Evaluation of Minimum Unit Price of Alcohol in the Northern Territory

A report prepared for the Northern Territory Department of Health | 6 July 2022

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The MUP was introduced on October 1, 2018

The NT Government has introduced a range of interrelated interventions with the aim of reducing harmful alcohol consumption, including the Minimum Unit Price (MUP). The MUP, also known as the Minimum Floor Price, was implemented on October 1, 2018. This policy aims to reduce alcohol consumption amongst heavy drinkers (and thereby reduce the associated social and economic costs of harmful alcohol consumption), while leaving moderate drinkers unaffected, by increasing the price of alcohol-containing beverages to at least $1.30 per standard drink. The MUP is part of a broader suite of direct policies targeting the supply of and demand for alcohol, including the Banned Drinkers Register (BDR) and PALIs (Police Auxiliary Licensing Inspectors).

This report presents our evaluation of the MUP

The NT Government is required under the *Liquor Act 2019 (NT)* to undertake a review of the MUP every 3 years. The review is required to assess the impact of the MUP against its main objectives: reducing the harmful consumption of alcohol while minimising the effect of the MUP on moderate consumers of alcohol.

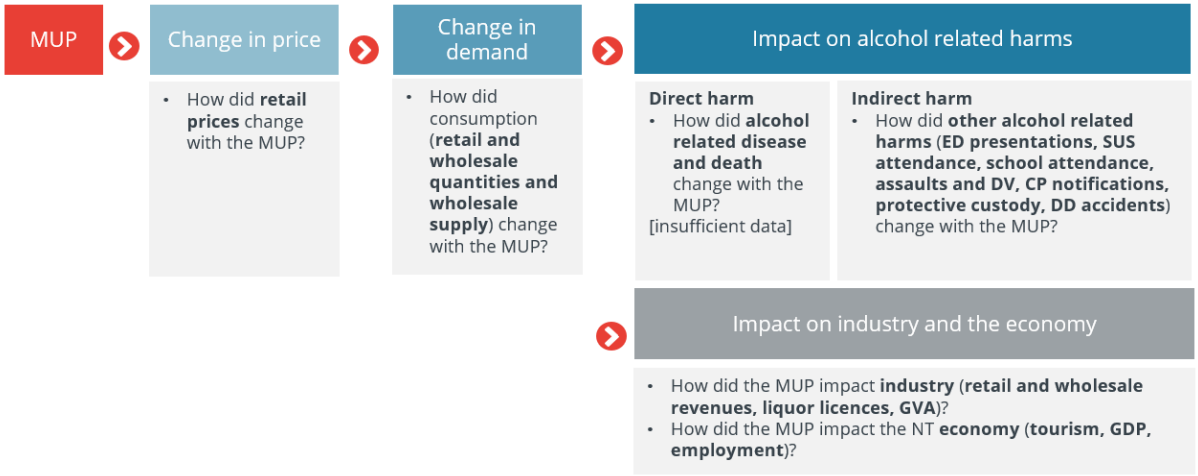
This report evaluates the impacts of the MUP on alcohol consumption trends, alcohol related harm and other impacts in the NT as a whole, as well as in individual regions. We recognise that it is difficult to directly attribute changes in alcohol related harms or other impacts to any individual alcohol related policy intervention such as the MUP, Banned Drinkers Register (BDR) and PALIs (Police Auxiliary Licensing Inspectors), since these were all introduced around the same time. The impact of COVID-19 is another important consideration for this evaluation.

Methodology

We combined quantitative analysis and consultation to evaluate the MUP

Figure 1 provides an overview of the intended impact of the MUP. The intent of the MUP was to increase the price of low cost, high alcohol products while leaving the price of other alcoholic beverages unchanged. This in turn was intended to reduce consumption by harmful drinkers, with minimal impact on the consumption of alcohol by moderate drinkers. Finally, the reduction in harmful consumption was expected to reduce the associated harmful behaviours.

Figure 1: Overview of the expected impact of the MUP



Source: Frontier Economics

We used quantitative analysis to assess the impact of the MUP on the prices of alcohol in the NT, the demand for alcohol, alcohol related harms and industry and the economy. Data on wholesale alcohol sales and impacts provided by the NT Government was supplemented by sales data from the main alcohol retailers and wholesaler in the NT.

We consulted with a wide range of stakeholders across the NT, with representatives from NT Government, community members and alcohol purchasers, local government, Indigenous service providers and community organisations, drug and alcohol treatment providers, non-government organisations and industry. The stakeholder consultation approach was aligned with best practice methods and principles and adhered to local community protocols and cultural lore.

Ideally, we would aim to examine the short-term impact of the MUP in the period immediately after implementation, as distinct from the medium to long-term impact in the following years. However, the impact of COVID-19 makes it difficult to attribute medium to long-term outcomes in key variables to the MUP.

Key findings

In summary, our evaluation finds that the MUP reduced the consumption of cask wine, leading to a small reduction in total alcohol consumption. It resulted in price rebalancing across a wide range of alcohol products and has therefore likely impacted a wide range of drinkers. There is evidence of a reduction in alcohol related harms, but it is not possible to directly attribute this to the MUP. There is no evidence the MUP negatively impacted industry or the economy. Changes in consumption and alcohol related harms after the MUP are small compared to changes in response to COVID-19.

The MUP has been effective in reducing supply of low-cost, high-alcohol products, but drinkers have shifted to other products

Our analysis finds the MUP has been effective in reducing purchases of low-cost, high alcohol products across the NT as a whole. Following the introduction of the MUP, quarterly per capita alcohol consumption fell slightly, although the strong seasonal trend continued. Immediately following the MUP total alcohol consumption declined by 6.3% to a new low of 2.5 litres per capita in 2019 Q1. The declines in cask wine were statistically significant following the

introduction of the MUP in all regions, apart from Alice Springs; this likely reflects the influence of existing alcohol policy settings in Alice Springs.

There is evidence of substitution to other low priced alcohol products, including spirits. However, there is evidence of a trend towards spirits before the introduction of the MUP, reflecting changes in consumer preferences. Our results show that immediately after the MUP was implemented and the subsequent price rebalancing that followed, the increase in retail sales across a wide variety of alcohol types increased, offsetting to some extent the decrease in cask wine sales.

Cask wine sales in NT remain below pre-MUP volumes, suggesting the MUP has had an enduring impact. However, there has been an increase in the sales of all other alcohol types, most notable for spirits, where sales increased substantially from early 2020.

There was significant price rebalancing following the introduction of the MUP, across a range of alcohol products

We found evidence of high compliance with the MUP. Our analysis of retail prices found the vast majority of prices complied with the MUP after it was introduced. This is consistent with feedback from NT Licensing that compliance with the MUP is high.

The products directly impacted by the MUP increased their prices and generally saw significant decreases in sales. A significant portion of the products which previously sold below the MUP were discontinued. However, many products increased prices above the new limit, and in some cases saw increases in total sales as consumers and retailers adjusted to new market dynamics.

By increasing the cost of cheap alcohol products, the MUP led to widespread price rebalancing which allowed more moderately priced products to increase their prices. Our analysis shows products that were priced above the MUP tended to increase in real terms, especially for products that were priced close to the MUP.

It is likely the MUP had an impact on moderate as well as harmful drinkers

The effectiveness of the MUP is based on the assumption that harmful drinkers tend to drink the cheapest alcohol. However, the rebalancing of prices across a range of products suggests the impact of the MUP was not likely to be limited to harmful drinkers.

There is evidence of a reduction in alcohol related harms, but it is difficult to attribute this to the MUP

There is evidence of a reduction in alcohol related harms following the suite of policy interventions introduced around the time of the MUP. For example, there is a reduction of 25.8% in alcohol related non-domestic violence assaults per 10,000 population in the NT following the introduction of the suite of policy interventions around the time of the MUP.

However, for those impacts where regional data is available there is no reduction in the Greater Darwin area and significant reductions in other locations. For example, there is no significant impact on the number of drink driving crashes in Greater Darwin following the introduction of the MUP, contrasting to the significant reduction in Alice Springs and across other areas of the NT, respectively. Similarly, there is no significant reduction in alcohol related emergency department presentations in Greater Darwin, while reductions of 37.6% and 24.2% can be observed in Alice Springs Hospital and Tennant Creek Hospital, after the MUP's introduction, respectively.

This suggests the reduction in alcohol related harms is likely to be related to policy interventions other than the MUP, including local licencing arrangements and PALIs.

There is no evidence the MUP has had a negative effect on industry, tourism or the NT economy, based on available information

Overall, the effect on retailer revenues was small as increased margins compensated for decreased volumes (though the impact depended on the mix of alcoholic drinks sold pre-MUP). We identify an increased price and increased sales of drinks sold between $1.30-$1.50, which had minimal impact on overall revenue collected. We did not conduct a detailed review or survey to test whether retailers or producers reported closing local units, reducing staff numbers or reducing investment as a result of the MUP.

Overall, we found no relationship between the MUP and key macroeconomic indicators for the NT including gross regional product, gross value added (for all industries), tourism and the unemployment rate.

It is likely the MUP had some impact on interstate supply

There is some evidence from the interviews that NT consumers increased cross-border purchasing behaviour, primarily affecting retailers in the immediate vicinity of the NT border particularly Mt Isa (Queensland) and Kununurra (Western Australia). It is difficult to determine the extent to which this relates to the MUP, as opposed to other alcohol policies including the BDR, PALIs and *Stronger Futures*.

It is unlikely the MUP materially impacted the use of alternative substances

There is very limited information about the use of alternative substances to inform our analysis. Many substitutes, including Listerine and hand sanitiser, are priced well below the MUP; suggesting the MUP is unlikely to impact the demand for these products. Evidence from consultation suggests limitations on access to alcohol, including licensing restrictions and the BDR, have a stronger influence on the use of alternative substances than price. It is therefore unlikely that the MUP materially impacted the use of alternative substances.

It is difficult to assess the impact of the MUP on secondary supply

There is evidence from consultation of an ongoing concern with the secondary supply of alcohol in the NT. There is limited research and information about secondary supply in the NT. By its nature secondary supply is likely to be a function of policies that limit access to alcohol, including *Stronger Futures* and the BDR, rather than the MUP.

The MUP is cost-effective for Government

The MUP is a relatively cost-effective policy from the perspective of Government. Retailers are responsible for administering the MUP and are compensated for these costs in the form of higher retail prices for products previously priced below the MUP. During consultation industry advised there were some set up costs associated with complying with the MUP, but that ongoing costs were limited.

Consumers bear the cost of the MUP through higher prices for alcohol products, especially those consumers that typically purchased alcohol priced less than $1.50 per standard drink.

The interaction between the MUP and other alcohol related policies is unclear

It is difficult to see how the MUP could influence policies aimed at managing supply to harmful drinkers, including the BDR and PALIs. This is consistent with evidence from stakeholder interviews.

The impact of COVID-19 is more significant than the impact of the MUP

COVID-19 had a more significant impact on many key outcomes, including alcohol sales and related assaults, than the suite of policy interventions introduced around the time of the MUP. Over 2019 Q2 to 2020 Q2 (the quarter immediately after the COVID-19 outbreak started), there was a 15.2% decline in total wholesale alcohol supply in the NT. By comparison, total wholesale alcohol supply deceased from 2017 Q2 to 2018 Q2 and 2018 Q2 to 2019 Q2 by 2.5% and 4.9%, respectively.

Stakeholders suggested a range of other policies that could be used to manage harmful alcohol consumption

We engaged with a wide range of stakeholders about potential policy solutions to manage harmful alcohol consumption in the NT. Stakeholders suggested policies ranging from prohibition to enhancement of existing programs. There was considerable interest in community-led solutions that empower communities to manage access to alcohol. Several important policy principles emerged during consultation:

- Programs should be designed on an incentive-based approach rather than punitive approach.
- A consistent approach should be adopted for all drinkers.

Our recommendations

We recommend retaining the MUP at its current level

We make several recommendations aimed at improving the implementation of alcohol policy in the NT with the aim of minimising alcohol related harm:

- On balance we do not recommend removing the MUP. There is some evidence it has impacted consumption.
- We do not recommend increasing the level of the MUP, since it is likely to result in widespread price rebalancing that will impact both harmful and moderate consumers.
- The NT Government should define the harmful consumption of alcohol and the moderate consumption of alcohol.
- The NT Government should take advantage of opportunities to collect systematic data about the consumption of alcohol and alternative substances. For example, SUS could be used to collect data on the type and quantity of alcohol consumed, in particular, secondary supply and alternative substance substitutes.
- The NT Government should ensure data collection methodologies support robust policy analysis. For example, ensuring data is consistent across regions (different methodologies were adopted to record emergency department presentations between different locations) and reflects policy settings (it was difficult to determine the timing of policy interventions, including, for example, the final rollout of PALIs).

