

New Zealand Injury Prevention Strategy
Rautaki Arai Whara o Aotearoa

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**A Chartbook of the New Zealand Injury Prevention
Strategy Serious Injury Outcome Indicators
for Maori: 1996-2009**



A Chartbook of the NZIPS Serious Injury Outcome Indicators for Māori: 1996-2009

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Contents

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Acknowledgements.....	iv
Foreword.....	v
Abbreviations.....	vi
Summary of the charts – key highlights of the chartbook	vii
Frequencies	vii
Age standardised rates	viii
Part 1: Background and Methods.....	1
1.1 The New Zealand Injury Prevention Strategy	2
1.2 What is a serious injury?.....	2
1.3 The indicators.....	3
1.4 Serious injury indicators for Māori.....	3
1.5 What the chartbook comprises.....	4
1.6 Frequently Asked Questions	5
1.7 Interpretation of the charts	9
Part 2: The Charts	10
2.1 All injury.....	11
2.2 Assault.....	14
2.3 Work-related injury.....	16
2.4 Intentional self-harm.....	17
2.5 Falls.....	19
All ages	19
0-74 years of age.....	21
75+ years of age.....	23
2.6 Motor Vehicle Traffic Crashes (MVTC).....	25
References.....	28
Appendix – Tables	29

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Foreword

Presented here is a chartbook of the New Zealand Injury Prevention Strategy serious injury outcome indicators for Māori. This is the third in a series. The development of the all population indicators was described in the report:

Cryer C, Langley J, Stephenson S. Developing valid injury indicators. [A report for the New Zealand Injury Prevention Strategy. Injury Prevention Research Unit Occasional Report OR 049, Dunedin: University of Otago, September 2004](#)

The specifications of the indicators for Māori were proposed by the authors of the first chartbook report, following consultation with Tony Blakely (University of Otago, Wellington) and Bridget Robson (Te Rōpū Rangahau Hauora a Eru Pōmare).

The Chartbooks have been developed to provide a measure of New Zealand's progress in reducing the incidence and annual rates of injury since the introduction of the New Zealand Injury Prevention Strategy. The main foci of the Chartbooks are the charts. These charts provide a diagrammatic representation of the changes in the annual incidence and rates of injury, both overall and for each of the six New Zealand Injury Prevention Strategy priority areas. Because the charts are intended to be the main focus of the chartbooks, we have intentionally limited the description of the background and methods surrounding the development of these charts. For more technical detail, please refer to the "[The New Zealand Injury Prevention Strategy Serious Injury Outcome Indicators: Technical Report](#)".

Abbreviations

ACC	Accident Compensation Corporation
Cryer 2004 report	Developing valid injury outcome indicators. A report for the New Zealand Injury Prevention Strategy.
ICD	WHO International Classification of Diseases
ICD-9	WHO International Classification of Diseases 9 th revision
ICD-9-CM	WHO International Classification of Diseases 9 th revision, Clinical Modification
ICD-10	WHO International Classification of Diseases 10 th revision
ICD-10-AM	WHO International Classification of Diseases 10 th revision, Australian Modification
ICISS	ICD-based Injury Severity Score
IPRU	Injury Prevention Research Unit, University of Otago, New Zealand
LTNZ	Land Transport New Zealand
MoH	Ministry of Health
MVTC	Motor Vehicle Traffic Crashes
NMDS	Ministry of Health's National Minimum Data Set of hospital discharges
NZIPS	New Zealand Injury Prevention Strategy
StatsNZ	Statistics New Zealand
SRR	Survival Risk Ratio
Technical Report	The New Zealand Injury Prevention Strategy Serious Injury Outcome Indicators: Technical Report.
WHO	World Health Organisation
WRFIS	Work-Related Fatal Injury Study

Summary of the charts – key highlights of the chartbook

Below is a summary of the overall changes from baseline in the frequency and age standardised rates of serious non-fatal injury and death for ‘All injury’ and each of the six NZIPS priority areas.

Frequencies

The frequency of injury details the number of fatalities or hospitalisations resulting from injury, thereby describing the impact of injury on society.

Injury Area	Fatal trends to 2007	Serious non-fatal trends to 2009	Serious (fatal and non-fatal) trends to 2007
<u>All injury</u>	M(T)I11: Weak evidence of an increase from baseline of 314 to 349 in 2007.	M(T)I01: Increase from the baseline of 1,331 to 1,667 in 2009.	M(T)I21: Increase from the baseline of 1,645 to 1,892 in 2007.
<u>Assault</u>	M(T)A11: No indicators presented	M(T)A01: Increase from baseline	M(T)A21: Increase from baseline
<u>Work related</u>	M(T)W11: No indicators presented	M(T)W01 (provisional indicators): No change from baseline, although this could be the result of reporting behaviour	M(T)W21: No indicators presented
<u>Intentional self harm</u>	M(T)S11: Increase from baseline in 2005 and 2006.	M(T)S01: No indicators presented	M(T)S21: Increase from baseline in 2006 and 2007
<u>Falls</u>	M(T)F11a-c: No indicators presented	M(T)F01a-c: Increase from baseline for all ages, and 75+ age groups. Weak evidence of an increase for the 0-74 age group.	M(T)F21a-c: No detectable change for the all ages and 0-74 age group. Increase from baseline for the 75+ age groups.
<u>MVTC</u>	M(T)M11: No change from baseline.	M(T)M01: Increase from baseline.	M(T)M21: Increase from baseline
<u>Drowning</u>	M(T)D11: No indicators presented	M(T)D01: No indicators presented	M(T)D21: No indicators presented

Age standardised rates

Age standardised rates provide an estimate of an individuals' average annual risk of being injured.

Injury Area	Fatal trends to 2007	Serious non-fatal trends to 2009	Serious (fatal and non-fatal) trends to 2007
<u>All injury</u>	M(T)I12: No detectable change	M(T)I02: In the period 2005 to 2009 there was an increase from baseline.	M(T)I22: Increase from baseline in the period 2005 - 2007.
<u>Assault</u>	M(T)A12: No indicators presented	M(T)A02: Increase from baseline	M(T)A22: Increase from baseline
<u>Work related</u>	M(T)W12: No indicators presented	M(T)W02 (provisional indicators): Decrease from baseline, although this could be the result of reporting behavior.	M(T)W22: No indicators presented
<u>Intentional self harm</u>	M(T)S12: Weak evidence of an increase from baseline in 2005 and 2006.	M(T)S02: No indicators presented	M(T)S22: Increase from baseline in 2006 and 2007
<u>Falls</u>	M(T)F21a-c: No indicators presented	M(T)F02a-c: No increase from baseline for all ages, for 0-74 and for the 75+ age group.	M(T)F22a-c: No change from baseline for all age groups, 0-74 and 75+ age groups.
<u>MVTC</u>	M(T)M12: No change from baseline in 2007	M(T)M02: No change from baseline in 2009	M(T)M22: Increase from baseline in 2007.
<u>Drowning</u>	M(T)D12: No indicators presented	M(T)D02: No indicators presented	M(T)D22: No indicators presented

Part 1: Background and Methods

1.1 The New Zealand Injury Prevention Strategy

The [New Zealand Injury Prevention Strategy \(NZIPS\)](#) is an expression of the Government's commitment to working with organisations and groups in the wider community to improve the country's injury prevention performance.

The broad structure of the strategy includes a vision, principles, goals, objectives and actions. The vision is "a safe New Zealand, becoming injury free", which is supported by two goals:

- to achieve a positive safety culture, and
- to create safe environments.

Ten key objectives are identified which are designed to address the vision and goals of NZIPS. (For further details see www.nzips.govt.nz)

Six priority areas are referred to in the objectives and actions. These priority areas are:

- Assault,
- Workplace injuries,
- Suicide and deliberate self harm,
- Falls,
- Motor vehicle traffic crashes, and
- Drowning and near-drowning.

Serious injury outcome indicators, that include fatal and serious non-fatal injury indicators, have been developed for these areas as the main means of measuring performance in reducing injury. The purpose of this chartbook is to present trends for Māori over the period 1996 to 2009 for each of the NZIPS fatal, serious non-fatal and serious (fatal and non-fatal) injury indicators, for each of these priority areas, in order to judge progress in the prevention of serious injury during the lifetime of the NZIPS. The Chartbook of NZIPS serious injury outcome indicators for Māori is an assertion of the principles of the Treaty of Waitangi, applied with the intention of contributing to positive health gains in Māori injury prevention.

1.2 What is a serious injury?

Serious injuries were those that resulted in death, or an admission to hospital that was associated with at least a 6% chance of death (serious non-fatal injury). Amongst first discharges from hospital (i.e. not including those who are readmitted for the same injury) with a primary diagnosis of injury, approximately 10% have at least a 6% chance of death. The methods by which cases of fatal, serious non-fatal, and serious (fatal and non-fatal) injury are identified are described briefly in the accompanying [Technical Report](#).

1.3 The indicators

The development of the NZIPS indicators is described in the Cryer 2004 [report](#)[1].

The NZIPS fatal and serious non-fatal injury indicators are one of the key indicators to measure the Strategy's progress and impact. In April 2010, lead agencies for the six NZIPS priority areas signed a 'Protocol for government agency reporting on serious injury' (developed by Statistics NZ) which ensures that lead agencies adopt consistent, high level injury measures when reporting on injury trends.

The high threshold of 6% or greater threat to life, used to define serious non-fatal injury, described above, was chosen for the non-fatal injury indicators to reduce the likelihood of producing misleading time trends. For discussion and illustration of this point, see the Cryer 2004 report[1].

The detailed methods used to produce the charts in this chartbook and the indicator specifications are presented in the accompanying [Technical Report](#). These methods and specifications have been adapted from those presented in the Cryer 2004 [report](#)[1].

1.4 Serious injury indicators for Māori

This work has produced a single Chartbook of both the 'proposed' and the 'provisional' injury outcome indicators for Māori, typically for the period 1996 to 2009. The full set of NZIPS serious injury indicators is listed in the [Technical Report](#). Only a subset of indicators were viable for Māori (see Table 1 below).

Unlike the All Population indicators which use 1994 as the starting year, the indicators in the Maori Chartbook use 1996 as the starting year. This deviation was based on two main factors. There was a major change in the recording of ethnicity in the Mortality Collection between 1994 and 1996. Reliable counts are not available for 1995⁷. Additionally, there was a major change in the collection of ethnicity data by hospitals from 1995 to 1996. Morbidity data from 1996 onwards are thought to have a low under-count for Māori, in contrast to the years prior to this. The choice of 1996 as a start year is consistent with practice within Ministry of Health (Craig Wright, MoH, personal correspondence, 8 March 2005).

When calculating rates for Māori, there are difficulties with the comparability of numerators and denominators, which can lead to numerator-denominator bias. One of the challenges was to minimise the effects of this bias on the Maori indicators. An additional problem was that ethnic group classifications within the potential sources of numerator data (death registrations, hospitalisations, ACC claims) and the denominator data (Census and StatsNZ population estimates) have not been constant over time. For example, the ethnicity question in the Census changed from 1991 to 1996, and then changed back to the 1991 format in 2001 (see Appendix C of Statistics New Zealand. Report of the Review of the Measurement of Ethnicity, June 2004) [2]. How the problem of

numerator-denominator bias has been addressed when using death registrations and hospital data is described below ([section 1.6](#)). Note: we were unable to address the problem of numerator-denominator bias when using ACC data alone as numerators and, as such, no indicators have been presented for fatal work related injury.

For the calculation of the indicators, there are practical limitations in regard to numbers of Māori cases for some priority groups, and thus for the precision and viability of the indicators. Viable indicators are shown in Table 1.

For each indicator, where annual average counts during the period 2000-2009 were less than 100, 3-year moving averages were presented. If the 3-year cumulative total number of cases was less than 100, the indicator was regarded as non-viable.

Table 1: The number of viable indicators for Māori for each NZIPS priority area.

Area	Fatals	Serious non-fatals	Serious (Fatal + serious non-fatal)
All injury	✓(2)	✓(2)	✓(2)
Assault	X	✓(2)	✓(2)
Work-related injury	X[a]	✓(2)	X[a]
Intentional self-harm	✓(2)	X	✓(2)
Falls	X	✓(6)	✓(6)
Motor vehicle traffic crashes	✓(2)[b]	✓(2)[b]	✓(2)[b]
Drowning and near-drowning	X	X	X

✓ = number of cases per year makes the indicators viable

X = small numbers of cases makes the indicators non-viable

() = The number in brackets indicates the number of viable indicators.

[a] practical difficulties resulted in these indicators not being produced for this report.

[b] For the MVTC indicators, only 2 fatal, 2 non-fatal, and 2 serious injury indicators are indicated as viable. These are NZIPS indicators M(T)M01, M(T)M02, M(T)M11, M(T)M12, M(T)M21 and M(T)M22 (see Chapter 4, Technical Report). It was not possible to produce the other indicators M13-M18. These rely on data from the Ministry of Transport (MoT) and the classification of Māori was not accurate enough to enable the production of valid indicators.

1.5 What the chartbook comprises

Part 2 presents the charts for the NZIPS fatal and serious non-fatal injury indicators for ‘All injury’ and for five of the six priority areas for Maori. These charts speak largely for themselves, and so only a brief commentary is provided for each. The figures from which the charts are derived have been reproduced as Appendices at the end of this document.

1.6 Frequently Asked Questions

Q What are the validated^a NZIPS serious injury indicators for all injury?

A The validated NZIPS fatal, serious non-fatal, and serious (fatal and non-fatal) injury indicators for ‘all injury’ are as follows:

- Frequency of injury deaths
- Age-standardised injury mortality rate, per 100,000 person-years at risk
- Frequency of serious non-fatal injuries
- Age-standardised serious non-fatal injury incidence rate, per 100,000 person-years at risk
- Frequency of serious (fatal and non-fatal) injuries
- Age-standardised serious (fatal and non-fatal) injury incidence rate, per 100,000 person years at risk.

Age-standardisation is a process of adjusting the rates of injury to account for changes in the age structure of a population over time. It allows comparison of the rates of injury from one year to another, taking into account the changing population.

The methodology for the derivation of the NZIPS fatal, serious non-fatal and serious (fatal and non-fatal) injury indicators for the priority areas included in this Chartbook are based on those for ‘all injury’ (refer [‘Technical Report’](#) for more detail).

Q Why is there a serious (fatal and non-fatal) injury indicator?

A We have supplemented the original NZIPS fatal and serious non-fatal injury indicators with “serious injury indicators”, for which the numerators are the sum of the relevant fatal and serious non-fatal injuries – see the Technical Report. The reason for including these additional indicators is as follows. Where there is a decline in the rates or numbers of fatal injury, one explanation could be improved case-fatality rates, eg. improved emergency medical systems resulting in more cases of serious injury surviving than before. If this is the case, then there would be a shift of cases from the fatal category to serious non-fatal. Thus in order to present a more complete picture, the trends in serious injury (fatal and serious non-fatal injury) have been presented.

Q What data are the indicators based on?

