

Acquired Brain Injury by Local Health Integration Network in Ontario

04 Hamilton Niagara Haldimand Brant



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Methods

Acquired brain injury (ABI), which includes brain injury from traumatic (e.g., falls, motor vehicle collisions) and non-traumatic (e.g., anoxia, brain tumours) causes, is a leading cause of death and disability in Canada (please see Table 13 and Table 14 for a list of ABI definitions used in this report). ABI is more common than breast cancer, HIV/AIDS, spinal cord injury, and multiple sclerosis combined. The ABI Dataset Project, funded by the Ontario Neurotrauma Foundation, utilized existing administrative data to answer important research questions about ABI in Ontario that resulted from a recent publication of ABI by Local Health Integration Network (LHIN) in Ontario (please see www.onf.org → ABI → Program in Action → ABI Data).

This analysis included fiscal years 2003/04 to 2009/10. LHIN-specific analyses based on inpatient acute care data were obtained from the Discharge Abstract Database (DAD) and inpatient rehabilitation data were obtained from the National Rehabilitation Reporting System (NRS).

Six questions were addressed in this report:

1. Who is discharged to long term care from acute care?
2. Who is discharged to inpatient rehabilitation from acute care?
3. Who is living in residential care at discharge from inpatient rehabilitation?
4. What are the characteristics of ABI patients with 15+ days in alternate level of care?
5. What are the characteristics of ABI patients with extended length of stay in acute care?
6. Who is readmitted to acute care within 30 days of discharge?

Definitions of terms used in the report:

- **Alternate Level of Care (ALC):** An ALC patient is one who “has completed the acute care phase of his or her treatment but remains in the acute care bed” (CIHI 2009)
- **Charlson Comorbidity Index:** The Charlson Comorbidity Index estimates the risk of death from comorbid diseases and is calculated as an indicator of the need of patients with ABI
- **Special Care Days:** The cumulative number of days spent in all intensive care units

Who is Discharged to Long Term Care from Acute Care?

Table 1. Characteristics of TBI Patients Discharged to Long Term Care from Acute Care, 2003/04 – 2009/10

Characteristics	Hamilton Niagara Haldimand Brant		Ontario	
	N	Col%	N	Col%
Overall	232	100	1,558	100
Age				
<19	<5	.	<5	.
19 – 54	NR	.	NR	.
55 – 64	28	12.1	128	8.2
65 – 74	28	12.1	168	10.8
75 – 84	66	28.4	520	33.4
85+	88	37.9	627	40.2
Sex				
Female	120	51.7	825	53.0
Male	112	48.3	733	47.0
Fiscal Year of Discharge				
2003/04	23	9.9	169	10.8
2004/05	30	12.9	186	11.9
2005/06	40	17.2	199	12.8
2006/07	36	15.5	221	14.2
2007/08	31	13.4	228	14.6
2008/09	42	18.1	264	16.9
2009/10	30	12.9	291	18.7
Length of Stay in Acute Care				
1 – 2	18	7.8	102	6.5
3 – 5	40	17.2	258	16.6
6 – 11	41	17.7	314	20.2
12+	133	57.3	884	56.7
Charlson Comorbidity Index Score				
0 – 1 (low)	182	78.4	1,168	75.0
2 - 3	40	17.2	311	20.0
4+ (high)	10	4.3	79	5.1
Psychiatric Comorbidity				
Yes	93	40.1	724	46.5
No	139	59.9	834	53.5
Number of ALC Days				
None	135	58.2	893	57.3
1 – 2	NR	.	32	2.1
3 – 5	<5	.	35	2.2
6 – 11	20	8.6	101	6.5

Characteristics	Hamilton Niagara Haldimand Brant		Ontario	
	N	Col%	N	Col%
12+	65	28	497	31.9
Number of Special Care Days				
None	193	83.2	1,308	84.0
1 – 2	7	3.0	79	5.1
3 – 5	11	4.7	75	4.8
6 – 11	10	4.3	51	3.3
12+	11	4.7	45	2.9
Motor Vehicle Collision				
Yes	23	9.9	77	4.9
No	209	90.1	1,481	95.1
Number of Previous ABI Admissions				
0	166	71.6	1,135	72.8
1	41	17.7	315	20.2
2+	25	10.8	108	6.9

Note: NR = not reportable due to small cell size

Table 2. Characteristics of nTBI Patients Discharged to Long Term Care from Acute Care, 2003/04 – 2009/10

