Health New Zealand
Te Whatu Ora

Alcohol-related Emergency Department presentations to Lakes District 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. Presentation rates at SA1 level need to be treated with caution since Lakes District population increased quickly, while NZ deprivation index is linked to 2018 SA1 definitions.

Introduction

This report is based on the dataset recording presentations to Emergency Department of Lakes District Public Hospital in 2023 (extracted in October 2024) and compared to the previous 5-year values and averages (2018 to 2022). This hospital is located in Queenstown, which has an overall resident population of ~ 46 000, about a million visitors annually, and ~ 12 500 total yearly ED visits. 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 below). Missing records and those recorded as unrelated to alcohol are combined in a single category.

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 84 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, 15 (18%) 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 varied between 5 and 23% in the 6-year interval.

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

	2018	2019	2020	2021	2022	2023
Flagged as alcohol-related	62	64	58	65	70	69
Unflagged	3 (5%)	5 (7%)	16 (22%)	5 (7%)	21 (23%)	15 (18%)

Conditions, related to acute alcohol consumption (F10.0-F10.9) comprise 92% of the full list of codes wholly attributable to alcohol. The fraction of unflagged visits with these “acute codes” also demonstrates an increase over the years, with 14% 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, Figure 1 strongly suggests a poor and variable quality of this variable. Therefore, direct comparisons of visit counts from year to year and between hospitals are not recommended.

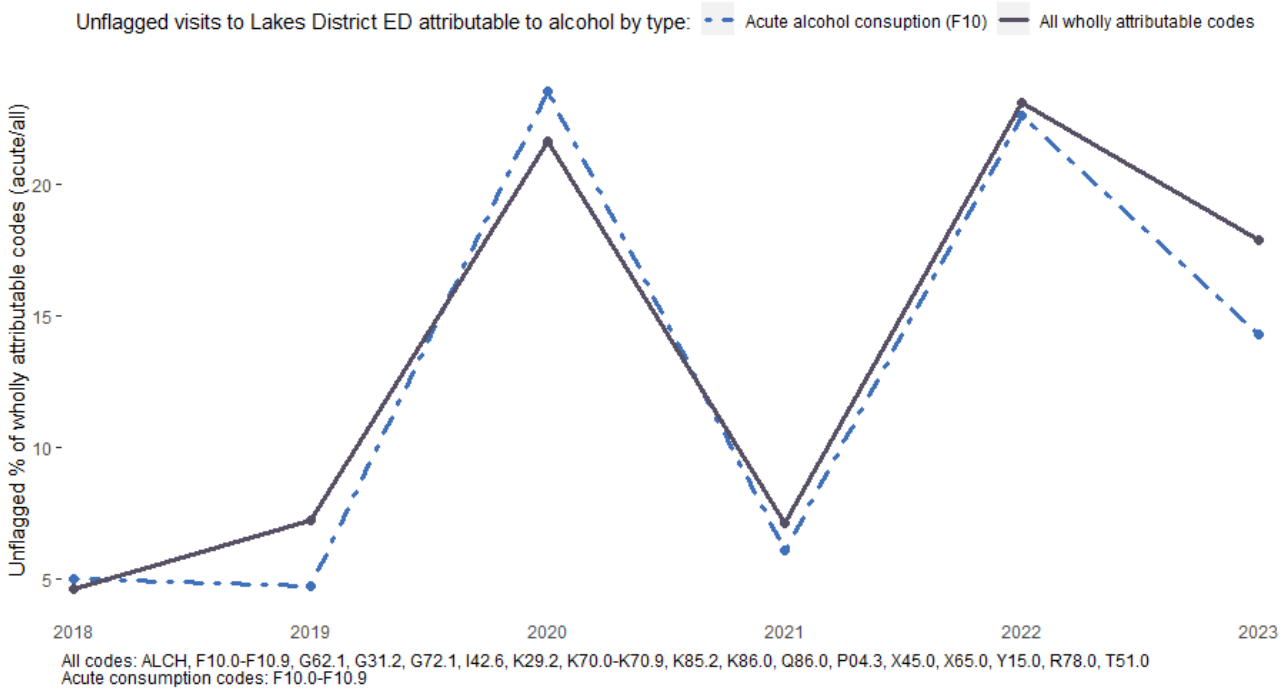

Figure 1. Percentage of ED visits with conditions wholly attributable to alcohol, which were not flagged as related to alcohol by Ministry of Health flag.