A The majority of these indicators are based on the Ministry of Health’s Mortality Collection[3] and their National Minimum Data Set (NMDS)[4] of hospital discharge

^a The terms ‘validity’ and ‘validated’ refer to the extent that the indicators measure what they are intended to measure (incidence of injury) rather than measuring other factors that may influence injury (admission criteria, funding, hospital policies etc)

data. Provisional indicators for serious non-fatal work related injury are based on Accident Compensation Corporation data linked to NMDS data.

Q What do the frequencies and rates reflect?

A Frequencies reflect the societal burden of injury^b, while rates reflect individual risk of being injured.

Q Why are there provisional indicators?

A Where valid indicators could not be identified, provisional indicators were developed (see Cryer 2004 report)[1]. The provisional serious injury indicators were candidate NZIPS indicators, but had some identifiable threats to validity. In these cases it was considered that the count of injuries based on the data available could be impacted by factors such as reporting behaviour (people being more willing to report the true cause of an injury because of an increased awareness) or monitoring behaviour (more cases being identified because of increased policing, or a cause of injury becoming more of a public health priority).

Prior to the 2010 update of the Chartbook, the serious non-fatal assault and self-harm indicators were considered provisional. However, in an investigation conducted in 2009, it became apparent that there had been no detectable change in the way either assault or self-harm was captured or recorded in the NMDS between 2001 and 2007. As a result, the provisional status for these indicators has been removed.

Q What is the period presented in the charts?

A Wherever possible, the period presented for serious non-fatal injuries for Maori is 1996 to 2009. For fatal injuries, the period presented is 2000 to 2007 (see below). Because many cases of injury related death are required to be reviewed by a Coroner, there is a time delay in the recording of the cause of fatal injury. Hence, 2007 is the most recent year available for the mortality data.

Q How is ethnicity recorded for this chartbook?

A When deriving counts for total Māori^c using Ministry of Health's Mortality Collection and NMDS of hospital discharges, historically there has been an undercount for Māori [6]. For the calculation of these national indicators for the first Māori chartbook, the ever-Māori method was recommended in our discussions with Craig Wright (MoH), Tony Blakely and Bridget Robson (Wellington School of Medical and Health Sciences), and Joanne Baxter (Dunedin School of Medicine), and has been used in some recent reports produced or published by the Ministry of Health

^b In this context, the societal burden of injury is considered to be related to the number of deaths and hospitalisations associated with injury. The majority of injury discharges from hospitals in New Zealand are publicly funded. For 2010 (based on 2006/2007 data) it was estimated that 99.5% of all hospital injury discharges were publicly funded.

^c In 'Total' response output, all cases that indicated Maori ethnicity were recorded as such, irrespective of other ethnicities identified. Because individuals who indicate more than one ethnic group are counted more than once, the sum of the ethnic group populations will exceed the total population of New Zealand.

[5]. We have subsequently used the ever-Maori method to estimate numerators for the serious non-fatal indicators in all Chartbooks, and continue to do so in the current report. A recent publication by the New Zealand Census Mortality Study [6] has revealed that adjusters are no longer required for ethnicity data derived from the Mortality Collection. As such, ethnicity for the fatal indicators is based on that from the Mortality Collection. Because we can only have confidence in Mortality Collection ethnicity data from 2000 onwards however, fatal and serious (fatal and non-fatal) indicator charts have 2000 as the start date.

The ever-Māori method used in the current report allocated Māori ethnicity to an individual according to whether or not any previous admission for patients (as identified by their unique NHI identifiers) had been recorded as Māori in any NMDS admission record (1982-2009), cancer registry record (1948-2009), or on the Mortality Collections (1988-2007). A description of the validation of this method is provided in the Technical Report.

There appears to be an undercount in some years and over count in other years when using the ever-Maori method for classifying Maori ethnicity. However, the direction and slope of injury trends are consistent, whether or not a correction is made. This is also true irrespective of the correction method used (Chapter 5, Technical Report).

Q Why does the Maori Chartbook cover a different period than the other Chartbooks (All population and Children's)?

A The choice of 1996 as the starting year for the serious non-fatal Māori indicators is based on one main factor. There was a major change in the collection of ethnicity data by hospitals from 1995 to 1996. Morbidity data from 1996 onwards are thought to have a low under-count for Māori, in contrast to the years prior to this. The choice of 1996 as a start year is consistent with practice within the Ministry of Health (Craig Wright, MoH, personal correspondence, 8 March 2005).

Q What is the coding scheme used for diagnosis of injury?

A The coding system used for classifying injury diagnosis and cause of injury in the Mortality Collection and NMDS is the World Health Organisation (WHO) International Classification of Diseases (ICD)[7]. During the period considered in these charts, the ICD was substantially revised, and a new version of the coding scheme was introduced (from ICD-9 to ICD-10, refer Technical Report). This change has resulted in differences in the number of deaths and hospitalizations attributable to injury[8]. That is, it is apparent that, for many of the charts, the years before 1999 cannot be compared with the years after 1999.

Readers should exercise caution if commenting on trends that include indicator values based on both ICD-9 and ICD-10 coded data. Accordingly, the commentary will focus on the trends since the implementation of the newest revision ICD-10, ie. from the year 2000 onwards.

Q Why include the years before 2000 in the charts, given that commentary is only provided from 2000 onwards?

A For some of the priority areas, the effect of the changeover is discernable, in others it is not. Since the effects vary for each priority area, we have elected to present the whole of the period from 1996 onwards and let the reader make their own judgments about trends in the period before 2000, and their relevance to the trends from 2000 onwards.

Q What is the significance of the various colours used in the charts?

A The colours used in the charts have been chosen in order to signal the different status of the indicators (NZIPS compared with provisional), as well as the information used to generate the bars in the charts (ICD-9 vs ICD-10 coding).

Blue:	NZIPS fatal, serious non-fatal and serious (fatal and non-fatal) injury indicator (ICD-9).
Green:	NZIPS fatal, serious non-fatal and serious (fatal and non-fatal) injury indicator (ICD-10).
Light brown:	Provisional fatal, serious non-fatal and serious (fatal and non-fatal) indicator (ICD-9).
Brown:	Provisional fatal, serious non-fatal and serious (fatal and non-fatal) injury indicator (ICD-10).

An intermediate colour (teal) was used for the bars for 1999 for indicators based on hospitalisation data, since 1999 was a transitional year when both ICD-9 and ICD-10 coding systems were used.

Q Why are some of the injury indicators presented as a 3-year moving average? What does this mean?

A For some of the fatal, serious non-fatal, and serious (fatal and non-fatal) injury indicators, the numbers of cases attributable to specific NZIPS priority groups fall below 100 per year. In these instances, the numbers fluctuate substantially on a year-to-year basis. Such fluctuations may hide trends in the numbers and rates of injury. In order to overcome this effect, three year moving averages have been estimated. This means, for example, that data from 1996, 1997 and 1998 are used to estimate an indicator value for 1997. Consequently, for the serious non-fatal injury indicators and the serious (fatal and non-fatal) injury indicators, when using 3-year moving averages, the indicator values for 1998 (which use data from 1997, 1998 and 1999), 1999 (which use data from 1998, 1999 and 2000) and 2000 (which uses data from 1999, 2000, and 2001) are presented using an intermediate colour as they are based on both ICD-9 and ICD-10 coded mortality data. For the fatal injury indicators, when using 3-year moving averages, the indicator values for 1999 (which use data from 1998, 1999 and 2000) and 2000 (which uses data from 1999, 2000, and 2001) are presented using an intermediate colour as they are based on both ICD-9 and ICD-10 coded mortality data (ICD9 in 1998 and 1999, ICD10 in 2000 and 2001). For similar reasons, the final years presented in this Chartbook for indicators based on moving averages are: mortality – 2006; serious non-fatal – 2008; serious – 2006.

Q What is the 'baseline'?

A The 'baseline' (horizontal line half way up the graphs) provides a point from which to compare the frequencies and rates of injuries. It is the average count or rate of injury for the three years leading up to the launch of NZIPS (2001-2003). For those indicators where moving averages were used, the baseline is the average count or rate of injury for the five years closest to the launch of NZIPS (2000-2004). The line has been extended across the graphs to provide an easy point of reference for the description of any injury trends. It is this line on which the commentary in this chartbook is based.

Q What are the red lines shown on the graphs and what do these mean?

A Each bar on each chart has confidence intervals shown in red. These give an indication of the amount of random variation associated with a single year's indicator value. Narrow confidence intervals indicate little random variability; wide confidence intervals a lot of random variability. Where wide confidence intervals are displayed, little weight should be given to the variation from one year to the next – it could be due to chance alone.

Confidence intervals are useful when gauging change from one point to another. They may also be useful when examining the frequency or rate of injury in a given year. When considering trends, the amount of overlap of confidence intervals for individual years is important. Confidence intervals that do not overlap from one year to another are indicative of a change. Similarly, confidence intervals that do not overlap the baseline (the years immediately preceding the baseline) are indicative of a change from baseline that is unlikely to be due to chance alone.

Q Why have there been changes in the annual frequencies and rates between this Chartbook and that released in January 2010?

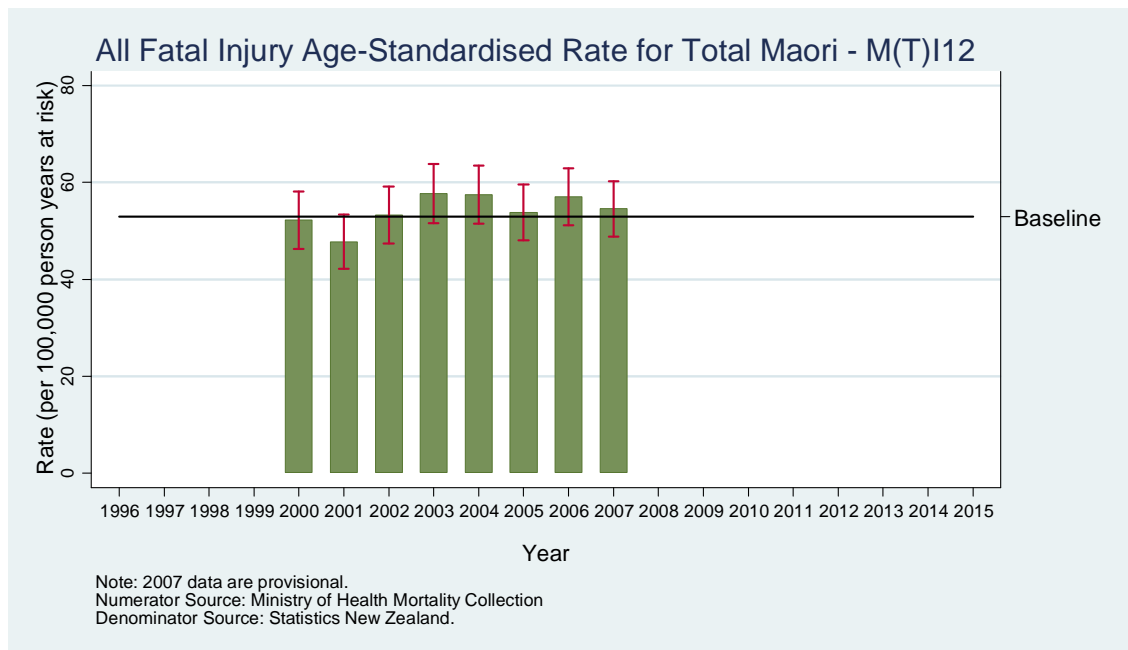
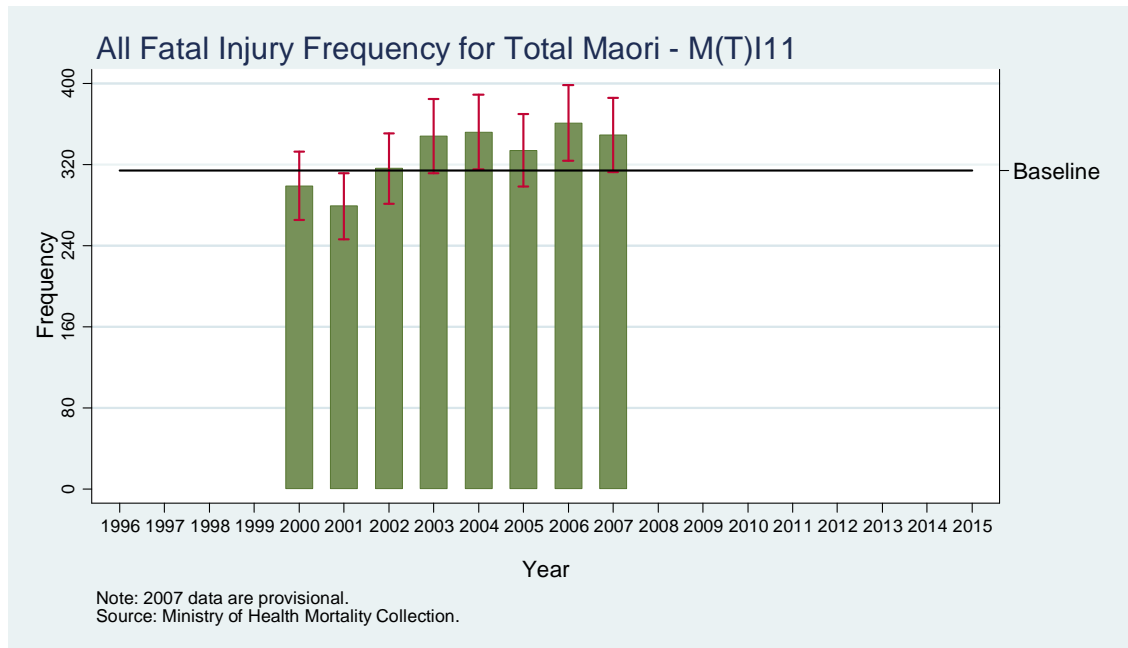
A As described above, the ever-Māori method is used to determine the ethnicity of people admitted to hospital. The process of determining ethnicity is repeated each year as, in New Zealand, it is possible to change your ethnic affiliation. When the ever-Māori method was applied for the current Chartbook, there was an increase in the number of people identified as Māori. Reassuringly, this increase has not resulted in a change in the trends presented in the charts, however, readers will notice an increase in the frequencies of all of the indicators.

