


Alcohol-Involved Emergency Department Encounters and Hospital Admissions at Middlemore Hospital in 2018

Supplementary Paper to the Alcohol-Related Harm Profile, 2018



This report is available in pdf format on
www.countiesmanukau.health.nz

NOTE: This report is a supplement to the comprehensive 'Counties Manukau Health Alcohol-Related Harm Profile' by K Wright, 2018.

Acknowledgements

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Disclaimer

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Every effort has been made to ensure that the information in this report is correct. Counties Manukau Health and the authors will not accept any responsibility for information which is incorrect, or any actions taken as a result of the information in this report.

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Executive Summary

Introduction

Counties Manukau Health cares about the achievement of equitable health and wellbeing for the population we serve. Hazardous alcohol use and alcohol-related harm cause large health, social, and economic burdens in Counties Manukau and are key drivers of inequities. The aim of this report is to present information on alcohol-involved Emergency Department (ED) encounters and hospital admissions at Middlemore Hospital. The report contributes to our commitment to improving, refining, and providing information for action on alcohol-related harm.

Methods

Encrypted National Health Index event data describing ED presentations and hospital admissions at Middlemore Hospital for the year January to December 2018 were extracted from Ministry of Health data sources. Numbers and percentages of **'alcohol-involved ED encounters'** and **'alcohol-involved hospital admissions'** are described, by various variables (month of the year, day of the week, ED triage category, 'accident' status, hospital specialty, and the demographic variables gender, ethnic group, age group, NZDep2013 quintile, and area of residence). A new indicator **'alcohol-involved hospital admissions'** was developed by mapping alcohol-involved ED encounter data to hospital admissions and grouping those admissions with admissions coded with alcohol specific ICD codes, to provide a broader view of alcohol-involved hospital admissions than was previously available. Health sector pricing information has been used to estimate the cost associated with alcohol-involved ED encounters and hospital admissions.

Results

1. There were 4,217 **'alcohol-involved ED encounters'** in 2018, accounting for 3.6% of all Middlemore ED presentations in 2018, and 4.5% of all ED presentations in people aged 15 years or more. The distribution of harm was inequitable, with high proportions of males, Maaori, 15-44 year olds, and those living in the most socioeconomically deprived communities experiencing harm from alcohol.
2. There were 2,877 **'alcohol-involved hospital admissions'** to Middlemore Hospital in 2018, accounting for 3.0% of all hospital admission events to Middlemore Hospital in 2018, and 4.3% of acute hospital admission events. High proportions of alcohol-involved hospital admissions were seen in males, Maaori, Pacific Peoples, NZ European/Other (non-Maaori/non-Pacific/non-Asian) ethnic groups, people aged 15-24 years, and those living in the most socioeconomically deprived communities.
3. **The cost associated with alcohol-involved ED encounters and hospital admissions** was just under \$15 million, which was 3.4% of total cost of all ED encounters and hospital admissions in 2018.

Due to various limitations, described in this report, the values described here are very likely to be under-estimates of the true burden of alcohol-related harm seen at Middlemore Hospital. Estimates in this report, from analyses using two different methods, indicate the true cost is likely to be much higher (estimate 1: \$21.0 million; estimate 2: \$25.8 million).

Conclusions

Alcohol use is associated with a substantial amount of harm and inequities experienced by people, whaanau, and communities in Counties Manukau, and creates a significant burden and cost for hospital services. Alongside the provision of healthcare services that identify and address people's needs in relation to alcohol use problems, more attention and resource needs to be directed towards the prevention of alcohol-related harms and alcohol-related inequities. Evidence-based, pro-equity, 'best-buy' policies for reducing and preventing alcohol harm have not yet been implemented in New Zealand, but are critically important for improving health and wellbeing.

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List of Abbreviations

AAF	Alcohol Attributable Fraction
CAU	Census area unit
CM	Counties Manukau
DHB	District Health Board
ED	Emergency Department
ICD	International Classification of Diseases
MOH	Ministry of Health
NFD	Not Further Defined
NHI	National Health Index
NNPAC	National Non-Admitted Patients Collection
NMDS	National Minimum Dataset
NAPHD Act 2000	New Zealand Public Health and Disability Act 2000
WHO	World Health Organization
WIES	Weighted Inlier Equivalent Separations

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1 Introduction

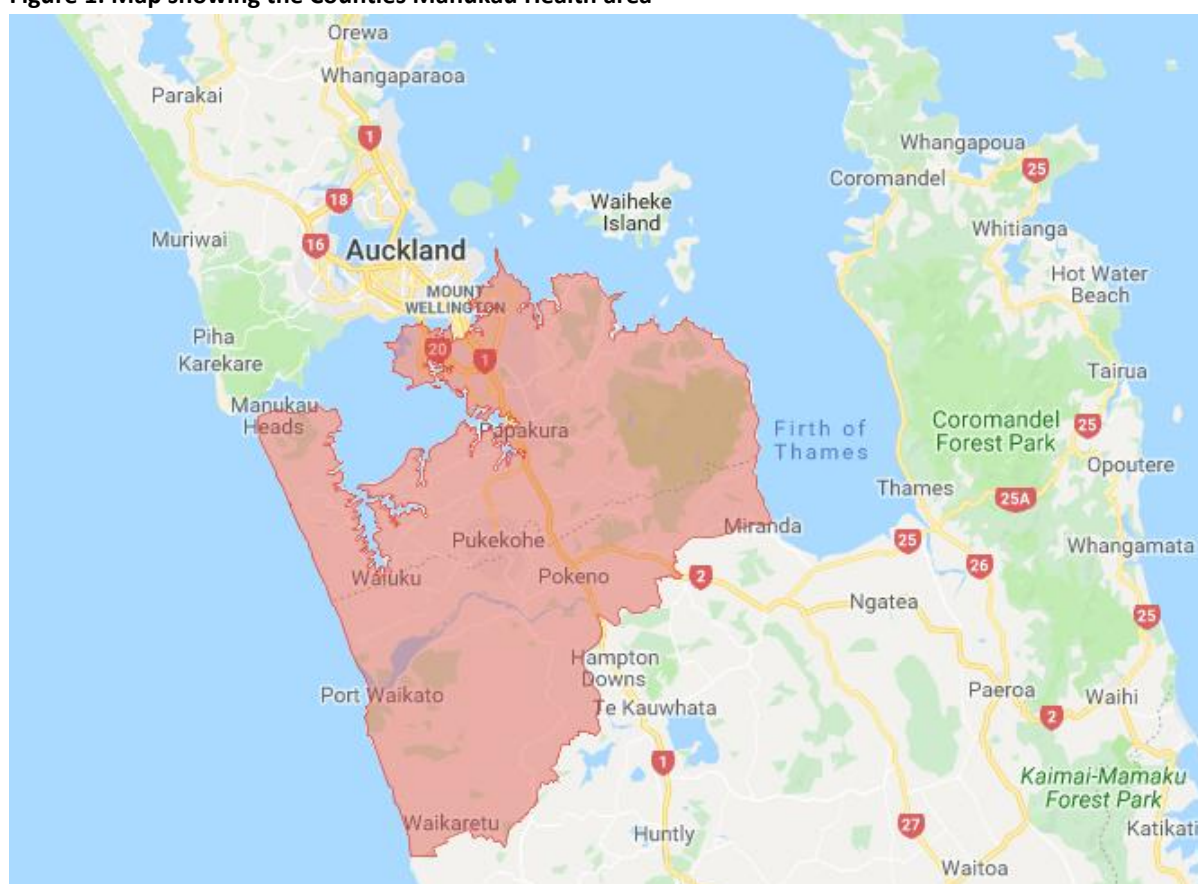
1.1 Counties Manukau Health

Counties Manukau (CM) Health (CM District Health Board) serves an estimated 569,400 people in 2019 who reside in the local authorities of Auckland, Waikato and Hauraki District.¹ See Figure 1 for a map showing the CM Health area.

CM District Health Board (DHB) is one of twenty DHBs established under the New Zealand Public Health and Disability Act 2000 (NZPHD Act 2000) to plan and fund the provision of personal health, public health and disability support services for the improvement of the health of the population. DHBs have responsibilities under the NZPHD Act 2000 to improve, promote, and protect the health of our people and communities, improve health outcomes for Māori² and reduce, with a view to eliminating, health outcomes disparities.

CM Health recognises and respects Te Tiriti o Waitangi as the founding document of New Zealand and aims to fulfil its obligations as an agent of the Crown. The relationship with the taangata whenua of the rohe is expressed through a board-to-board relationship with Mana Whenua i Taamaki Makaurau. The articles of Te Tiriti implicitly recognise the important role the health sector plays in recognising the indigenous rights of Māori and therefore the status and rights of Māori to achieve equitable health outcomes in comparison to the rest of the population.

Figure 1: Map showing the Counties Manukau Health area



¹ Population data is sourced from the District Health Board Ethnic Group population projections (2013-Census Base) –2018 update, provided by Statistics NZ to the Ministry of Health.

² Double vowels are used rather than macrons where appropriate in Te Reo words in CM Health in keeping with the Tainui convention, as Mana Whenua for the Counties Manukau district.

1.2 Alcohol-Related Harm

Hazardous alcohol use and alcohol-related harm cause large health, social, and economic burdens in CM and are key drivers of inequities. Alcohol use is a leading cause of violence and injury; a cause of many other conditions, including alcohol dependence, liver cirrhosis, cancers, cardiovascular disease, and Foetal Alcohol Spectrum Disorder; and a contributing factor to many mental health problems and suicide.

Alcohol-related problems affect many people and communities in CM and touch most departments and services with the CM Health system, as well as sectors outside health. In CM, it is estimated that approximately 13% of adults aged 15 years and over (approximately 75,000 people) have hazardous alcohol use. Prevalence of hazardous alcohol use in Maaori is disproportionately high at 29%. A range of alcohol-related harm indicators (including alcohol-related mortality, hospitalisations, and Emergency Department [ED] presentations) have been described in the 'CM Health Alcohol-Related Harm Profile' (2018), and overall this paints a picture of great concern in relation to inequities in alcohol-related harms, particularly for Maaori.³

Widespread availability and easy access to cheap alcohol are important determinants of hazardous drinking and alcohol-related harm. For people living in the CM district there are, on average, five alcohol off-licence premises within a five minute drive, and 30 off-licence premises within a 10-minute drive of where people live. One quarter of the schools and preschools are located within a five minute walk of at least one off-licence premise, and over half are located within a 10-minute walk of at least one off-licence premise.⁴

CM Health has adopted a Position Statement on reducing harms from alcohol in our communities.⁵ We support a broad and comprehensive package of evidence-based strategies that equitably prevent and reduce hazardous alcohol use and alcohol-related harm, as described in the 2010 New Zealand Law Commission report 'Alcohol in Our Lives, Curbing the Harm.'⁶ Strategies include: restricting the availability of alcohol; increasing the price of alcohol; reducing alcohol advertising, promotion and sponsorship; and ensuring drink-driving countermeasures are implemented. We also support improving and refining information on hazardous alcohol use and alcohol-related harms in the CM population and region to support efforts to improve community outcomes and reduce inequities.

CM Health is implementing an alcohol harm minimisation programme which focusses on alcohol as a key determinant of population health and wellbeing outcomes. We are focussing on prevention and early intervention actions (i.e. implementing Alcohol ABC Approach – Assessment, Brief advice, and referral for Counselling – which involves supporting front-line staff to have skilled and empathetic conversations with people and whaanau about alcohol use) and working together with communities, health agencies, and other partners to influence the social and environmental determinants of hazardous alcohol use.

³ Wright, K (2018) Counties Manukau Health Alcohol-Related Harm Profile. Counties Manukau Health. Available at: <https://countiesmanukau.health.nz/assets/About-CMH/Performance-and-planning/health-status/20180710-CMH-Alcohol-Related-Harm-Profile.pdf>

⁴ GIS analysis from Auckland Regional Public Health Service; 2016

⁵ CM Health (2017). CM Health Position Statement: Reducing harms from alcohol in our communities. Available at: <https://countiesmanukau.health.nz/assets/About-CMH/Reports-and-planning/CM-Health-Alcohol-position-statement-2017-updated.pdf>

⁶ The New Zealand Law Commission (2010). Alcohol in Our Lives, Curbing the Harm. Wellington: New Zealand Law Commission.

