# General Description

| Project Name: | Impact of Comorbid Conditions on Persistent Concussion Symptoms |
|--------------|---------------------------------------------------------------|
| Description: | Key Research Question: How many people with an initial diagnosis of concussion or head injury from a family physician or paediatrician access neurological or rehabilitation specialized care? What are possible predictive factors for those that require further specialized care? |
| Research Objectives: | 1) Analyze family physician and paediatrician OHIP billings to determine incidence of concussion by number with concussion as the diagnosis  
2) Quantify the number of identified cohort that required further specialized care for post concussive symptoms by a specialist by following for 2 years after their diagnosis  
3) Examine how co-morbid health conditions and previous health care seeking behaviours, as well as other demographic information could be predictive of those that require specialized care |
| TRIM Number: | 2016 0970 031 000 |
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| Assigned Analyst: | Nadia Gunraj |
| Budgeted Analyst Hours: | |
| Update History: | 2016-01-11 Reformatting and clarification (NG)  
2015-11-12 Creation |
| Type of study: | Cohort |
## Data & Analytic Services

### Dataset Creation Plan

#### Cohort Definitions

| Confirmed concussion: | Step | Description | # Excluded | Total Cohort |
|-----------------------|------|-------------|------------|--------------|
|                       | 1 a) | First ED visit with a diagnosis of concussion or head injury between 01JAN2008 and 31DEC2013 [APPENDIX 1] (NACRS) OR b) First visit to a GP/FP/paediatrician [spec IN ("00","26")] for concussion or head injury [dxcode IN: ("850","854")] between 01JAN2008 and 31DEC2013 (OHIP) OR c) First visit to a specialist [spec IN ("18","19","23","24","31")] for concussion or head injury [dxcode IN: ("850","854")] between 01JAN2008 and 31DEC2013 and not identified in parts a) or b) (OHIP) | | |
|                       | 2    | No concussion or head injury [dxcode IN: ("850","854")] or [APPENDIX 1] in the year prior to index date (OHIP / NACRS) | | |
|                       | 3    | No acute care admission within 30 days after index date (DAD) | | |
|                       | 4    | Ontario residents (PCCF) | | |
|                       | 5    | Age 0-105 (RPDB) | | |
|                       | 6    | Available sex data (RPDB) | | |
|                       | 7    | Available LHIN data (RPDB) | | |
|                       | 8    | Death date missing or after index date (RPDB) | | |

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Cohort Definitions (continued)

| Suspected concussion: | Step | Description | # Excluded | Total Cohort |
|-----------------------|------|-------------|------------|-------------|
|                       | 1    | First visit to GP/FP/paediatrician [spec IN ("00", "26")] with trauma-related diagnosis [APPENDIX 2] between 01JAN2008 and 31DEC2013 (OHIP) |          |             |
|                       |      | • Index date ≡ Date of first visit |          |             |
|                       |      | • Valid IKN |          |             |
|                       |      | • Location = office / LTC / home |          |             |
|                       | 2    | No visits for trauma-related diagnosis [APPENDIX 2] in the year prior to index date (OHIP) |          |             |
|                       | 3    | Patients not in confirmed concussion cohort (see definition above) |          |             |
|                       | 4    | At least one visit GP/FP/paediatrician (as defined in step 1) for neurological/cognitive complaints [APPENDIX 3] within the 6 months after index date (OHIP) |          |             |
|                       | 5    | No acute care admission within 30 days after index date (DAD) |          |             |
|                       | 6    | Ontario residents (PCCF) |          |             |
|                       | 7    | Age 0-105 (RPDB) |          |             |
|                       | 8    | Available sex data (RPDB) |          |             |
|                       | 9    | Available LHIN data (RPDB) |          |             |
|                       | 10   | Death date missing or after index date (RPDB) |          |             |

Variable Definitions

Baseline Characteristics:
- At index date:
  - Age (RPDB)
    - 0-4 years
    - 5-12 years
    - 13-17 years
    - 18-30 years
    - 31-65 years
    - 66-80 years
    - 80+ years
  - Sex (RPDB)
  - LHIN (PCCF)
  - Urban/rural indicator (PCCF)
  - Main specialty of physician [APPENDIX 4] (OHIP)
- Season
  - Winter ≡ December to February
  - Spring ≡ March to May
  - Summer ≡ June to August
  - Fall ≡ September to November

Comorbidities:
- See APPENDIX 5
  - Number of comorbidities
    - 1-year lookback
    - 5-year lookback

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**Variable Definitions**

| Additional Variables: |  |
|-----------------------|---|
| • Death date          |  |
| • Continuum of care   |  |
|   o GP only ≡ Patients diagnosed by GP/FP/ paediatrician only |  |
|   o ED only ≡ Patients diagnosed in ED only |  |
|   o GP=ED ≡ Patients visited both GP/FP/ paediatrician and ED |  |
|   o GP→ED ≡ Patients visited GP/FP/ paediatrician before visiting ED |  |
|   o ED→GP ≡ Patients visited ED before visiting GP/FP/ paediatrician |  |