Characteristics	Hamilton Niagara Haldimand Brant		Ontario	
	N	Col%	N	Col%
Overall	465	100	4,214	100
Age				
<19	0	0	<5	.
19 – 54	34	7.3	NR	.
55 – 64	35	7.5	397	9.4
65 – 74	88	18.9	755	17.9
75 – 84	184	39.6	1,619	38.4
85+	124	26.7	1,168	27.7
Sex				
Female	266	57.2	2,466	58.5
Male	199	42.8	1,748	41.5
Fiscal Year of Discharge				
2003/04	89	19.1	683	16.2
2004/05	74	15.9	688	16.3
2005/06	72	15.5	630	15.0
2006/07	72	15.5	582	13.8
2007/08	48	10.3	533	12.6
2008/09	53	11.4	569	13.5
2009/10	57	12.3	529	12.6
Length of Stay in Acute Care				
1 – 2	25	5.4	149	3.5
3 – 5	74	15.9	612	14.5
6 – 11	110	23.7	1,041	24.7
12+	256	55.1	2,412	57.2
Charlson Comorbidity Index Score				
0 – 1 (low)	230	49.5	1,832	43.5
2 – 3	140	30.1	1,406	33.4
4+ (high)	95	20.4	976	23.2
Psychiatric Comorbidity				
Yes	138	29.7	1,546	36.7
No	327	70.3	2,668	63.3
Number of ALC Days				
None	291	62.6	2,645	62.8
1 – 2	<5	.	81	1.9
3 – 5	NR	.	100	2.4
6 – 11	38	8.2	277	6.6
12+	119	25.6	1,111	26.4
Number of Special Care Days				
None	401	86.2	3,613	85.7
1 – 2	20	4.3	202	4.8
3 – 5	16	3.4	165	3.9
6 – 11	16	3.4	118	2.8

Characteristics	Hamilton Niagara Haldimand Brant		Ontario	
	N	Col%	N	Col%
12+	12	2.6	116	2.8
Number of Previous ABI Admissions				
0	332	71.4	2,868	68.1
1	76	16.3	848	20.1
2+	57	12.3	498	11.8

Note: NR = not reportable due to small cell size

Who is Discharged to Inpatient Rehabilitation from Acute Care?

Table 3. Characteristics of TBI Patients Discharged to Inpatient Rehabilitation from Acute Care, 2003/04 – 2009/10

Characteristics	Hamilton Niagara Haldimand Brant		Ontario	
	N	Col%	N	Col%
Overall	275	100	3,248	100
Age				
<19	17	6.2	182	5.6
19 – 54	109	39.6	1,276	39.3
55 – 64	25	9.1	382	11.8
65 – 74	39	14.2	454	14.0
75 – 84	60	21.8	659	20.3
85+	25	9.1	295	9.1
Sex				
Female	91	33.1	1,144	35.2
Male	184	66.9	2,104	64.8
Fiscal Year of Discharge				
2003/04	29	10.5	375	11.5
2004/05	37	13.5	396	12.2
2005/06	32	11.6	423	13.0
2006/07	38	13.8	471	14.5
2007/08	44	16.0	522	16.1
2008/09	57	20.7	515	15.9
2009/10	38	13.8	546	16.8
Length of Stay in Acute Care				
1 – 2	<5	.	22	0.7
3 – 5	NR	.	159	4.9
6 – 11	50	18.2	642	19.8
12+	206	74.9	2,425	74.7
Charlson Comorbidity Index Score				
0 – 1 (low)	235	85.5	2,804	86.3
2 - 3	NR	.	389	12.0
4+ (high)	<5	.	55	1.7
Psychiatric Comorbidity				
Yes	57	20.7	667	20.5
No	218	79.3	2,581	79.5
Number of ALC Days				
None	157	57.1	1,669	51.4
1 – 2	18	6.5	232	7.1
3 – 5	16	5.8	281	8.7
6 – 11	38	13.8	456	14.0

Characteristics	Hamilton Niagara Haldimand Brant		Ontario	
	N	Col%	N	Col%
12+	46	16.7	610	18.8
Number of Special Care Days				
None	151	54.9	1,429	44.0
1 – 2	14	5.1	351	10.8
3 – 5	20	7.3	376	11.6
6 – 11	35	12.7	423	13.0
12+	55	20.0	669	20.6
Motor Vehicle Collision				
Yes	67	24.4	1,003	30.9
No	208	75.6	2,245	69.1
Number of Previous ABI Admissions				
0	182	66.2	2,294	70.6
1	74	26.9	771	23.7
2+	19	6.9	183	5.6

Note: NR = not reportable due to small cell size

Table 4. Characteristics of nTBI Patients Discharged to Inpatient Rehabilitation from Acute Care, 2003/04 – 2009/10