1.3 Purpose of this Report

As described in the 'Counties Manukau Health Alcohol-Related Harm Profile', a range of alcohol-related harm indicators can be used to provide a population-level 'picture' of alcohol-related harm. Two indicators that contribute to this 'picture' are 'alcohol-involved ED encounters' and 'alcohol-specific hospital admissions'.

The aim of this report is to build on the 2018 'Profile' and present information on alcohol-involved ED encounters and hospital admissions at Middlemore Hospital, CM Health. Firstly, alcohol-involved ED encounters are described based on responses to a screening question completed by nurses at ED triage, i.e.: "Is alcohol associated with this presentation?" Then information on alcohol-involved hospital admissions are described by linking the alcohol-involved ED encounter data with hospitalisation data and combining the results with hospital admission data on alcohol-specific (wholly attributable) hospital admissions. This provides a broader view of alcohol-related hospital admissions than the 'alcohol-specific hospital admissions' indicator alone.

The objectives of this report are:

1. To describe the volumes and percentages of alcohol-involved ED encounters at Middlemore Hospital in 2018;
2. To explore using 'alcohol-involved ED encounter' data to create a new indicator of alcohol-involved hospital admissions which includes admissions which are related (at least in part) to alcohol alongside alcohol-specific (wholly attributable) admissions; and
3. To estimate the cost associated with alcohol-involved ED encounters and admissions at CM Health in 2018.

2 Definitions and Methods

2.1 Definitions

‘Alcohol-involved ED encounters’ and ‘alcohol-specific hospital admissions’ have been previously described in the 2018 ‘Profile’ and are defined as follows:

‘Alcohol-involved ED encounters’ are presentations in patients of all ages where primary or secondary alcohol use is involved in the presentation to ED. At Middlemore Hospital ED, patients are screened at triage using the initial question “Is alcohol associated with this presentation?” The triage nurse may elect to use clinical information and judgement to determine the most appropriate response when indicated. Responses include whether the presentation involves alcohol consumption by the patient (yes), alcohol consumption by someone else (secondary), no alcohol involvement (no), or alcohol involvement is unknown or could not be determined (unknown). Note the following important points:

- Responses to this question are entered to the Patient Management information system (called ‘iPM’) at triage and, due to Information Technology limitations, are not updated later in the ED encounter or hospital admission (even if new clinical information becomes known that could, for example, change an ‘unknown’ response to another response).
- This question predominantly identifies ED presentations that involve ‘acute’ causes of alcohol harm e.g. injuries to which alcohol use was a contributing factor and alcohol intoxication, rather than chronic conditions to which alcohol contributes, such as alcohol-related liver disease and alcohol-related cancers.

‘Alcohol-specific hospital admissions’ are hospital admissions (nationally defined as encounters lasting ≥ 3 hours duration) in patients of all ages where the principal or secondary diagnosis is an alcohol-specific condition. Alcohol-specific conditions are wholly attributable to alcohol. Appendix One includes the ICD-10 codes used in this analysis to identify alcohol-specific (wholly attributable) conditions. Note two important points:

- The inclusion of secondary diagnoses, in addition to principal diagnosis, creates a broad definition of alcohol-specific hospital admissions.
- This definition does not include conditions that are partially-attributable to alcohol (such as cancers).

This report explores the development of another indicator, named **‘Alcohol-involved hospital admissions’**, which combines the two concepts described above. In addition to ‘alcohol-specific hospital admissions’, hospital admissions (i.e. encounters lasting ≥ 3 hours duration) are included if there is an ‘alcohol-involved ED encounter’ response ‘yes’ or ‘secondary’ associated with the admission.

2.2 Methods

Information in this report has been derived from analysis of encrypted (anonymised) National Health Index (NHI) event data for 2018 from two Ministry of Health sources:

- The National Non-Admitted Patients Collection (NNPAC), which stores data about non-admitted face-to-face secondary care events, such as outpatient and ED encounters, and which has included the ‘alcohol-involved ED encounter’ data since January 2018; and

- The National Minimum Dataset (NMDS), which is a national collection of public and private hospital (where these events are publicly funded) discharge⁷ information, including clinical information, for inpatients and day patients.

The population described in this report includes patients of all ages who, in 2018, presented to Middlemore Hospital ED and/or were admitted to Middlemore Hospital. This is a hospital ‘view’, rather than a CM Health residents ‘view’, and therefore includes some patients who live outside the CM Health area and presented or were referred to CM Health (e.g. to the Plastic Reconstructive & Hand Surgery service, which provides services for people living in CM, Auckland, Waitemata, and Northland DHB areas). Similarly, patients who are CM Health area residents and presented to another hospital in New Zealand with an alcohol-involved presentation, are not included in the population described in this report. It is also important to note that this report is event-based, i.e. it describes numbers and percentages of encounters or admissions in 2018 (rather than numbers and percentages of people). Therefore, one person could be counted more than once, if they had more than one encounter or admission in 2018.

To address Objectives 1 and 2, simple counts and percentages have been used to describe the volumes and proportions of alcohol-involved ED encounters and alcohol-involved hospital admissions, by various variables, i.e. month of the year, day of the week, ED triage category, ‘accident’ status, hospital specialty, and the demographic variables gender, ethnic group, age group, NZDep2013 quintile, and area of residence. There are some important points to note in relation to certain variables:

- ED triage has five categories, indicating the seriousness of the presentation (level 1 - immediately life-threatening; level 2 - imminently life-threatening or important time-critical; level 3 - potentially life-threatening, or potential adverse outcomes from delay >30 minutes, or severe discomfort or distress; level 4 – potentially serious, or potential adverse outcomes from delay >60 minutes, or significant complexity or severity, or discomfort or distress; and level 5 – less urgent, or dealing with administrative issues only).
- ‘Accident’ status has been derived from the ‘accident flag’ variable in NNPAAC; this denotes “whether a person is receiving care or treatment as a result of an accident”.⁸
- Ethnic group was determined from ethnicity coding associated with each encounter (NNPAAC) or hospital admission (NMDS) with one ethnic group being assigned using the prioritised output method.⁹
- NZDep2013¹⁰ quintile was determined from linkage to Primary Health Organisation (PHO) enrolment register meshblock¹¹ data. Quintile 1 represents the 20% of areas with least deprived NZDep2013 scores and Quintile 5 represents the 20% of areas with the most deprived NZDep2013 scores. (Note that NZDep scores refer to areas that patients live in, not the individuals themselves).

⁷ The language in this report refers to hospital ‘admissions’ however, technically, NMDS is a collection of information about hospital ‘discharges’ or ‘events’.

⁸ This is the definition provided in the NNPAAC Data Dictionary (<https://www.health.govt.nz/publication/national-non-admitted-patient-collection-data-mart-data-dictionary>)

⁹ Ministry of Health. (2017) HISO 10001:2017 Ethnicity Data Protocols. Wellington: Ministry of Health

¹⁰ NZDep is a relative index of the socioeconomic deprivation of an area, based on Census data relating to income, home ownership, employment, qualifications, family structure, housing, access to transport and internet at home. Atkinson J, Salmond C, Crampton P. (2014) *NZDep2013 Index of deprivation*. Wellington: University of Otago.

¹¹ NZDep provides a deprivation score for each meshblock in New Zealand. Meshblocks are the smallest geographical area defined by Statistics NZ, varying in size from part of a city block to large areas of rural land. Meshblock derived NZDep Quintile is more accurate for the CM Health population than the Census Area Unit (CAU) NZDep data available in the NMDS and NNPAAC collections; CAU areas are larger than meshblock areas.

- For this report, the CM area has been divided into seven geographic areas: Eastern, Maangere, Ootara, Papatoetoe, Manurewa, Papakura, and Franklin. The Census area units (CAUs) included in each area and the estimated population resident in each area are listed in Appendix Two.

To address Objective 2, the two data sources (i.e. NNPAC and NMDS) were linked using encrypted NHI. A single dataset was formed which included:

- Admission events (from NMDS) that also had a code in NNPAC for an 'alcohol-involved encounter'; *and*
- Admission events (from NMDS) that fulfilled the definition of an 'alcohol-specific hospital admission'.

For Objective 3, pricing information from the data sources has been used to estimate the cost associated with alcohol-involved ED encounters and hospital admissions. The following pricing information was used:

- 2018 price for Level 6 ED care (i.e. \$326 per encounter), for non-admitted alcohol-involved ED encounters;
- Weighted Inlier Equivalent Separations (WIES) cost weights and the pricing schedule for 2018 (i.e. \$5,068.12 per WIES), for hospital admissions.

3 Alcohol-Involved ED Encounters

During the year January to December 2018, there were 3,755 Middlemore Hospital ED encounters coded as having primary alcohol use involved with the presentation (i.e. patient's alcohol use; alcohol involvement status 'yes' in Table 1) and 462 ED encounters coded as having secondary alcohol use involved with the presentation (i.e. someone else's alcohol use contributed to the patient presenting to the ED; alcohol involvement status 'secondary' in Table 1).

These alcohol-involved ED encounters (total n = 4,217) accounted for 3.6% of all Middlemore ED presentations among all age groups, including children. Alcohol-involved ED encounters among people aged 15 years or more accounted for 4.5% of all presentations of people in this age range. Of the 4,217 alcohol-involved ED encounters, 2,287 (54%) were considered 'admitted' (i.e. the encounter lasted ≥ 3 hours), comprising 3.5% of all hospitalisations.

3.1 Alcohol-Involved ED Encounters by Month and Day

During 2018, there were on average 351 alcohol-involved presentations per month (range 285 to 488), with the largest numbers occurring in January (n=424, 4.2% of all ED presentations in January) and December (n=488, 5.2% of all ED presentations in December; see Table 1). The percentage component bar chart in Figure 2 shows that the percentages of alcohol-involved presentations by month across the year were relatively even, except for January, November, and December (10.1%, 10.8%, and 11.6%, respectively, of all alcohol-involved encounters). Over one fifth of all alcohol-related encounters occurred during January and December.

By 'day of the week', the highest numbers and percentages of alcohol-involved encounters occurred on Saturdays and Sundays (Table 1). As shown in Figure 3, about half (46.1%) of all alcohol-involved encounters were on Saturdays (21.6%) and Sundays (24.5%). 'Secondary' cases were also frequent on Mondays (20.0%) and Tuesdays (18.0%), with 70.7% of 'secondary' cases presenting across the four days of Saturdays through to Tuesdays.

3.2 Alcohol-Involved ED Encounters by Triage Category

The majority of alcohol-involved encounters (n=3,483, 82.6% of all alcohol-involved encounters) were in triage categories 3 (n= 1,969, 3.5% of all triage category 3 encounters, 46.7% of all alcohol-involved encounters) and 4 (1,514, 3.6% of all triage category 4 encounters, 35.9% of all alcohol-involved encounters). See Table 1 and Figure 4.

Although there were *relatively fewer* patients with alcohol-involved presentations triaged as category 1 (n=141, compared with n=1,969 in category 3), the *highest percentage* was seen in this category (i.e. 12.9% of triage category 1 presentations were alcohol-involved). Triage category 1 indicates immediately life-threatening and extremely serious conditions, requiring the highest level of ED resource and input. Due to the life-threatening nature of these conditions, there are often gaps in information on circumstances and clinical details, hence the high percentage of 'unknown' responses in category 1 (47.1%).

3.3 Alcohol-Involved ED Encounters by Accident Status

Of all ED encounters coded as being the result of an 'accident', just under 10% (n=2,570) were recorded as being associated with alcohol (Table 1). In comparison, of all ED encounters coded as not being accident-related, just under 2% (n=1,647) were alcohol-involved. Figure 5 shows the percentage of total alcohol-involved encounters with either a positive accident flag (61%) or a negative accident flag (39%).