1.7 Interpretation of the charts

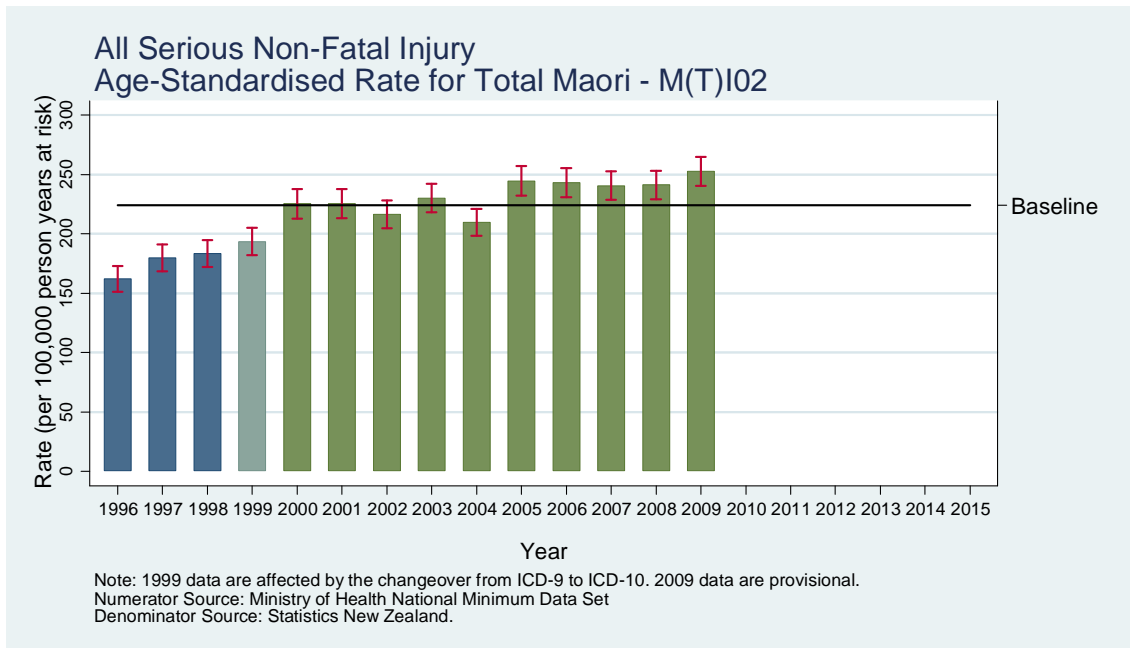
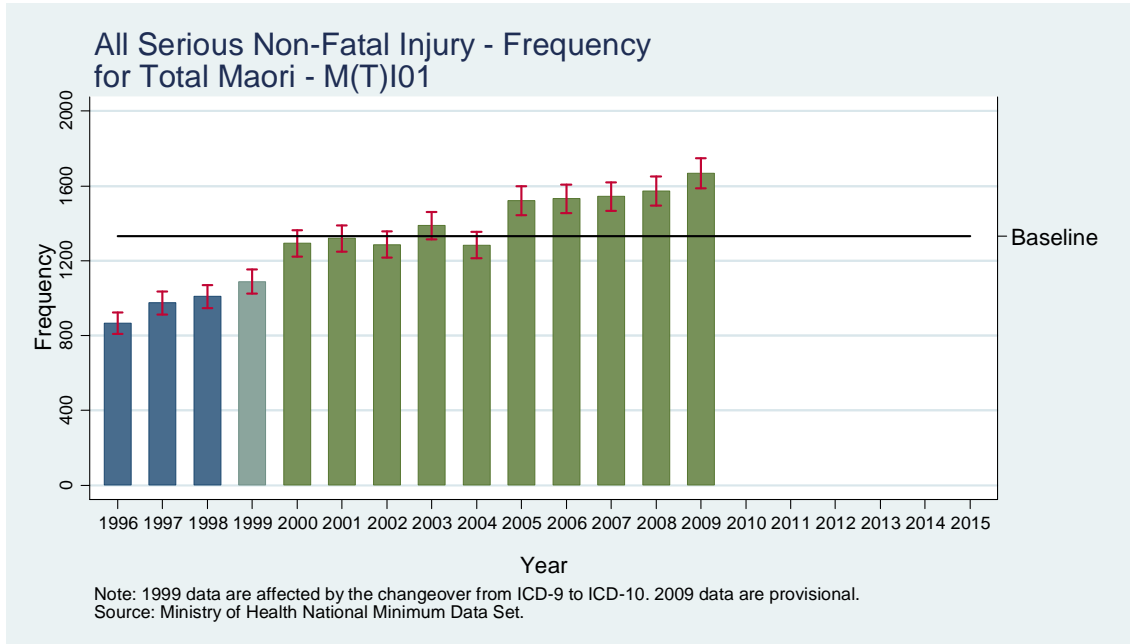
Brief comments on each chart are provided at the foot of each page in Part 2. The interpretations provided are based on a visual inspection (as opposed to formal statistical trend analysis). Within a chart, where the confidence intervals do not overlap the baseline, this is indicative of a change from baseline that is unlikely to be due to chance alone – unless some threats to the validity of the indicator have been identified.

Part 2: The Charts

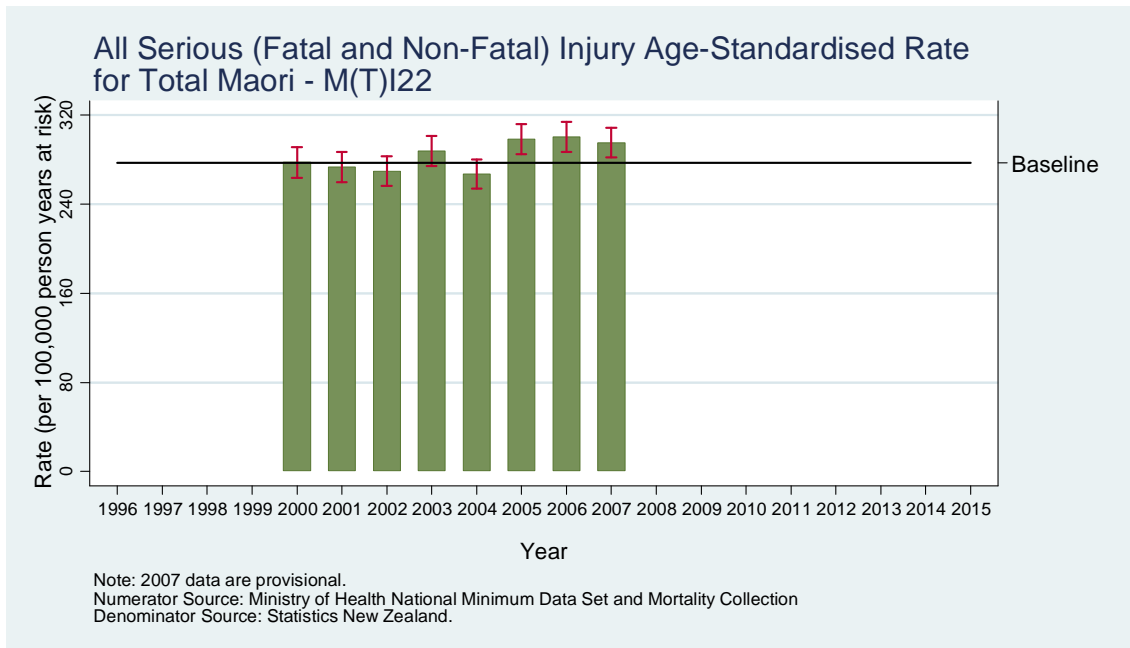
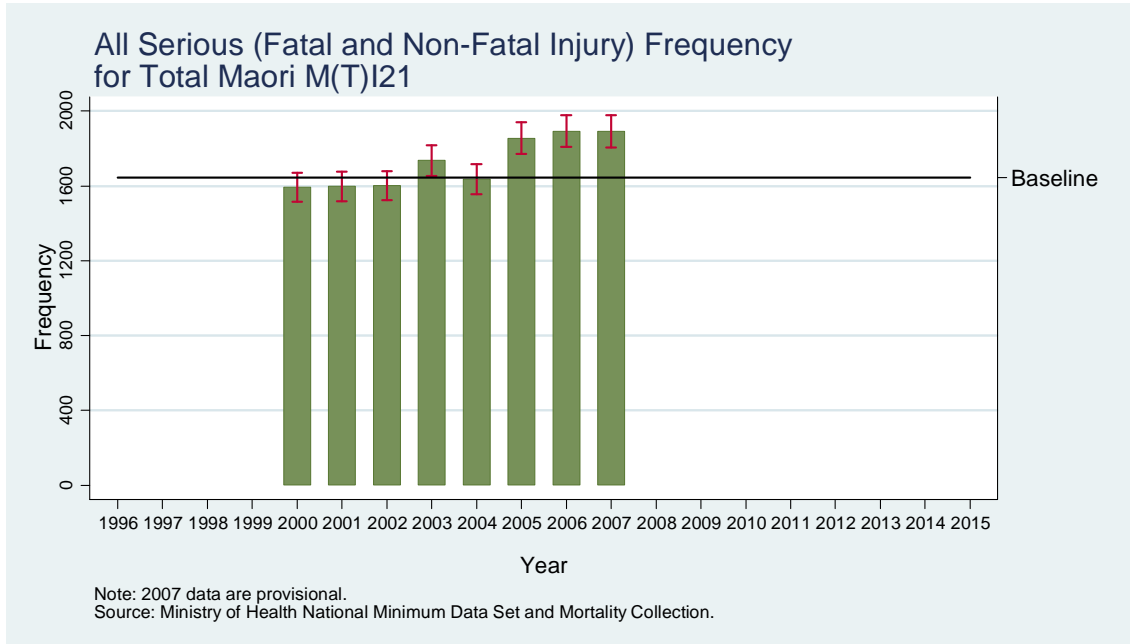
2.1 All injury



The frequencies (M(T)11) and rates (M(T)12) of fatal injury for Māori are variable. There is weak evidence of an increase from baseline for the frequency of fatal injuries in 2006 and 2007, but no clear change from baseline for the rates.

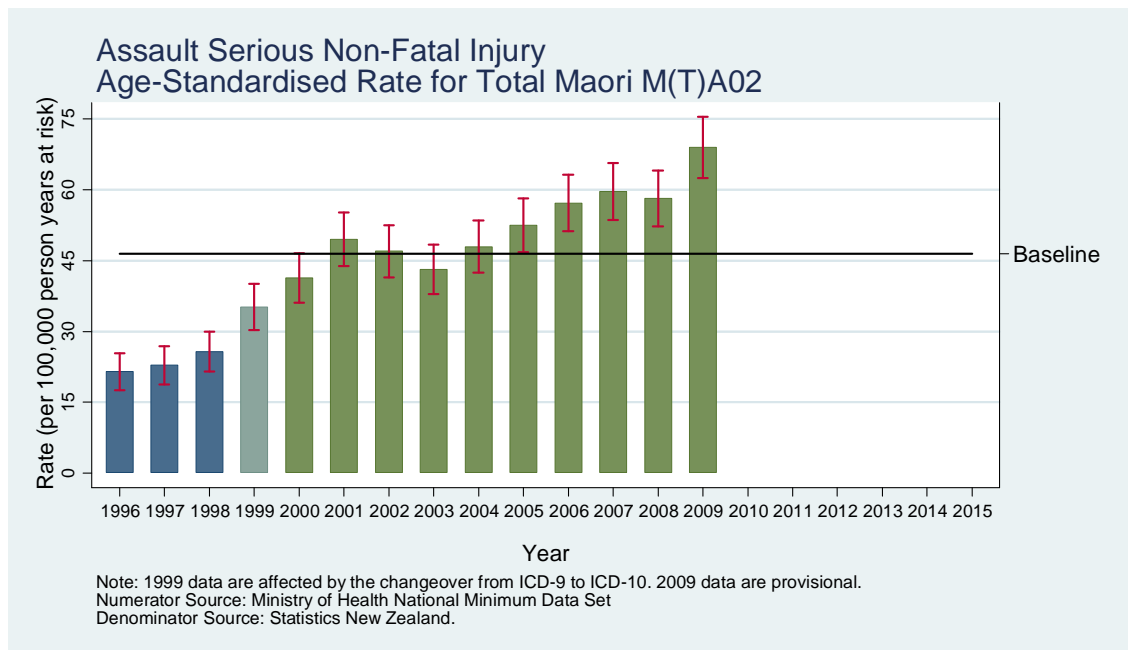
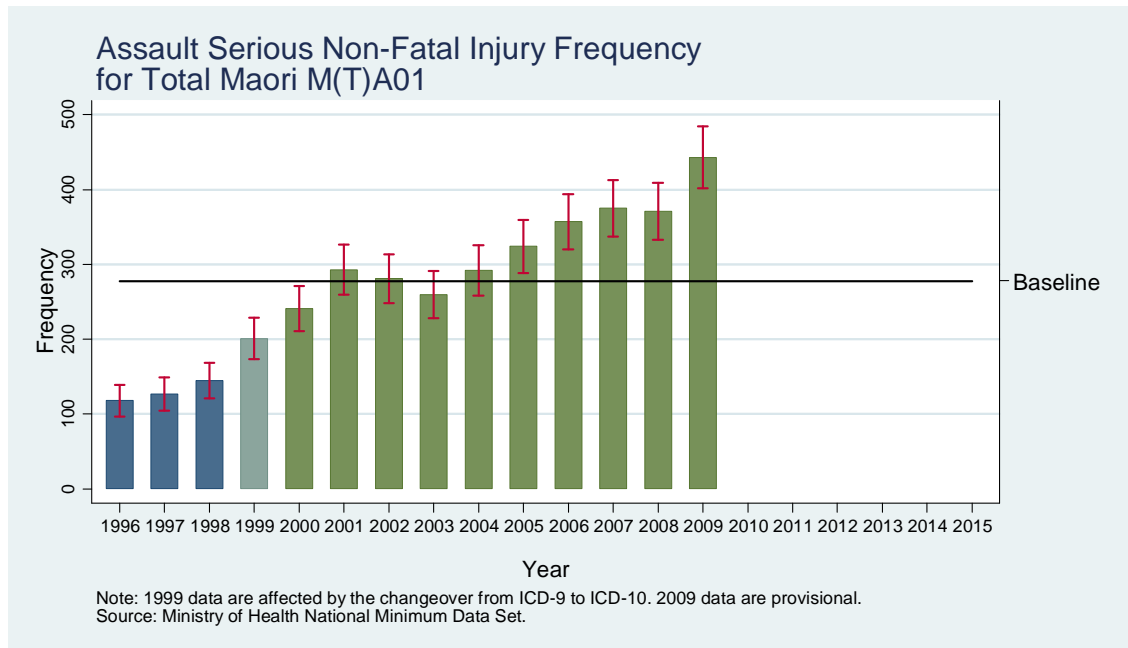


The frequencies (M(T)I01) and rates (M(T)I02) of serious non-fatal injury have consistently remained above the baseline during 2005-2009.