**Outcome Definition(s)**

| Resource Use: |  |
|---------------|---|
| • In the 2 years following the index date |  |
|   o GP/FP/paediatrician visits |  |
|     • Total number of visits |  |
|   o Specialist visits [APPENDIX 4] (OHIP) |  |
|     • Total number of visits |  |
|     • First visit after index date |  |
|      • Wait time ≡ Time since index date |  |
|      • Main specialty of physician |  |
|       • Reason for visit (fee code) [APPENDIX 6] |  |
|     • Date of last visit |  |
|      • Main specialty of physician |  |
|       • Reason for visit (fee code) [APPENDIX 6] |  |
|   o Diagnostic imaging [APPENDIX 7] (OHIP) |  |
|     • Fee code |  |
|     • Number of services – one record per fee coded |  |
Data & Analytic Services

Analysis Plan

Table 1. Baseline characteristics for the Confirmed and Suspected Concussion Cohorts

| Characteristic                          | Confirmed Concussion | Suspected Concussion |
|----------------------------------------|----------------------|----------------------|
|                                       | GP Only | ED Only | GP + ED | n=     | n=     | n=     |
| Index year, n (%)                      |         |         |         |         |         |         |
| 2008                                   |         |         |         |         |         |         |
| 2009                                   |         |         |         |         |         |         |
| 2010                                   |         |         |         |         |         |         |
| 2011                                   |         |         |         |         |         |         |
| 2012                                   |         |         |         |         |         |         |
| 2013                                   |         |         |         |         |         |         |
| Age (years)                            |         |         |         |         |         |         |
| Mean (± SD)                            |         |         |         |         |         |         |
| Median (IQR)                           |         |         |         |         |         |         |
| Age Group, n (%)                       |         |         |         |         |         |         |
| <5 years                               |         |         |         |         |         |         |
| 5-12 years                             |         |         |         |         |         |         |
| 13-17 years                            |         |         |         |         |         |         |
| 18-30 years                            |         |         |         |         |         |         |
| 31-65 years                            |         |         |         |         |         |         |
| 66-80 years                            |         |         |         |         |         |         |
| 80+ years                              |         |         |         |         |         |         |
| Sex, n (%)                             |         |         |         |         |         |         |
| Female                                 |         |         |         |         |         |         |
| Male                                   |         |         |         |         |         |         |
| Patient LHIN, n (%)                    |         |         |         |         |         |         |
| Erie St. Clair                         |         |         |         |         |         |         |
| South West                             |         |         |         |         |         |         |
| Waterloo Wellington                    |         |         |         |         |         |         |
| Hamilton Niagara Haldimand Brant       |         |         |         |         |         |         |
| Central West                           |         |         |         |         |         |         |
| Mississauga Halton                     |         |         |         |         |         |         |
| Toronto Central                        |         |         |         |         |         |         |
| Central                               |         |         |         |         |         |         |
| Central East                           |         |         |         |         |         |         |
| South East                             |         |         |         |         |         |         |
| Champlain                              |         |         |         |         |         |         |
| North Simcoe Muskoka                   |         |         |         |         |         |         |
| North East                             |         |         |         |         |         |         |
| North West                             |         |         |         |         |         |         |
| Rural, n (%)                           |         |         |         |         |         |         |
| Season, n (%)                          |         |         |         |         |         |         |
| Winter                                 |         |         |         |         |         |         |
| Spring                                 |         |         |         |         |         |         |
| Summer                                 |         |         |         |         |         |         |
| Fall                                   |         |         |         |         |         |         |
| Main specialty of diagnosing physician, n (%) |         |         |         |         |         |         |
| Family practice and general practice   |         |         |         |         |         |         |
| Neurology                              |         |         |         |         |         |         |
| Psychiatry                             |         |         |         |         |         |         |
| Ophthalmology                          |         |         |         |         |         |         |
| Otolaryngology                         |         |         |         |         |         |         |
| Paediatrics                            |         |         |         |         |         |         |
| Physical medicine                      |         |         |         |         |         |         |
### Analysis Plan (continued)