Characteristics	Hamilton Niagara Haldimand Brant		Ontario	
	N	Col%	N	Col%
Overall	527	100	4,936	100
Age				
<19	8	1.5	51	1.0
19 – 54	148	28.1	1,325	26.8
55 – 64	99	18.8	931	18.9
65 – 74	126	23.9	1,060	21.5
75 – 84	116	22.0	1,193	24.2
85+	30	5.7	376	7.6
Sex				
Female	232	44.0	2,293	46.5
Male	295	56.0	2,643	53.5
Fiscal Year of Discharge				
2003/04	73	13.9	605	12.3
2004/05	66	12.5	646	13.1
2005/06	65	12.3	697	14.1
2006/07	87	16.5	714	14.5
2007/08	73	13.9	714	14.5
2008/09	88	16.7	744	15.1
2009/10	75	14.2	816	16.5
Length of Stay in Acute Care				
1 – 2	<5	.	50	1.0
3 – 5	NR	.	271	5.5
6 – 11	109	20.7	1,037	21.0
12+	382	72.5	3,578	72.5
Charlson Comorbidity Index Score				
0 – 1 (low)	268	50.9	2,613	52.9
2 – 3	159	30.2	1,436	29.1
4+ (high)	100	19.0	887	18.0
Psychiatric Comorbidity				
Yes	84	15.9	836	16.9
No	443	84.1	4,100	83.1
Number of ALC Days				
None	337	63.9	2,660	53.9
1 – 2	33	6.3	399	8.1
3 – 5	39	7.4	460	9.3
6 – 11	50	9.5	639	12.9
12+	68	12.9	778	15.8
Number of Special Care Days				
None	346	65.7	2,710	54.9
1 – 2	33	6.3	627	12.7
3 – 5	36	6.8	482	9.8
6 – 11	46	8.7	436	8.8

Characteristics	Hamilton Niagara Haldimand Brant		Ontario	
	N	Col%	N	Col%
12+	66	12.5	681	13.8
Number of Previous ABI Admissions				
0	285	54.1	2,848	57.7
1	148	28.1	1,322	26.8
2+	94	17.8	766	15.5

Note: NR = not reportable due to small cell size

Who Lives in Residential Care* at Discharge from Inpatient Rehabilitation?

* This analysis combined data for ABI patients living in a residential care facility and those living in assisted living settings at discharge from inpatient rehabilitation.

Table 5. Characteristics of TBI Patients Living in Residential Care at Discharge from Inpatient Rehabilitation, 2003/04 - 2009/10

Characteristics	Hamilton Niagara Haldimand Brant		Ontario	
	N	Col%	N	Col%
Overall	58	100	431	100
Age				
19 – 54	20	34.5	136	31.6
55 – 64	8	13.8	49	11.4
65 – 74	<5	.	55	12.8
75 – 84	20	34.5	117	27.1
85+	NR	.	74	17.2
Sex				
Female	18	31.0	183	42.5
Male	40	69.0	248	57.5
Fiscal Year of Discharge				
2003/04	8	13.8	70	16.2
2004/05	<5	.	65	15.1
2005/06	<5	.	57	13.2
2006/07	12	20.7	67	15.5
2007/08	<5	.	63	14.6
2008/09	17	29.3	68	15.8
2009/10	8	13.8	41	9.5
Length of Stay in Acute Care				
1 – 2	<5	.	6	1.4
3 – 5	<5	.	18	4.2
6 – 11	10	17.2	67	15.5
12+	43	74.1	340	78.9
Charlson Comorbidity Index Score				
0 – 1 (low)	45	77.6	358	83.1
2 - 3	NR	.	61	14.2
4+ (high)	<5	.	12	2.8
Psychiatric Comorbidity				
Yes	12	20.7	97	22.5
No	46	79.3	334	77.5
Number of ALC Days				
None	30	51.7	210	48.7
1 – 2	<5	.	21	4.9

Characteristics	Hamilton Niagara Haldimand Brant		Ontario	
	N	Col%	N	Col%
3 – 5	<5	.	28	6.5
6 – 11	11	19.0	65	15.1
12+	13	22.4	107	24.8
Number of Special Care Days				
None	33	56.9	187	43.4
1 – 2	<5	.	48	11.1
3 – 5	<5	.	42	9.7
6 – 11	11	19.0	50	11.6
12+	12	20.7	104	24.1
Motor Vehicle Collision				
Yes	14	24.1	120	27.8
No	44	75.9	311	72.2
Number of Previous ABI Admissions				
0	41	70.7	333	77.3
1	10	17.2	81	18.8
2+	7	12.1	17	3.9

Note: NR = not reportable due to small cell size

Table 6. Characteristics of nTBI Patients Living in Residential Care at Discharge from Inpatient Rehabilitation, 2003/04 - 2009/10