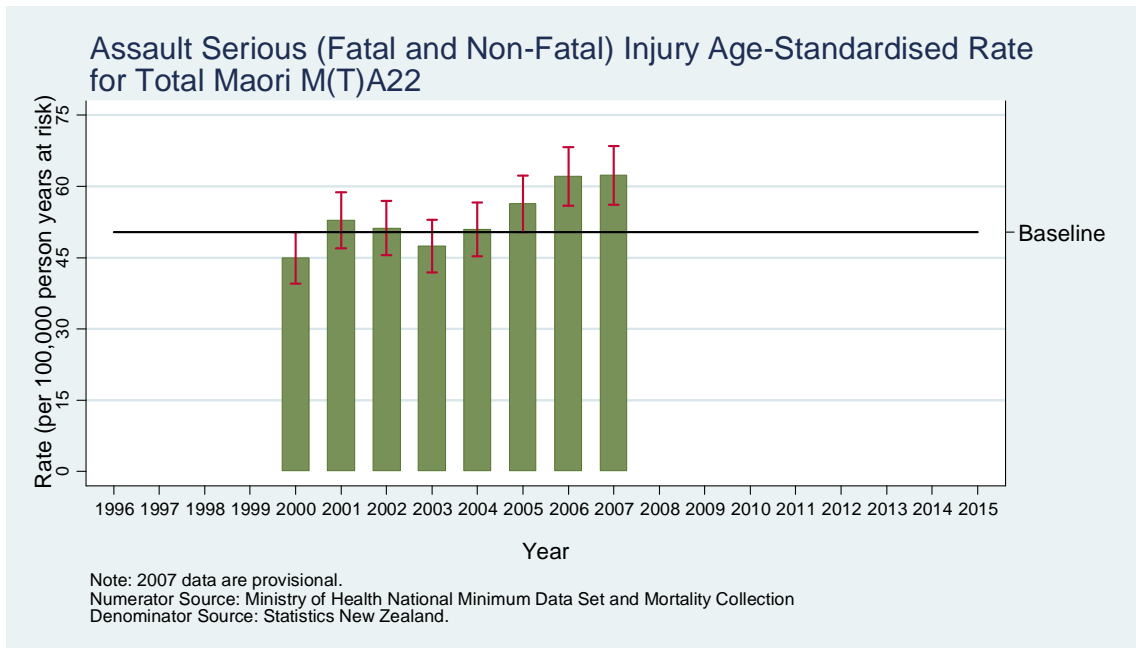
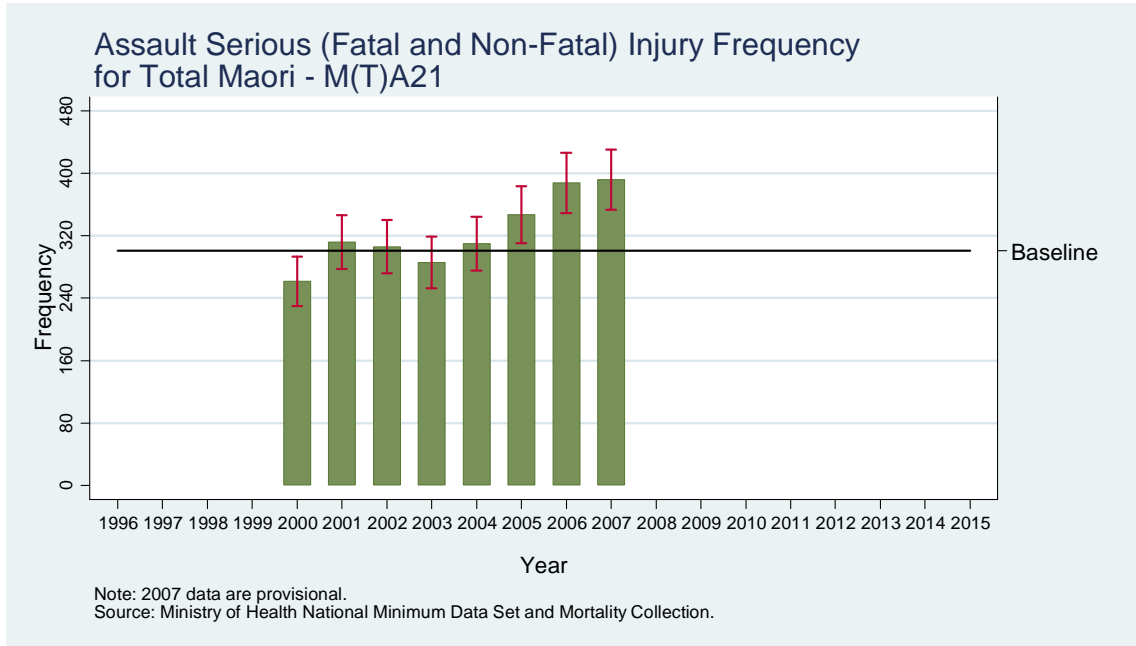


In the most recent years (2005-2007), there is evidence of an increase from baseline in the frequencies (M(T)I21) and rates (M(T)I22) of serious (fatal and non-fatal) injury for Māori.

2.2 Assault

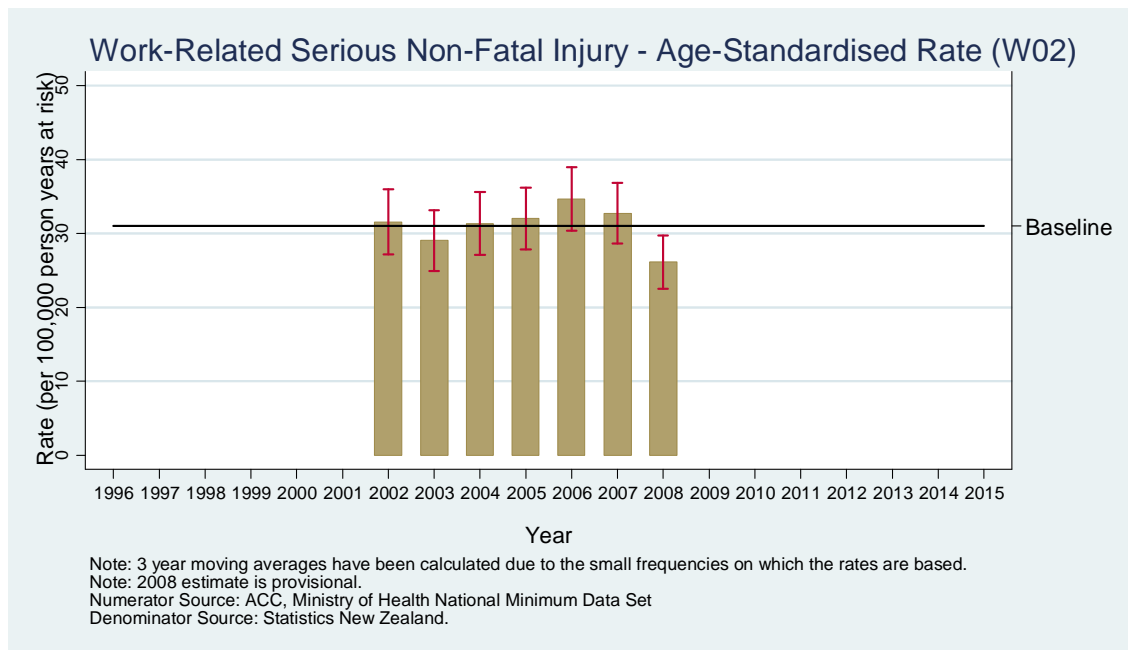
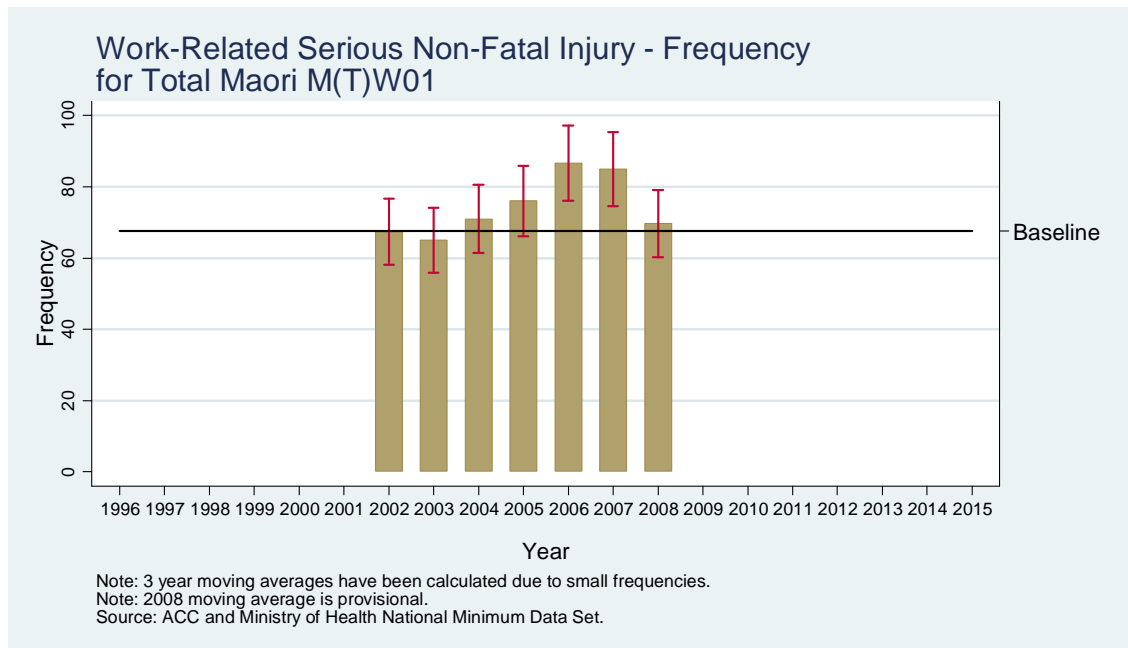


In the period 2005-2009, the frequencies (M(T)A01) and rates (M(T)A02) of serious non-fatal assaultive injuries have been above the baseline.



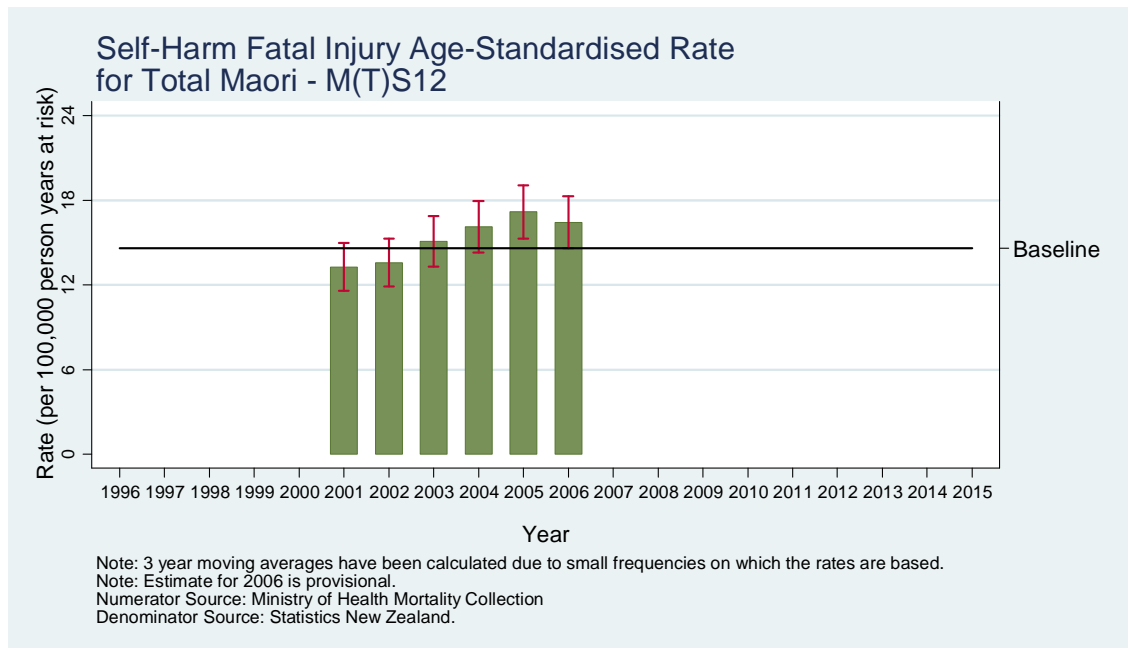
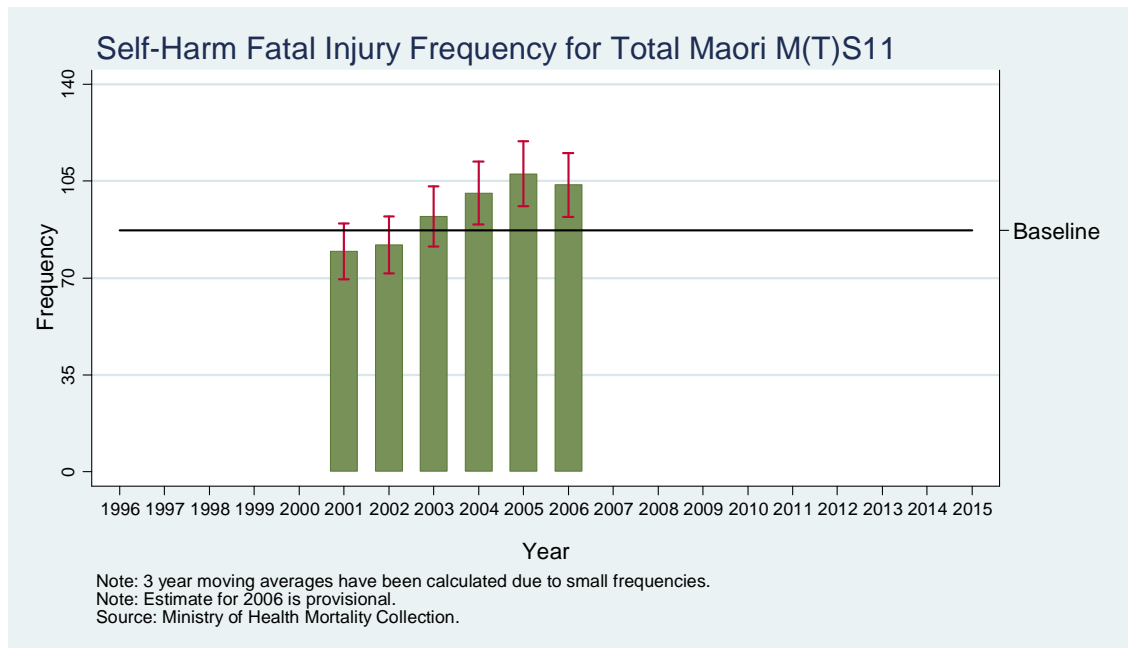
In the period 2005-2007, the frequencies (M(T)A21) and rates (M(T)A22) of serious (fatal and non-fatal) assaultive injury for Māori were above baseline.