Table 2a. Baseline characteristics for the Confirmed Concussion Cohort, by LHIN

| Characteristic                  | Overall | Erie St. Clair | South West | Waterloo Wellington | Hamilton Niagara Haldimand Brant | Central West | Mississauga Halton | Toronto Central | Central East | South East | Champlain | North Simcoe Muskoka | North East | North West |
|--------------------------------|---------|----------------|------------|--------------------|---------------------------------|-------------|--------------------|----------------|-------------|------------|-----------|----------------------|------------|-----------|
| Index year, n (%)              |         |                |            |                    |                                 |             |                    |                |             |            |           |                     |            |           |
| 2008                           |         |                |            |                    |                                 |             |                    |                |             |            |           |                     |            |           |
| 2009                           |         |                |            |                    |                                 |             |                    |                |             |            |           |                     |            |           |
| 2010                           |         |                |            |                    |                                 |             |                    |                |             |            |           |                     |            |           |
| 2011                           |         |                |            |                    |                                 |             |                    |                |             |            |           |                     |            |           |
| 2012                           |         |                |            |                    |                                 |             |                    |                |             |            |           |                     |            |           |
| 2013                           |         |                |            |                    |                                 |             |                    |                |             |            |           |                     |            |           |
| Age (years)                    |         |                |            |                    |                                 |             |                    |                |             |            |           |                     |            |           |
| Mean (± SD)                    |         |                |            |                    |                                 |             |                    |                |             |            |           |                     |            |           |
| Median (IQR)                   |         |                |            |                    |                                 |             |                    |                |             |            |           |                     |            |           |
| Age Group, n (%)               |         |                |            |                    |                                 |             |                    |                |             |            |           |                     |            |           |
| <5 years                       |         |                |            |                    |                                 |             |                    |                |             |            |           |                     |            |           |
| 5-12 years                     |         |                |            |                    |                                 |             |                    |                |             |            |           |                     |            |           |
| 13-17 years                    |         |                |            |                    |                                 |             |                    |                |             |            |           |                     |            |           |
| 18-30 years                    |         |                |            |                    |                                 |             |                    |                |             |            |           |                     |            |           |
| 31-65 years                    |         |                |            |                    |                                 |             |                    |                |             |            |           |                     |            |           |
| 66-80 years                    |         |                |            |                    |                                 |             |                    |                |             |            |           |                     |            |           |
| 80+ years                      |         |                |            |                    |                                 |             |                    |                |             |            |           |                     |            |           |
| Sex, n (%)                     |         |                |            |                    |                                 |             |                    |                |             |            |           |                     |            |           |
| Female                         |         |                |            |                    |                                 |             |                    |                |             |            |           |                     |            |           |
| Male                           |         |                |            |                    |                                 |             |                    |                |             |            |           |                     |            |           |
| Season, n (%)                  |         |                |            |                    |                                 |             |                    |                |             |            |           |                     |            |           |
| Winter                         |         |                |            |                    |                                 |             |                    |                |             |            |           |                     |            |           |
| Spring                         |         |                |            |                    |                                 |             |                    |                |             |            |           |                     |            |           |
| Summer                         |         |                |            |                    |                                 |             |                    |                |             |            |           |                     |            |           |
| Fall                           |         |                |            |                    |                                 |             |                    |                |             |            |           |                     |            |           |
## Analysis Plan (continued)

**Table 2b.** Baseline characteristics for the Suspected Concussion Cohort, by LHIN

| Characteristic               | Overall | Erie St. Clair | South West | Waterloo Wellington | Hamilton Niagara Haldimand Brant | Central West | Mississauga Halton | Toronto Central | Central East | South East | Champlain | North Simcoe Muskoka | North East | North West |
|------------------------------|---------|----------------|------------|---------------------|-------------------------------|--------------|-------------------|-----------------|--------------|------------|-----------|---------------|------------|------------|
| **Index year, n (%)**       |         |                |            |                     |                               |              |                   |                 |              |            |           |               |            |            |
| 2008                         | n=       | n=             | n=         | n=                  | n=                            | n=           | n=                | n=              | n=           | n=         | n=        | n=           | n=         | n=         |
| 2009                         | n=       | n=             | n=         | n=                  | n=                            | n=           | n=                | n=              | n=           | n=         | n=        | n=           | n=         | n=         |
| 2010                         | n=       | n=             | n=         | n=                  | n=                            | n=           | n=                | n=              | n=           | n=         | n=        | n=           | n=         | n=         |
| 2011                         | n=       | n=             | n=         | n=                  | n=                            | n=           | n=                | n=              | n=           | n=         | n=        | n=           | n=         | n=         |
| 2012                         | n=       | n=             | n=         | n=                  | n=                            | n=           | n=                | n=              | n=           | n=         | n=        | n=           | n=         | n=         |
| 2013                         | n=       | n=             | n=         | n=                  | n=                            | n=           | n=                | n=              | n=           | n=         | n=        | n=           | n=         | n=         |
| **Age (years)**             |         |                |            |                     |                               |              |                   |                 |              |            |           |               |            |            |
| Mean (± SD)                  |         |                |            |                     |                               |              |                   |                 |              |            |           |               |            |            |
| Median (IQR)                 |         |                |            |                     |                               |              |                   |                 |              |            |           |               |            |            |
| **Age Group, n (%)**         |         |                |            |                     |                               |              |                   |                 |              |            |           |               |            |            |
| <5 years                     |         |                |            |                     |                               |              |                   |                 |              |            |           |               |            |            |
| 5-12 years                   |         |                |            |                     |                               |              |                   |                 |              |            |           |               |            |            |
| 13-17 years                  |         |                |            |                     |                               |              |                   |                 |              |            |           |               |            |            |
| 18-30 years                  |         |                |            |                     |                               |              |                   |                 |              |            |           |               |            |            |
| 31-65 years                  |         |                |            |                     |                               |              |                   |                 |              |            |           |               |            |            |
| 66-80 years                  |         |                |            |                     |                               |              |                   |                 |              |            |           |               |            |            |
| 80+ years                    |         |                |            |                     |                               |              |                   |                 |              |            |           |               |            |            |
| **Sex, n (%)**               |         |                |            |                     |                               |              |                   |                 |              |            |           |               |            |            |
| Female                       |         |                |            |                     |                               |              |                   |                 |              |            |           |               |            |            |
| Male                         |         |                |            |                     |                               |              |                   |                 |              |            |           |               |            |            |
| **Season, n (%)**            |         |                |            |                     |                               |              |                   |                 |              |            |           |               |            |            |
| Winter                       |         |                |            |                     |                               |              |                   |                 |              |            |           |               |            |            |
| Spring                       |         |                |            |                     |                               |              |                   |                 |              |            |           |               |            |            |
| Summer                       |         |                |            |                     |                               |              |                   |                 |              |            |           |               |            |            |
| Fall                         |         |                |            |                     |                               |              |                   |                 |              |            |           |               |            |            |
## Analysis Plan