To compensate for the quality degradation of the flag variable, an improved visit count was estimated by applying year-appropriate correction to the raw yearly count (e.g. in 2023 a raw count was 560, a percentage of correctly flagged visits is 100 – 18 = 82, and the estimated true visit count is (560 / 82) * 100 = 682). 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 1.5(SD ±1.5) in 2023, which does not differ from the average of 1.5 (SD ±1.7) in 2018-2022. After applying the correction factor, average daily number of alcohol-related visits also remained the same at 1.8 in 2023 and 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)	532	653	776	601	670	682
Alcohol-related (raw count)	508	606	608	558	515	560
Estimated undercounting	24	47	168	43	155	122
Total ED presentations (all causes)	11390	13201	11923	12918	14308	15923

* data for 2021 include estimated 28 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 times higher compared to working days. Hours between 11 PM on Saturday and 5 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	1.4 (±1.3)	0.8 (±0.9)	0.7 (±1.0)	1.1 (±1.2)	1.6 (±1.3)	2.2 (±1.7)	2.8 (±1.8)
Unrelated or unknown	45 (±8.5)	41 (±7.5)	39 (±8.5)	40 (±8.6)	39 (±8.0)	46 (±10.5)	44 (±8.4)

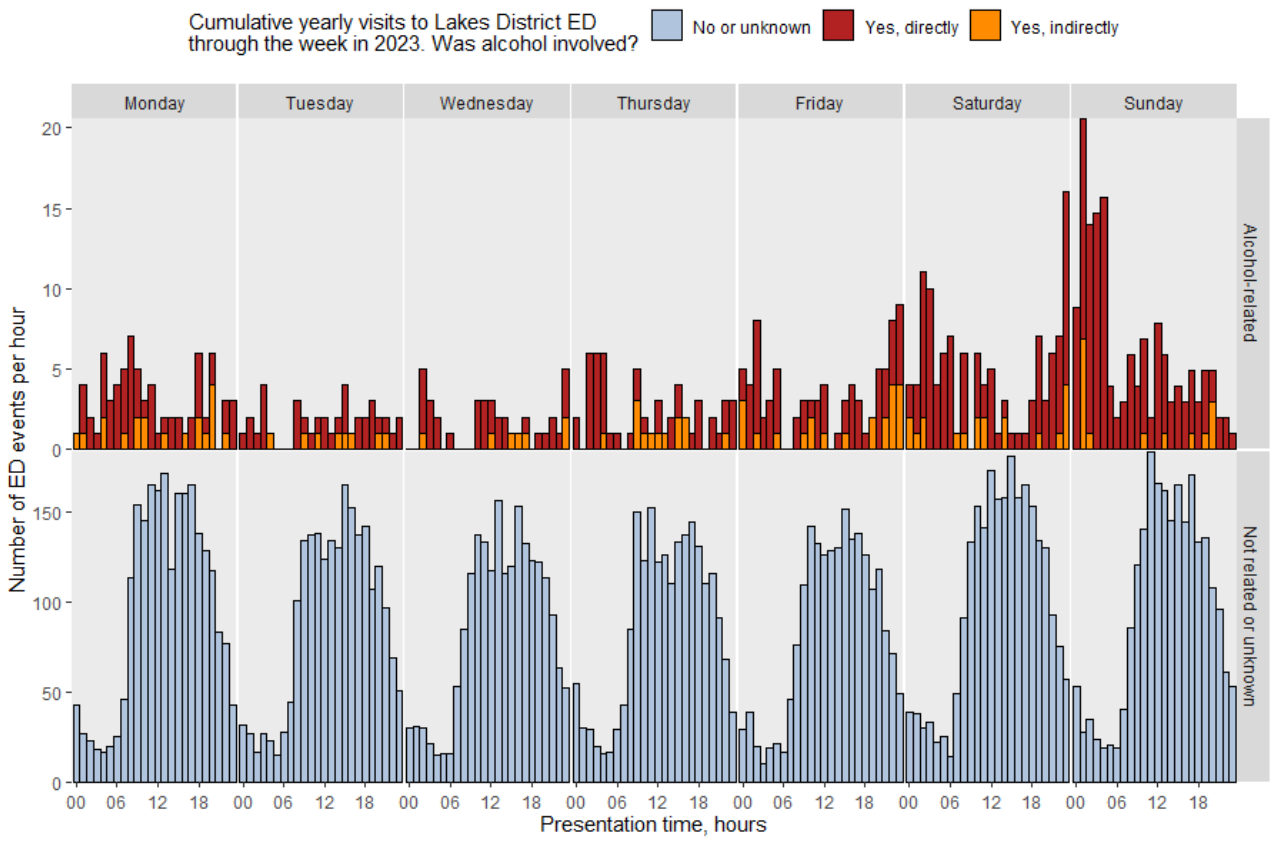

Figure 2. Distribution of yearly visits by time of the day and day of the week.

Demography of presentations: gender and age

Presenters aged 15 to 24 and 25 to 34 consistently have the highest numbers of alcohol-related ED visits and each group accounts for about a third of alcohol-related presentations. The 15-24 years age group has the highest proportion (7.6%) of alcohol-related presentations among all ED visits.

With very few exceptions, males visit Lakes District 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 (4.1%) compared to females (2.8%).

Table 4. Alcohol-related ED presentations by age group and gender in 2023 (raw visit counts)

Age group	female/male	total count	% of all-cause ED visits	% of alcohol-related visits
< 15	3/2	5	0.2%	0.9%
15-24	82/109	193	7.6%	34.5%
25-34	58/114	172	4.4%	30.7%
35-44	22/62	85	3.9%	15.2%
45-54	19/33	52	3.6%	9.3%
55-64	6/25	31	2.5%	5.5%
65-74	10/6	16	1.6%	2.9%
75+	2/4	6	0.7%	1.1%

Note: cases where gender is recorded as “other” or “unknown” are excluded from gender-specific counts, but not from yearly averages and percentages.

