



# The Epidemiology of Serious Non-fatal Work-Related Traumatic Injury – A Demonstration Project

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Official Statistics Seminar Series, 18 October 2007

# Background

## ■ Mortality

- 10 and 20 years ago, no one national source could be used to provide a valid description of the size and nature of the work-related (wr) fatal injury problem in New Zealand.
- 10-year reviews of wr fatal injury in NZ
  - WRFIS-1: 1975-1984
  - WRFIS-2: 1985-1994
- I believe that the first statement is still true.
  - If it is, the information gap is growing
    - ie. Reliable data on wr fatal injuries is over 12 years old!

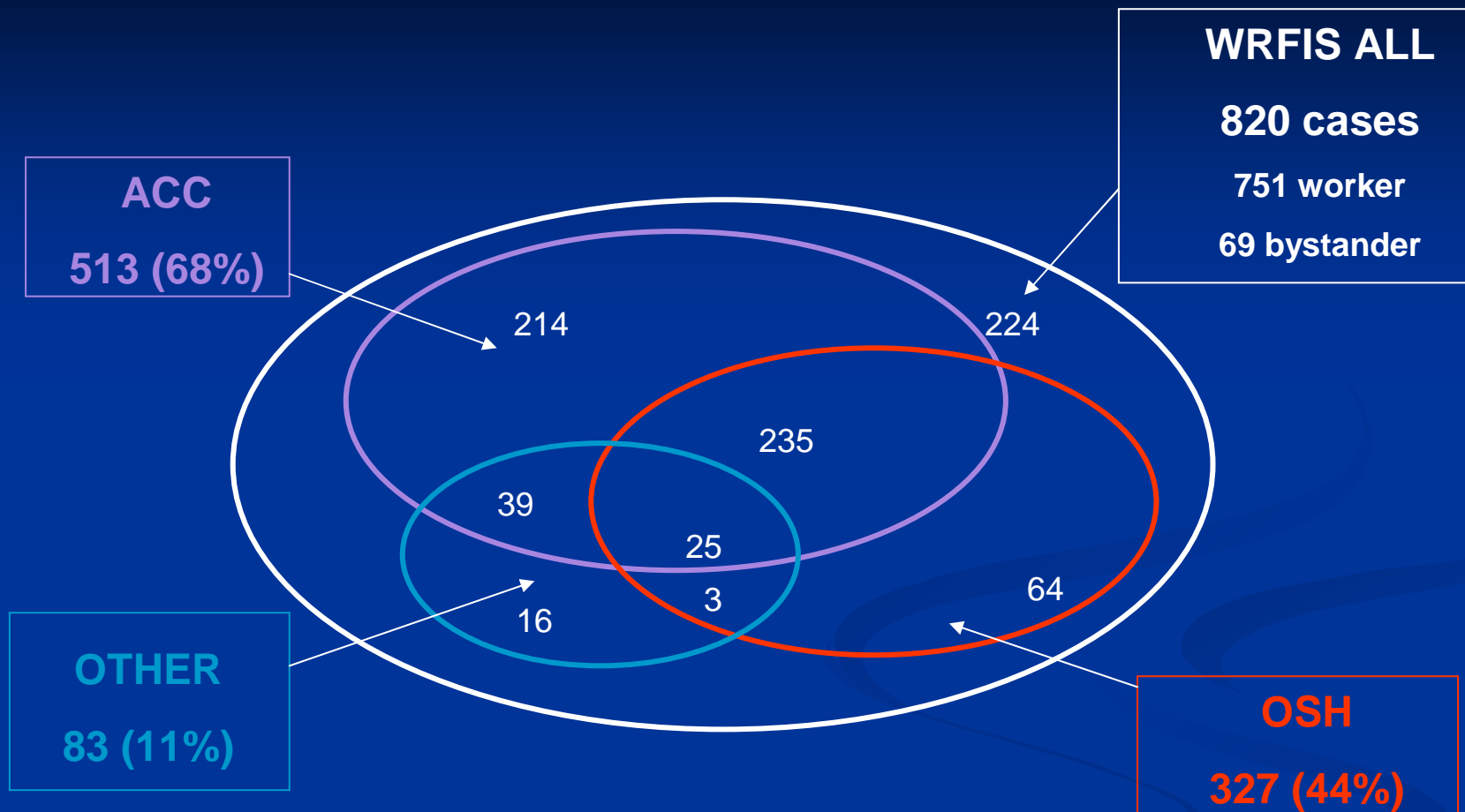
# Background and scope

- WRFIS-1 & -2 focused on wr (non-MVTC) fatal injury:
  - Difficult to identify wr MVTC injury using ACC and hospital data
- For the remaining slides, the focus is on non-MVTC injury for the same reason.