| Comorbidity                        | Confirmed Cohort |                     | Suspected Cohort |                     |
|------------------------------------|------------------|--------------------|------------------|--------------------|
|                                    | 1-Year Lookback   | 5-Year Lookback    | 1-Year Lookback  | 5-Year Lookback    |
|                                    | n=               | n=                 | n=               | n=                 |
| Brain injury, n (%)                |                  |                    |                  |                    |
| Anxiety and mood disorders, n (%)  |                  |                    |                  |                    |
| Headaches and migraines, n (%)     |                  |                    |                  |                    |
| Psychosis-related disorders, n (%) |                  |                    |                  |                    |
| Sleep disorders, n (%)             |                  |                    |                  |                    |
| Pain disorders, n (%)              |                  |                    |                  |                    |
| TMJ disorders, n (%)               |                  |                    |                  |                    |
## Analysis Plan (continued)

**Table 4a.** Physician visits during the two years following the index date among patients in the Confirmed Concussion Cohort, by index year

| Physician Specialty | Overall | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 |
|---------------------|---------|------|------|------|------|------|------|
|                     | N=      | N=   | n=   | n=   | n=   | n=   | n=   |
| Number of GP/FP/pediatrician visits | | | | | | | |
| Mean (± SD) | | | | | | | |
| Median (IQR) | | | | | | | |
| Number of specialist visits | | | | | | | |
| Overall | | | | | | | |
| Mean (± SD) | | | | | | | |
| Median (IQR) | | | | | | | |
| General surgery | | | | | | | |
| Mean (± SD) | | | | | | | |
| Median (IQR) | | | | | | | |
| Neurosurgery | | | | | | | |
| Mean (± SD) | | | | | | | |
| Median (IQR) | | | | | | | |
| Plastic surgery | | | | | | | |
| Mean (± SD) | | | | | | | |
| Median (IQR) | | | | | | | |
| Neurology | | | | | | | |
| Mean (± SD) | | | | | | | |
| Median (IQR) | | | | | | | |
| Psychiatry | | | | | | | |
| Mean (± SD) | | | | | | | |
| Median (IQR) | | | | | | | |
| Ophthalmology | | | | | | | |
| Mean (± SD) | | | | | | | |
| Median (IQR) | | | | | | | |
| Otolaryngology | | | | | | | |
| Mean (± SD) | | | | | | | |
| Median (IQR) | | | | | | | |
| Paediatrics | | | | | | | |
| Mean (± SD) | | | | | | | |
| Median (IQR) | | | | | | | |
| Physical medicine | | | | | | | |
| Mean (± SD) | | | | | | | |
| Median (IQR) | | | | | | | |
| Optometrists | | | | | | | |
| Mean (± SD) | | | | | | | |
| Median (IQR) | | | | | | | |
### Analysis Plan (continued)

**Table 4b.** Physician visits during the two years following the index date among patients in the Suspected Concussion Cohort, by index year