2.3 Work-related injury

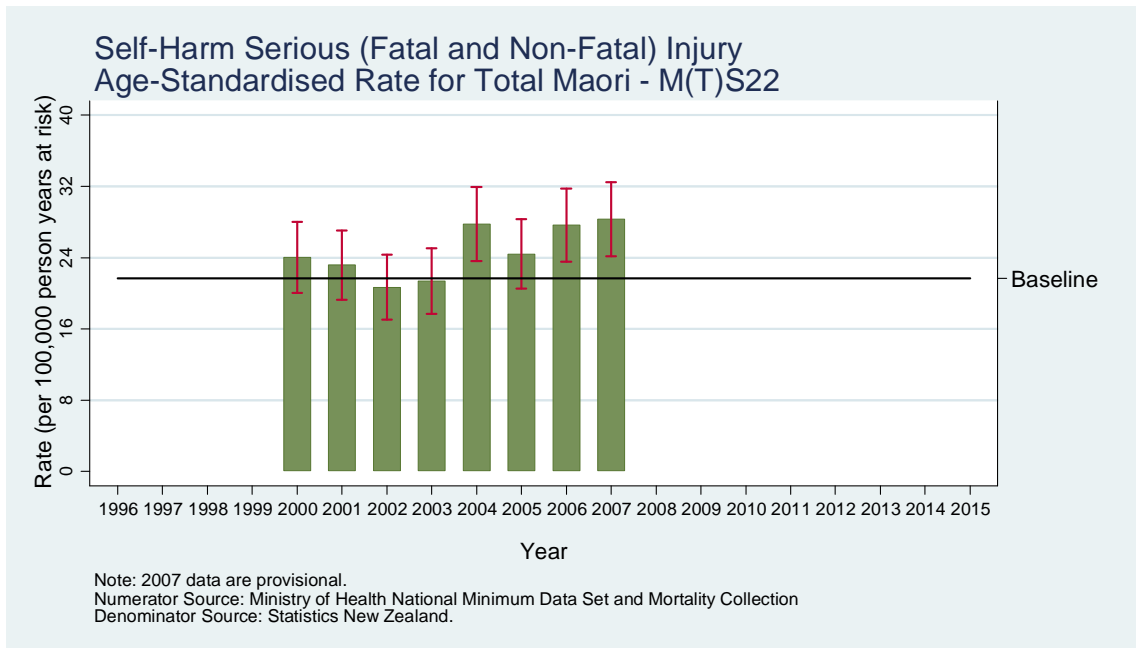
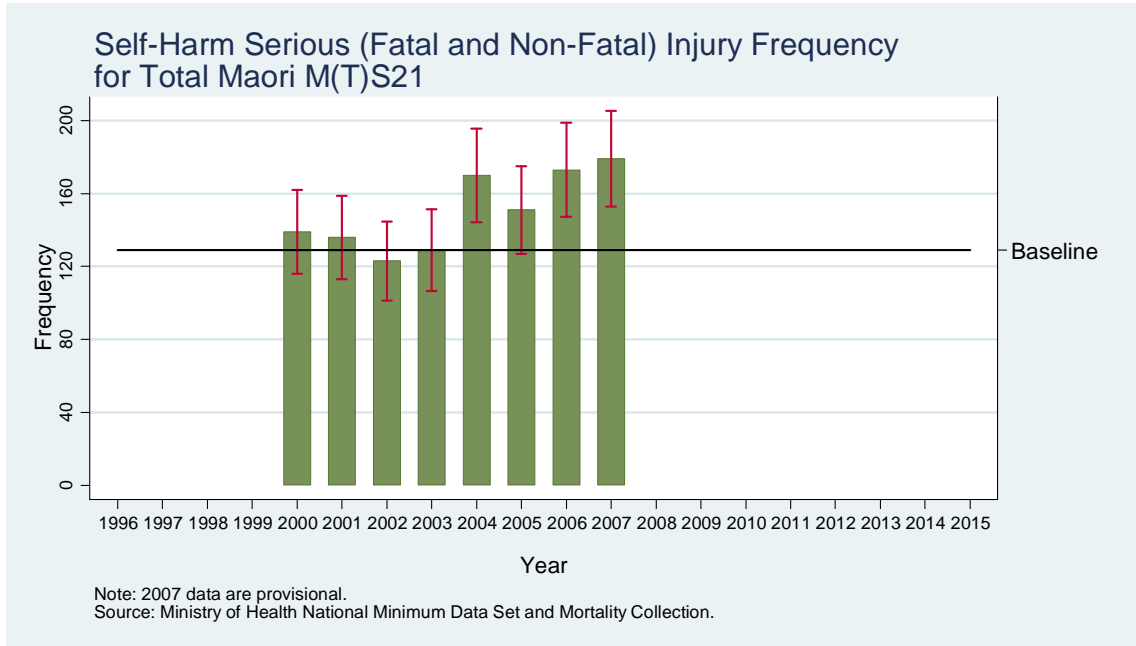


Between 2006 and 2008, there was a decrease in the frequencies (M(T)W01) and rates (M(T)W02) of serious work related injury. There was no change from baseline in 2008 for the frequency of serious non-fatal work related injury. However, the rate estimates for 2008 was below the baseline.

2.4 Intentional self-harm



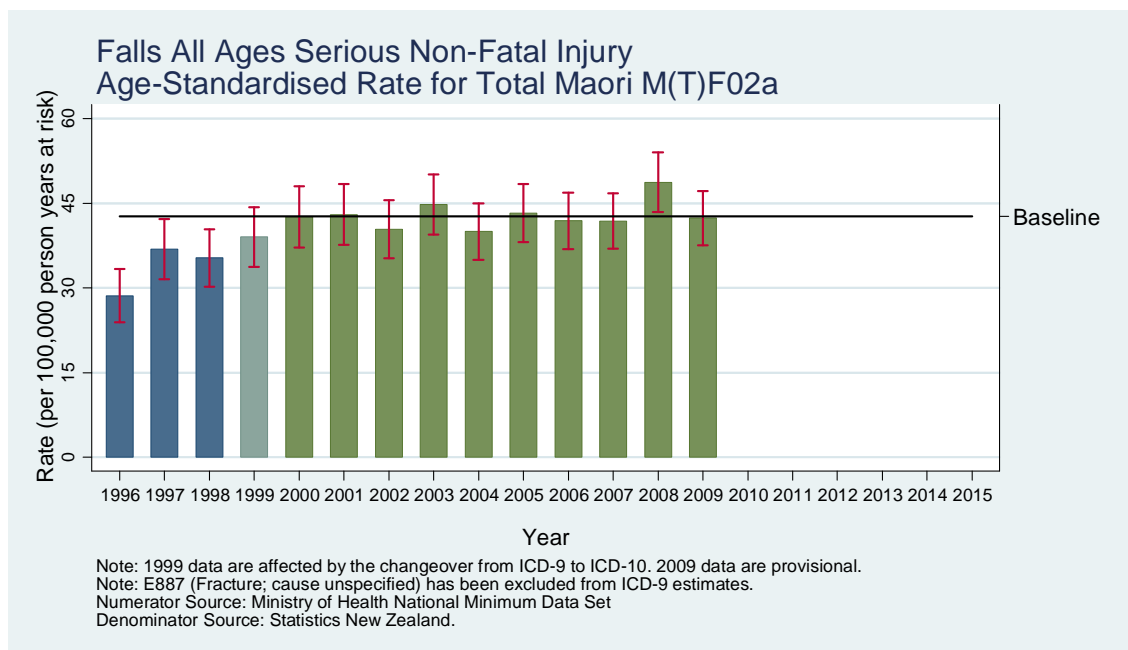
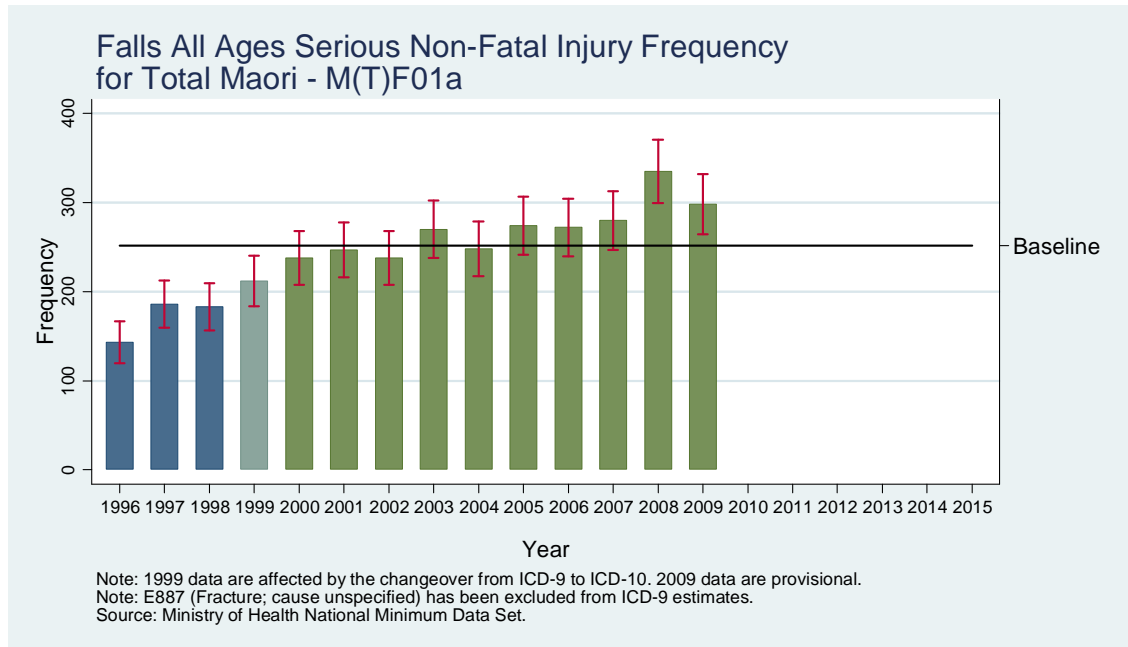
The annual frequencies for fatal self harm injuries (M(T)S11) were higher than baseline in 2005 and 2006. There was weak evidence of an increase in the rate of fatal self harm injuries (M(T)S12) in 2006.



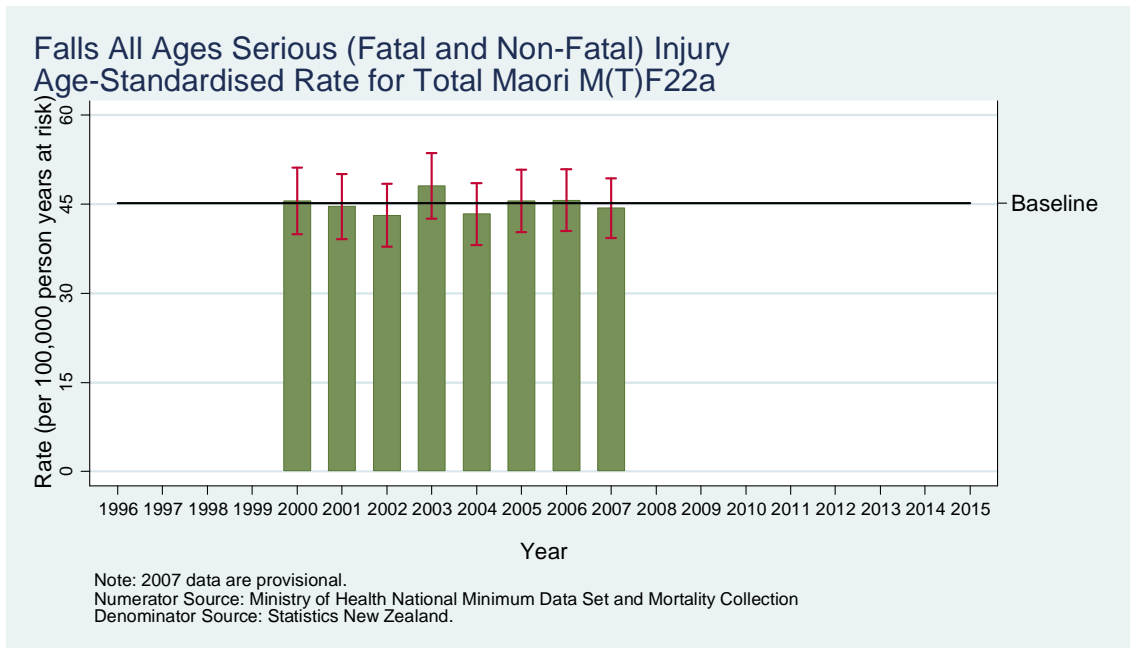
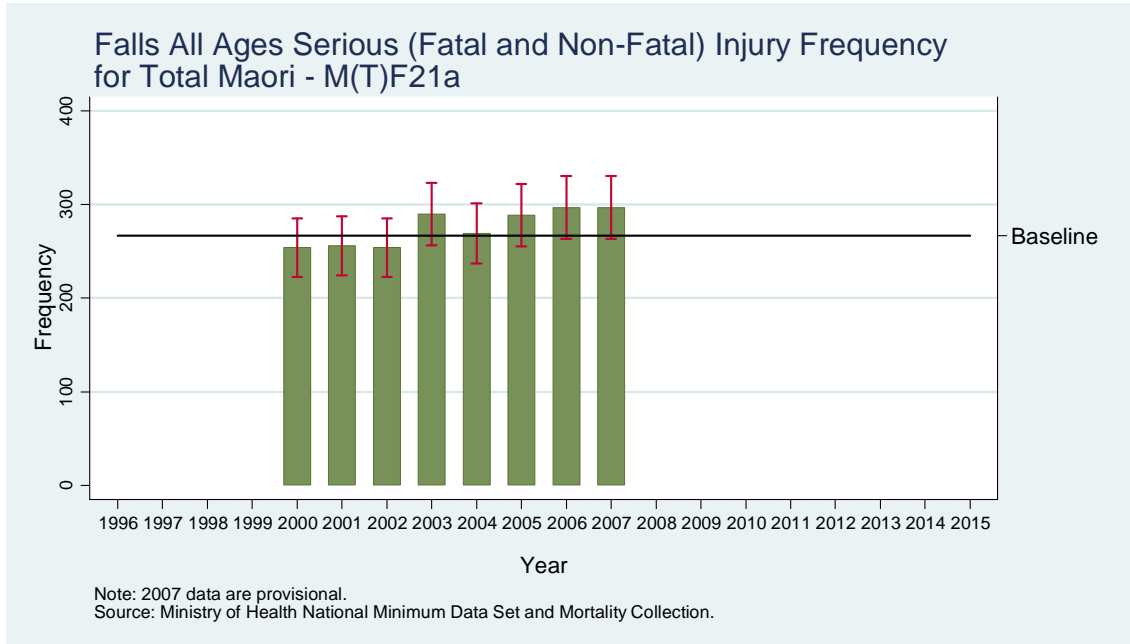
The frequencies (M(T)S21) and rates (M(T)S22) of serious (fatal and non-fatal) self-harm injury in Māori are variable. The frequencies and rates were higher than baseline in 2004, 2006 and 2007.