Characteristics	Hamilton Niagara Haldimand Brant		Ontario	
	N	Col%	N	Col%
Overall	72	100	525	100
Age				
19 – 54	18	25.0	135	25.7
55 – 64	NR	.	74	14.1
65 – 74	17	23.6	96	18.3
75 – 84	21	29.2	157	29.9
85+	<5	.	63	12.0
Sex				
Female	37	51.4	268	51.0
Male	35	48.6	257	49.0
Fiscal Year of Discharge				
2003/04	10	13.9	82	15.6
2004/05	10	13.9	94	17.9
2005/06	<5	.	71	13.5
2006/07	NR	.	85	16.2
2007/08	16	22.2	65	12.4
2008/09	13	18.1	70	13.3
2009/10	10	13.9	58	11.0
Length of Stay in Acute Care				
1 – 2	<5	.	13	2.5
3 – 5	NR	.	43	8.2
6 – 11	12	16.7	81	15.4
12+	51	70.8	388	73.9
Charlson Comorbidity Index Score				
0 – 1 (low)	42	58.3	303	57.7
2 - 3	23	31.9	170	32.4
4+ (high)	7	9.7	52	9.9
Psychiatric Comorbidity				
Yes	11	15.3	113	21.5
No	61	84.7	412	78.5
Number of ALC Days				
None	43	59.7	279	53.1
1 – 2	<5	.	28	5.3
3 – 5	<5	.	45	8.6
6 – 11	9	12.5	64	12.2
12+	16	22.2	109	20.8
Number of Special Care Days				
None	45	62.5	298	56.8
1 – 2	<5	.	44	8.4
3 – 5	<5	.	43	8.2
6 – 11	<5	.	49	9.3

Characteristics	Hamilton Niagara Haldimand Brant		Ontario	
	N	Col%	N	Col%
12+	16	22.2	91	17.3
Number of Previous ABI Admissions				
0	53	73.6	394	75.0
1	NR	.	101	19.2
2+	<5	.	30	5.7

Note: NR = not reportable due to small cell size

What are the Characteristics of ABI Patients with 15+ Days in ALC*?

* This analysis focused on the characteristics of ABI patients with 15+ days in ALC as a result of feedback received from LHINs on the recently published ABI reports.

Table 7. Characteristics of TBI Patients with 15+ Days in ALC, 2003/04 - 2009/10

Characteristics	Hamilton Niagara Haldimand Brant		Ontario	
	N	Col%	N	Col%
Overall	247	100	1,791	100
Age				
<19	9	3.6	31	1.7
19 – 54	59	23.9	413	23.1
55 – 64	27	10.9	206	11.5
65 – 74	46	18.6	255	14.2
75 – 84	42	17.0	464	25.9
85+	64	25.9	422	23.6
Sex				
Female	97	39.3	698	39.0
Male	150	60.7	1,093	61.0
Fiscal Year of Discharge				
2003/04	24	9.7	181	10.1
2004/05	19	7.7	204	11.4
2005/06	19	7.7	181	10.1
2006/07	42	17.0	233	13.0
2007/08	42	17.0	304	17.0
2008/09	63	25.5	335	18.7
2009/10	38	15.4	353	19.7
Charlson Comorbidity Index Score				
0 – 1 (low)	199	80.6	1,361	76.0
2 - 3	37	15.0	327	18.3
4+ (high)	11	4.5	103	5.8
Psychiatric Comorbidity				
Yes	90	36.4	747	41.7
No	157	63.6	1,044	58.3
Number of Special Care Days				
None	171	69.2	1,071	59.8
1 – 2	10	4.0	99	5.5
3 – 5	16	6.5	139	7.8
6 – 11	10	4.0	150	8.4
12+	40	16.2	332	18.5
Motor Vehicle Collision				
Yes	43	17.4	299	16.7

Characteristics	Hamilton Niagara Haldimand Brant		Ontario	
	N	Col%	N	Col%
No	204	82.6	1,492	83.3
Number of Previous ABI Admissions				
0	136	55.1	1,215	67.8
1	88	35.6	462	25.8
2+	23	9.3	114	6.4
Discharge Destination ¹				
Death	21	8.5	135	7.5
Home	55	22.3	378	21.1
Inpatient Rehabilitation	34	13.8	479	26.7
Long Term Care	58	23.5	442	24.7
Transferred ²	79	32.0	350	19.5

Note: ¹ Missing values were excluded and thus, column percentages may not add up to 100%

² Transferred includes transferred to another facility providing inpatient hospital care and to other

Table 8. Characteristics of nTBI Patients with 15+ Days in ALC, 2003/04 - 2009/10