| Physician Specialty | Overall | 2008 N= | 2009 n= | 2010 n= | 2011 n= | 2012 n= | 2013 n= |
|---------------------|---------|---------|---------|---------|---------|---------|---------|
| Number of GP/FP/paediatrician visits | Overall | | | | | | |
| Mean (± SD) | | | | | | | |
| Median (IQR) | | | | | | | |
| Number of specialist visits | Overall | | | | | | |
| Mean (± SD) | | | | | | | |
| Median (IQR) | | | | | | | |
| General surgery | | | | | | | |
| Mean (± SD) | | | | | | | |
| Median (IQR) | | | | | | | |
| Neurosurgery | | | | | | | |
| Mean (± SD) | | | | | | | |
| Median (IQR) | | | | | | | |
| Plastic surgery | | | | | | | |
| Mean (± SD) | | | | | | | |
| Median (IQR) | | | | | | | |
| Neurology | | | | | | | |
| Mean (± SD) | | | | | | | |
| Median (IQR) | | | | | | | |
| Psychiatry | | | | | | | |
| Mean (± SD) | | | | | | | |
| Median (IQR) | | | | | | | |
| Ophthalmology | | | | | | | |
| Mean (± SD) | | | | | | | |
| Median (IQR) | | | | | | | |
| Otolaryngology | | | | | | | |
| Mean (± SD) | | | | | | | |
| Median (IQR) | | | | | | | |
| Paediatrics | | | | | | | |
| Mean (± SD) | | | | | | | |
| Median (IQR) | | | | | | | |
| Physical medicine | | | | | | | |
| Mean (± SD) | | | | | | | |
| Median (IQR) | | | | | | | |
| Optometrists | | | | | | | |
| Mean (± SD) | | | | | | | |
| Median (IQR) | | | | | | | |
## Analysis Plan (continued)

**Table 5a.** Wait times for physician visits during the two years following the index date among patients in the Confirmed Concussion Cohort, by index year

| Physician Specialty          | Overall | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 |
|------------------------------|---------|------|------|------|------|------|------|
| Time to GP/FP/paediatrician visit (days) |         |      |      |      |      |      |      |
| Mean (± SD)                  |         |      |      |      |      |      |      |
| Median (IQR)                |         |      |      |      |      |      |      |
| Time to specialist visits (days) |         |      |      |      |      |      |      |
| Overall                      |         |      |      |      |      |      |      |
| Mean (± SD)                  |         |      |      |      |      |      |      |
| Median (IQR)                |         |      |      |      |      |      |      |
| General surgery             |         |      |      |      |      |      |      |
| Mean (± SD)                  |         |      |      |      |      |      |      |
| Median (IQR)                |         |      |      |      |      |      |      |
| Neurosurgery                |         |      |      |      |      |      |      |
| Mean (± SD)                  |         |      |      |      |      |      |      |
| Median (IQR)                |         |      |      |      |      |      |      |
| Plastic surgery             |         |      |      |      |      |      |      |
| Mean (± SD)                  |         |      |      |      |      |      |      |
| Median (IQR)                |         |      |      |      |      |      |      |
| Neurology                   |         |      |      |      |      |      |      |
| Mean (± SD)                  |         |      |      |      |      |      |      |
| Median (IQR)                |         |      |      |      |      |      |      |
| Psychiatry                  |         |      |      |      |      |      |      |
| Mean (± SD)                  |         |      |      |      |      |      |      |
| Median (IQR)                |         |      |      |      |      |      |      |
| Ophthalmology               |         |      |      |      |      |      |      |
| Mean (± SD)                  |         |      |      |      |      |      |      |
| Median (IQR)                |         |      |      |      |      |      |      |
| Otolaryngology              |         |      |      |      |      |      |      |
| Mean (± SD)                  |         |      |      |      |      |      |      |
| Median (IQR)                |         |      |      |      |      |      |      |
| Paediatrics                 |         |      |      |      |      |      |      |
| Mean (± SD)                  |         |      |      |      |      |      |      |
| Median (IQR)                |         |      |      |      |      |      |      |
| Physical medicine           |         |      |      |      |      |      |      |
| Mean (± SD)                  |         |      |      |      |      |      |      |
| Median (IQR)                |         |      |      |      |      |      |      |
| Optometrists                |         |      |      |      |      |      |      |
| Mean (± SD)                  |         |      |      |      |      |      |      |
| Median (IQR)                |         |      |      |      |      |      |      |
| Table 5b. | wait times for physician visits during the two years following the index date among patients in the Suspected Concussion Cohort, by index year |
|-----------|-----------------------------------------------------------------------------------------------------------------------------------|
| **Physician Specialty** | **Overall** | **2008** | **2009** | **2010** | **2011** | **2012** | **2013** |
| Time to GP/FP/paediatrician visit (days) | Mean (± SD) | Median (IQR) |
| Time to specialist visit (days) | Overall | Mean (± SD) | Median (IQR) |
| General surgery | Mean (± SD) | Median (IQR) |
| Neurosurgery | Mean (± SD) | Median (IQR) |
| Plastic surgery | Mean (± SD) | Median (IQR) |
| Neurology | Mean (± SD) | Median (IQR) |
| Psychiatry | Mean (± SD) | Median (IQR) |
| Ophthalmology | Mean (± SD) | Median (IQR) |
| Otolaryngology | Mean (± SD) | Median (IQR) |
| Paediatrics | Mean (± SD) | Median (IQR) |
| Physical medicine | Mean (± SD) | Median (IQR) |
| Optometrists | Mean (± SD) | Median (IQR) |
Analysis Plan (continued)