- Many of the alcohol related harm impacts can possibly be attributed to the PALIs. Consultation identified concerns that this policy may target Indigenous consumers. An evaluation of this policy could inform future policy implementation and development.
- Alcohol policy interventions should be community led and consistently applied across all drinkers.

Glossary

Abbreviation	Definition
BAC	Blood Alcohol Content
BDR	Banned Drinkers Register
DD	Drink driving
DV	Domestic violence
ED Presentation	Emergency Department Presentation
GRP	Gross Regional Product
GVA	Gross Value Added
MUP	Minimum Unit Price
NT	Northern Territory
NT Health	Northern Territory Health
NT Police	Northern Territory Police
PALI	Police Auxiliary Licensing Inspector
PCAC	Per capita alcohol consumption
PHSOs	Public Housing Safety Officers
SUS	Sobering Up Shelters

1 Introduction

The Northern Territory (NT) Government Department of Health (NT Health) has appointed Frontier Economics and Yarning to evaluate the impact of the Minimum Unit Price (MUP) of alcohol in the NT. This report sets out our analysis and findings.

1.1 Background and context

The NT Government has introduced a range of interrelated interventions with the aim of reducing harmful alcohol consumption, including the Minimum Unit Price (MUP)

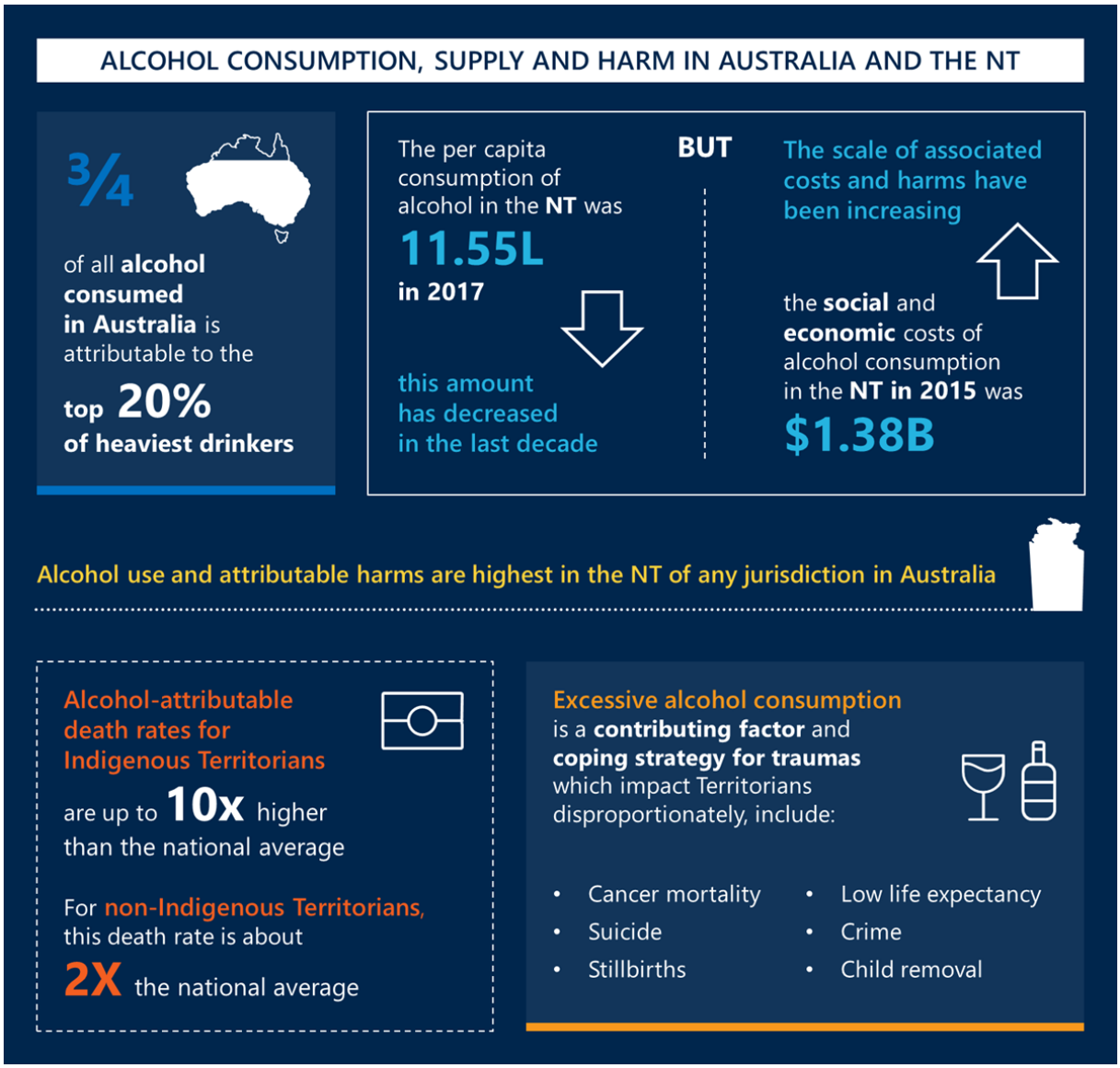
While the per capita alcohol consumption has been decreasing in the NT, the rate of alcohol consumption and alcohol related harm is the highest in Australia, and the costs of harmful alcohol consumption are increasing (**Figure 2**).

In this context, the NT Government has introduced a range of interrelated interventions with the aim of reducing harmful alcohol consumption, including the MUP. The MUP, also known as the Minimum Floor Price, was implemented on October 1, 2018. This policy aims to reduce alcohol consumption amongst heavy drinkers (and thereby reduce the associated social and economic costs of harmful alcohol consumption), while leaving moderate drinkers unaffected. It aims to achieve this by increasing the price of alcohol-containing beverages to at least $1.30 per standard drink.[1]

The MUP is part of a broader suite of direct policies targeting the supply and demand for alcohol. Social factors such as location, security, safety and psychological distress can all affect and be affected by alcohol abuse. Additionally, policies such as COVID-19 supplementary payments might indirectly facilitate increased consumption of alcohol. It is therefore important to adopt a holistic approach when evaluating the MUP.

[1] A standard drink is defined as the volume of an alcoholic drink that contains 10g of ethyl alcohol when measured at 20°C.

Figure 2: Overview of alcohol consumption, supply and alcohol related harm



Source: NT Health, Q21-0291 – Request for Quotation, Darwin – Consultancy – Evaluation of Minimum Unit Price of Alcohol, August 2021

1.2 Scope

This report presents our evaluation of the MUP

The NT Government is required under the *Liquor Act 2019 (NT)* to undertake a review of the MUP every 3 years. The review is required to assess the effectiveness, efficiency and impact of the MUP against its main objectives: reducing the harmful consumption of alcohol while minimising the effect of the MUP on moderate consumers of alcohol.

This report evaluates the impacts of the MUP on alcohol consumption trends, alcohol related harm and other impacts in the NT as a whole, as well as in individual regions. We recognise that it is difficult to directly attribute changes in alcohol related harms or other impacts to any individual alcohol related policy intervention such as the MUP, Banned Drinkers Register (BDR) and PALIs (Police Auxiliary Licensing Inspectors), since these were all introduced around the same time.

The review must also address how the MUP relates to the secondary purposes of the *Liquor Act 2019 (NT),* which are to regulate liquor in a way that:

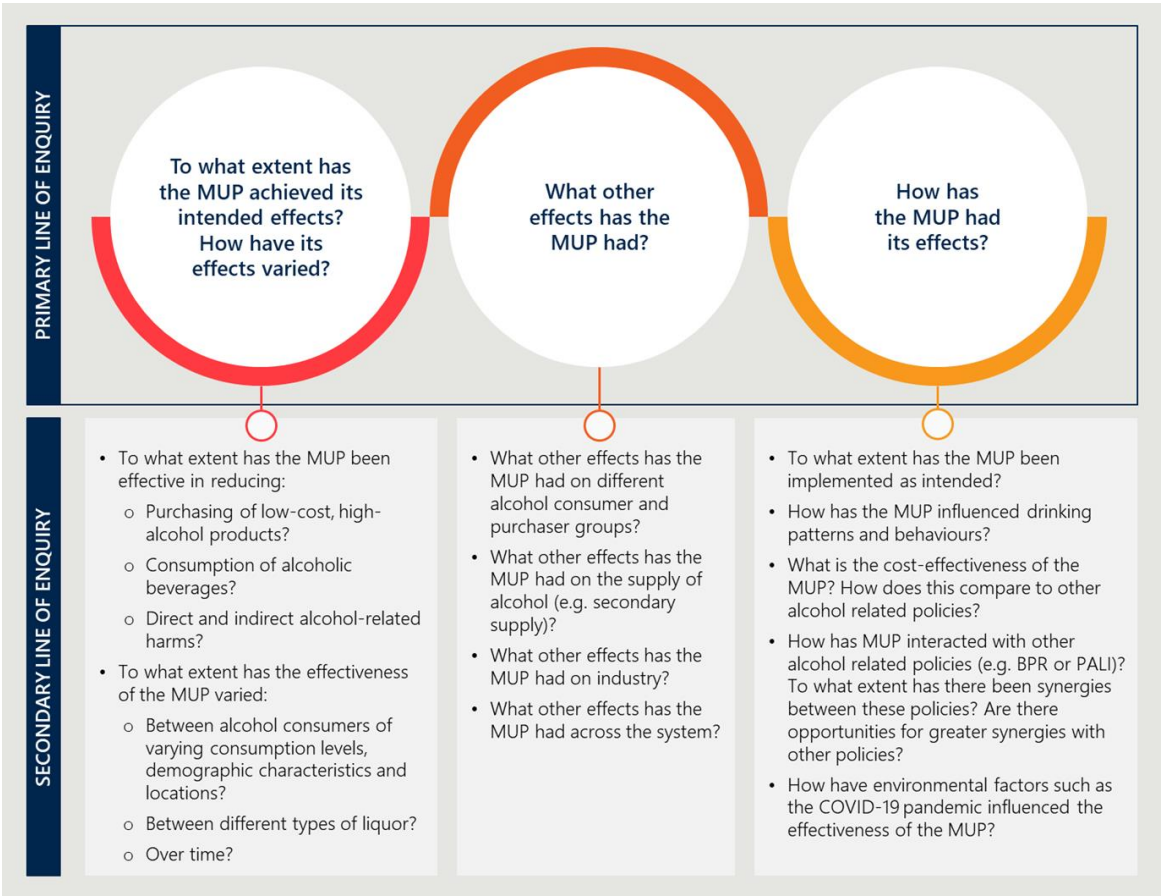
- protects and enhances community amenity and wellbeing
- contributes to responsible development of the liquor industry and associated businesses
- facilitates the diversity of licensed premises and associated services for the benefit of communities
- stimulates the tourism and hospitality industries.

Through a review of past studies of the MUP, consultations with relevant stakeholders, and econometric analysis, our review aims to answer the following key evaluation questions developed by NT Health:

- To what extent has the MUP achieved its intended effects? How have its effects varied by, say, different types of consumers, location or other factors?
- What other effects has the MUP had?
- How has the MUP had its effects?

Further detail on these key evaluation questions is provided in **Figure 3**.

Figure 3: Key evaluation questions



Source: NT Health, Q21-0291 – Request for Quotation, Darwin – Consultancy – Evaluation of Minimum Unit Price of Alcohol, August 2021

Our evaluation of the MUP is informed by quantitative and qualitative analysis, including consultation with a wide range of Government, industry and community stakeholders.

