province
divided by
 the expected number of deaths in the MHA population based on the provincial age- and sex-specific death rates.

3.2 Data Selection Process

The selection was done separately for the fiscal years 2010/11, 2011/12, and 2012/13.¹⁵ The goal was to identify a data set consisting of individuals treated for a MHA reason any time in the prior two fiscal years and who were alive at the start of the fiscal year. From this group, the number who died during the fiscal year was identified. The age- and sex-mortality pattern for the MHA treated population was then compared to the expected number of deaths given the age- and sex-mortality pattern of the province's population.

3.2.1 IDENTIFICATION OF THE MHA POPULATION

1. For a fiscal year in question, select all records from the physician-billing database where the billing diagnosis is a MHA diagnosis and the date of service is in the prior two fiscal years.
 - MHA diagnoses are any ICD10 Chapter V (F00 to F99) or ICD9 Chapter V (290 to 319) diagnosis.
2. Drop out so called "problem" records, that is, records where:
 - a. Provincial identity number is invalid
 - b. Sex is missing
 - c. Not resident of province
 - d. Date of birth is missing or is such that the age is a negative number or greater than 125 at the time of service
3. If there is more than one physician visit in the fiscal year for an individual, drop all but the last visit.
4. For a fiscal year select all records from the hospital discharge database where the discharge diagnosis is a MHA diagnosis and the date of discharge is in the prior two fiscal years.
5. Drop out "problem" records, that is, records where:
 - a. Provincial identity number is invalid

¹⁵ These dates are the last three years that can be done as of this date because of limitations in the CANSIM mortality database (have deaths to year 2012). These might be able to be moved forward should additional years become available in CANSIM, although the 2012 data was added in December of 2015 and a release date for additional data has not been established (communication from Statistics Canada).

- b. Sex is missing
 - c. Not resident of province
 - d. Date of birth is missing or is such that the age is a negative number or greater than 125 at the time of service.
6. If there is more than one hospital discharge in the fiscal year for an individual, drop all but the last discharge.
 7. Merge the records selected by physician and records selected by hospital.
 8. If there is more than one visit in the fiscal year for an individual, drop all but the last visit.
 9. If the individual's age at the time of the last visit was less than 10 drop from the dataset.
 10. If the individual died before the start of the fiscal year being analyzed drop from the dataset.

The records form the data set of the MHA population for that fiscal year.

3.2.2 IDENTIFICATION OF MORTALITY IN MHA GROUP

For every record in the data set derived in 3.2.1, determine if the individual is represented in mortality data with a date of death within the fiscal year being analyzed.

3.2.3 EXPECTED DEATHS

Provincial age- and sex-specific death rates can be derived from CANSIM¹⁶ tables 102-0503 (deaths) and 051-0001 (population). From these tables an age- and sex-specific mortality rate can be calculated. The number of expected deaths calculation is the age- and sex-specific provincial population death rate multiplied by the observed number of MHA cases (#MHA).

3.3 Data Sources and Notes

Instead of a standardized mortality ratio (SMR) Quebec calculated the rate of death in the fiscal year for people with a MHA diagnosis in the previous two years and the rate for people without MHA diagnosis in the previous two years.¹⁷ Consequently the Quebec results cannot be compared with the results in other provinces.

No other province reported issues with using their mortality data or accessing population data. However, while Ontario produced mortality rates and SMRs the results are in the process of being validated and were not ready at time of publication.

¹⁶ Canadian Socio-economic database. Statistics Canada.

www5.statcan.gc.ca/cansim/a01?lang=eng

¹⁷ Quebec's source and collaborator to the project was its Chronic Disease Surveillance System of the Public Health Agency of Quebec. It is its policy to release only standardised mortality data. (see Blais C et al, Quebec Integrated Chronic Disease Surveillance System (QICDSS), an innovative approach. *Chronic Dis Inj Can.* 2014 Nov;34(4):226-35. English, French.).

Deaths in the 10 to 14 age group were infrequent, producing SMRs that varied within a province by a large degree over the three years examined. For that reason the *Data Interpretation Working Group* decided not to include this age range in the results.

In the plots, the Y-axis range covers all provinces and thus some plots have large areas of “white space.” This indirectly indicates the results for this province are different from at least some other province. Note that the Y-axis has been set to start at zero and there is a heavy line at SMR 1 (indicating the value where no difference in the SMR would exist).

3.4 Results

Results were summarized by 5-year age groups for the total sample and by sex. Results for each province are presented separately and then combined.

For this indicator there are three SMR measures for each age group, one for each year. We have calculated (but do not present) the 95% confidence interval (CI)¹⁸ for each of the SMRs in each of the years within each age group. These were examined to see if any of the SMRs had a CI that overlaps with the value of 1.00. Such an overlap would indicate that the mortality rate of the MHA group was not different from that of the overall population in that age group.

Because of the occasional small cell size (especially in the sex- and hospital-specific data) only the SMRs are presented in this chapter. As noted, the SMR results for 10 to 14 were not included.

3.4.1 QUEBEC

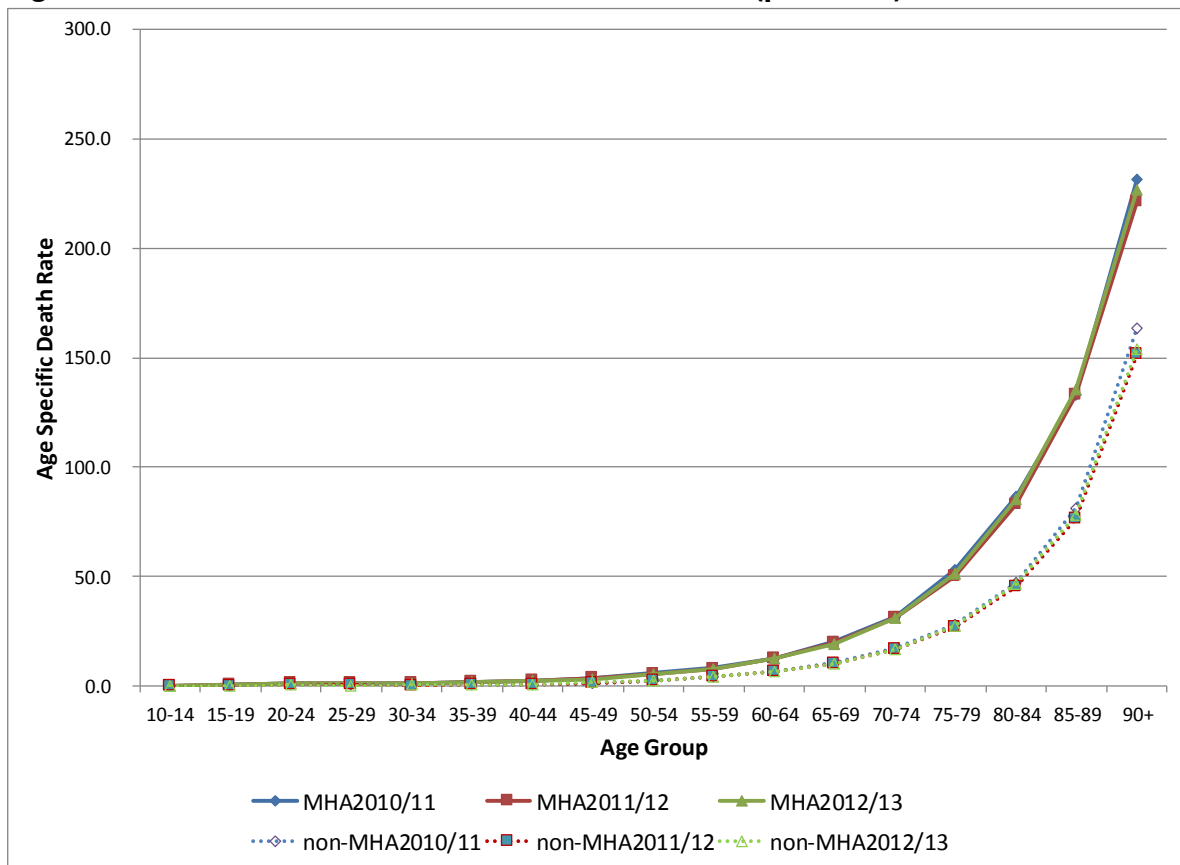
As stated above, instead of a SMR, Quebec calculated the rate of death in the fiscal year for people with a MHA diagnosis in the previous two years and the same rate but for people without MHA diagnosis in the previous two years. Results are presented in Table 7 and Figure 10. The MHA rates are higher than the non-MHA rates across all ages, making the pattern of these results consistent with the SMR data that follows.

¹⁸ There are a variety of ways to calculate the CI of the SMR. Here we have used the simplest method: 1.96 times the standard error of the SMR which is estimated by the SMR divided by the square root of the number of observed deaths. These results tend to be conservative (in that they are sometimes wider than other methods might produce).

Table 7 MHA and non-MHA Death Rates (per 1000) – Quebec

Age	MHA Population			non-MHA Population		
	2010/11	2011/12	2012/13	2010/11	2011/12	2012/13
10-14	0.2	0.2	0.2	0.1	0.1	0.1
15-19	0.7	0.8	0.7	0.3	0.2	0.2
20-24	1.0	1.1	1.0	0.4	0.4	0.4
25-29	1.4	1.2	1.1	0.4	0.4	0.3
30-34	1.5	1.5	1.4	0.4	0.3	0.4
35-39	1.8	1.6	1.7	0.5	0.5	0.6
40-44	2.4	2.3	2.3	0.9	0.8	0.8
45-49	3.6	3.6	3.1	1.5	1.4	1.5
50-54	5.8	5.6	5.3	2.4	2.4	2.6
55-59	8.5	7.9	7.8	4.1	4.1	4.2
60-64	12.6	12.4	12.8	6.8	6.6	6.6
65-69	20.4	19.8	19.2	10.8	10.3	10.3
70-74	31.9	31.2	31.3	17.3	17.0	16.8
75-79	52.9	50.0	51.1	28.3	26.6	27.3
80-84	86.5	82.9	85.5	47.3	45.2	46.3
85-89	133.2	133.2	135.4	81.2	76.3	78.0
90+	231.2	221.3	226.5	163.4	151.7	153.7
Crude	17.1	16.9	17.5	6.6	6.5	6.8
Age Std	12.3	11.9	11.9	6.8	6.4	6.5

Figure 10 Plot of MHA and non-MHA Death Rates (per 1000) – Quebec



3.4.2 ONTARIO

Ontario produced mortality rates and SMRs but the results are in the process of being validated and were not ready at time of publication.

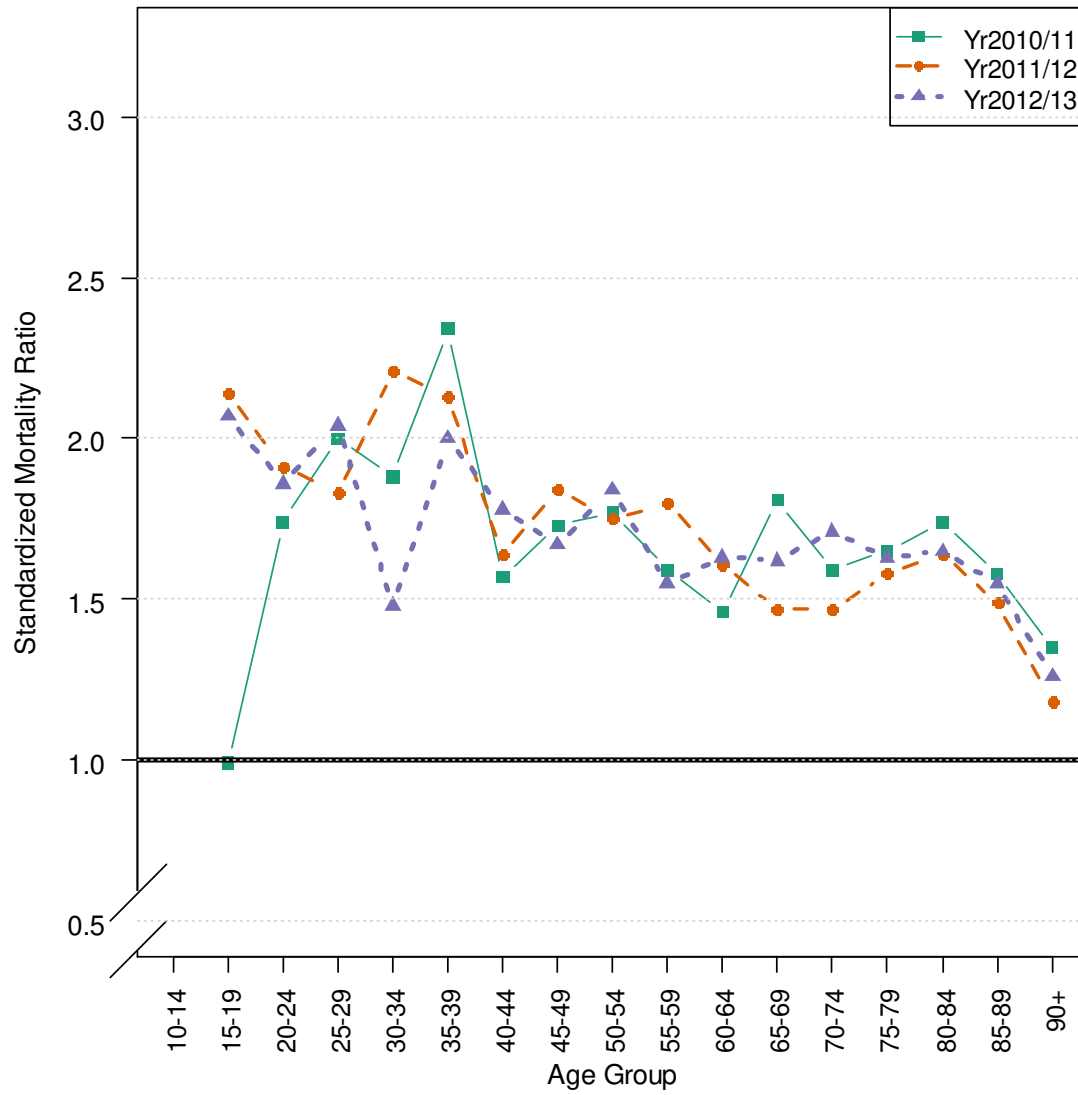
3.4.3 MANITOBA

Results are presented in Table 8 and plotted in Figure 11. SMRs ranged between 0.99 and 2.34. In all but two cases (2010/11 age 15-19, 2012/13 age 30-34) the SMR CIs are greater than 1.0, indicating higher risk of mortality in the MHA group.

Table 8 All MHA Standardized Mortality Ratio Results – Manitoba

Age	SMR		
	2010/11	2011/12	2012/13
10-14			
15-19	0.99	2.14	2.07
20-24	1.74	1.91	1.86
25-29	2.00	1.83	2.04
30-34	1.88	2.21	1.48
35-39	2.34	2.13	2.00
40-44	1.57	1.64	1.78
45-49	1.73	1.84	1.67
50-54	1.77	1.75	1.84
55-59	1.59	1.80	1.55
60-64	1.46	1.61	1.63
65-69	1.81	1.47	1.62
70-74	1.59	1.47	1.71
75-79	1.65	1.58	1.63
80-84	1.74	1.64	1.65
85-89	1.58	1.49	1.55
90+	1.35	1.18	1.26
Total	1.57	1.49	1.54

Figure 11 Plot of All MHA Standardized Mortality Ratio Results – Manitoba



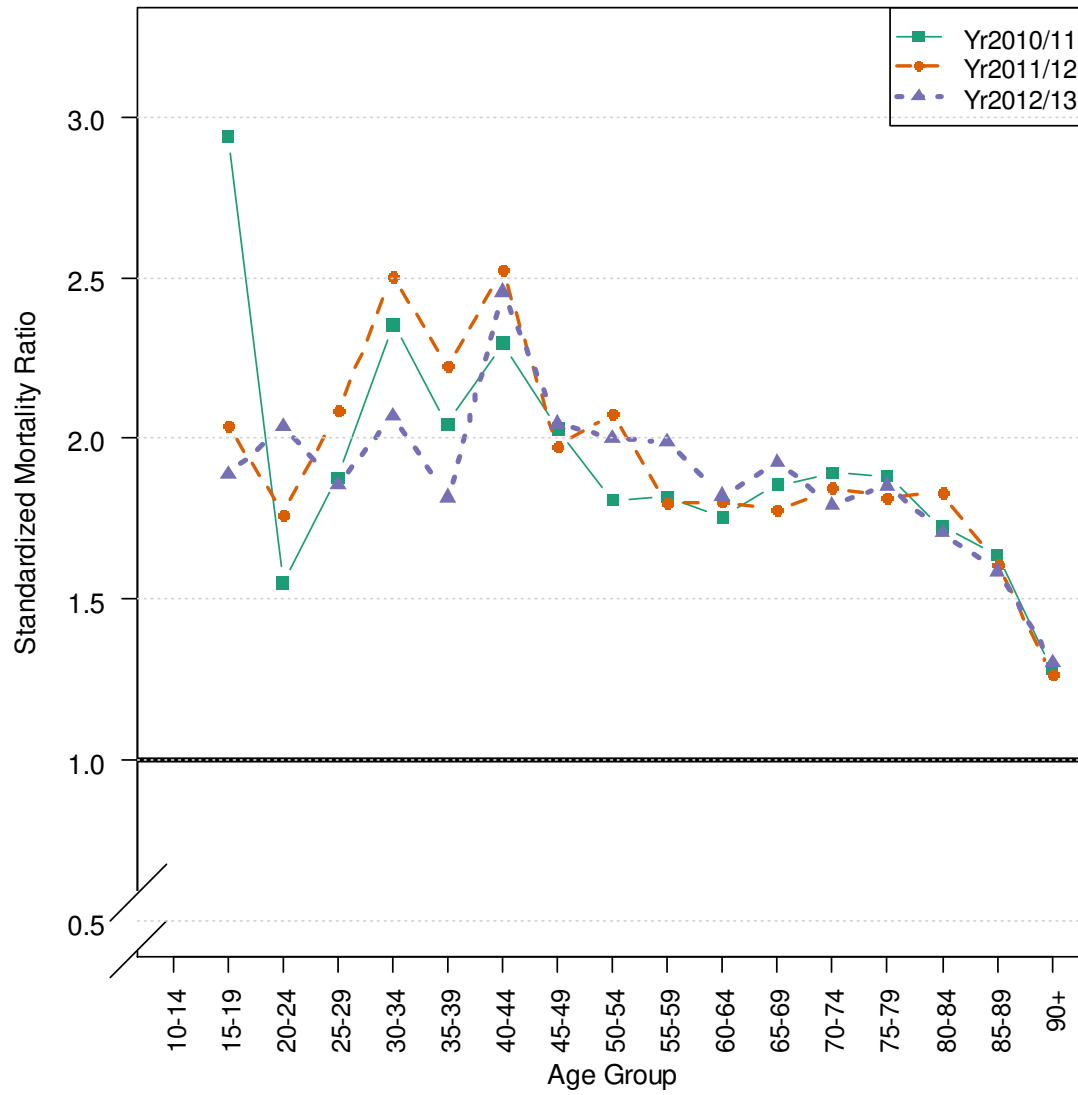
3.4.4 ALBERTA

Results are presented in Table 9 and plotted in Figure 12. SMRs ranged between 1.55 and 2.94.

Table 9 All MHA Standardized Mortality Ratio Results – Alberta

Age	SMR		
	2010/11	2011/12	2012/13
10-14			
15-19	2.94	2.04	1.89
20-24	1.55	1.76	2.04
25-29	1.88	2.09	1.86
30-34	2.35	2.51	2.07
35-39	2.04	2.22	1.82
40-44	2.30	2.52	2.46
45-49	2.03	1.97	2.05
50-54	1.81	2.08	2.00
55-59	1.82	1.80	1.99
60-64	1.76	1.80	1.82
65-69	1.86	1.78	1.93
70-74	1.89	1.85	1.79
75-79	1.88	1.81	1.85
80-84	1.72	1.83	1.71
85-89	1.64	1.61	1.59
90+	1.29	1.27	1.30
Total	2.14	2.14	2.15

Figure 12 Plot of All MHA Standardized Mortality Ratio Results – Alberta



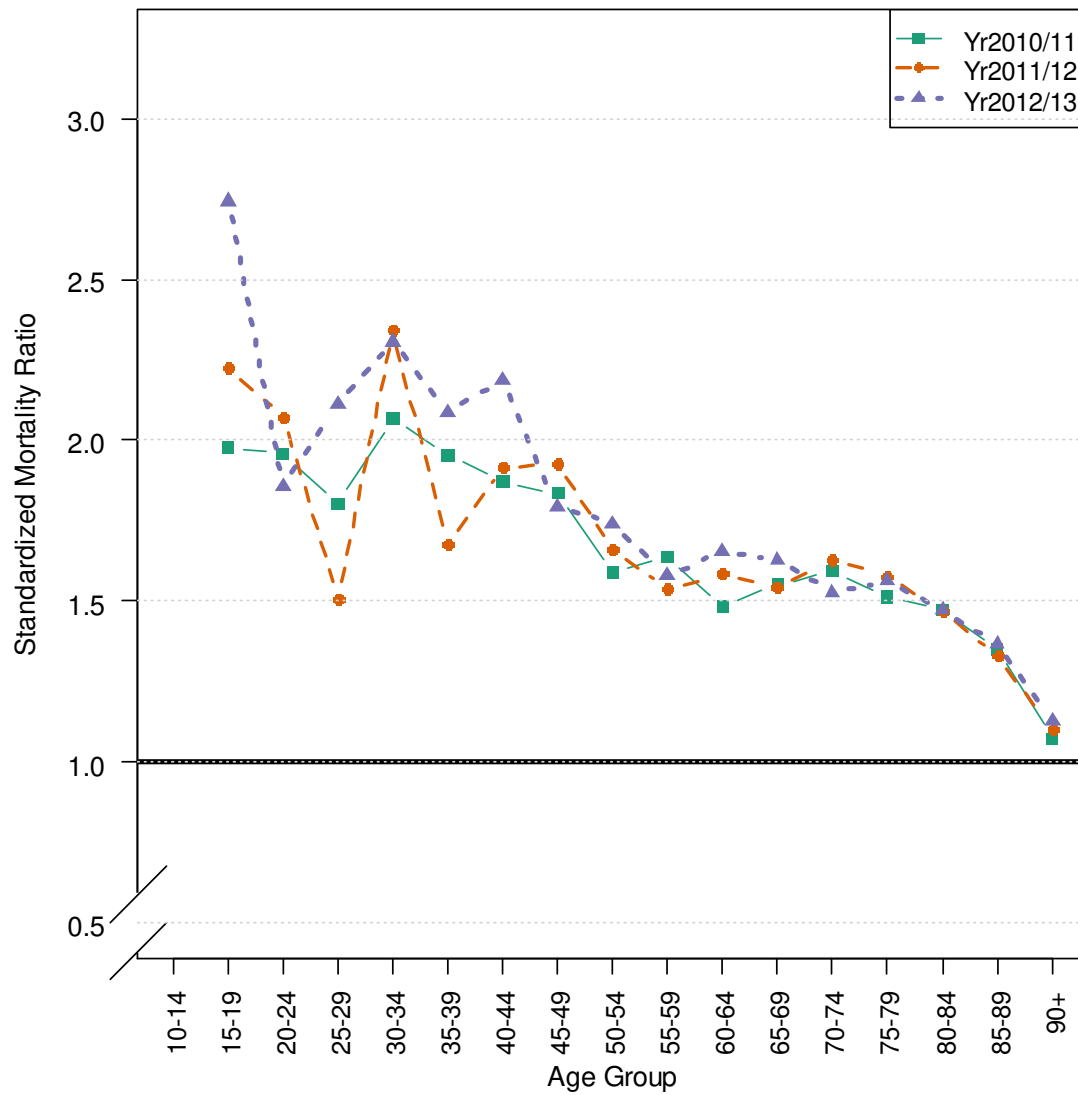
3.4.5 BRITISH COLUMBIA

Results are presented in Table 10 and plotted in Figure 13. SMRs range between 1.07 and 2.74. In all cases the SMR CIs are greater than 1.0, indicating higher risk of mortality in the MHA group.

Table 10 All MHA Standardized Mortality Ratio Results – British Columbia

Age	SMR		
	2010/11	2011/12	2012/13
10-14			
15-19	1.98	2.23	2.74
20-24	1.96	2.07	1.86
25-29	1.80	1.51	2.11
30-34	2.07	2.34	2.31
35-39	1.95	1.68	2.09
40-44	1.87	1.92	2.19
45-49	1.83	1.93	1.79
50-54	1.59	1.66	1.74
55-59	1.64	1.54	1.58
60-64	1.48	1.58	1.65
65-69	1.55	1.54	1.63
70-74	1.59	1.63	1.53
75-79	1.51	1.58	1.56
80-84	1.47	1.47	1.47
85-89	1.35	1.33	1.37
90+	1.07	1.10	1.13
Total	1.39	1.40	1.42

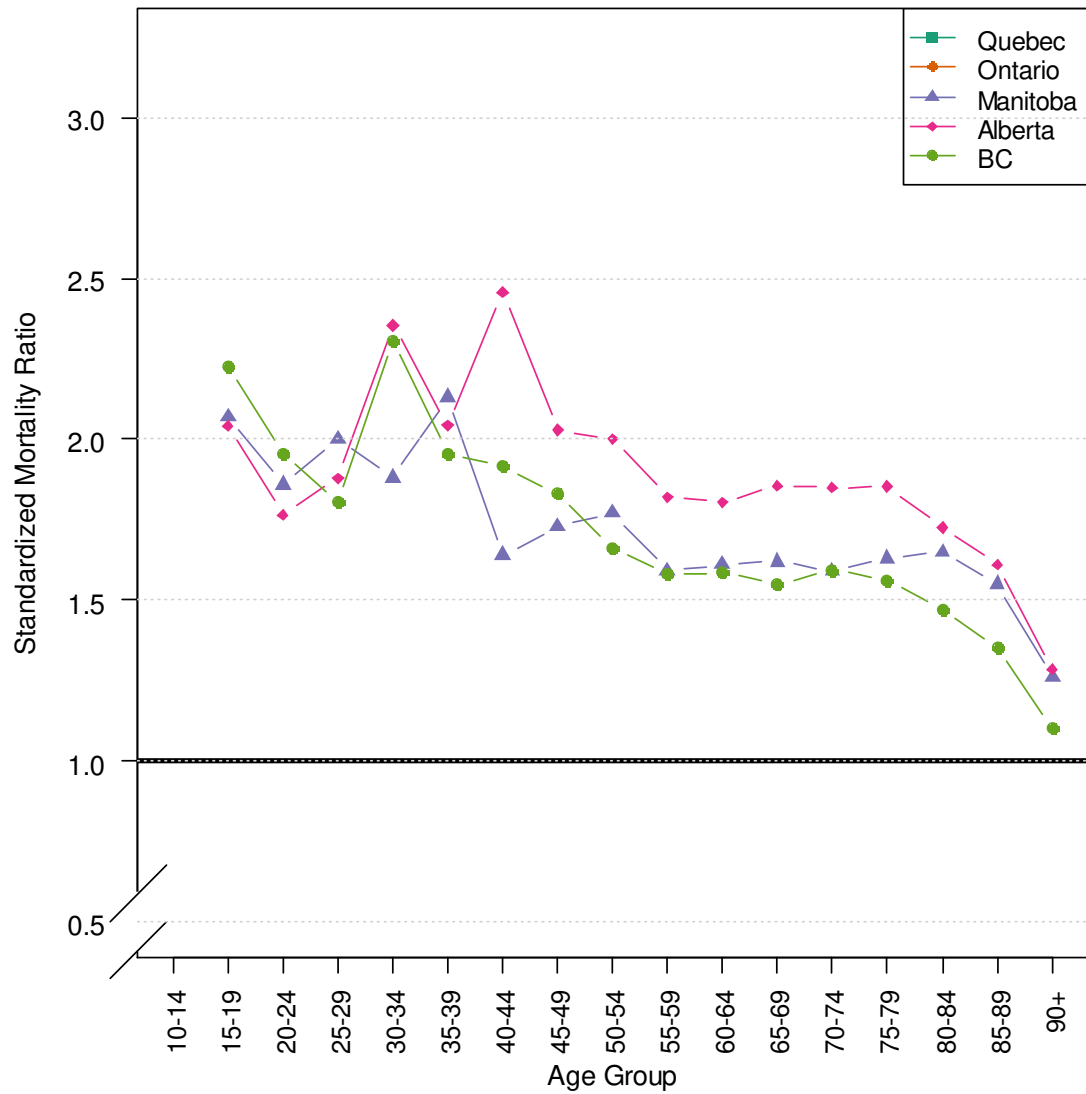
Figure 13 Plot of All MHA Standardized Mortality Ratio Results – British Columbia



3.4.6 COMBINED DATA

The median SMRs by age group for each of the individual provinces is plotted in Figure 14. The shape of the curves is generally similar but the Ontario SMRs are clearly higher across all ages.

Figure 14 Plot of All MHA Standardized Mortality Ratio Results – by Provincial 3 Year Medians



3.5 Additional Analysis 1: Population from Hospital Discharges

The analysis above was repeated for the MHA population consisting of only those discharged from hospital with a MHA diagnosis. Data selection instructions were changed accordingly. The following details the revised approach from that described in section 3.2.1.

3.5.1 IDENTIFICATION OF THE MHA HOSPITAL ONLY POPULATION

1. For a fiscal year select all records from the hospital discharge database where the discharge diagnosis is a MHA diagnosis and the date of discharge is in the prior two fiscal years.
 - MHA diagnoses are any ICD10 Chapter V (F00 to F99) or ICD9 Chapter V (290 to 319) diagnosis.
2. Drop out so called “problem” records, that is, records where:
 - Provincial identity number is invalid
 - Sex is missing
 - Not resident of province
 - Date of birth is missing or is such that the age is a negative number or greater than 125 at the time of service
3. If there is more than 1 hospital discharge in the fiscal year for an individual, drop all but the last discharge.
4. If the individual’s age at the time of the last visit was less than 10 drop from the dataset.

The records form the data set of the MHA hospital population for that fiscal year.

The above sections regarding “Identification of the mortality,” the calculation of the “expected number of deaths” and the calculation of the SMR follow the same procedures as described above.

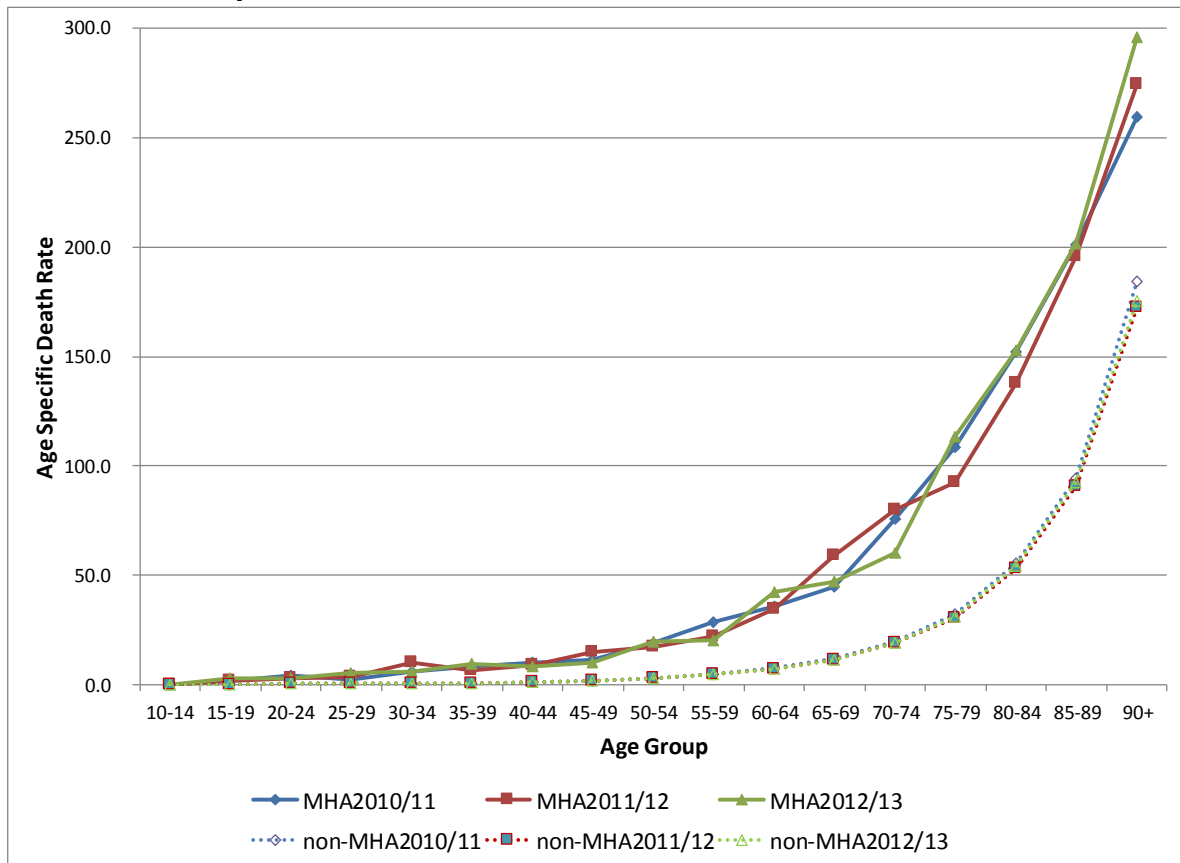
3.5.2 QUEBEC

As above, Quebec calculated the rate of death in the fiscal year for people with a hospital discharge with a MHA diagnosis in the previous two years and the same rate but for people without MHA diagnosis in the previous two years. Results are presented in Table 7 and Figure 15. The MHA rates are higher than the non-MHA rates at all ages, consistent with the hospital specific SMR data that follows.

Table 11 Mortality rates for individuals with and without previous MHA hospitalization – Quebec

Age	MHA Population			non-MHA Population		
	2010/11	2011/12	2012/13	2010/11	2011/12	2012/13
10-14						
15-19	1.6	1.6	2.9	0.3	0.3	0.3
20-24	4.4	2.9	2.8	0.5	0.4	0.4
25-29	2.6	3.9	5.4	0.5	0.5	0.4
30-34	6.2	10.0	6.0	0.5	0.4	0.5
35-39	8.3	6.7	9.3	0.7	0.7	0.7
40-44	10.3	9.2	8.2	1.1	1.1	1.0
45-49	11.1	14.8	10.1	1.9	1.7	1.8
50-54	19.2	17.1	19.6	3.0	2.9	3.0
55-59	28.6	22.1	20.3	4.8	4.8	4.8
60-64	36.1	34.5	42.3	7.7	7.5	7.5
65-69	44.7	59.1	47.4	12.3	11.7	11.6
70-74	75.9	80.2	60.1	19.6	19.1	19.1
75-79	108.8	92.4	113.1	32.5	30.7	31.2
80-84	152.3	137.8	152.5	55.4	53.0	54.3
85-89	201.0	195.9	201.7	94.2	90.7	92.4
90+	259.4	274.5	296.1	184.2	172.2	175.1
Crude	40.5	41.6	44.4	8.2	8.1	8.4
Age Std	26.5	26.0	26.0	7.8	7.5	7.6

Figure 15 Plot of Mortality rates for individuals with and without previous MHA hospitalization – Quebec



3.5.3 ONTARIO

Ontario produced mortality rates and SMRs but the results are in the process of being validated and were not ready at time of publication.