# Background

- Sticking with WRFIs for the moment – another question was:
  - Will a combination of sources (ACC, OSH, etc.) identify all cases of wr fatal injury?
  - We think the answer is “no”.

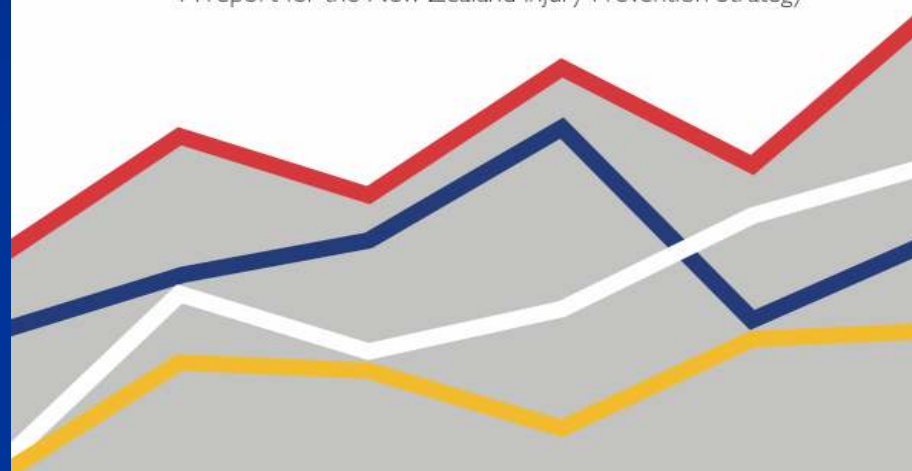
# Agency coverage of the WRFIS dataset



- Our current knowledge suggests that we are still struggling to use national sources to describe wr fatal injury in NZ
  
- What about wr non-fatal injury?
  - What approach should we take to describing the epidemiology of these injuries?