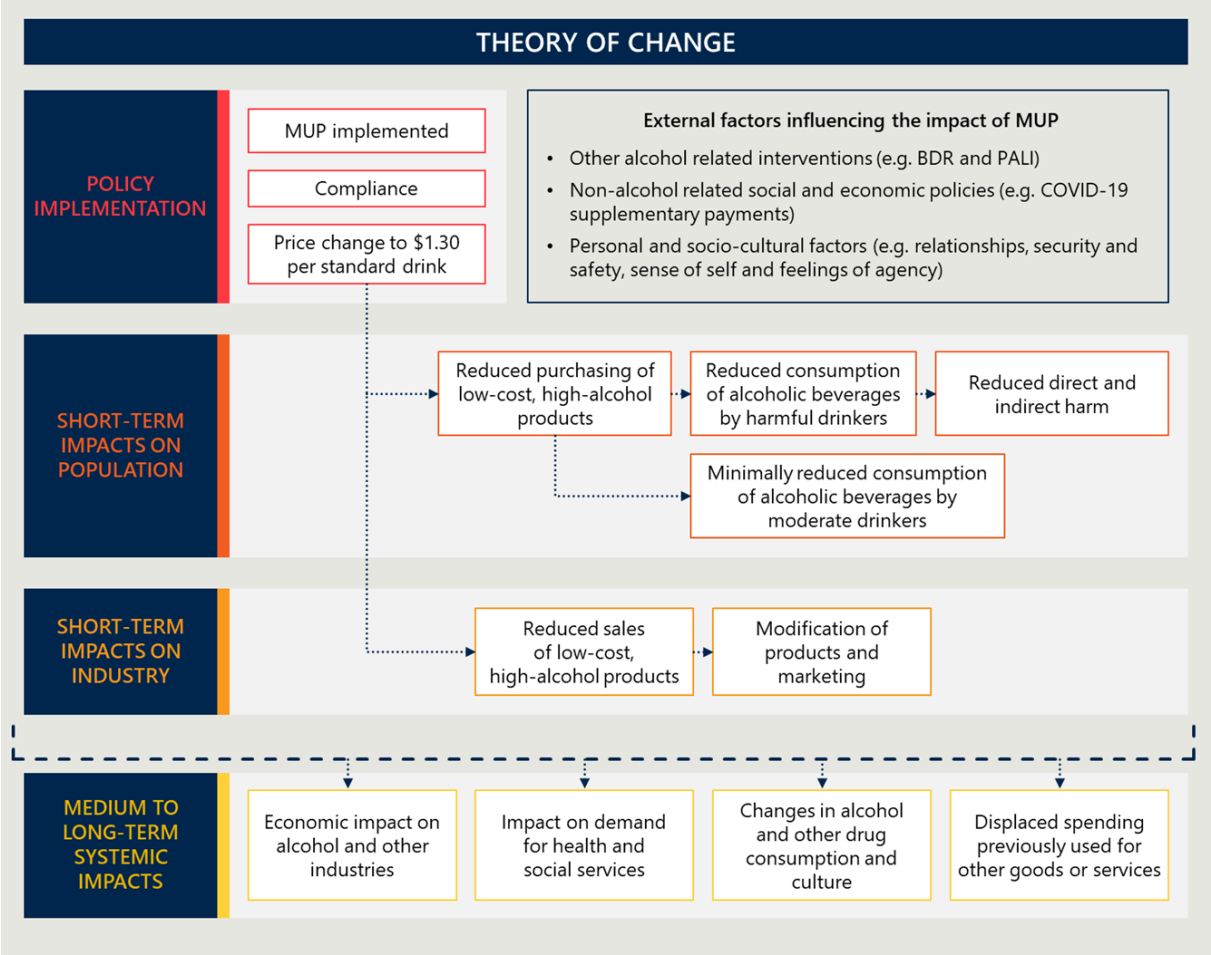
Our analysis extends previous evaluations of the MUP by using sales data collected from industry to enable a closer examination of the impact of the MUP on prices and quantities. It also compares outcomes in alcohol related harms across the NT to assess the extent to which the MUP has impacted these outcomes.

1.3 Theory of change

The NT Government developed a Theory of Change framework to identify the expected causal links between the MUP and various outcomes

The Theory of Change framework provides a chain of results flowing from the implementation of the MUP to short-term, and medium to long-term outcomes (**Figure 4**). The Theory of Change framework distinguishes between implementation failure (the MUP was not implemented correctly, e.g. failure to enforce the policy), and theory failure (MUP was implemented correctly but still failed to achieve its objectives; i.e. the MUP was not the appropriate solution to tackling alcohol related issues).

Figure 4: Theory of change



Source: NT Health, Q21-0291 – Request for Quotation, Darwin – Consultancy – Evaluation of Minimum Unit Price of Alcohol, August 2021

The theory of change describes several hypotheses about the impact of the MUP on alcohol consumption in the NT. These hypotheses can be divided into the following groupings:

- **Policy implementation.** Immediately after the policy is introduced, we expect that prices of all alcoholic drinks retailed below $1.30 per standard drink will increase, assuming retailers comply with the policy. Based on pre-MUP alcohol prices, we expect the direct effects to be greatest for low-cost, high alcohol-content beverages.
- **Short-term impacts on population**
  - **Demand response.** Consumers are likely to respond to the higher prices of some alcoholic beverages by decreasing consumption for these products. We expect that consumers may instead switch to consuming alcoholic beverages that were more expensive pre-MUP or reduce overall alcohol consumption. It is also possible that some consumers will purchase alcoholic beverages via secondary supply or switch to alternate substances.
  - **Impact of direct and indirect harm.** A reduction in alcohol consumed is expected to result in a decrease in direct (self-inflected) and indirect (inflict harm on others) alcohol related harm.
- **Short-term impacts on industry**
  - **Retailers' responses.** Retailers may respond to the changing demand for alcoholic drinks by changing pricing and marketing strategies. The competitive dynamics of the alcoholic drinks industry will mean that retailers share some of this increased surplus with producers and consumers. In the absence of other changes, the alcoholic drinks industry will shift to a new equilibrium characterised by a decrease in the overall quantity of alcoholic drinks sold, but higher average prices.
- **Medium to long-term systemic impacts**
  - The MUP could have a range of medium to long-term systemic impacts driven by changes in the demand for alcohol and in the demand for health and social services dealing with alcohol related harm. For example, in the medium to long-term, the MUP could impact the drinking culture in the NT, the number and types of venues supplying alcohol, and how and where health and social services are provided. The MUP could also lead to a change in consumer expenditure patterns since it is likely the impact the amount that consumers spend on alcohol.
- **External drivers.** We recognise that there are a range of external drivers beyond the MUP that are also likely to influence consumer, retailer and producer behaviour in the alcoholic drinks industry. These include input costs, alcohol duties and regulation, population change, economic activity, weather patterns, tourism and changes in alcohol and other drug consumption and culture.

1.4 About this report

Our evaluation finds the MUP led to a small reduction in total alcohol consumption

Our evaluation finds that the MUP reduced the consumption of cask wine, leading to a small reduction in total alcohol consumption. It resulted in price rebalancing across a wide range of alcohol products and has therefore likely impacted a wide range of drinkers. There is evidence of a reduction in alcohol related harms, but it is not possible to directly attribute this to the MUP. There is no evidence the MUP negatively impacted industry or the economy. Changes in

consumption and alcohol related harms after the MUP are small compared to changes in response to COVID-19.

This report sets out our evaluation of the MUP. It is structured as follows:

- Section 2 discusses the policy context for this evaluation
- Section 3 briefly reviews previous studies on the MUP
- Section 4 provides an overview of our evaluation methodology
- Section 5 presents our analysis and results
- Section 6 sets out our findings and conclusions.

Additional information is provided in a series of appendices:

- Appendix A presents a list of stakeholders consulted
- Appendix B summarises the key themes from consultation
- Appendix C presents our detailed literature review
- Appendix D summarises our quantitative data sources
- Appendix E includes our detailed modelling methodology and results
- Appendix F presents the graphs from our analyses.

2 Policy context

This section considers the policy context for the introduction and evaluation of the MUP. It begins by discussing harmful alcohol consumption in the NT, before discussing NT alcohol related policy interventions and the MUP in more detail.

2.1 Harmful alcohol consumption in the NT

Any policy evaluation needs to consider the unique policy context of the NT

The NT has a number of characteristics making it unique, both in the Australian context and internationally. NT's population of around 246,000 accounts for 1% of the Australian population, with the majority residing in Darwin, and the remainder dispersed over remote and very remote areas.[2] Around one-third of the population in the NT is Indigenous, compared to 3% nationally.[3] The population in the NT is relatively young, with a large proportion aged 25 to 34 years, and male dominated compared to the Australian average.[4] The NT has the lowest population density in Australia with 0.2 people per square kilometre compared to the national average of 3.3 people per square kilometre.[5] NT has a tropical, monsoonal climate which results in strong seasonal patterns of alcohol consumption.

Harmful alcohol consumption imposes significant economic and social costs on the community

Alcohol occupies a significant place in Australian culture and is consumed in a wide range of social circumstances.[6] Some people drink at levels that increase the risk of developing health problems over their life and increase their risk of alcohol related injury.[7] This in turn imposes significant costs on individuals and the broader community.

The most recent study of the social and economic costs of alcohol to Australia conservatively estimated these costs at $66.8bn in 2017/18.[8] This reflects the cost of premature deaths, heavy use of the health system, high rates of crime (particularly violent crime and antisocial behaviour),

2 Northern Territory Department of Treasury and Finance, 2022, Population, Available at: https://nteconomy.nt.gov.au/population#regional

3 Australian Bureau of Statistics. 4715.0 – National Aboriginal and Torres Strait Islander Health Survey, 2018-19. Canberra (AUST): ABS; 2019.

4 Northern Territory Department of Treasury and Finance, 2022, Population, Available at: https://nteconomy.nt.gov.au/population#regional

5 Australian Bureau of Statistics. 3218.0 – Regional Population Growth, Australia, 2017-18. Canberra (AUST): ABS; 2019.

6 Australian Bureau of Statistics (2022), Alcohol Consumption, 21 March, Available at: https://www.abs.gov.au/statistics/health/health-conditions-and-risks/alcohol-consumption/latest-release#key-statistics

7 Australian Institute of Health and Welfare (2018) Alcohol, tobacco and other drugs in Australia, Australian Government.

8 National Drug Research Institute, Curtin University (2021), Examining the Social and Economic Costs of Alcohol Use in Australia: 2017/18, December, p vi.

child abuse and neglect, and road crashes.[9] Intangible harms, including the costs of family and relationship breakdowns and disconnection from culture and land, can be difficult to measure.[10]

The majority of this cost relates to harmful drinking, which can involve high average daily use or irregular heavy drinking occasions.[11] In Australia around three-quarters of all alcohol consumed is attributed to the top 20% of heaviest drinkers.[12] In 2020/21, one in four Australians aged 18 years and over exceeded the Australian Alcohol Guideline.[13]

Guideline 1: Reducing the risk of alcohol related harm for adults

To reduce the risk of harm from alcohol related disease or injury, healthy men and women should drink no more than 10 standard drinks a week and no more than 4 standard drinks on any one day.

Source: National Health and Medical Research Council (2020), Australian Guidelines to Reduce Health Risks from Drinking Alcohol, p 26.

The cost of harmful alcohol consumption in the NT has increased in recent years

While per capita consumption of alcohol has been decreasing in recent years (see **Figure 5**), the NT has the highest per capita consumption and the highest rate of alcohol related disease and death in Australia.[14]

9 Australian Institute of Health and Welfare (2018) Alcohol, tobacco and other drugs in Australia, Australian Government.

10 Smith, J., Whetton, S. & d'Abbs, P. (2019). The social and economic costs and harms of alcohol consumption in the NT. Darwin, Menzies School of Health Research.