To be discussed ...
## APPENDIX 1. ICD-10 diagnosis codes for concussion or head injury

| Code | Description |
|------|-------------|
| S00  | Superficial injury of head |
| S01  | Open wound of head |
| S02.0| Fracture of vault of skull |
| S02.1| Fracture of base of skull |
| S02.3| Fracture of orbital floor |
| S02.7| Multiple fractures involving skull and facial bones |
| S02.8| Fractures of other specified skull and facial bones |
| S02.9| Fracture of unspecified skull and facial bones |
| S04.0| Injury of optic nerve and pathways |
| S06  | Intracranial injury |
| S07  | Crushing injury of head |
| T02.0| Fractures involving head with neck |
| T90.2| Sequelae of fracture of skull and facial bones |
| T90.3| Sequelae of injury of cranial nerves |
| T90.4| Sequelae of injury of eye and orbit |
| T90.5| Sequelae of intracranial injury |
| T90.6| |
| T90.7| |
| T90.8| Sequelae of other specified injuries of head |
| T90.9| Sequelae of unspecified injury of head |
## APPENDIX 2. OHIP codes for trauma-related diagnoses

| Code | Description                                                                                           |
|------|--------------------------------------------------------------------------------------------------------|
| 803  | Fractures and fracture-dislocations - skull                                                           |
| 805  | Fractures and fracture-dislocations - vertebral column - without spinal cord damage                    |
| 806  | Fractures and fracture-dislocations - vertebral column - with spinal cord damage                        |
| 807  | Fractures and fracture-dislocations - ribs                                                             |
| 808  | Fractures and fracture-dislocations - pelvis                                                           |
| 810  | Fractures and fracture-dislocations - clavicle                                                         |
| 812  | Fractures and fracture-dislocations - humerus                                                          |
| 813  | Fractures and fracture-dislocations - radius and/or ulna                                               |
| 814  | Fractures and fracture-dislocations - carpal bones                                                    |
| 815  | Fractures and fracture-dislocations - metacarpals                                                     |
| 816  | Fractures and fracture-dislocations - phalanges - foot or hand                                        |
| 821  | Fractures and fracture-dislocations - femur                                                           |
| 824  | Fractures and fracture-dislocations - ankle                                                           |
| 829  | Fractures and fracture-dislocations - other fractures                                                  |
| 831  | Dislocations - shoulder                                                                                |
| 832  | Dislocations - elbow                                                                                  |
| 834  | Dislocations - finger                                                                                  |
| 839  | Dislocations - other dislocations                                                                      |
| 840  | Sprains, strains and other trauma - shoulder, upper arm                                                |
| 842  | Sprains, strains and other trauma - wrist, hand, fingers                                               |
| 844  | Sprains, strains and other trauma - knee, leg                                                          |
| 845  | Sprains, strains and other trauma - ankle, foot, toes                                                  |
| 847  | Sprains, strains and other trauma - neck, low back, coccyx                                              |
| 848  | Sprains, strains and other trauma - other sprains and strains                                          |
| 869  | Sprains, strains and other trauma - other head injuries                                               |
| 879  | Sprains, strains and other trauma - lacerations, open wounds - except limbs                           |
| 884  | Sprains, strains and other trauma - lacerations, open wounds, traumatic amputations - upper limb(s)    |
| 894  | Sprains, strains and other trauma - lacerations, open wounds, traumatic amputations - lower limb(s)    |
| 959  | Sprains, strains and other trauma - other injuries or trauma                                          |
# APPENDIX 3. OHIP diagnosis codes for neurological complaints

| Code | Description |
|------|-------------|
| 306  | Neuroses and personality disorders - psychosomatic disturbances |
| 307  | Neuroses and personality disorders - habit spasms, tics, stuttering, tension headaches, anorexia nervosa, sleep disorders, enuresis |
| 368  | Eye - amblyopia, visual field defects |
| 388  | Ear and mastoid - wax or cerumen in ear, other disorders of ear and mastoid, tinnitus |
| 780  | Signs and symptoms not yet diagnosed - convulsions, ataxia, vertigo, headache, except tension headache and migraine |
| 781  | Signs and symptoms not yet diagnosed - leg cramps, leg pain, muscle pain, joint pain, arthralgia, joint swelling, masses |
# APPENDIX 4. Codes for specialists of interest

| Code | Description                        |
|------|------------------------------------|
| 00   | Family practice and general practice |
| 04   | Neurosurgery                       |
| 08   | Plastic surgery                    |
| 18   | Neurology                          |
| 19   | Psychiatry                          |
| 23   | Ophthalmology                      |
| 24   | Otolaryngology                     |
| 26   | Paediatrics                        |
| 31   | Physical medicine                  |
| 56   | Optometrists                        |
### APPENDIX 5 Codes for comorbidities of interest