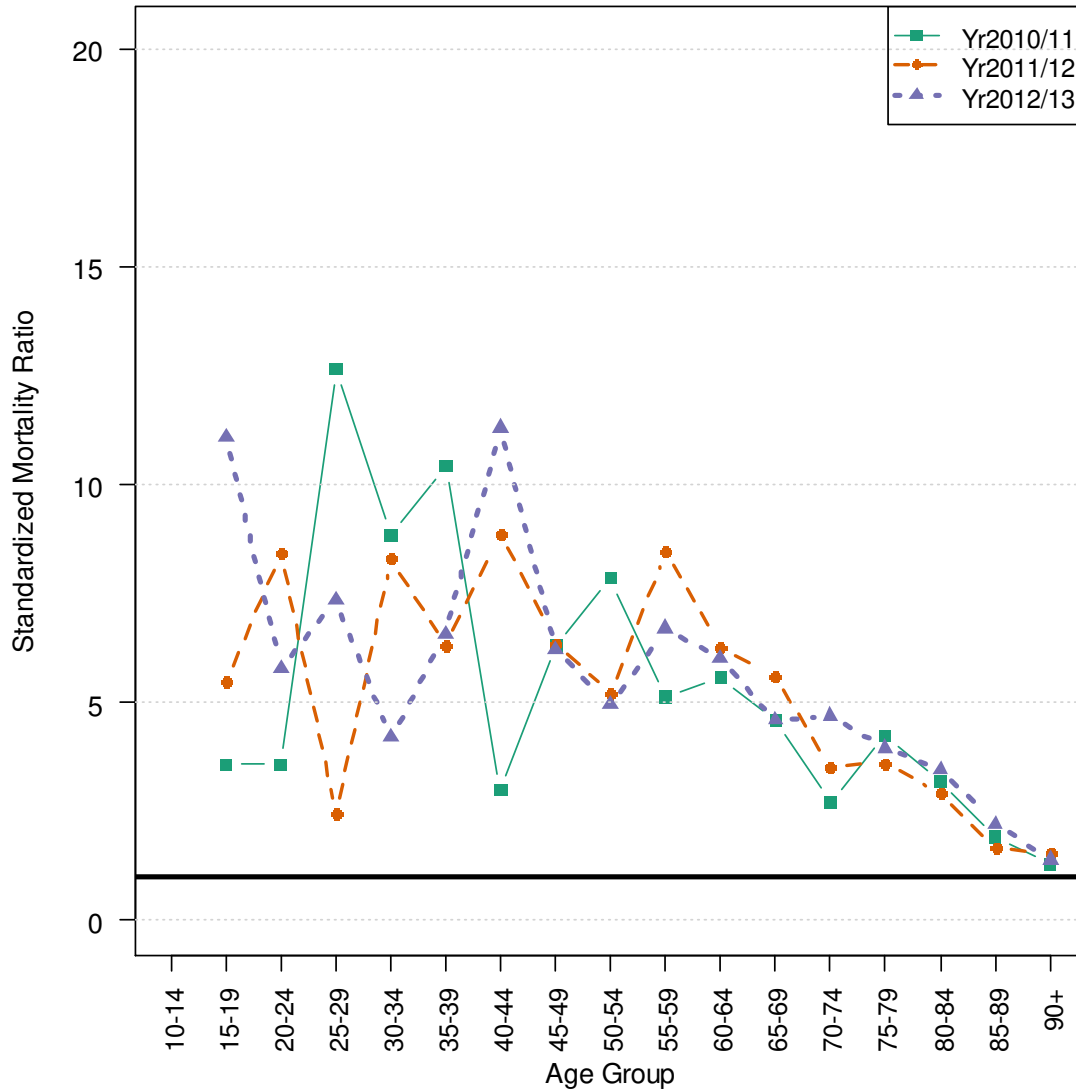
3.5.4 MANITOBA

Results are presented in Table 12 and plotted in Figure 16. SMRs range between 0.99 and 2.34. In all but one case (2010/11, age 90+) the SMR CIs are greater than 1.0, indicating higher risk of mortality in the MHA group.

Table 12 Hospital Discharge MHA Standardized Mortality Ratio Results – Manitoba

Age	SMR		
	2010/11	2011/12	2012/13
10-14			
15-19	3.57	5.47	11.08
20-24	3.58	8.41	5.78
25-29	12.66	2.44	7.34
30-34	8.85	8.29	4.20
35-39	10.41	6.30	6.55
40-44	2.96	8.87	11.30
45-49	6.30	6.35	6.20
50-54	7.84	5.21	4.95
55-59	5.12	8.47	6.69
60-64	5.56	6.25	6.00
65-69	4.58	5.61	4.58
70-74	2.70	3.52	4.69
75-79	4.23	3.60	3.94
80-84	3.17	2.90	3.44
85-89	1.89	1.64	2.20
90+	1.29	1.55	1.38
Total	2.64	2.65	2.86

Figure 16 Plot of Hospital Discharge MHA Standardized Mortality Ratio Results – Manitoba



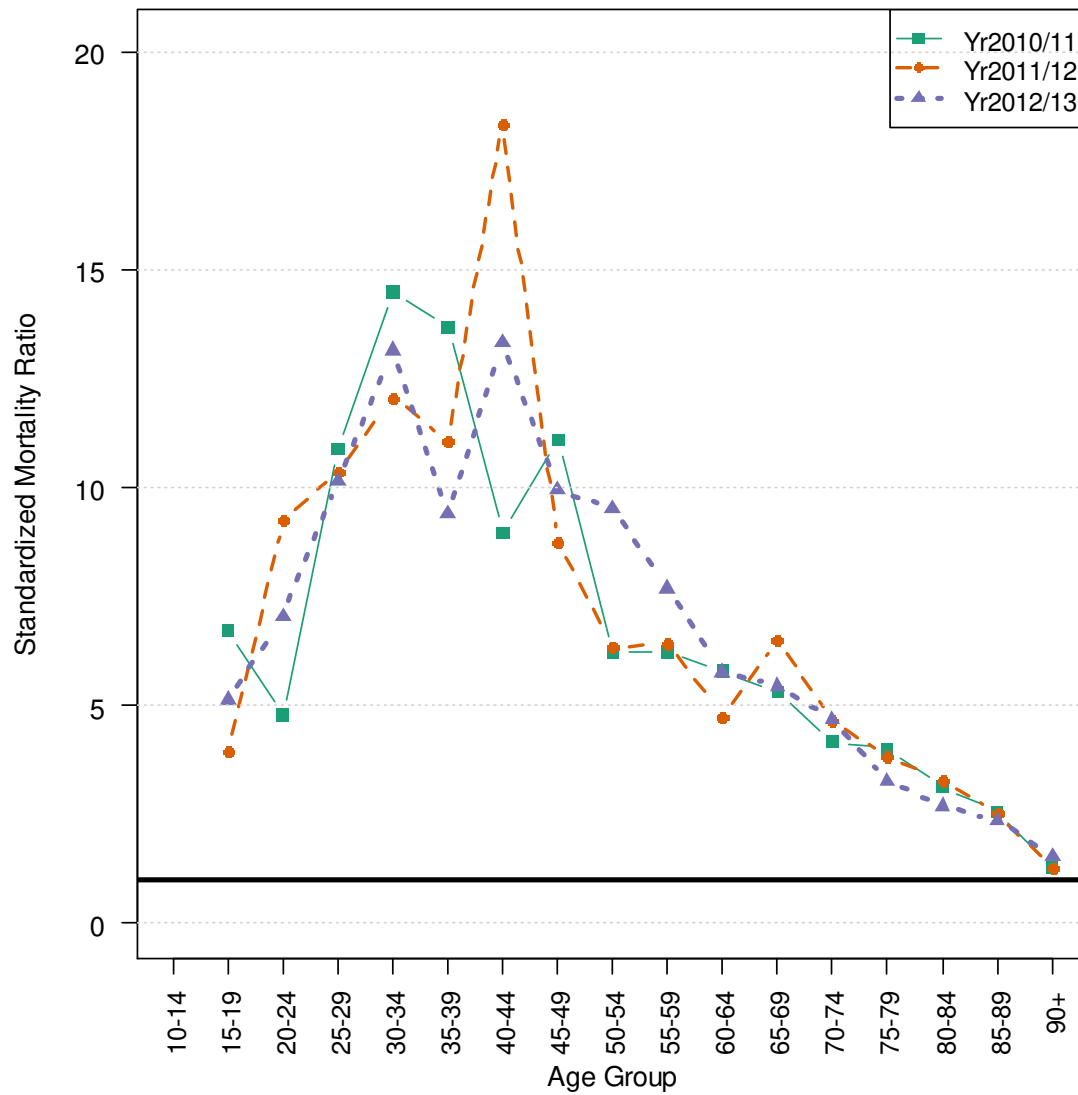
3.5.5 ALBERTA

Results are presented in Table 13 and plotted in Figure 17. SMRs range between 1.55 and 2.94. In all cases but one (2011/12, age 15 to 19) the SMR CIs are greater than 1.0, indicating higher risk of mortality in the MHA group.

Table 13 Hospital Discharge MHA Standardized Mortality Ratio Results – Alberta

Age	SMR		
	2010/11	2011/12	2012/13
10-14			
15-19	6.71	3.95	5.12
20-24	4.76	9.23	7.04
25-29	10.88	10.37	10.15
30-34	14.49	12.06	13.15
35-39	13.69	11.08	9.40
40-44	8.97	18.35	13.33
45-49	11.08	8.72	9.94
50-54	6.22	6.33	9.50
55-59	6.22	6.43	7.68
60-64	5.79	4.72	5.76
65-69	5.29	6.51	5.44
70-74	4.16	4.66	4.67
75-79	3.99	3.82	3.25
80-84	3.12	3.26	2.68
85-89	2.54	2.51	2.36
90+	1.27	1.27	1.53
Total	5.86	5.98	6.15

Figure 17 Plot of Hospital Discharge MHA Standardized Mortality Ratio Results – Alberta



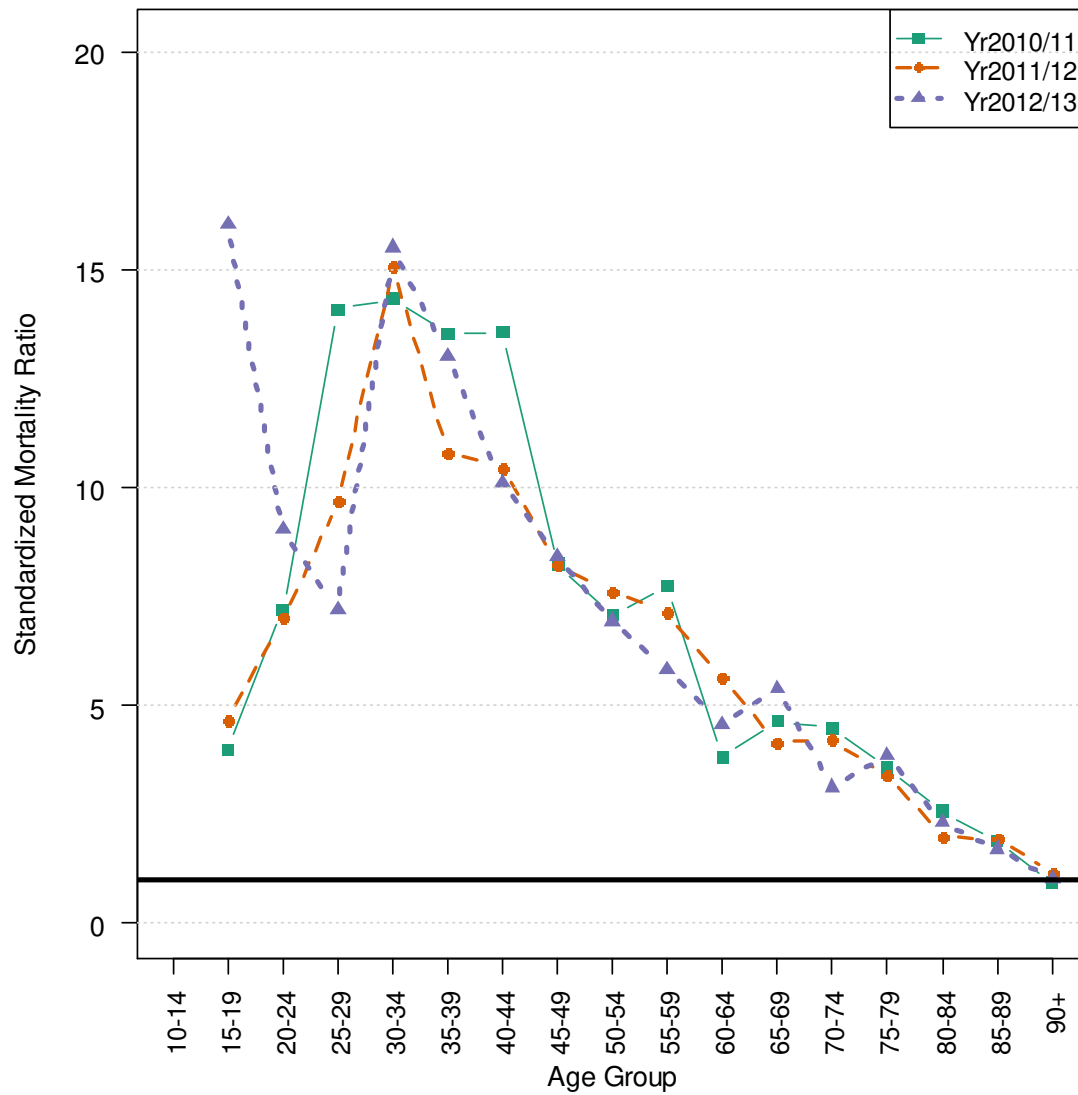
3.5.6 BRITISH COLUMBIA

Results are presented in Table 14 and plotted in Figure 18. SMRs range between 1.07 and 2.74. In all but three cases (age 90+ for all three years) the SMR CIs are greater than 1.0, indicating higher risk of mortality in the MHA group.

Table 14 Hospital Discharge MHA Standardized Mortality Ratio Results – British Columbia

Age	SMR		
	2010/11	2011/12	2012/13
10-14			
15-19	NA	NA	16.04
20-24	7.19	6.99	9.03
25-29	14.09	9.69	7.20
30-34	14.34	15.06	15.51
35-39	13.52	10.81	13.02
40-44	13.56	10.45	10.10
45-49	8.23	8.22	8.42
50-54	7.05	7.60	6.93
55-59	7.73	7.12	5.82
60-64	3.80	5.61	4.55
65-69	4.62	4.14	5.38
70-74	4.48	4.20	3.12
75-79	3.55	3.39	3.85
80-84	2.56	1.99	2.31
85-89	1.86	1.93	1.70
90+	0.93	1.13	1.00
Total	3.30	3.09	2.87

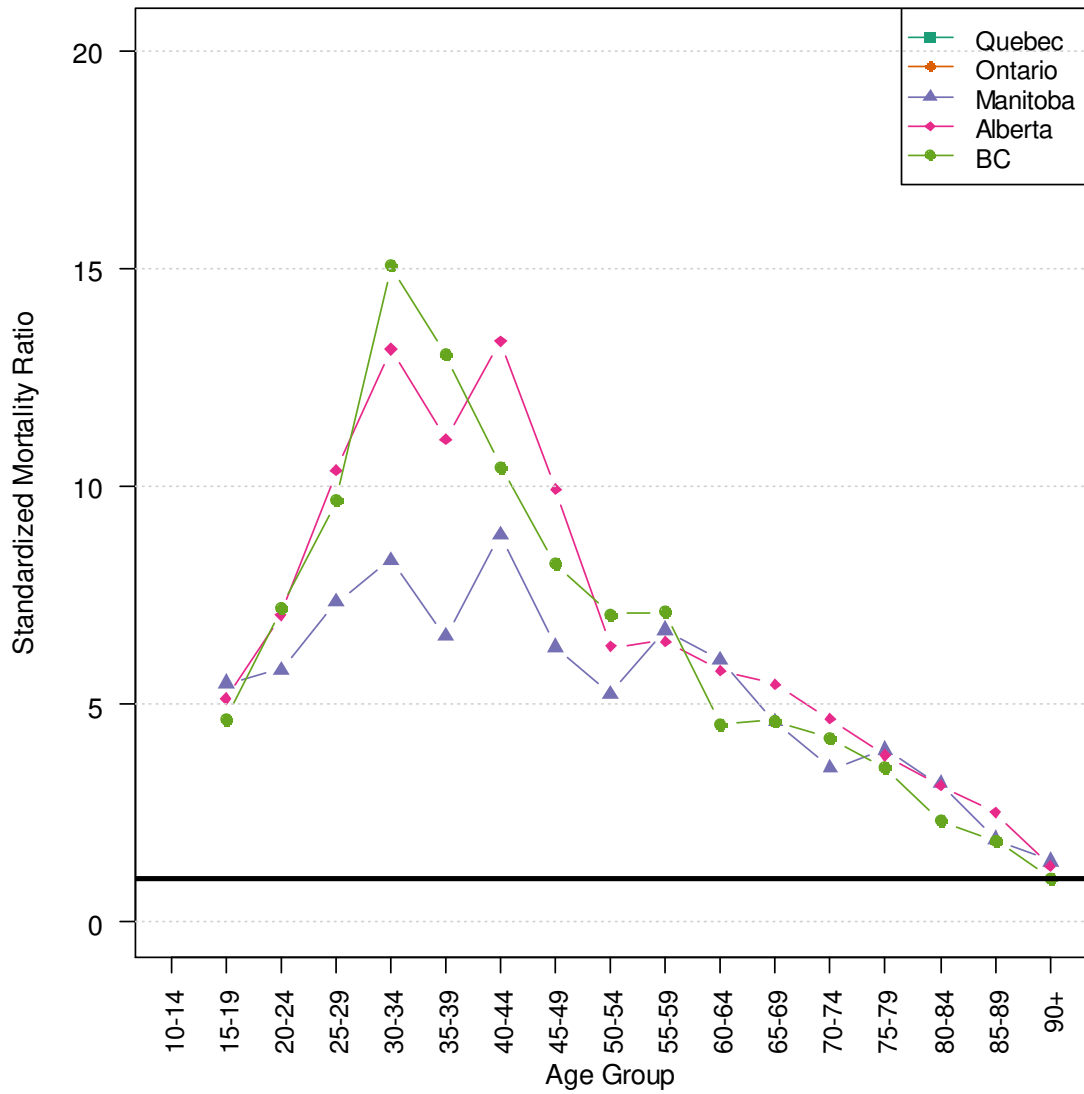
Figure 18 Plot of Hospital Discharge MHA Standardized Mortality Ratio Results – British Columbia



3.5.7 COMBINED DATA

The median of SMRs based on hospital discharge data by age group for each of the individual provinces is plotted in Figure 19. The shape of the curves is generally similar but the Ontario SMRs are clearly higher across most age groups.

Figure 19 Plot of Hospital Discharge MHA Standardized Mortality Ratio Results – by Provincial 3 Year Medians



3.6 Additional Analysis 2 – by Sex

Results for both populations were also broken down by sex.

3.6.1 QUEBEC

As above, Quebec calculated the rate of death in the fiscal year for people with a MHA diagnosis in the previous two years and the rate for people without MHA diagnosis in the previous two years. Results are presented in Table 15 and plotted in Figure 20 for males and Figure 21 for females.

Table 15 MHA and non MHA Death Rates by Sex-- Quebec

Age	Male MHA Population			Male non-MHA Population			Female MHA Population			Female non-MHA Population		
	2010/11	2011/12	2012/13	2010/11	2011/12	2012/13	2010/11	2011/12	2012/13	2010/11	2011/12	2012/13
10-14	0.2	0.1	0.1	0.1	0.1	0.1	0.3	0.2	0.2	0.1	0.1	0.1
15-19	1.0	1.1	0.9	0.4	0.3	0.3	0.4	0.5	0.5	0.2	0.1	0.2
20-24	1.5	1.8	1.5	0.6	0.5	0.5	0.8	0.6	0.6	0.2	0.2	0.2
25-29	2.1	1.8	1.6	0.5	0.6	0.5	0.8	0.7	0.6	0.2	0.2	0.2
30-34	2.2	2.2	2.5	0.5	0.5	0.5	1.0	0.9	0.8	0.3	0.2	0.3
35-39	3.1	2.7	2.5	0.6	0.6	0.8	0.9	1.0	1.1	0.3	0.4	0.4
40-44	3.4	3.1	3.3	1.1	1.0	0.9	1.7	1.7	1.5	0.7	0.6	0.6
45-49	4.9	4.9	4.2	1.7	1.6	1.7	2.7	2.6	2.4	1.3	1.1	1.4
50-54	7.7	7.2	7.0	2.8	2.7	3.0	4.7	4.5	4.1	2.0	2.1	2.0
55-59	11.6	10.8	11.0	4.8	4.9	5.0	6.4	6.0	5.6	3.4	3.3	3.4
60-64	17.0	17.6	17.7	8.2	7.9	7.9	9.7	8.9	9.4	5.4	5.2	5.2
65-69	29.9	27.0	25.8	13.3	12.6	12.6	14.6	15.1	14.9	8.2	8.1	8.1
70-74	44.6	45.2	46.4	21.5	20.9	21.0	24.1	22.6	22.1	13.4	13.2	12.9
75-79	73.9	69.7	70.6	35.3	33.5	33.4	41.1	38.8	39.8	22.3	20.8	22.0
80-84	115.1	115.0	116.7	59.7	56.5	57.3	72.2	66.7	69.3	38.5	37.1	38.2
85-89	178.5	171.4	181.9	100.7	95.9	95.0	114.9	117.4	115.8	70.9	65.7	68.5
90+	285.7	283.4	283.6	181.1	175.4	170.7	216.4	204.1	210.7	157.6	143.5	147.8
Crude	18.2	18.1	18.8	6.7	6.6	6.9	16.3	16.0	16.6	6.6	6.3	6.6
Age Std	16.7	16.2	16.4	8.2	7.8	7.9	9.9	9.5	9.5	5.6	5.3	5.5

Figure 20 Plot of MHA and non MHA Death Rates Males – Quebec

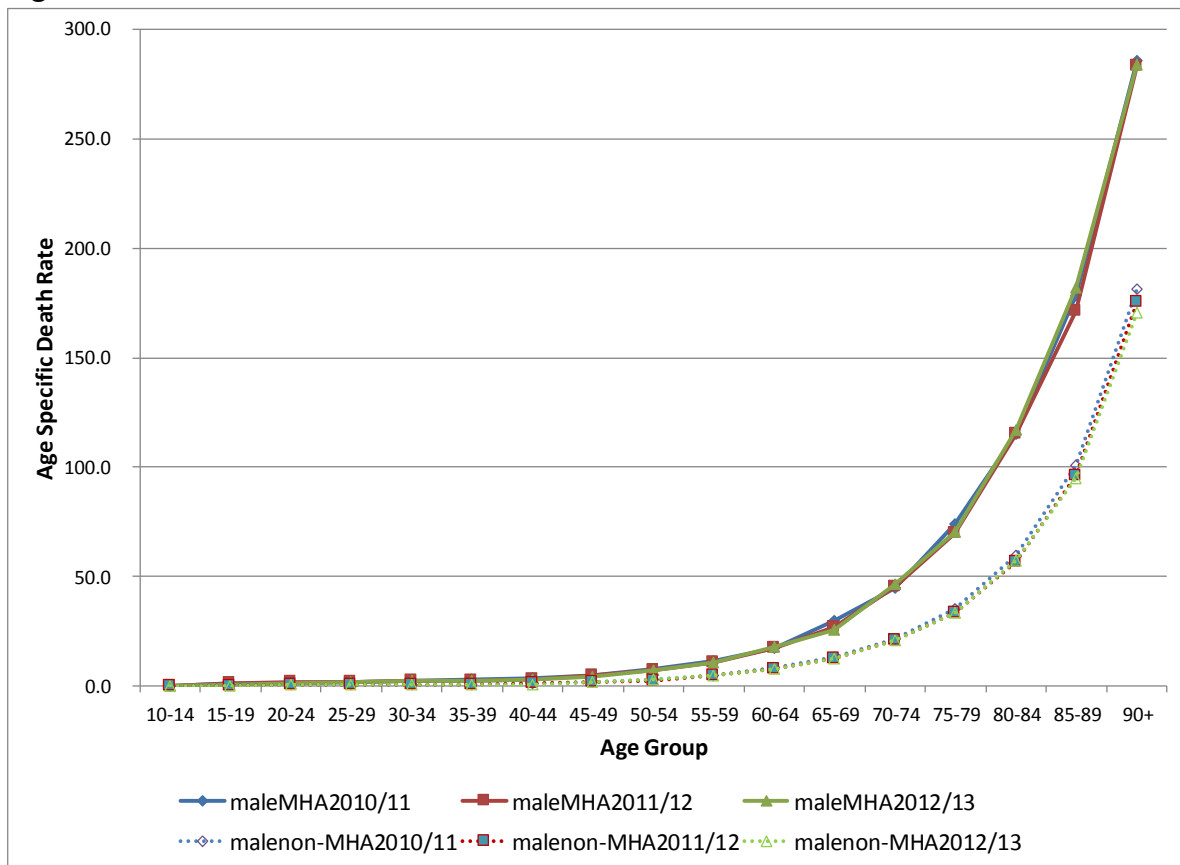
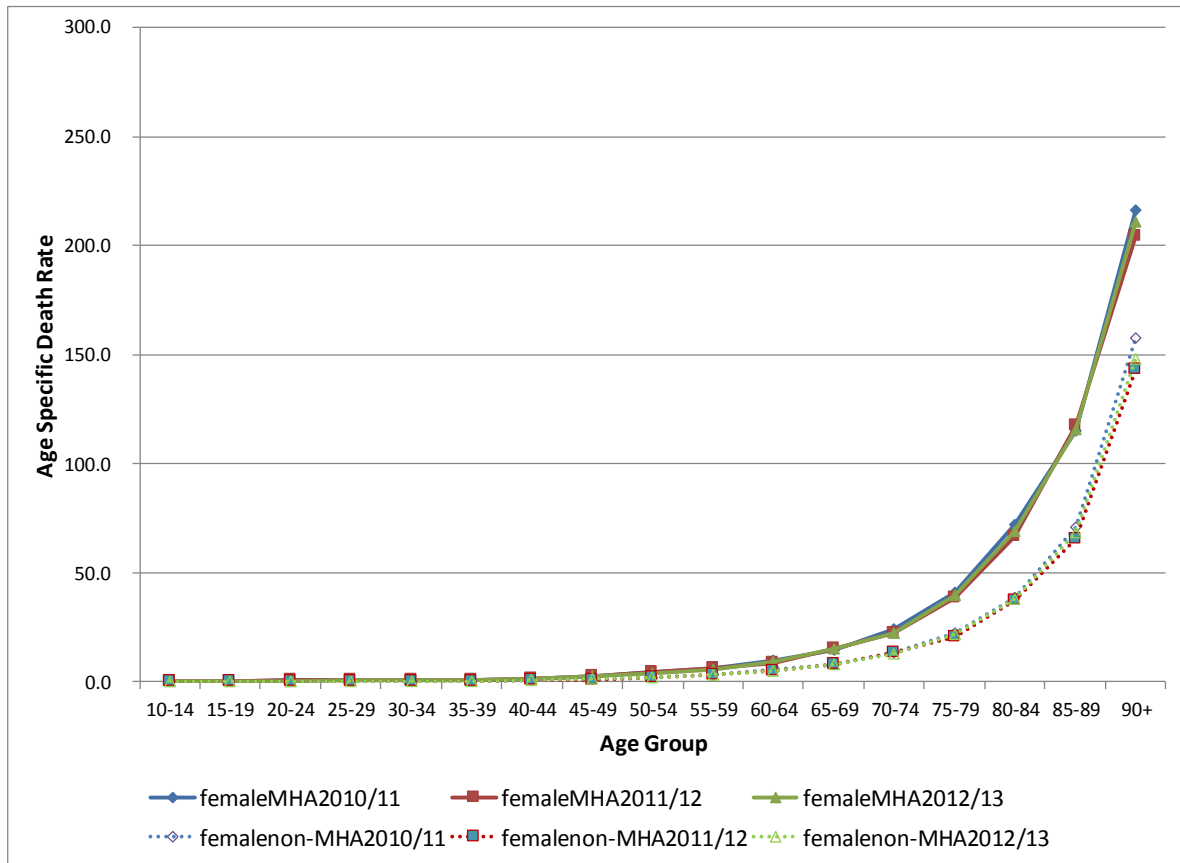


Figure 21 Plot of MHA and non MHA Death Rates Females – Quebec



3.6.2 ONTARIO

Ontario produced mortality rates and SMRs but the results are in the process of being validated and were not ready at time of publication.

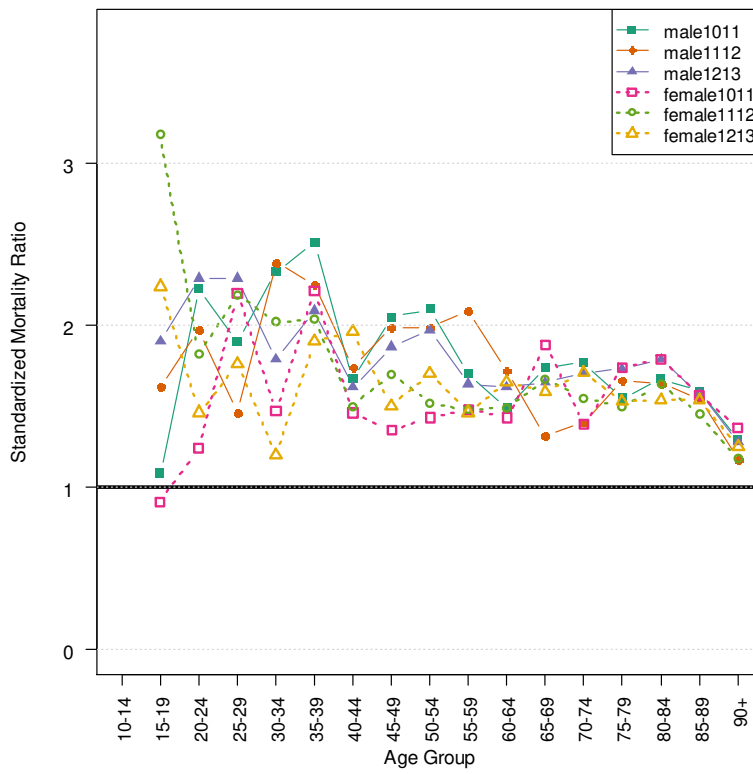
3.6.3 MANITOBA

Results are presented in Table 16 and plotted in Figure 22. Data was not available for hospital discharges.

Table 16 Hospital Discharge MHA Standardized Mortality Ratio Results by Sex – Manitoba

Age	All Male			All Female			Hospital Male			Hospital Female		
	2010/11	2011/12	2012/13	2010/11	2011/12	2012/13	2010/11	2011/12	2012/13	2010/11	2011/12	2012/13
10-14												
15-19	1.09	1.62	1.90	0.91	3.18	2.24						
20-24	2.23	1.97	2.29	1.24	1.82	1.46						
25-29	1.90	1.46	2.29	2.20	2.19	1.76						
30-34	2.33	2.39	1.79	1.47	2.02	1.20						
35-39	2.51	2.25	2.09	2.21	2.04	1.90						
40-44	1.67	1.74	1.62	1.46	1.50	1.96						
45-49	2.05	1.99	1.87	1.35	1.70	1.50						
50-54	2.10	1.99	1.97	1.43	1.52	1.70						
55-59	1.70	2.09	1.64	1.48	1.48	1.46						
60-64	1.49	1.72	1.62	1.43	1.49	1.65						
65-69	1.74	1.32	1.65	1.88	1.67	1.59						
70-74	1.77	1.40	1.71	1.39	1.55	1.71						
75-79	1.55	1.66	1.73	1.74	1.50	1.53						
80-84	1.67	1.64	1.79	1.79	1.64	1.54						
85-89	1.59	1.55	1.58	1.57	1.45	1.54						
90+	1.29	1.17	1.28	1.37	1.18	1.25						
Total	1.62	1.57	1.64	1.54	1.43	1.47						

Figure 22 Plot of SMR by Sex Results – Manitoba Overall



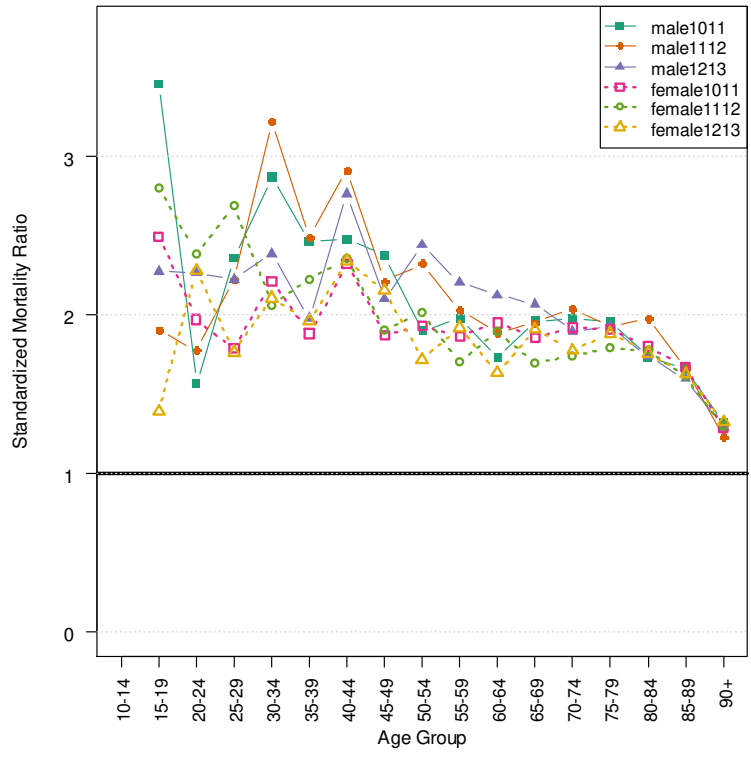
3.6.4 ALBERTA

Results are presented in Table 17 and plotted in Figure 23.