Table 1: Numbers and Percentages of ED encounters by alcohol involvement status, 2018

2018	Unknown		No		Yes		Secondary		Yes or Secondary		Total
	n	%	n	%	n	%	n	%	n	%	n
Total year	5756	4.9%	106869	91.5%	3755	3.2%	462	0.4%	4217	3.6%	116842
By month											
Jan	580	5.8%	8978	89.9%	380	3.8%	44	0.4%	424	4.2%	9982
Feb	403	4.5%	8326	92.4%	259	2.9%	26	0.3%	285	3.2%	9014
Mar	399	4.0%	9293	92.6%	306	3.0%	36	0.4%	342	3.4%	10034
Apr	471	5.1%	8468	91.6%	270	2.9%	38	0.4%	308	3.3%	9247
May	396	4.1%	8854	92.5%	294	3.1%	33	0.3%	327	3.4%	9577
Jun	433	4.5%	8830	91.8%	319	3.3%	41	0.4%	360	3.7%	9623
Jul	397	3.8%	9758	93.3%	276	2.6%	25	0.2%	301	2.9%	10456
Aug	659	6.1%	9794	90.6%	320	3.0%	39	0.4%	359	3.3%	10812
Sep	578	6.0%	8794	90.5%	297	3.1%	44	0.5%	341	3.5%	9713
Oct	443	4.6%	8823	92.0%	284	3.0%	37	0.4%	321	3.4%	9587
Nov	521	5.6%	8456	90.6%	311	3.3%	50	0.5%	361	3.9%	9338
Dec	476	5.0%	8495	89.8%	439	4.6%	49	0.5%	488	5.2%	9459
By day of the week											
Mon	879	4.9%	16616	92.1%	459	2.5%	92	0.5%	551	3.1%	18046
Tue	960	5.6%	15604	91.8%	354	2.1%	84	0.5%	438	2.6%	17002
Wed	727	4.5%	15126	93.3%	329	2.0%	37	0.2%	366	2.3%	16219
Thu	857	5.2%	15272	92.2%	378	2.3%	50	0.3%	428	2.6%	16557
Fri	862	5.2%	15247	91.9%	440	2.7%	48	0.3%	488	2.9%	16597
Sat	794	5.0%	14148	89.2%	841	5.3%	70	0.4%	911	5.7%	15853
Sun	677	4.1%	14856	89.7%	954	5.8%	81	0.5%	1035	6.2%	16568
By ED triage category											
1	517	47.1%	439	40.0%	135	12.3%	6	0.5%	141	12.9%	1097
2	2255	17.6%	10108	79.0%	384	3.0%	44	0.3%	428	3.3%	12791
3	1678	3.0%	52462	93.5%	1775	3.2%	194	0.3%	1969	3.5%	56109
4	1190	2.8%	39101	93.5%	1315	3.1%	199	0.5%	1514	3.6%	41805
5	116	2.3%	4759	94.4%	146	2.9%	19	0.4%	165	3.3%	5040
By 'accident' status											
No	4553	5.1%	83876	93.1%	1459	1.6%	188	0.5%	1647	1.8%	90076
Yes	1203	4.5%	22975	85.9%	2296	8.6%	274	0.3%	2570	9.6%	26748
Missing data	0	-	18	100%	0	-	0	-	0	-	18

Notes: Includes all patients of all ages; includes all people presenting to MMH ED including those who live outside the CMDHB area; for definitions of 'Yes' and 'Secondary' alcohol involvement status see Section 2.1 and the first paragraph of Section 3; ED triage category definitions see Section 2.

Data source: NNPAC, analysis by CM Health

Figure 2: Percentages of total ED alcohol-involved encounters, by month, all ages, 2018

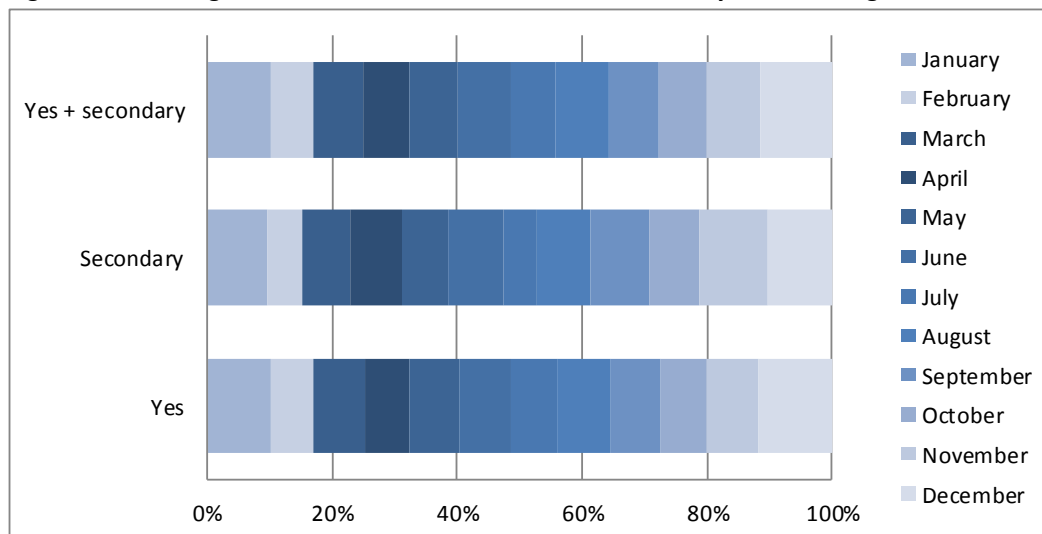


Figure 3: Percentages of total ED alcohol-involved encounters, by day of the week, all ages, 2018

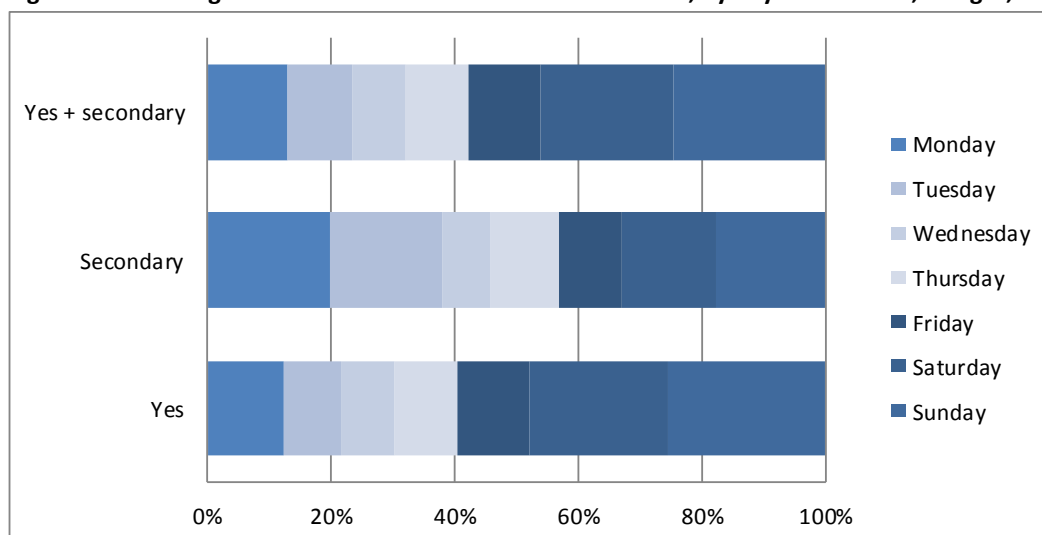
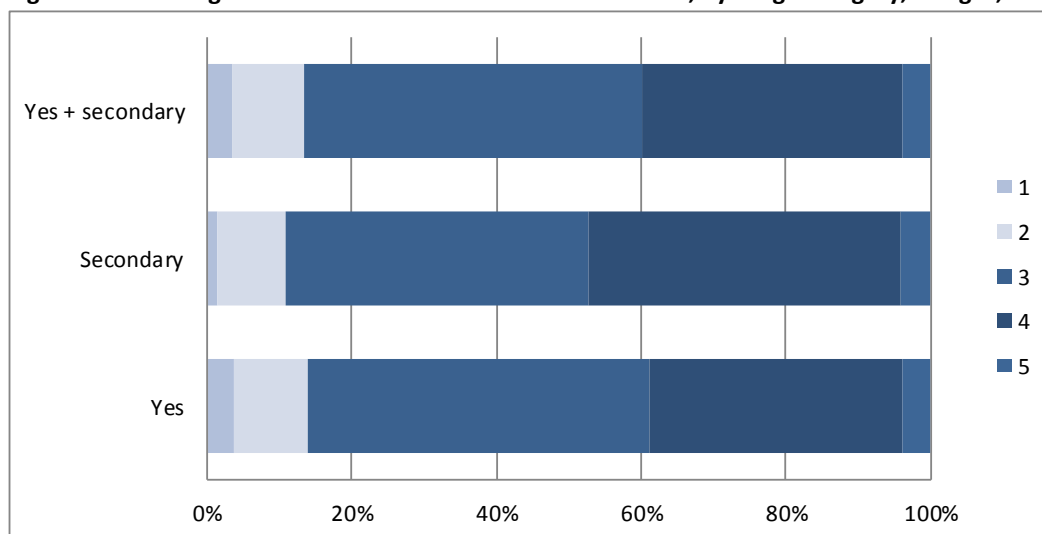
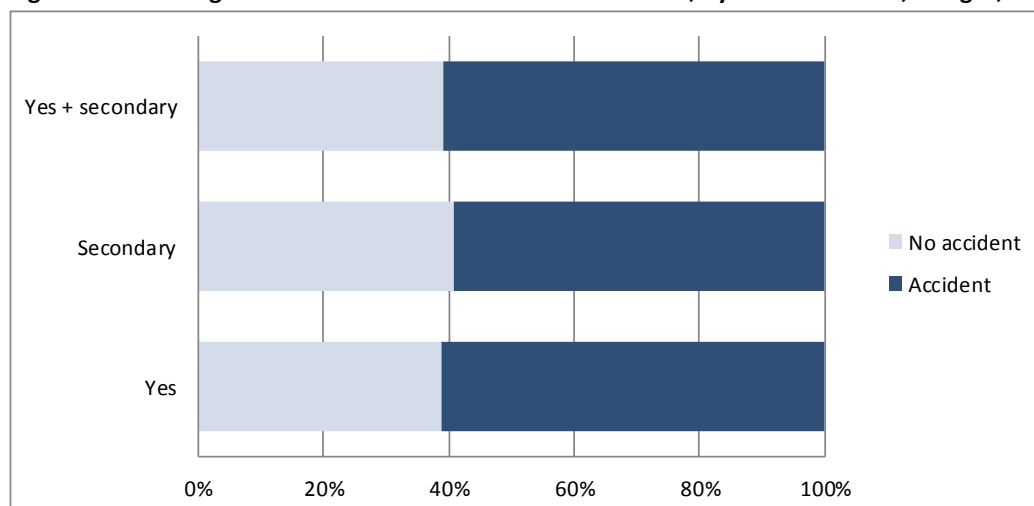


Figure 4: Percentages of total ED alcohol-involved encounters, by triage category, all ages, 2018



Note: Triage category levels range from 1 (most serious conditions) to 5 (least serious conditions). See Section 2.2 for definitions.

Figure 5: Percentages of total ED alcohol-involved encounters, by accident status, all ages, 2018



3.4 Alcohol-Involved ED Encounters by Demographic Variables

The highest numbers and/or percentages of alcohol-involved presentations within the various demographic categories, described in Table 2, were in the following groups:

- Males (n=2,785, 4.9% of all male presentations to ED were alcohol-related);
- Maaori (n= 1,246, 5.4% of all presentations among Maaori were alcohol-related);
- People aged 15-24 years (n=1,325, 8.4% of all presentations in this age group were alcohol-related);
- People aged 25-34 years (n=1,048, 6.4% of all presentations in this age group were alcohol-related);
- People aged 35-44 years (n=628, 5.2% of all presentations in this age group were alcohol-related);
- NZDep2013 quintile 5 (n=2,308, 3.9% of all presentations in this quintile were alcohol-related).

By area of residence, 968 people (23% of the total) with alcohol-involved presentations lived outside the CM Health area. From within the CM Health area, the highest number of alcohol-involved presentations were of people who live in Manurewa (n=704, 3.3% of all Manurewa residents presenting to ED in 2018), followed by Maangere (n=550, 2.8%), Eastern (n=488, 2.8%), and Papakura (n=426, 3.9%).

The percentage component bar charts in Figures 6 to 10 show the percentages each group contributes to the total number of alcohol-involved encounters. Of note:

- By gender (Figure 6), two-thirds of the total 'yes + secondary' alcohol-involved encounters were males, but for 'secondary' alcohol-involved encounters alone, just over half were males (i.e. a relatively higher proportion of females were impacted by 'secondary' alcohol-involved ED encounters [related to the alcohol use of others] than 'yes' alcohol-involved ED encounters [related to their own alcohol use]);¹²
- By ethnic groups (Figure 7), 30%, each, of the total alcohol-involved encounters were Maaori, Pacific Peoples, and NZ European/Other ethnic groups, and 10% were Asian;¹³

¹² Note, based on information in Table 2, that 49% of all ED encounters were male patients.