| Comorbidity                          | Code Type | Code and Description |
|--------------------------------------|-----------|----------------------|
| **Brain injury**                     | OHIP      | 850............Concussion  
|                                      |           | 854............Other head injuries |
| **Anxiety and mood disorders**       | OHIP      | 296............Manic depressive psychosis, involutional melancholia  
|                                      |           | 300............Anxiety neurosis, hysteria, neurasthenia, obsessive compulsive neurosis, reactive depression  
|                                      |           | 301............Personality disorders (e.g., paranoid personality, schizoid personality, obsessive compulsive personality)  
|                                      |           | 307............Habit spasms, tics, stuttering, tension headaches, anorexia nervosa, sleep disorders, enuresis  
|                                      |           | 309............Adjustment reaction  
|                                      |           | 311............Depressive or other non-psychotic disorders, not elsewhere classified |
| **ICD-10**                           |           | F30............Manic episode  
|                                      |           | F31............Bipolar affective disorder  
|                                      |           | F32............Depressive episode  
|                                      |           | F33............Recurrent depressive disorder  
|                                      |           | F34............Persistent mood [affective] disorders  
|                                      |           | F35............Other mood disorders  
|                                      |           | F39............Unspecified mood [affective] disorder  
|                                      |           | F41............Other anxiety disorders  
|                                      |           | F42............Obsessive-compulsive disorder  
|                                      |           | F43............Reaction to severe stress, and adjustment disorders  
|                                      |           | F45............Somatoform disorders  
|                                      |           | F48............Other neurotic disorders  
|                                      |           | F60............Specific personality disorders  
|                                      |           | F99............Mental disorder, not otherwise specified |
| **Headaches and migraines**          | OHIP      | 346............Migraine  
|                                      |           | 784............Headache |
| **Psychosis-related disorders**      | OHIP      | 295............Schizophrenia  
|                                      |           | 297............Manic depressive psychosis, involutional melancholia |
| **ICD-10**                           |           | F20............Schizophrenia  
|                                      |           | F21............Schizotypal disorder  
|                                      |           | F22............Persistent delusional disorders  
|                                      |           | F23............Acute and transient psychotic disorders  
|                                      |           | F24............Induced delusional disorder  
|                                      |           | F25............Schizoaffective disorders  
|                                      |           | F28............Other nonorganic psychotic disorders  
|                                      |           | F29............Unspecified nonorganic psychosis |
| **Sleep disorders**                  | OHIP      | 307............Habit spasms, tics, stuttering, tension headaches, anorexia nervosa, sleep disorders, enuresis  
|                                      |           | 729.1............Myositis plain and trauma  
|                                      |           | 780............Insomnia |
| **Pain disorders**                   | OHIP      | 338 ............ Chronic Pain  
|                                      |           | 729.1............Myositis plain and trauma  
|                                      |           | 780 ............ Insomnia  
|                                      |           | Convulsions, ataxia, vertigo, headache, except tension headache and migraine |
| **TMJ disorders**                    | OHIP      | 524............Prognathism, micrognathism, macrognathism, retrognathism, malocclusion, temporomandibular joint disorders |
| **Vestibular disorders**             | OHIP      | 379............Other disorders of the eye  
|                                      |           | 380............Otitis externa  
|                                      |           | 381............Serous otitis media, eustachian tube disorders  
|                                      |           | 382............Suppurative otitis media  
|                                      |           | 383............Mastoiditis  
|                                      |           | 384............Perforation of tympanic membrane  
|                                      |           | 386............Meniere’s disease, labyrinthitis  
|                                      |           | 387............Otosclerosis  
|                                      |           | 389............Deafness  
|                                      |           | 780............Convulsions, ataxia, vertigo, headache, except tension headache and migraine  
|                                      |           | 781............Leg cramps, leg pain, muscle pain, joint pain, arthralgia, joint swelling, masses |
| **Neurological disorders**           | OHIP      | 331 ............ Other cerebral degenerations  
|                                      |           | 332 ............ Parkinson’s |
| Code | Description                                                                 |
|------|-----------------------------------------------------------------------------|
| 333  | Abnormal movement disorders                                                 |
| 340  | Multiple Sclerosis                                                          |
| 345  | Epilepsy                                                                    |
| 349  | Unspecified disorders of the nervous system                                  |
| 352  | Disorders of other cranial nerves                                           |
| 377  | Optic neuritis                                                              |
| 434  | Occlusion of cerebral arteries                                              |
| 805  | Fractures and fracture-dislocations - vertebral column - without spinal cord damage |
| 806  | Fractures and fracture-dislocations - vertebral column - with spinal cord damage |

| Category         | Code | Description                      |
|------------------|------|----------------------------------|
| Substance abuse  | OHIP | 303 Alcoholism                   |
|                  |      | 305 Tobacco abuse                |
## Data & Analytic Services