# Developing Valid Injury Outcome Indicators

A report for the New Zealand Injury Prevention Strategy



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# NZIPS Priority Areas

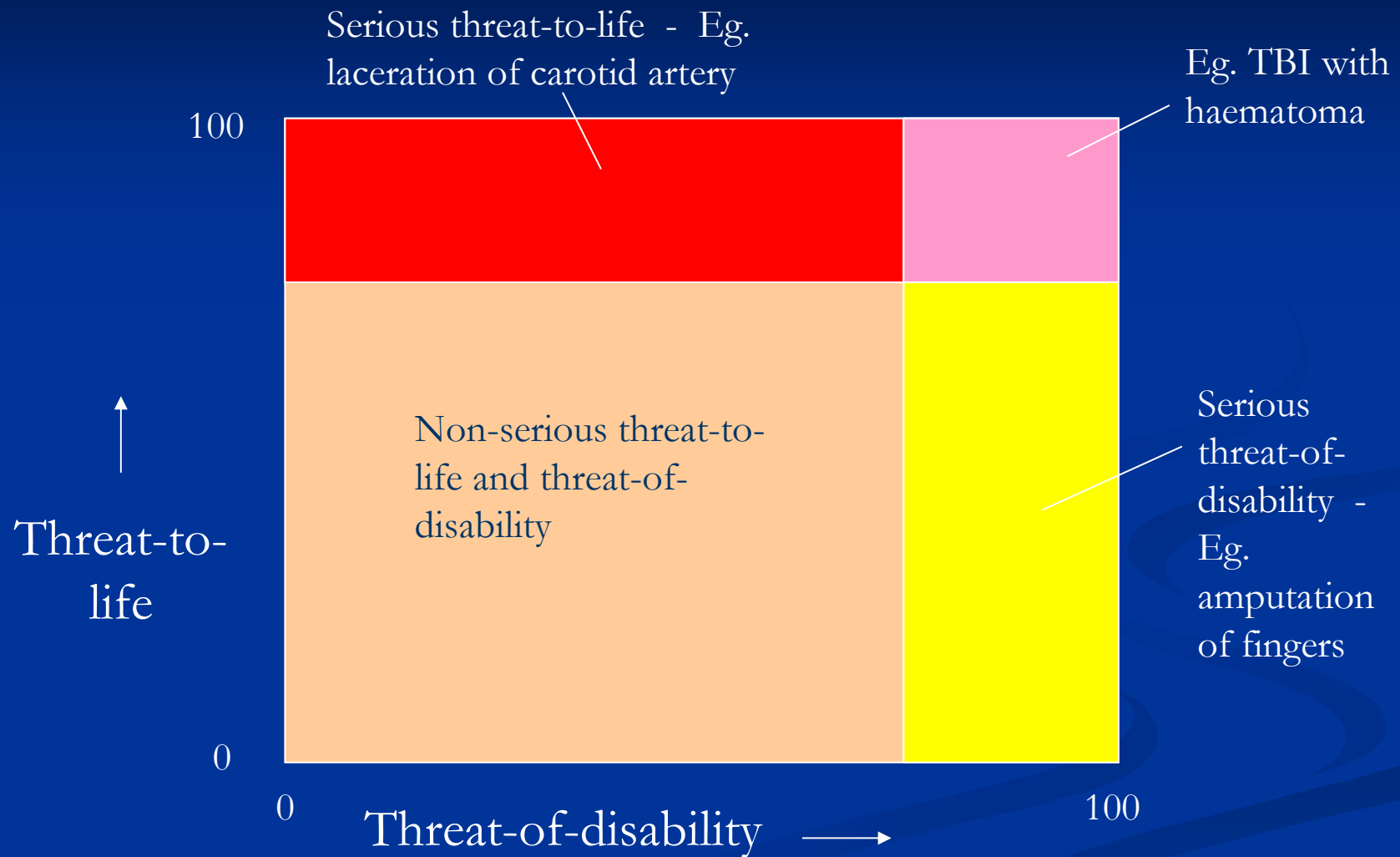
- The 6 priority areas:
  - Assault
  - Workplace injury
  - Suicide and deliberate self-harm
  - Falls
  - Motor vehicle traffic crashes
  - Drowning and near-drowning

# Raison d'être for approach

	ACC	NMDS	Explanation
Accuracy of work-relatedness information	Very good	Poor	There are powerful financial drivers (levy rates) to maximize the accuracy of these ACC data. No such system exists with NMDS. The activity codes which identify work activity in NMDS have only recently been introduced, utilisation is poor and accuracy is unknown.
Accuracy of external cause coded data	Prob poor	OK	There are no ACC coding guidelines and there is no audit data to gauge accuracy. This contrasts with NMDS.
Accuracy of diagnosis coded data	Prob poor	Good	As above. In addition, historically, ACC diagnostic data has typically related to when the injured person was first seen, as opposed to NMDS where a confirmed diagnosis is used, ie. after all tests etc have been performed.
Effects of extraneous factors other than the incidence of traumatic injury.	Prob high	Prob high but can be controlled	Both data sets have threats to validity which cannot be ignored. The presence of accurate and detailed diagnosis data in the NMDS provides a mechanism to control these (using ICISS).

- Use of ACC-NMDS linked data to produce indicators – the same could be used to develop a picture of serious non-fatal injury for NZ.
- But why not use ACC data on their own to produce a complementary picture, ie. the epidemiology of serious disabling injury?

# Threat-to-life vs threat-of disability



# Aims

## ■ Primary

- To present an accurate picture of the epidemiology of serious threat-to-life work-related traumatic injuries using a linked data set.

## ■ Secondary

- To judge whether ACC claims data alone can be used for
  - official statistical purposes, including for describing the epidemiology of serious (disabling) work-related injuries.

