Health New Zealand
Te Whatu Ora

Alcohol-related Emergency Department presentations to Southland Hospital in 2023

Te Waipounamu, Southern District

13/12/2024

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Purpose: Update of a yearly report

Data: Southern District Patient Information System extract

Limitations: Issues with data recording quality and quality deterioration does not permit direct comparisons of visit counts from year to year and between hospitals.

Introduction

This report is based on the dataset recording presentations to Emergency Department of Southland Public Hospital in 2023 (extracted in October 2024) and compared to the previous 5-year values and averages (2018 to 2022). Southland Hospital is located in Invercargill City, which has an overall resident population of ~ 68 000 with total yearly ED visits of ~ 38 000. Whether a presentation is related to alcohol consumption or not is recorded in a flag variable, required by the Ministry of Health, which captures the following grades:

- Yes - alcohol consumption is directly associated with this presentation,
- Secondary - consequence of others' alcohol consumption,
- No - alcohol consumption is NOT directly associated with this presentation,
- Not known - couldn't determine if alcohol is associated with this presentation.

Although the alcohol variable is mandatory, there are issues with data recording quality (see last section). Missing records and those recorded as unrelated to alcohol are combined in a single category. In the comparison dataset a data gap in early 2021 is filled with a 4-year average estimate

Alcohol-related presentations are compared to unrelated ones along the following dimensions:

- Absolute visit counts and visit periodicity (day of the week and hour of the day),
- Basic demographic traits of presenters (age and gender),
- Basic clinical characteristic of the visits (mode of arrival, triage and admission rates).

Data recording quality

In 2023 a total of 70 ED visits were diagnosed with 100% alcohol-attributable conditions (ICD-10 codes F10.0, F10.2, F10.3, F10.4, F10.5, K29.2, K70.3, R78.0 and T51.0). Of those, 21 (30%) were not labelled as alcohol-related by Ministry of Health alcohol flag variable, suggesting undercounting of true alcohol-related presentations. The percentage of such un-flagged ED visits wholly attributable to alcohol consumption increased from 18% in 2018 to 30% in 2023.

Table 1. ED visits wholly attributable to alcohol flagged and un-flagged as related to alcohol.

	2018	**2019**	**2020**	**2021**	**2022**	**2023**
Total	87	93	87	82	73	70
Unflagged	16 (18%)	15 (16%)	20 (23%)	31 (38%)	22 (30%)	21 (30%)