¹³ Note, based on information in Table 2, that 20% of all ED encounters were Maaori patients, 34% were Pacific Peoples, 31% were NZ European/Other ethnicities, and 16% were Asian.

- By age groups (Figure 8): 31% of all alcohol-involved encounters were in 15-24 year olds, and there were also high percentages in 25-34 year olds (25% of total) and 35-44 year olds (15% of total). For 'secondary' cases, 5.6% of the total 'secondary' cases were in children aged 0-4 years, with 5.9% in children aged 4-14 years;
- By NZDep2013 quintiles (Figure 9), 52% of all alcohol-involved encounters were in people who live in NZDep2013 quintile 5 areas, and 68% were in people who live in NZDep2013 quintile 4 and 5 areas;¹⁴
- By area of residence (Figure 10), 23% of the total alcohol-involved encounters were people who live outside the CM Health area, and the next highest residential areas were Manurewa (17%), followed by Maangere (13%) and Eastern (12%).¹⁵

Table 2: Numbers and percentages of ED encounters by alcohol involvement status, 2018

2018	Unknown		No		Yes		Secondary		Yes or Secondary		Total
	n	%	n	%	n	%	n	%	n	%	n
Total year	5756	4.9%	106869	91.5%	3755	3.2%	462	0.4%	4217	3.6%	116842
By gender											
Female	2681	4.5%	56034	93.2%	1208	2.0%	224	0.4%	1432	2.4%	60147
Male	3075	5.4%	50827	89.7%	2547	4.5%	238	0.4%	2785	4.9%	56687
No record	0	-	8	100%	0	-	0	-	0	-	8
By ethnic group											
Maaori	1275	5.5%	20704	89.1%	1121	4.8%	125	0.5%	1246	5.4%	23225
Pacific Peoples	1630	4.1%	36587	92.7%	1077	2.7%	153	0.4%	1230	3.1%	39447
Asian	739	4.1%	17059	93.7%	358	2.0%	53	0.3%	411	2.3%	18209
Other	2112	5.9%	32519	90.4%	1199	3.3%	131	0.4%	1330	3.7%	35961
By age group											
0-4	505	3.2%	15143	96.6%	6	0.0%	26	0.2%	32	0.2%	15680
5-14	279	3.1%	8634	96.2%	34	0.4%	27	0.3%	61	0.7%	8974
15-24	627	4.0%	13761	87.6%	1208	7.7%	117	0.7%	1325	8.4%	15713
25-34	621	3.8%	14807	89.9%	940	5.7%	108	0.7%	1048	6.4%	16476
35-44	554	4.6%	10783	90.1%	573	4.8%	55	0.5%	628	5.2%	11965
45-54	723	5.6%	11677	90.6%	438	3.4%	52	0.4%	490	3.8%	12890
55-64	787	6.4%	11143	90.7%	328	2.7%	33	0.3%	361	2.9%	12291
65-74	794	7.6%	9436	90.7%	156	1.5%	23	0.2%	179	1.7%	10409
75-84	567	6.9%	7521	92.1%	60	0.7%	15	0.2%	75	0.9%	8163
85+	299	7.0%	3964	92.6%	12	0.3%	6	0.1%	18	0.4%	4281

¹⁴ Note, based on information in Table 2, that 50% of all ED encounters in 2018 were for people who live in Quintile 5 areas and 16.7% were for people who live in Quintile 4 areas.

¹⁵ Note, based on information in Table 2, that 14% of all ED encounters were in people who live outside the CM Health area, 18% were in people who live in Manurewa area, 17% were in people who live in Maangere, and 15% were in people who live in the Eastern area.

By NZDep2013 quintile											
1	667	5.4%	11306	91.7%	311	2.5%	42	0.3%	353	2.9%	12326
2	731	5.6%	11991	91.1%	387	2.9%	57	0.4%	444	3.4%	13166
3	656	5.0%	12155	91.8%	377	2.8%	47	0.4%	424	3.2%	13235
4	889	4.6%	17939	91.9%	615	3.2%	73	0.4%	688	3.5%	19516
5	2812	4.8%	53473	91.3%	2065	3.5%	243	0.4%	2308	3.9%	58593
Missing data	1	-	5	-	0	-	0	-	0	-	6
By area of residence											
Eastern	895	5.0%	16350	92.2%	425	2.4%	63	0.4%	488	2.8%	17733
Maangere	829	4.2%	18162	92.9%	490	2.5%	60	0.3%	550	2.8%	19541
Ootara	444	5.0%	8052	91.4%	280	3.2%	30	0.3%	310	3.5%	8806
Papatoetoe	530	4.6%	10729	92.2%	341	2.9%	41	0.4%	382	3.3%	11641
Manurewa	1035	4.8%	19705	91.9%	617	2.9%	87	0.4%	704	3.3%	21444
Papakura	619	5.7%	9866	90.4%	381	3.5%	45	0.4%	426	3.9%	10911
Franklin	666	6.2%	9658	90.2%	345	3.2%	42	0.4%	387	3.6%	10711
CM nfd	1	5.9%	14	82.4%	2	11.8%	0	0.0%	2	11.8%	17
Outside CMDHB	737	4.6%	14333	89.4%	874	5.4%	94	0.6%	968	6.0%	16038

Notes: Includes all patients of all ages; includes all people presenting to Middlemore ED including those who live outside the CM Health area; for definitions of 'Yes' and 'Secondary' alcohol involvement status see Section 2.1 and the first paragraph of Section 3.

Data source: NNPAC, analysis by CM Health

Figure 6: Percentages of total ED alcohol-involved encounters, by gender, all ages, 2018

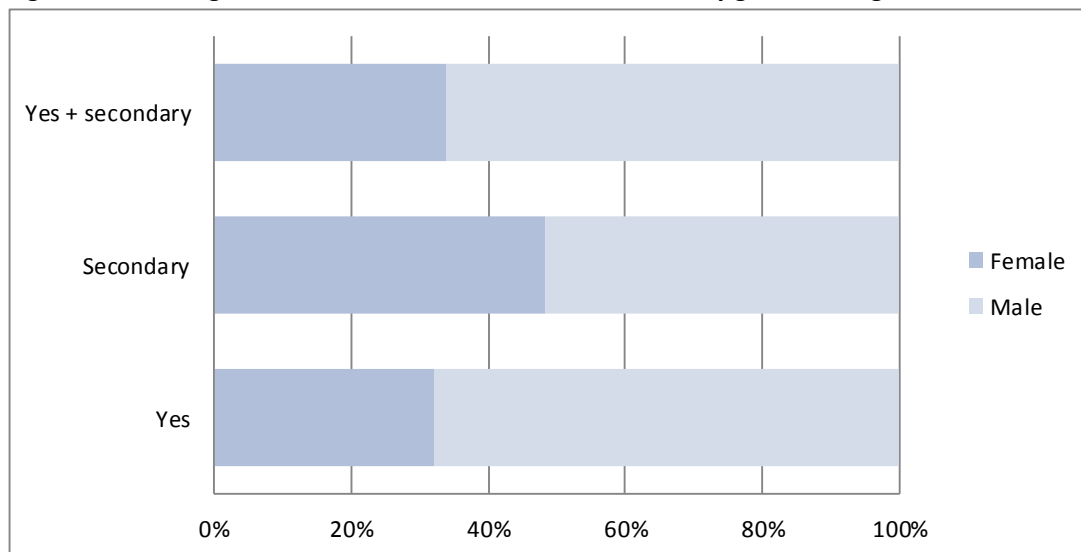


Figure 7: Percentages of total ED alcohol-involved encounters, by ethnic groups, all ages, 2018

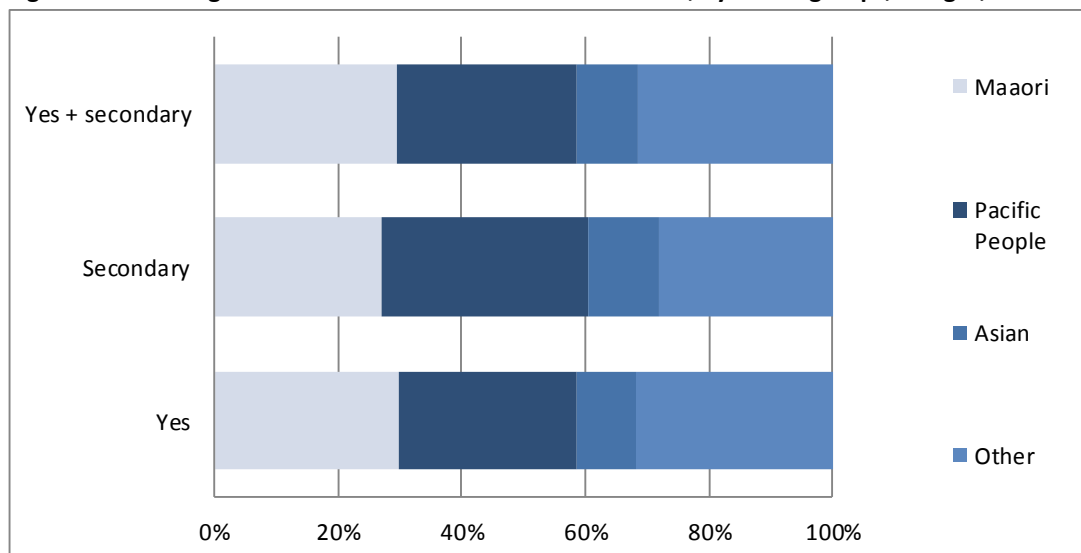


Figure 8: Percentages of total ED alcohol-involved encounters, by age groups, all ages, 2018

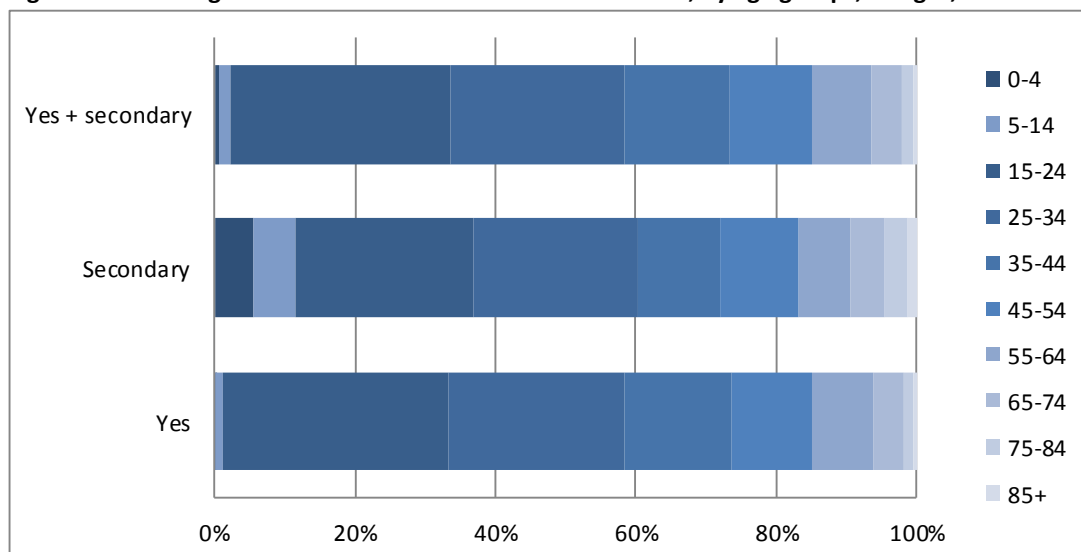


Figure 9: Percentages of total ED alcohol-involved encounters, by NZDep2013 quintiles, all ages, 2018