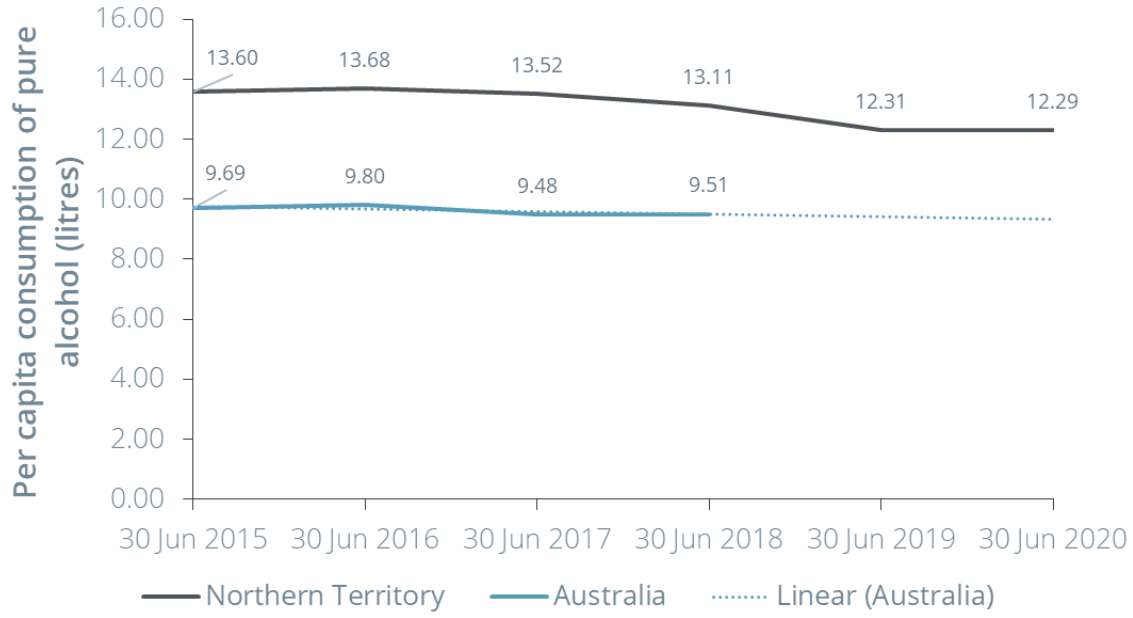
11 Taylor et al. (2021). The impact of a minimum unit price on wholesale alcohol supply trends in the Northern Territory, Australia, Australian and New Zealand Journal of Public Health, vol. 45, no. 1, p. 26.

12 Cook, M. Mojica-Perez, Y. & Callinan, S. (2022). Distribution of alcohol use in Australia.

13 Australian Bureau of Statistics (2022), Alcohol Consumption, 21 March, Available at: https://www.abs.gov.au/statistics/health/health-conditions-and-risks/alcohol-consumption/latest-release#key-statistics

14 Australian Bureau of Statistics (2017), 3303.0 – Causes of Death, Australia.

Figure 5: Per capita wholesale alcohol consumption in the NT compared to Australia



Source: *Frontier Economics analysis and Australian Institute of Health and Welfare (AIHW)*

Note 1: *Per capita consumption of pure alcohol (litres) refers to litres available per person aged 15 and over*
Linear (Australia) shows a linear extrapolation to 2020

Note 2: *Dotted line represents the linear extrapolation of per capita consumption of pure alcohol for Australia (litres)*

A 2019 report by the Menzies School of Health report found that, while alcohol consumption in the NT decreased over the 2005/06 to 2015/16 period, the real social and economic costs of the impact of alcohol in the NT increased by 64.2% to $1.39bn over this period (in 2015/16 prices; see Box 1).[15] Most of this cost impact falls on households, due to the main driver of the total cost being premature death.

Most of the Indigenous Aboriginal and Torres Strait Islander population in the NT live in remote and very remote areas with high levels of socioeconomic disadvantage.[16] Aboriginal and Torres Strait Islander people experience disproportionate levels of alcohol related harm, including mortality rates 4.9 times higher than non- Aboriginal and Torres Strait Islander people, with alcohol a contributing factor.[17] However, Aboriginal and Torres Strait Islander people are also more likely to abstain from alcohol than their non-Indigenous counterparts (31% compared to 23%).[18]

15 Smith, J., Whetton, S. & d'Abbs, P. (2019). The social and economic costs and harms of alcohol consumption in the NT. Darwin, Menzies School of Health Research.

16 Australian Bureau of Statistics. 4715.0 – National Aboriginal and Torres Strait Islander Health Survey, 2018-19. Canberra (AUST): ABS; 2019.

17 Commonwealth Department of Health (2019). National Alcohol Strategy 2019-2028, p. 8.

18 Commonwealth Department of Health (2019). National Alcohol Strategy 2019-2028, p. 8.

Box 1: The economic cost of alcohol consumption in the NT

A 2019 report by the Menzies School of Health report found that, while alcohol consumption in the NT decreased over the 2005/06 to 2015/16 period, the real social and economic costs of the impact of alcohol in NT increased by 64.2% from $844.4m to $1,386.8m (in 2015/16 prices).[19] However, the authors note that the two figures are not directly comparable due to a changing understanding of alcohol impacts and approaches to measurement.

The estimate of $1,386.8m for 2015/16 was calculated using the following categories of tangible and intangible cost impacts:

- costs of premature mortality (e.g., the net present value (NPV) of lost economic output)
- health costs (e.g., alcohol- attributable primary healthcare costs)
- road crash costs (e.g., loss of quality of life due to road crash injuries or death)
- costs of crime (e.g., police costs) and
- child protection costs (e.g., lifetime costs to victims of child abuse).

The tangible costs associated with alcohol consumption in 2015/16 was estimated to be $701.3m (50.5% of total costs) and intangible costs $685.5m (49.5% of total cost). The intangible cost of premature death (value of statistical life) is the largest component of total costs at $652.5m (47.1%), followed by the tangible costs of alcohol–related crime at $272.6m (19.6% of total cost) child protection at $170.9m (12.3% of total cost.

The paper also estimated the distribution of the estimated costs of alcohol use between the NT government, Australian government, businesses, and all households. Most of the cost impacts of alcohol falls on households at $878.5m (63.3% of total costs) due to the main driver of total cost being premature death.

There were several economic costs that were not included, suggesting the estimate could be conservative. The cost of FASD (Fetal Alcohol Spectrum Disorder) is not included in the quantitative analysis due to lack of good quality data. Similarly, the lack of data on the impact of alcohol consumption on homelessness in the NT suggests that the researchers were unable to determine the social and economic costs associated with people affected by alcohol seeking supported accommodation options. Finally, the researchers did not include data relating to alcohol related Emergency Department (ED) presentations.

Source: Smith, J., Whetton, S. & d'Abbs, P. (2019). The social and economic costs and harms of alcohol consumption in the NT. Darwin, Menzies School of Health Research.

The social and cultural context for alcohol consumption in Indigenous communities is complex. The poorer health, social and emotional wellbeing of Indigenous people can significantly influence drinking behaviour.[20] Social determinants include current and past inequalities, racism

[19] Menzies School of Health Research (2019), Harms from and Costs of Alcohol Consumption in the Northern Territory'

[20] Commonwealth Department of Health (2019). National Alcohol Strategy 2019-2028, p. 8.

and higher levels of emotional and social distress.[21] Kinship structures can impact the ability to abstain from drinking if requested by family members. Alcohol sharing also influences drinking behaviours.[22]

The possibility that the harmful consumption of alcohol and associated harms extend beyond the individual consumer to the wider community provides a rationale for interventions to minimise harmful drinking.

2.2 NT policy interventions to address harmful alcohol consumption

There is a long history of alcohol related policy interventions in NT

Policy interventions targeting harmful alcohol consumption have been implemented in various regions of the NT over many years, with the aim of reducing the social and economic costs of the harmful consumption of alcohol. These policy interventions include measures to influence prices (including taxation), modifying drinking environments, drink driving countermeasures, restrictions on marketing, education, early intervention and treatment. A summary of alcohol-focused legislative interventions in the NT since 2011 is shown in **Figure 6**.

Commonwealth Government alcohol related policies are active in the NT

The Commonwealth Government has implemented a range of measures to reduce alcohol related harm, including the taxation of alcoholic beverages and the development of a national advertising code. The Commonwealth Government works with jurisdictional governments in the development and implementation of liquor licensing and service regimes, education programs to raise awareness about the dangers of harmful drinking, drink driving campaigns combined with law enforcement initiatives such as random breath testing, responsible service of alcohol training programs, and a range of prevention, early intervention and treatment programs.[23]

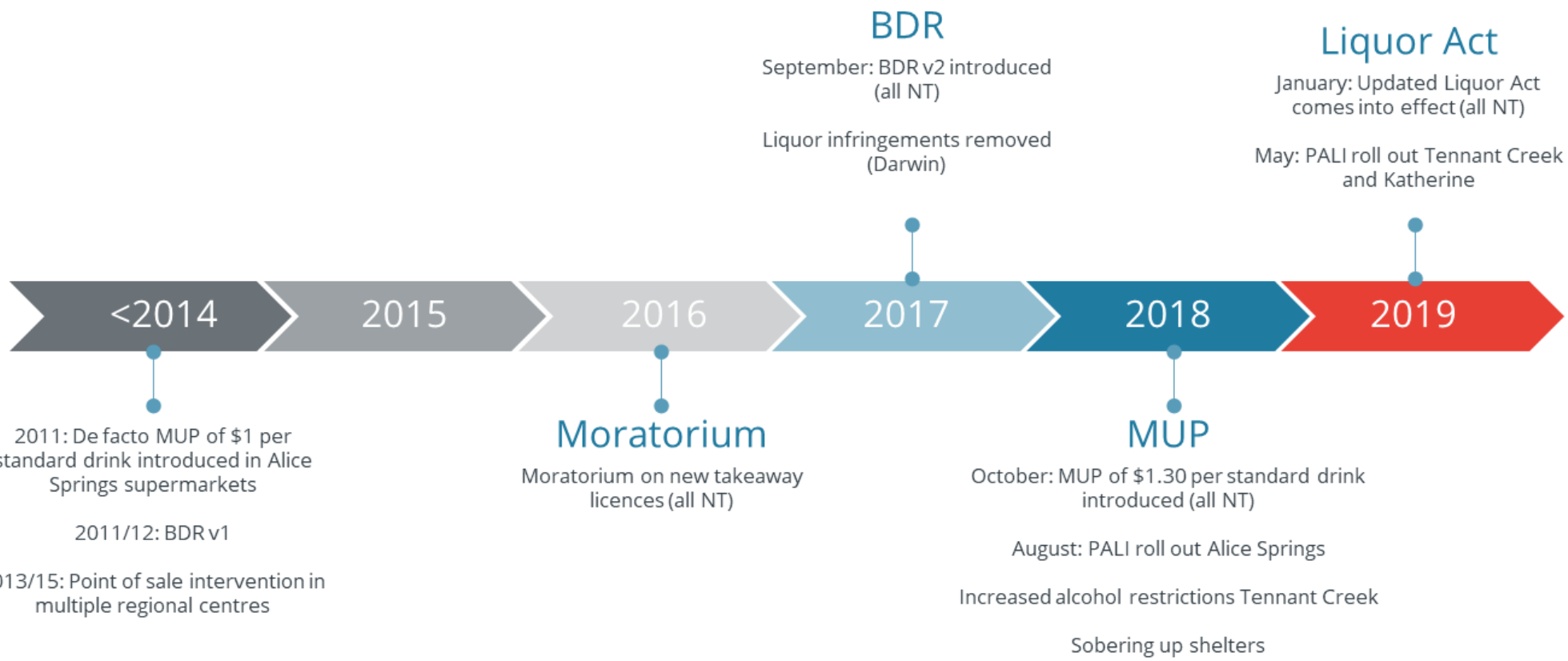
In addition, the Commonwealth *Stronger Futures in the Northern Territory Act 2012* designates a series of dry or alcohol-free zones in remote and regional communities throughout the NT, among other things. This legislation is due to cease in July 2022, 10 years after its introduction.

[21] Gray D, Cartwright K, Stearne A, Saggers S, Wilkes E & Wilson M (2018). Review of the harmful use of alcohol among Aboriginal and Torres Strait Islander people. Australian Indigenous HealthInfoNet.

[22] Smith, J., Whetton, S. & d'Abbs, P. (2019). The social and economic costs and harms of alcohol consumption in the NT. Darwin, Menzies School of Health Research.

[23] Commonwealth Department of Health (2019). National Alcohol Strategy 2019-2028, p. 19.

Figure 6: Timeline of alcohol-focused legislative interventions in the NT



Source: Frontier Economics

Recent NT Government policy development has focused on harm minimisation

The MUP is part of a package of alcohol reform interventions aimed at reducing alcohol related harms in the NT. The package of reforms was introduced in response to the recommendations of the *Alcohol Policies and Legislative Review October 2017* (the Riley Review).

The de facto MUP was trialled in Alice Springs in 2011, which was the first region to have the MUP, BDR and PALIs in operation at the same time. The trial demonstrated significant reductions in alcohol related emergency department presentations (33% reduction), alcohol related domestic violence assaults (37% reduction), alcohol related assaults (45% reduction) and protective custody episodes (63% reduction) between 2017/18 and 2018/19.[24]

Following the success of the Alice Springs trial, the MUP was introduced across the NT as part of a suite of supply-side measures. Identifying the impact of the MUP, as distinct from other policy and contextual factors, is a key challenge for this evaluation.