Conditions related to acute alcohol consumption (F10.0-F10.9) comprise 88% of the full list of codes wholly attributable to alcohol. The fraction of unflagged visits with these "acute codes" is higher in the past three years (2021 – 2023) compared to 2018 - 2020, with 30% missing the flag in 2023. Since the conditions wholly attributable to acute alcohol consumption represent the least ambiguous situation for the application of the alcohol flag, the trend depicted in Figure 1 strongly suggests a poor and declining quality of alcohol flag use over time. Therefore, direct comparisons of visit counts from year to year and between hospitals are not recommended.
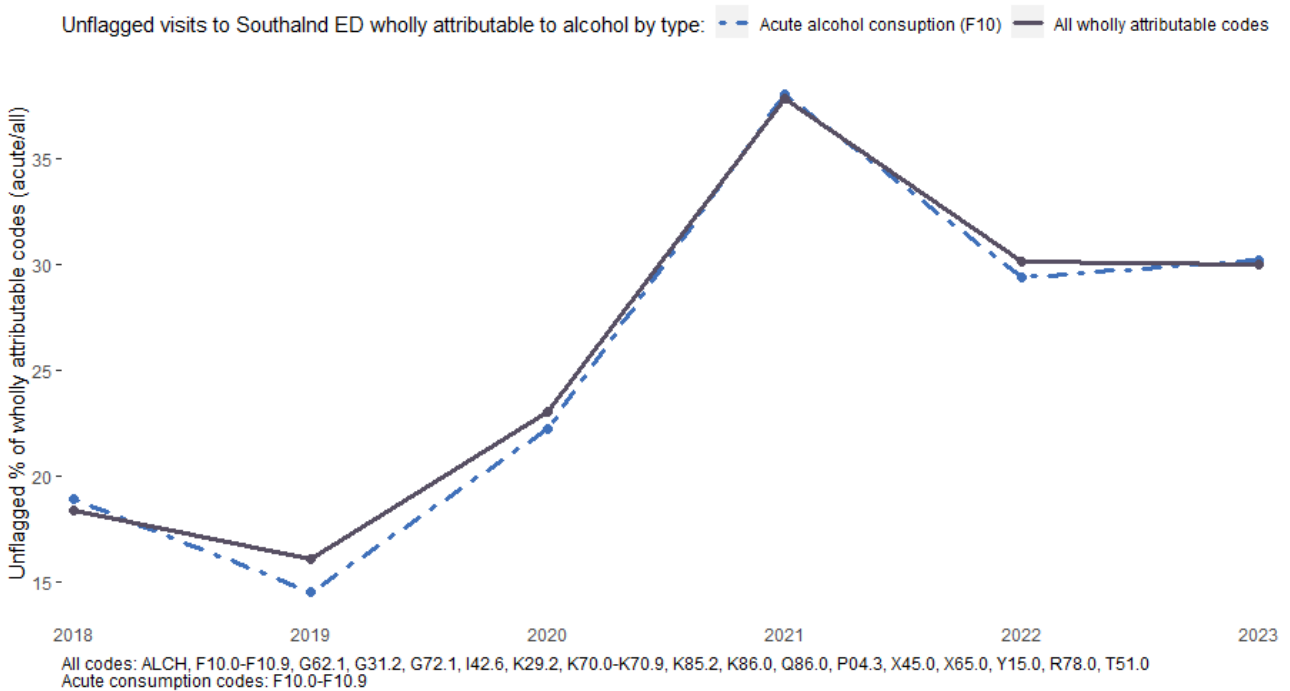

Figure 1. Percentage of ED visits with conditions wholly attributable to alcohol, which were not flagged as related to alcohol by Ministry of health flag.

To compensate for the poor quality of the flag variable, an adjusted visit count was estimated by applying year-appropriate corrections to the raw yearly counts (e.g. in 2023 the raw count was 427, a percentage of correctly flagged visits is 100 – 30 = 70, and the estimated true visit count is (427 / 70) * 100 = 610). Since the true degree of quality reduction in any given year is unknown, the correction factor is based directly on the percentage of unflagged ICD-10 codes wholly attributable to alcohol as the only available metric. It can also be seen as a conservative estimate, since visits with 100% alcohol-attributable ICD-10 codes are presumably the least likely codes to be unflagged. As such, even when this correction is applied to raw visits counts, a possibility remains that the true volume of alcohol-related presentations is still underestimated.

Periodicity and number of ED visits

Before correction, the average daily number of alcohol-related presentations was 1.2 (SD ±1.2) in 2023 compared to the average of 1.6 (SD ±1.6) in 2018-2022. After applying the correction factor, average daily number of alcohol-related visits was 1.7 in 2023 compared to 2.1 in 2018-2022.

Table 2. Total and alcohol-related ED presentations. All values are given as both raw counts and estimates based on a year-specific percentage of correctly flagged presentations

	2018	2019	2020	2021*	2022	2023
Alcohol-related (corrected)	832	810	779	859	642	610
Alcohol-related (raw count)	679	680	600	534	449	427
Estimated undercounting	153	130	179	325	193	183
Total ED presentations (all causes)	38652	39517	36596	39013	36702	36891

* data for 2021 does not include estimated 27 visits lost in the raw visit counts due to a software issue

Overall, ED visits are distributed evenly throughout the week. By contrast, alcohol-related presentations increase notably toward the weekend. Maximum visit count, which occurs on Sunday, is 2-3 times higher compared to working days. Hours between 9 PM on Saturday and 4 AM on Sunday see the highest average number of alcohol-related visits.