2.5 Falls

All ages

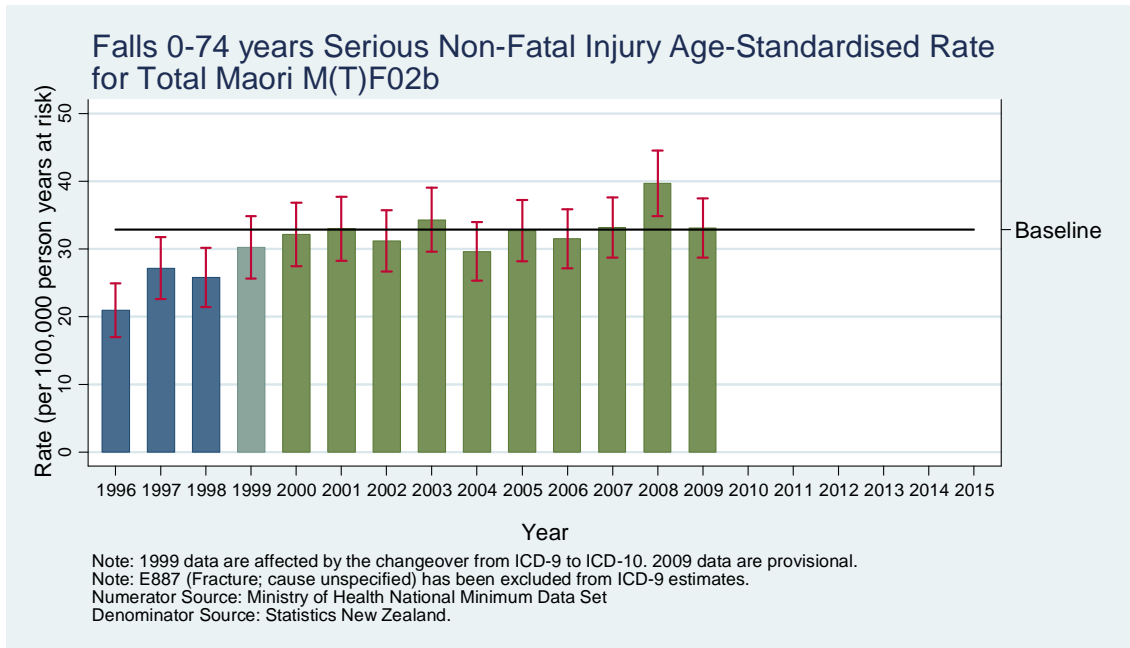
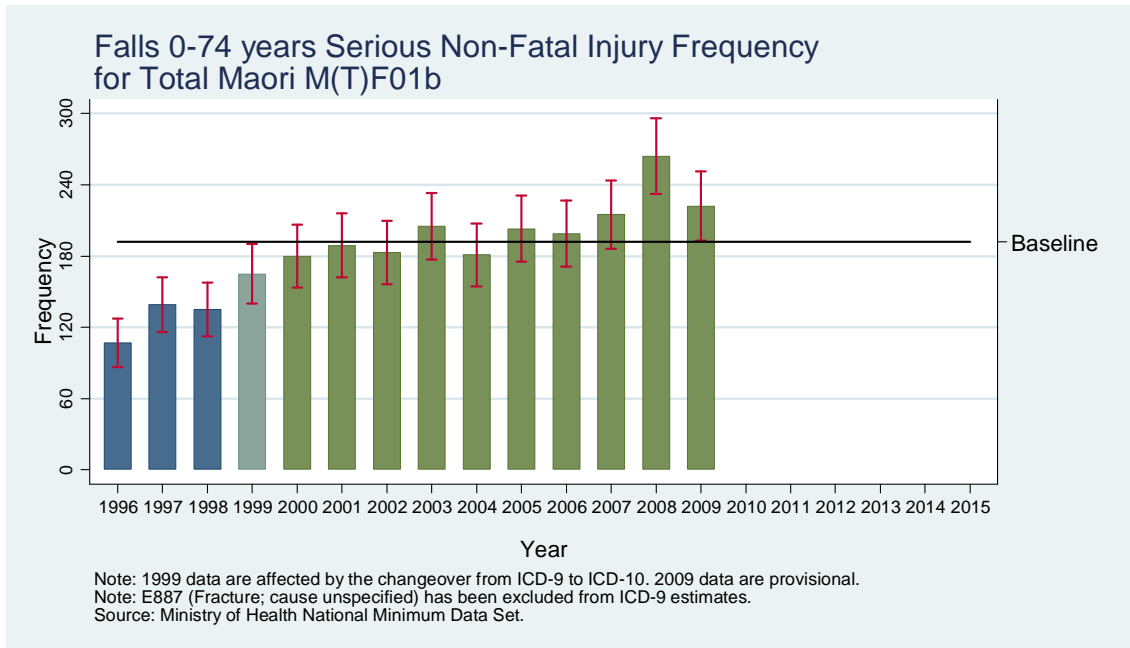


In 2008 and 2009, the frequencies of serious non-fatal falls (M(T)F01a) increased above the baseline. The rate of serious non-fatal falls (M(T)F02a) had also increased above baseline in 2008 but not 2009.

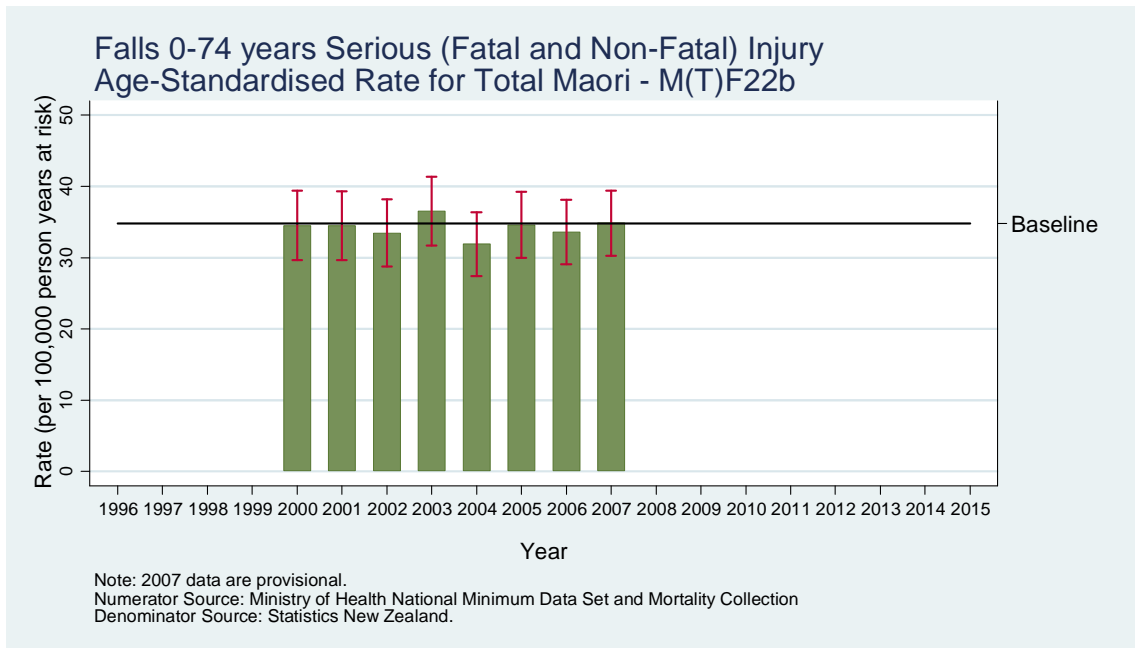
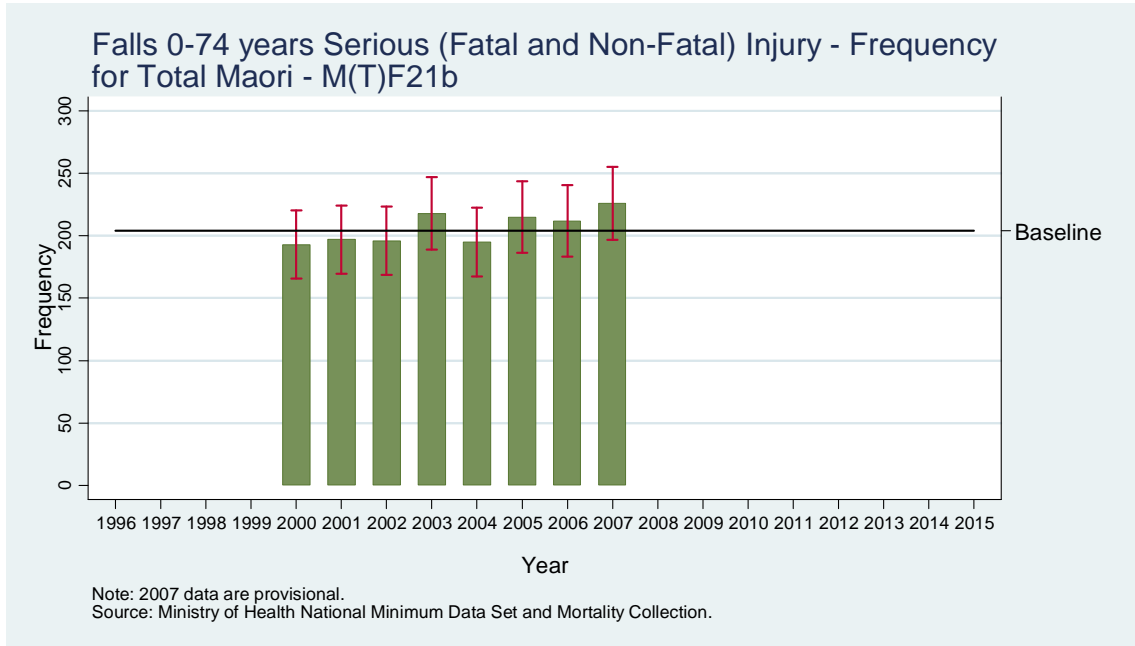


There was no change from baseline in the frequencies (M(T)F21) of serious (fatal and non-fatal) falls in 2006 and 2007. There is no evidence of a change from baseline in the rates (M(T)F22) of serious (fatal and non-fatal) falls.

0-74 years of age

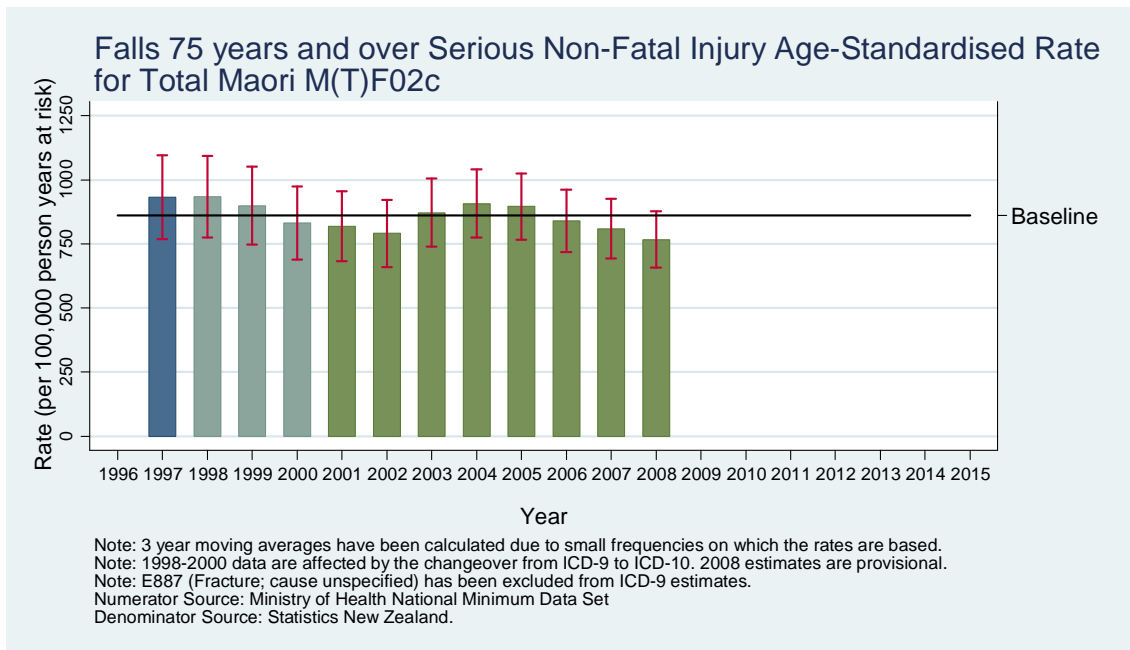
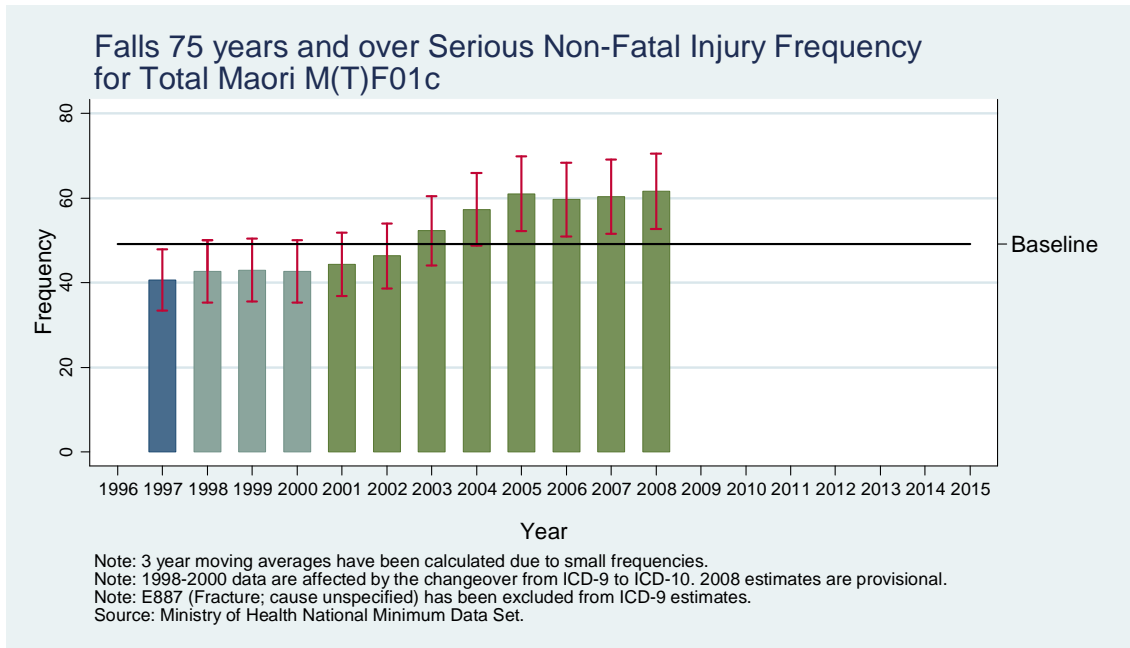


In 2008, the frequency (M(T)F01) of serious non-fatal falls increased dramatically above the baseline. The frequency for 2009 was less, although still above baseline. The rate (M(T)F02) of serious non-fatal falls was above baseline in 2008, but not in 2009



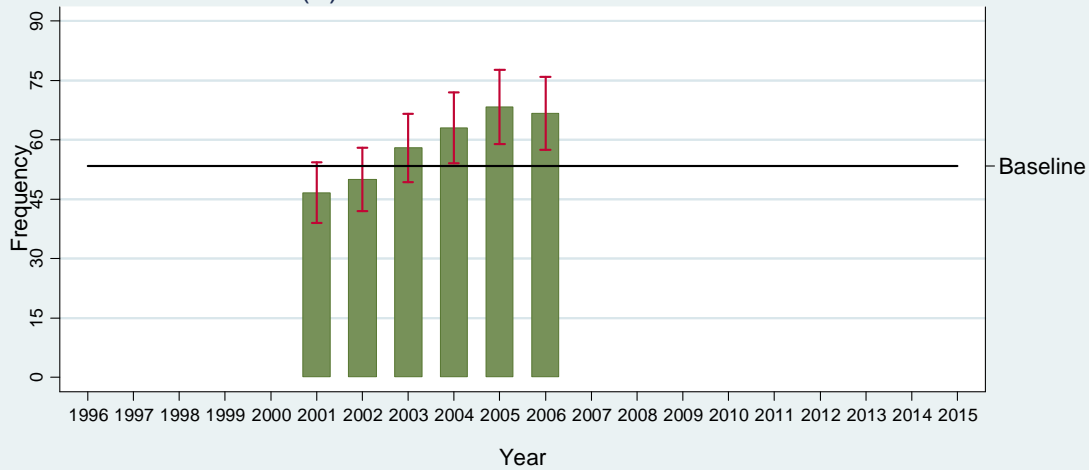
There is no strong evidence of a change from baseline in either the frequencies (M(T)F21b) or rates (M(T)F22b) of serious (fatal and non-fatal) falls injuries for Māori aged 0-74 years.