Secondary supply is an ongoing issue in the NT

The supply of alcohol to individuals who are not permitted to consume alcohol, including individuals under the age of 18, a person on the BDR or people in dry communities, is known as secondary supply. Secondary supply can occur through the sharing of alcohol between family and friends, which may also involve a profit.[25] It can also refer to grog-running, where individuals sell alcohol on the black market in restricted areas for a profit.

During consultations, there was strong evidence from stakeholders that secondary supply of alcohol was a major issue in the NT. Several stakeholders reported that a bottle of Jim Beam was sold for as much as $600 during COVID-19 lockdowns, and one informed us that people were spending as much as $200 on a carton of beer.

There is limited research on the secondary supply of alcohol in the NT. By its nature, secondary supply is likely to be a function of policies that limit access to alcohol, including the BDR and PALIs. Since secondary supply is illegal, information on its prevalence is difficult to obtain and unreliable (see **Figure 7**).

[24] Northern Territory Government (2019). Northern Territory Alcohol Harm Minimisation Action Plan 2018-19, August 2019 update.

[25] Adamson, E. et al. (2021). Understanding the secondary supply of alcohol as a wicked policy problem: the unique case of the Banned Drinker Register in the Northern Territory, *Australian Journal of Public Administration*, 80, pp283-299.

Figure 7: Secondary supply in the NT

Source: Yarning and NT Police

2.3 The MUP

The objective of the MUP is to reduce the harmful consumption of alcohol, while minimising the impact on moderate consumers

The objective of the MUP is to increase the price of low-price, high-alcohol products with the aim of decreasing alcohol consumption and alcohol related harms, while having minimal impact on moderate drinkers.[26] The MUP was introduced via amendments to the NT *Liquor Act 1978*, introduced on 22 August 2018. There is no definition of harmful or moderate consumption included in the NT *Liquor Act 2019*, but reference is usually made to the Australian Guidelines, which state that to reduce the risk of harm from alcohol related disease or injury, healthy men and women should drink no more than 10 standard drinks a week and no more than 4 standard drinks on any one day.

The MUP took effect on 1 October 2018 and prohibits selling alcohol below the price of $1.30 per unit. Compliance is an automatic condition of a liquor licence. The unit in the MUP is a standard drink, which is defined as the volume of an alcoholic product that contains 10g of ethyl alcohol

[26] Northern Territory of Australia, *Liquor Act 2019*, Part 5, Division 3, Section 121.

when measured at 20°C. The MUP is used to calculate the minimum cost at which a product can be sold, based on the number of standard drinks the product contains.

The MUP applies to the retail sale and supply of alcohol products in the NT, including takeaway outlets, on premise sales and interstate retailers delivering alcohol to the NT. The MUP is not a tax. Retailers and licensed premises bear the costs of implementing the MUP and keep any additional revenue associated with the introduction of the MUP. Licencing NT supervises compliance with the MUP.

The expectation at the time the MUP was introduced was that:

- It would have greater impact on harmful drinkers. Modelling done for the MUP predicted that the price elasticity for heavy drinkers was 0.28% while moderate drinkers had a higher elasticity of 0.4%. Interestingly, this suggests moderate drinkers who drink cheap alcohol would reduce their consumption more than heavy drinkers.
- There would be no highly regressive effects because impacts were likely to be focused on harmful drinkers regardless of income. However, in practice the MUP is likely to impact low-income heavy drinkers to a greater extent than higher income heavy drinkers.
- The MUP would have a low cost of implementation for Government and any costs for industry would be compensated through increased profits.[27]

The MUP was targeted at the consumption of cheap wine, particularly cask wine, which offers high alcohol content for low cost and is frequently implicated as contributing to harmful drinking.[28] The intent was that beer, ciders and spirits would see no change in price or only a small change in price due to the MUP.[29]

The MUP was introduced as part of a suite of measures

Several other key policies were introduced around the time of the MUP (see **Table 1**). The BDR, which is a register of individuals who are banned from purchasing alcohol and from being served by licensees, was introduced across the NT from 1 September 2017. PALIs, who are police officers stationed at bottle shops, were deployed in some regions of the NT as far back as 2014. The current formulation was introduced in Alice Springs, Katherine and Tennant Creek from August 2018. There are no PALIs in the Darwin/Palmerston area. BDRs and PALIs are the subject of separate evaluations; it is not the intent of this report to comment on the performance of those policies.

27 NT Health, Q21-0291 – Request for Quotation, Darwin – Consultancy – Evaluation of Minimum Unit Price of Alcohol, August 2021

28 Taylor et al. (2021). The impact of a minimum unit price on wholesale alcohol supply trends in the Northern Territory, Australia, Australian and New Zealand Journal of Public Health, vol. 45, no. 1, p. 26.

29 Taylor et al. (2021). The impact of a minimum unit price on wholesale alcohol supply trends in the Northern Territory, Australia, Australian and New Zealand Journal of Public Health, vol. 45, no. 1, p. 26.

Table 1: Introduction of MUP and other recent alcohol policy interventions by region

Region	MUP	BDR[30]	PALIs	Other changes
Darwin	October 2018	September 2017	N/A	
Barkly (Tennant Creek)	October 2018	September 2017	Commencing May 2019	March 2018 restrictions on alcohol sales tightened
Big Rivers (Katherine)	October 2018	September 2017	Commencing May 2019	
Central Australia (Alice Springs)	De facto MUP: 2011 NT-wide MUP: October 2018	September 2017	Commencing August 2018	MUP regime
East Arnhem	October 2018	September 2017	N/A	
Top End	October 2018	September 2017	N/A	

Source: Frontier Economics analysis

30 BDR v1 (NT-wide) was introduced in July 2011 and was officially repealed on 1 July 2013.

3 Literature review

This section provides a high-level overview of the relevant literature. We begin by reviewing existing studies on the MUP in the NT, the impacts of the MUP in other jurisdictions globally and other alcohol related interventions in the NT. A more detailed literature review is provided in Appendix C.

3.1 Studies of the MUP in the NT

Two main studies evaluating the MUP in the NT that have been published to date. Both studies were conducted by researchers at Deakin University and focused on the MUP impacts one year after the policy's introduction. The 2020 Deakin study focused on a broad range of MUP impacts including alcohol prices, wholesale supply (as a proxy for consumption), alcohol related harms and other industry and economy-related outcome variables. The analysis was undertaken for the NT as a whole and for several of the main regions.[31] The 2021 Deakin study focused only on the wholesale supply of alcohol NT-wide and in the Darwin and Palmerston region.[32] Both studies analyse data over the period two months prior three months post-MUP implementation.

Previous studies showed significant price impacts per standard drink of cask wine following the introduction of the MUP

The 2020 Deakin study assessed the impact of the MUP on alcohol prices (two months pre-MUP and three months post-MUP) using online catalogue data in the NT and found that the average price per standard drink of cask wine across the NT almost doubled post-MUP, compared to pre-MUP, from $0.70 to $1.30. However, the study found that prices of other types of alcohol were generally unaffected.

Previous studies showed significant reductions in cask wine consumption after the MUP was introduced

Using quarterly wholesales sales data from 2013 to the third quarter of 2019, both studies found significant declines in the wholesale supply of cask wine in the NT immediately following the introduction of the MUP. The 2020 Deakin study found that this applied to the Darwin and Palmerston, Katherine and the Rest of the NT regions.[33] In Alice Springs, supply of cask wine was very low prior to the MUP, and no significant change was found after the MUP. But there was a very significant decline in the supply of bottled wine. In Tennant Creek, there was no significant change in the supply of cask wine or any other type of beverage after the introduction of the MUP.

31 Coomber, K., Miller, P., Taylor, N., Livingston, M., Smith, J. and Buykx, P., (2020). Investigating the introduction of the alcohol minimum unit price in the Northern Territory: final report. *Prepared for the Northern Territory Department of Health: Deakin University, Geelong Australia*.

32 Taylor, N., Miller, P., Coomber, K., Livingston, M., Scott, D., Buykx, P. and Chikritzhs, T., (2021). The impact of a minimum unit price on wholesale alcohol supply trends in the Northern Territory, Australia. *Australian and New Zealand Journal of Public Health*, *45*(1), pp.26-33.

33 Coomber, K., Miller, P., Taylor, N., Livingston, M., Smith, J. and Buykx, P., (2020). Investigating the introduction of the alcohol minimum unit price in the Northern Territory: final report. *Prepared for the Northern Territory Department of Health: Deakin University, Geelong Australia*.

The 2021 Deakin study found that per capita alcohol consumption of cask wine decreased by 48.8% and 50.6% in the Darwin/Palmerston region and NT-wide, respectively.[34] Similarly, total wine and total liquor sales per capita decreased in both in Darwin/Palmerston region and the NT-wide, though not nearly to the same extent as cask wine. The study found that the MUP specifically targeted sales of wine and wine-based beverages while leaving sales of beer, spirits and other beverage types largely unaffected.

There were substantial declines in alcohol related harms in the NT after the MUP was introduced

The 2020 Deakin study found that the introduction of the MUP was associated with significant declines in alcohol related assaults, drink driving, child protection notifications, emergency department presentations and Sobering Up Shelter (SUS) admissions. The study found no significant changes in the number of liquor licenses and tourism numbers. These impacts were found to have occurred across all regions in the NT.

The Foundation for Alcohol Research and Education (FARE) and the People's Alcohol Action Coalition (PAAC) reported similar reductions in alcohol related assaults and alcohol related domestic violence. [35,36] Across the entire NT, alcohol related assaults decreased by 26%, with Alice Springs exhibiting the largest decrease (43%), and Darwin exhibiting the smallest decrease (16%). The Alice Springs alcohol reform measures have been in place for the longest period (since August 2018); further north in the NT, alcohol reform measures were introduced later, and the smaller reduction in assaults reflects this.

3.2 Studies of MUPs in other jurisdictions

In other parts of the world, MUPs have been introduced in Scotland, the Republic of Ireland, eastern Europe, Wales, Canada and the USA. In these regions, the primary objective of the MUP is to reduce self-inflicted alcohol related harms. The studies conducted on the MUPs in Scotland, Wales and Canada are the most relevant to our evaluation of the MUP in the NT.

3.2.1 Scotland and Wales

A number of studies have been conducted on the impacts of the MUP in Scotland. The MUP was introduced on 1 May 2018 and set at £0.50 per unit (10ml or 8 grams) of alcohol. The MUP in Wales was introduced on 2 May 2020 and also set at £0.50 per unit (10ml) of alcohol.

The MUP had an immediate impact on prices and consumption

An initial investigation into the impact of the MUP in Scotland relied on household purchasing data ranging from three years pre-MUP to eight months post-MUP. The study found that the MUP was associated with an increase in the average price paid for alcohol by households of

[34] Taylor, N., Miller, P., Coomber, K., Livingston, M., Scott, D., Buykx, P. and Chikritzhs, T., (2021). The impact of a minimum unit price on wholesale alcohol supply trends in the Northern Territory, Australia. *Australian and New Zealand Journal of Public Health*, *45*(1), pp.26-33.

[35] Foundation for Alcohol Research and Education (FARE) and the People's Alcohol Action Coalition (PAAC) (2019), *Northern Territory Alcohol-Harm Reduction Report*.

[36] Pre-MUP is defined as the period from 1 October 2017 to 31 July 2018, and post-MUP from 1 October 2018 to 31 July 2019.

0.64p per gram of alcohol.[37] The price increase was greater for lower income households and in households that purchased the most alcohol. The increase in the purchase price of alcohol was maintained in the first half of 2020 (two years-post MUP in Scotland) and was associated with a 7.6% decrease in the mean price per gram of alcohol in Scotland. [38]

It was estimated that the MUP reduced weekly alcohol purchases by households consuming relatively high levels of alcohol in the eight months post-MUP by 9.5g per adult. The studies found that the MUP achieved its objective of reducing the amount of alcohol purchased by households that consumed relatively high levels of alcohol in Scotland, while leaving households which consumed moderate levels of alcohol unaffected.[39] An evaluation of the impact of the MUP after its first year of implementation found that the MUP in Scotland was associated with a 3.5% reduction in off-trade alcohol sales per adult.[40] The reduction in alcohol sales was driven by reduced purchases of spirits, cider and perry. By contrast, there was a 2.4% increase in sales over the same time period in England and Wales. Later studies, assessing the impact of the MUP two years post-MUP using daily purchase data concluded that the MUP was associated with a 7.7% decline in the quantity of alcohol purchased in Scotland, controlling for northern England. [41, 42]

In Wales, the introduction of the MUP had a similar immediate impact in Scotland; alcohol prices increased immediately, and alcohol purchases fell.[43] The MUP was associated with an 8.2% increase in price per gram of alcohol and an 8.6% decrease in the quantity of alcohol purchased, controlling for changes in western England and using data from March to July 2020.