Characteristics	Hamilton Niagara Haldimand Brant		Ontario	
	N	Col%	N	Col%
Overall	677	100	4,662	100
Age				
<19	<5	.	16	0.3
19 – 54	119	17.6	812	17.4
55 – 64	106	15.7	771	16.5
65 – 74	165	24.4	1,019	21.9
75 – 84	202	29.8	1,425	30.6
85+	NR	.	619	13.3
Sex				
Female	330	48.7	2,260	48.5
Male	347	51.3	2,402	51.5
Fiscal Year of Discharge				
2003/04	93	13.7	648	13.9
2004/05	55	8.1	554	11.9
2005/06	63	9.3	585	12.5
2006/07	111	16.4	645	13.8
2007/08	107	15.8	718	15.4
2008/09	135	19.9	760	16.3
2009/10	113	16.7	752	16.1
Charlson Comorbidity Index Score				
0 – 1 (low)	204	30.1	1,571	33.7
2 - 3	204	30.1	1,423	30.5
4+ (high)	269	39.7	1,668	35.8
Psychiatric Comorbidity				
Yes	177	26.1	1,491	32.0
No	500	73.9	3,171	68.0
Number of Special Care Days				
None	518	76.5	3,309	71.0
1 – 2	25	3.7	226	4.8
3 – 5	26	3.8	257	5.5
6 – 11	35	5.2	297	6.4
12+	73	10.8	573	12.3
Number of Previous ABI Admissions				
0	411	60.7	2,837	60.9
1	161	23.8	1,151	24.7
2+	105	15.5	674	14.5
Discharge Destination ¹				
Death	162	23.9	1,054	22.6
Home	112	16.5	780	16.7
Inpatient Rehabilitation	53	7.8	599	12.8
Long Term Care	105	15.5	973	20.9

Characteristics	Hamilton Niagara Haldimand Brant		Ontario	
	N	Col%	N	Col%
Transferred ²	242	35.7	1,241	26.6

Note: NR = not reportable due to small cell size

¹ Missing values were excluded and thus, column percentages may not add up to 100%

² Transferred includes transferred to another facility providing inpatient hospital care and to other

Who is Discharged with Extended Length of Stay* in Acute Care?

* Extended length of stay (LOS) is defined as LOS in the 75th percentile and higher.

Table 9. Characteristics of TBI Patients Discharged with Extended Length of Stay in Acute Care, 2003/04 - 2009/10

Characteristics	Hamilton Niagara Haldimand Brant		Ontario	
	N	Col%	N	Col%
Overall	1,293	100	9,399	100
Age				
<19	123	9.5	912	9.7
19 – 54	434	33.6	2,822	30.0
55 – 64	138	10.7	958	10.2
65 – 74	180	13.9	1,266	13.5
75 – 84	249	19.3	2,059	21.9
85+	169	13.1	1,382	14.7
Sex				
Female	474	36.7	3,454	36.7
Male	819	63.3	5,945	63.3
Fiscal Year of Discharge				
2003/04	169	13.1	1,169	12.4
2004/05	188	14.5	1,296	13.8
2005/06	175	13.5	1,269	13.5
2006/07	181	14.0	1,286	13.7
2007/08	182	14.1	1,407	15.0
2008/09	217	16.8	1,414	15.0
2009/10	181	14.0	1,558	16.6
Charlson Comorbidity Index Score				
0 – 1 (low)	1,066	82.4	7,539	80.2
2 - 3	183	14.2	1,437	15.3
4+ (high)	44	3.4	423	4.5
Psychiatric Comorbidity				
Yes	399	30.9	2,948	31.4
No	894	69.1	6,451	68.6
Number of ALC Days				
None	790	61.1	5,545	59.0
1 – 2	25	1.9	256	2.7
3 – 5	51	3.9	433	4.6
6 – 11	133	10.3	1,005	10.7
12+	294	22.7	2,160	23.0
Number of Special Care Days				
None	691	53.4	4,529	48.2
1 – 2	63	4.9	730	7.8

Characteristics	Hamilton Niagara Haldimand Brant		Ontario	
	N	Col%	N	Col%
3 – 5	136	10.5	1,052	11.2
6 – 11	165	12.8	1,248	13.3
12+	238	18.4	1,840	19.6
Motor Vehicle Collision				
Yes	322	24.9	2,203	23.4
No	971	75.1	7,196	76.6
Number of Previous ABI Admissions				
0	885	68.4	6,706	71.3
1	286	22.1	2,097	22.3
2+	122	9.4	596	6.3
Discharge Destination ¹				
Death	118	9.1	890	9.5
Home	544	42.1	3,641	38.7
Inpatient Rehabilitation	198	15.3	2,303	24.5
Long Term Care	128	9.9	851	9.1
Transferred ²	303	23.4	1,677	17.8

Note: ¹ Missing values were excluded and thus, column percentages may not add up to 100%

² Transferred includes transferred to another facility providing inpatient hospital care and to other

Table 10. Characteristics of nTBI Patients Discharged with Extended Length of Stay in Acute Care, 2003/04 – 2009/10