75+ years of age



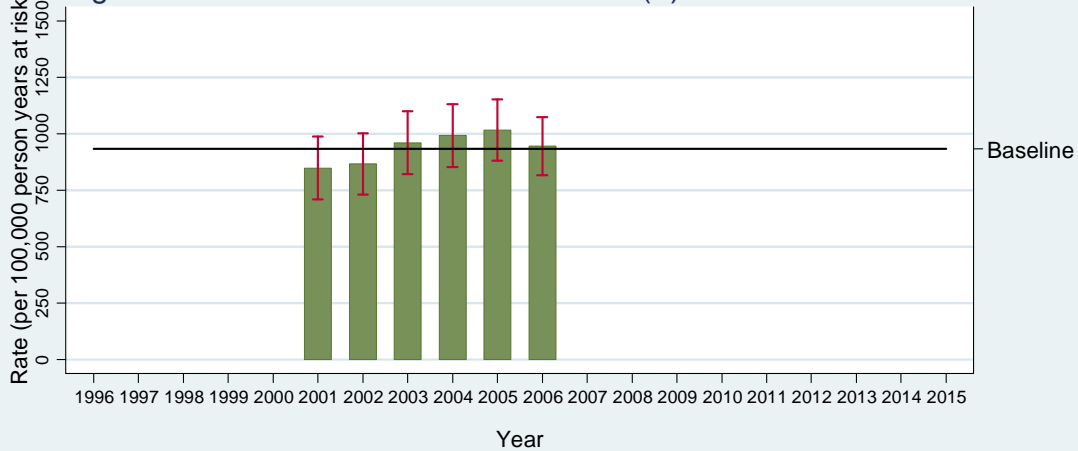
During 2005 to 2008, there was an increase from baseline in the frequencies of serious non-fatal falls injury for those aged 75+ years (M(T)F01c). There was no change from baseline in the rates (M(T)F02c) of serious non-fatal falls injury for those aged over 75 years (M(T)F02c).

Falls 75 years and over Serious (Fatal and Non-Fatal) Injury Frequency for Total Maori M(T)F21c



Note: 3 year moving averages have been calculated due to small frequencies.
 Note: 2006 data are provisional.
 Source: Ministry of Health National Minimum Data Set and Mortality Collection.

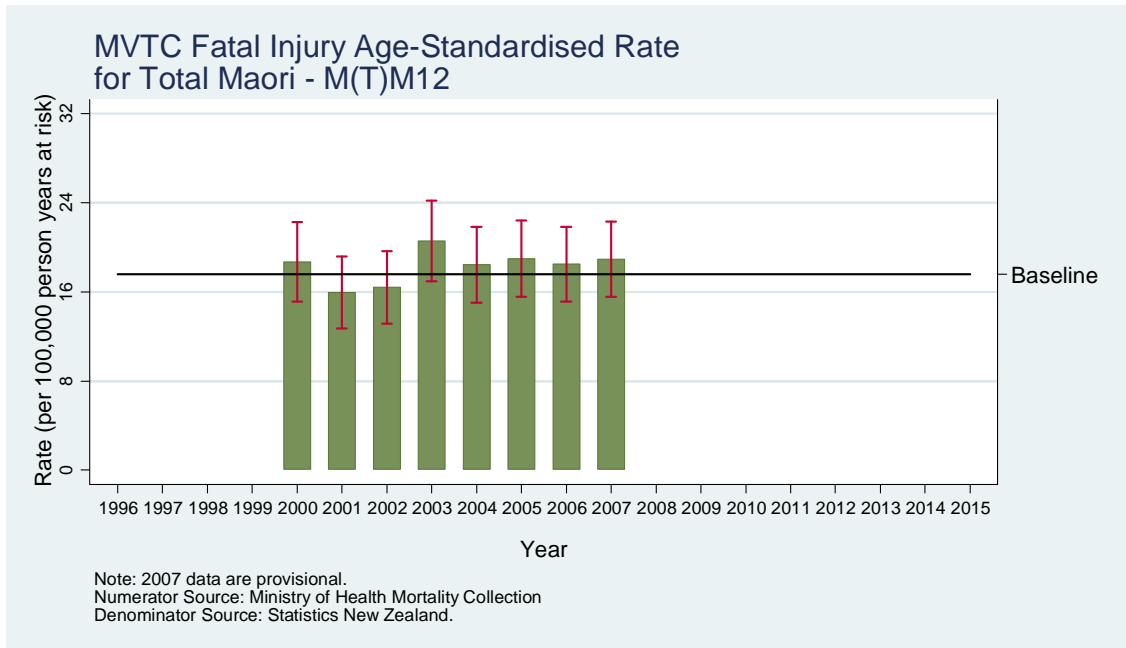
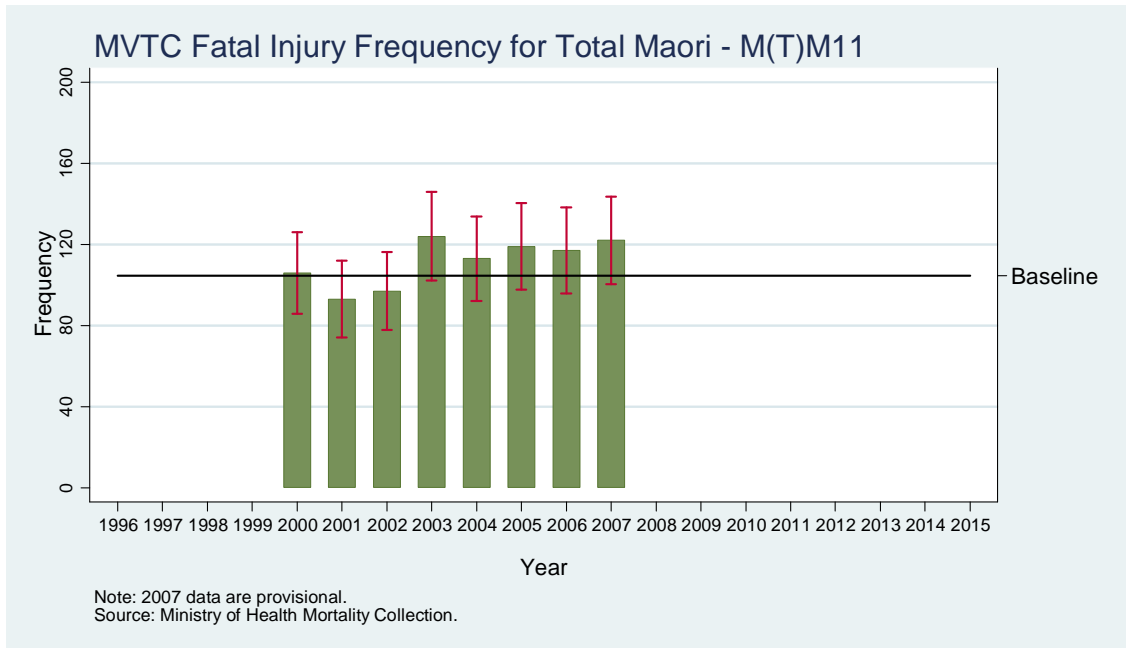
Falls 75 years and over Serious (Fatal and Non-Fatal) Injury Age-Standardised Rate for Total Maori M(T)F22c



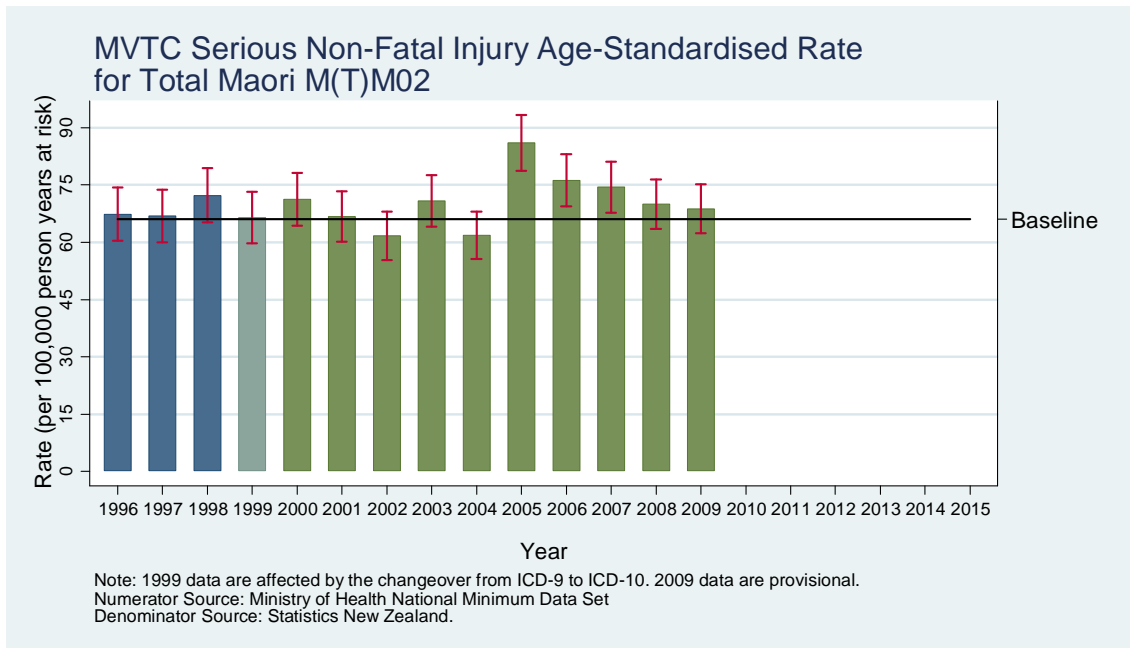
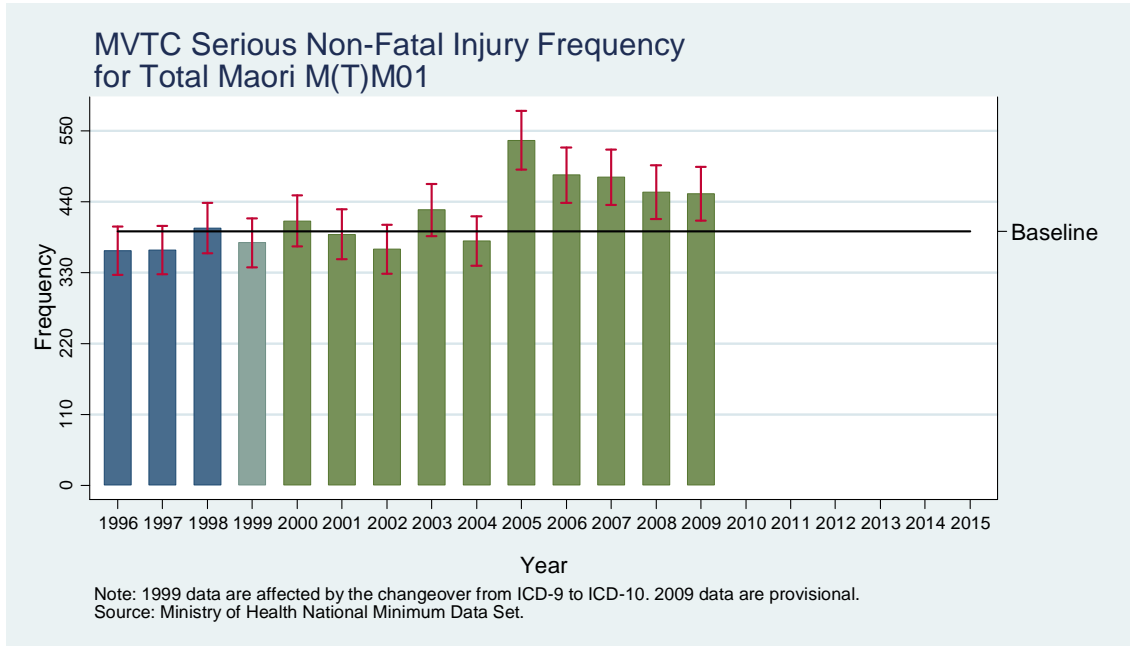
Note: 3 year moving averages have been calculated due to small frequencies.
 Note: 2006 data are provisional.
 Numerator Source: Ministry of Health National Minimum Data Set and Mortality Collection
 Denominator Source: Statistics New Zealand.

During 2004-2006, there was an increase from baseline in the frequency (M(T)F21c) of serious (fatal and non-fatal) falls injury for Māori aged 75+ years. The rates (M(T)F22c) of serious (fatal and non-fatal) falls injury for Māori aged 75+ years have not changed from baseline.