Evidence shows that alcohol dependent drinkers in Scotland maintained their alcohol consumption habits by reducing spending in other areas

A more recent study by NHS Health Scotland found evidence that alcohol dependent drinkers paid more for drinks post-MUP than pre-MUP, and that harmful drinkers switched from

37 O'Donnell, A., Anderson, P., Jané-Llopis, E., Manthey, J., Kaner, E. and Rehm, J., (2019). Immediate impact of minimum unit pricing on alcohol purchases in Scotland: controlled interrupted time series analysis for 2015-18. *bmj*, *366*.

38 O'Donnell, A., Anderson, P., Jané-Llopis, E., Manthey, J., Kaner, E. and Rehm, J., (2019). Immediate impact of minimum unit pricing on alcohol purchases in Scotland: controlled interrupted time series analysis for 2015-18. *bmj*, *366*.

39 O'Donnell, A., Anderson, P., Jané-Llopis, E., Manthey, J., Kaner, E. and Rehm, J., (2019). Immediate impact of minimum unit pricing on alcohol purchases in Scotland: controlled interrupted time series analysis for 2015-18. *bmj*, *366*.

40 Robinson, M., Mackay, D., Giles, L., Lewsey, J., Richardson, E. and Beeston, C., (2021). Evaluating the impact of minimum unit pricing (Mup) on off-trade alcohol sales in Scotland: an interrupted time–series study. *Addiction*, *116*(10), pp.2697-2707.

41 Anderson, P., O'Donnell, A., Kaner, E., Llopis, E.J., Manthey, J. and Rehm, J., (2021). Impact of minimum unit pricing on alcohol purchases in Scotland and Wales: controlled interrupted time series analyses. *The Lancet Public Health*, *6*(8), pp.e557-e565.

42 The study used data from January 2015 to July 2020, but excluding May 2018 to December 2019 due to data limitations.

43 Anderson, P., O'Donnell, A., Kaner, E., Llopis, E.J., Manthey, J. and Rehm, J., (2021). Impact of minimum unit pricing on alcohol purchases in Scotland and Wales: controlled interrupted time series analyses. *The Lancet Public Health*, *6*(8), pp.e557-e565.

consuming stronger ciders to spirits, as a result of the MUP.[44, 45] There was no evidence to suggest that the MUP led to an overall decrease in consumption among harmful drinkers or those with alcohol dependence. Further, the study found that the MUP led to increased financial strain for alcohol dependent drinkers as they reduced spending in other areas to be able to maintain their alcohol consumption habits.

The MUP had no impact on alcohol related crime and disorder, but resulted in a slight positive impact for retailers

Manchester Metropolitan University evaluated the impact of the MUP in Scotland on crime and disorder, public safety and public nuisance using data covering the period from January 2015 to January 2020.[46] The study found no statistically significant impact of the MUP on the level or trend of alcohol related crime and disorder, and of alcohol related incidents.

Frontier Economics evaluated the economic impact of the MUP in Scotland on producers and retailers of alcoholic drinks.[47] Although the study is not yet complete, preliminary conclusions based on consultations were that the overall impact on retailer revenue and prices was minimal. This is because increased margins compensated firms for decreased volumes sold, although the impact depended on the mix of alcoholic drinks sold pre-MUP.

3.2.2 Canada

All 13 provinces and territories in Canada have some form of minimum pricing on alcohol, and most of them have some government control over alcohol distribution. However, there is huge variation in the way minimum prices on alcohol are set across the country.[48]

In the Canadian province of Saskatchewan, the Saskatchewan Liquor and Gaming Authority introduced minimum prices for alcohol on 1 April 2010 which vary according to the alcoholic strength of alcoholic beverages. The MUP ranged between $1.16 and $1.84 per standard drink.

Increases in minimum prices for alcohol have been associated with declines in alcohol consumption

Early studies found that a 10% increase in minimum prices was associated with an 8.4% decrease in total alcohol consumption.[49] The consumption of high strength beer (beer containing more than 6.8% alcohol volume) and wine exhibited the greatest decline. Later studies estimated using longitudinal models that a 10% increase in minimum price of an alcoholic beverage reduced its

44 Public Health Scotland (2022), *Evaluating the impact of Minimum Unit Pricing in Scotland on people who are drinking at harmful levels.*

45 Harmful drinking is defined in the UK as consuming more than 35 units a week of women and more than 50 units for men in a week where 1 unit = 10 ml or 8g of pure ethanol.

46 Krzemieniewska-Nandwani, K., Bannister, J., Ellison, M. and Adepeju, M., (2021). Evaluation of the impact of alcohol minimum unit pricing (MUP) on crime and disorder, public safety and public nuisance.

47 Frontier Economics Ltd (2019), *Minimum Alcohol Pricing - Evaluating the impacts on the alcoholic drinks industry in Scotland: baseline evidence and initial impacts*.

48 Thomas, G., (2012). Price policies to reduce alcohol related harms in Canada: Current context and recommendations for targeted policies. *Ottawa, Ontario, Canada: Canadian Centre on Substance Abuse*.

49 Stockwell, T., Zhao, J., Giesbrecht, N., Macdonald, S., Thomas, G. and Wettlaufer, A., (2012). The raising of minimum alcohol prices in Saskatchewan, Canada: impacts on consumption and implications for public health. *American journal of public health*, *102*(12), pp.e103-e110.

consumption relative to other beverages by 14.6% to 16.1%.[50] Further, independent time-series models estimated that a 10% increase in minimum prices reduced spirits and liquor consumption by 6.8%, wine by 8.9%, beer by 1.5% and all alcoholic types by 3.4%.

Alcohol related hospital admissions declined following the introduction of minimum prices for alcohol

Investigations into the relationship between minimum prices for alcohol and hospital admissions in British Columbia, Canada found that a 1% increase in minimum prices was associated with a 1.6% reduction in acute alcohol related hospital admissions immediately, and a 1.3% reduction in total chronic alcohol related hospital admissions after two years.[51]

3.3 Studies of other alcohol related interventions in the NT

Several studies have reviewed the effectiveness of the BDR and SUS in the NT and investigated the secondary supply of alcohol in the NT.

3.3.1 Reviews of the NT Banned Drinker Register

There is evidence that the BDR has been effective in improving the behaviour of banned drinkers

The Menzies School of Health Research reviewed the BDR in the NT 6 months and 12 months post-implementation, and Ernst & Young evaluated the BDR 24 months post-implementation.

The six months post-implementation review concluded that it was too early to observe any significant behavioural changes as a result of the BDR.[52] The 12 months evaluation looked at 3,682 individuals on the BDR on 31 August 2018, 93% of whom were banned due to alcohol related contact with the NT justice system. [53] The study found that the BDR may have had a positive impact since 40% of the individuals on the BDR for predominantly non-criminal alcohol related events in the year prior to the BDR implementation had no alcohol related events in the justice system in the year post-BDR implementation. Overall, the BDR was found to have primarily impacted individuals who had relatively frequent alcohol related contact with the justice system.

Ernst & Young's review of the BDR 24 months post-implementation concluded that over 57% of individuals who had predominantly criminal contact with the justice system prior to the BDR had no further recorded alcohol related contact after being placed on the BDR.[54] However, the review notes that this figure may be inaccurate as some individuals may have left the NT, been

50 Stockwell, T., Auld, M.C., Zhao, J. and Martin, G., (2012). Does minimum pricing reduce alcohol consumption? The experience of a Canadian province. *Addiction*, *107*(5), pp.912-920.

51 Zhao, J. and Stockwell, T., (2017). The impacts of minimum alcohol pricing on alcohol attributable morbidity in regions of British Colombia, Canada with low, medium and high mean family income. *Addiction*, *112*(11), pp.1942-1951.

52 Smith, J. and Adamson, E., (2018). Process evaluation of the banned drinker register in the Northern Territory. *Menzies School of Health Research: Darwin.*

53 Department of Health. (2019). Twelve-month evaluation of the Banned Drinker Register in the Northern Territory Part 1-Descriptive analysis of administrative. and Part 2–A qualitative analysis of selected stakeholder perspectives

54 Ernst & Young (EY) (2020), *Medium term (24 months) outcomes and impacts of the Banned Drinker Register*, A report for NT Department of Health.

incarcerated or relocated to an area where they are less likely to engage with the justice system for alcohol related events.

Some stakeholders argue that the BDR may have led to more crimes including break-ins

In a study undertaken by the Menzies School of Health Research, industry stakeholders were interviewed to gain insight into the extent to which the BDR achieved its objectives of reducing alcohol related harms.[55] There were mixed views about the BDR's effectiveness in reducing antisocial behaviour and crime, and in improving public amenity. Some participants acknowledged the positive aspects of the BDR as a tool to prevent crime. But some participants expressed the view that the BDR led to increases in theft and break-ins of both licenses premises and residences to obtain alcohol for banned drinkers. Further, some participants perceived there to be a decline in public amenity and an increase in antisocial behaviour which they attributed to the impact of the BDR on the secondary supply of alcohol. Tourists and taxi drivers were flagged as two groups of people who potentially facilitated the secondary supply of alcohol to individuals on the BDR.

3.3.2 Sobering Up Shelters

Impact of BDR on SUS presentations is mixed

PriceWaterhouseCoopers' Indigenous Consulting (PwC) undertook a review of SUS in the NT for NT Health.[56] The focus of the study was on operational aspects, and the study makes a number of recommendations for improving the operations of the SUS, including recommendations for specific SUS sites. One of the recommendations was that SUS could collect more information on how many clients are registered on the BDR to inform ongoing review of secondary supply.

As part of its investigation, PwC found that the introduction of the BDR did not result in a noticeable decrease in presentations to the SUS, and that intoxicated individuals who were already on the BDR continued to be admitted to SUS. Consultations with stakeholders indicated that this was due to secondary supply, black market sales, and licensed venues that still allowed individuals on the BDR to access alcohol and continue to get intoxicated.

However, communities that had Point of Sale Interventions (Alice Springs, Tennant Creek and Katherine) had seen differences in the number of intoxicated people presenting at SUS. Stakeholders felt that the presence of PALIs at take-away alcohol outlets is a deterrent for people that are identified as heavy drinkers or are on the BDR.

3.3.3 Secondary supply of alcohol in the NT

Analysing secondary supply in the NT is complex

The Menzies School of Health examined the secondary supply in the context of investigating the impact of the BDR, as well as in the broader context of alcohol consumption in the NT.[57] Data

[55] Adamson E. et al (2021), Industry views about the Banned Drinker Register in the Northern Territory: Early lessons from a qualitative evaluation, *Drug and Alcohol Review*, 40,

[56] PWC Indigenous Consulting (2018), *Review of the Northern Territory Sobering Up Shelters*, A report for the NT Department of Health.

[57] Adamson E. et al (2021), Understanding the secondary supply of alcohol as a wicked policy problem: The unique case of the Banned Drinker Register in the Northern Territory, *Australian Journal of Public Administration*, 80, 283–299.

collected in interviews identified key barriers in accurately identifying and confirming that secondary supply has taken place. Secondary supply involves a number of transactions in the supply process: the sale of the alcohol, transfer of the alcohol to the banned individual, and consumption by the banned individual. The study concludes that a key barrier to determining whether secondary supply of alcohol has occurred is the challenge faced by a person of authority to confirm whether the recipient and consumer at the end of this chain of transactions is on the BDR.