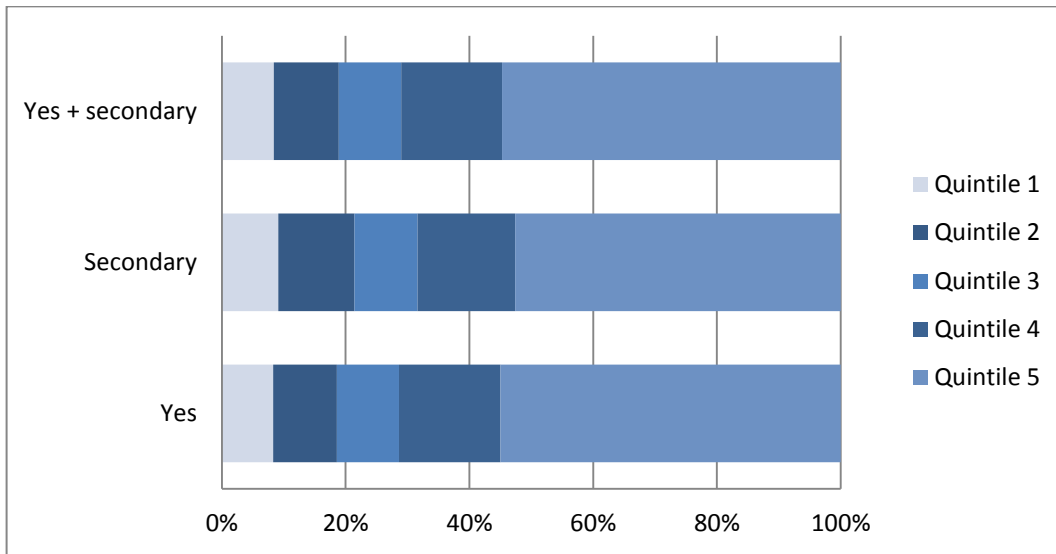
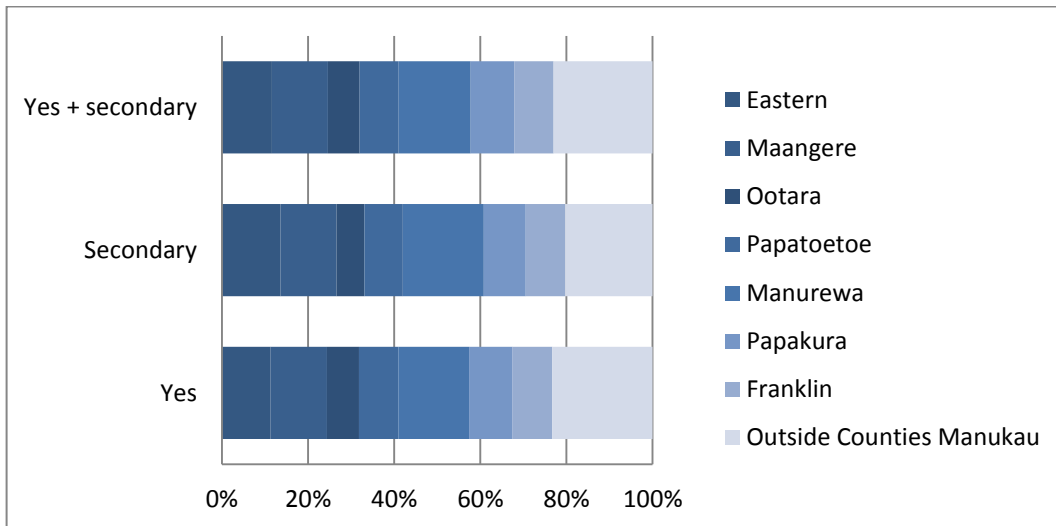


Figure 10: Percentages of total ED alcohol-involved encounters, by area of residence, all ages, 2018



4 Alcohol-Involved Hospital Admissions

Through record linkage between NMDS and NNPAC data sources, presence or absence of alcohol-specific ICD codes¹⁶ related to the hospital admission were mapped against alcohol status at ED encounter (Table 3). 2,134 hospital admissions to Middlemore Hospital were identified from NMDS which had an alcohol-involved flag of 'yes' (n=1929) or 'secondary' (n=205) recorded in NNPAC.¹⁷

Of the 2134 hospitalisations with an alcohol-involved ED encounter:

- 803 hospital admission events were coded with one or more alcohol-specific ICD codes (i.e. 52% of the 1546 hospital admissions with an alcohol-specific ICD code also had an alcohol-involved ED encounter flag);
- 1,331 hospital admission events were not coded with an alcohol-specific ICD code.

Another 743 hospital admission events were coded in NMDS with an alcohol-specific ICD code, but did not have an associated ED alcohol-involved flag of 'yes' or 'secondary' in NNPAC.

Taking this group together, i.e. hospital admissions with either a flag indicating an alcohol-involved ED encounter and/or an alcohol-specific ICD code, the total number of 'alcohol-involved hospital admissions' was 2,877 (i.e. 2,134 + 743). This equates to approximately 3.0% (i.e. 2,877 of 96,861) of all hospital admission events to Middlemore Hospital in 2018.¹⁸ Limiting this to acute admissions only (i.e. excluding arranged or elective admissions), alcohol-involved hospital admissions comprised 4.3% of all such admission events.¹⁹

4.1 Alcohol-Involved Hospital Admissions by Specialty Service

Of all the speciality service groups, the Emergency Medicine service provided care and treatment for the largest number of people with alcohol-involved hospital admissions²⁰ (n=1,130, 39.3% of all alcohol-involved hospital admissions, and 7.4% of all admissions under Emergency Medicine care). Other specialty services with substantial volumes of alcohol-involved hospital admissions were General Medicine, General Surgery, Adult Acute Mental Health Services, Plastic Surgery, Orthopaedic Surgery, Dental Surgery, Gastroenterology, and Cardiology (Table 4). The percentages of alcohol-involved hospital admissions, of total hospital admissions within each specialty group (shown in the fourth column of Table 4), were particularly high in Adult Acute Mental Health Services (17.4%), Dental Surgery (13.1%), and Gastroenterology (8.2%).

¹⁶ See Appendix One for a list of alcohol-specific ICD codes.

¹⁷ Note that there is a discrepancy between NNPAC and NDMS data sources in the number of patients with an alcohol flag who were 'admitted' (n=153). This is not unexpected as the data sources are completely different non-linked collections.

¹⁸ The denominator includes Middlemore Hospital and Tiaho Mai admissions and excludes other CMDHB facilities such as Manukau SuperClinic. It includes all hospitalisations to Middlemore including arranged admissions, elective surgery, and maternity services.

¹⁹ There were 60,499 admissions coded as acute admissions. Alcohol-involved hospitalisations in this group numbered 2610 (therefore percentage is $2610/60,499 = 4.3\%$). Excluding patients discharged home directly from the ED following their admission event, there were 35,413 hospital admission events coded as acute admissions. Of these 1188 (3.4%) involved alcohol.

²⁰ As explained in the Methodology section, a hospital admission is defined as an encounter lasting ≥ 3 hours duration (and includes people physically located in ED or acute assessment units for the duration of their encounter).

Table 3: Numbers and percentages of Middlemore Hospital admissions by presence or absence of alcohol specific ICD codes and alcohol involvement status, 2018

2018	Alcohol status at ED encounter								Blank*		Total
	Unknown		No		Yes		Secondary				
	n	%	n	%	n	%	n	%	n	%	n
ICD code specific to alcohol	92	6.0%	439	28.4%	780	50.5%	23	1.5%	212	13.7%	1546
No ICD code specific to alcohol	4461	4.7%	55257	58.0%	1149	1.2%	182	0.2%	34266	36.0%	95315
Total	4553	4.7%	55696	57.5%	1929	2.0%	205	0.2%	34478	35.6%	96861

Data sources: NNPAC for 'alcohol status at ED encounter'; NMDS for ICD codes related to hospital admissions, analysis by CM Health.

* 'Blank' indicates no NNPAC alcohol status flag (i.e. not admitted to hospital via ED triage system).

Table 4: Numbers and percentages of alcohol-involved hospital admissions at Middlemore Hospital, by specialty, 2018

Hospital specialties	Number of alcohol-involved hospital admissions	Percentage of total alcohol-involved hospital admissions	Percentage of total hospital admissions in each specialty
Emergency Medicine	1130	39.3%	7.4%
General Medicine	392	13.6%	2.0%
General Surgery	299	10.4%	2.8%
Adult Acute Mental Health Services	274	9.5%	17.4%
Plastic Surgery	233	8.1%	2.9%
Orthopaedic Surgery	215	7.5%	3.6%
Dental Surgery	106	3.7%	13.1%
Other specialties	102	3.5%	0.3%
Gastroenterology	85	3.0%	8.2%
Cardiology	41	1.4%	1.5%
Total	2877	100%	3.0%

Data sources: NNPAC and NMDS, analysis by CM Health

4.2 Alcohol-Involved Hospital Admissions by Demographic Variables

The highest numbers and/or percentages of alcohol-involved hospital admissions within the various demographic categories, described in Table 5, were in the following groups:

- Males (n=1,903, two thirds of all alcohol-involved hospital admissions, and 4.5% of all hospital admissions among male patients);
- NZ Euro/Other ethnic groups (n= 1,057, 36.7% of all alcohol-involved hospital admissions, and 3.0% of all hospital admissions in this ethnic group);
- Maaori (n= 802, 27.9% of all alcohol-involved hospital admissions, and 4.4% of all hospital admissions in this ethnic group);
- Pacific Peoples (n= 748, 26.0% of all alcohol-involved hospital admissions, and 2.6% of all hospital admissions in this ethnic group);
- People aged 15-24 years (n=724, 25.2% of all alcohol-involved hospital admissions, and 6.7% of all hospital admissions in this age group);
- NZDep2013 quintile 5 (n=1,465, 50.9% of all alcohol-involved hospital admissions, and 3.3% of all hospital admissions in this quintile);
- Manurewa area (n=489; although this residential area had the highest number of alcohol-involved admissions making up contributing 17.0% to all alcohol-involved hospital admissions, the percentage [2.7%] of total hospital admissions in Manurewa residents was similar to other areas).

Further information on numbers and percentages of alcohol-involved hospital admissions, by ethnic groups, gender, and age groups are provided in Appendix Three (Table 9 and Figures 11-15). Of note, the contribution of females as a percentage of total alcohol-involved admissions was higher among Maaori and NZ Euro/Other ethnic groups (approximately 40% females and 60% males; Figure 11) than other ethnic groups. Within-group differences in percentage components are shown in Figures 12-15. For example, within ethnic groups among females, the 15-24 year age group contributes a larger percentage to total alcohol-involved admissions in Pacific Peoples and to a lesser extent Asian populations, compared with other ethnic groups (Figure 12), and compared with the patterns seen in these ethnic groups among males (Figure 13). Within age groups (Figures 14 and 15), the majority of alcohol-involved hospital admissions in the younger age groups are for Maaori and Pacific Peoples.

Table 5: Numbers and percentages of alcohol-involved hospital admissions at Middlemore Hospital, by demographic variables, 2018

Demographic variables	Number of alcohol-involved hospital admissions	Percentage of total alcohol-involved hospital admissions	Percentage of total hospital admissions in each subgroup
<i>By gender</i>			
Female	974	33.9%	1.8%
Male	1903	66.1%	4.5%
<i>By ethnic group</i>			
Māori	802	27.9%	4.4%
Pacific Peoples	748	26.0%	2.6%
Asian	270	9.4%	1.8%
Other	1057	36.7%	3.0%
<i>By age group</i>			
0-14 years	49	1.7%	0.3%
15-24 years	724	25.2%	6.7%
25-34 years	573	19.9%	3.9%
35-44 years	431	15.0%	4.6%
45-54 years	411	14.3%	4.3%
55-64 years	361	12.5%	3.4%
65-74 years	214	7.4%	2.1%
75-84 years	95	3.3%	1.1%
85+ years	19	0.7%	0.4%
<i>By NZDep2013 quintile</i>			
1	261	9.1%	2.3%
2	317	11.0%	2.6%
3	333	11.6%	2.8%
4	485	16.9%	3.0%
5	1465	50.9%	3.3%
Missing data	16	0.6%	3.0%
<i>By area of residence</i>			
Eastern	398	13.8%	2.4%
Maangere	352	12.2%	2.4%
Ootara	203	7.1%	2.9%
Papatoetoe	283	9.8%	3.1%
Manurewa	489	17.0%	2.7%
Papakura	314	10.9%	3.0%
Franklin	313	10.9%	2.8%
CM nfd	13	0.5%	8.6%
Outside CMDHB	512	17.8%	5.0%
Total	2877	100%	3.0%

5 Cost Associated with Alcohol-Involved ED Encounters and Hospital Admissions

Of the 4,217 alcohol-involved ED encounters (described in Section 3), 1930 (46%) were considered 'non-admitted'. Assigning a price of \$326 to each non-admitted encounter,²¹ this equates to a cost of \$629,180, 3.8% of the total cost (approximately \$16,545,800) associated with all non-admitted ED encounters at Middlemore Hospital.