Characteristics	Hamilton Niagara Haldimand Brant		Ontario	
	N	Col%	N	Col%
Overall	3,393	100	29,710	100
Age				
<19	228	6.7	2,315	7.8
19 – 54	724	21.3	6,357	21.4
55 – 64	573	16.9	5,387	18.1
65 – 74	767	22.6	6,511	21.9
75 – 84	822	24.2	6,807	22.9
85+	279	8.2	2,333	7.9
Sex				
Female	1,558	45.9	14,355	48.3
Male	1,835	54.1	15,355	51.7
Fiscal Year of Discharge				
2003/04	491	14.5	4,445	15.0
2004/05	493	14.5	4,273	14.4
2005/06	473	13.9	4,294	14.5
2006/07	516	15.2	4,039	13.6
2007/08	449	13.2	4,045	13.6
2008/09	479	14.1	4,251	14.3
2009/10	492	14.5	4,363	14.7
Charlson Comorbidity Index Score				
0 – 1 (low)	1,313	38.7	10,238	34.5
2 – 3	910	26.8	8,033	27.0
4+ (high)	1,170	34.5	11,439	38.5
Psychiatric Comorbidity				
Yes	760	22.4	6,413	21.6
No	2,633	77.6	23,297	78.4
Number of ALC Days				
None	1,979	58.3	20,085	67.6
1 – 2	85	2.5	644	2.2
3 – 5	162	4.8	1,008	3.4
6 – 11	341	10.1	2,285	7.7
12+	826	24.3	5,688	19.1
Number of Special Care Days				
None	2,103	62.0	18,596	62.6
1 – 2	187	5.5	1,958	6.6
3 – 5	225	6.6	2,025	6.8
6 – 11	299	8.8	2,454	8.3
12+	579	17.1	4,677	15.7
Number of Previous ABI Admissions				
0	2,217	65.3	18,246	61.4
1	734	21.6	6,867	23.1
2+	442	13.0	4,597	15.5

Characteristics	Hamilton Niagara Haldimand Brant		Ontario	
	N	Col%	N	Col%
Discharge Destination ¹				
Death	709	20.9	7,645	25.7
Home	1,302	38.4	11,618	39.1
Inpatient Rehabilitation	300	8.8	2,930	9.9
Long Term Care	224	6.6	2,027	6.8
Transferred ²	853	25.1	5,418	18.2

Note: ¹ Missing values were excluded and thus, column percentages may not add up to 100%

² Transferred includes transferred to another facility providing inpatient hospital care and to other

Who is Readmitted to Acute Care within One Month of Discharge?

Table 11. Characteristics of TBI Patients Readmitted to Acute Care within One Month of Discharge, 2003/04 - 2008/09

Characteristics	Hamilton Niagara Haldimand Brant (N = 4,194)		Ontario (N = 30,579)	
	N	Col%	N	Col%
Overall	170	100	1,220	100
Age				
<19	11	6.5	199	16.3
19 – 54	81	47.6	386	31.6
55 – 64	17	10.0	144	11.8
65 – 74	26	15.3	160	13.1
75 – 84	29	17.1	235	19.3
85+	6	3.5	96	7.9
Sex				
Female	39	22.9	360	29.5
Male	131	77.1	860	70.5
Fiscal Year of Discharge				
2003/04	18	10.6	163	13.4
2004/05	39	22.9	238	19.5
2005/06	30	17.6	224	18.4
2006/07	22	12.9	190	15.6
2007/08	25	14.7	186	15.2
2008/09	36	21.2	219	18.0
Length of Stay in Acute Care				
1 – 2	23	13.5	194	15.9
3 – 5	64	37.6	410	33.6
6 – 11	36	21.2	282	23.1
12+	47	27.6	334	27.4
Charlson Comorbidity Index Score				
0 – 1 (low)	135	79.4	1,068	87.5
2 - 3	NR	.	124	10.2
4+ (high)	<5	.	28	2.3
Psychiatric Comorbidity				
Yes	58	34.1	277	22.7
No	112	65.9	943	77.3
Number of ALC Days				
None	161	94.7	1,099	90.1
1 – 2	<5	.	22	1.8
3 – 5	0	0	18	1.5
6 – 11	<5	.	28	2.3
12+	<5	.	53	4.3

Characteristics	Hamilton Niagara Haldimand Brant (N = 4,194)		Ontario (N = 30,579)	
	N	Col%	N	Col%
Number of Special Care Days				
None	145	85.3	867	71.1
1 – 2	NR	.	170	13.9
3 – 5	7	4.1	86	7.0
6 – 11	8	4.7	53	4.3
12+	<5	.	44	3.6
Motor Vehicle Collision				
Yes	18	10.6	164	13.4
No	152	89.4	1,056	86.6
Number of Previous ABI Admissions				
0	11	6.5	76	6.2
1	80	47.1	755	61.9
2+	79	46.5	389	31.9
Discharge Destination ¹				
Home	131	77.1	911	74.7
Inpatient Rehabilitation	11	6.5	111	9.1
Long Term Care	6	3.5	54	4.4
Transferred ²	22	12.9	142	11.6