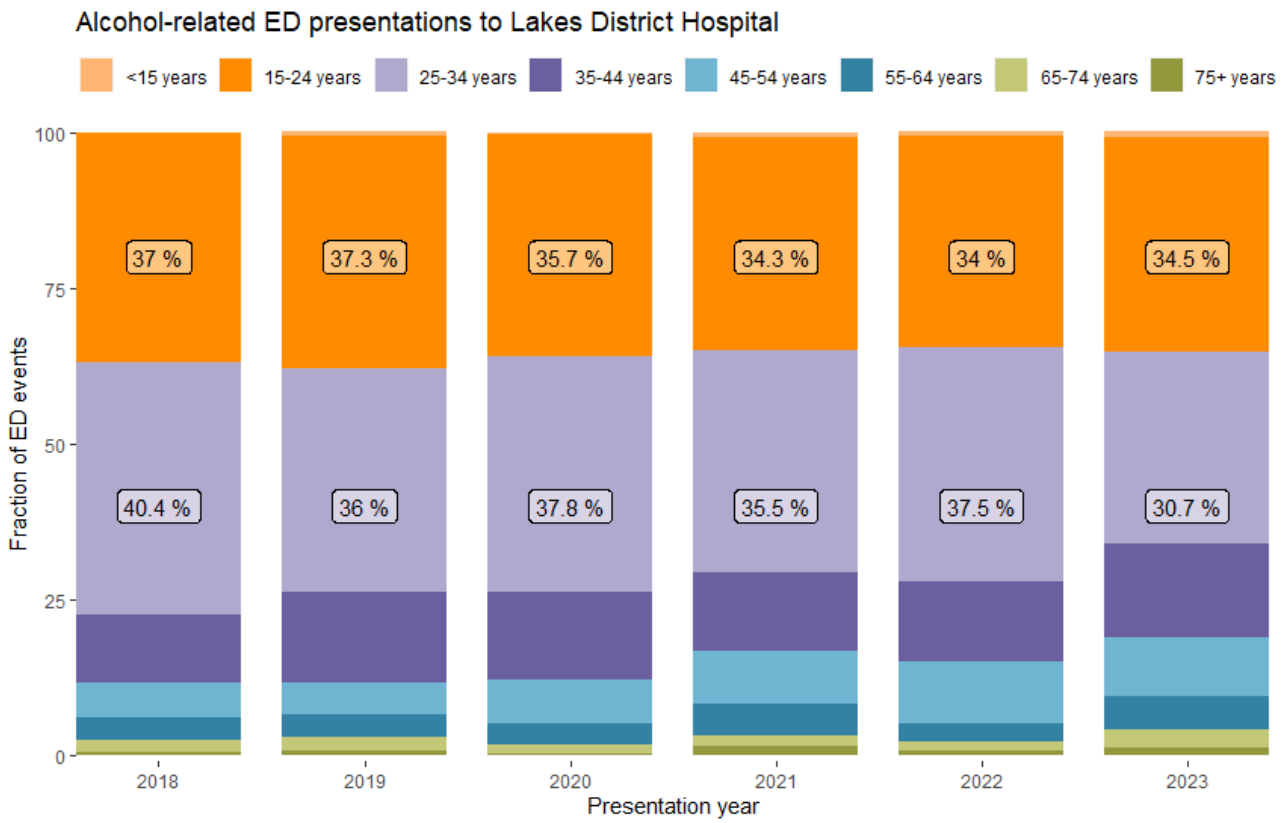

Figure 3. Year by year fractions of alcohol-related presentations among age groups.

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 4 times more frequently in alcohol-related presentations. Walk-ins, by contrast, were much less frequent in this group (68% vs 94%).

Table 5. Mode of arrival for ED presentations in 2023

Mode of arrival	**Alcohol-related** (directly and indirectly)	**Unrelated to alcohol or unknown**	**Pairwise z-test p-value**
Ambulance	142 (25.4%)	931 (6.1%)	< 0.001
Police	39 (7%)	28 (0.2%)	< 0.001
Walk-in	379 (67.7%)	14390 (93.7%)	< 0.001
Other or unknown	-	14 (0.1%)	-

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

Table 6. Severity for ED presentations in 2023: a yearly average and percentage (based on raw counts)

Severity of presentation	**Alcohol-related**	**Unrelated or unknown**	**Pairwise z-test p-value**
Resuscitation	6 (1.1%)	37 (0.2%)	< 0.005
Emergency	84 (15%)	1628 (10.6%)	< 0.005
Urgent	217 (38.8%)	5517 (35.9%)	> 0.1
Semi-urgent	222 (39.6%)	7267 (47.3%)	< 0.005
Non-urgent or unknown	31 (5.5%)	914 (5.9%)	> 0.1

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

Table 7. Admission rates of ED presentations in 2023 (raw counts)

	2023 (% of all visits)	**2018-2022** (% of all visits)
Alcohol-related	51 (9.1%)	9%
Not related or unknown	1728 (11.2%)	11%

ED visits by statistical areas and deprivation deciles

Over half of alcohol-related ED visits to Lakes District Hospital were made by residents of the Lakes District TA in all examined years. Due to travel restrictions, the percentage was higher (average of 60%) in COVID-affected years (2020-2022) compared to years before and after (average of 55%). In the urban areas of the Lakes District the yearly SA1-level rates of alcohol-related ED visits per 1000 residents averaged over a 6-year period varied from 0 to 52, with a median value of 6. The rates need to be treated with caution, however, since Queenstown area is actively growing and SA1 definitions and population estimates are quickly becoming outdated, while NZ deprivation index remains attached to 2018 SA1 boundaries.