The cost associated with alcohol-involved hospital admissions was estimated to be \$14,271,130, 3.3% of the total cost of all hospital admissions at Middlemore Hospital. Costs by hospital specialty service are shown in Table 6. Of all the specialty service groups, Orthopaedic Surgery had the most cost associated with alcohol-involved hospital admissions (just under \$2.7 million, 18.6% of total cost associated with alcohol-involved hospital admissions, and 5.3% of the cost of all admissions to Orthopaedic Surgery). Other specialty services with substantial costs, contributing above 10% each of the total cost associated with alcohol-involved admissions were Emergency Medicine, General Medicine, Adult Acute Mental Health Services, General Surgery, and Plastic Surgery. Cost percentages, of total cost for all hospital admissions within each specialty group (shown in the fourth column of Table 6), were particularly high in Dental Surgery (16.5%), Gastroenterology (12.2%), and Adult Acute Mental Health Services (10.8%).

Table 6: Cost associated with alcohol-involved hospital admissions at Middlemore Hospital, by specialty, 2018

Hospital specialty	Cost associated with alcohol-involved hospital admissions*	Percentage of total cost associated with alcohol-involved hospital admissions	Percentage of total cost for each specialty
Emergency Medicine	\$1,792,030	12.6%	7.7%
General Medicine	\$1,753,790	12.3%	2.1%
General Surgery	\$1,619,360	11.3%	2.7%
Adult Acute Mental Health Services	\$1,679,110	11.8%	10.8%
Plastic Surgery	\$1,465,810	10.3%	4.2%
Orthopaedic Surgery	\$2,653,180	18.6%	5.3%
Dental Surgery	\$885,180	6.2%	16.5%
Other specialties	\$1,429,520	10.0%	1.1%
Gastroenterology	\$689,890	4.8%	12.2%
Cardiology	\$303,290	2.1%	1.7%
Total	\$14,271,130	100%	3.3%

*Cost values are rounded to the nearest '10'.

In summary, the cost in 2018 associated with 'non-admitted' alcohol-involved ED encounters was \$629,180 and with alcohol-involved hospital admissions was \$14,271,130, a total cost of \$14,900,310 (3.4% of total cost of all ED encounters and hospital admissions).

²¹ This is the price per encounter for Level 6 ED care (see Methodology section).

6 Discussion

This report presents information describing the burden and inequities related to harms from alcohol seen at Middlemore Hospital in 2018. Firstly, a comprehensive ‘picture’ of alcohol-involved presentations to Middlemore Hospital ED for the calendar year 2018 has been provided (Section 3). Secondly, exploratory work linking data on alcohol-involved ED presentations with data on hospital admissions has been conducted (Section 4). Thirdly, the cost to the hospital system associated with these alcohol-related encounters and admissions has been estimated (Section 5). The amount of alcohol-related harm in 2018, documented here, was substantial and the distribution of harm was inequitable, with high numbers of males, Maaori, 15-44 year olds, and those living in the most socioeconomically deprived communities experiencing harm from alcohol.

6.1 Summary of Key Findings

1. There were 4,217 **‘alcohol-involved ED encounters’** in 2018, accounting for 3.6% of all Middlemore ED presentations in 2018, and 4.5% of all ED presentations in people aged 15 years or more.
 - Of all alcohol-involved ED encounters, one fifth occurred during January and December and just under half occurred on weekends.
 - More than 80% were triaged as categories 3 and 4 (indicating potentially life-threatening or serious conditions) and three fifths were associated with an ‘accident’.
 - The highest numbers and percentages of alcohol-involved presentations were seen in males, Maaori, people in age groups 15-24 years, 25-34 years, and 35-44 years, and people living in NZDep2013 quintile 5 (i.e. the most socioeconomically deprived areas).
2. A new indicator **‘alcohol-involved hospital admissions’** was developed by mapping alcohol-involved ED encounter data to hospital admissions and grouping those admissions with admissions coded with alcohol specific ICD codes, to provide a broader view of alcohol-involved hospital admissions than was previously available.
 - There were 2,877 alcohol-involved hospital admissions to Middlemore Hospital in 2018, accounting for 3.0% of all hospital admission events to Middlemore Hospital in 2018, and 4.3% of acute hospital admission events.
 - A number of hospital speciality services cared for substantial numbers of people with alcohol-involved admissions (Emergency Medicine, General Medicine, General Surgery, Acute Mental Health Services, Plastic Surgery, Orthopaedic Surgery, Dental Surgery, Gastroenterology, and Cardiology).
 - The highest numbers and percentages of alcohol-involved hospital admissions were seen in males, NZ Euro/Other ethnic groups, Maaori, and Pacific Peoples, people aged 15-24 years, and people living in NZDep2013 quintile 5.
3. **The cost associated with alcohol-involved ED encounters and hospital admissions** was just under \$15 million, which was 3.4% of total cost of all ED encounters and hospital admissions in 2018.²²

²² The cost of \$15 million is very likely to be an underestimate. Analyses which take account of ‘under-count’ in alcohol-related hospital admissions have been explored (see next page and Appendix Four) and indicate that the true cost is likely to be much higher. Capture-recapture analysis indicates cost of alcohol-involved hospital admissions of approximately \$20.4 million. Alcohol Attributable Fraction analysis indicates cost of alcohol-attributable hospital admissions of approximately \$25.8 million. With the addition of the cost in 2018 associated with ‘non-admitted’ alcohol-involved ED encounters (\$629,180), cost estimations for alcohol-involved ED encounters and hospital admissions in 2018 are \$21.0 million (based on capture-recapture analysis) and \$26.5 million (based on AAF analysis).

6.2 Strengths and Limitations

This report builds on the previously published 'Counties Manukau Health Alcohol-Related Harm Profile' and provides additional, full-year information on alcohol-involved ED encounters, a broader view of alcohol-involved hospital admissions than we have had previously (i.e. including conditions which are partially-attributable to alcohol as well as those which are wholly-attributable), and a first attempt (at CM Health) to estimate cost associated with the burden of alcohol-related harm at Middlemore Hospital.

However, it is important to be aware of a number of important limitations and caveats, including the following:

- The values described in this report are very likely to be **under-estimates** of the burden of alcohol-related harm seen at Middlemore Hospital.
 - Whilst the ED alcohol question is probably a reasonable question for detecting alcohol-related acute harms (e.g. intoxication and injuries that are associated with alcohol use), presentations to ED with chronic alcohol-related harms (e.g. alcohol-related liver disease) or chronic conditions in which alcohol may contribute partially to causation (e.g. cancers) are unlikely to be recorded as 'alcohol-involved'. In addition, as described in Table 1 and Section 3, for 'triage category 1' patients (i.e. those with the most serious, immediately life-threatening conditions) there are, understandably, a high percentage of 'unknown' responses recorded.
 - Similarly for the hospital admission data, while the newly developed 'alcohol-involved hospital admissions' indicator provides a broader view of alcohol-related admissions than we have had previously and includes some admissions which would be considered 'partially-attributable' to alcohol, there are likely to be many admissions for conditions which are partially-attributable to alcohol that have not been counted using this methodology, particularly chronic conditions.
 - Two possible alternate methods have been explored to estimate the likely 'under-count' of the number and cost of alcohol-involved hospital admissions to Middlemore Hospital in 2018 (see Appendix Four for detail).
 1. Using a capture-recapture method, the number of alcohol-involved hospital admissions was estimated to be approximately 4,110, 43% higher than the estimate of 2,877 described in Section 4. This equates to approximately 4.2% of all hospital admission events to Middlemore Hospital in 2018.²³
 2. Applying Alcohol Attributable Fractions (AAFs) developed for England²⁴ to hospitalisation data, there were approximately 5,200 admissions to Middlemore Hospital which would be considered wholly or partially attributable to alcohol, 81% higher than the estimate of 2,877 described in Section 4. This equates to approximately 5.4% of all hospital admission events to Middlemore Hospital in 2018.²³
- Collection of the alcohol-involved flag data at ED triage is a relatively new and developing activity. The quality of the data collection process is likely to be improving over time as gradually more triage nurses receive training in alcohol assessment.

²³ Denominator used for this percentage is the total number of hospital admissions counted in the analysis in Section 4 and Table 3, i.e. n=96,861

²⁴ Note that AAFs developed for England are **not likely** to be accurate for use in Counties Manukau, due to differences in alcohol consumption patterns within the CMDHB population, and hence this method has not been used in this report. However, high level estimation is provided here for comparison in order to highlight the burden that is missing (from alcohol-related chronic conditions) and the opportunity to utilise AAFs in the future once appropriate AAFs for our population are available.

- The question allows for clinical judgement to be exercised in order to determine the most appropriate response and therefore leads to some variation in how the question is managed and answered by triage staff.
- As previously outlined in the Methodology section, responses to this question are entered to the Patient Management information system at triage and are not able to be updated later in the ED encounter or hospital admission. This may lead to some inaccuracies, e.g. an encounter may be coded as 'no' not alcohol-involved at triage, when in fact during the clinical assessment it is discovered that the encounter is in fact 'yes' alcohol-involved. It is less likely that an encounter coded 'yes' alcohol-involved at ED triage would subsequently be found not to be alcohol related.
- The alcohol-involved ED data are not likely to be comparable between EDs across New Zealand due to differences in factors such as training and support for staff regarding how to ask about alcohol and record information, alcohol data collection and recording processes and how these are integrated with work processes, and IT systems for collecting and recording information on alcohol in ED.
 - A recently published analysis of data on alcohol-related presentations in people aged ≥15 years at Auckland Hospital ED during the 12 months November 2017 to October 2018 reported that 7% (n=5,130) of presentations were alcohol-related, with the majority being male (65%) and aged 20-39 years (52%).²⁵ This is a larger burden than described for Middlemore Hospital ED. As part of the process for determining whether alcohol is associated with a person's presentation at Auckland Hospital ED, the alcohol question has been incorporated into the nursing assessment form, rather than being a 'triage' question as it is at Middlemore Hospital.

6.3 Implications

Alcohol use causes a substantial amount of harm to people, whaanau, and communities, and creates a significant burden and cost for the health system in Counties Manukau, as described in this report. Inequities in harm are unacceptable, unfair, and a breach of Te Tiriti of Waitangi and indigenous rights for Maaori. Whilst people, whaanau, communities, and the health sector (and the taxpayer) experience the harm and pay the costs associated with alcohol, as described by Allen et al in a recent Lancet article, the alcohol industry and its shareholders make enormous profits.²⁶

Alcohol-related harms to people and cost to the health system are preventable. There are a range of evidence-based strategies that would reduce and help to prevent harm.^{27,28} Pricing policies that increase the price of alcohol, restrictions to alcohol availability, and regulation/restriction of alcohol marketing, promotions, and sponsorship are the most pro-equity, cost-effective 'best-buy' strategies for prevention of alcohol-related harms.²⁹ Implementation of healthy public policies such as these, at national level, would help to redress the imbalance of power that currently exists between the unhealthy alcohol commodity industry and the population of New Zealand. Alongside

²⁵ Svenson G, Kool B, Buller S. (2019) The burden of alcohol-related presentations to a busy urban New Zealand hospital emergency department. NZMJ. 132(1504)

²⁶ Allen LN, Hatefi A, Feigl AB. (2019) Corporate profits versus spending on non-communicable disease prevention: an unhealthy balance. Lancet Global Health. 7(11):e1482-e1483

²⁷ The New Zealand Law Commission (2010). Alcohol in Our Lives, Curbing the Harm. Wellington: New Zealand Law Commission.

²⁸ Babor T. (2010) Alcohol: No ordinary commodity: research and public policy. Oxford; Oxford University Press.

²⁹ Chisholm D, Moro D, Bertram M, et al. (2018) Are the 'Best Buys' for alcohol control still valid? An update on the comparative cost-effectiveness of alcohol control strategies at global level. J Stud Alcohol Drugs. 79(4):514-522

‘upstream’ policies to prevent harm, it also critical that people have equitable access to high quality and culturally-appropriate healthcare services to identify and help with alcohol use problems.