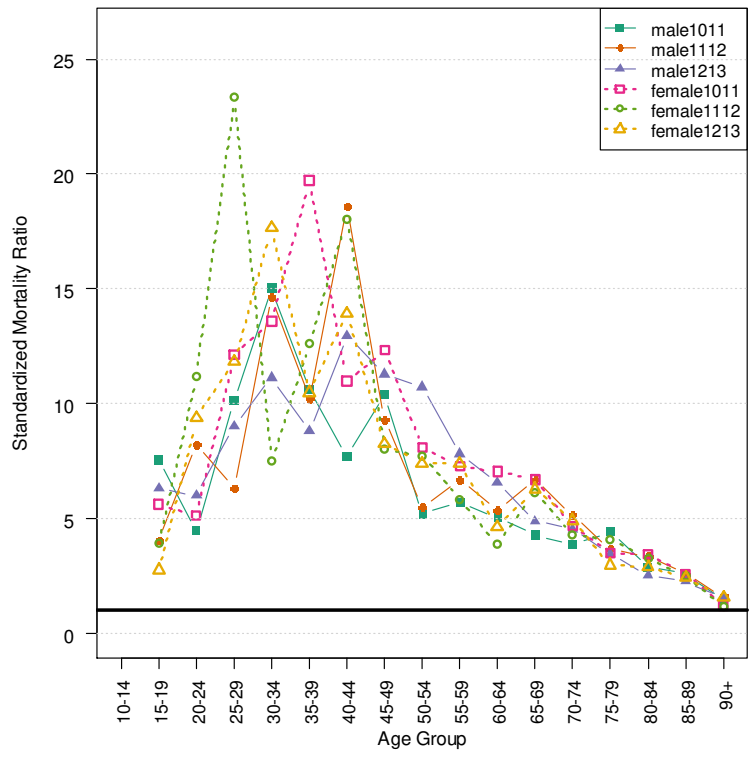
Table 17 Hospital Discharge MHA Standardized Mortality Ratio Results by Sex – Alberta

Age	All Male			All Female			Hospital Male			Hospital Female		
	2010/11	2011/12	2012/13	2010/11	2011/12	2012/13	2010/11	2011/12	2012/13	2010/11	2011/12	2012/13
10-14												
15-19	3.46	1.91	2.28	2.50	2.80	1.39	7.56	4.05	6.31	5.62	3.91	2.76
20-24	1.57	1.78	2.26	1.97	2.39	2.28	4.47	8.24	6.01	5.15	11.20	9.39
25-29	2.36	2.22	2.23	1.79	2.69	1.77	10.12	6.34	9.02	12.13	23.34	11.83
30-34	2.87	3.22	2.39	2.21	2.06	2.11	15.02	14.67	11.15	13.59	7.51	17.64
35-39	2.46	2.49	1.98	1.88	2.22	1.96	10.60	10.19	8.80	19.71	12.60	10.48
40-44	2.48	2.92	2.76	2.32	2.35	2.34	7.71	18.57	12.96	10.98	18.04	13.91
45-49	2.38	2.21	2.10	1.87	1.90	2.15	10.40	9.32	11.30	12.32	8.00	8.26
50-54	1.90	2.32	2.44	1.93	2.02	1.71	5.20	5.51	10.73	8.10	7.72	7.40
55-59	1.98	2.03	2.21	1.86	1.70	1.92	5.71	6.68	7.82	7.27	5.85	7.39
60-64	1.73	1.89	2.13	1.95	1.89	1.63	5.05	5.37	6.57	7.05	3.88	4.63
65-69	1.96	1.95	2.07	1.86	1.70	1.91	4.29	6.71	4.88	6.69	6.15	6.30
70-74	1.97	2.04	1.90	1.92	1.74	1.78	3.86	5.15	4.54	4.69	4.28	4.90
75-79	1.96	1.93	1.93	1.91	1.79	1.88	4.41	3.66	3.48	3.52	4.10	2.96
80-84	1.73	1.98	1.74	1.80	1.78	1.76	2.89	3.36	2.53	3.46	3.28	2.90
85-89	1.66	1.67	1.60	1.67	1.61	1.63	2.60	2.59	2.27	2.59	2.49	2.43
90+	1.32	1.23	1.29	1.28	1.29	1.33	1.47	1.61	1.52	1.23	1.18	1.56
Total	2.34	2.38	2.34	2.02	1.99	2.03	5.55	6.06	6.14	6.20	5.90	6.16

Figure 23 Plot of SMR by Sex Results – Alberta
Overall



Hospital



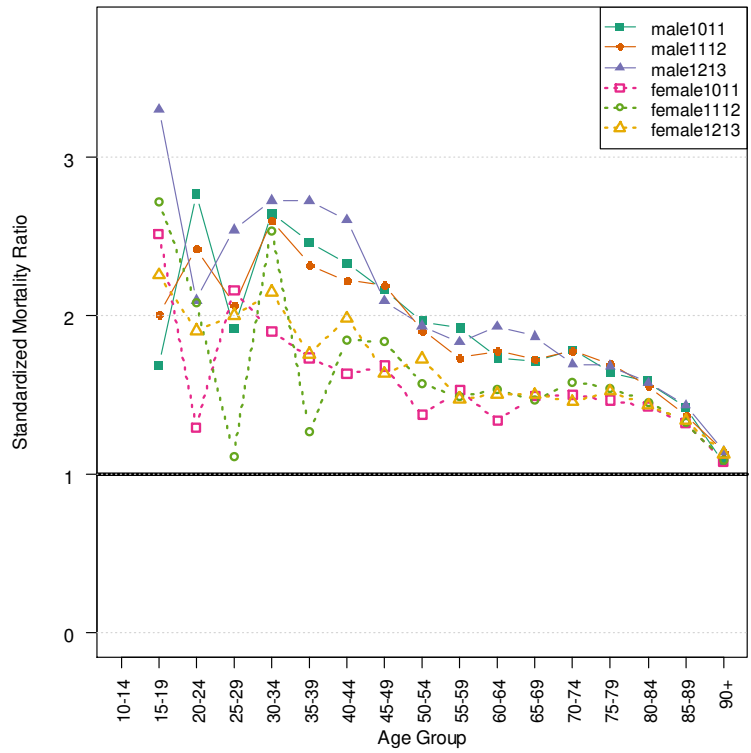
3.6.5 BRITISH COLUMBIA

Results are presented in Table 18 and plotted in Figure 24.

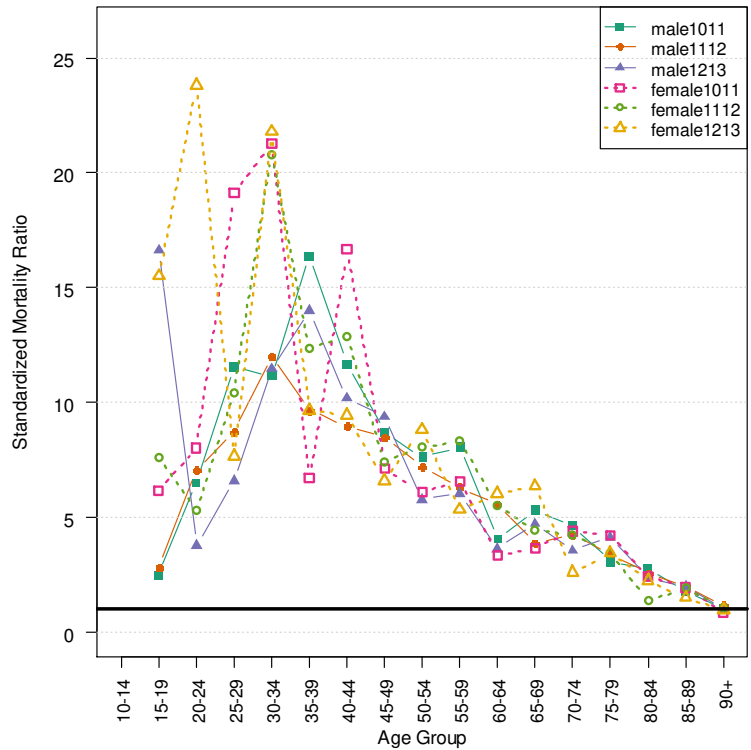
Table 18 Hospital Discharge MHA Standardized Mortality Ratio Results by Sex – British Columbia

Age	All Male			All Female			Hospital Male			Hospital Female		
	2010/11	2011/12	2012/13	2010/11	2011/12	2012/13	2010/11	2011/12	2012/13	2010/11	2011/12	2012/13
10-14												
15-19	1.68	2.01	3.30	2.52	2.72	2.26	2.49	2.82	16.62	6.15	7.63	15.52
20-24	2.77	2.42	2.10	1.30	2.08	1.91	6.51	7.07	3.78	8.03	5.31	23.82
25-29	1.92	2.07	2.54	2.16	1.11	2.00	11.55	8.74	6.59	19.11	10.42	7.66
30-34	2.65	2.60	2.73	1.90	2.53	2.15	11.14	12.03	11.46	21.29	20.79	21.78
35-39	2.47	2.32	2.72	1.74	1.27	1.76	16.38	9.67	14.00	6.72	12.36	9.66
40-44	2.33	2.22	2.61	1.64	1.84	1.98	11.69	8.98	10.18	16.67	12.88	9.46
45-49	2.16	2.20	2.09	1.68	1.84	1.64	8.71	8.50	9.38	7.11	7.41	6.59
50-54	1.97	1.91	1.94	1.38	1.57	1.73	7.61	7.21	5.78	6.09	8.07	8.81
55-59	1.92	1.73	1.83	1.53	1.49	1.48	8.07	6.31	6.03	6.55	8.32	5.33
60-64	1.73	1.78	1.93	1.34	1.53	1.50	4.05	5.56	3.64	3.34	5.53	6.04
65-69	1.71	1.73	1.87	1.49	1.46	1.50	5.32	3.90	4.72	3.67	4.44	6.37
70-74	1.78	1.78	1.70	1.50	1.58	1.46	4.64	4.25	3.57	4.40	4.25	2.61
75-79	1.64	1.70	1.68	1.47	1.54	1.53	3.06	3.42	4.14	4.23	3.45	3.44
80-84	1.59	1.56	1.58	1.43	1.45	1.43	2.76	2.57	2.38	2.41	1.36	2.26
85-89	1.42	1.37	1.44	1.32	1.32	1.34	1.78	2.00	2.00	1.95	1.92	1.50
90+	1.08	1.14	1.14	1.08	1.09	1.13	1.05	1.18	1.03	0.85	1.10	0.99
Total	1.56	1.55	1.58	1.31	1.34	1.34	3.91	3.58	3.32	2.73	2.66	2.46

Figure 24 Plot of SMR by Sex Results – British Columbia
Overall



Hospital



3.6.6 OBSERVATIONS

We have not provided a combined result of sex differences given that similar patterns for males and females in hospital discharge MHA standardized mortality ratios were observed across the provinces.

4 Suicide rates among people diagnosed with a mental disorder or addiction

4.1 Measure

Two rates were to be compared:

The number of individuals who received health services for a mental disorder in one year who died due to suicide in the 12 months following their first service

divided by

the number of people who received health services for a mental disorder in a fiscal year.

Compared to:

The number of individuals who received health services for reasons other than a mental disorder in one year who died due to suicide

divided by

the number of people who received health services for reasons other than a mental disorder.

4.2 Data Selection Process

The selection was done for the year 2014/15. The goal was to identify a data set of all those who received health services in a year. This set was to be partitioned into those who were treated for a MHA reason in the fiscal year and those who were not. Then, within each partition, the number who died by suicide in a year after their first contact was identified. The overall rates (as well as the age- and sex-specific rates) of the two partitions are compared.

4.2.1 IDENTIFICATION OF THE MHA AND NON-MHA POPULATIONS

1. For the fiscal year select all records from the physician-billing database.
2. Drop out so called “problem” records, that is, records where:
 - a. Provincial identity number is invalid
 - b. Sex is missing
 - c. Not resident of province
 - d. Date of birth is missing or is such that the age is a negative number or greater than 125 at the time of service
3. For a fiscal year select all records from the hospital discharge database where the date of discharge is in the fiscal year and the individual is discharged alive.
4. Drop out so called “problem” records, that is, records where:
 - a. Provincial identity number is invalid

- b. Sex is missing
 - c. Not resident of province
 - d. Date of birth is missing or is such that the age is a negative number or greater than 125 at the time of service
5. Merge the physician and hospital records
 - a. Overlap of dates is not a concern
6. **Create the MHA partition:** Select all records from the combined database where the billing diagnosis or the most responsible diagnosis is a MHA diagnosis
 - MHA diagnoses are any ICD10 Chapter V (F00 to F99) or ICD9 Chapter V (290 to 319) diagnosis.
7. If there is more than one MHA visit in the fiscal year for an individual, drop all but the first visit.
8. If the individual's age at the time of the first visit was less than 10 drop from the dataset.
9. **Create the no MHA partition:** Select all records from the combined database where the billing diagnosis or the most responsible diagnosis is not a MHA diagnosis.¹⁹
 - MHA diagnoses are any ICD10 Chapter V (F00 to F99) or ICD9 Chapter V (290 to 319) diagnosis.
10. If there is more than one visit in the fiscal year for an individual, drop all but the first visit.
11. Delete any individual who is in the MHA partition.
12. If the individual's age at the time of the first visit was less than 10 drop from the dataset.

The above procedure results in two mutually exclusive data sets of individual's first visit date in the fiscal year that are age 10 or above.

4.2.2 IDENTIFICATION OF SUICIDE IN MHA AND THE NON MHA GROUP

For every record in the data sets derived above, determine the date 365 days after the date of service/date of discharge (i.e., date + 365). Then determine if the individual is in the mortality data with a date of death on or before the date 365 days after the date of service/date of discharge and the cause of death is ICD10 X60-X84 (inclusive) or Y87.0²⁰.

- Check for records where the date of death is before the date of service/date of discharge. If this anomaly is found, the record is to be dropped.

¹⁹ This step might not seem necessary, but it is possible for an individual to have a MHA diagnosis at age 9 and a non MHA diagnosis at age 10 in the same fiscal year and this ensures that the record will be included in the non MHA partition.

²⁰ Note the decimal must be present in Y87.0

4.3 Data Sources and Notes

A decision about whether or not a death was a suicide is dependent upon the coroner's finding in each of the provinces. The time to reach this finding can vary from province to province (in some cases it can take over a year) and the criteria for deciding a death was due to suicide may vary slightly across provinces.

This is also an area where small numbers of events can be observed, resulting in provinces suppressing some parts of the data. In most cases the province did calculate the actual age-specific death rate despite the small cell size, but with the understanding that this report would not provide enough information for the suppressed cell value to be calculated. For this reason we only reported the calculated rates.

4.4 Results

Results are summarized in 5-year age groups beginning at age 10. They are presented here first by province and then combined. Results were broken down by sex and these breakdowns were included as part of the provincial results. As above, the Y-axis in the plots has been scaled to fit all provincial results. However, data from Manitoba for ages 85 to 89 and 90+ produced rates that far exceeded all others and these outliers, while included in the tables, have been omitted in the plots (nor included in the setting of the Y-axis scale).

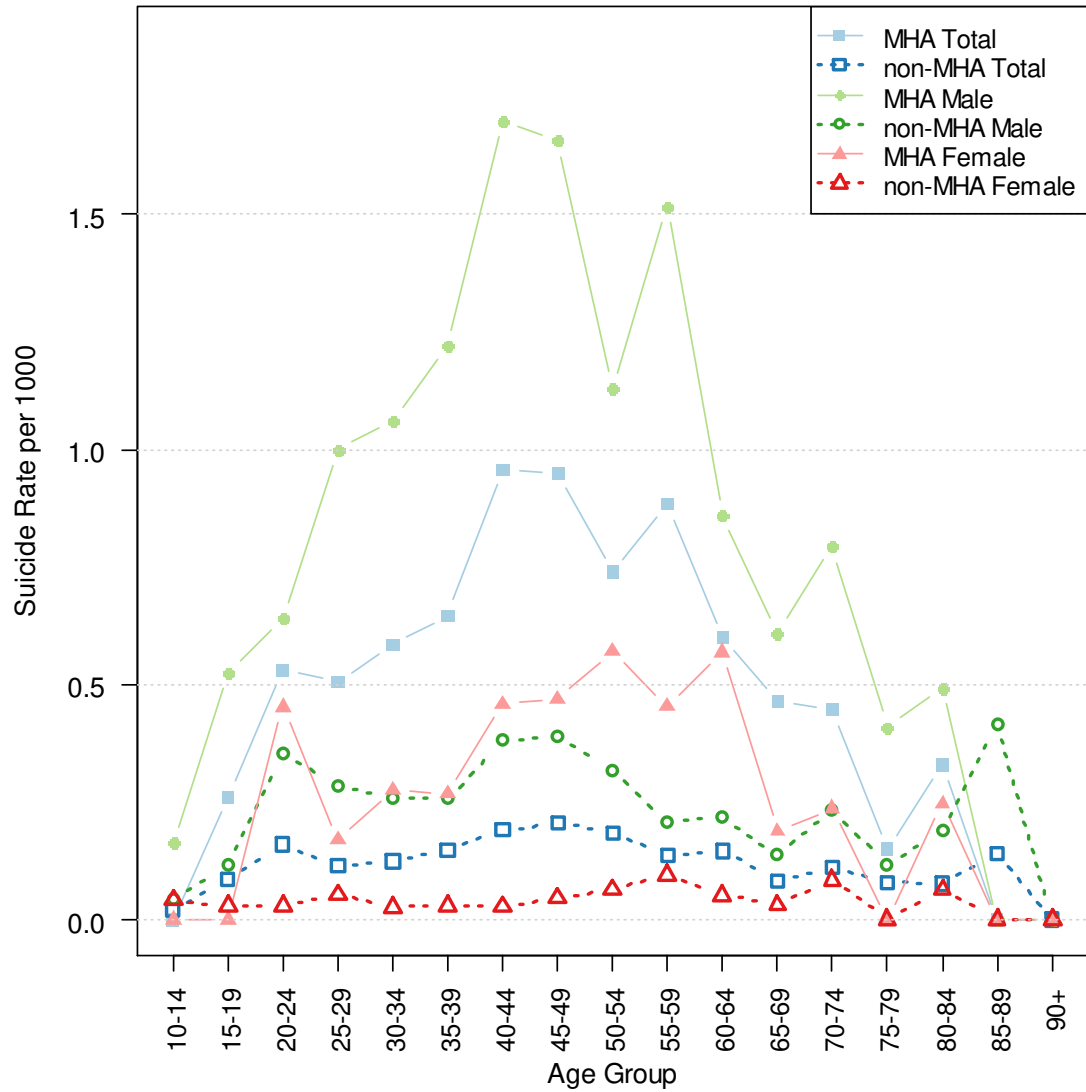
4.4.1 QUEBEC

Results are presented in Table 19 and plotted in Figure 25.

Table 19 Suicide Rates (per 1000) for MHA and non-MHA Groups – Quebec 2009/10

Age	Overall		Males		Females	
	MHA Suicide Rate	non-MHA Suicide Rate	MHA Suicide Rate	non-MHA Suicide Rate	MHA Suicide Rate	non-MHA Suicide Rate
10-14	0.00	0.02	0.16	0.04	0.00	0.04
15-19	0.26	0.09	0.52	0.12	0.00	0.03
20-24	0.53	0.16	0.64	0.35	0.45	0.03
25-29	0.50	0.11	1.00	0.28	0.17	0.05
30-34	0.58	0.12	1.06	0.26	0.28	0.03
35-39	0.65	0.15	1.22	0.26	0.27	0.03
40-44	0.96	0.19	1.70	0.38	0.46	0.03
45-49	0.95	0.21	1.66	0.39	0.47	0.05
50-54	0.74	0.18	1.13	0.32	0.57	0.07
55-59	0.88	0.14	1.52	0.21	0.45	0.10
60-64	0.60	0.15	0.86	0.22	0.57	0.05
65-69	0.47	0.08	0.61	0.14	0.19	0.03
70-74	0.45	0.11	0.79	0.23	0.24	0.08
75-79	0.15	0.08	0.41	0.12	0.00	0.00
80-84	0.33	0.08	0.49	0.19	0.25	0.06
85-89	0.00	0.14	0.00	0.42	0.00	0.00
90+	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.59	0.13	0.99	0.24	0.32	0.04

Figure 25 Plot of Suicide Rates (per 1000) for MHA and non-MHA Groups – Quebec 2009/10



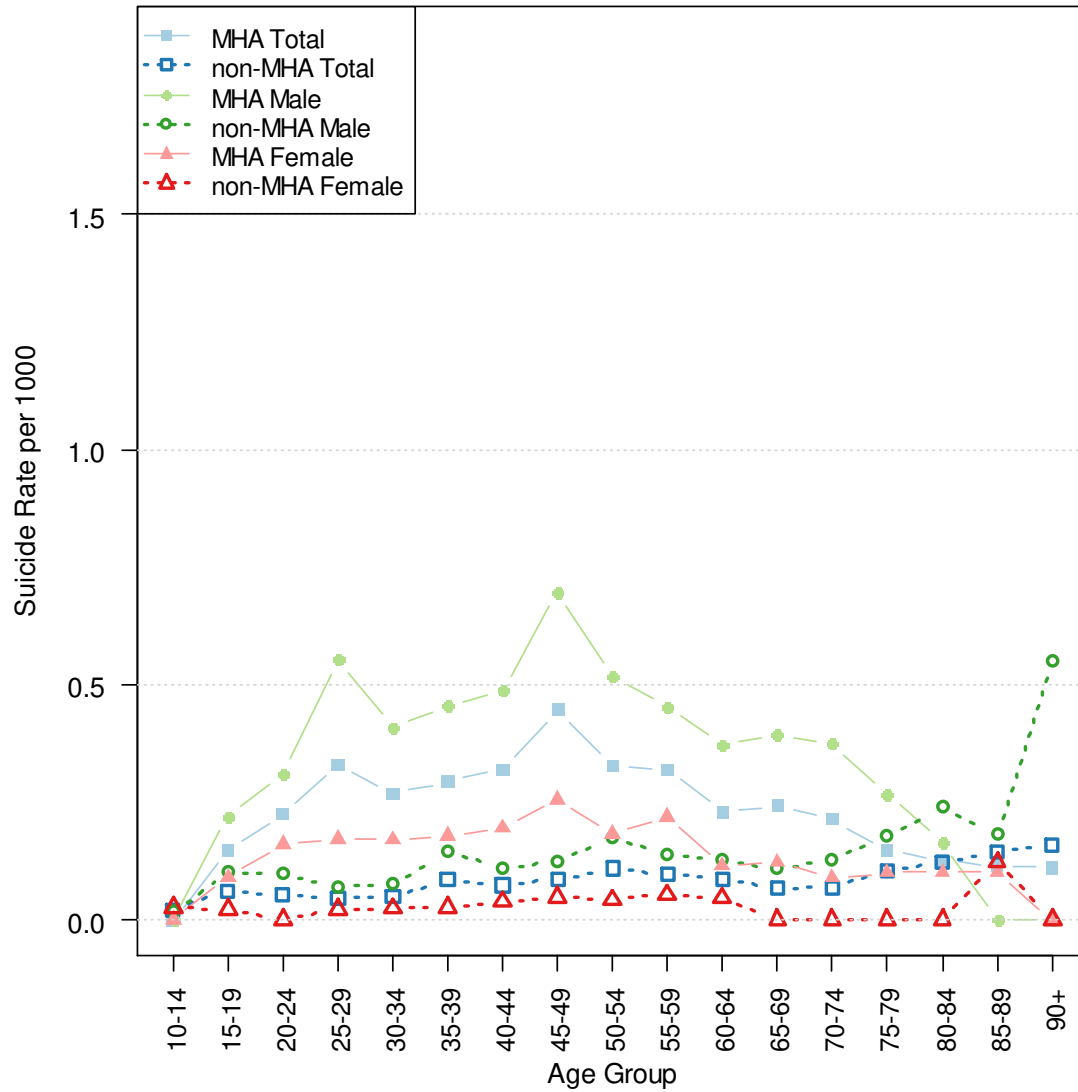
4.4.2 ONTARIO

Results are presented in Table 20 and plotted in Figure 26.

Table 20 Suicide Rates (per 1000) for MHA and non-MHA Groups – Ontario 2010/11

Age	Overall		Males		Females	
	MHA Suicide Rate	non-MHA Suicide Rate	MHA Suicide Rate	non-MHA Suicide Rate	MHA Suicide Rate	non-MHA Suicide Rate
10-14	0.00	0.02	0.00	0.02	0.00	0.03
15-19	0.15	0.06	0.22	0.10	0.09	0.02
20-24	0.22	0.05	0.31	0.10	0.16	0.00
25-29	0.33	0.05	0.55	0.07	0.17	0.02
30-34	0.27	0.05	0.41	0.07	0.17	0.02
35-39	0.29	0.08	0.46	0.15	0.18	0.03
40-44	0.32	0.07	0.49	0.11	0.20	0.04
45-49	0.45	0.09	0.70	0.12	0.26	0.05
50-54	0.33	0.11	0.52	0.17	0.18	0.04
55-59	0.32	0.10	0.45	0.14	0.22	0.05
60-64	0.23	0.09	0.37	0.13	0.12	0.05
65-69	0.24	0.07	0.39	0.11	0.12	0.00
70-74	0.21	0.07	0.38	0.13	0.09	0.00
75-79	0.15	0.11	0.27	0.18	0.10	0.00
80-84	0.13	0.12	0.17	0.24	0.10	0.00
85-89	0.12	0.14	0.00	0.18	0.10	0.12
90+	0.11	0.16	0.00	0.55	0.00	0.00
Total	0.26	0.07	0.41	0.11	0.16	0.03

Figure 26 Plot of Suicide Rates (per 1000) for MHA and non-MHA Groups – Ontario 2010/11



4.4.3 MANITOBA

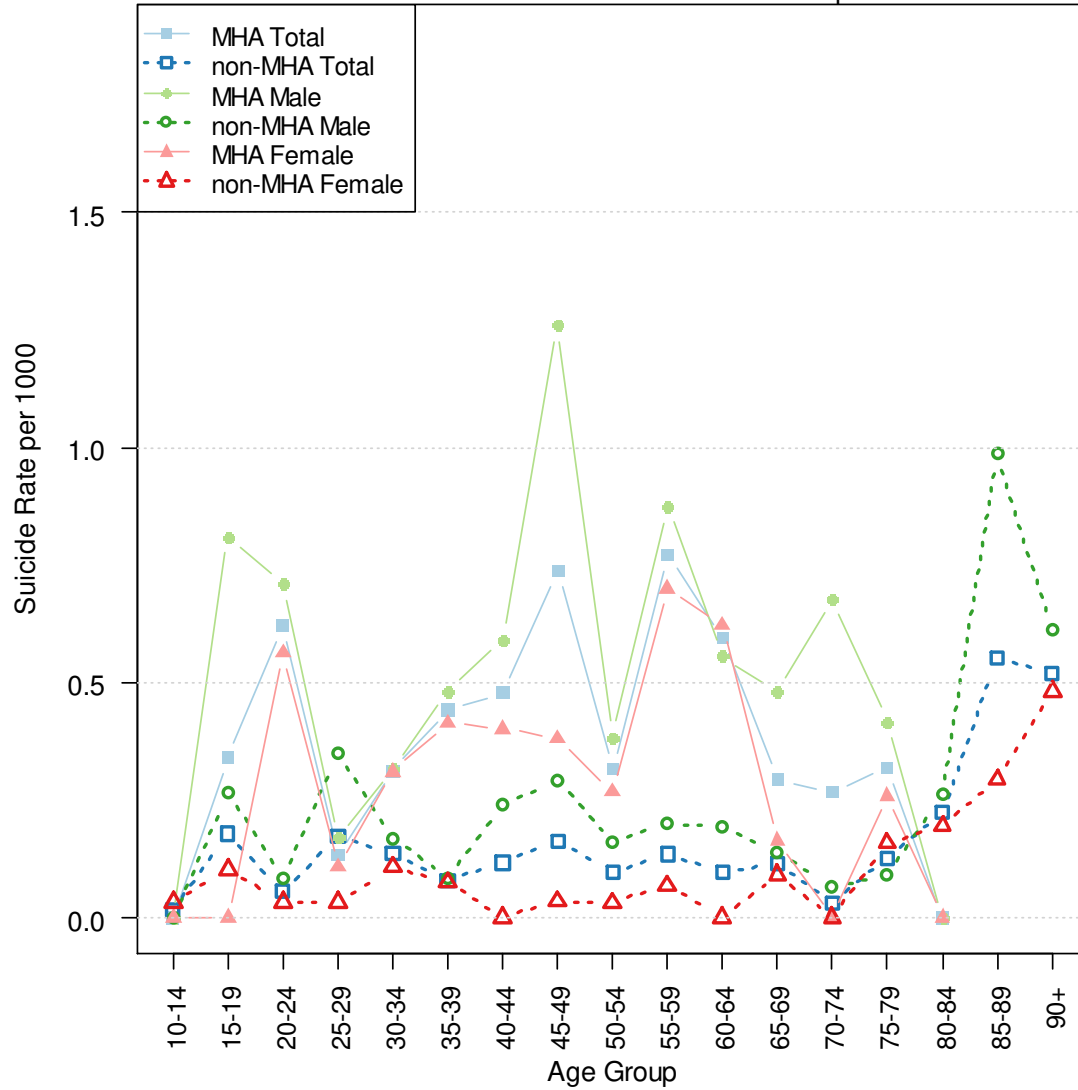
Results are presented in Table 21 and plotted in Figure 27.

Table 21 Suicide Rates (per 1000) for MHA and non-MHA Groups – Manitoba 2013/14

Age	Overall		Males		Females	
	MHA Suicide Rate	non-MHA Suicide Rate	MHA Suicide Rate	non-MHA Suicide Rate	MHA Suicide Rate	non-MHA Suicide Rate
10-14	0.00	0.02	0.00	0.00	0.00	0.03
15-19	0.34	0.18	0.81	0.27	0.00	0.10
20-24	0.62	0.06	0.71	0.09	0.56	0.03
25-29	0.13	0.17	0.17	0.35	0.11	0.03
30-34	0.31	0.14	0.32	0.17	0.31	0.11
35-39	0.44	0.08	0.48	0.08	0.42	0.08
40-44	0.48	0.12	0.59	0.24	0.40	0.00
45-49	0.74	0.16	1.26	0.29	0.38	0.04
50-54	0.32	0.10	0.38	0.16	0.27	0.03
55-59	0.77	0.14	0.87	0.20	0.70	0.07
60-64	0.60	0.10	0.56	0.19	0.62	0.00
65-69	0.29	0.12	0.48	0.14	0.17	0.09
70-74	0.27	0.03	0.68	0.07	0.00	0.00
75-79	0.32	0.13	0.42	0.09	0.26	0.16
80-84	0.00	0.22	0.00	0.26	0.00	0.20
85-89	1.49	0.55	1.37	0.99	1.54	0.29
90+	2.85	0.52	3.80	0.61	2.57	0.48
Total	0.49	0.12	0.60	0.19	0.41	0.07

Figure 27 Plot of Suicide Rates (per 1000) for MHA and non-MHA Groups – Manitoba 2013/14

Note 85-89 and 90+ MHA not included in plot



4.4.4 ALBERTA

Alberta data was not available for this indicator.

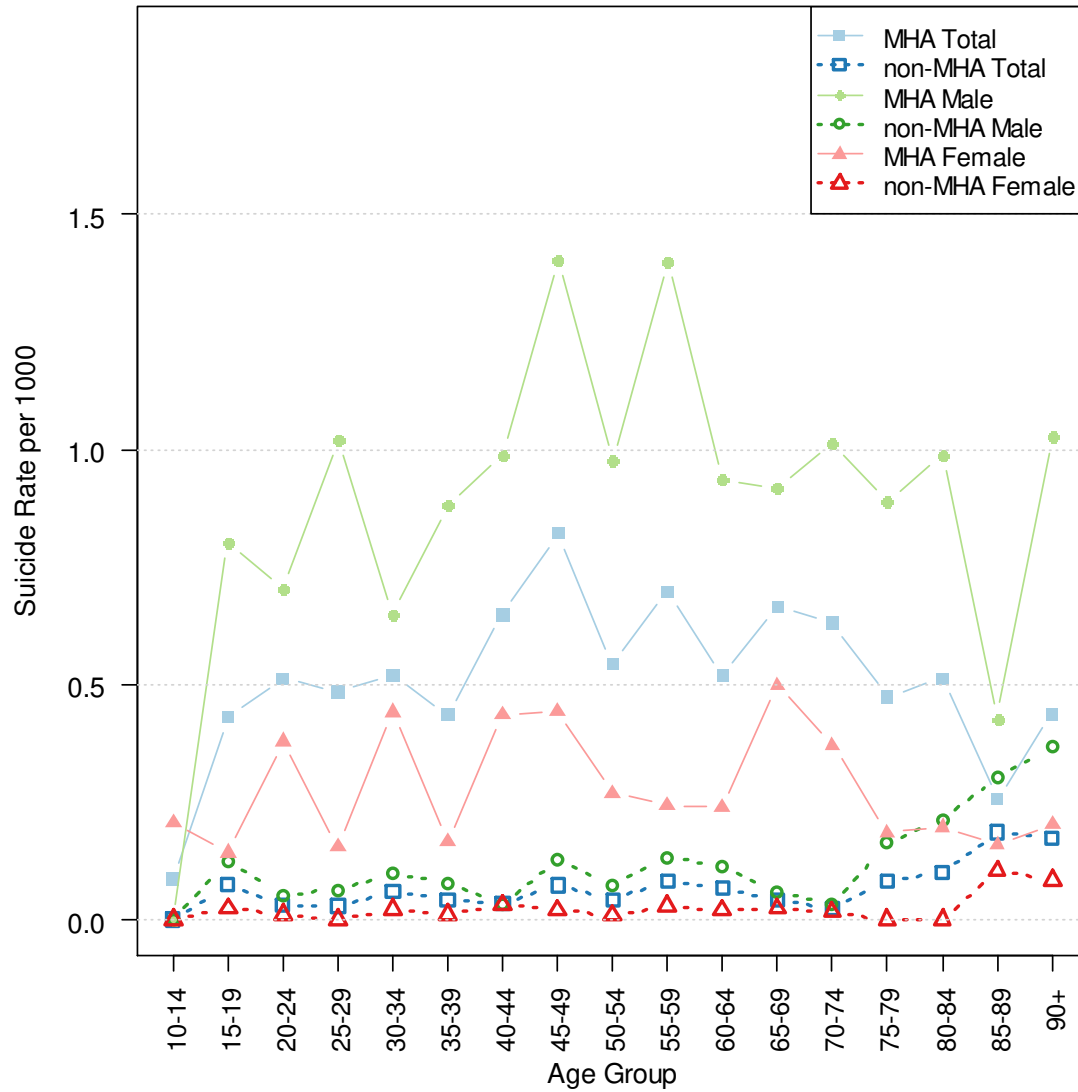
4.4.5 BRITISH COLUMBIA

Results are presented in Table 22 and plotted in Figure 28.