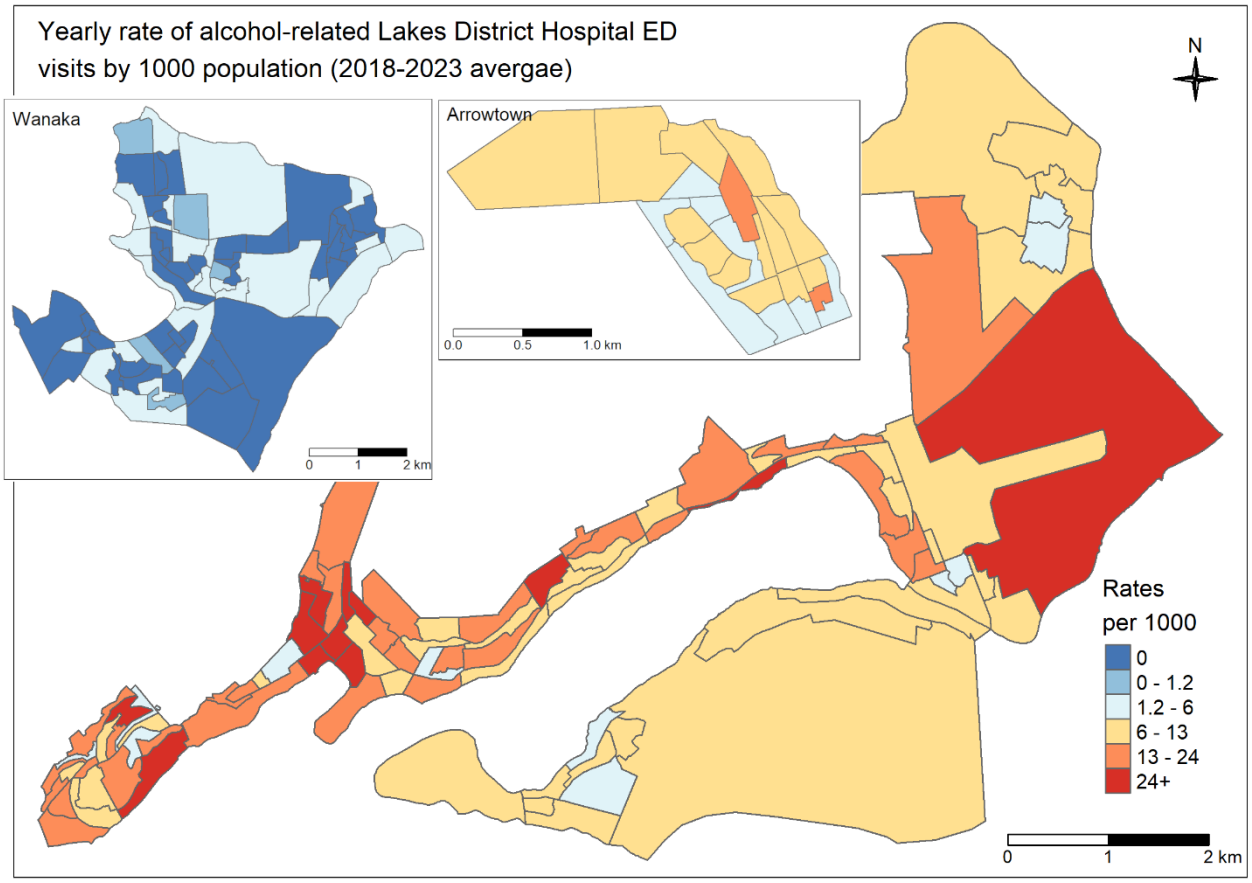

Figure 4. SA1-level distribution of alcohol-related visit yearly rates by residents of urban parts of lakes District, averaged over 6 years (2018 to 2023, based on raw counts).

One of the important contributors to the alcohol-related visit rates and year-to-year consistency of ED presentations is deprivation decile. 6-year average rates were moderately positively correlated with deprivation, and number of years an SA1 contributed to ED attendance was weakly positively correlated with deprivation (correlation coefficients of 0.43 and 0.31 respectively, p-values < 0.001). In other words, an increase in deprivation is correlated with higher yearly alcohol-related visit rate and a higher persistence of such visits across multiple years.

There are no areas with NZDep 2018 decile 9 or 10 in the Lakes District, and areas with deciles 7 and 8 collectively comprise only 1.5% of the resident population. Areas with NZDep 2018 decile 1 to 4 collectively comprise 87% of resident population. Predictably, these areas also accounted for the greatest fraction of alcohol-related ED visits (73%). Corrected for population size, however, the yearly rate of ED presentations increased with higher deprivation, with decile 6 having the highest value.