# Definitions - 1

## ■ Population

- People living in NZ aged 15-84 years working for income.

## ■ Theoretical definition of work-related traumatic injury

- Any traumatic injury arising out of, or in the course of, paid employment and occurring at the workplace,
  - but not whilst driving or being transported on public highways.
- *Paid employment*
  - Includes: for payment, profit, or payment in kind
- *Workplace*
  - Any place where the worker (self-employed or employee, full-time or part-time) is present in the exercise of his / her duties.
- *Excludes*
  - Self-harm; MVTC-related, commuting, bystanders, voluntary workers, unpaid home duties

# Definitions - 2

- **Case definition of work-related traumatic injury**
  - An injured person who is compensated by ACC from the Employer or Self-Employed Accounts.
    - Excludes: bystander, commuter, MVTC-related (most)
- **Case definition of serious threat-to-life traumatic injury**
  - Injuries discharged from hospital with  $ICISS \leq 0.941$
- **Case definition of serious disabling traumatic injury**
  - Time off work / reduced duties (ie “wcdays”)
    - Several definitions considered – ie.  $wcdays > 0$ ,  $> 7$ ,  $> 14$ ,  $> 21$ ,  $> 49$ ,  $> 84$ , and  $> 175$ 
      - Approximates to time off work / reduced duties for:  $> 1$  week,  $> 2$  weeks,  $> 3$  weeks,  $> 4$  weeks,  $> 8$  weeks,  $> 3$  months,  $> 6$  months

# Methods

- Injuries occurring during the period 1/1/02 to 31/12/04
- **Linking the data: AUTOMATCH**
  - 763,539 ACC claims; 257,859 NMDS 1<sup>st</sup> admission records
- **ACC-NMDS linked data: Cross-sectional analysis of serious threat-to-life wr traumatic injuries**
  - Numbers (and rates): age, gender, ethnicity, industry, occupation, employment status, diagnosis and external cause.
- **Relative frequencies were compared for**
  - ACC-NMDS serious threat-to-life injury vs.
  - ACC data for the serious disabling injury thresholds
- **ACC data on their own: Cross-sectional analysis of serious disabling wr traumatic injuries.**
- **Concordance between key fields: NMDS versus ACC using linked source**
  - For age, gender, ethnicity, and diagnosis

# Focus of the presentation

- Primary aim
  - Descriptive epidemiology of serious threat-to-life work-related traumatic injury
- Secondary aim – accuracy of some ACC data fields.

# Linkage results

- 763,539 ACC claims; 257,859 NMDS 1<sup>st</sup> admission records
- 19,098 linked records
  - 5.4% of NMDS records
  - 2.1% of ACC wr claims
- However, linkage rate = 70%
  - for NMDS subset of serious injuries with Activity coded to “While working for income”.
  - Similar to linkage rate StatsNZ obtained in the Injury Statistics Pilot Project

# Cases selected for linked data analysis

- Cases linked = 16,098
  - Excluded due to diagnosis outside range S00-T78 = 218
  - Excluded due to non-serious (ICISS>0.941) = 14,705
  - Excluded due to fatal = 32
- Cases remaining = 1,143
  - (People remaining = 1,140)

