Weather and work-related fatal injury: what is the link?

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Background

Injury is a leading cause of premature death and health loss in New Zealand (NZ).[1] Around 2000 New Zealanders die annually from injury.[2] It has been estimated that 1 in 10 NZ workers are injured at work each year.[1]

Environmental conditions play a significant role in the causes and circumstances of work-related fatal injury (WRFI) yet, limited previous research has examined the contribution of weather-related factors on these incidents.

Climate change will modify weather patterns and increase the frequency of extreme weather events. Understanding the current risks posed to workers from weather related factors is critical because climate change consequences on human health and burden of WRFI are imminent.

Objective

To examine the contribution of weather-related factors to the burden of WRFI in New Zealand.

Methods

This study utilised Coronial records to create a dataset comprised of WRFI occurring in New Zealand during 2005-2014, in workers aged 15-84 years.[2] Cases in which the underlying cause of death was injury, were selected from the Mortality Collection and linked to Coronial records.[2] Cases were reviewed to determine work-relatedness[2] and weather-relatedness.

Cases were classified as weather-related if a weather condition was the direct cause of injury, or a weather condition was a contributing factor in the causal chain of events leading to the injury.[3]

Events in which there were 10, or more, fatalities were excluded.

Descriptive analysis was conducted and frequencies, proportions, and rates per 100,000 worker-years were calculated.

Photo by Alden Williams (https://www.stuff.co.nz/environment/climate-news/125299269/canterbury-floods-is-climate-change-to-blame-for-severe-weather-events)

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Key Results

- Of the 840 unintentional WRFI between 2005 and 2014, 145 fatalities (17% [95% CI 15,20) involved weather-related factors.

e.g. = 41%

Tractor rollover due to loss of traction on wet soil.

= 23% e.g.

Strong winds causing truck to overturn on bend.

- Weather-related WRFI rates were highest among individuals aged 70 to 84 years, males, and those identifying as Māori (table 1).
- The agriculture, forestry, and fisheries industries experience the highest proportion of weather-related WRFI (39%).
- Autumn is the season with the highest burden of weather-related WRFI (32%).

Table 1. Number and rate per 100,000 worker-years of WRFI by age, sex, ethnicity, stratified by weather-relatedness, 2005-2014, New Zealand

Demographic characteristics	Weather-related		Not weather-related		Indeterminate	
	n	Rate (95% CI)	n	Rate (95% CI)	n	Rate (95% CI)
Age (years)						
15-24	16	0.6 (0.3,0.9)	70	2.4 (1.9,3.0)	7	0.2 (0.1,0.5)
25-34	22	0.6 (0.4,0.9)	80	2.2 (1.7,2.7)	7	0.2 (0.08,0.4)
35-44	30	0.7 (0.5,0.9)	115	2.5 (2.1,3.0)	18	0.4 (0.2,0.6)
45-54	33	0.7 (0.5,1.0)	140	3.1 (2.6,3.7)	15	0.3 (0.2,0.6)
55-64	31	1.0 (0.7,1.4)	126	4.0 (3.4,4.8)	17	0.5 (0.3,0.9)
65-69	7	1.1 (0.4,2.3)	34	5.3 (3.7,7.5)	6	0.9 (0.4,2.1)
70-84	6	1.5 (0.6,3.3)	55	14.0 (10.6,18.3)	5	1.3 (0.4,3.0)
Sex						
Male	136	1.3 (1.1,1.5)	573	5.5 (5.1,6.0)	73	0.7 (0.6,0.9)
Female	9	0.1 (0.04,0.2)	47	0.5 (0.4,0.7)	2	0.02 (0.003,0.08)
Ethnicity						
European	111	0.8 (0.6,0.9)	434	3.0 (2.7,3.3)	60	0.4 (0.3,0.5)
Māori	28	1.3 (0.8,1.8)	127	5.7 (4.7,6.8)	12	0.5 (0.3,0.9)
Pacific	<3	0.1 (0.003,0.63)	22	2.5 (1.6,3.8)	<3	0.2 (0.03,0.81)
Asian	4	0.2 (0.06,0.6)	33	1.8 (1.2,2.5)	<3	0.05 (0.001,0.3)
MELAA & other	<3	0 (0,2.2)	3	1.8 (0.4,5.3)	<3	0 (0,2.2)
Missing	<3	-	<3	-	<3	-

Conclusions

Weather-related factors were found to make a substantive contribution to the burden of WRFI in New Zealand for the decade 2005 to 2014. Close to one in five worker deaths involved weather-related factors, indicating an emerging area of concern within occupational health and safety.

The contribution of weather-related factors to WRFI is expected to increase with changing weather patterns and increased frequency of extreme weather events due to climate change.

The findings of this research highlight the importance of identifying weather-related hazards in the workplace to address the injury risks posed to workers now and in the future.

References:

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