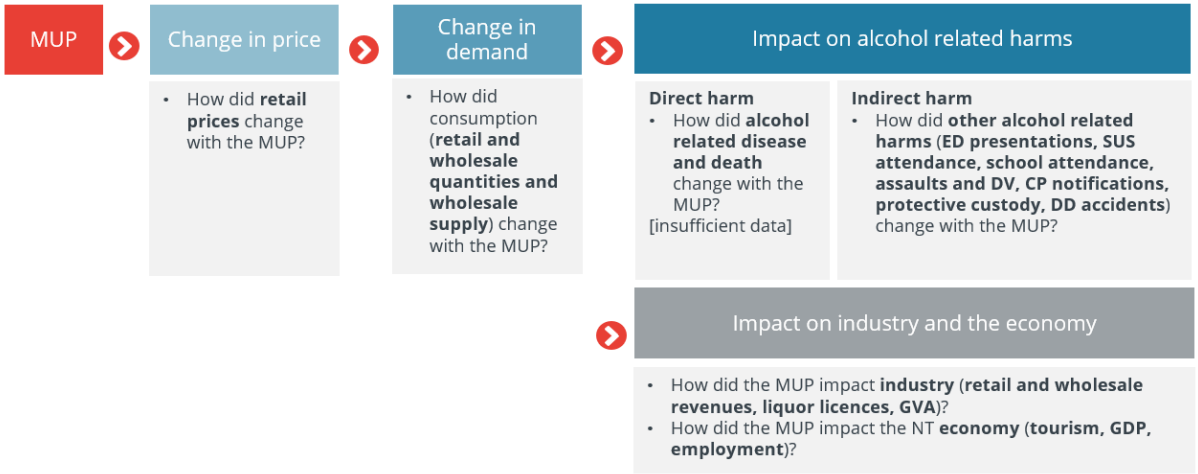
Approximately 30% of the NT population identify as Indigenous. A disproportionate number of Indigenous people are on the BDR. It would therefore seem important to consider Indigenous cultural values, such as sharing of resources, which directly link to the challenge of addressing the secondary supply of alcohol in Indigenous communities, when attempting to gain insight in the secondary supply of alcohol. A limitation of this study is that the data only represents the views of takeaway bottle shop owners and managers, and not members of the Indigenous community.

4 Methodology for evaluation

The main purpose of this evaluation is to assess whether the MUP has achieved its intended primary objective of reducing the harmful consumption of alcohol while having minimal impact on moderate drinkers. The evaluation also assesses related objectives of the MUP such as a reduction in harmful behaviour as a result of a reduction in harmful alcohol consumption.

Figure 8 provides an overview of the intended impact of the MUP, drawing on the Theory of Change presented in Section 1.3. The intent of the MUP was to increase the price of low cost, high alcohol products while leaving the price of other alcoholic beverages unchanged. This in turn was intended to reduce the consumption of low cost, high alcohol products by harmful drinkers, with minimal impact on the consumption of alcohol by moderate drinkers. Finally, the reduction in consumption of low cost, high alcohol products by harmful drinkers as a result of the MUP was expected to reduce the associated harmful behaviours.

Figure 8: Overview of the expected impact of the MUP



Source: Frontier Economics

Table 2 identifies the key impacts we are seeking to identify and assess as part of this evaluation. We discuss our approach to quantitative and qualitative analysis in more detail below.

Ideally, we would aim to examine the short-term impact of the MUP in the period immediately after implementation, as distinct from the medium to long-term impact in the following years. However, as we discuss in more detail below, the impact of COVID-19 makes it difficult to attribute medium to long-term outcomes in key variables to the MUP.

Table 2: Categories of impacts – Questions we aim to answer

Impact	Questions we aim to answer
Price impact	
1. Alcohol prices	• Did the MUP achieve its intended effects of increasing the price of low cost, high alcohol products (for heavy drinkers)? • Did the MUP leave the price of other alcoholic beverages unchanged (for moderate drinkers)? • How has the MUP's impact on alcohol prices varied by location?
Demand impact	
2. Wholesale supply / consumption of alcohol	• Did the MUP achieve its intended impact of reducing consumption of low cost, high alcohol products (for heavy drinkers)? • Did the MUP leave the consumption of other alcoholic beverages unchanged (for moderate drinkers)? • How has the impact of the MUP on alcohol on consumption varied in by location? • What other effects has the MUP had on the supply of alcohol (e.g., increased secondary supply on black market)?
Alcohol related harms impact	
3. Assaults and domestic violence (DV)	• How did the MUP impact the number of alcohol related assaults and DVs by location?
4. Road traffic crashes / drink driving (DD) crashes and fatalities	• How did the MUP impact the number of DD crashes and fatalities by location?
5. ED presentations	• How did the MUP impact the number of ED presentations by location?
6. SUS attendance	• How did the MUP impact the number of people admitted to SUS by location?
7. Child protection	• How did the MUP impact the number of child protection cases by location?
8. Protective custody	• How did the MUP impact the protective custody cases by location?

Impact	Questions we aim to answer
9. School enrolment / attendance	• How did the MUP impact the number of school enrolment / attendance by location?
Impact on industry and the economy	
10. Liquor licences	• How did the MUP impact the number of liquor licences by location?
11. Tourism	• How did the MUP impact tourism by location?
12. Gross Regional Product (GRP) and Gross value added (GVA)	• How did the MUP impact the GRP by location? • How did the MUP impact GVA?
13. Employment	• How did the MUP impact employment by location?

Source: Frontier Economics

4.1 Approach to quantitative analysis

We analyse data on our selected metrics of interest to determine whether the MUP's main objective of reducing harmful alcohol consumption while minimising the effect of the MUP on moderate alcohol consumers have been achieved.

The metrics we selected are based on discussions with key stakeholders, including NT Health. Additionally, we were guided by indicators identified in the Social and Economic Costs and Harms of Alcohol Consumption in the NT study conducted by the Menzies School of Health Research, such as alcohol related road crashes. We worked closely with NT Health to collect data from NT Government stakeholders to supplement data and insights obtained through consultations.

4.1.1 Data

Data from six agencies and several alcohol retailers were used to evaluate the quantitative impact of the MUP on alcohol prices, alcohol consumption and alcohol related harms in the NT.

Table 3 provides a brief overview of the datasets used in our analysis. Further detail on each of the datasets provided to us can be found in Appendix D.

Table 3: Datasets

Agency	Datasets
Retailers	• Weekly/monthly average price and quantity data by product ID and store across NT regions from 2 major retailers
Wholesalers	• Weekly average wholesale sales data by product ID and customer type provided by a major wholesaler
Licensing NT	• Quarterly wholesale supply data by beverage type across NT regions • Annual liquor licences across entire NT
NT Police and the Department of the Attorney-General and Justice	• Monthly alcohol related assaults and domestic violence for the entire NT • Annual protective custody episodes across NT regions • Incident drink driving accident data (including geographical coordinates and the blood alcohol content ranges of drivers) and annual drink driving apprehensions and infringements for the entire NT
NT Department of Health	• Monthly alcohol related ED presentations by hospitals across NT regions • Individual-level data on SUS attendance (including demographic information, admission time, etc.) by shelters across the NT

Agency	Datasets
	• Monthly alcohol related child protection substantiations across NT regions
NT Department of Education	• School attendance by term and remoteness levels
Department of Industry, Tourism and Trade	• Annual visitors and tourism expenditure categorised by domestic and international traveller for NT regions
Department of Industry, Tourism and Trade	• Annual gross regional product and gross value added across NT regions
Department of Industry, Tourism and Trade	• Monthly unemployment rate for NT regions

4.1.2 Methodology

The impact of the MUP on our outcome variables was examined using regression analysis. We include an indicator variable in our models for whether an observation is 'pre-MUP' or a 'post-MUP'. The coefficient on this variable captures the impact of the MUP on the outcome variable.[58] This is similar to the approach adopted in other studies involving an evaluation of a MUP.[59] Our regression models account for any seasonal fluctuations in the outcome variable by using seasonal indicator variables. We also include a linear time trend variable to control for a possible long-term trend in the outcome variable. Our regression analysis only includes data up to and including March 2020 to avoid confounding the impact of the MUP with the impact of the COVID-19 outbreak.[60]

Where possible, we undertook NT-wide analyses on a per capita basis (using ABS population data). But regional analyses were done using regional totals for the outcome variables since regional population data is less reliable.

[58] We assign the MUP intervention variable as a binary dummy variable where 'PostMUP' equals 0 represents pre-MUP observation and 'PostMUP' equals 1 represents post-MUP observation.

[59] See, for example, Coomber, K., Miller, P., Taylor, N., Livingston, M., Smith, J. and Buykx, P., (2020). Investigating the introduction of the alcohol minimum unit price in the Northern Territory: final report. *Prepared for the Northern Territory Department of Health: Deakin University, Geelong Australia*; and Taylor, N., Miller, P., Coomber, K., Livingston, M., Scott, D., Buykx, P. and Chikritzhs, T., (2021). The impact of a minimum unit price on wholesale alcohol supply trends in the Northern Territory, Australia. *Australian and New Zealand Journal of Public Health*, *45*(1), pp.26-33.

[60] More specifically, we exclude data from April 2020 onwards from our estimation datasets due to the declaration of a public health emergency in the NT on 19 March 2020. https://coronavirus.nt.gov.au/updates/items/2020-03-19-public-health-emergency-declared.

For several outcome variables, we also analysed the ratios of alcohol related incidents to total incidents (e.g., alcohol related assaults as a proportion of total assaults) to facilitate control for underlying trends.

We supplemented our quantitative results with insights from relevant stakeholder interviews to inform our interpretation of findings that could not be clearly determined from the quantitative analysis. Through investigation and consultation, we focussed on understanding the influence of contextual factors in determining MUP impacts. Where data was available, we explored the impact of the MUP for different demographics and different regions in NT.

Further information on our methodology can be found in Appendix E.

4.1.3 Regional analysis

Throughout this report, we present our results by the geographic regions specified in the data provided to us. In most cases, the data is categorised according to the following regions: NT-wide, Alice Springs, Darwin and Palmerston, Katherine, Nhulunbuy and Tennant Creek. We group Darwin and Palmerston together in our analyses given the close proximity of these two regions. This is consistent with previous studies of the MUP in the NT.[61]

Similar to the 2021 Deakin report, we pay special attention to the results for the Darwin/Palmerston region for the following reasons:

- Darwin is the NT's capital and Darwin/Palmerston accounts for approximately 60% of the total NT population.[62]
- We expect the largest price impacts to occur in Darwin given that transportation cost would be lowest in Darwin.
- No PALIs were deployed in the Darwin/Palmerston area; hence in this region the impact of the MUP is not confounded with the impact of PALIs (though it is still confounded with the impact of the BDR).

4.2 Approach to stakeholder consultation

Yarning undertook consultations across the NT with a wide range of stakeholders, with the support of Fronter Economics

Yarning was tasked to lead the stakeholder consultations for this project. Yarning recognises that the views of on-the-ground stakeholders that have experienced the MUP policy first-hand is vital to evaluating the MUP.

The purpose of the stakeholder consultation was to:

- Inform the data analysis (e.g., by providing insights on why we observe, or do not observe, certain trends or correlations)
- Identify the shared experiences and diverse views across the stakeholders in relation to the impacts of the MUP

61 We also consider Darwin and Palmerston to be in the same retail market for alcohol.

62 ABS ERP by SA2 and above (www.abs.gov.au/)

- Confirm appropriate metrics to measure the impacts of the MUP.

The stakeholder consultation approach was aligned with best practice methods and principles and adhered to local community protocols and cultural lore.

4.2.1 Consultation principles

The consultation principles which underpinned our approach to stakeholder consultation were:

- Transparency
  - We were transparent in our consultations and engagement
  - We informed the stakeholder of who we are, the purpose of the consultation or engagement, what would be recorded and how the information may be used
- Inclusiveness
  - We provided the opportunity for all stakeholders who may wish to participate, to do so
  - We used mixed methodology approaches as appropriate and suitable
  - We addressed language barriers when necessary
- Listening
  - We provided the opportunity for stakeholders to be listened to and heard
  - We did not interpret responses
  - We took the necessary time, as appropriate, to obtain the stakeholder feedback
- Safe Spaces
  - We provided culturally safe space and time to undertake stakeholder consultations and engagements
  - We adhered to Cultural Protocols
  - We provided suitable meeting places to undertake consultations or engagements
- Time
  - We took and provided the necessary time as appropriate to undertake consultations or engagements suitably
  - We were flexible with the timing of our consultations to allow for greater participation
- Respect
  - We acknowledged and respected those stakeholders that gave their time to participate
  - We respected the need to undertake our consultations and engagements within the parameters of the project
- Confidentiality
  - Confidential information remained confidential
  - We will dispose of confidential information at the end of the project
  - Information is published in a form that does not identify an individual, unless consent by the individual has been provided.

It is important to note that, as part of our approach, we did not engage with or consult people who appear to be under the influence or affected by drugs or alcohol; or engage with or consult with people under the age of 18 years old without ethical clearance.