Table 22 Suicide Rates (per 1000) for MHA and non-MHA Groups – British Columbia 2013/14

Age	Overall		Males		Females	
	MHA Suicide Rate	non-MHA Suicide Rate	MHA Suicide Rate	non-MHA Suicide Rate	MHA Suicide Rate	non-MHA Suicide Rate
10-14	0.09	0.00	0.00	0.00	0.21	0.00
15-19	0.43	0.07	0.80	0.12	0.14	0.02
20-24	0.51	0.03	0.70	0.05	0.38	0.01
25-29	0.49	0.03	1.02	0.06	0.16	0.00
30-34	0.52	0.06	0.65	0.10	0.44	0.02
35-39	0.43	0.04	0.88	0.08	0.17	0.01
40-44	0.65	0.03	0.99	0.03	0.44	0.03
45-49	0.82	0.07	1.40	0.13	0.44	0.02
50-54	0.54	0.04	0.97	0.07	0.27	0.01
55-59	0.70	0.08	1.40	0.13	0.24	0.03
60-64	0.52	0.07	0.94	0.11	0.24	0.02
65-69	0.67	0.04	0.92	0.06	0.50	0.02
70-74	0.63	0.03	1.01	0.03	0.37	0.02
75-79	0.47	0.08	0.89	0.16	0.19	0.00
80-84	0.51	0.10	0.99	0.21	0.20	0.00
85-89	0.26	0.19	0.43	0.30	0.16	0.10
90+	0.44	0.17	1.03	0.37	0.20	0.08
Total	0.55	0.05	0.94	0.09	0.30	0.02

Figure 28 Plot of Suicide Rates (per 1000) for MHA and non-MHA Groups – British Columbia 2013/14



4.4.6 COMBINED DATA

Data from each of the individual provinces (overall and by sex) is plotted in Figure 29 through Figure 31. While the proportions vary between the provinces, the shape of the curves was found to be similar.

Figure 29 Plot of Suicide Rates (per 1000) for MHA Groups by Provinces – Males and Females Combined

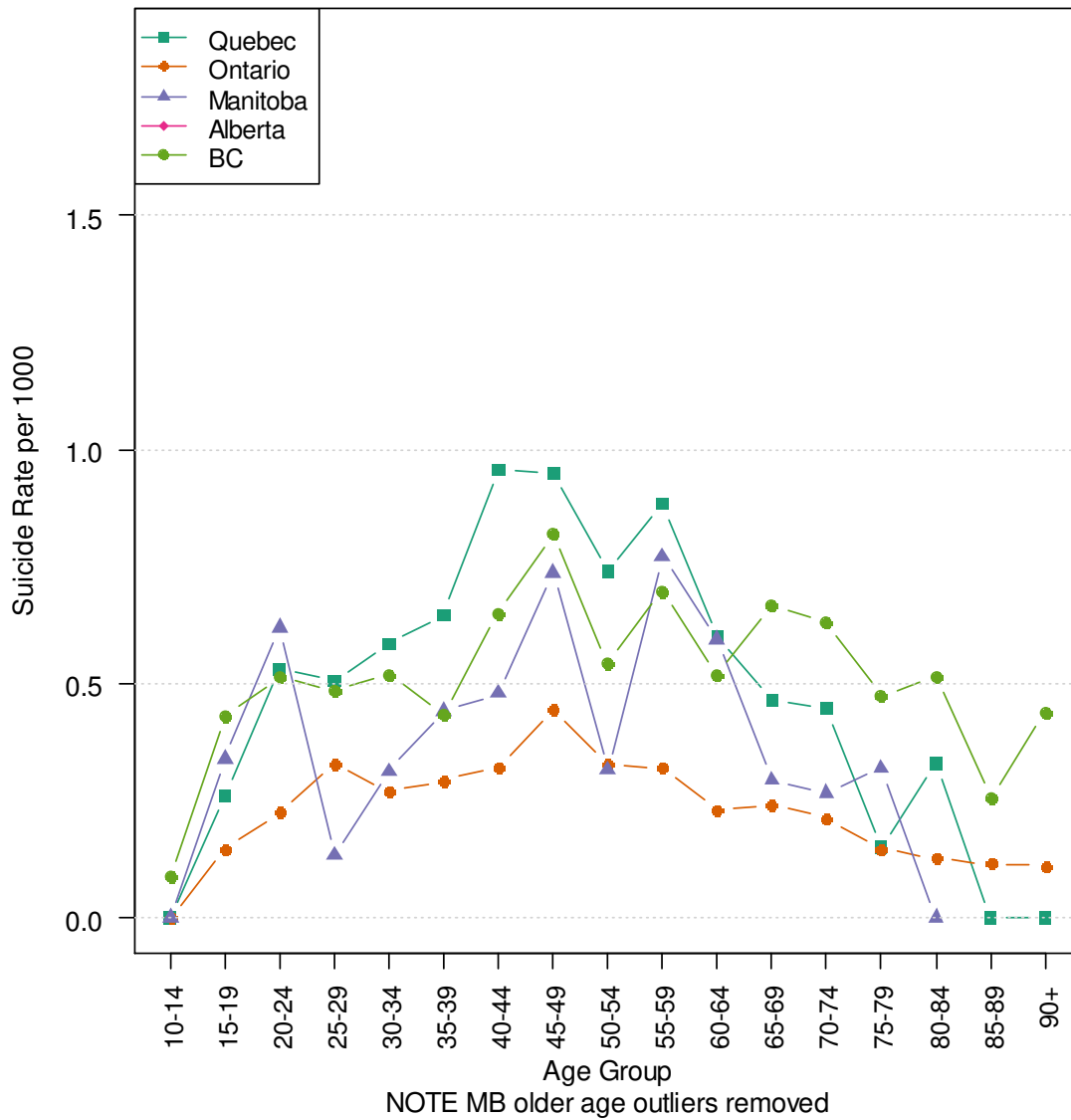


Figure 30 Plot of Suicide Rates (per 1000) for MHA Groups by Provinces – Males

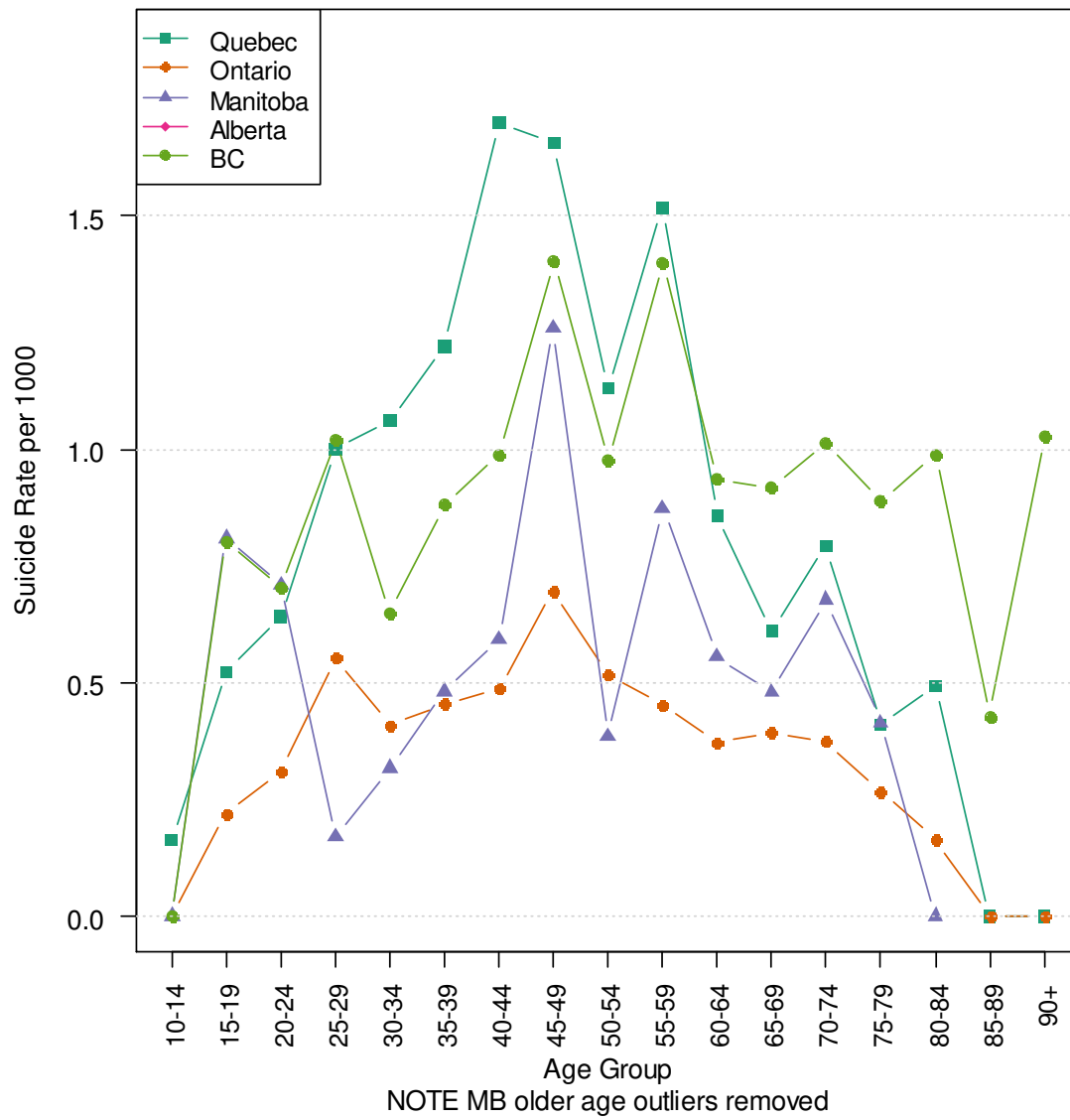
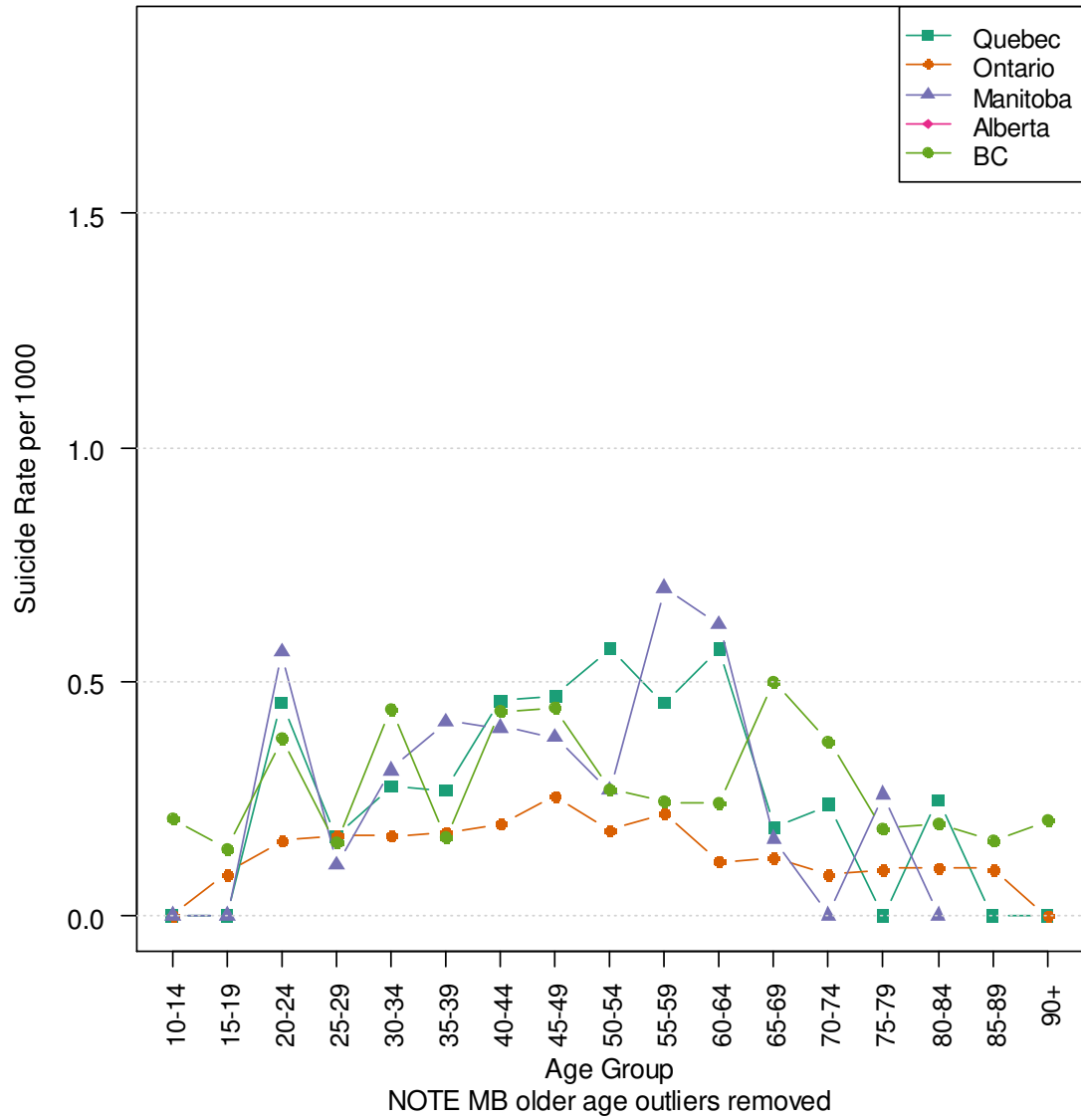


Figure 31 Plot of Suicide Rates (per 1000) for MHA Groups by Provinces – Females



Also of some interest is the actual number of suicides by MHA status. The totals collapsed over age and sex are summarized in Table 23.

Table 23 Suicide Number and Rates (per 1000) for MHA and non-MHA Groups by Province Collapsed across Age and Sex

Province	#MHA			# non-MHA			MHA / non-MHA
	Individuals	Suicides	Rate /1000	Individuals	Suicides	Rate /1000	
Quebec	849,795	505	0.594	4,651,195	610	0.131	4.53
Ontario	3,064,615	808	0.264	7,930,046	577	0.073	3.62
Manitoba	203,178	99	0.487	736,165	90	0.122	3.99
Alberta							
British Columbia	759,904	419	0.551	2,440,533	130	0.053	10.35

Two key findings emerge. First, the BC ratio is considerably higher than the other provinces (primarily due to the low non-MHA rate). Second, while suicides among those known to have a MHA problem occur at a much greater rate, the number of suicides in the non-MHA population is still quite large.

4.5 Additional Analyses

No additional analyses were planned for this measure.

5 Rates of suicide attempts among people diagnosed with a mental disorder or addiction

5.1 Measure

Two rates are to be compared:

The number of individuals who received health services for a mental disorder in one year who attempted suicide
divided by
 the number of people who received health services for a mental disorder in one year.

Compared to:

The number of individuals who received health services for reasons other than a mental disorder in one year who attempted suicide
divided by
 the number of people who received health services for reasons other than a mental disorder in one year.

5.2 Data Selection Process

Selection was done for the year 2014/15. The goal was to identify a data set of all those who received health services in a year. This set was partitioned into those who were treated for a MHA reason in the fiscal year and those who were not. Then, within each partition, the number who attempted (but did not die by) suicide in a year after their first contact was identified. The overall rates (as well as the age- and sex-specific rates) of the two partitions are compared.

5.2.1 IDENTIFICATION OF THE MHA AND NON-MHA POPULATIONS

This is the same procedure as outlined in Section 4.2.1.

1. For the fiscal year select all records from the physician-billing database.
2. Drop out so called “problem” records, that is, records where:
 - a. Provincial identity number is invalid
 - b. Sex is missing
 - c. Not resident of province
 - d. Date of birth is missing or is such that the age is a negative number or greater than 125 at the time of service
3. For a fiscal year select all records from the hospital discharge database where the date of discharge is in the fiscal year and the individual is discharged alive.
4. Drop out so called “problem” records, that is, records where:
 - a. Provincial identity number is invalid

- b. Sex is missing
 - c. Not resident of province
 - d. Date of birth is missing or is such that the age is a negative number of greater than 125 at the time of service
5. Merge the physician and hospital records
 - a. Overlap of dates is not a concern
6. **Create the MHA partition:** Select all records from the combined database where the billing diagnosis or the most responsible diagnosis is a MHA diagnosis
 - MHA diagnoses are any ICD10 Chapter V (F00 to F99) or ICD9 Chapter V (290 to 319) diagnosis.
7. If there is more than one MHA visit in the fiscal year for an individual, drop all but the first visit.
8. If the individual's age at the time of the first visit was less than 10 drop from the dataset.
9. **Create the non-MHA partition:** Select all records from the combined database where the billing diagnosis or the most responsible diagnosis is not a MHA diagnosis.²¹
 - MHA diagnoses are any ICD10 Chapter V (F00 to F99) or ICD9 Chapter V (290 to 319) diagnosis.
10. If there is more than one visit in the fiscal year for an individual, drop all but the first visit.
11. Delete any individual who is in the MHA partition.
12. If the individual's age at the time of the first visit was less than 10 drop from the dataset.

The above procedure results in two mutually exclusive data sets of individuals aged 10 and above whose first visit date is in the fiscal year.

5.2.2 IDENTIFICATION OF ATTEMPTED SUICIDE IN MHA AND NON-MHA GROUP

For every record in the data sets derived above, determine the date 365 days after the date of service/date of discharge (i.e., date + 365). Then determine if the individual has an "alive" hospital discharge disposition where the first accident code is ICD10 X60-X84 (inclusive) or Y87.0.²²

5.3 Data Sources and Notes

Many small cells in the non-MHA group affected this measure through very low (often 0) suicide attempt numbers.

²¹ This step might not seem necessary, but it is possible for an individual to have a MHA diagnosis at age 9 and a non-MHA diagnosis at age 10 in the same fiscal year and this ensures that the record will be included in the non MHA partition.

²² Note the decimal must be present in Y87.0

5.4 Results

Results are presented in the same manner as in Section 4.4.

5.4.1 QUEBEC

Quebec was not able to supply data for this indicator.

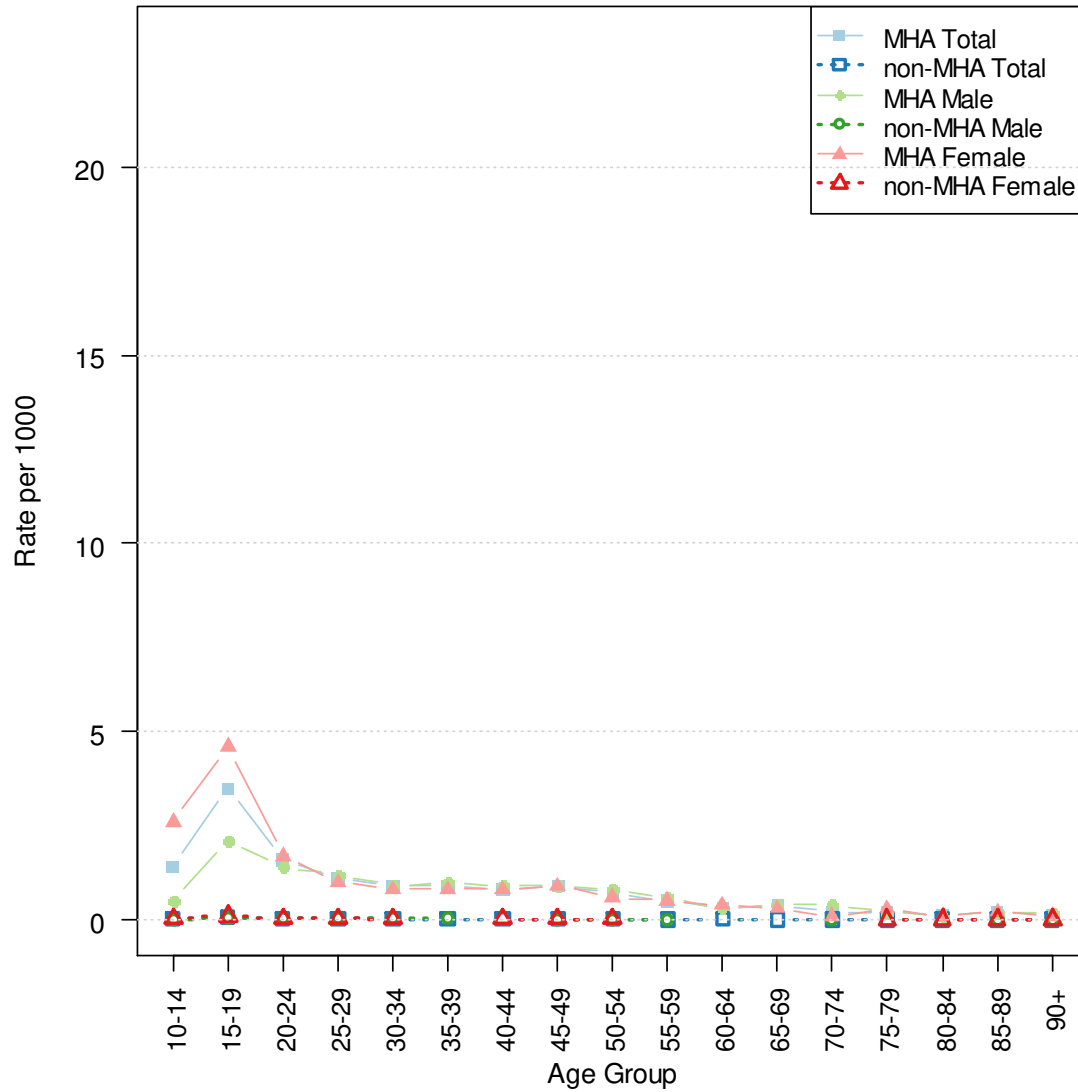
5.4.2 ONTARIO

Results are presented in Table 24 and plotted in Figure 32.

Table 24 Suicide Attempt Rates (per 1000) for MHA and non-MHA Groups – Ontario 2010/11

Age	Overall		Males		Females	
	MHA Suic. Att. Rate	non-MHA Suic. Att. Rate	MHA Suic. Att. Rate	non-MHA Suic. Att. Rate	MHA Suic. Att. Rate	non-MHA Suic. Att. Rate
10-14	1.40	0.03	0.50	0.00	2.60	0.04
15-19	3.50	0.08	2.10	0.05	4.60	0.11
20-24	1.60	0.04	1.40	0.05	1.70	0.03
25-29	1.10	0.03	1.20	0.03	1.00	0.03
30-34	0.90	0.03	0.90	0.03	0.80	0.02
35-39	0.90	0.02	1.00	0.03	0.80	0.00
40-44	0.80	0.02	0.90	0.00	0.80	0.02
45-49	0.90	0.02	0.90	0.02	0.90	0.02
50-54	0.70	0.02	0.80	0.02	0.60	0.02
55-59	0.50	0.00	0.60	0.00	0.50	0.00
60-64	0.30	0.01	0.30	0.00	0.40	0.00
65-69	0.40	0.00	0.40	0.00	0.30	0.00
70-74	0.20	0.00	0.40	0.00	0.10	0.00
75-79	0.20	0.00	0.20	0.00	0.30	0.00
80-84	0.10	0.00	0.10	0.00	0.10	0.00
85-89	0.20	0.00	0.20	0.00	0.20	0.00
90+	0.10	0.00	0.20	0.00	0.10	0.00
Total	0.90	0.02	0.80	0.02	1.00	0.03

Figure 32 Plot of Suicide Attempt Rates (per 1000) for MHA and non-MHA Groups – Ontario 2010/11



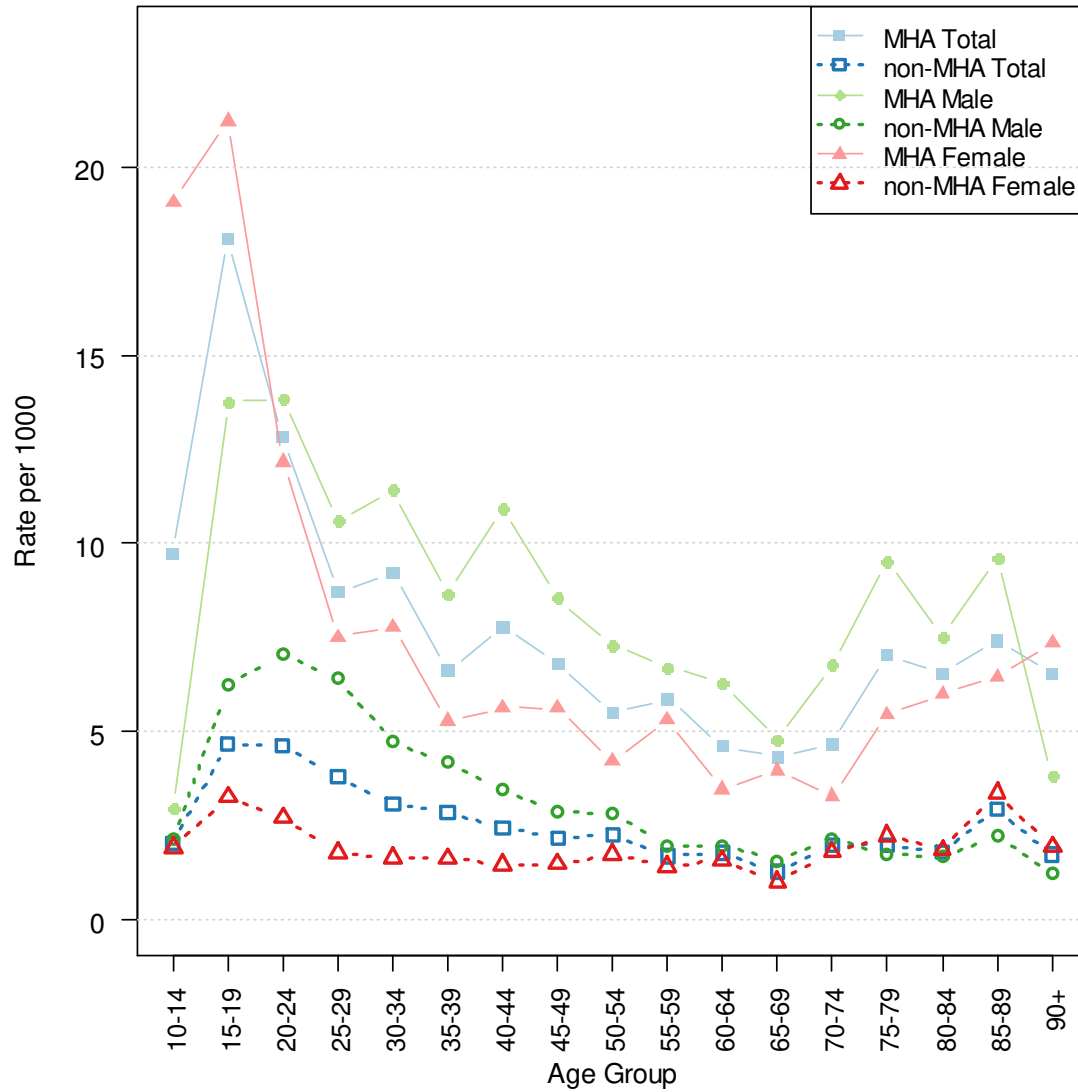
5.4.3 MANITOBA

Results are presented in Table 25 and plotted in Figure 33.

Table 25 Suicide Attempt Rates (per 1000) for MHA and non-MHA Groups – Manitoba 2013/14

Age	Overall		Males		Females	
	MHA Suic. Att. Rate	non-MHA Suic. Att. Rate	MHA Suic. Att. Rate	non-MHA Suic. Att. Rate	MHA Suic. Att. Rate	non-MHA Suic. Att. Rate
10-14	9.74	2.04	2.95	2.16	19.06	1.92
15-19	18.10	4.68	13.77	6.25	21.23	3.26
20-24	12.82	4.61	13.83	7.04	12.17	2.71
25-29	8.71	3.82	10.59	6.40	7.51	1.78
30-34	9.21	3.06	11.41	4.73	7.78	1.65
35-39	6.62	2.84	8.65	4.18	5.29	1.63
40-44	7.78	2.43	10.95	3.45	5.63	1.47
45-49	6.81	2.17	8.54	2.88	5.62	1.48
50-54	5.48	2.27	7.30	2.81	4.21	1.73
55-59	5.87	1.69	6.70	1.97	5.30	1.41
60-64	4.61	1.78	6.30	1.97	3.47	1.58
65-69	4.31	1.28	4.80	1.55	3.97	1.01
70-74	4.67	1.97	6.78	2.16	3.29	1.80
75-79	7.03	1.99	9.54	1.72	5.45	2.23
80-84	6.54	1.79	7.52	1.69	6.00	1.86
85-89	7.42	2.94	9.61	2.22	6.45	3.37
90+	6.55	1.73	3.81	1.22	7.35	1.93
Total	7.86	2.65	8.77	3.50	7.25	1.87

Figure 33 Plot of Suicide Attempt Rates (per 1000) for MHA and non-MHA Groups – Manitoba 2013/14



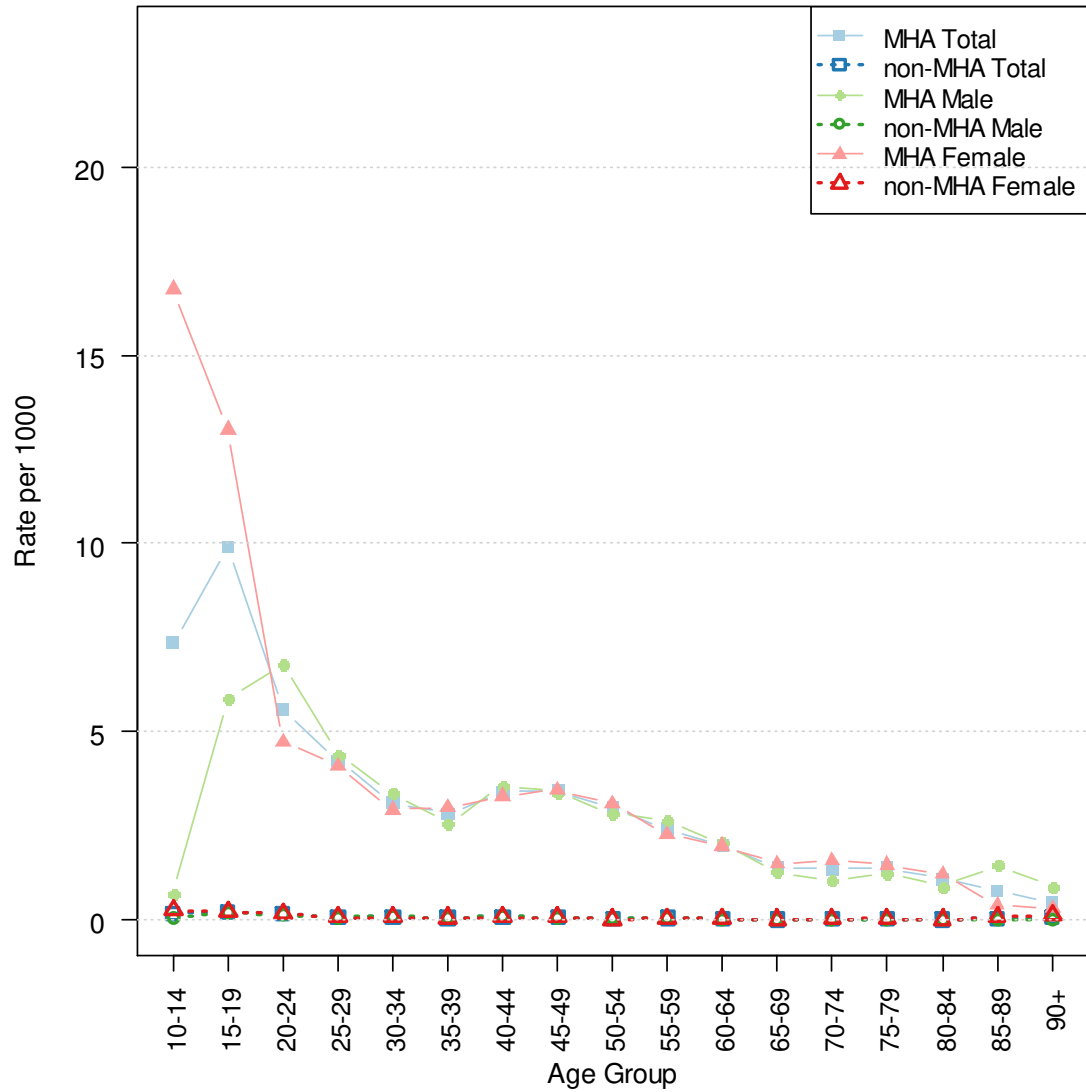
5.4.4 ALBERTA

Results are presented in Table 26 and plotted in Figure 34.

Table 26 Suicide Attempt Rates (per 1000) for MHA and non-MHA Groups – Alberta

Age	Overall		Males		Females	
	MHA Suic. Att. Rate	non-MHA Suic. Att. Rate	MHA Suic. Att. Rate	non-MHA Suic. Att. Rate	MHA Suic. Att. Rate	non-MHA Suic. Att. Rate
10-14	7.36	0.15	0.67	0.03	16.77	0.26
15-19	9.90	0.21	5.86	0.20	13.03	0.22
20-24	5.59	0.15	6.80	0.13	4.71	0.17
25-29	4.22	0.07	4.39	0.07	4.09	0.06
30-34	3.10	0.08	3.36	0.09	2.93	0.06
35-39	2.81	0.04	2.55	0.04	2.99	0.05
40-44	3.40	0.08	3.57	0.10	3.28	0.06
45-49	3.43	0.06	3.39	0.05	3.45	0.07
50-54	2.98	0.04	2.82	0.07	3.08	0.01
55-59	2.41	0.05	2.62	0.06	2.27	0.04
60-64	2.00	0.02	2.04	0.01	1.97	0.03
65-69	1.40	0.00	1.26	0.00	1.50	0.00
70-74	1.36	0.02	1.03	0.02	1.58	0.02
75-79	1.38	0.02	1.25	0.00	1.46	0.03
80-84	1.08	0.00	0.87	0.00	1.21	0.00
85-89	0.77	0.04	1.45	0.00	0.39	0.07
90+	0.46	0.08	0.88	0.00	0.31	0.11
Total	3.50	0.08	3.13	0.07	3.77	0.08

Figure 34 Plot of Suicide Attempt Rates (per 1000) for MHA and non-MHA Groups – Alberta



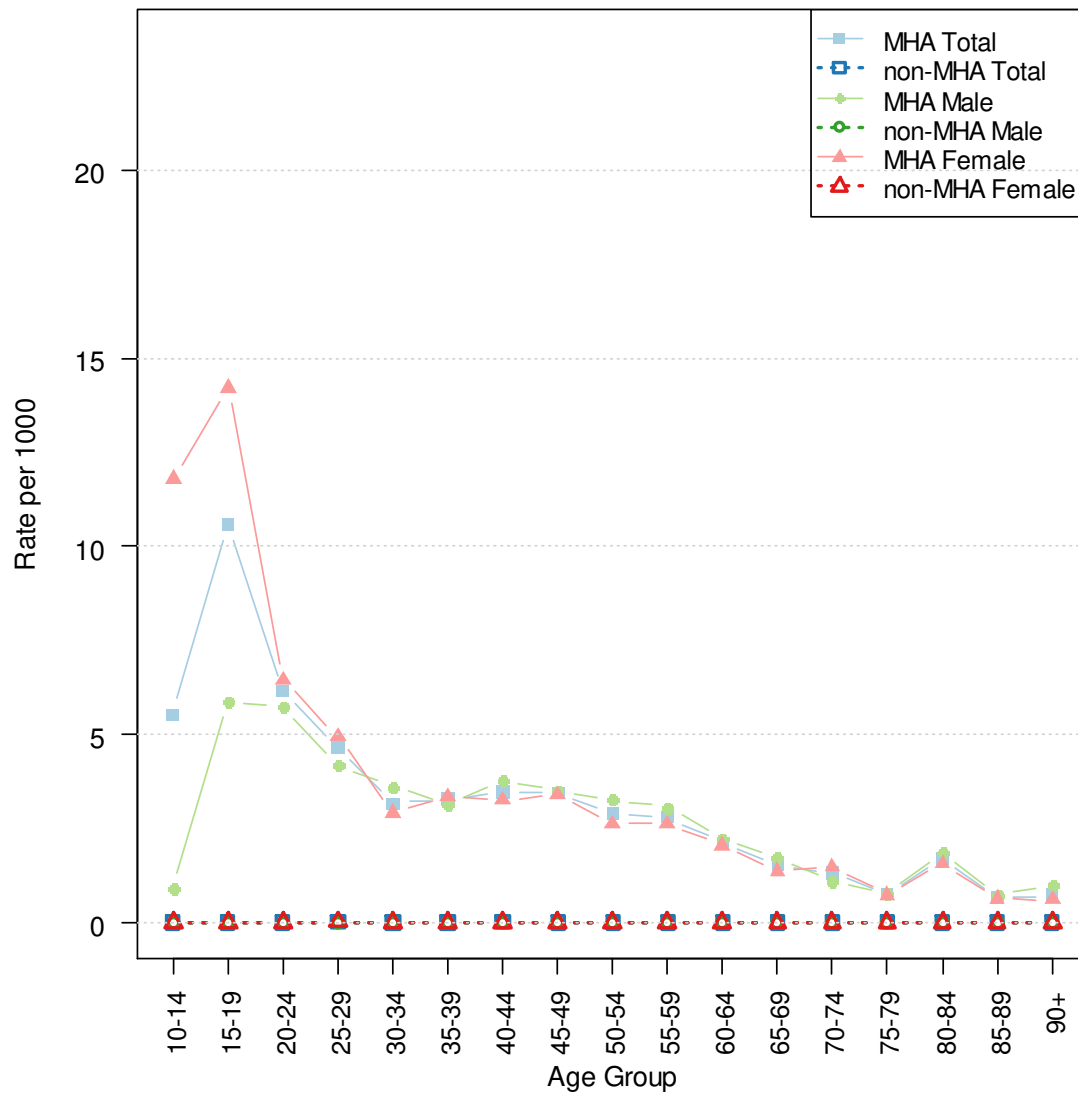
5.4.5 BRITISH COLUMBIA

Results are presented in Table 27 and plotted in Figure 35.