Note: NR = not reportable due to small cell size

¹ Missing values were excluded and thus, column percentages may not add up to 100%

² Transferred includes transferred to another facility providing inpatient hospital care and to other

Table 12. Characteristics of nTBI Patients Readmitted to Acute Care within One Month of Discharge, 2003/04 - 2008/09

Characteristics	Hamilton Niagara Haldimand Brant (N = 11,693)		Ontario (N = 97,700)	
	N	Col%	N	Col%
Overall	1,158	100	9,300	100
Age				
<19	260	22.5	1,569	16.9
19 – 54	307	26.5	2,688	28.9
55 – 64	200	17.3	1,904	20.5
65 – 74	222	19.2	1,794	19.3
75 – 84	147	12.7	1,144	12.3
85+	22	1.9	201	2.2
Sex				
Female	520	44.9	4,165	44.8
Male	638	55.1	5,135	55.2
Fiscal Year of Discharge				
2003/04	215	18.6	1,562	16.8
2004/05	195	16.8	1,492	16.0
2005/06	174	15.0	1,561	16.8
2006/07	196	16.9	1,578	17.0
2007/08	168	14.5	1,553	16.7
2008/09	210	18.1	1,554	16.7
Length of Stay in Acute Care				
1 – 2	183	15.8	1,169	12.6
3 – 5	423	36.5	2,928	31.5
6 – 11	304	26.3	2,747	29.5
12+	248	21.4	2,456	26.4
Charlson Comorbidity Index Score				
0 – 1 (low)	326	28.2	2,425	26.1
2 - 3	389	33.6	2,642	28.4
4+ (high)	443	38.3	4,233	45.5
Psychiatric Comorbidity				
Yes	67	5.8	666	7.2
No	1,091	94.2	8,634	92.8
Number of ALC Days				
None	1,081	93.4	8,812	94.8
1 – 2	10	0.9	73	0.8
3 – 5	14	1.2	97	1.0
6 – 11	28	2.4	145	1.6
12+	25	2.2	173	1.9
Number of Special Care Days				
None	1,024	88.4	7,802	83.9
1 – 2	79	6.8	921	9.9
3 – 5	33	2.8	324	3.5
6 – 11	13	1.1	152	1.6

Characteristics	Hamilton Niagara Haldimand Brant (N = 11,693)		Ontario (N = 97,700)	
	N	Col%	N	Col%
12+	9	0.8	101	1.1
Number of Previous ABI Admissions				
0	16	1.4	92	1.0
1	367	31.7	3,220	34.6
2+	775	66.9	5,988	64.4
Discharge Destination ¹				
Home	1,032	89.1	8,234	88.5
Inpatient Rehabilitation	29	2.5	303	3.3
Long Term Care	19	1.6	146	1.6
Transferred ²	78	6.7	611	6.6

Note:

¹ Missing values were excluded and thus, column percentages may not add up to 100%

² Transferred includes transferred to another facility providing inpatient hospital care and to other

ICD-10 Definitions of ABI

Table 13. ICD-10 Definition of TBI

Diagnosis	ICD-10 Code and Description
1. Fracture and crushing of the skull and facial bones	<ul style="list-style-type: none"> ✓ S02.0 Fracture of vault of skull ✓ S02.1 Fracture of base of skull ✓ S02.3 Fracture of the orbital floor ✓ S02.7 Multiple fractures involving skull and facial bones ✓ S02.8 Fractures of other skull and facial bones ✓ S02.9 Fractures of skull and facial bones, part unspecified ✓ S07.1 Crushing injury of skull
2. Intracranial injury, excluding those with skull fracture	<ul style="list-style-type: none"> ✓ S06.0 Concussion ✓ S06.1 Traumatic cerebral oedema ✓ S06.2 Diffuse brain injury ✓ S06.3 Focal brain injury ✓ S06.4 Epidural hemorrhage ✓ S06.5 Traumatic subdural hemorrhage ✓ S06.6 Traumatic subarachnoid hemorrhage ✓ S06.7 Intracranial injury with prolonged coma ✓ S06.8 Other intracranial injuries ✓ S06.9 Intracranial injury, unspecified
3. Late effects of injuries The "sequelae" include conditions specified as such or as late effects, or those present one year or more after onset of the causal condition.	<ul style="list-style-type: none"> ✓ F07.2 Post concussion syndrome ✓ T90.2 Sequelae of fracture of skull and facial bones ✓ T90.5 Sequelae of intracranial injury