Table 3. Average daily ED presentations through the week (2023; raw visit counts)

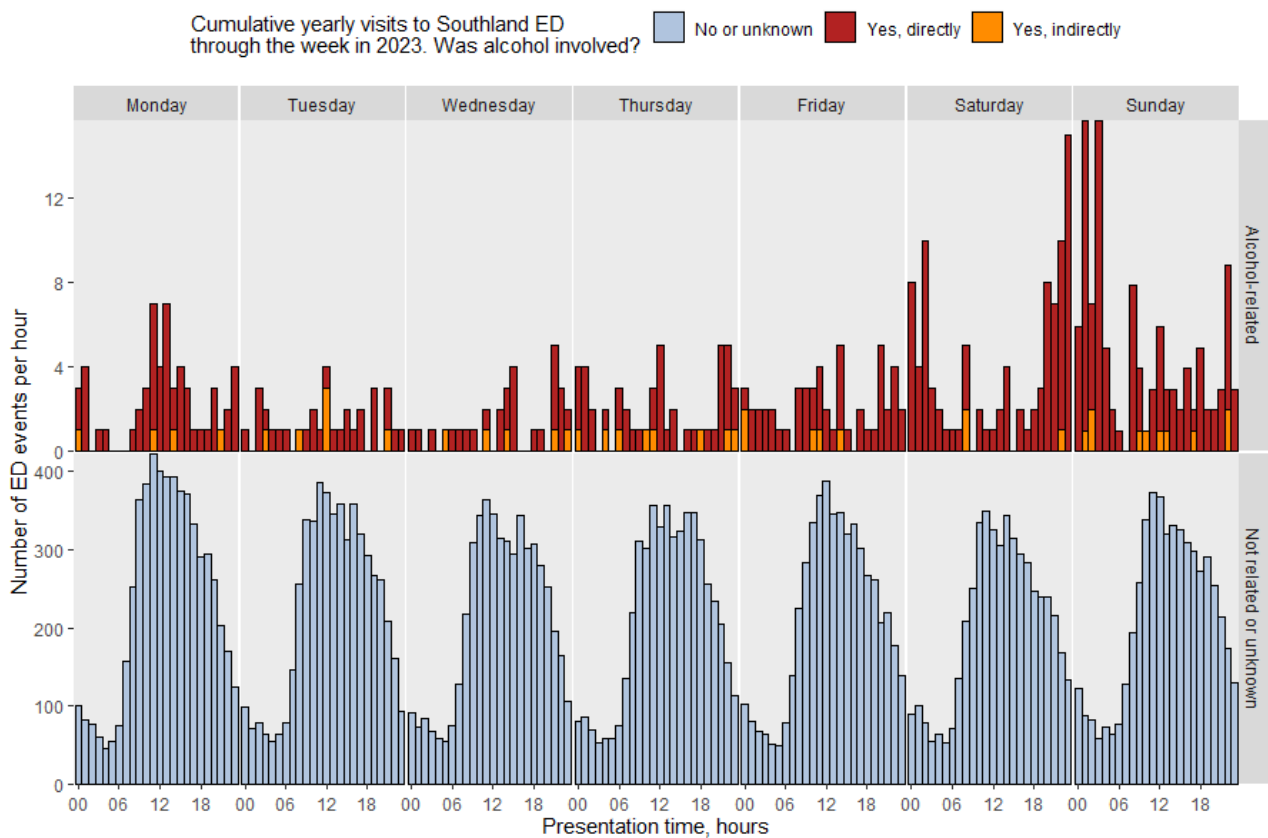|	Monday (±SD)	Tuesday (±SD)	Wednesday (±SD)	Thursday (±SD)	Friday (±SD)	Saturday (±SD)	Sunday (±SD)
Alcohol-related	1.1 (±1.2)	0.6 (±0.8)	0.6 (±0.8)	0.9 (±0.9)	1.0 (±1.1)	1.8 (±1.3)	2.1 (±1.6)
Unrelated or unknown	109 (±11.1)	102 (±9.4)	98 (±9.2)	98 (±10.6)	99 (±10.7)	94 (±12.1)	99 (±9.5)

Figure 1. Distribution of yearly visits by time of the day and day of the week.