In order to address alcohol harm prevention priorities for Māori and to uphold Te Tiriti o Waitangi, CM Health supports Māori leadership in taking actions on alcohol. This includes supporting the kaupapa of the Waitangi Tribunal Health Services and Outcomes Inquiry, and specifically, ‘Wai 2624 – the Alcohol Claim’ brought by a Counties Manukau community champion, which resonates strongly with public health views on what needs to be done to reduce alcohol-related harm and inequities. The claim states that:

- *“The sale, supply, and consumption of alcohol in Aotearoa/New Zealand is resulting in ill-health amongst Māori, disparities in health outcomes for Māori, and is actively driving health inequalities between Māori and other New Zealanders,”* and
- *“These prejudicial effects are being caused, at least in part, by omissions made by the Crown in its regulation of the sale, supply and consumption of alcohol, and particularly because: a) the Crown has failed to implement all of the policies and recommendations made by the Law Commission in its 2010 Report ‘Alcohol In Our Lives: Curbing the Harm’, and b) the Sale and Supply of Alcohol Act 2012 is inconsistent with the principles of the Treaty of Waitangi”.*³⁰

In summary, CM Health cares about the achievement of equitable health and wellbeing for the population we serve. Alongside the provision of healthcare services that identify and address people’s needs in relation to alcohol use problems, more attention and resource should be directed towards the prevention of alcohol-related harms and alcohol-related inequities. Evidence-based, pro-equity, ‘best-buy’ policies for reducing and preventing alcohol harm have not yet been implemented in New Zealand, but are critically important for improving health and wellbeing.

³⁰ Wai 2624 – the Alcohol Claim, available at:

https://forms.justice.govt.nz/search/Documents/WT/wt_DOC_122228675/Wai%202624%2C%201.1.1.pdf

Appendix One

Table 7: ICD code list for alcohol-specific condition categories

ICD code descriptor	ICD-10 code	Condition category
Alcohol-induced pseudo-Cushing's syndrome	E24.4	Endocrine
Wernicke's encephalopathy	E51.2	Neuro-psychiatric
Mental and behavioural disorders due to use of alcohol	F10	Neuro-psychiatric
Degeneration of nervous system due to alcohol	G31.2	Neuro-psychiatric
Alcoholic polyneuropathy	G62.1	Neuro-psychiatric
Alcoholic myopathy	G72.1	Neuro-psychiatric
Alcoholic cardiomyopathy	I42.6	Cardiovascular
Alcoholic gastritis	K29.2	Digestive
Alcoholic liver disease	K70	Digestive
Alcohol-induced acute pancreatitis	K85.2	Digestive
Alcohol-induced chronic pancreatitis	K86.0	Digestive
Foetal alcohol syndrome (dysmorphic)	Q86.0, O35.4, P04.3	Maternal, infant and child
Excess alcohol blood levels	R78.0	Evidence of alcohol involvement
Toxic effect of alcohol, Ethanol	T51.0	Toxic effect of alcohol
Toxic effect of alcohol, Methanol	T51.1	Toxic effect of alcohol
Toxic effect of alcohol, other alcohols	T51.8	Toxic effect of alcohol
Toxic effect of alcohol, unspecified	T51.9	Toxic effect of alcohol
Accidental poisoning by and exposure to alcohol	X45	Unintentional injuries
Intentional self-poisoning by and exposure to alcohol	X65	Intentional injuries
Poisoning by and exposure to alcohol undetermined intent	Y15	Unintentional injuries
Evidence of alcohol involvement determined by blood alcohol level	Y90	Evidence of alcohol involvement
Evidence of alcohol involvement determined by level of intoxication	Y91	Evidence of alcohol involvement

Appendix Two

Table 8: Counties Manukau areas

Counties Manukau areas and estimated populations*	CAUs included in each area
Eastern Estimated population: 163,210	Aberfeldy, Baverstock Oaks, Beachlands – Maraetai, Bleakhouse, Botany Downs, Bucklands and Eastern Beaches, Bucklands Beach South, Burswood, Clevedon, Cockle Bay, Dannemora, Donegal Park, Edgewater, Elsmore Park, Golfland, Greenmount, Halfmoon Bay, Highbrook, Howick Central, Howick West, Kawakawa-Orere, Kilkenny, Maungamaungaroa, Mellons Bay, Millhouse, Mission Heights, Murvale, Ormiston, Pakuranga Central, Pakuranga East, Pakuranga North, Pigeon Mountain North, Pigeon Mountain South, Point View, Redoubt East, Shelly Park, Sunnyhills, Turanga
Maangere Estimated population: 71,880	Ambury, Aorere, Arahanga, Favona North, Favona South, Favona West, Harania East, Harania North, Harania West, Mangere Bridge, Mangere Central, Mangere East, Mangere South, Mangere Station, Mascot, Viscount
Ootara Estimated population: 36,175	Clover Park, Ferguson, Flat Bush, Otara East, Otara North, Otara South, Otara West, Redoubt North
Papatoetoe Estimated population: 48,240	Dingwall, Grange, Kohuora, Manukau Central, Middlemore, Papatoetoe Central, Papatoetoe East, Papatoetoe North, Papatoetoe West, Puhinui, Puhinui South, Wymondley
Manurewa Estimated population: 93,040	Beaumont, Burbank, Clendon North, Clendon South, Hillpark, Homai East, Homai West, Hyperion, Leabank, Manurewa Central, Manurewa East, Mill Road, Randwick Park, Redoubt South, Rowandale, Totara Heights, Wattle Farm, Weymouth East, Weymouth West, Wiri
Papakura Estimated population: 58,930	Ardmore, Bremner, Drury, Hingaia, Massey Park, North East Papakura, Opaheke, Pahurehure, Papakura Central, Papakura East, Papakura North, Papakura South, Red Hill, Rosehill, Takanini North, Takanini South, Takanini West
Franklin Estimated population: 74,170	Awhitu, Bledisloe Park, Bombay, Buckland, Buckland South, Eden Road - Hill Top, Glenbrook, Hunua, Kaiaua, Kingseat, Mangatawhiri, Onewhero, Opuawhanga, Otatau, Paerata - Cape Hill, Paparata, Patumahoe, Pokeno, Pukekohe North, Pukekohe West, Pukeoware, Redoubt, Runciman, South Waiuku, Tuakau, Waiuku East, Waiuku West, Whangapouri Creek

**Estimated population figures are based on Statistic NZ estimated resident population projections for 2017 (2013 Census based), being the most recently available CAU level estimates*

Appendix Three

Table 9: Numbers and percentages of alcohol-involved hospital admissions at Middlemore Hospital, by ethnic group, gender, and age groups, 2018

2018	Maaori			Pacific Peoples			Asian ethnic groups			Other ethnic groups			Total	
	n	% (column)	% (row)	n	% (column)	% (row)	n	% (column)	% (row)	n	% (column)	% (row)	n	% (column)
Female														
0-14 yrs	10	2.9%	55.6%	4	2.3%	22.2%	1	2.4%	5.6%	3	0.7%	16.7%	18	1.8%
15-24 yrs	97	28.0%	36.9%	81	46.3%	30.8%	14	33.3%	5.3%	71	17.3%	27.0%	263	27.0%
25-34 yrs	98	28.3%	51.0%	34	19.4%	17.7%	8	19.0%	4.2%	52	12.7%	27.1%	192	19.7%
35-44 yrs	59	17.1%	35.8%	26	14.9%	15.8%	8	19.0%	4.8%	72	17.5%	43.6%	165	16.9%
45-54 yrs	48	13.9%	34.3%	18	10.3%	12.9%	5	11.9%	3.6%	69	16.8%	49.3%	140	14.4%
55-64 yrs	21	6.1%	20.6%	7	4.0%	6.9%	2	4.8%	2.0%	72	17.5%	70.6%	102	10.5%
65-74 yrs	9	2.6%	17.6%	4	2.3%	7.8%	1	2.4%	2.0%	37	9.0%	72.5%	51	5.2%
75+ yrs	4	1.2%	9.3%	1	0.6%	2.3%	3	7.1%	7.0%	35	8.5%	81.4%	43	4.4%
Total	346	100%	35.5%	175	100%	18.0%	42	100%	4.3%	411	100%	42.2%	974	100%
Male														
0-14 yrs	12	2.6%	38.7%	10	1.7%	32.3%	1	0.4%	3.2%	8	1.2%	25.8%	31	1.6%
15-24 yrs	143	31.4%	31.0%	172	30.0%	37.3%	29	12.7%	6.3%	117	18.1%	25.4%	461	24.2%
25-34 yrs	110	24.1%	28.9%	131	22.9%	34.4%	37	16.2%	9.7%	103	15.9%	27.0%	381	20.0%
35-44 yrs	69	15.1%	25.9%	65	11.3%	24.4%	50	21.9%	18.8%	82	12.7%	30.8%	266	14.0%
45-54 yrs	62	13.6%	22.9%	69	12.0%	25.5%	34	14.9%	12.5%	106	16.4%	39.1%	271	14.2%
55-64 yrs	40	8.8%	15.4%	63	11.0%	24.3%	56	24.6%	21.6%	100	15.5%	38.6%	259	13.6%
65-74 yrs	11	2.4%	6.7%	54	9.4%	33.1%	16	7.0%	9.8%	82	12.7%	50.3%	163	8.6%
75+ yrs	9	2.0%	12.7%	9	1.6%	12.7%	5	2.2%	7.0%	48	7.4%	67.6%	71	3.7%
Total	456	100%	24.0%	573	100%	30.1%	228	100%	12.0%	646	100%	33.9%	1903	100%

Note: 'Column %' indicates percentage of total alcohol-involved hospital admissions within each ethnic group (for females and males separately); 'row %' indicates percentage of total alcohol-involved hospital admissions within each age group (for females and males separately). Data sources: NNPAC and NMDS

Figure 11: Percentage of total alcohol-involved hospital admissions, ethnic groups by gender, 2018

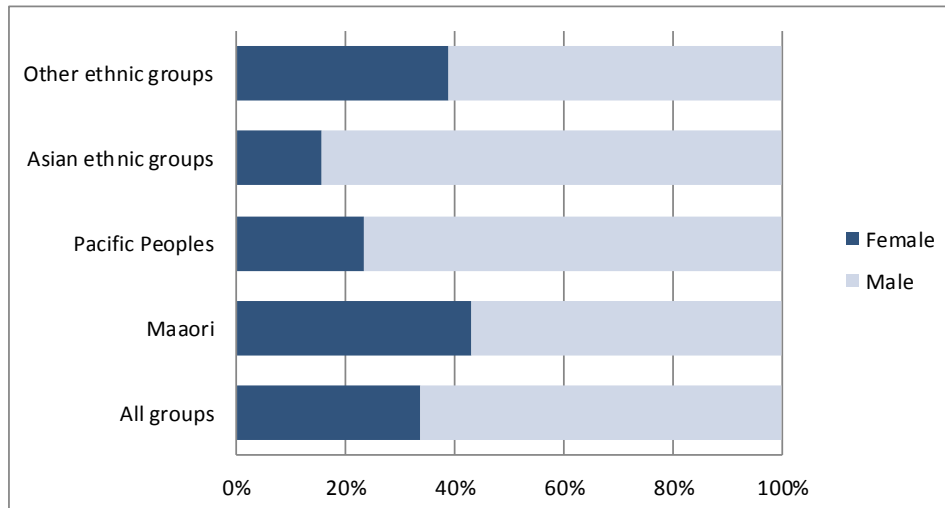


Figure 12: Percentage of total alcohol-involved hospital admissions in females, ethnic groups by age groups, 2018