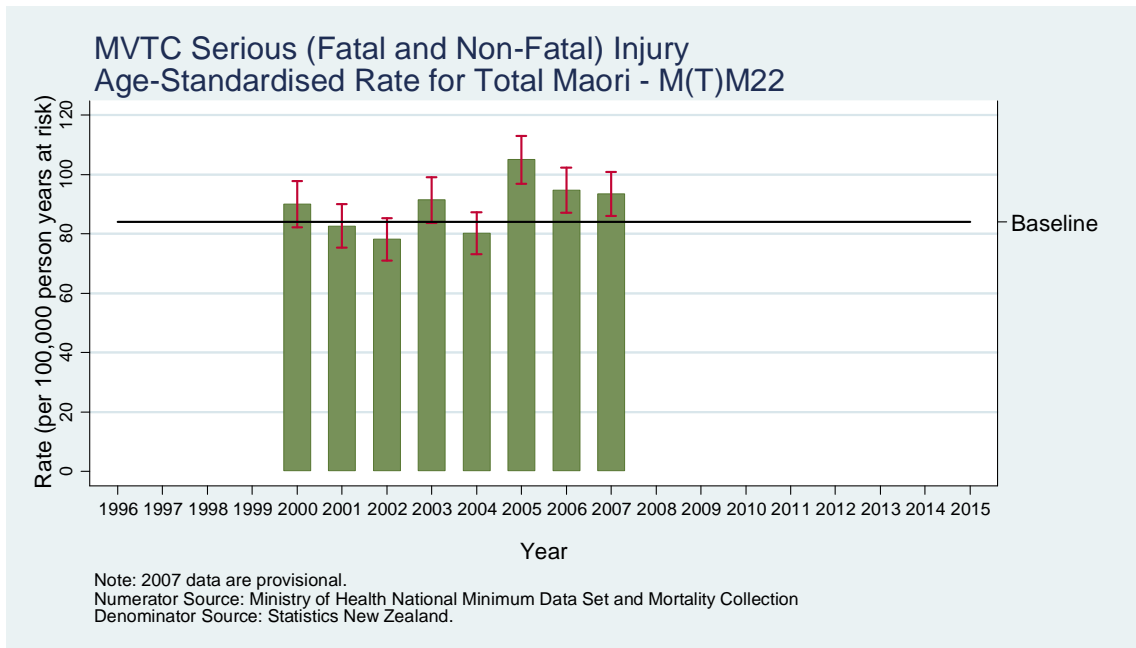
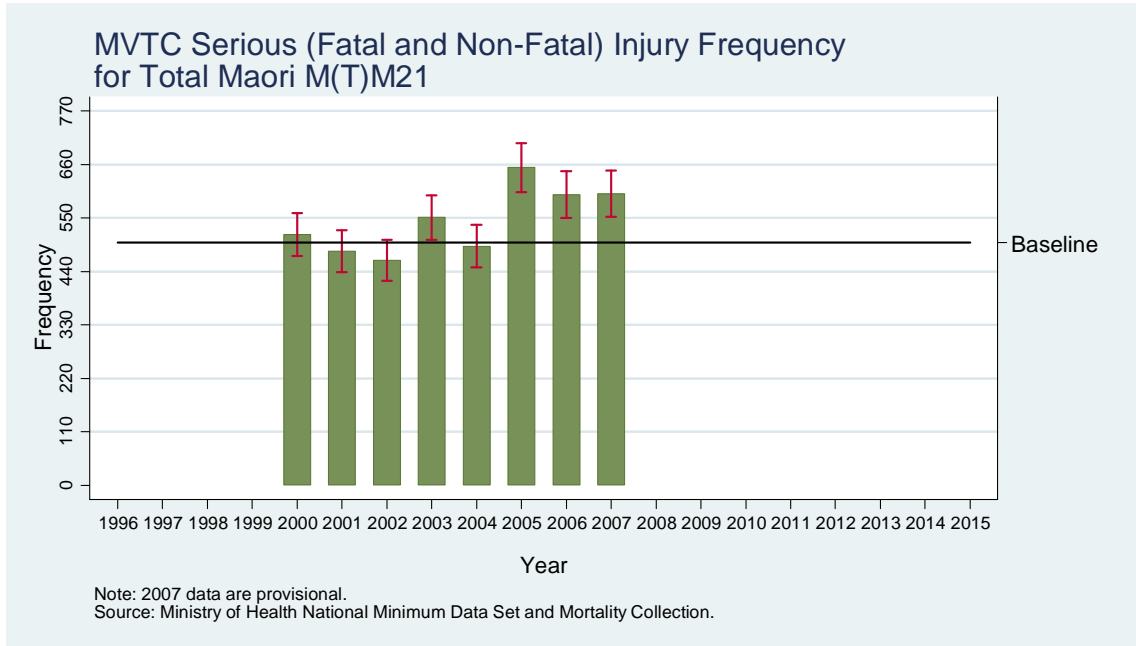
2.6 Motor Vehicle Traffic Crashes (MVTC)



There has been no detectable change from baseline in either the frequencies (M(T)M11) or rates (M(T)M12) of fatal MVTC injury for Māori.



During 2005-2009, the frequencies (M(T)M01) of serious non-fatal MVTC injury were above the baseline. There was no detectable change from baseline in the 2008 and 2009 rates (M(T)M02) of serious non-fatal MVTC injury for Māori.



For 2005-2007, the frequencies (M(T)M21) and rates (M(T)M22) of serious (fatal and non-fatal) MVTC injury for Māori increased above the baseline.

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6. Fawcett, J., Atkinson, J., Herd, P., and Blakely, T., *Record linkage of census and mortality 2001-2004 records: New Zealand Census Mortality Study Technical Report No 6*, in *Public Health Monograph Series*. 2008, Department of Public Health, University of Otago: Wellington.
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8. Anderson, R., Minino, A., Hoyert, D., and Rosenberg, H., *Comparability of cause of death between ICD-9 and ICD-10: preliminary estimates*. National Vital Statistics Reports, 2001. **49**(2): p. 1-32.

Appendix – Tables

	Frequency			Age standardised rates (per 100,000 population)		
	Estimate	Lower CI	Upper CI	Estimate	Lower CI	Upper CI
<i>All Injury</i>						
Fatal: M(T)I11				M(T)I12		
2000	299	265	333	52	46	58
2001	279	246	312	48	42	53
2002	316	281	351	53	47	59
2003	348	311	385	58	52	64
2004	352	315	389	57	51	63
2005	334	298	370	54	48	60
2006	361	324	398	57	51	63
2007	349	312	386	55	49	60
Baseline = 314				Baseline = 53		
Serious non-fatal: M(T)I01				M(T)I02		
1996	867	809	925	162	151	173
1997	975	914	1036	180	169	191
1998	1009	947	1071	183	172	195
1999	1088	1023	1153	193	182	205
2000	1294	1223	1365	225	213	238
2001	1319	1248	1390	226	213	238
2002	1286	1216	1356	216	204	228
2003	1388	1315	1461	230	218	242
2004	1284	1214	1354	210	198	221
2005	1521	1445	1597	245	232	257
2006	1532	1455	1609	243	231	255
2007	1543	1466	1620	241	229	253
2008	1572	1494	1650	241	229	253
2009	1667	1587	1747	253	241	265
Baseline = 1331				Baseline = 224		
Serious (fatal and non-fatal): M(T)I21				M(T)I22		
2000	1593	1515	1671	278	264	291
2001	1598	1520	1676	273	260	287
2002	1602	1524	1680	270	256	283
2003	1736	1654	1818	288	274	301
2004	1636	1557	1715	267	254	280
2005	1855	1771	1939	299	285	312
2006	1893	1808	1978	300	287	314
2007	1892	1807	1977	295	282	308
Baseline = 1645				Baseline = 277		

	Estimate	Frequency		Age standardised rates (per 100,000 population)		
		Lower CI	Upper CI	Estimate	Lower CI	Upper CI
<i>Assault</i>						
	Serious non-fatal: M(T)A01			M(T)A02		
1996	118	97	139	21	18	25
1997	127	105	149	23	19	27
1998	145	121	169	26	21	30
1999	201	173	229	35	30	40
2000	241	211	271	41	36	47
2001	293	259	327	50	44	55
2002	281	248	314	47	41	52
2003	260	228	292	43	38	48
2004	292	259	325	48	42	53
2005	324	289	359	52	47	58
2006	357	320	394	57	51	63
2007	375	337	413	60	54	66
2008	371	333	409	58	52	64
2009	443	402	484	69	63	75
	Baseline = 278			Baseline = 47		
	Serious (fatal and non-fatal): M(T)A21			M(T)A22		
2000	262	230	294	45	40	50
2001	312	277	347	53	47	59
2002	306	272	340	51	45	57
2003	286	253	319	47	42	53
2004	310	275	345	51	45	57
2005	347	310	384	56	50	62
2006	388	349	427	62	56	68
2007	392	353	431	62	56	69
	Baseline = 301			Baseline = 50		

	Estimate	Frequency		Age standardised rates (per 100,000 population)		
		Lower CI	Upper CI	Estimate	Lower CI	Upper CI
<i>Work related</i>						
	Serious non-fatal: M(T)W01 (moving averages)			M(T)W02 (moving averages)		
2001						
2002	67.3	58.0	76.6	31.6	27.2	35.9
2003	65.0	55.9	74.1	29.0	24.9	33.2
2004	71.0	61.5	80.5	31.4	27.1	35.6
2005	76.0	66.1	85.9	32.0	27.8	36.2
2006	86.7	76.1	97.2	34.6	30.4	38.9
2007	85.0	74.6	95.4	32.7	28.6	36.8
2008	69.7	60.2	79.1	26.1	22.5	29.8
2009						
	Baseline = 67.6			Baseline = 31.0		

	Frequency			Age standardised rates (per 100,000 population)		
	Estimate	Lower CI	Upper CI	Estimate	Lower CI	Upper CI
<i>Self harm</i>						
	Fatal: M(T)S11 (moving averages)			M(T)S12 (moving averages)		
2000						
2001	79.7	69.6	89.8	13.3	11.6	15.0
2002	82.0	71.8	92.2	13.6	11.9	15.3
2003	92.3	81.5	103.2	15.1	13.3	16.9
2004	100.7	89.3	112.0	16.1	14.3	18.0
2005	107.7	95.9	119.4	17.2	15.3	19.1
2006	103.7	92.1	115.2	16.4	14.6	18.3
2007						
	Baseline = 87.2			Baseline = 14.6		
	Serious (fatal and non-fatal): M(T)S21			M(T)S22		
2000	139	116	162	24	20	28
2001	136	113	159	23	19	27
2002	123	101	145	21	17	24
2003	129	107	151	21	18	25
2004	170	144	196	28	24	32
2005	151	127	175	24	21	28
2006	173	147	199	28	24	32
2007	179	153	205	28	24	32
	Baseline = 129			Baseline = 22		

	Estimate	Frequency		Age standardised rates (per 100,000 population)		
		Lower CI	Upper CI	Estimate	Lower CI	Upper CI
<i>Falls - All</i>						
	Serious non-fatal M(T)F01a			M(T)F02a		
1996	143	120	166	29	24	33
1997	186	159	213	37	32	42
1998	183	156	210	35	30	40
1999	212	183	241	39	34	44
2000	238	208	268	43	37	48
2001	247	216	278	43	38	48
2002	238	208	268	40	35	46
2003	270	238	302	45	39	50
2004	248	217	279	40	35	45
2005	274	242	306	43	38	48
2006	272	240	304	42	37	47
2007	280	247	313	42	37	47
2008	335	299	371	49	43	54
2009	298	264	332	42	38	47
	Baseline = 252			Baseline = 43		
	Serious (fatal and non-fatal): M(T)F21a			M(T)F22a		
2000	254	223	285	46	40	51
2001	256	225	287	45	39	50
2002	254	223	285	43	38	48
2003	290	257	323	48	43	54
2004	269	237	301	43	38	49
2005	289	256	322	46	40	51
2006	297	263	331	46	40	51
2007	297	263	331	44	39	49
	Baseline = 267			Baseline = 45		

	Estimate	Frequency		Age standardised rates (per 100,000 population)		
		Lower CI	Upper CI	Estimate	Lower CI	Upper CI
<i>Falls - 0-74 yrs</i>						
	Serious non-fatal M(T)F01b			M(T)F02b		
1996	107	87	127	21	17	25
1997	139	116	162	27	23	32
1998	135	112	158	26	21	30
1999	165	140	190	30	26	35
2000	180	154	206	32	27	37
2001	189	162	216	33	28	38
2002	183	156	210	31	27	36
2003	205	177	233	34	30	39
2004	181	155	207	30	25	34
2005	203	175	231	33	28	37
2006	199	171	227	32	27	36
2007	215	186	244	33	29	38
2008	264	232	296	40	35	45
2009	222	193	251	33	29	37
	Baseline = 192			Baseline = 33		
	Serious (fatal and non-fatal): M(T)F21b			M(T)F22b		
2000	193	166	220	35	30	39
2001	197	169	225	34	30	39
2002	196	169	223	33	29	38
2003	218	189	247	37	32	41
2004	195	168	222	32	27	36
2005	215	186	244	35	30	39
2006	212	183	241	34	29	38
2007	226	197	255	35	30	39
	Baseline = 204			Baseline = 35		

	Frequency			Age standardised rates (per 100,000 population)		
	Estimate	Lower CI	Upper CI	Estimate	Lower CI	Upper CI
<i>Falls - 75+ years</i>						
	Serious non-fatal M(T)F01c (moving averages)			M(T)F02c (moving averages)		
1996						
1997	40.7	33.5	47.9	931.8	768.1	1095.4
1998	42.7	35.3	50.1	934.9	775.4	1094.5
1999	43.0	35.6	50.4	898.8	747.0	1050.7
2000	42.7	35.3	50.1	832.0	689.4	974.6
2001	44.3	36.8	51.9	818.4	681.9	954.8
2002	46.3	38.6	54.0	791.2	660.5	921.9
2003	52.3	44.1	60.5	872.2	738.4	1006.0
2004	57.3	48.8	65.9	907.7	774.4	1041.0
2005	61.0	52.2	69.8	895.9	767.3	1024.5
2006	59.7	50.9	68.4	839.7	718.3	961.2
2007	60.3	51.5	69.1	809.5	692.7	926.3
2008	61.7	52.8	70.6	767.6	658.1	877.1
2009						
	Baseline = 49.2			Baseline = 861.0		
	Serious (fatal and non-fatal): M(T)F21c (moving averages)			M(T)F22c (moving averages)		
2000						
2001	46.7	38.9	54.4	849.1	710.2	987.9
2002	50.0	42.0	58.0	866.7	730.2	1003.2
2003	58.0	49.4	66.6	961.1	821.1	1101.1
2004	63.0	54.0	72.0	992.6	853.5	1131.8
2005	68.3	59.0	77.7	1017.0	880.4	1153.7
2006	66.7	57.4	75.9	945.2	816.6	1073.8
2007						
	Baseline = 53.4			Baseline = 933.0		

	Estimate	Frequency		Age standardised rates (per 100,000 population)		
		Lower CI	Upper CI	Estimate	Lower CI	Upper CI
<i>MVTC</i>						
Fatal: M(T)M11				M(T)M12		
2000	106	86	126	19	15	22
2001	93	74	112	16	13	19
2002	97	78	116	16	13	20
2003	124	102	146	21	17	24
2004	113	92	134	18	15	22
2005	119	98	140	19	16	22
2006	117	96	138	18	15	22
2007	122	100	144	19	16	22
Baseline = 105				Baseline = 18		
Serious non-fatal: M(T)M01				M(T)M02		
1996	364	327	401	67	60	74
1997	365	328	402	67	60	74
1998	399	360	438	72	65	79
1999	376	338	414	66	60	73
2000	410	370	450	71	64	78
2001	389	350	428	67	60	73
2002	366	329	403	62	55	68
2003	427	386	468	71	64	78
2004	379	341	417	62	56	68
2005	535	490	580	86	79	93
2006	481	438	524	76	69	83
2007	478	435	521	74	68	81
2008	455	413	497	70	64	77
2009	452	410	494	69	62	75
Baseline = 394				Baseline = 66		
Serious (fatal and non-fatal): M(T)M21				M(T)M22		
2000	516	471	561	90	82	98
2001	482	439	525	83	75	90
2002	463	421	505	78	71	85
2003	551	505	597	91	84	99
2004	492	449	535	80	73	87
2005	654	604	704	105	97	113
2006	598	550	646	95	87	102
2007	600	552	648	93	86	101
Baseline = 499				Baseline = 84		