Demography of presentations: gender and age

Presenters aged 15 to 24 consistently have the highest numbers of alcohol-related ED visits. They make up a higher proportion (2.6%) of all ED presentations compared to other age-groups and account for one third of all alcohol-related visits. For adults aged 25 to 34, 35 to 44 and 45 to 54 years alcohol-related presentations also comprise a sizable proportion (>1.5%) of all ED presentations in each of the age groups.

In almost all age groups males visit Southland Hospital ED with alcohol-related presentations more frequently than females. The average percentage of alcohol-related presentations out of all visits is higher for males (1.4%) compared to females (0.9%).

Table 4. Alcohol-related ED presentations by age group and gender

Age group	female/male	total count	% of all-cause ED visits	% of alcohol-related visits
< 15	3/1	4	0.1%	0.9%
15-24	57/77	134	2.6%	31.4%
25-34	23/59	82	1.7%	19.2%
35-44	26/37	63	1.5%	14.8%
45-54	23/29	52	1.5%	12.2%
55-64	20/26	46	1.1%	10.8%
65-74	9/19	28	0.7%	6.6%
75+	5/13	18	0.4%	4.2%

Note: cases where gender is recorded as "other" or "unknown" are excluded from gender-specific counts, but not from yearly averages and percentages. * Visit counts with data gap in place.
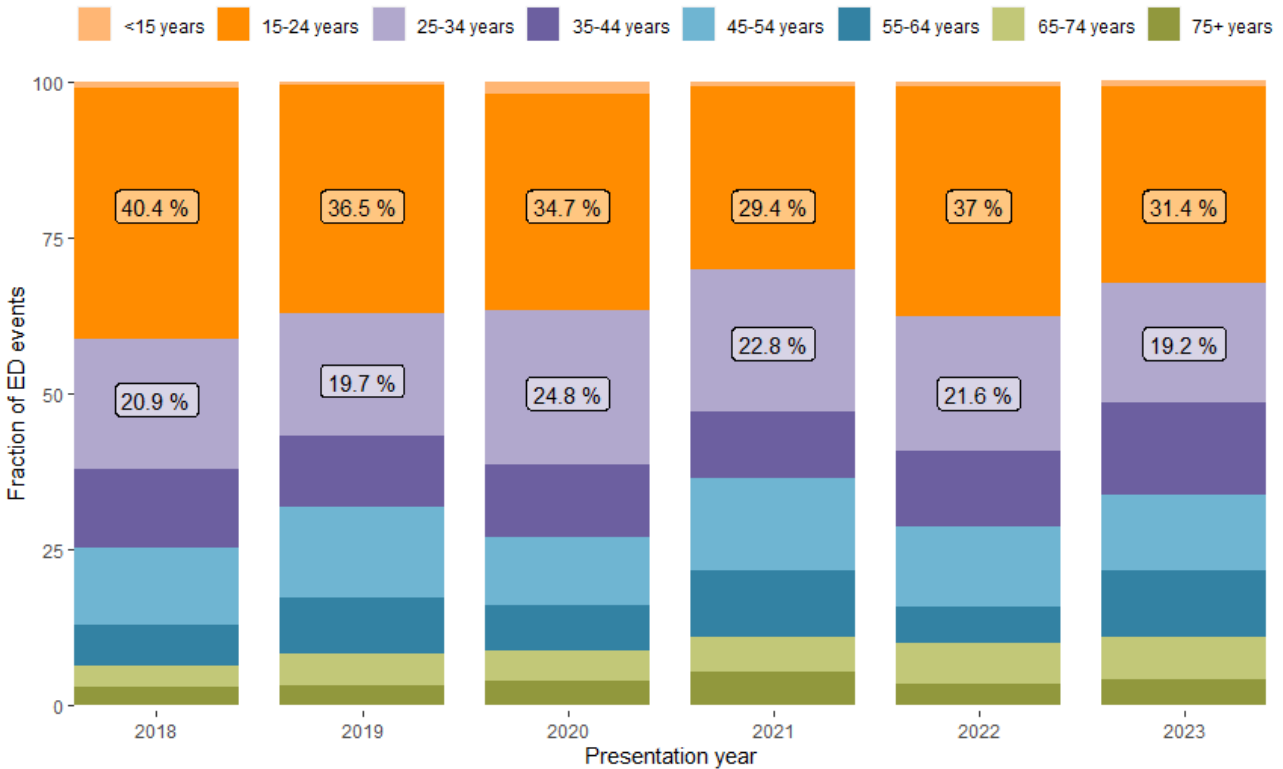