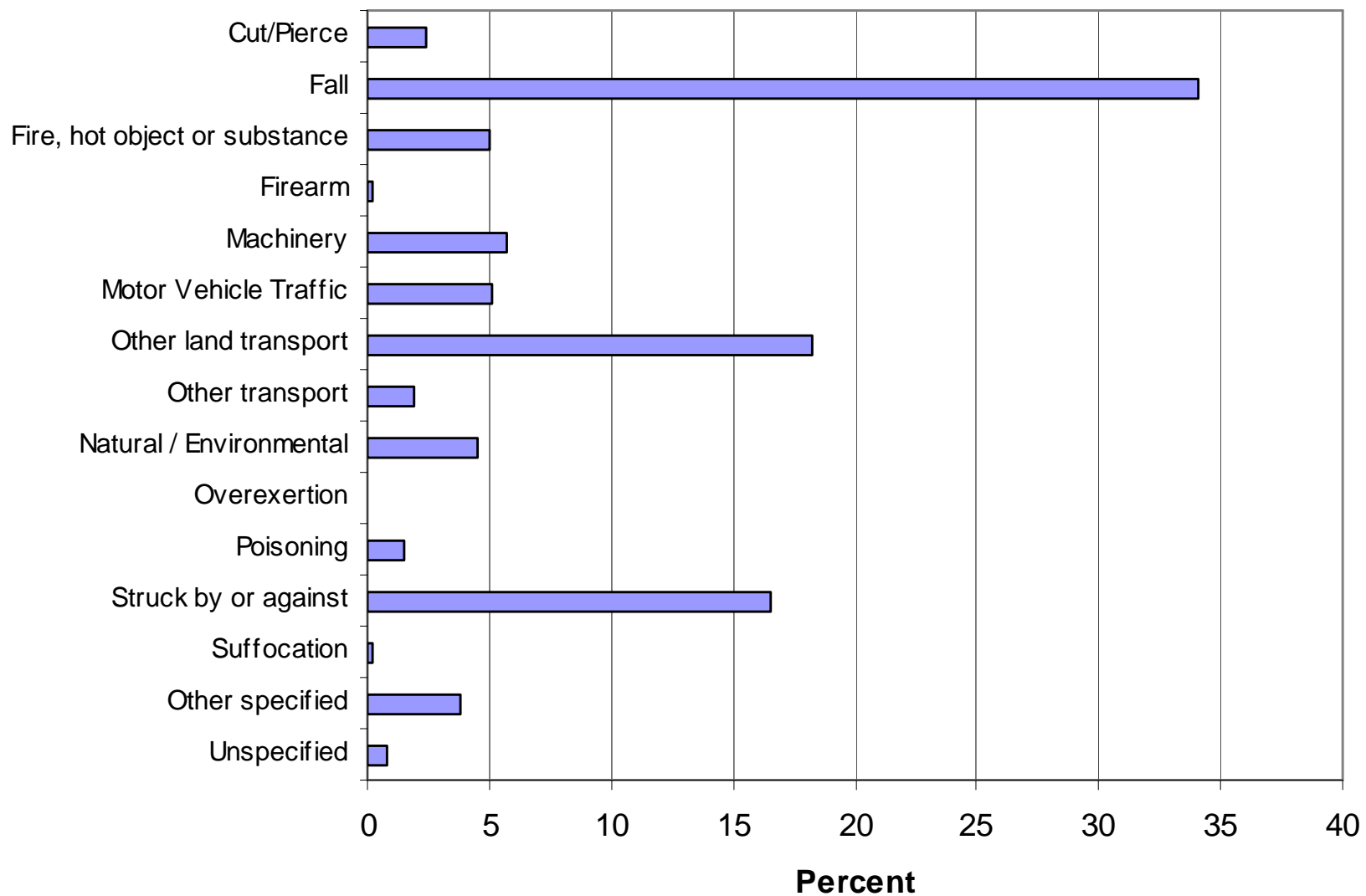
# Selected results

- Numbers of serious threat-to-life wr injury
  - 89% male
  - 71% European; 14% Maori
  - 75% employees; 25% self-employed
- Rates
  - Higher rates beyond aged 54, highest for age 65-84
  - High rates for men cf women
  - Higher rates for self-employed
  - Higher rates for Maori than European than Pacific people
  - Very high rates in: mining; agric / forestry / fishing; construction
  - Very high rates for occ groups: agric and fishery workers; plant and machinery operators / assemblers; elementary occupations (incl. labourers etc.)

# Linked data - Diagnoses

Diagnosis (Most frequent Barell matrix cells)	Frequency	Percent
TBI / fracture	105	9
Other head / fracture	56	5
Vertebral column / fracture	82	7
Thorax / fracture	95	8
Pelvis and lower back / fracture	59	5
Upper extremity / fracture	72	6
Hip / fracture	83	7
Other lower extremity / fracture	60	5
TBI / internal	137	12
Spinal cord / internal	36	3
Thorax / internal	75	7
Abdomen / internal	49	4
TBI / open wound	30	3
Head and neck / burn	28	2
Upper extremity / burn	31	3
Other	145	13
<b><i>Total</i></b>	<b><i>1143</i></b>	<b><i>100</i></b>