### Dataset Creation Plan

**APPENDIX 6. OHIP fee codes for follow-up physician visits**

| Code  | Description                                                                 |
|-------|-----------------------------------------------------------------------------|
| A100  | General/Family physician emergency department assessment                      |
| A181  | Neurology - complex medical specific re-assessment                           |
| A183  | Neurology - medical specific assessment                                      |
| A184  | Neurology - medical specific re-assessment                                    |
| A185  | Neurology - consultation                                                     |
| A186  | Neurology - repeated consultation                                            |
| A188  | Neurology - partial assessment                                               |
| A190  | Psychiatry - special psychiatric consultation                                 |
| A195  | Psychiatry - consultation                                                    |
| A230  | Ophthalmology - orthoptic assessment                                         |
| A231  | Ophthalmology - neuro-ophthalmology consultation                            |
| A233  | Ophthalmology - specific assessment                                          |
| A236  | Ophthalmology - repeat consultation                                          |
| A243  | Otolaryngology - specific assessment                                         |
| A245  | Otolaryngology - consultation                                                |
| A246  | Otolaryngology - repeat consultation                                         |
| A252  | Ophthalmology - initial vision rehabilitation assessment                      |
| A254  | Ophthalmology - follow-up vision rehabilitation assessment                    |
| A313  | Physical medicine & rehabilitation - medical specific assessment             |
| A385  | Neurology - limited consultation                                             |
| A425  | Physical medicine & rehabilitation - comprehensive physical medicine and rehabilitation consultation |
| A511  | Complex physiatry assessment                                                  |
| A680  | Family practice & practice in general - initial assessment - substance abuse  |
| A695  | Psychiatry - neurodevelopmental consultation                                  |
| A888  | Emergency department equivalent - partial assessment                         |
| A895  | Psychiatry - consultation in association with special visit to a hospital in-patient, long-term care in-patient or emergency department patient |
| A911  | Special family and general practice consultation                              |
| A912  | Comprehensive family and general practice consultation                       |
| A917  | Sport medicine focused practice assessment                                   |
| C005  | Non-emergency hospital in-patient services - family practice & practice in general - consultation |
| C263  | Non-emergency hospital in-patient services - paediatrics - medical specific assessment |
| C265  | Non-emergency hospital in-patient services - paediatrics - consultation      |
| G790  | Acquired brain injury management - first day (neurosurgery)                  |
| H055  | Emergency department - physician on duty - consultation                      |
| H313  | Physical medicine & rehabilitation - rehabilitation counselling              |
| K004  | Family practice & practice in general - psychotherapy - 2 or more family members in attendance at the same time |
| K005  | Family practice & practice in general - primary mental health care - individual care |
| K007  | Family practice & practice in general - psychotherapy - individual care      |
| K010  | Family practice & practice in general - psychotherapy - additional units per member (maximum 6 units per patient per day) |
| K012  | Family practice & practice in general - psychotherapy - 4 people             |

... continued on next page
## APPENDIX 6. OHIP fee codes for follow-up physician visits (continued)

| Code | Description                                                                                   |
|------|---------------------------------------------------------------------------------------------|
| K013 | Family practice & practice in general - counselling - first three units of k013 and k040 combined per patient per provider per 12 month period |
| K019 | Family practice & practice in general - psychotherapy - 2 people                           |
| K020 | Family practice & practice in general - psychotherapy - 3 people                            |
| K024 | Family practice & practice in general - psychotherapy - 5 people                            |
| K025 | Family practice & practice in general - psychotherapy - 6 to 12 people                       |
| K032 | Specific neurocognitive assessment                                                           |
| K033 | Family practice & practice in general - counselling - additional units per patient per provider per 12 month period |
| K037 | Family practice & practice in general - fibromyalgia/chronic fatigue syndrome care           |
| K040 | Family practice & practice in general - counselling - where no group members have received more than 3 units of any counselling Paid under codes k013 and k040 combined per provider per 12 month period |
| K041 | Family practice & practice in general - counselling - additional units where any group member has received 3 or more units of any Counselling paid under codes k013 and k040 combined per provider per 12 Month period |
| K623 | Family practice & practice in general - certification of mental illness - application for psychiatric assessment |
| K624 | Family practice & practice in general - certification of mental illness - certification of involuntary admission |
| K629 | Family practice & practice in general - certification of mental illness - all other re-certification(s) of involuntary admission including completion of appropriate forms |
| Code | Description                                                                 |
|------|-----------------------------------------------------------------------------|
| G414 | Routine EEG                                                                 |
| G540 | Prolonged EEG monitoring                                                    |
| X001 | Diagnostic radiology - skull - four views                                  |
| X009 | Diagnostic radiology - skull - five or more views                           |
| X188 | Diagnostic radiology - computed tomography - head - with and without IV contrast |
| X400 | Diagnostic radiology - computed tomography - head - without IV contrast    |
| X401 | Diagnostic radiology - computed tomography - head - with IV contrast       |
| X402 | Diagnostic radiology - computed tomography - complex head - without IV contrast |
| X405 | Diagnostic radiology - computed tomography - complex head - with IV contrast |
| X408 | Diagnostic radiology - computed tomography - complex head - with and without IV contrast |