Figure 3. Year by year fractions of alcohol-related presentations among age groups.

Clinical characteristics

For alcohol-related presentations, ambulance and police were significantly more frequent modes of arrival to ED compared to visits unrelated to alcohol. Ambulance was involved 2 times more frequently in alcohol-related presentations. Walk-ins, by contrast, were much less frequent in this group (57% vs 81%).

Table 5. Mode of arrival for ED presentations in 2023 (raw counts)

Mode of arrival	Alcohol-related (directly and indirectly)	Unrelated to alcohol or unknown	Pairwise z-test p-value
Ambulance	179 (41.9%)	6786 (18.6%)	< 0.001
Police	6 (1.4%)	31 (0.1%)	< 0.001
Walk-in	242 (56.7%)	29557 (81.1%)	< 0.001
Other or unknown	-	90 (0.2%)	-

Presentations with the two highest severity grades (resuscitation and emergency) were significantly more frequent among alcohol-related visits, whereas urgent and semi-urgent presentations were less frequent.

Table 6. Severity for ED presentations: a yearly average and percentage*

Severity of presentation	Alcohol-related	Unrelated or unknown	Pairwise z-test p-value
Resuscitation	12 (2.8%)	155 (0.4%)	< 0.001
Emergency	188 (27.6%)	5258 (14.4%)	< 0.001
Urgent	177 (41.5%)	17864 (49%)	< 0.05
Semi-urgent	113 (26.5%)	12103 (33.2%)	< 0.05
Non-urgent or unknown	7 (1.6%)	1084 (3%)	> 0.1

The admission rate was very similar for alcohol-related ED presentations and ones unrelated to alcohol, with 2023 data in agreement with the previous 5-year average.

Table 7. Admission rates of ED presentations in 2023

	2018-2022* average (% of all visits)	2023 (% of all visits)
Alcohol-related	132 (22%)	73 (17.1%)
Not related or unknown	8591 (23%)	7453 (20.4%)

ED visits by statistical areas and deprivation deciles

A majority of alcohol-related ED visits to Southland Hospital were made by residents of Invercargill City TA.

Table 8. ED attenders with addresses inside and outside of Invercargill City TA

	2018	2019	2020	2021	2022	2023
All alcohol-related visits	679	680	600	534	449	427
Visits by residents	507 (75%)	484 (71%)	433 (72%)	395 (74%)	322 (72%)	285 (67%)