Table 27 Suicide Attempt Rates (per 1000) for MHA and non-MHA Groups – British Columbia 2013/14

Age	Overall		Males		Females	
	MHA Suic. Att. Rate	non-MHA Suic. Att. Rate	MHA Suic. Att. Rate	non-MHA Suic. Att. Rate	MHA Suic. Att. Rate	non-MHA Suic. Att. Rate
10-14	5.53	0.00	0.91	0.00	11.80	0.00
15-19	10.58	0.00	5.87	0.00	14.22	0.00
20-24	6.16	0.01	5.74	0.01	6.45	0.00
25-29	4.66	0.01	4.18	0.00	4.95	0.02
30-34	3.18	0.01	3.62	0.00	2.93	0.01
35-39	3.28	0.01	3.16	0.00	3.36	0.01
40-44	3.47	0.01	3.79	0.01	3.26	0.01
45-49	3.43	0.00	3.49	0.00	3.40	0.00
50-54	2.89	0.00	3.27	0.00	2.64	0.00
55-59	2.80	0.00	3.07	0.01	2.63	0.00
60-64	2.13	0.00	2.23	0.00	2.06	0.00
65-69	1.52	0.00	1.72	0.00	1.38	0.00
70-74	1.32	0.00	1.09	0.00	1.48	0.00
75-79	0.77	0.01	0.80	0.02	0.74	0.00
80-84	1.69	0.00	1.88	0.00	1.57	0.00
85-89	0.66	0.00	0.71	0.00	0.64	0.00
90+	0.73	0.00	1.03	0.00	0.61	0.00
Total	3.38	0.00	3.09	0.00	3.58	0.00

Figure 35 Plot of Suicide Attempt Rates (per 1000) for MHA and non-MHA Groups – British Columbia 2013/14



5.4.6 COMBINED DATA

The data from each of the individual provinces (overall and by sex) is plotted in Figure 36 through Figure 38. While the proportions vary between the provinces the shape of the curves is similar.

Figure 36 Plot of Suicide Attempt Rates (per 1000) for MHA Groups by Provinces – Males and Females

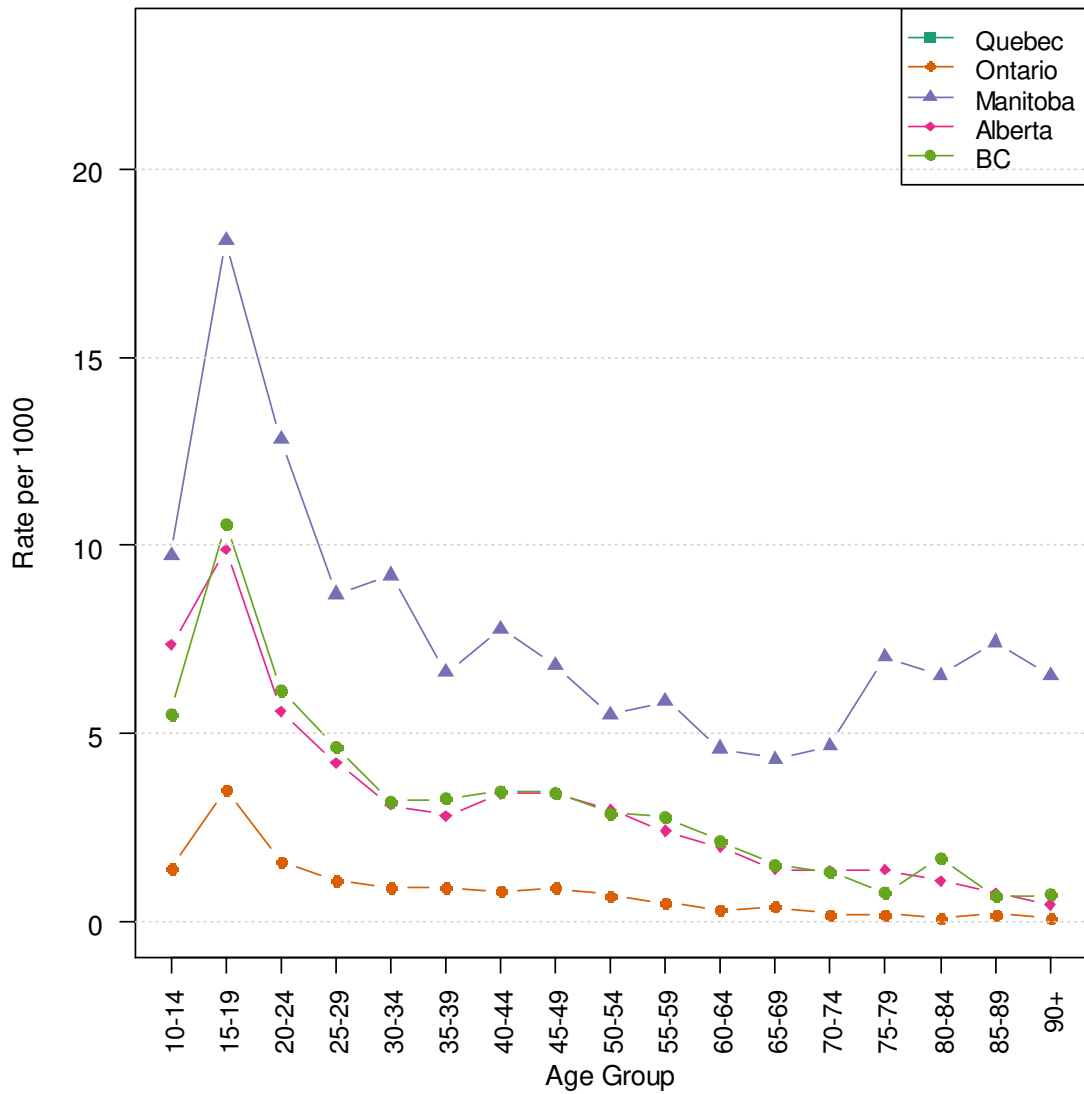


Figure 37 Plot of Suicide Rates (per 1000) for MHA Groups by Provinces – Males

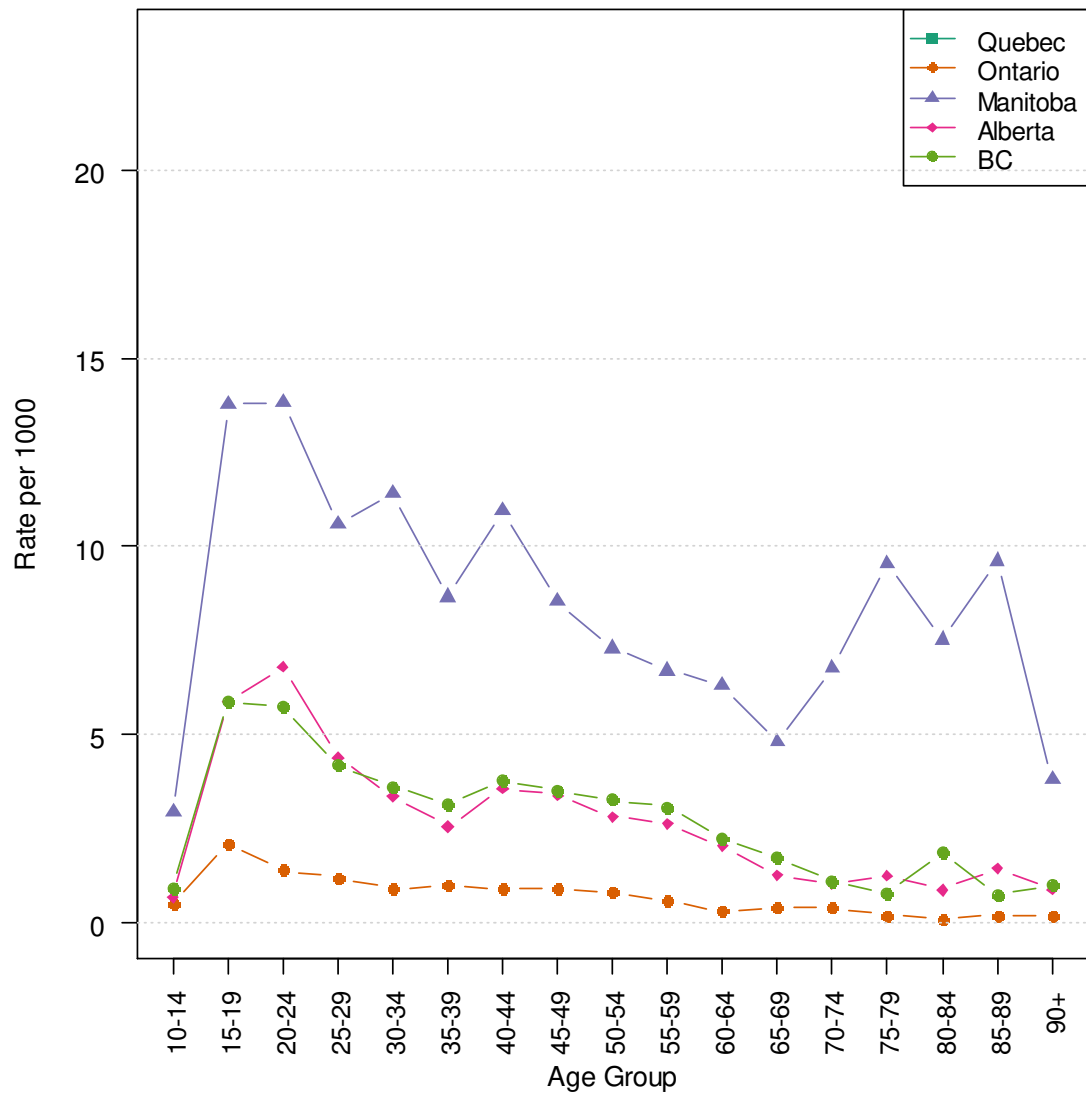
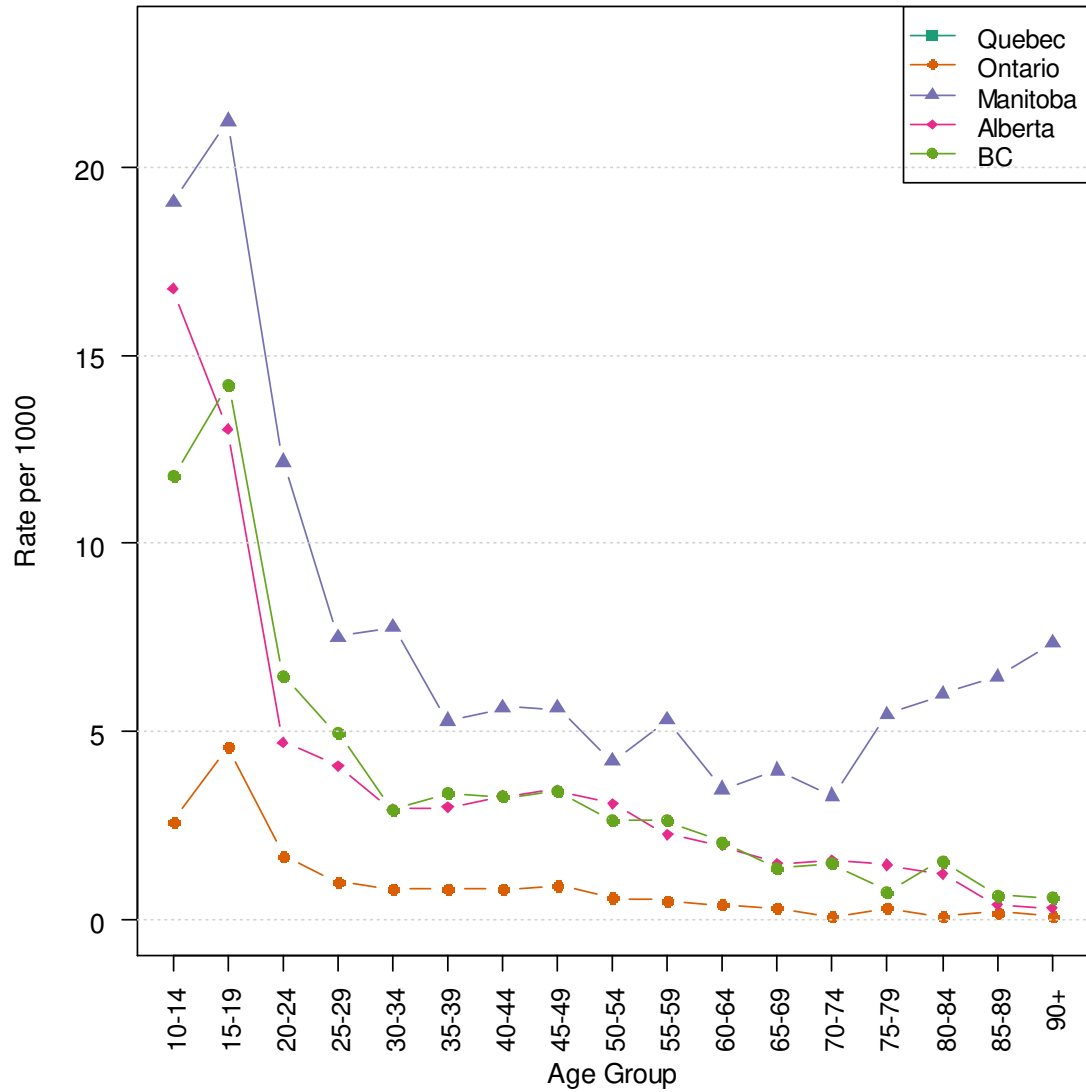


Figure 38 Plot of Suicide Rates (per 1000) for MHA Groups by Provinces – Females



Also of some interest is the actual number of suicide attempts by MHA status. The totals collapsed over age and sex are summarized in Table 28.

Table 28 Suicide Attempt Numbers and Rates (per 1000) for MHA and non-MHA Groups by Province Collapsed across Age and Sex

Province	#MHA			# non-MHA			MHA / non-MHA
	Individuals	Attempted Suicides	Rate /1000	Individuals	Attempted Suicides	Rate /1000	
Quebec							
Ontario	3,064,615	2,793	0.911	7,930,046	188	0.024	38.44
Manitoba	203,178	1,597	7.860	736,165	1,948	2.646	2.97
Alberta	605,648	2,122	3.504	2,496,729	188	0.075	46.53
British Columbia	759,904	2,572	3.385	2,440,533	9	0.004	917.81

Two key findings emerge. First, there is considerable provincial variability: the BC ratio is considerably higher than the other provinces and the Manitoba rate much lower. Second, unlike completed suicides (and except for Manitoba), the number of suicide attempts in the non-MHA population is small.

5.5 Additional Analyses

5.5.1 IMPACT OF INCLUDING ED DIAGNOSES

The above results include only those suicide attempts that result in a hospital admission. Ontario and Alberta repeated the analysis with suicide attempts identified through diagnoses associated with either a hospital discharge or an ED visit (ICD10 X60-X84 inclusive or Y87.0).

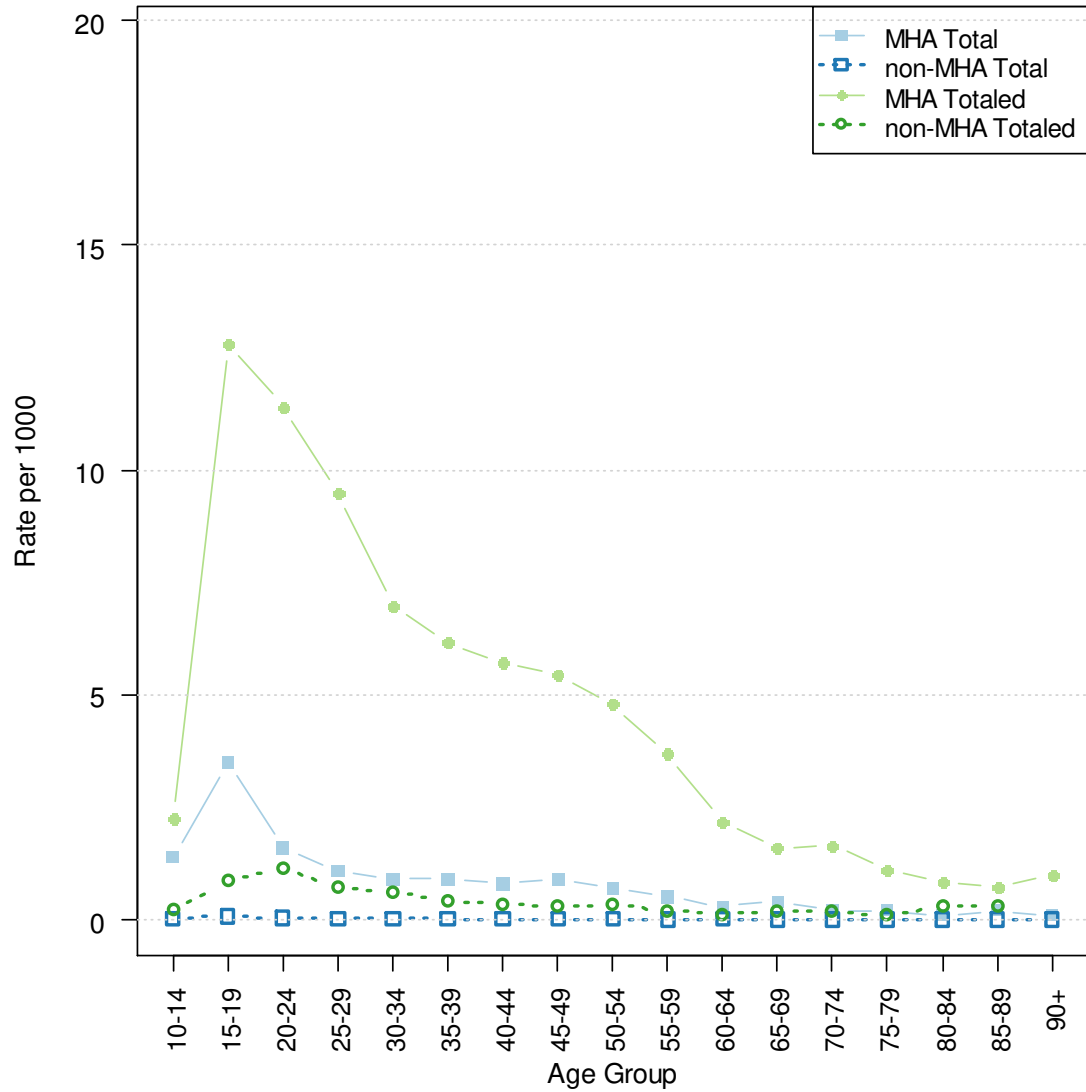
Ontario results are presented in Table 29 and plotted in Figure 39, Alberta results are presented in Table 30 and plotted in Figure 40. In both provinces, including the ED data reveals a substantial increase in both the MHA and non-MHA attempted suicide rates. While the MHA rates are higher in both instances, it should be noted that the non-MHA rates increase ten-fold when ED cases are included.

Clearly, as more provinces collect and report ED data, a more accurate picture of suicide attempts will emerge if ED is included as a data source for this indicator.

Table 29 Suicide Attempt Rates (per 1000) for MHA and non-MHA Groups Based on Hospital and ED Discharges – Ontario

Age	Hospital Only Codes						Hospital and Emergency Department Codes					
	Overall		Males		Females		Overall		Males		Females	
	MHA Suic. Att. Rate	non-MHA Suic. Att. Rate	MHA Suic. Att. Rate	non-MHA Suic. Att. Rate	MHA Suic. Att. Rate	non-MHA Suic. Att. Rate	MHA Suic. Att. Rate	non-MHA Suic. Att. Rate	MHA Suic. Att. Rate	non-MHA Suic. Att. Rate	MHA Suic. Att. Rate	non-MHA Suic. Att. Rate
10-14	1.40	0.03	0.50	0.00	2.60	0.04	5.75	0.29	2.26	0.23	10.51	0.35
15-19	3.50	0.08	2.10	0.05	4.60	0.11	16.80	0.91	12.80	0.88	20.07	0.94
20-24	1.60	0.04	1.40	0.05	1.70	0.03	11.13	0.85	11.41	1.16	10.92	0.56
25-29	1.10	0.03	1.20	0.03	1.00	0.03	7.87	0.54	9.47	0.73	6.74	0.37
30-34	0.90	0.03	0.90	0.03	0.80	0.02	6.14	0.41	6.98	0.62	5.55	0.22
35-39	0.90	0.02	1.00	0.03	0.80	0.00	5.55	0.29	6.16	0.41	5.12	0.18
40-44	0.80	0.02	0.90	0.00	0.80	0.02	5.33	0.29	5.73	0.36	5.03	0.22
45-49	0.90	0.02	0.90	0.02	0.90	0.02	5.33	0.24	5.45	0.31	5.24	0.18
50-54	0.70	0.02	0.80	0.02	0.60	0.02	4.31	0.25	4.79	0.33	3.94	0.17
55-59	0.50	0.00	0.60	0.00	0.50	0.00	3.39	0.18	3.69	0.21	3.17	0.16
60-64	0.30	0.01	0.30	0.00	0.40	0.00	2.12	0.12	2.18	0.13	2.07	0.11
65-69	0.40	0.00	0.40	0.00	0.30	0.00	1.67	0.16	1.59	0.18	1.74	0.14
70-74	0.20	0.00	0.40	0.00	0.10	0.00	1.19	0.14	1.66	0.19	0.83	0.10
75-79	0.20	0.00	0.20	0.00	0.30	0.00	1.13	0.12	1.11	0.10	1.14	0.14
80-84	0.10	0.00	0.10	0.00	0.10	0.00	0.80	0.20	0.83	0.31	0.78	0.12
85-89	0.20	0.00	0.20	0.00	0.20	0.00	0.82	0.25	0.72	0.30	0.87	0.21
90+	0.10	0.00	0.20	0.00	0.10	0.00	0.60	0.16	0.99	0.00	0.47	0.00
Total	0.90	0.02	0.80	0.02	1.00	0.03	5.41	0.36	5.39	0.43	5.43	0.29

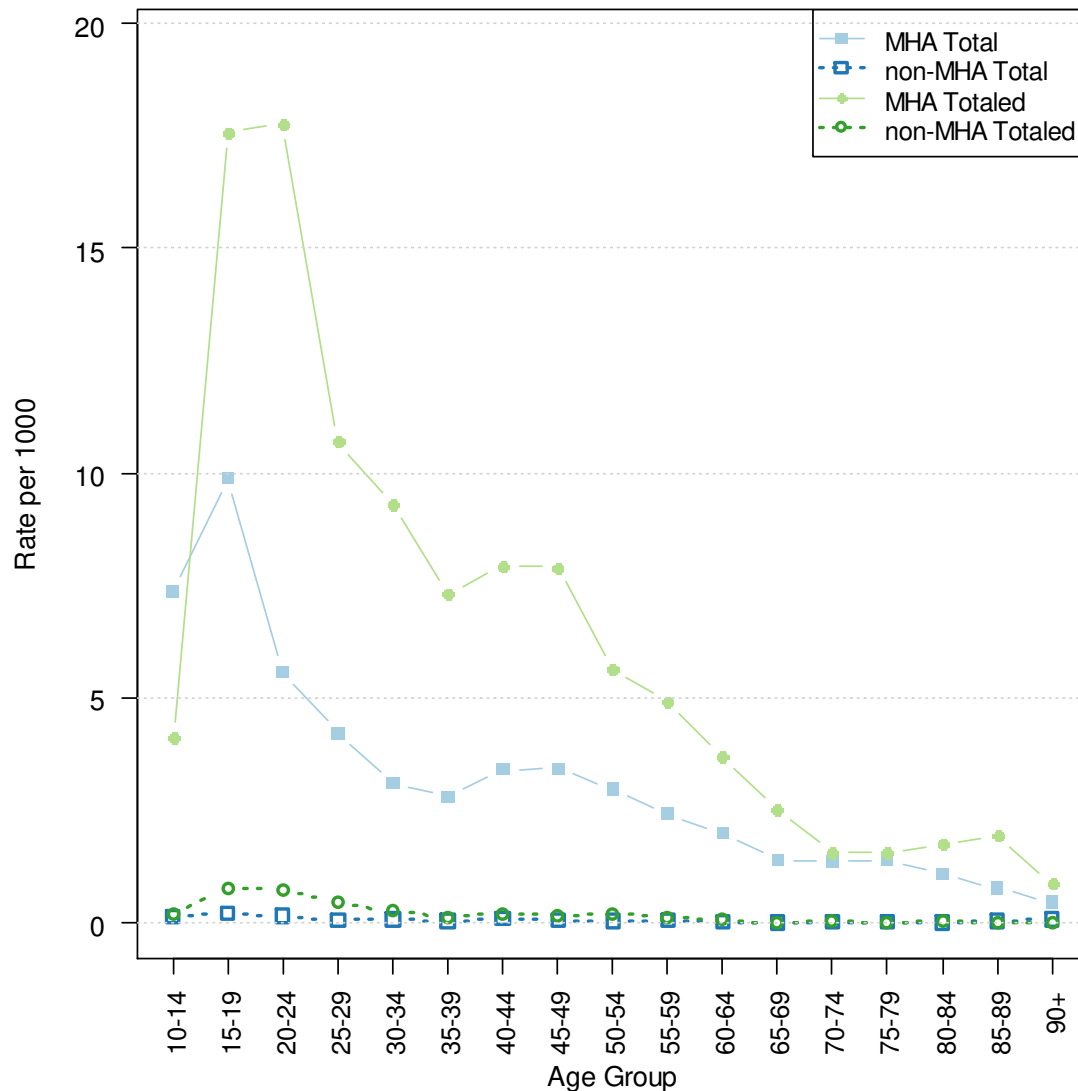
Figure 39 Plot of Suicide Attempt Rates (per 1000) for MHA and non-MHA Groups Based on Hospital and ED Discharges – Ontario



**Table 30 Suicide Attempt Rates (per 1000) for MHA and non-MHA Groups
Based on Hospital and ED Discharges – Alberta**

Age	Hospital Only Codes						Hospital and Emergency Department Codes					
	Overall		Males		Females		Overall		Males		Females	
	MHA Suic. Att. Rate	non-MHA Suic. Att. Rate	MHA Suic. Att. Rate	non-MHA Suic. Att. Rate	MHA Suic. Att. Rate	non-MHA Suic. Att. Rate	MHA Suic. Att. Rate	non-MHA Suic. Att. Rate	MHA Suic. Att. Rate	non-MHA Suic. Att. Rate	MHA Suic. Att. Rate	non-MHA Suic. Att. Rate
10-14	7.36	0.15	0.67	0.03	16.77	0.26	19.57	0.62	4.10	0.18	41.29	1.06
15-19	9.90	0.21	5.86	0.20	13.03	0.22	28.14	1.05	17.58	0.77	36.33	1.31
20-24	5.59	0.15	6.80	0.13	4.71	0.17	16.17	0.65	17.77	0.73	15.02	0.57
25-29	4.22	0.07	4.39	0.07	4.09	0.06	10.64	0.41	10.69	0.44	10.60	0.38
30-34	3.10	0.08	3.36	0.09	2.93	0.06	8.43	0.23	9.29	0.25	7.83	0.22
35-39	2.81	0.04	2.55	0.04	2.99	0.05	7.34	0.14	7.33	0.13	7.35	0.14
40-44	3.40	0.08	3.57	0.10	3.28	0.06	7.63	0.20	7.92	0.21	7.42	0.19
45-49	3.43	0.06	3.39	0.05	3.45	0.07	7.36	0.17	7.90	0.16	6.97	0.17
50-54	2.98	0.04	2.82	0.07	3.08	0.01	5.90	0.13	5.63	0.20	6.08	0.07
55-59	2.41	0.05	2.62	0.06	2.27	0.04	4.45	0.11	4.91	0.13	4.12	0.09
60-64	2.00	0.02	2.04	0.01	1.97	0.03	3.67	0.08	3.70	0.06	3.65	0.09
65-69	1.40	0.00	1.26	0.00	1.50	0.00	2.47	0.03	2.52	0.00	2.43	0.06
70-74	1.36	0.02	1.03	0.02	1.58	0.02	2.09	0.03	1.55	0.05	2.46	0.02
75-79	1.38	0.02	1.25	0.00	1.46	0.03	1.76	0.02	1.57	0.00	1.88	0.03
80-84	1.08	0.00	0.87	0.00	1.21	0.00	1.55	0.02	1.74	0.05	1.43	0.00
85-89	0.77	0.04	1.45	0.00	0.39	0.07	1.11	0.08	1.94	0.00	0.66	0.13
90+	0.46	0.08	0.88	0.00	0.31	0.11	0.57	0.16	0.88	0.00	0.46	0.23
Total	3.50	0.08	3.13	0.07	3.77	0.08	8.53	0.29	7.68	0.25	9.14	0.33

Figure 40 Plot of Suicide Attempt Rates (per 1000) for MHA and non-MHA Groups Based on Hospital and ED Discharges – Alberta



5.5.2 OVERLAP BETWEEN HOSPITAL ADMISSION AND DISCHARGE DATES

After development of the specifications for this indicator, a potential confound in the assignment of the individual to the MHA group was uncovered.²³ Assignment is based on the existence of a MHA diagnosis in either physician-billing claims or hospital discharge data. To be counted as an attempted suicide in the MHA group, the diagnosis had to have occurred before the hospital discharge with the attempted suicide diagnosis. The algorithm uses the hospital discharge date as the date of the suicide diagnosis. An individual could have been visited by his/her

²³ See minutes from the June 14, 2016 meeting for additional details.

physician during a hospital stay related to the attempted suicide. If the physician submitted a medical services claim for that hospital visit using a psychiatric diagnosis and that was the first time a psychiatric claim was used for the individual, then this would constitute a case where the individual was classified as a member of the MHA cohort after the hospital admission but before the hospital discharge, thereby confounding the numerator and denominator.

One province (Alberta) examined whether, among those identified in the MHA group with a suicide attempt, there were any cases that met the following condition: the earliest MHA visit (as described in step 7 in the data selection process described above) is a physician-billing visit that falls between the admission and discharge dates of a hospital discharge that meets the criterion for an attempted suicide.

Results showed that of the 2122 suicide attempts in the MHA cohort (these are the cases that make up the rate of 3.50 per 1000 in Table 26):

- 2114 had their index visit defined using the physician claims database.
- Of these 2114 claims records, 528 (25%) overlapped with the suicide attempt discharge in DAD. (e.g., DAD admission date \leq claim date $<$ DAD discharge date)
- Of the 528 overlap records, 346 (66%) overlapped exactly on the admission date corresponding to the suicide attempt record in DAD (e.g., DAD admit date = claim date)

Consequently, the calculation of this indicator should ensure that the admission date of the attempted suicide case be taken into account when defining the MHA status of the patient. This may account, in part, for the pattern found in Table 28.

6 Receipt of treatment commensurate with clinical guidelines

This indicator was discussed at length by the working group. While it was considered important to include an indicator related to primary mental health care there are difficulties in measuring the quality of treatment provided in that sector through administrative data.

Clinical practice guidelines exist in some areas (e.g., depression) but they do not translate easily to measures that can be obtained from administrative data. The original attempt to include such an indicator in the report was a 'test case' to document the types of barriers encountered in measuring clinical practice and illustrate the need for valid indicators of primary mental health care. Upon examination of the data required for this indicator, the consensus was that there are not adequate administrative data in any province to support an indicator related to adherence to clinical guidelines. Thus, further work on this indicator was discontinued.

7 Access to the same family physician for people diagnosed with a mental disorder or addiction

7.1 Measure

The number of individuals with a MHA condition who are classified as having a primary care physician
divided by
 the number of individuals in a year with a MHA condition.

7.2 Data Selection Process

Selection was done for the year 2014/15²⁴. The goal is to identify a data set of all those who received any mental health services in a year and to identify how many of these individuals visited the same primary care physician two or more times in the course of the fiscal year.

7.2.1 IDENTIFICATION OF THE MHA POPULATION

1. For the fiscal year select all records from the physician-billing database where the billing diagnosis is a MHA diagnosis and the date of service is in the fiscal year.
 - MHA diagnoses are any ICD10 Chapter V (F00 to F99) or ICD9 Chapter V (290 to 319) diagnosis.
2. Drop out so called “problem” records, that is, records where:
 - a. Provincial identity number is invalid
 - b. Sex is missing
 - c. Not resident of province
 - d. Date of birth is missing or is such that the age is a negative number or greater than 125 at the time of service.
3. If there is more than one physician visit in the fiscal year for an individual, drop all but the first visit.
4. For a fiscal year select all records from the hospital discharge database where the discharge diagnosis is a MHA diagnosis and the date of discharge is in the fiscal year.
5. Drop out so called “problem” records, that is, records where:
 - a. Provincial identity number is invalid
 - b. Sex is missing
 - c. Not resident of province
 - d. Date of birth is missing or is such that the age is a negative number or greater than 125 at the time of service.
6. If there is more than one hospital discharge in the fiscal year for an individual, drop all but the first discharge.
7. Merge the records selected by physician and records selected by hospital.