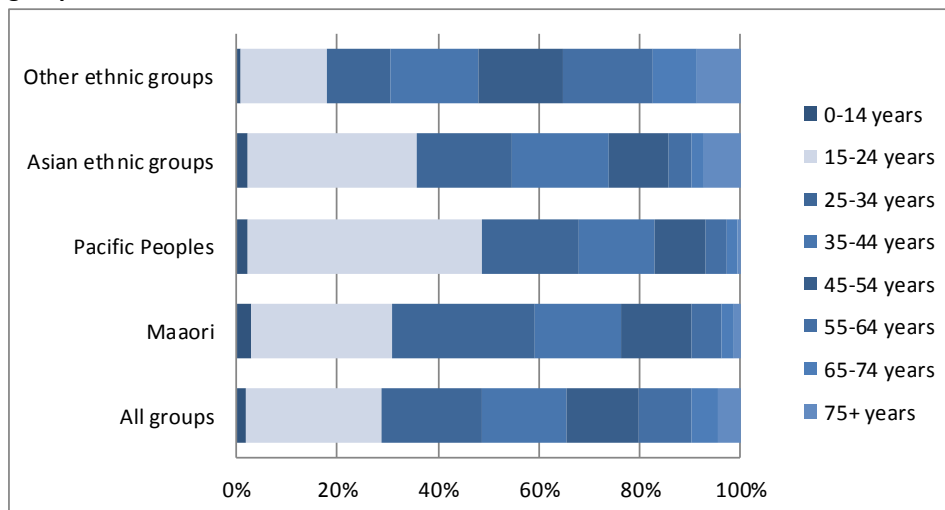


Figure 13: Percentage of total alcohol-involved hospital admissions in males, ethnic groups by age groups, 2018

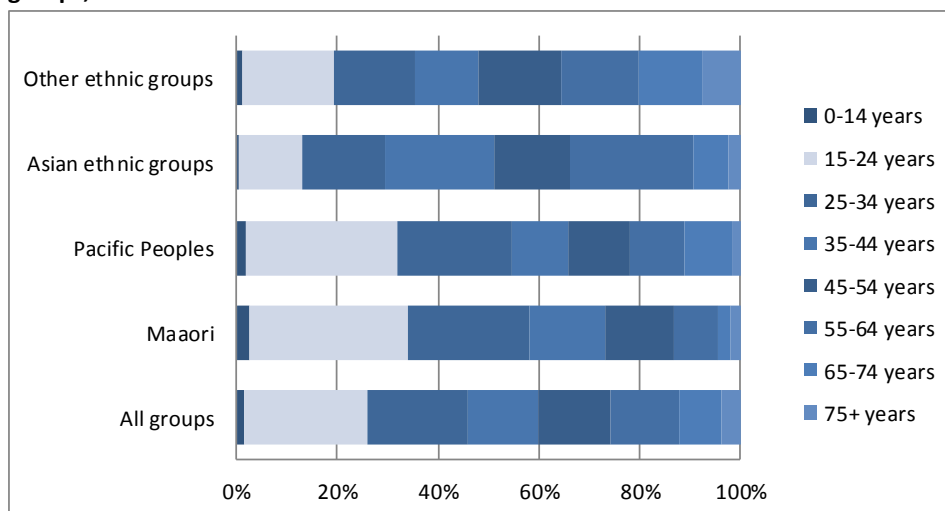


Figure 14: Percentage of total alcohol-involved hospital admissions in females, age groups by ethnic groups, 2018

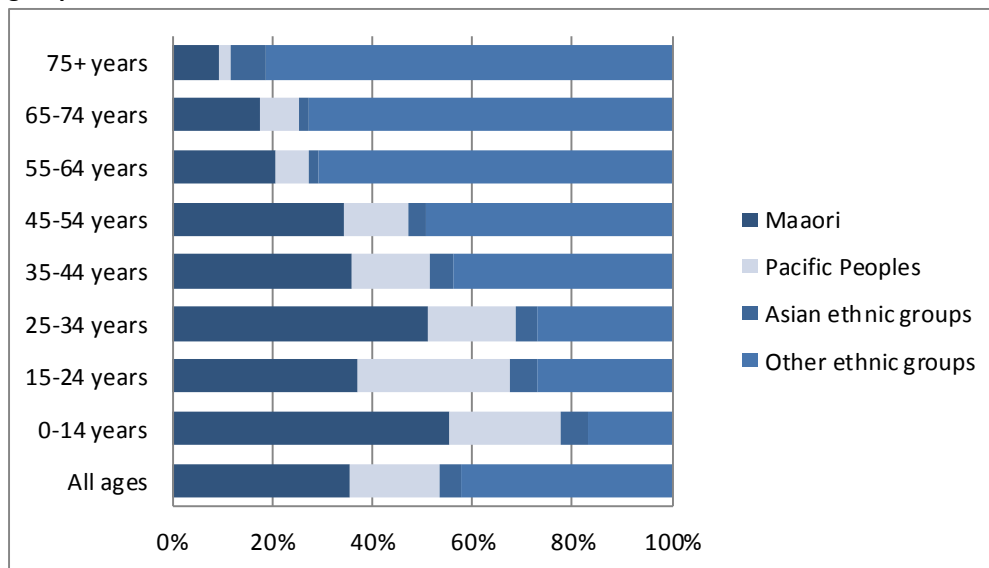
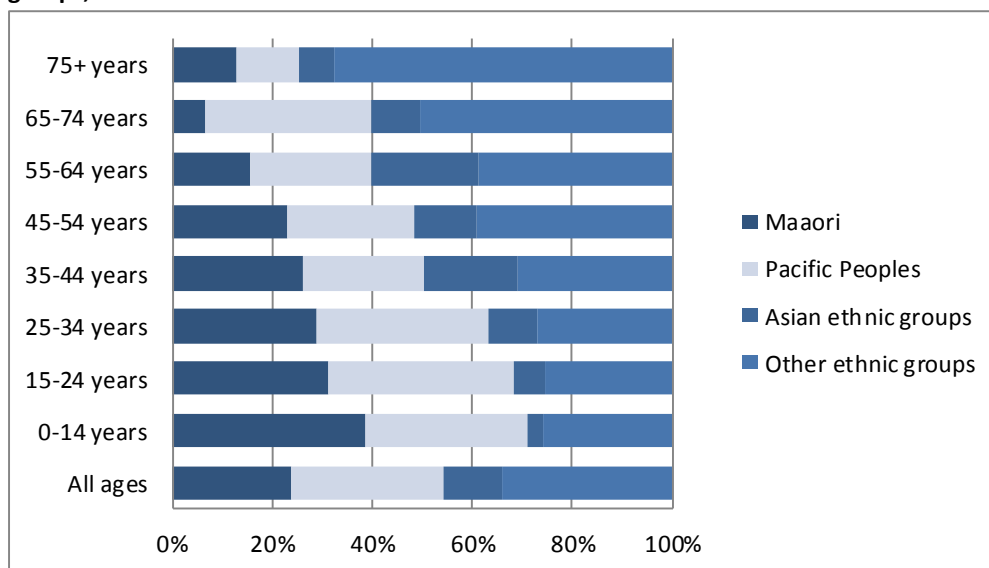


Figure 15: Percentage of total alcohol-involved hospital admissions in males, age groups by ethnic groups, 2018



Appendix Four

1. Using a capture-recapture method to estimate the number of alcohol-involved hospital admissions to Middlemore Hospital in 2018

Capture-recapture is an indirect method which allows estimation of the total number of events or the total size of a population based on the degree of overlap between two or more separate samples (or sources of information) of the population under study. Capture-recapture methods were first used in the context of counting fish and wildlife populations and have been adapted for other purposes including epidemiology studies.^{31,32,33}

The simplest capture-recapture model is the two-sample/list model, used to estimate the unknown size of a population. The calculation used in this report is:

$$N_p = (n_1 \times n_2) / m_2$$

Where n_1 is the number of people identified in one source, n_2 is the number identified in another source, m_2 is the number common to both sources, and N_p (known as the 'Petersen estimator') is the estimate of the true total number.^{34,35}

To estimate the number of alcohol-involved hospital admissions:

- **$N_1 = 2134$** , the number of hospital admissions to Middlemore Hospital identified from NMDS which had an alcohol-involved flag of 'yes' or 'secondary' recorded in NNPAAC, as described in Section 4 p20. This is the first information source/list in the model.
- **$N_2 = 1546$** , the number of hospital admissions to Middlemore Hospital, identified from NMDS, with one or more alcohol-specific ICD codes related to the hospital admission (see Table 3). This is the second information source/list in the model.
- **$M_2 = 803$** , the number of hospital admissions in both information sources/lists.

i.e.: $N_p = (2134 \times 1546) / 803 = 4,109$

In summary, it is estimated through using a capture-recapture method that the number of alcohol-involved hospital admissions to Middlemore Hospital in 2018 was approximately 4,110 (rounded to closest '10'), which is 43% higher than the estimate of 2,877 described in Section 4.

Applying this 43% increase to the estimation of cost associated with alcohol-involved hospital admissions (i.e. \$14,271,130; from Section 5), results in a revised estimation of cost associated with alcohol-involved hospital admissions of 20.4 million, approximately 4.8% of the total cost of all hospital admissions at Middlemore Hospital in 2018.

³¹ International Working Group for Disease Monitoring and Forecasting. Capture-recapture and multiple-record systems estimation I: History and Theoretical Development. *Am J Epidemiology* 1995;142(10):1047-58.

³² International Working Group for Disease Monitoring and Forecasting. Capture-recapture and multiple-record systems estimation II: Applications in Human Disease. *Am J Epidemiology* 1995;142(10):1059-68.

³³ Corrao G, Bagnardi V, Vittadini G, Favilli S. Capture-recapture methods to size alcohol related problems in a population. *J Epidemiol Community Health* 2000;54(8):603-10.

³⁴ Jackson G, Wright C, Thornley S, et al. Potential unmet need for gout diagnosis and treatment: capture-recapture analysis of a national administrative dataset. *Rheumatology* 2012;51(10):1820-4.

³⁵ Lugardon S, Dexboeuf K, Fernet P, et al. Using a capture-recapture method to assess the frequency of adverse drug reactions in a French university hospital. *Br J Clin Pharmacol* 2006;62(2):225-31.

2. Using Alcohol Attributable Fractions to estimate the number of hospital admissions attributable to alcohol use

Population Attributable Fractions are proportions of health conditions (e.g. a type of cancer) or external causes (e.g. injury mechanisms) that are attributable to exposure to specific risk factors (e.g. alcohol use) in a population. Public Health England has developed Alcohol Attributable Fractions (AAFs) to estimate the number of deaths and hospital admissions that are related to alcohol consumption.

AAFs developed for England are not likely to be accurate for use in Counties Manukau, due to differences in alcohol consumption patterns within the CMDHB population, and hence this method has not been used in the main body of this report. However, a high level estimation is provided below for comparison in order to highlight the burden that is missing (from alcohol-related chronic conditions) and the opportunity to utilise AAFs in the future once appropriate AAFs for our population are available.

AAFs for wholly attributable, partially attributable chronic conditions, and partially attributable acute conditions, have been taken from tables in the Public Health England document 'Local Alcohol Profiles for England 2017 user guide'.³⁶ When these are applied to hospital admissions for Middlemore Hospital, an estimated 5,200 admissions in 2018 would have been described as alcohol attributable hospital admissions, which is 81% higher than the estimate of 2,877 described in Section 4.

Applying this 81% increase to the estimation of cost associated with alcohol-involved hospital admissions (i.e. \$14,271,130; from Section 5), results in a revised estimation of cost associated with alcohol-attributable hospital admissions of 25.8 million, approximately 6.1% of the total cost of all hospital admissions at Middlemore Hospital in 2018.

Table 10: Number of hospital admissions associated with alcohol attributable conditions

Alcohol attributable conditions	Approximate number of hospital admissions
Partially attributable conditions – acute conditions (including unintentional injuries such as road/pedestrian accidents, poisoning, fall injuries, fire injuries, drowning; and intentional injuries such as self-harm and assault)	1590
Partially attributable conditions – chronic conditions (including tuberculosis; cancers of lip, oral cavity, larynx, pharynx, oesophagus, colorectum, liver, and breast; epilepsy; cardiovascular disease; respiratory infections; liver disease, pancreatitis; spontaneous abortion; and low birth weight)	2400
Wholly attributable conditions (including those conditions listed in Appendix One)	1560
Total wholly or partially attributable conditions	5200*

*Note: The total number of hospital admissions is not a sum of the previous three categories/rows as one person's admission may have more than one condition represented (as all diagnostic codes were considered in the analysis).

³⁶ Public Health England. (2017) Local Alcohol Profiles for England 2017 user guide. Available from: https://fingertips.phe.org.uk/profile/local-alcohol-profiles/supporting-information/supporting_docsLAPE2