Among the residents of Invercargill City, alcohol-related visits were not distributed evenly between constituent SA1s. Yearly SA1-level rates of alcohol-related ED visits per 1000 residents averaged over 6-year period varied from 0 to 86.4, with a median value of 6.
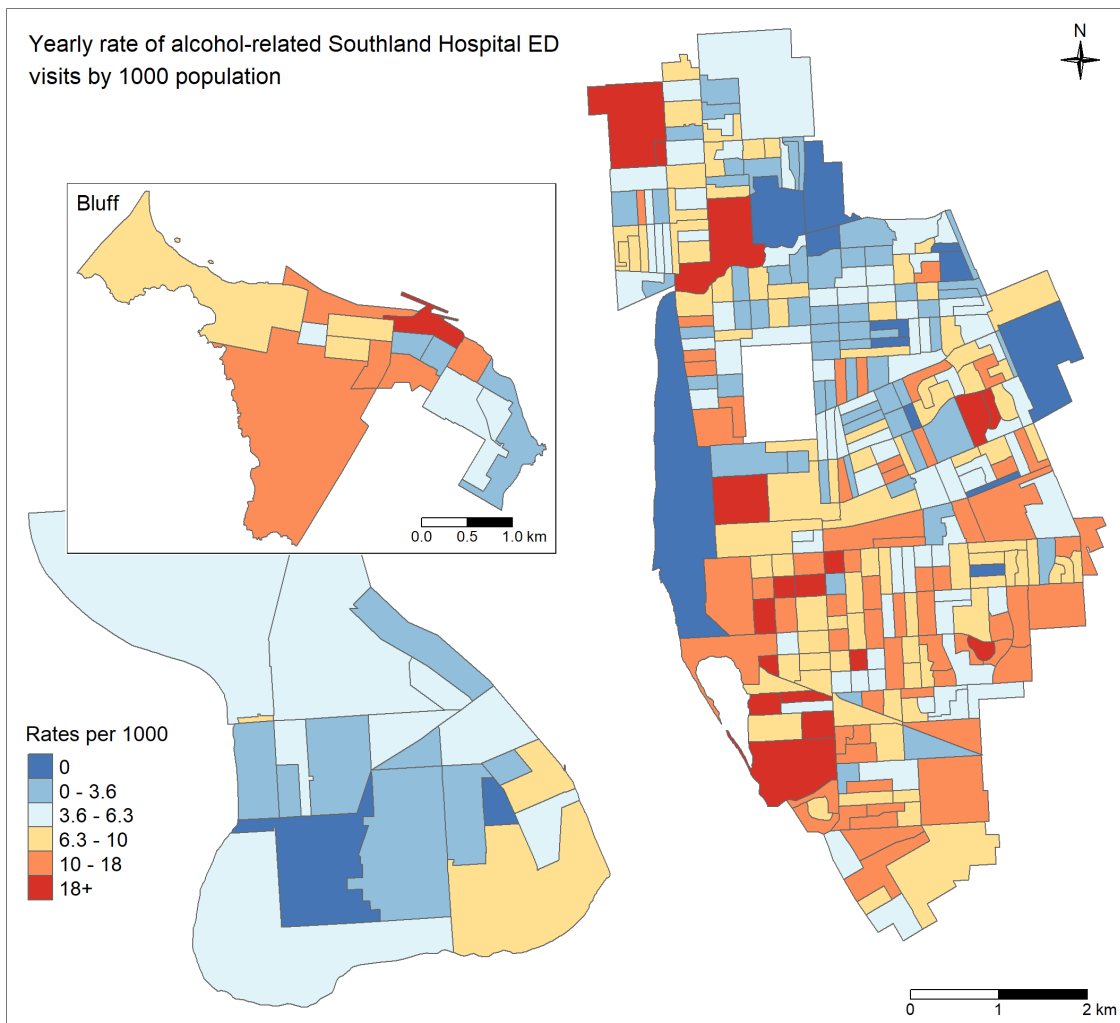

Figure 4. SA1-level distribution of alcohol-related visit yearly rates by residents of metropolitan Invercargill and Bluff, averaged over 6 years (2018 to 2023).

One of the important contributors to the alcohol-related visit rates and year-to-year consistency of ED presentations is deprivation decile. Both 6-year median rates and number of years an SA1 contributed to ED attendance were positively correlated with deprivation (correlation coefficients of 0.39 and 0.42). Although the strength of the relationship is moderate, the positive nature of the correlation is without doubt (p-values of Pearson's correlation tests < 0.001).