²⁴ We did not decide to do this over the years, but clearly could extend it back in time if desired.

8. If there is more than one visit in the fiscal year for an individual, drop all but the first visit.
9. If the individual's age at the time of the first visit was less than 10 drop from the dataset. This forms the denominator data set.

7.2.2 IDENTIFICATION OF THOSE WITH A PRIMARY PHYSICIAN

For every record in the data set, select all physician-billings where the billing physician was a GP or Family Practice Physician. Group by physician and select out records with two or more visits to one or more of the physicians.

7.3 Data Sources and Notes

The data selection process did not include paediatrician billings, and thus the results at earlier ages are now seen as probable undercounts.

7.4 Results

Results are summarized in five-year age groups beginning at age 10. They are presented here first by province and then combined.

7.4.1 QUEBEC

Quebec was not able to supply data for this indicator.²⁵

²⁵ Quebec's source and collaborator to the project was its Chronic Disease Surveillance System of the Public Health Agency of Quebec. Its available linked administrative databases include details of type of physicians, and thus would be able to produce this data for future versions of this indicator. Data was not available here due to administrative reasons.

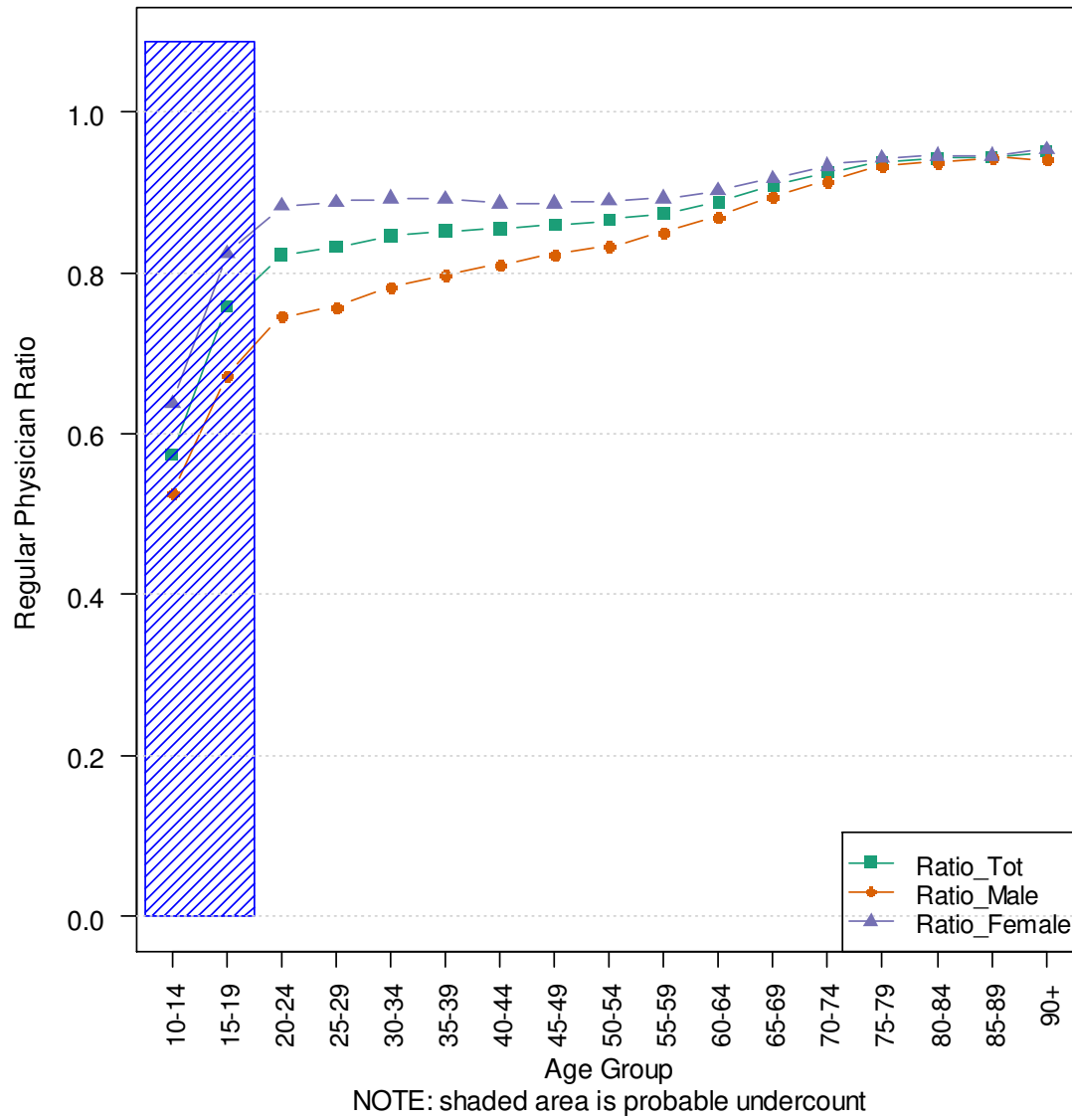
7.4.2 ONTARIO

Results are presented in Table 31 and plotted in Figure 41.

Table 31 Regular Family Physician for MHA Individuals – Ontario

Age	Overall			Males			Females		
	# MHA diagnosis	# with primary care physician	Ratio	# MHA diagnosis	# with primary care physician	Ratio	# MHA diagnosis	# with primary care physician	Ratio
10-14	78,327	44,948	0.57	44,860	23,618	0.53	33,467	21,330	0.64
15-19	126,630	95,938	0.76	55,671	37,452	0.67	70,959	58,486	0.82
20-24	141,743	116,537	0.82	62,379	46,474	0.75	79,364	70,063	0.88
25-29	139,930	116,314	0.83	60,586	45,869	0.76	79,344	70,445	0.89
30-34	151,322	127,978	0.85	63,916	49,984	0.78	87,406	77,994	0.89
35-39	156,007	132,925	0.85	65,226	51,992	0.80	90,781	80,933	0.89
40-44	168,087	143,554	0.85	70,769	57,357	0.81	97,318	86,197	0.89
45-49	184,485	158,513	0.86	78,635	64,721	0.82	105,850	93,792	0.89
50-54	209,060	180,878	0.87	89,571	74,632	0.83	119,489	106,246	0.89
55-59	182,065	159,213	0.87	77,823	66,167	0.85	104,242	93,046	0.89
60-64	146,204	129,788	0.89	62,927	54,701	0.87	83,277	75,087	0.90
65-69	119,206	108,176	0.91	51,507	46,091	0.89	67,699	62,085	0.92
70-74	88,531	81,883	0.92	37,744	34,492	0.91	50,787	47,391	0.93
75-79	77,216	72,465	0.94	31,934	29,799	0.93	45,282	42,666	0.94
80-84	71,842	67,703	0.94	28,382	26,616	0.94	43,460	41,087	0.95
85-89	57,506	54,318	0.94	19,896	18,757	0.94	37,610	35,561	0.95
90+	41,640	39,547	0.95	10,937	10,295	0.94	30,703	29,252	0.95
Total	2,139,801	1,830,678	0.86	912,763	739,017	0.81	1,227,038	1,091,661	0.89

Figure 41 Plot of Regular Family Physician for MHA Individuals – Ontario



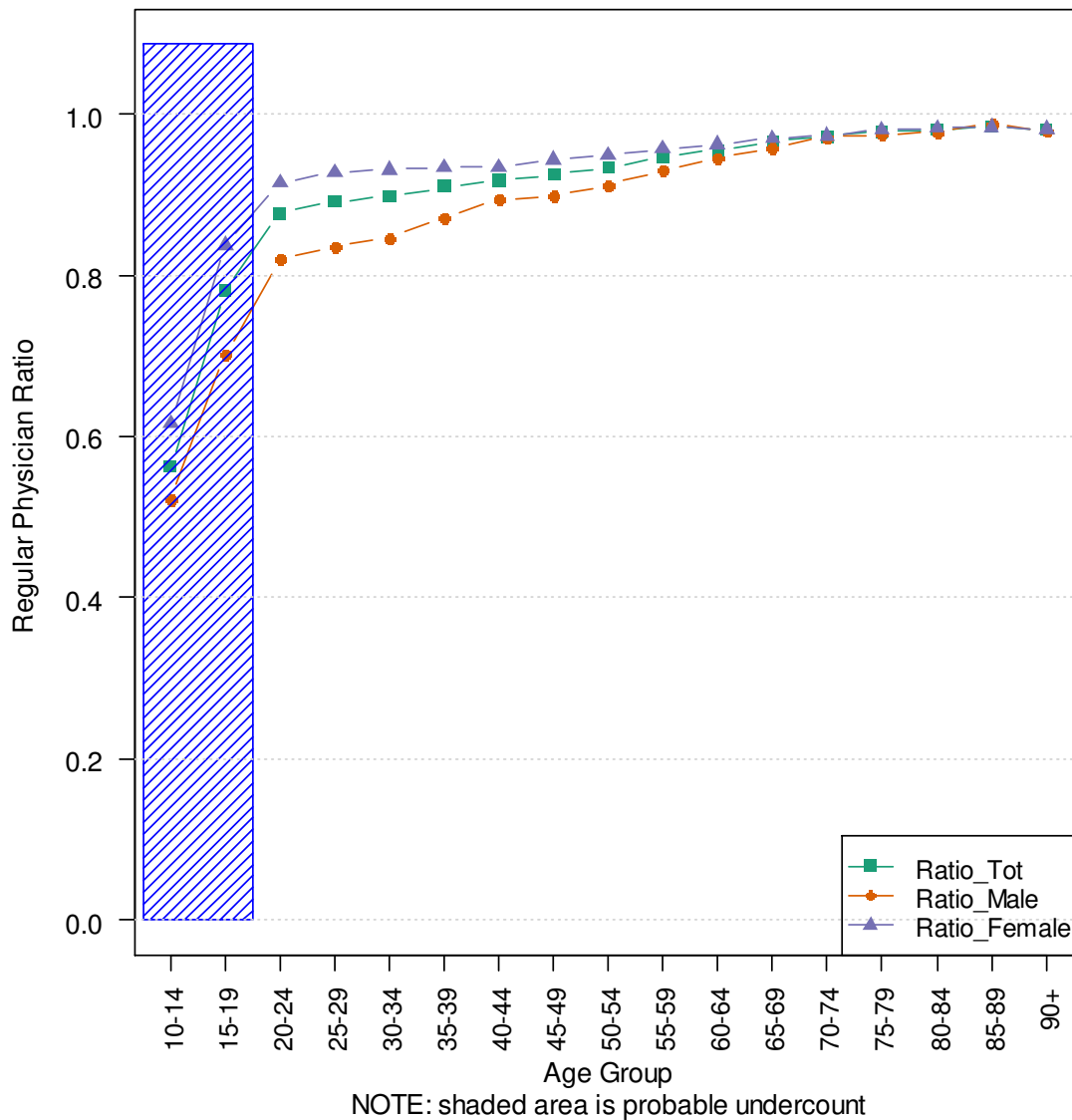
7.4.3 MANITOBA

Results are presented in Table 32 and plotted in Figure 42.

Table 32 Regular Family Physician for MHA Individuals – Manitoba

Age	Overall			Males			Females		
	# MHA diagnosis	# with primary care physician	Ratio	# MHA diagnosis	# with primary care physician	Ratio	# MHA diagnosis	# with primary care physician	Ratio
10-14	8,506	4,782	0.56	4,820	2,511	0.52	3,686	2,271	0.62
15-19	11,955	9,340	0.78	4,957	3,479	0.70	6,998	5,861	0.84
20-24	14,809	12,985	0.88	5,869	4,810	0.82	8,940	8,175	0.91
25-29	15,245	13,586	0.89	5,953	4,974	0.84	9,292	8,613	0.93
30-34	15,934	14,302	0.90	6,290	5,324	0.85	9,644	8,979	0.93
35-39	15,918	14,477	0.91	6,164	5,372	0.87	9,754	9,106	0.93
40-44	16,374	15,026	0.92	6,553	5,857	0.89	9,821	9,169	0.93
45-49	16,757	15,500	0.93	6,740	6,053	0.90	10,017	9,448	0.94
50-54	19,205	17,936	0.93	7,840	7,148	0.91	11,365	10,788	0.95
55-59	17,083	16,161	0.95	6,871	6,387	0.93	10,212	9,774	0.96
60-64	13,706	13,097	0.96	5,471	5,170	0.95	8,235	7,928	0.96
65-69	10,694	10,327	0.97	4,293	4,116	0.96	6,401	6,211	0.97
70-74	7,806	7,591	0.97	3,040	2,953	0.97	4,766	4,638	0.97
75-79	6,443	6,301	0.98	2,462	2,398	0.97	3,981	3,903	0.98
80-84	6,027	5,910	0.98	2,160	2,111	0.98	3,867	3,799	0.98
85-89	4,844	4,772	0.99	1,508	1,490	0.99	3,336	3,282	0.98
90+	3,504	3,437	0.98	758	742	0.98	2,746	2,695	0.98
Total	204,810	185,532	0.91	81,749	70,895	0.87	123,061	114,638	0.93

Figure 42 Plot of Regular Family Physician for MHA Individuals – Manitoba



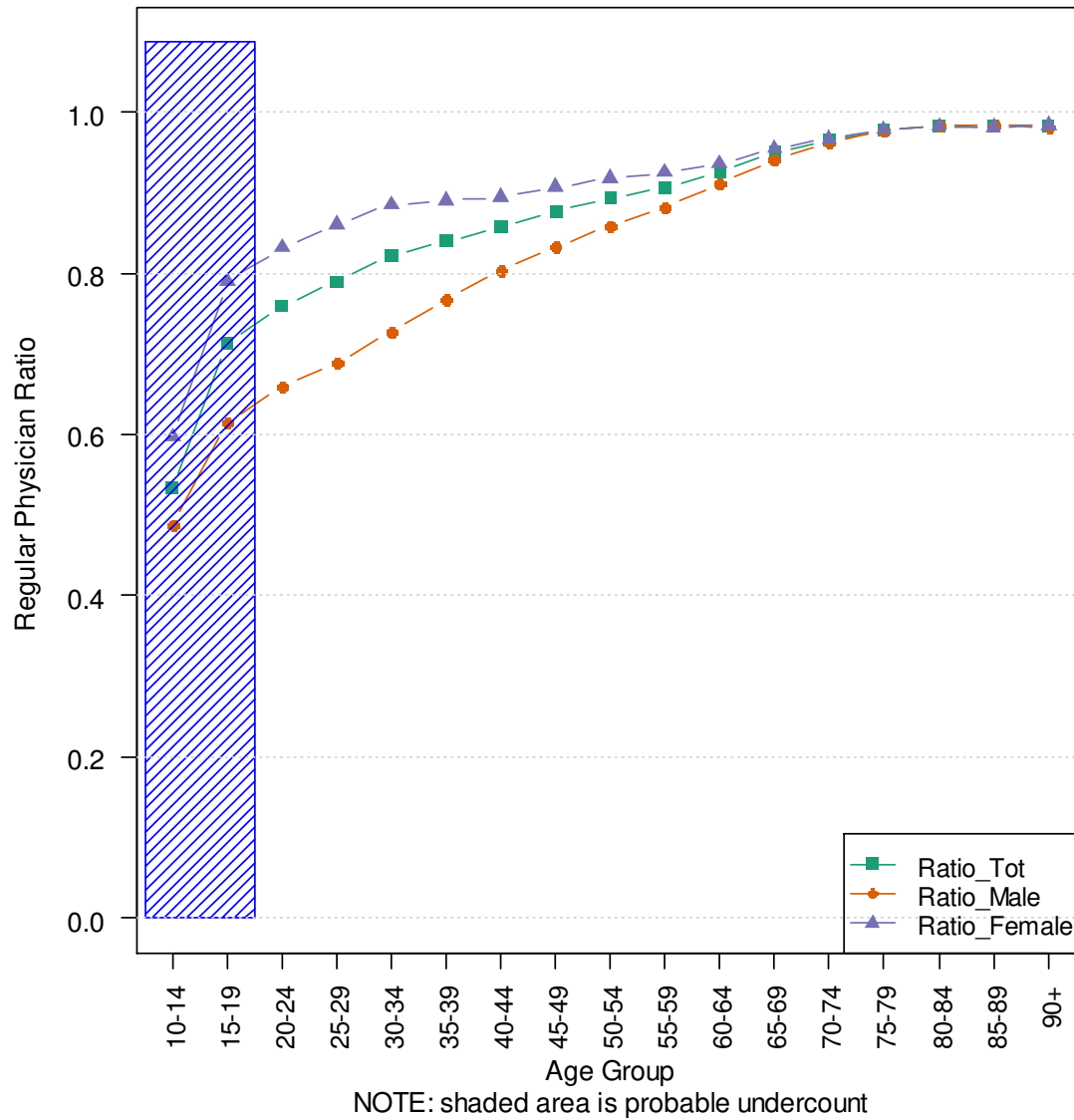
7.4.4 ALBERTA

Results are presented in Table 33 and plotted in Figure 43.

Table 33 Regular Family Physician for MHA Individuals – Alberta

Age	Overall			Males			Females		
	# MHA diagnosis	# with primary care physician	Ratio	# MHA diagnosis	# with primary care physician	Ratio	# MHA diagnosis	# with primary care physician	Ratio
10-14	22,949	12,225	0.53	13,406	6,525	0.49	9,543	5,700	0.60
15-19	34,755	24,781	0.71	15,185	9,332	0.61	19,570	15,449	0.79
20-24	42,414	32,205	0.76	17,786	11,718	0.66	24,628	20,487	0.83
25-29	51,233	40,477	0.79	20,948	14,414	0.69	30,285	26,063	0.86
30-34	56,378	46,307	0.82	22,931	16,688	0.73	33,447	29,619	0.89
35-39	53,411	44,843	0.84	21,973	16,861	0.77	31,438	27,982	0.89
40-44	52,308	44,800	0.86	21,830	17,535	0.80	30,478	27,265	0.89
45-49	51,094	44,755	0.88	21,254	17,686	0.83	29,840	27,069	0.91
50-54	56,470	50,454	0.89	23,075	19,809	0.86	33,395	30,645	0.92
55-59	50,106	45,421	0.91	20,979	18,484	0.88	29,127	26,937	0.92
60-64	37,047	34,286	0.93	15,676	14,279	0.91	21,371	20,007	0.94
65-69	27,141	25,781	0.95	11,115	10,467	0.94	16,026	15,314	0.96
70-74	19,096	18,431	0.97	7,732	7,442	0.96	11,364	10,989	0.97
75-79	15,951	15,588	0.98	6,381	6,229	0.98	9,570	9,359	0.98
80-84	14,821	14,561	0.98	5,737	5,641	0.98	9,084	8,920	0.98
85-89	11,735	11,525	0.98	4,136	4,066	0.98	7,599	7,459	0.98
90+	8,762	8,614	0.98	2,277	2,233	0.98	6,485	6,381	0.98
Total	605,671	515,054	0.85	252,421	199,409	0.79	353,250	315,645	0.89

Figure 43 Plot of Regular Family Physician for MHA Individuals – Alberta



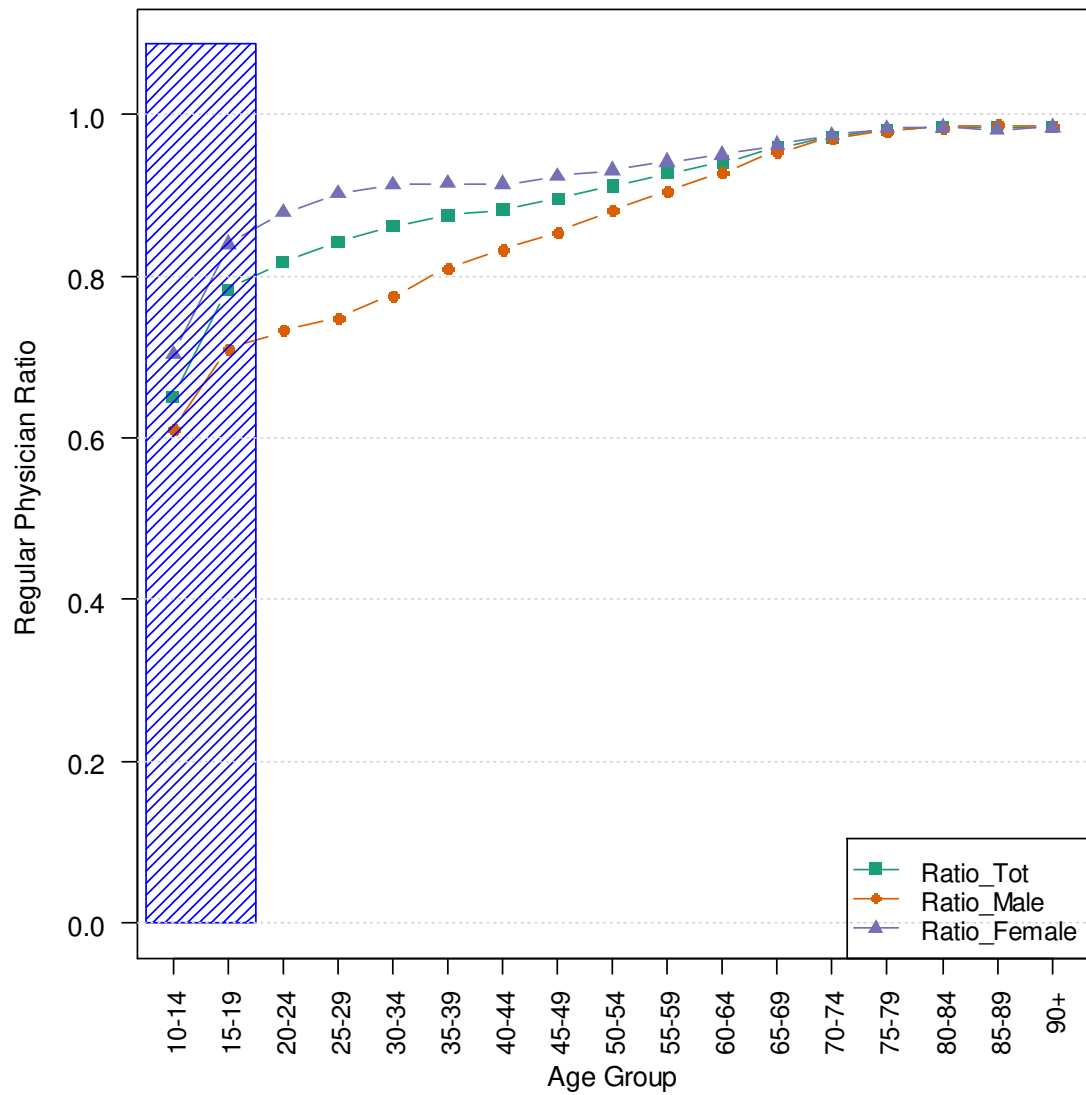
7.4.5 BRITISH COLUMBIA

Results are presented in Table 34 and plotted in Figure 44.

Table 34 Regular Family Physician for MHA Individuals – British Columbia

Age	Overall			Males			Females		
	# MHA diagnosis	# with primary care physician	Ratio	# MHA diagnosis	# with primary care physician	Ratio	# MHA diagnosis	# with primary care physician	Ratio
10-14	22,351	14,526	0.65	12,733	7,770	0.61	9,618	6,756	0.70
15-19	36,527	28,591	0.78	15,827	11,222	0.71	20,700	17,369	0.84
20-24	44,039	35,975	0.82	18,506	13,554	0.73	25,533	22,421	0.88
25-29	50,157	42,238	0.84	19,459	14,565	0.75	30,698	27,673	0.90
30-34	56,796	48,905	0.86	21,286	16,519	0.78	35,510	32,386	0.91
35-39	56,462	49,367	0.87	21,529	17,428	0.81	34,933	31,939	0.91
40-44	60,010	52,933	0.88	23,317	19,401	0.83	36,693	33,532	0.91
45-49	63,330	56,736	0.90	24,971	21,328	0.85	38,359	35,408	0.92
50-54	71,792	65,419	0.91	27,948	24,616	0.88	43,844	40,803	0.93
55-59	66,471	61,637	0.93	26,047	23,596	0.91	40,424	38,041	0.94
60-64	56,035	52,726	0.94	22,374	20,757	0.93	33,661	31,969	0.95
65-69	44,608	42,768	0.96	17,978	17,145	0.95	26,630	25,623	0.96
70-74	32,556	31,657	0.97	13,199	12,807	0.97	19,357	18,850	0.97
75-79	27,014	26,501	0.98	10,941	10,716	0.98	16,073	15,785	0.98
80-84	24,757	24,356	0.98	9,995	9,832	0.98	14,762	14,524	0.98
85-89	19,648	19,328	0.98	7,187	7,096	0.99	12,461	12,232	0.98
90+	14,154	13,923	0.98	3,984	3,922	0.98	10,170	10,001	0.98
Total	746,707	667,586	0.89	297,281	252,274	0.85	449,426	415,312	0.92

Figure 44 Plot of Regular Family Physician for MHA Individuals – British Columbia



NOTE: shaded area is probable undercount

7.4.6 COMBINED DATA

The data from each of the individual provinces (overall and by sex) is plotted in Figure 45 through Figure 47. While the proportions vary between the provinces the shape of the curves is generally similar.

Figure 45 Plot of Regular Family Physician for MHA Individuals by Provinces – Males and Females

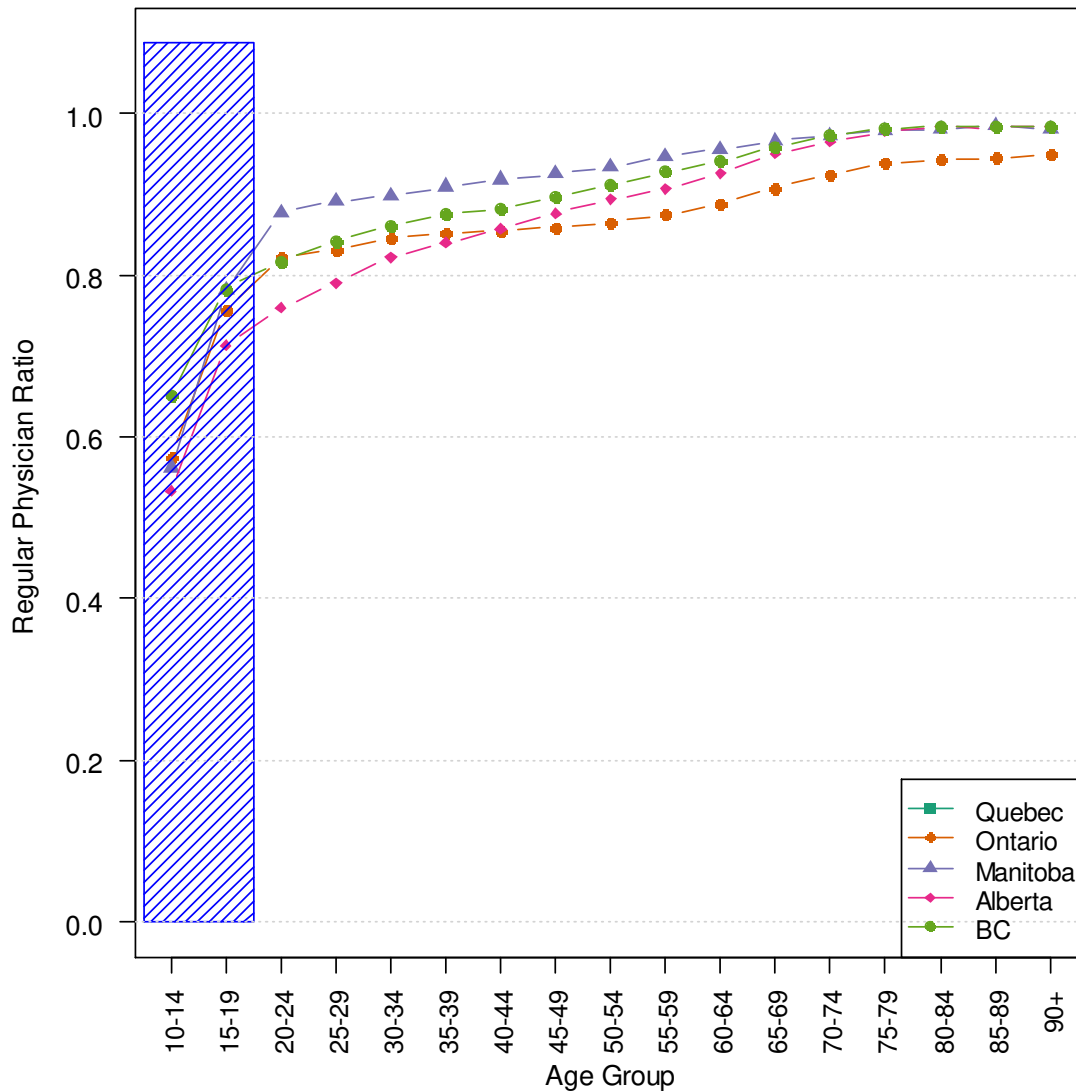
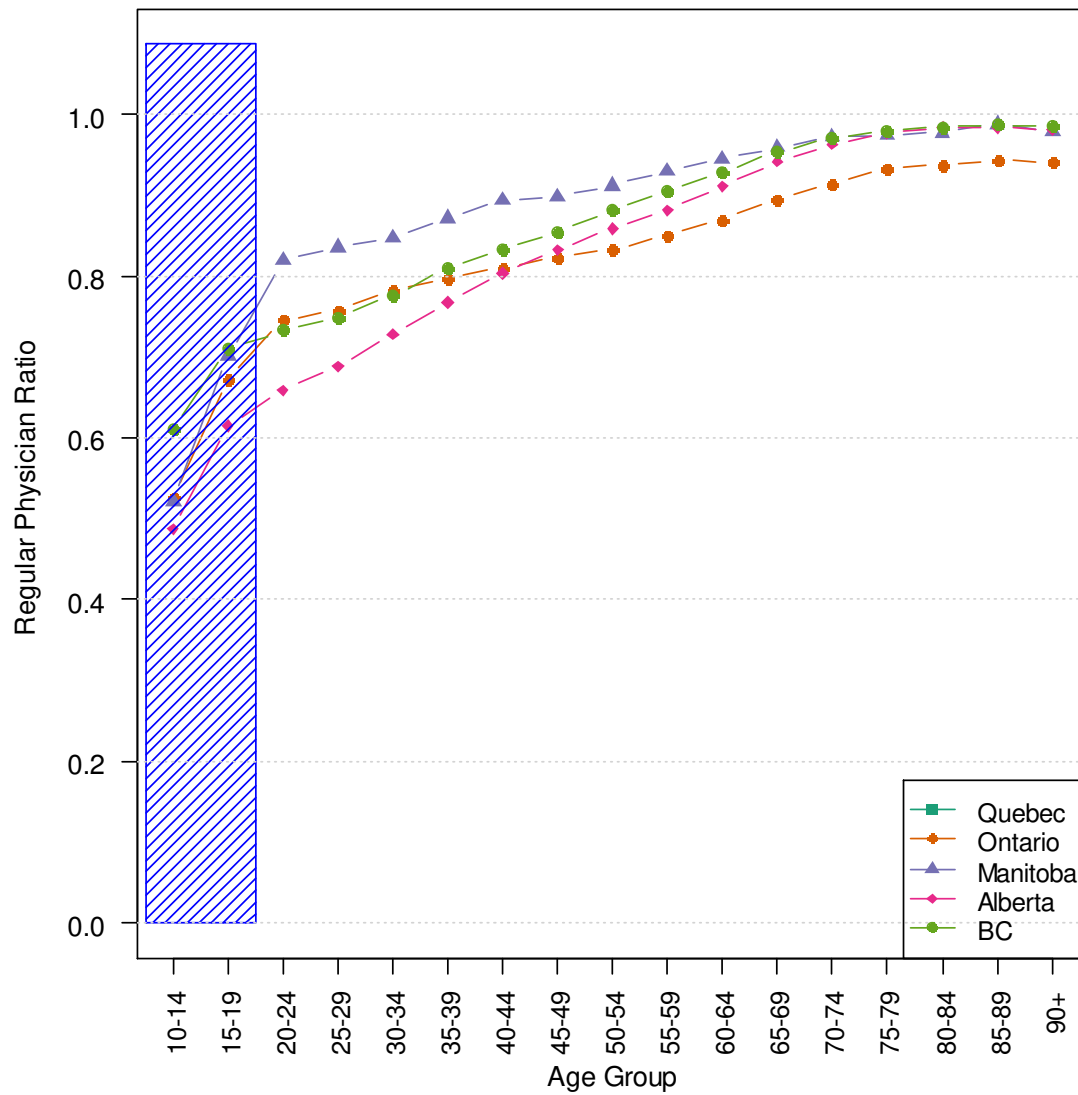
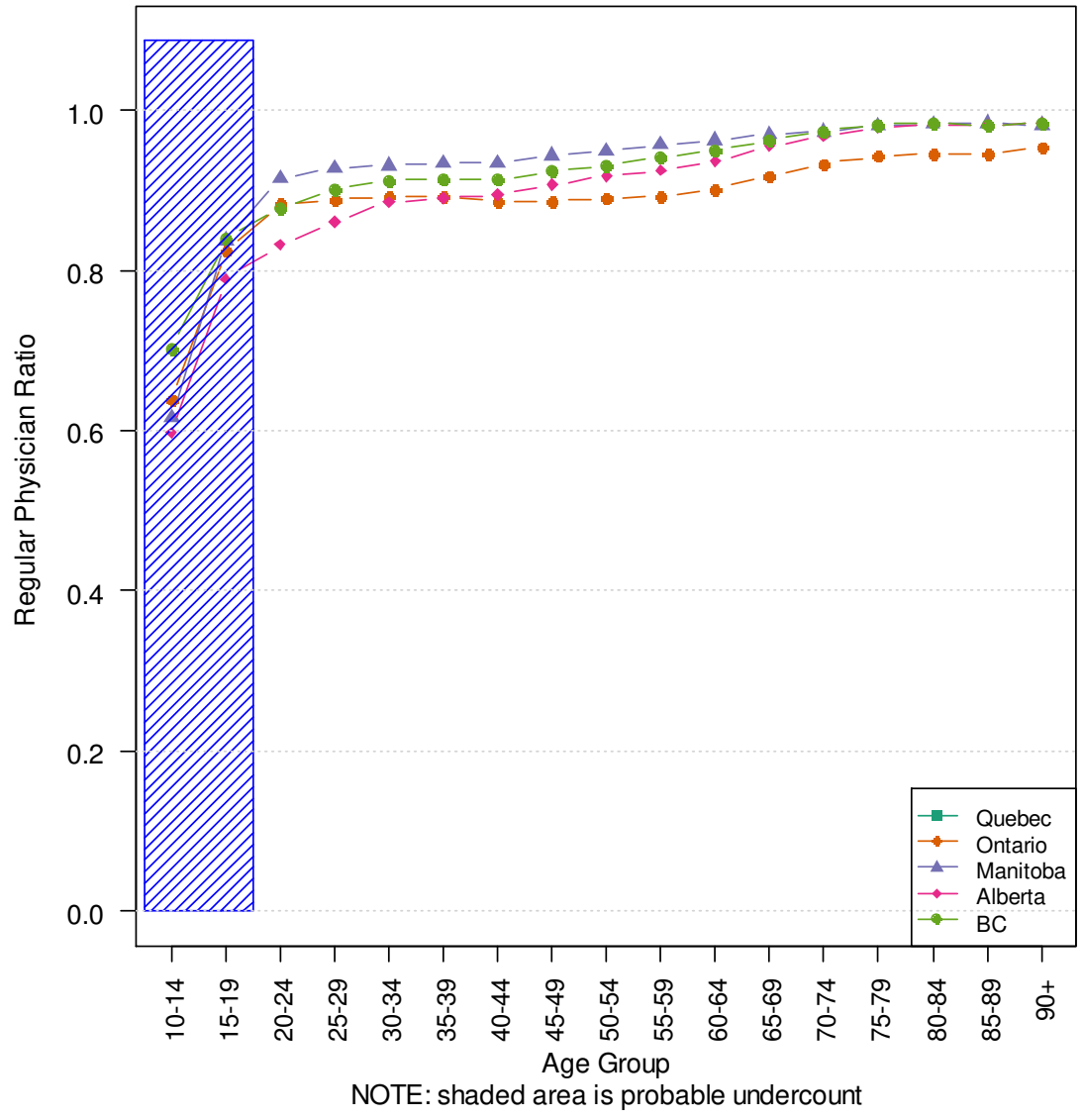


Figure 46 Plot of Regular Family Physician for MHA Individuals by Provinces – Males



NOTE: shaded area is probable undercount

Figure 47 Plot of Regular Family Physician for MHA Individuals by Provinces – Females



7.5 Additional Analyses

No additional analyses were planned for this indicator.