Table 14. ICD-10 Definition of nTBI

Diagnosis	ICD-10 Code and Description
1. Toxic effect of substances, chiefly non-medical as to source	<ul style="list-style-type: none"> ✓ T40.5 Poisoning: cocaine ✓ T42.6 Poisoning by other antiepileptic and sedative-hypnotic drugs, Methaqualone, Valproic acid ✓ T51 Toxic effect of alcohol ✓ T56 Toxic effect of metals ✓ T57.0 Toxic effect of arsenic and its compounds ✓ T57.2 Toxic effect of manganese and its compounds ✓ T57.3 Toxic effect of hydrogen cyanide ✓ T58 Toxic effect of carbon monoxide ✓ T64 Toxic effect of aflatoxin and other mycotoxin food contaminants ✓ T65.0 Toxic effect of cyanides
2. Anoxia	<ul style="list-style-type: none"> ✓ G93.1 Anoxic brain damage (includes all causes of anoxia except those occurring following abortions, ectopic pregnancy, labour and delivery and newborn) ✓ T71 Asphyxiation, suffocation (by strangulation) ✓ T75.1 Drowning and nonfatal submersion ✓ R09.0 Asphyxia
3. Vascular insults (not captured in stroke analyses)	<ul style="list-style-type: none"> ✓ I62.0 Subdural hemorrhage ✓ I62.9 Unspecified intracranial hemorrhage
4. Brain tumours	<ul style="list-style-type: none"> ✓ C70 Malignant neoplasm of brain ✓ C71 Malignant neoplasm of brain ✓ C79.3 Secondary malignant neoplasm of brain and cerebral meninges ✓ C79.4 Secondary malignant neoplasm of other and unspecified part of nervous system ✓ D32.0 Benign neoplasm of cerebral meninges ✓ D33.0 Benign neoplasm of brain, supratentorial ✓ D33.1 Benign neoplasm of brain, infratentorial ✓ D33.2 Benign neoplasm of brain, unspecified ✓ D33.3 Benign neoplasm of cranial nerves ✓ D42.0 Neoplasm of uncertain or unknown behaviour of cerebral meninges ✓ D43 Neoplasm of uncertain or unknown behaviour of brain and central nervous system ✓ D43.2 Neoplasm of brain, unspecified ✓ G06.0 Intracranial abscess and granuloma ✓ G06.1 Intraspinial abscess and granuloma ✓ G06.2 Extradural and subdural abscess, unspecified ✓ G07 Intracranial and intraspinal abscess and granuloma in disease classified elsewhere ✓ G93.0 Cerebral cysts

Diagnosis	ICD-10 Code and Description
5. Encephalitis	<ul style="list-style-type: none"> ✓ A81.1 Subacute, sclerosing encephalitis ✓ A83.0 Japanese encephalitis ✓ A83.2 Eastern equine encephalitis ✓ A86.0 Unspecified viral encephalitis ✓ B00.4 Herpes viral meningoencephalitis ✓ B01.1 Varicella encephalitis ✓ B02.0 Zoster encephalitis ✓ B05.0 Postmeasles encephalitis ✓ B94.1 Sequelae of viral encephalitis ✓ G04.0 Acute disseminated encephalitis ✓ G04.2 Bacterial meningoencephalitis and meningomyelitis, not elsewhere classified ✓ G04.8 Other encephalitis, myelitis and encephalomyelitis ✓ G04.9 Encephalitis, myelitis, and encephalomyelitis, unspecified ✓ G05 Encephalitis, myelitis, and encephalomyelitis in diseases classified elsewhere ✓ G09 Sequelae of inflammatory diseases of central nervous system
6. Metabolic encephalopathies	<ul style="list-style-type: none"> ✓ E10.0 (Type I) ✓ E11.0 (Type II) ✓ E13.0 Other specified diabetes mellitus with coma ✓ E14.0 Unspecified diabetes mellitus with coma ✓ E15 Nondiabetic hypoglycaemic coma ✓ G92 Toxic encephalopathy ✓ G93.4 Encephalopathy, unspecified
7. Meningitis	<ul style="list-style-type: none"> ✓ A87 Viral meningitis ✓ B01.0 Varicella meningitis ✓ B37.5 Candidal meningitis ✓ G00 Bacterial meningitis, not elsewhere classified ✓ G01 Meningitis in bacterial diseases classified elsewhere ✓ G02 Meningitis in other infectious and parasitic diseases classified elsewhere ✓ G03 Meningitis due to other and unspecified causes
8. Other brain disorders and infections	<ul style="list-style-type: none"> ✓ G91.0 Communicating hydrocephalus ✓ G91.1 Obstructive hydrocephalus ✓ G91.2 Normal-pressure hydrocephalus ✓ G93.2 Benign intracranial hypertension ✓ G93.5 Compression of brain ✓ G93.6 Cerebral oedema ✓ G93.8 Other specified disorders of the brain (including post-radiation encephalopathy) ✓ G93.9 Disorder of the brain, unspecified ✓ G99.8 Other specified disorders of nervous system in diseases classified elsewhere ✓ R29.1 Meningismus