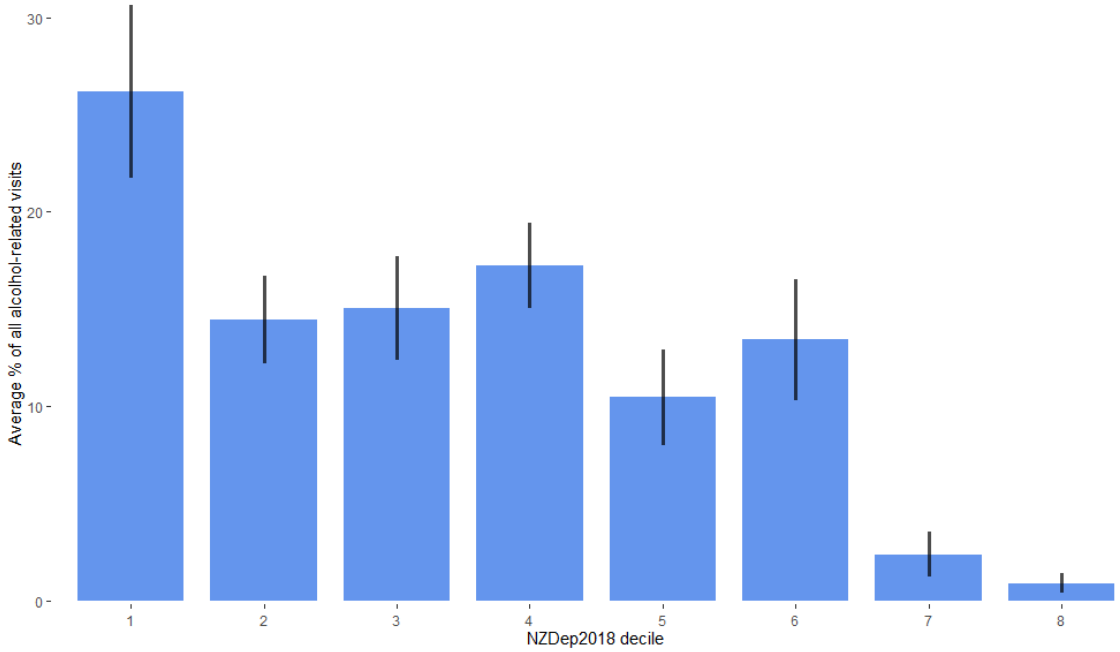

Figure 5. Average yearly percentage of alcohol-related visits to the Lakes District Hospital ED (2018 to 2023) by NZDep2018 decile

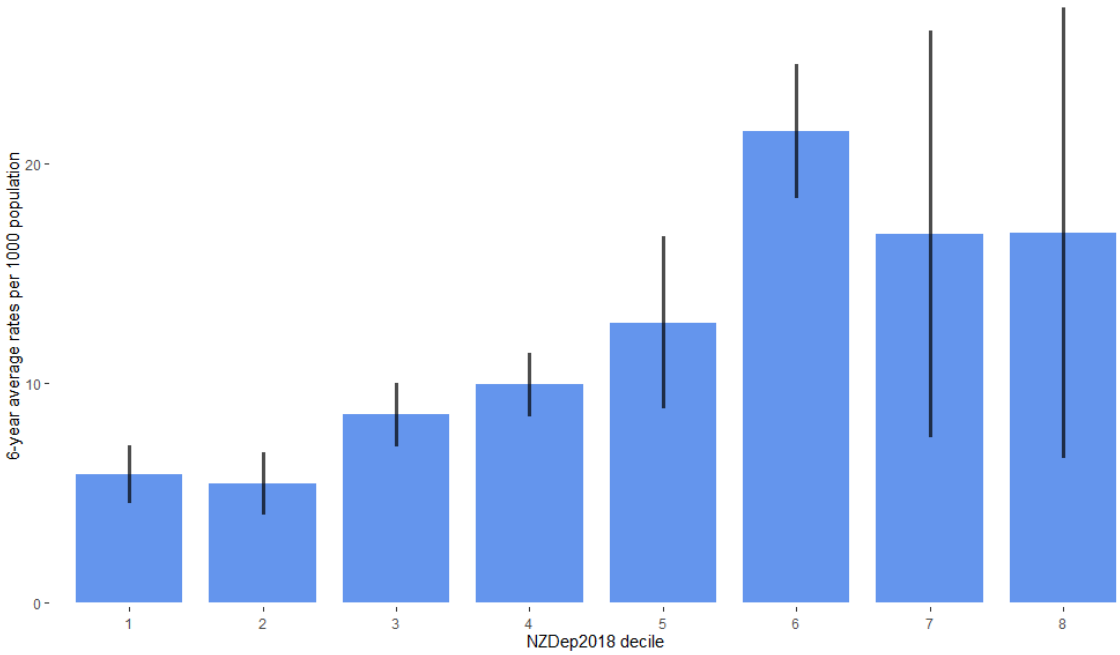

Figure 6. Average yearly rates of alcohol-related visits to lakes District Hospital ED (2018 to 2023) by NZDep2018 decile