8 Physician follow-up after hospital discharge for a mental disorder or addiction

8.1 Measure

The number of individuals discharged from hospital where the most responsible diagnosis was MHA who had a visit to a physician within [30]²⁶ days after discharge

divided by

the number of individuals discharged from hospital where the most responsible diagnosis was MHA.

8.2 Data Selection Process

Selection was done for the year 2014/15. The goal was to identify a data set of individuals who were discharged from hospital with a MHA diagnosis in the first 11 months of the fiscal year and to then determine how many were seen by a physician within 7, 14, 21, and 30 days of their discharge.

8.2.1 IDENTIFICATION OF THE MHA HOSPITAL DISCHARGE POPULATIONS

1. For a fiscal year select all records from the hospital discharge database where the discharge diagnosis is a MHA diagnosis and the date of discharge is in the first 11 months of the fiscal year.
 - MHA diagnoses are any ICD10 Chapter V (F00 to F99) or ICD9 Chapter V (290 to 319) diagnosis.
2. Drop out so called “problem” records, that is, records where:
 - a. Provincial identity number is invalid
 - b. Sex is missing
 - c. Not resident of province
 - d. Date of birth is missing or is such that the age is a negative number or greater than 125 at the time of service.
3. If there is more than 1 hospital discharge in the fiscal year for an individual, drop all but the first discharge.
4. If the individual’s age at the time of the first visit was less than 10 drop from the dataset.

8.2.2 IDENTIFICATION OF THE PHYSICIAN FOLLOW-UP POPULATIONS

1. From the above data set select all records for the individual from the physician-billing database where the date of service was after the date of discharge.
2. Drop out all billings for physicians who were not GPs, Family Practice, or Psychiatrists.
3. For the remaining records drop all but the earliest date.

²⁶ Different time periods will be examined – 30 days is one of the time periods of interest.

4. Calculate the difference between the physician service date and the hospital discharge date for each individual.

8.3 Data Sources and Notes

The period selection of 30 days (as opposed to the sequential 28 days) was made to fit with CIHI reporting over a 30-day period.

8.4 Results

Results are presented by province then combined across provinces.

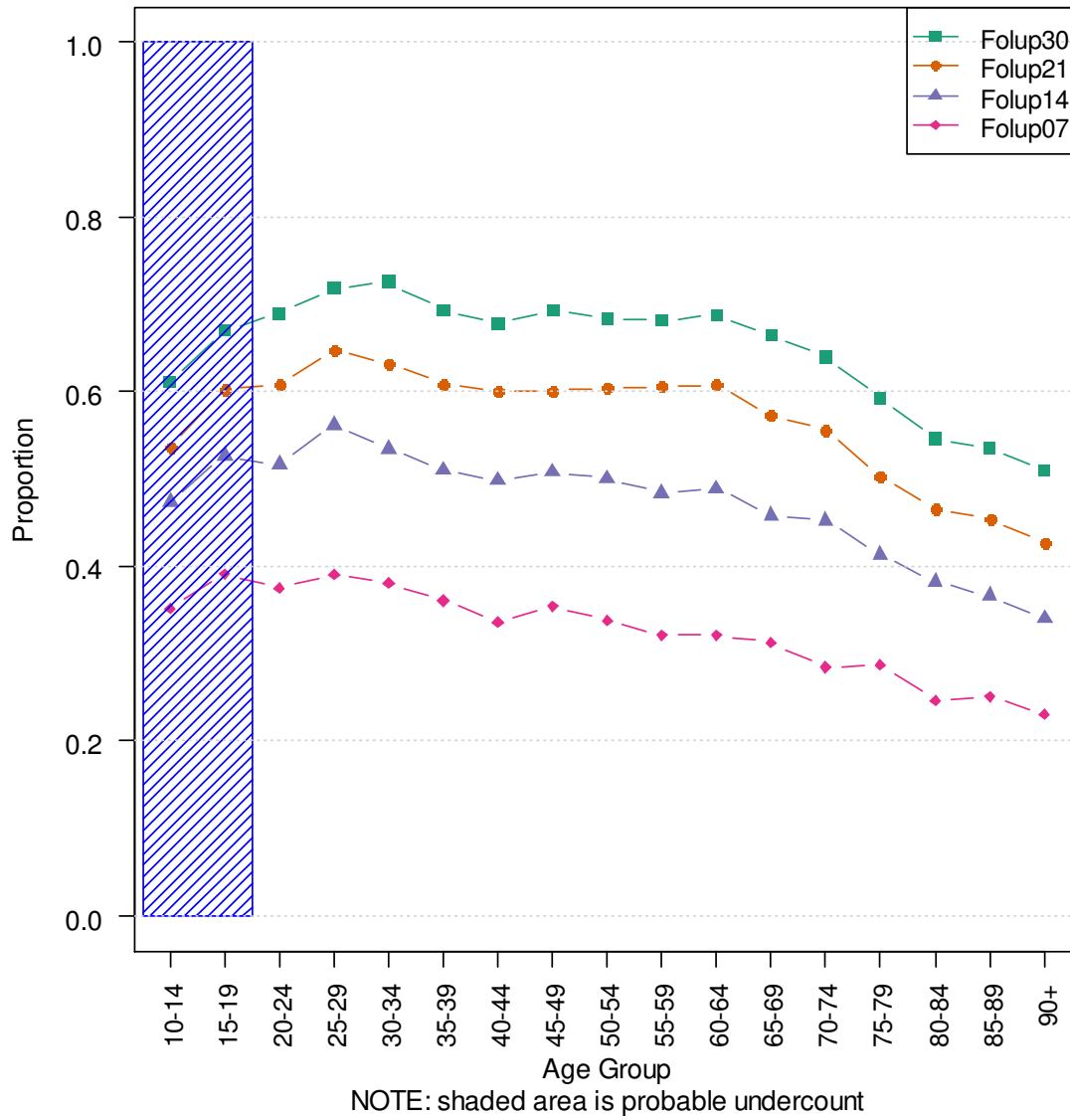
8.4.1 QUEBEC

Results are presented in Table 35 and plotted in Figure 48.

Table 35 Follow-up after MHA Discharge from Hospital – Quebec

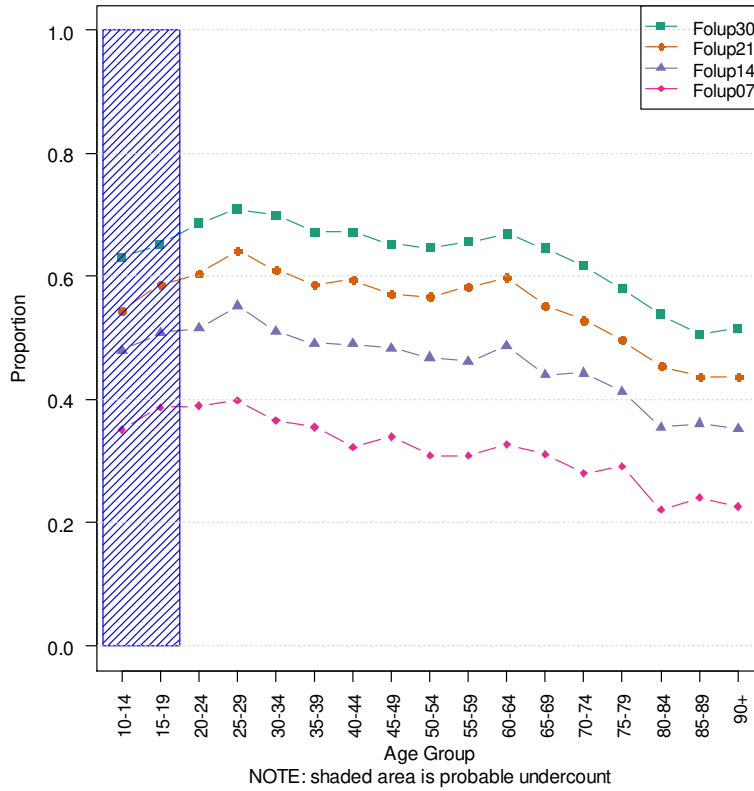
Age	Overall					Males					Females				
	# Hospital discharges with MHA diagnosis	Percent Seen within				# Hospital discharges with MHA diagnosis	Percent Seen within				# Hospital discharges with MHA diagnosis	Percent Seen within			
		7	14	21	30		7	14	21	30		7	14	21	30
10-14	892	35%	47%	54%	61%	336	35%	48%	54%	63%	556	35%	47%	53%	60%
15-19	2,397	39%	53%	60%	67%	1,014	39%	51%	59%	65%	1,383	40%	54%	62%	68%
20-24	2,410	38%	52%	61%	69%	1,454	39%	52%	60%	69%	956	35%	52%	62%	69%
25-29	2,315	39%	56%	65%	72%	1,396	40%	55%	64%	71%	919	38%	58%	66%	73%
30-34	2,576	38%	53%	63%	73%	1,511	37%	51%	61%	70%	1,065	40%	57%	66%	76%
35-39	2,514	36%	51%	61%	69%	1,431	36%	49%	59%	67%	1,083	37%	54%	64%	72%
40-44	2,191	34%	50%	60%	68%	1,220	32%	49%	59%	67%	971	35%	51%	61%	68%
45-49	2,448	35%	51%	60%	69%	1,234	34%	48%	57%	65%	1,214	37%	53%	63%	74%
50-54	2,732	34%	50%	60%	68%	1,396	31%	47%	57%	65%	1,336	37%	53%	64%	72%
55-59	2,343	32%	48%	61%	68%	1,227	31%	46%	58%	66%	1,116	34%	51%	63%	71%
60-64	1,881	32%	49%	61%	69%	921	33%	49%	60%	67%	960	32%	49%	62%	71%
65-69	1,578	31%	46%	57%	66%	798	31%	44%	55%	65%	780	31%	48%	59%	68%
70-74	1,490	28%	45%	56%	64%	686	28%	44%	53%	62%	804	29%	46%	58%	66%
75-79	1,529	29%	41%	50%	59%	683	29%	41%	50%	58%	846	28%	41%	51%	60%
80-84	1,960	25%	38%	47%	55%	801	22%	35%	45%	54%	1,159	26%	40%	47%	55%
85-89	1,820	25%	37%	45%	54%	657	24%	36%	44%	51%	1,163	26%	37%	46%	55%
90+	1,417	23%	34%	43%	51%	380	23%	35%	44%	52%	1,037	23%	34%	42%	51%
Total	34,493	33%	48%	58%	66%	17,145	33%	47%	57%	65%	17,348	33%	49%	58%	67%

Figure 48 Plot of Follow-up after MHA Discharge from Hospital – Quebec

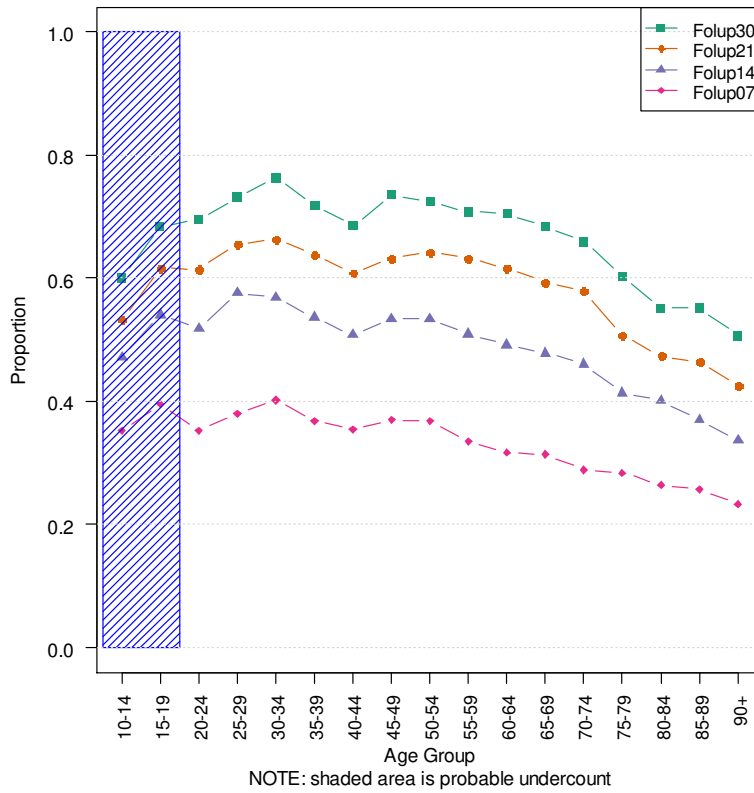


Cont.

Males



Females



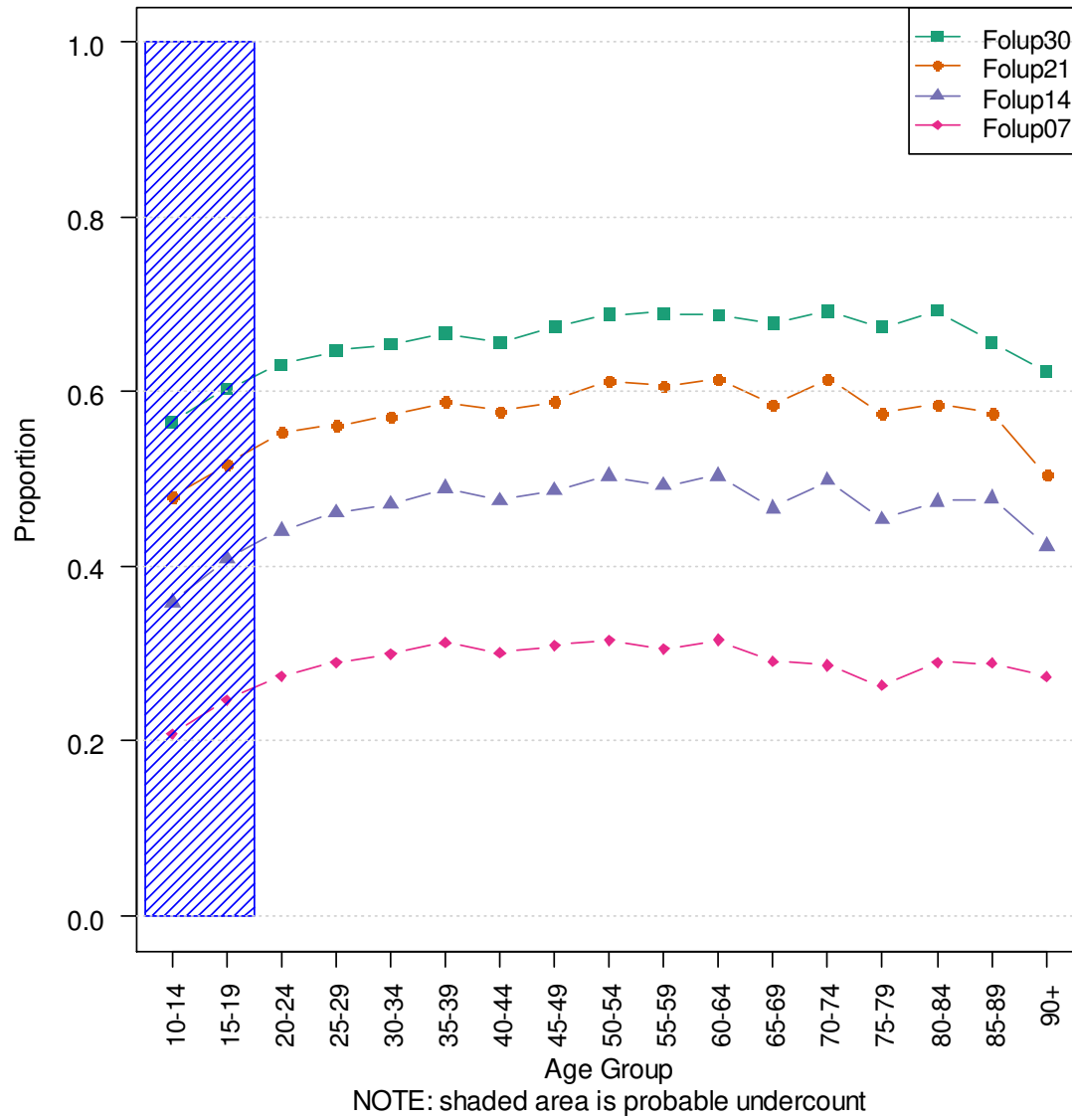
8.4.2 ONTARIO

Results are presented in Table 36 and plotted in Figure 49.

Table 36 Follow-up after MHA Discharge from Hospital – Ontario

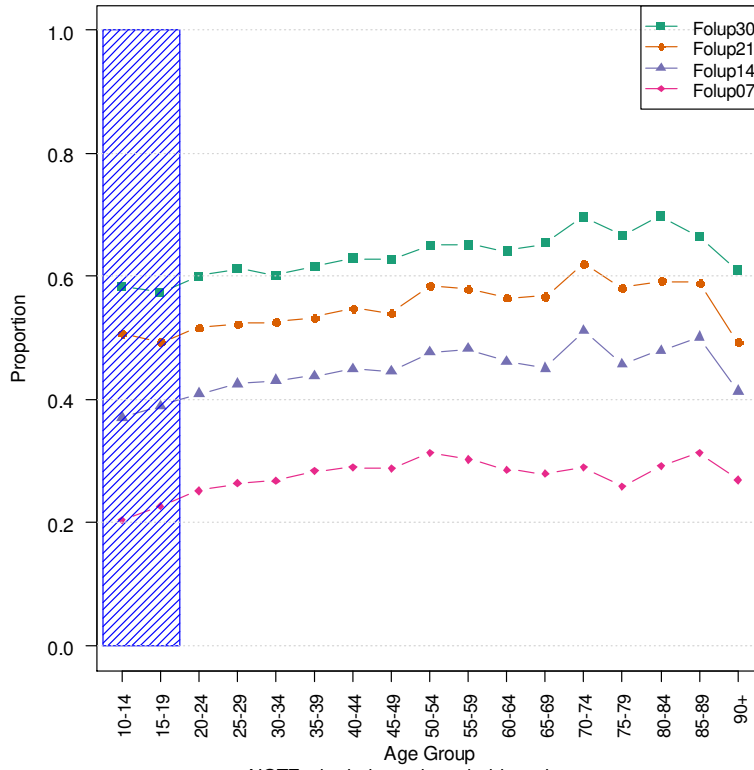
Age	Overall					Males					Females				
	discharges with MHA	Percent Seen within				discharges with MHA	Percent Seen within				discharges with MHA	Percent Seen within			
		7	14	21	30		7	14	21	30		7	14	21	30
10-14	1,659	21%	36%	48%	56%	445	20%	37%	51%	58%	1,214	21%	36%	47%	56%
15-19	5,660	25%	41%	52%	60%	2,248	23%	39%	49%	57%	3,412	26%	42%	53%	62%
20-24	4,494	27%	44%	55%	63%	2,614	25%	41%	52%	60%	1,880	31%	48%	60%	67%
25-29	3,726	29%	46%	56%	65%	2,240	26%	43%	52%	61%	1,486	33%	52%	62%	70%
30-34	3,374	30%	47%	57%	65%	1,858	27%	43%	53%	60%	1,516	34%	52%	63%	72%
35-39	3,102	31%	49%	59%	67%	1,638	28%	44%	53%	62%	1,464	35%	55%	65%	72%
40-44	3,137	30%	48%	58%	66%	1,639	29%	45%	55%	63%	1,498	31%	50%	61%	69%
45-49	3,434	31%	49%	59%	67%	1,734	29%	45%	54%	63%	1,700	33%	53%	64%	72%
50-54	3,869	32%	50%	61%	69%	1,935	31%	48%	59%	65%	1,934	32%	53%	64%	73%
55-59	3,117	31%	49%	61%	69%	1,532	30%	48%	58%	65%	1,585	31%	50%	63%	73%
60-64	2,244	32%	50%	61%	69%	1,127	29%	46%	57%	64%	1,117	35%	55%	66%	73%
65-69	1,762	29%	47%	59%	68%	872	28%	45%	57%	65%	890	30%	48%	60%	70%
70-74	1,437	29%	50%	61%	69%	645	29%	51%	62%	70%	792	28%	49%	61%	69%
75-79	1,381	26%	45%	58%	67%	618	26%	46%	58%	67%	763	27%	45%	57%	68%
80-84	1,334	29%	47%	59%	69%	616	29%	48%	59%	70%	718	29%	47%	58%	69%
85-89	1,151	29%	48%	58%	66%	453	31%	50%	59%	66%	698	27%	46%	57%	65%
90+	819	27%	42%	50%	62%	249	27%	41%	49%	61%	570	28%	43%	51%	63%
Total	45,700	29%	46%	57%	65%	22,463	27%	44%	54%	62%	23,237	30%	49%	60%	68%

Figure 49 Plot of Follow-up after MHA Discharge from Hospital – Ontario



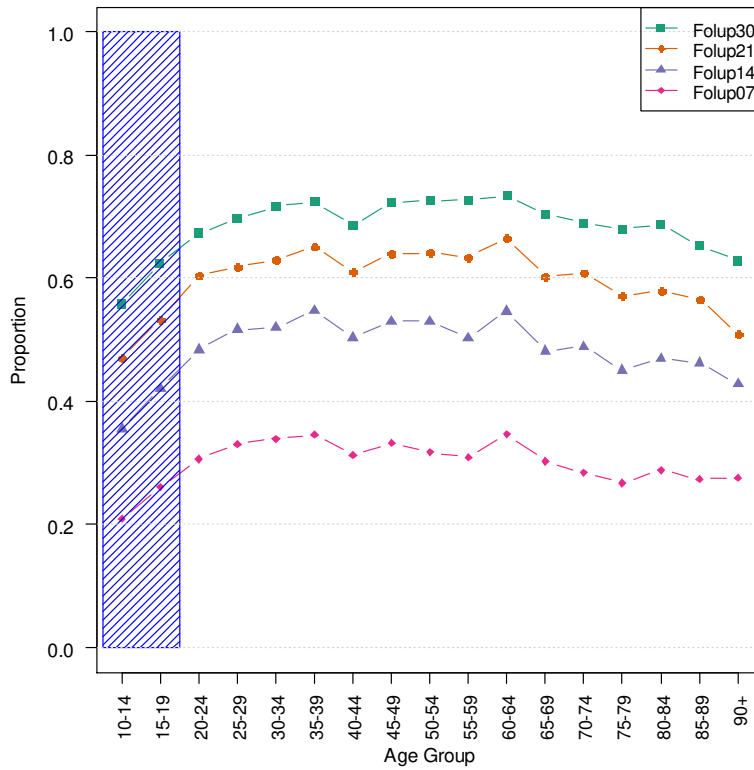
Cont.

Males



NOTE: shaded area is probable undercount

Females



NOTE: shaded area is probable undercount

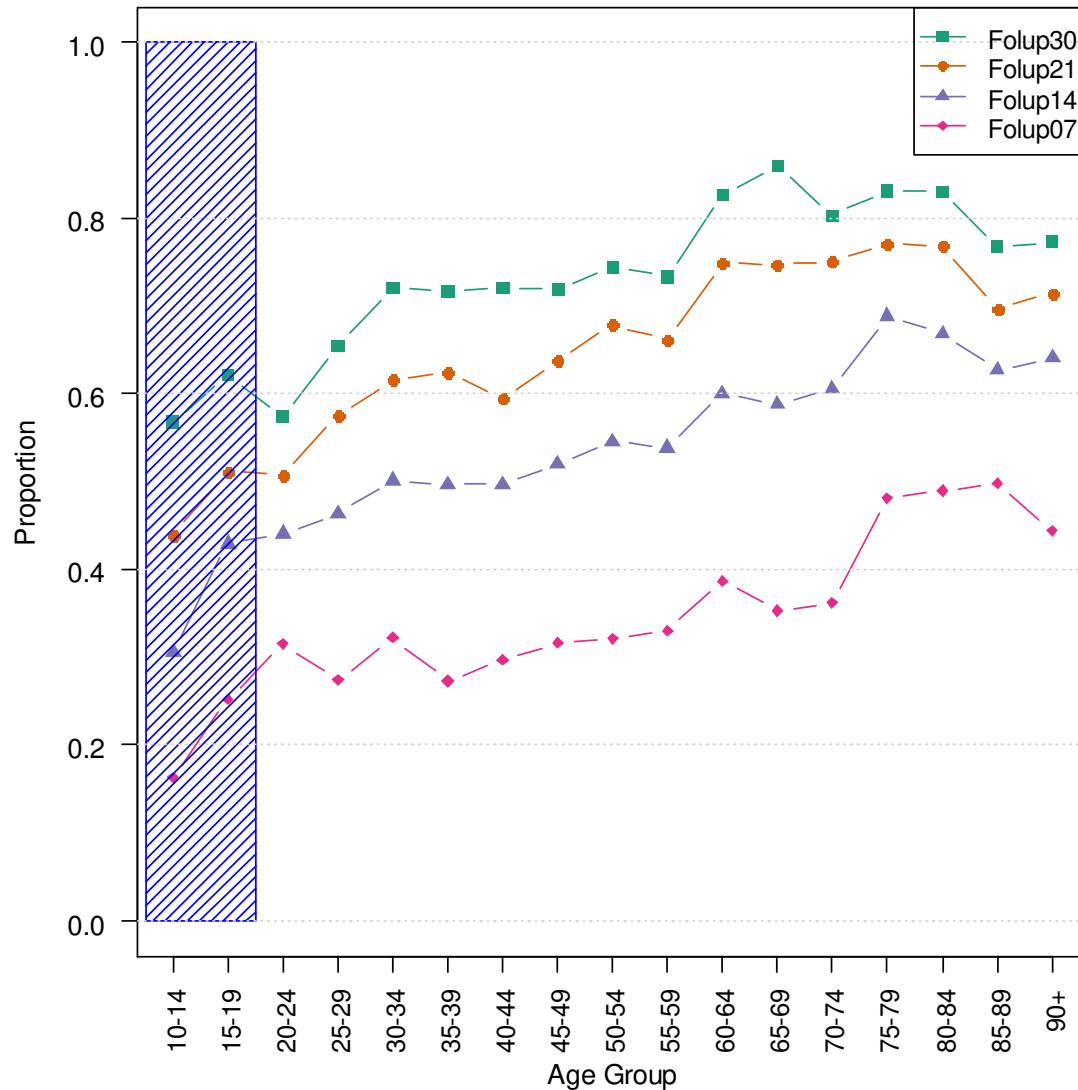
8.4.3 MANITOBA

Results are presented in Table 37 and plotted in Figure 50. Note Manitoba provided the percentages but not the number of discharges.

Table 37 Follow-up after MHA Discharge from Hospital – Manitoba

Age	Overall					Males					Females				
	discharges with MHA	Percent Seen within				discharges with MHA	Percent Seen within				discharges with MHA	Percent Seen within			
		7	14	21	30		7	14	21	30		7	14	21	30
10-14	NA	16%	31%	44%	57%	NA	8%	25%	25%	38%	NA	18%	32%	48%	61%
15-19	NA	25%	43%	51%	62%	NA	25%	36%	44%	55%	NA	25%	48%	56%	67%
20-24	NA	32%	44%	51%	57%	NA	25%	37%	44%	51%	NA	40%	54%	60%	66%
25-29	NA	27%	46%	58%	65%	NA	24%	41%	53%	60%	NA	32%	53%	64%	72%
30-34	NA	32%	50%	62%	72%	NA	27%	45%	56%	63%	NA	38%	56%	68%	82%
35-39	NA	27%	50%	62%	72%	NA	23%	42%	55%	64%	NA	31%	57%	69%	78%
40-44	NA	30%	50%	59%	72%	NA	28%	51%	60%	66%	NA	32%	48%	58%	78%
45-49	NA	32%	52%	64%	72%	NA	32%	47%	59%	65%	NA	32%	58%	70%	81%
50-54	NA	32%	55%	68%	74%	NA	33%	52%	63%	70%	NA	31%	57%	73%	79%
55-59	NA	33%	54%	66%	73%	NA	35%	53%	66%	73%	NA	30%	55%	67%	74%
60-64	NA	39%	60%	75%	83%	NA	39%	58%	73%	80%	NA	38%	62%	77%	85%
65-69	NA	35%	59%	75%	86%	NA	40%	59%	73%	84%	NA	30%	59%	76%	88%
70-74	NA	36%	61%	75%	80%	NA	37%	65%	75%	78%	NA	36%	56%	75%	82%
75-79	NA	48%	69%	77%	83%	NA	47%	68%	73%	78%	NA	49%	70%	81%	88%
80-84	NA	49%	67%	77%	83%	NA	54%	68%	78%	87%	NA	46%	66%	76%	80%
85-89	NA	50%	63%	70%	77%	NA	46%	57%	64%	74%	NA	52%	66%	73%	79%
90+	NA	44%	64%	71%	77%	NA	38%	59%	65%	74%	NA	48%	67%	75%	79%
Total	NA	34%	53%	63%	72%	NA	32%	49%	59%	67%	NA	35%	56%	67%	76%

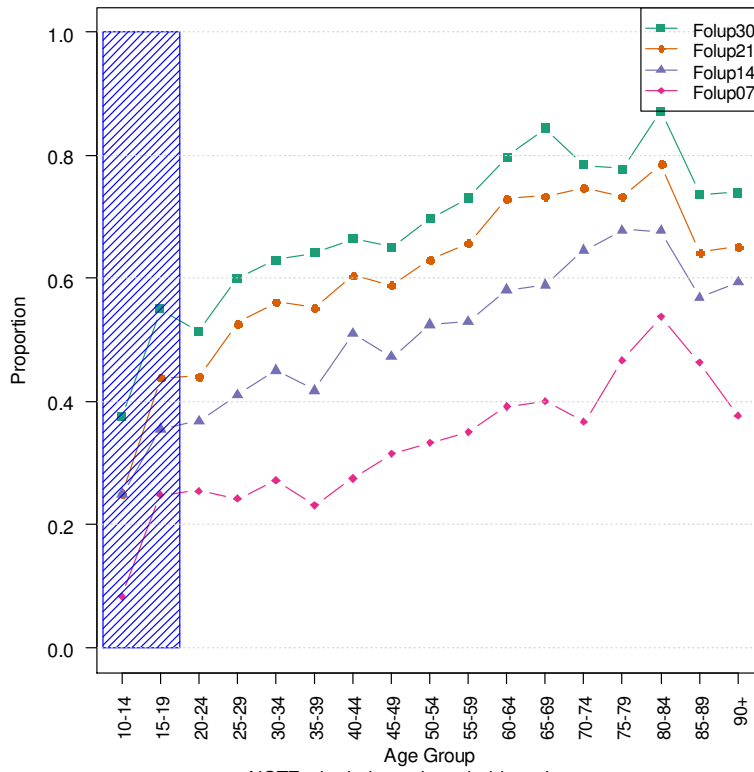
Figure 50 Plot of Follow-up after MHA Discharge from Hospital – Manitoba



NOTE: shaded area is probable undercount

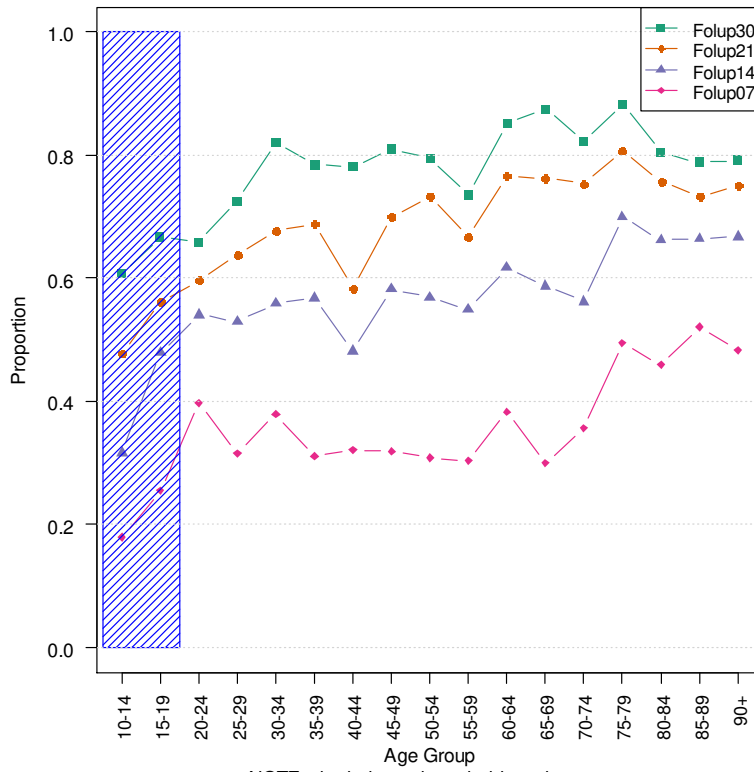
Cont.