# External cause



# Potential threats-to-validity

- The identification of work-related cases on ACC data.
  - Plausible that would be accurate; but think work required to investigate
- The linkage of ACC claims to NMDS data
  - Investigations suggest that false positive and false negative links will be small + consistency with StatsNZ results.
- Limitations of ICISS for identifying serious threat-to-life wr traumatic injury
  - Some recent work has found some limitations of the standard ICISS; but don't believe that practical impact of improving ICISS will be great.
- Accuracy of data
  - Investigations suggest that age and gender accurate; Maori classification reasonably valid.
  - We have no info on: employment status, industry and occupation.
  - IPRU work suggests some inaccuracies in NMDS ICD-10 diagnosis and external cause coding.

# Final remarks re Primary Aim

- There have been difficulties in describing the epidemiology of serious work-related traumatic injury in New Zealand
- The linkage of ACC data to hospitalisation data permit the description of serious threat-to-life wr injury – presented here
- We know of no other work, locally or internationally, that presents an epidemiological picture of serious threat-to-life work-related traumatic injury.
- We have no evidence that the potential threats to validity undermines the validity of the results
  - but have some small reservations about the inaccuracies in NMDS diagnosis and external cause codes
- We recommend further work be carried out to:
  - Identify specific occupational groups that are at particular risk – and describe the circumstances and nature of injury in those groups.
  - Describe the epidemiology of serious work-related injury for Maori.

# Correspondence of hospital and ACC data using linked data

- Age – same on both sources for 97% of people
- Gender – same for 1138 people (diff for 2)
- Ethnicity – same for 78% of people (see over)
- Diagnosis - <40% were classified to the same diagnostic groups by ACC and NMDS (see over)
- External cause – indication of some lack of concordance for some key categories (eg. Falls)

# Concordance of ethnicity

			ACC			
NZHIS ethnicity	European	Maori	Pacific Island	Other	Unknown	Total
European	690	16	3	31	68	808
Maori	19	129	2	3	7	160
Pacific Island	4	3	20	0	2	29
Other	42	7	6	41	19	115
Unknown	15	6	0	1	6	28
<b>Total</b>	<b>770</b>	<b>161</b>	<b>31</b>	<b>76</b>	<b>102</b>	<b>1140</b>

# Concordance of diagnosis groups – Some differences

## ■ NMDS

- Fractured skull / face with TBI
- Fractured skull / face
- Injury to internal organ (thorax)
- Hip fracture

## ■ ACC

- TBI – no fracture (with or without open wound)
- Fractured skull / face with TBI
- Rib fracture
- Other lower extremity fracture

# Our conclusions re: ACC data

- “This work has indicated that ACC data on their own are likely to be a suitable source from which an acceptable epidemiological picture of serious disabling non-fatal work-related traumatic injury can be derived, provided the identification of traumatic injury cases is not compromised by deficiencies in the ACC diagnostic data recorded on the ACC data base.
- The ACC algorithm used to identify traumatic injury, and its performance, should be investigated further and if found to be acceptable, then it will give the opportunity for routine monitoring of the national burden of serious disabling work-related traumatic injury using this source.”

# Overall strengths of this work

- Serious TTL work related injury (ACC-NMDS data)
  - It monopolises on the most accurate classification of work-related status from ACC data, as well as the most accurate information on diagnosis, provided by NMDS, to identify cases of serious threat-to-life traumatic injury rather than gradual process or disease.
- TTL versus Disability
  - This work provides confirmation of the need to present the epidemiological picture of serious work-related traumatic injury along more than the threat-to-life dimension of “serious”; but also along the (threat-of-)disability dimension.
- ACC data quality
  - The work identifies that some of the ACC data fields capture accurate data (on age, gender), whereas others appear to be problematic (eg. ethnic group, diagnosis). The apparent inaccuracies in the diagnosis codes examined call into question the use of this field for the production of meaningful information. Additionally, in the context of this and like projects, it questions the accuracy of the ACC’s algorithm to identify traumatic injury cases – as opposed to gradual process or disease cases.