Areas with NZDep 2018 decile 7, 8 9 and 10 provided the greatest fraction of alcohol-related ED visits, with the 9th decile alone contributing 28% of all such visits. Corrected for population size, yearly rate of ED presentations increased steadily with higher deprivation.
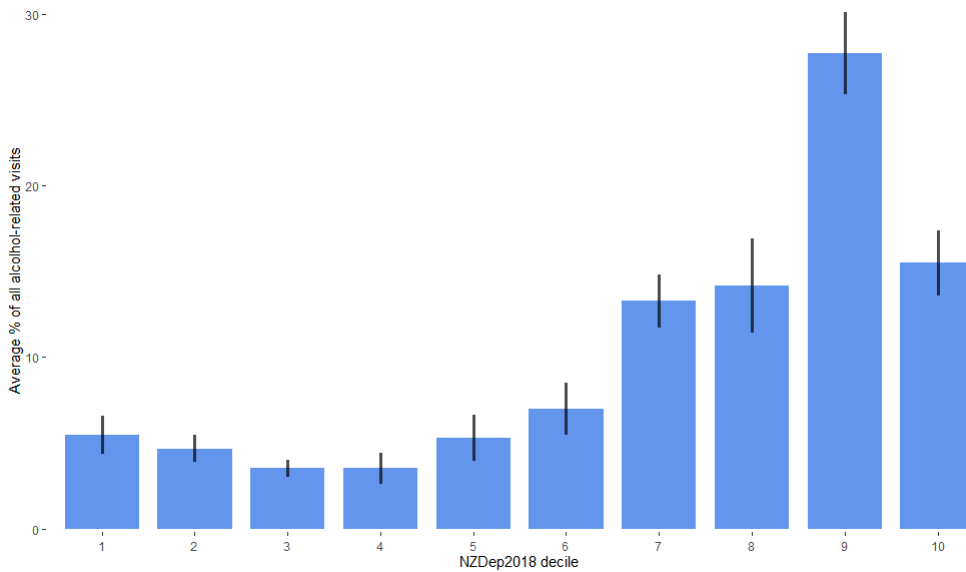

Figure 5. Average yearly percentage of alcohol-related visits to the Southland Hospital ED (2018 to 2023) by NZDep2018 decile
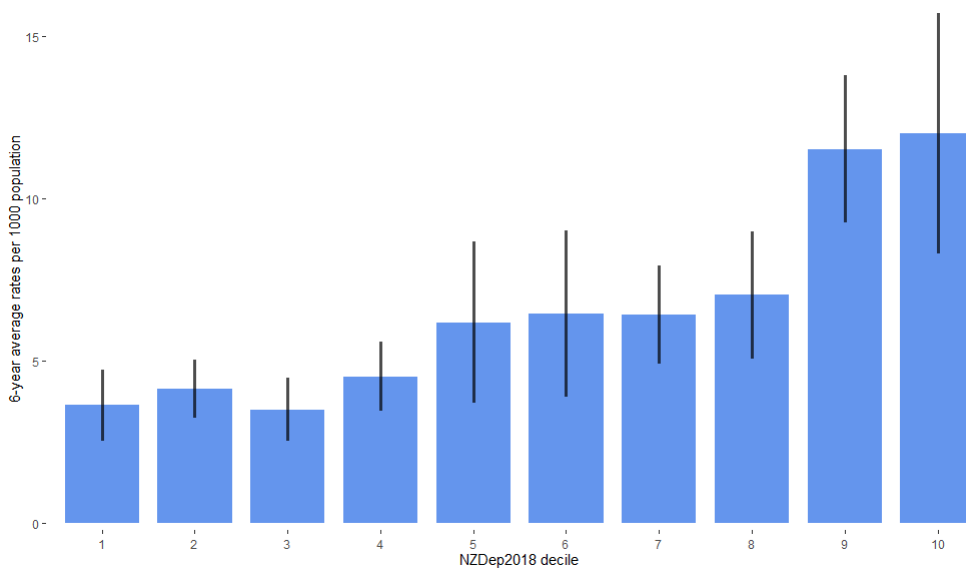

Figure 6. Average yearly rates of alcohol-related visits to Southland Hospital ED (2018 to 2023) by NZDep2018 decile