Males



NOTE: shaded area is probable undercount

Females



NOTE: shaded area is probable undercount

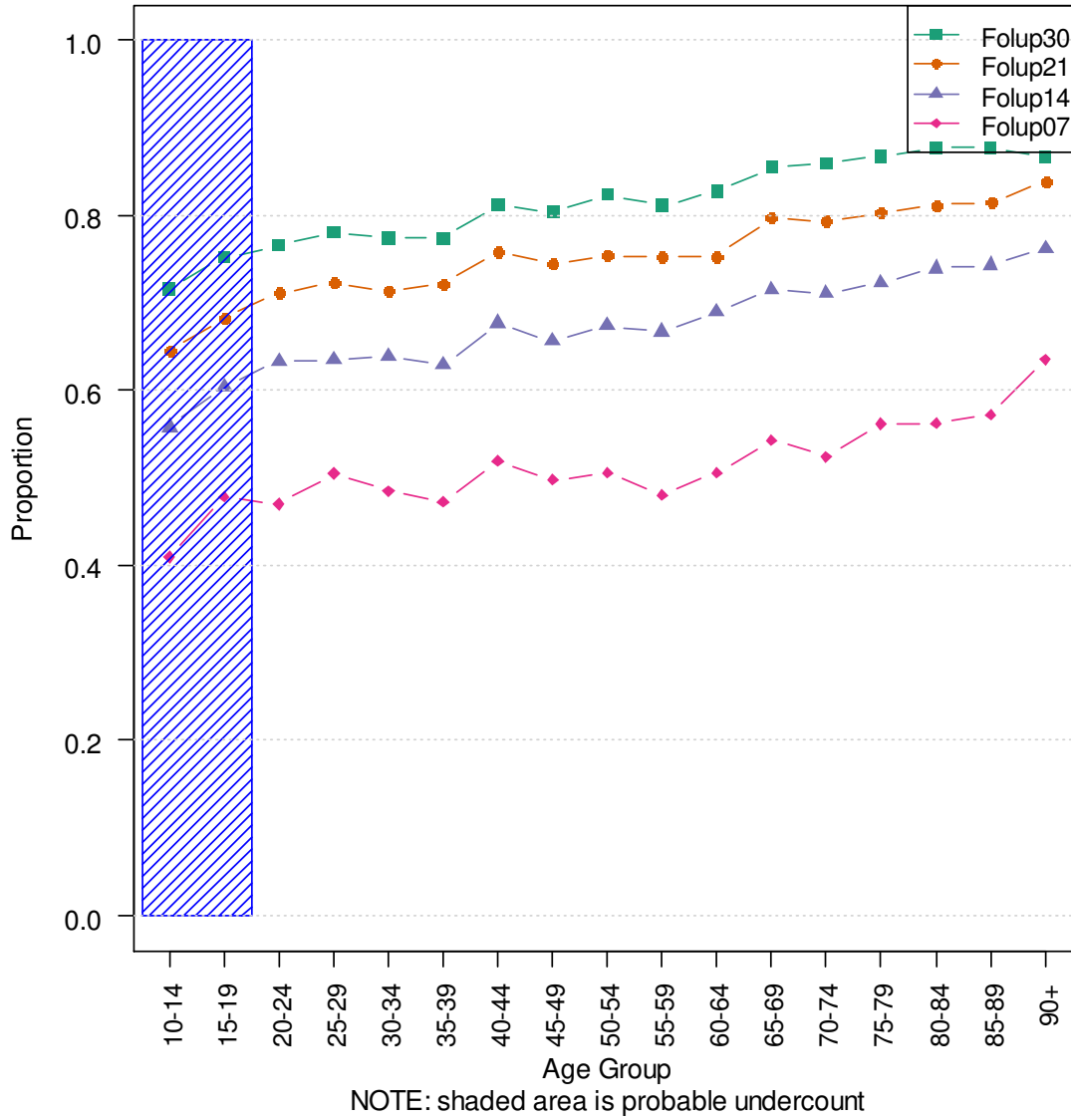
8.4.4 ALBERTA

Results are presented in Table 38 and plotted in Figure 51.

Table 38 Follow-up after MHA Discharge from Hospital – Alberta

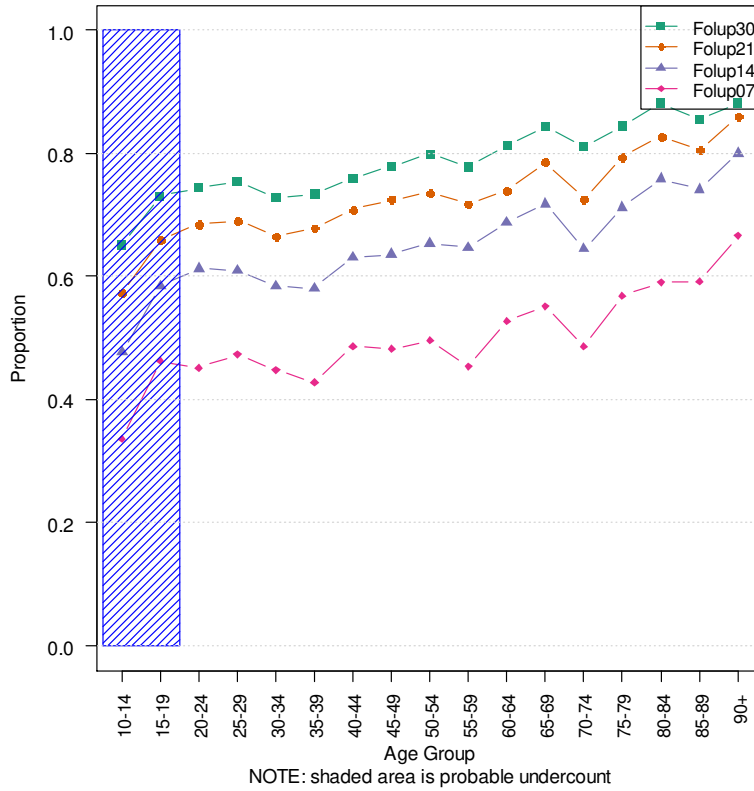
Age	Overall					Males					Females				
	discharges with MHA	Percent Seen within				discharges with MHA	Percent Seen within				discharges with MHA	Percent Seen within			
		7	14	21	30		7	14	21	30		7	14	21	30
10-14	640	41%	56%	65%	72%	241	34%	48%	57%	65%	399	45%	61%	69%	75%
15-19	1,594	48%	60%	68%	75%	705	46%	58%	66%	73%	889	49%	62%	70%	77%
20-24	1,381	47%	63%	71%	76%	820	45%	61%	69%	74%	561	50%	66%	75%	80%
25-29	1,344	51%	63%	72%	78%	763	47%	61%	69%	75%	581	55%	67%	77%	82%
30-34	1,355	48%	64%	71%	77%	746	45%	58%	66%	73%	609	53%	70%	77%	83%
35-39	1,198	47%	63%	72%	77%	667	43%	58%	68%	73%	531	53%	69%	78%	82%
40-44	1,121	52%	68%	76%	81%	599	49%	63%	71%	76%	522	56%	73%	82%	87%
45-49	1,125	50%	66%	74%	80%	593	48%	64%	73%	78%	532	52%	68%	77%	83%
50-54	1,207	51%	67%	75%	82%	647	50%	65%	74%	80%	560	52%	70%	78%	85%
55-59	1,012	48%	67%	75%	81%	518	45%	65%	72%	78%	494	51%	69%	79%	85%
60-64	767	51%	69%	75%	83%	425	53%	69%	74%	81%	342	48%	69%	77%	85%
65-69	632	54%	72%	80%	85%	312	55%	72%	79%	84%	320	53%	71%	81%	87%
70-74	498	52%	71%	79%	86%	222	49%	64%	73%	81%	276	55%	76%	85%	90%
75-79	559	56%	72%	80%	87%	257	57%	71%	79%	84%	302	56%	73%	81%	89%
80-84	594	56%	74%	81%	88%	261	59%	76%	83%	88%	333	54%	72%	80%	87%
85-89	584	57%	74%	82%	88%	247	59%	74%	81%	85%	337	56%	74%	82%	89%
90+	433	64%	76%	84%	87%	135	67%	80%	86%	88%	298	62%	74%	83%	86%
Total	16,044	50%	66%	74%	80%	8,158	48%	63%	71%	77%	7,886	52%	69%	77%	83%

Figure 51 Plot of Follow-up after MHA Discharge from Hospital – Alberta

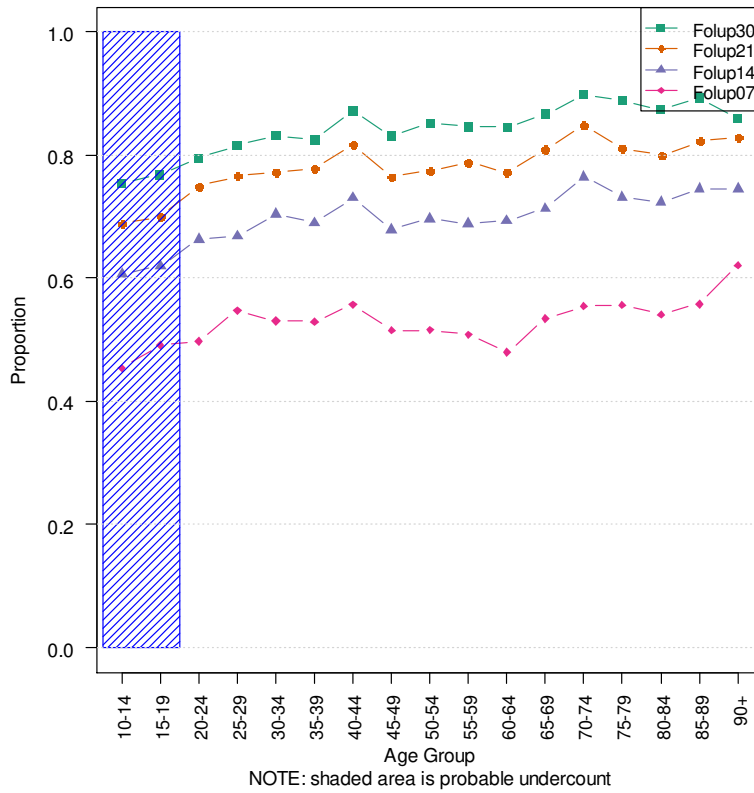


Cont.

Males



Females



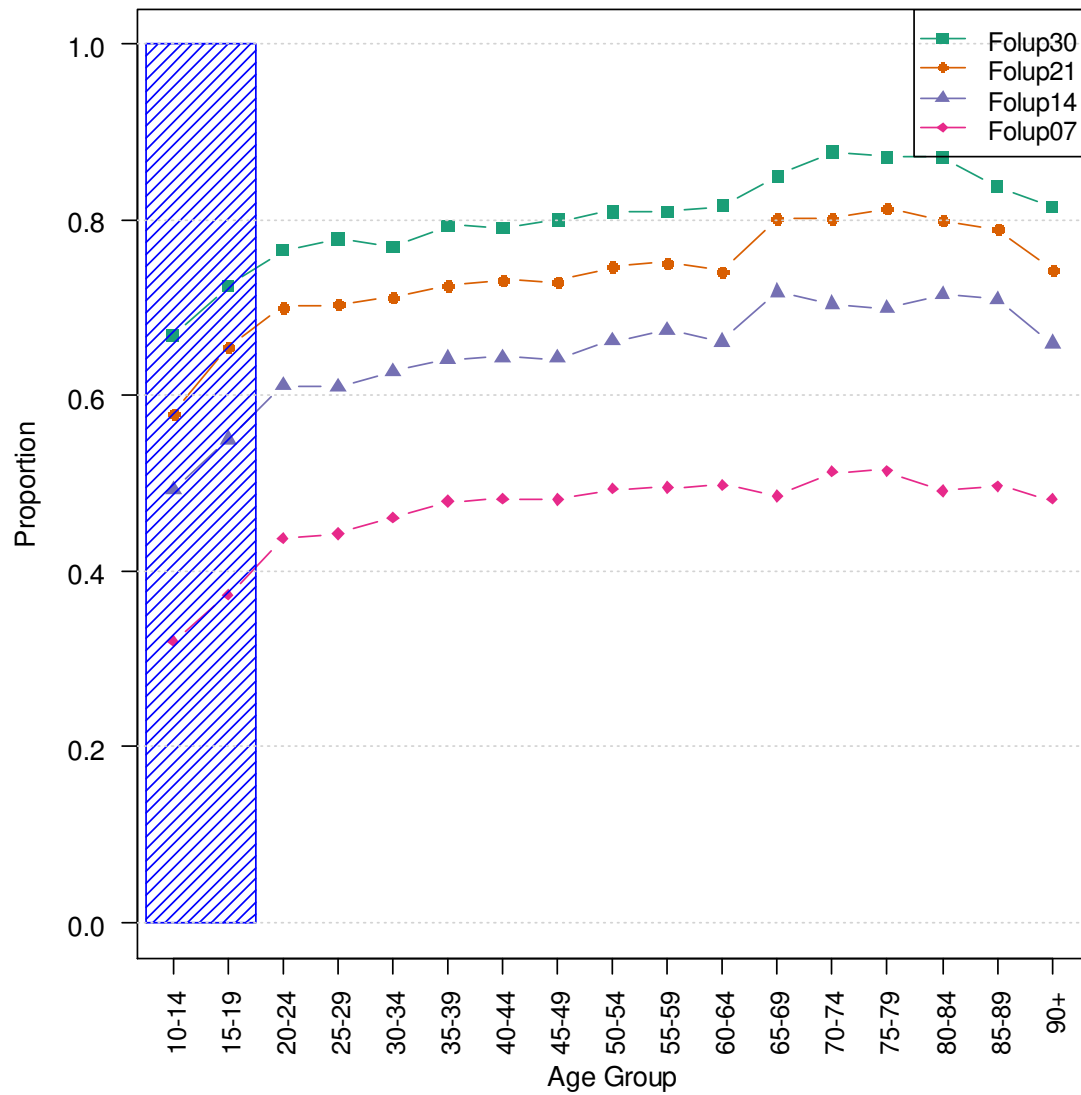
8.4.5 BRITISH COLUMBIA

Results are presented in Table 39 and plotted in Figure 52.

Table 39 Follow-up after MHA Discharge from Hospital – British Columbia

Age	Overall					Males					Females				
	discharges with MHA	Percent Seen within				discharges with MHA	Percent Seen within				discharges with MHA	Percent Seen within			
		7	14	21	30		7	14	21	30		7	14	21	30
10-14	562	32%	49%	58%	67%	182	32%	49%	57%	68%	380	32%	49%	59%	66%
15-19	1,790	37%	55%	66%	72%	762	36%	55%	64%	70%	1,028	38%	55%	67%	74%
20-24	1,750	44%	61%	70%	76%	957	43%	60%	69%	75%	793	45%	63%	72%	78%
25-29	1,626	44%	61%	70%	78%	953	42%	59%	67%	74%	673	47%	64%	75%	84%
30-34	1,570	46%	63%	71%	77%	903	43%	60%	68%	75%	667	51%	67%	76%	80%
35-39	1,486	48%	64%	73%	79%	820	44%	62%	70%	77%	666	53%	67%	76%	82%
40-44	1,563	48%	64%	73%	79%	882	47%	63%	72%	78%	681	50%	66%	75%	81%
45-49	1,540	48%	64%	73%	80%	847	47%	63%	71%	78%	693	50%	66%	75%	83%
50-54	1,709	49%	66%	75%	81%	878	48%	64%	72%	78%	831	51%	69%	78%	84%
55-59	1,427	50%	67%	75%	81%	770	47%	63%	71%	76%	657	53%	73%	80%	86%
60-64	1,096	50%	66%	74%	82%	593	49%	64%	70%	78%	503	50%	69%	79%	86%
65-69	766	49%	72%	80%	85%	402	47%	68%	76%	81%	364	51%	76%	85%	89%
70-74	588	51%	70%	80%	88%	291	51%	69%	77%	85%	297	52%	72%	83%	91%
75-79	488	51%	70%	81%	87%	224	49%	68%	79%	85%	264	53%	72%	84%	89%
80-84	513	49%	72%	80%	87%	239	49%	71%	80%	87%	274	49%	72%	80%	88%
85-89	451	50%	71%	79%	84%	192	48%	69%	77%	82%	259	51%	72%	81%	85%
90+	311	48%	66%	74%	81%	106	46%	65%	73%	79%	205	49%	66%	75%	82%
Total	19,236	46%	64%	73%	79%	10,001	45%	62%	70%	77%	9,235	48%	66%	75%	82%

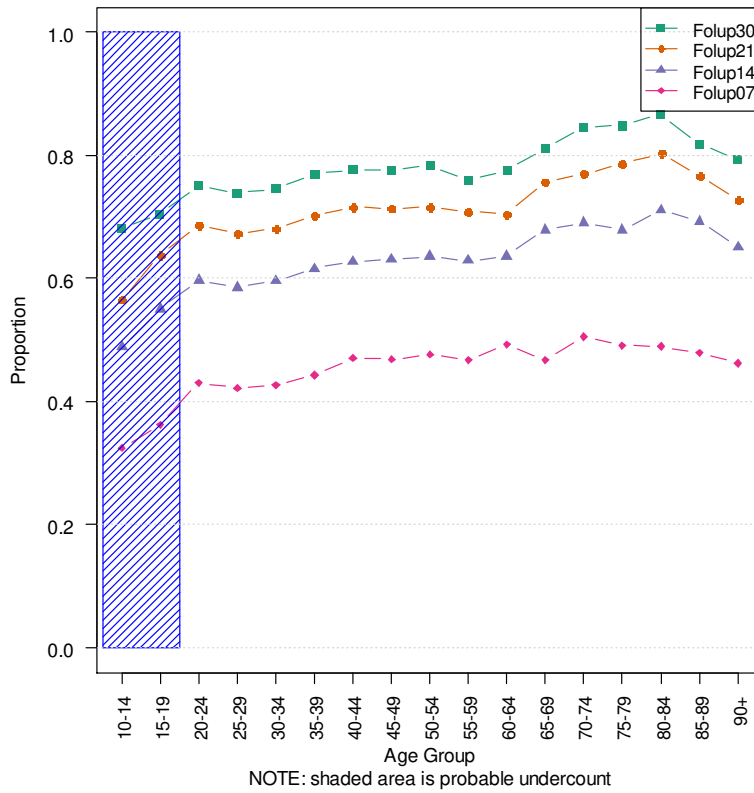
Figure 52 Plot of Follow-up after MHA Discharge from Hospital – British Columbia



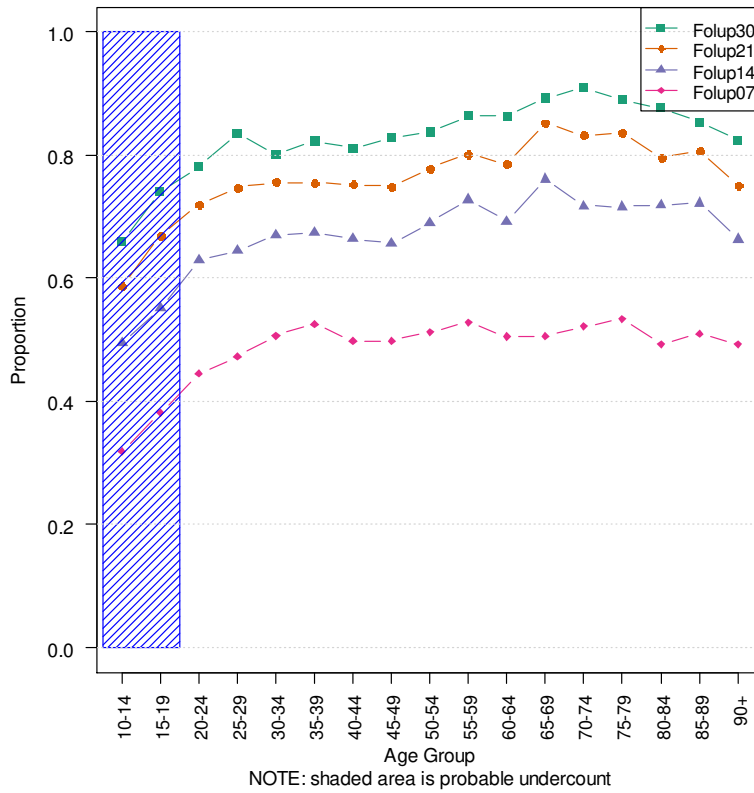
NOTE: shaded area is probable undercount

Cont.

Males



Females



8.4.6 COMBINED DATA

The data from each of the individual provinces for the different follow-up periods is plotted in Figure 53 through Figure 56.

Figure 53 Plot of Day 7 Follow-up after MHA Discharge from Hospital – Males and Females

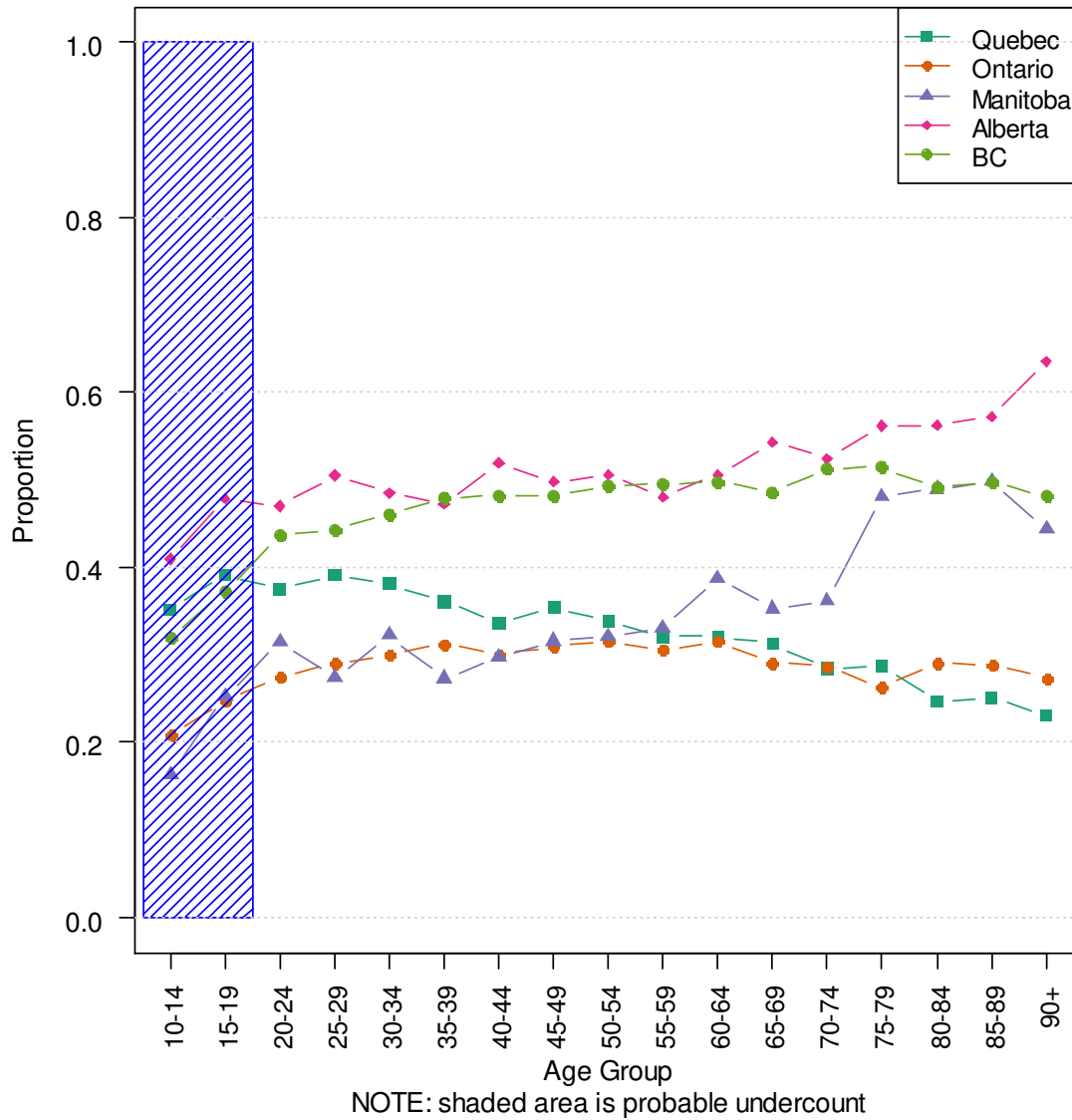


Figure 54 Plot of Day 14 Follow-up after MHA Discharge from Hospital – Males and Females

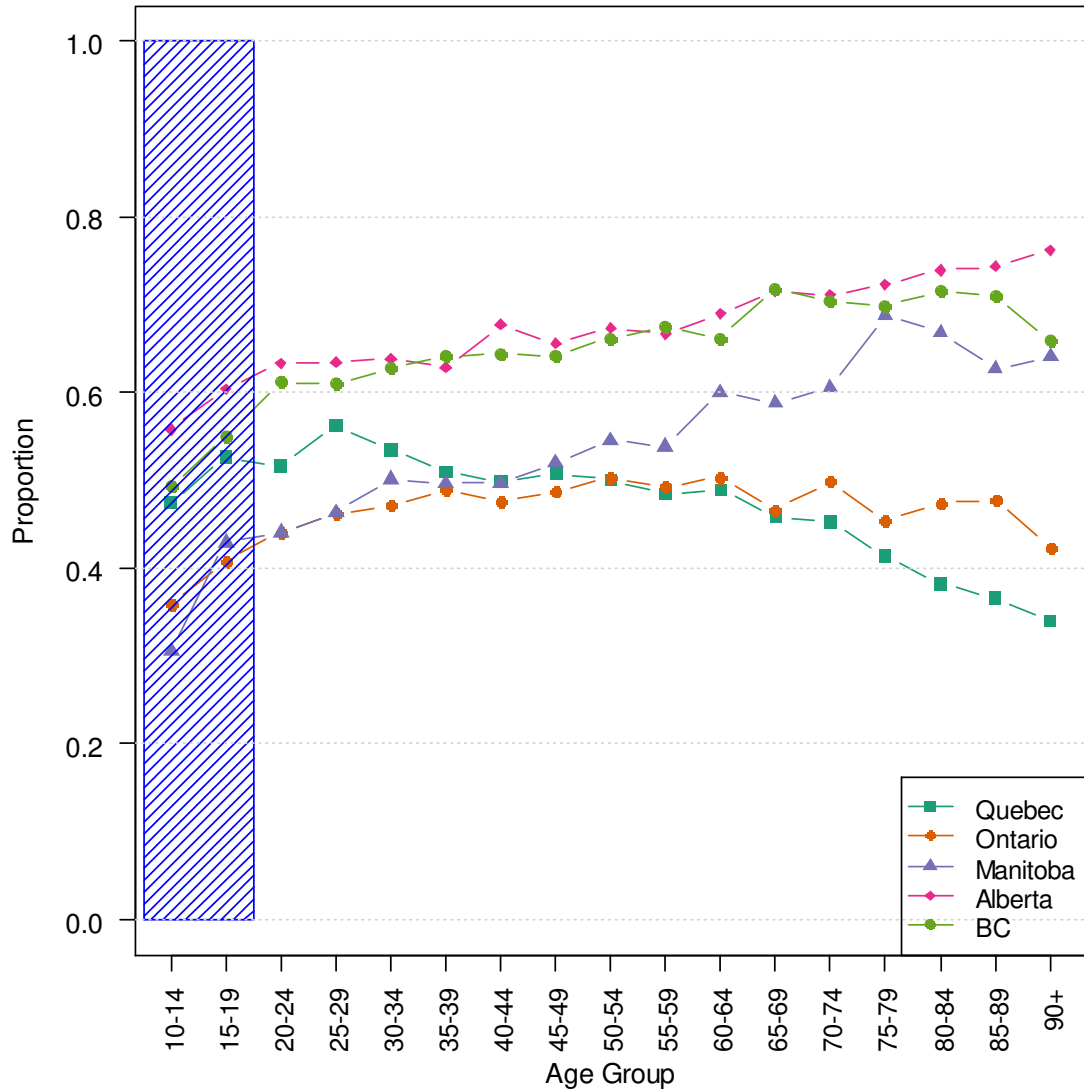


Figure 55 Plot of Day 21 Follow-up after MHA Discharge from Hospital – Males and Females

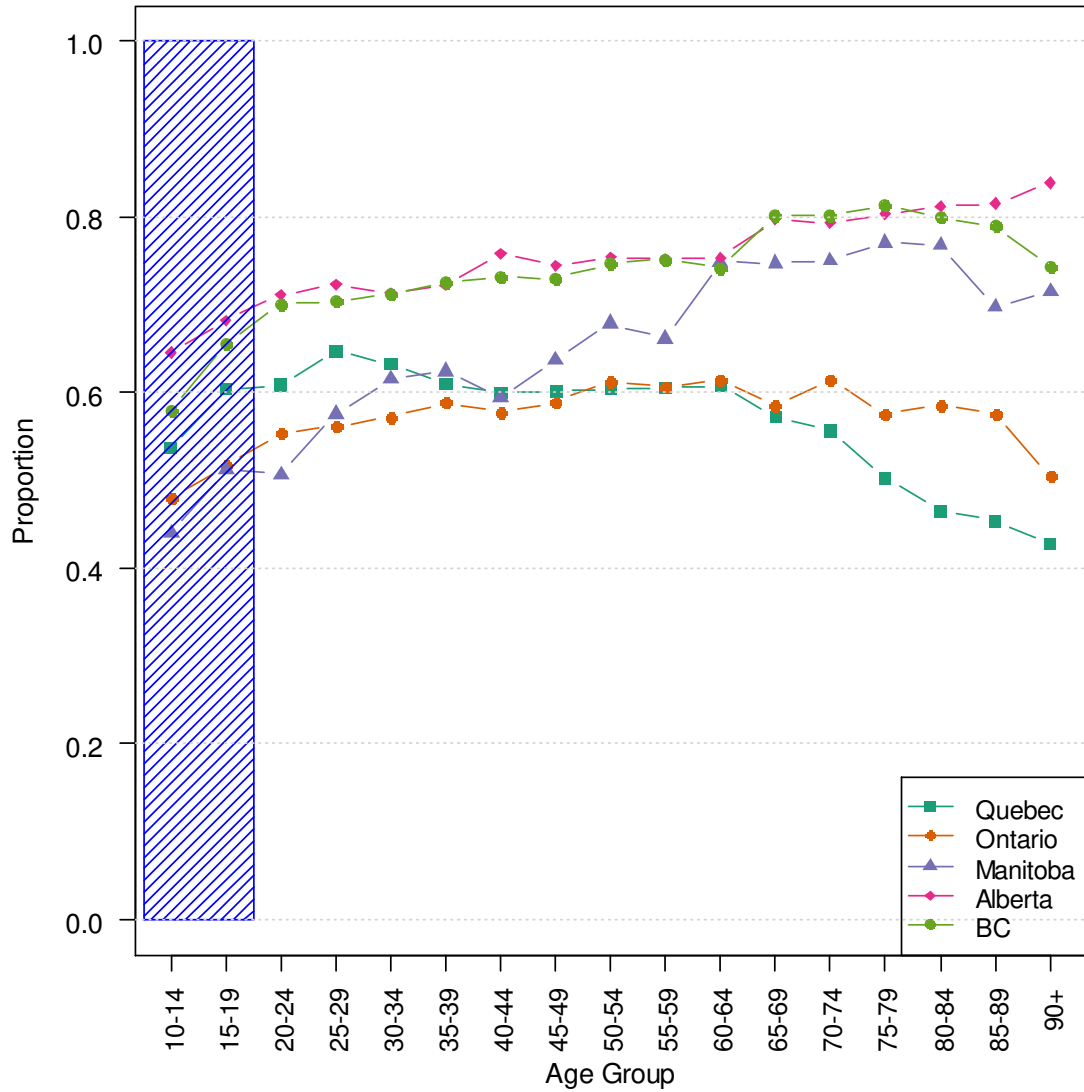
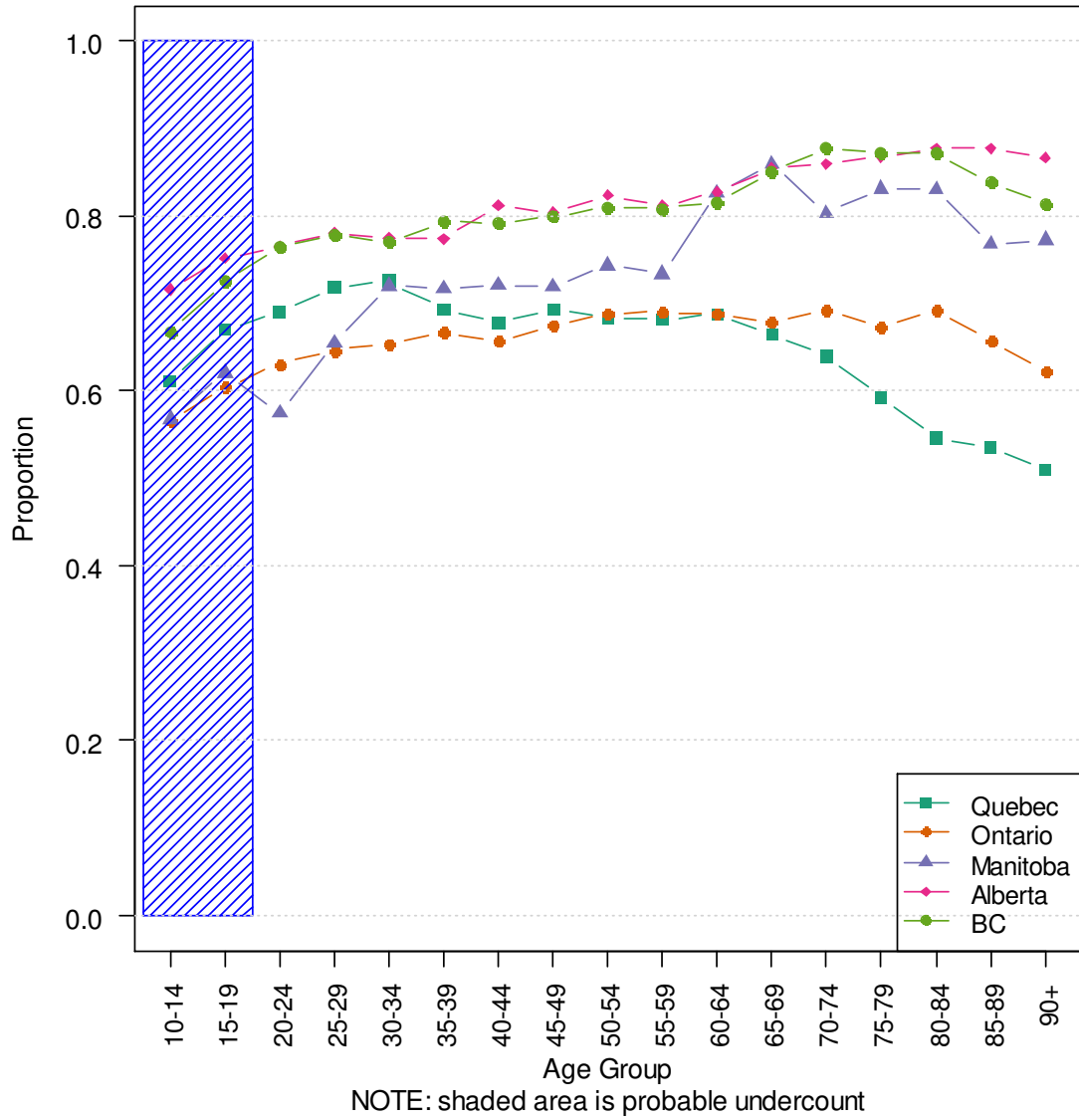


Figure 56 Plot of Day 30 Follow-up after MHA Discharge from Hospital – Males and Females



8.5 Additional Analyses

No additional analyses were planned for this indicator.