4.2.2 Pre-consultation process

Stakeholder list

We worked closely with NT Health and other key stakeholders to identify relevant stakeholder groups to be consulted for this evaluation. The key stakeholder groups we identified were as follows:

- NT Government
- Alcohol Reference and Community Safety Group
- Treatment providers
- Aboriginal community-controlled health organisations (ACCHO)
- Other groups e.g., Retail Drinks Australia, Foundation for Alcohol Research and Education, Hospitality NT.

A detailed list of stakeholders we consulted with can be found in Appendix A.

Location and timing

Our selection of locations and time spent at each location were guided by our list of key stakeholders. We kept track of our stakeholder list and the meetings held by using an excel spreadsheet that was also visible to the Frontier Economics team.

4.2.3 Consultations

To ensure effective consultation we carried out the following:

- Developed questions and prompts for discussion.
- Revised questions/prompts based on stakeholder feedback.
- Held consultations in Darwin, followed by Katherine, Tennant Creek, Alice Springs and Nhulunbuy.
- Undertook remote stakeholder group consultations.
- Requested for feedback via email follow up with stakeholders, with opportunity for stakeholders to provide written or verbal feedback.

Whilst we ensured a consistent approach to each consultation, the nature of each individual consultation differed due to the varying role, knowledge, and involvement each stakeholder had in relation to the MUP. Ultimately, through open-ended questions which sought to determine how wide ranging the impacts of the MUP where, we were able to hold organic conversations that enabled stakeholders to answer more honestly and naturally.

Yarning also undertook a large number of informal and ad hoc consultations with community members across the NT, to ensure the views of those most impacted by the MUP were consulted as part of this evaluation.

These consultations were undertaken in two stages:

- Consultation stage 1: Group stakeholder workshops / Roundtables
- Consultation stage 2: One-on-one consultation.

We elaborate further on our approach to each of the consultation stages in the subsequent subsections.

Consultation stage 1: Group stakeholder workshops / Roundtables

Three group consultation sessions in Darwin, one with Government stakeholders, one with industry representatives, and one with community and social interest groups. The purpose of these group consultations was to introduce the MUP Evaluation and why it was being undertaken, to gain preliminary views, and to secure increased participation within Stage 2 of the consultation process.

Consultation stage 2: One-on-one consultation

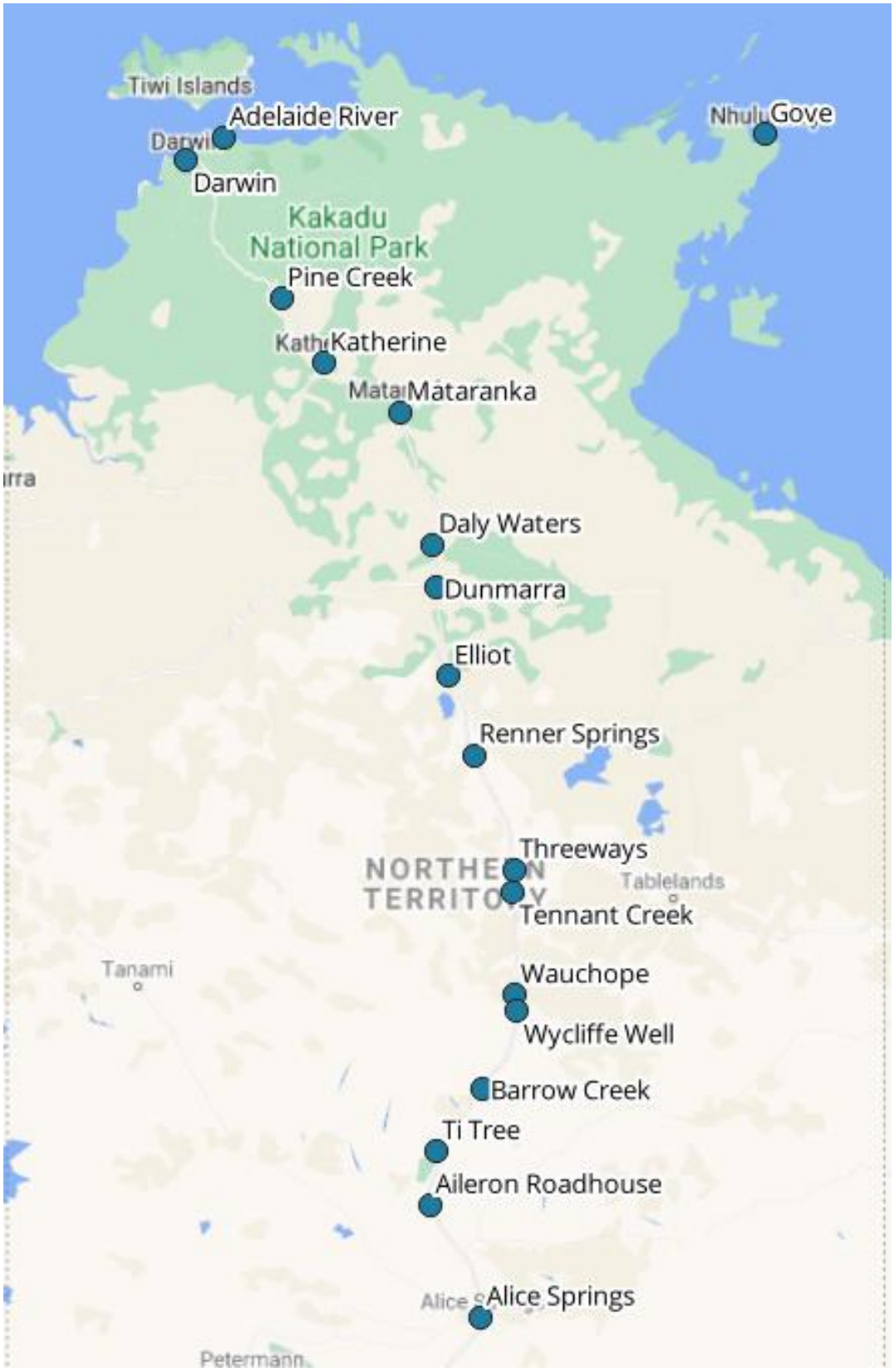
Targeted one-on-one meetings with key stakeholders to enable greater levels of engagement and willingness to share information. Stakeholders engaged were from a wide range of backgrounds.

Table 4: Types of stakeholders consulted with by region in the NT

Darwin	Nhulunbuy	Katherine	Tennant Creek	Alice Springs
NT Government Policy and Program Staff	Community members and alcohol purchasers	NT Government Policy and Program Staff	NT Government Policy and Program Staff	NT Government Policy and Program Staff
Industry body representatives	Local Government employees	Industry body representatives	Drug and Alcohol Treatment Providers	Drug and Alcohol Treatment Providers
Drug and Alcohol Treatment Providers	Indigenous Service Providers and Community Organisations	Drug and Alcohol Treatment Providers	NT Police	NT Police
Community members and alcohol purchasers		Community members and alcohol purchasers	Community members and alcohol purchasers	NT Health
Local Government employees		Local Government employees	Local Government employees	Community members and alcohol purchasers
Indigenous Service Providers and Community Organisations		Indigenous Service Providers and Community Organisations	Indigenous Service Providers and Community Organisations	Indigenous Service Providers and Community Organisations

Source: Yarning

Figure 9: Locations of stakeholder consultations across the NT



Source: Frontier Economics and Yarning

5 Results

This section presents the main results from our analysis. We discuss the impacts of the MUP on the following broad categories of variables in the NT:

- Alcoholic product prices: retail alcohol prices by individual alcoholic beverage products for a sample of retailers
- Demand for alcohol products: retail alcohol sales and wholesale supply of alcohol
- Alcohol related harms: assaults, drink driving crashes, emergency department presentations, SUS admissions, child protection substantiations, protective custody and school attendance
- Industry and economy: liquor licenses, tourism, gross regional product and gross value added and unemployment rate

The results presented in this section are estimates derived from our models that are statistically significant. More detailed results, including regression results, are provided in Appendix E.

Table 5 provides a summary of our key results for each of the categories of impacts.

Table 5: Summary of results

Impact	Results
Price impact	
1. Alcohol prices	• The product prices most affected by the MUP were cask wine in Darwin and bottled wine in Alice Springs, as well as beer Territory-wide • In the year before the MUP, 20% and 17% of alcoholic drinks sold were priced below $1.30 per standard drink in Darwin and Alice Springs respectively. This decreased to 1% of alcoholic drinks in the year following the MUP • Prices of low-priced drinks (including those above $1.30) increased after the MUP as a result of a rebalancing of product offerings and prices
Demand impact	
2. Retail quantities / wholesale supply	Wholesale supply • Total wholesale supply of alcohol drinks per capita in the NT decreased immediately after the MUP was introduced • Wholesale supply of cask wine per capita decreased dramatically immediately post-MUP in all regions of the NT apart from Alice Springs. Wholesale supply of cask wine in Alice Springs was already very low in Alice Spring prior to the MUP. • Wholesale supply of beer and bottled wine per capita in the NT also decreased immediately post-MUP • Wholesale supply of spirits per capita in the NT increased slightly after the MUP • There were changes in the trends of the wholesale supply of cider and fortified wine across the NT as a whole, but these could not be attributed to the MUP • The extent of the decrease in cask wine supply varies by regions in the NT

Impact	Results
	Retail quantities sold • Products previously sold below $1.30 experienced significant sales decreases after the MUP • Grouping products by category and pre-MUP price bin, we see a typical demand response whereby the groups that increase the price the most tended to have lower sales post-MUP • Although products which increased prices generally saw a reduction in sales after the MUP, low-price products above the MUP were able to increase prices without loss of sales – this is evidence of substitution Retail margin • The retail price of cask wine increased substantially. However, increases in wholesale prices were relatively small, and could have been driven by the reduction in volume and loss of economies of scale. This suggests that retail margins increased, and that retailers rather than wholesales or manufacturers obtained the benefits of increased retail prices.
Alcohol related harms impact	
3. Assaults and domestic violence (DV)	• After the MUP, the rate of total alcohol related assaults per capita in the NT decreased significantly • After the MUP, the rate of total alcohol related non-DV offences per capita in the NT decreased significantly • MUP had no statistically significant impact on the rate of alcohol related DV assaults per capita
4. Road traffic crashes / drink driving (DD) crashes and fatalities	• Most alcohol related crashes occur in the Alice Springs and Greater Darwin regions • There were decreases in the number of alcohol related crashes in Alice Springs and the rest of NT (excluding the Greater Darwin region) following the introduction of the MUP

Impact	Results
	• MUP had no statistically significant impact on alcohol related crashes in Greater Darwin
5. Alcohol related ED presentations	• The number of alcohol related ED presentations per capita decreased significantly across the NT following the introduction of the MUP • There were significant decreases in the number of alcohol related ED presentations at Alice Springs Hospital and Tennant Creek Hospital • MUP had no statistically significant impact on alcohol related ED presentations in Gove District Hospital (Nhulunbuy), Katherine Hospital, and hospitals in the Darwin region (Royal Darwin Hospital and Palmerston Regional Hospital).
6. SUS attendance	• SUS admissions per capita across the NT increased significantly following the MUP's introduction • The number of SUS admissions increased significantly after the MUP in all regions in the NT apart from Alice Springs
7. Child protection substantiations	• Child protection substantiations per capita across the NT decreased significantly following the MUP • Child protection substantiations decreased significantly following the MUP in Alice Springs, Big Rivers (Katherine) and Barkly (Tennant Creek). There was no statistically significant impact on substantiations in Greater Darwin and East Arnhem (Nhulunbuy)
8. Protective custody	• The number of individuals in protective custody across the NT decreased over the 2014 to 2021 period • We were unable to examine the impact of the MUP on the number of individuals in protective custody since we did not have access to a more granular level of data
9. School attendance	• Improvements in school attendance rates following the MUP varied by the level of remoteness in the NT and Indigenous status

Impact	Results
	• Attendance rates improved following the MUP for students in outer regions who identified as non-Indigenous and students in remote regions who identified as Indigenous
Impact on industry and the economy	
10. Liquor licenses	• The number of liquor licenses in the NT remained generally consistent over the last seven years
11. Tourism	• We were unable to determine whether the MUP had an impact on the number of visitors and tourism expenditure across the NT
12. Gross Regional Product (GRP) and Gross value added (GVA)	• We were unable to determine whether the MUP had an impact on GRP and GVA across the NT
13. Unemployment rate	• We were unable to determine whether the MUP had an impact on unemployment rates in the NT

Source: Frontier Economics

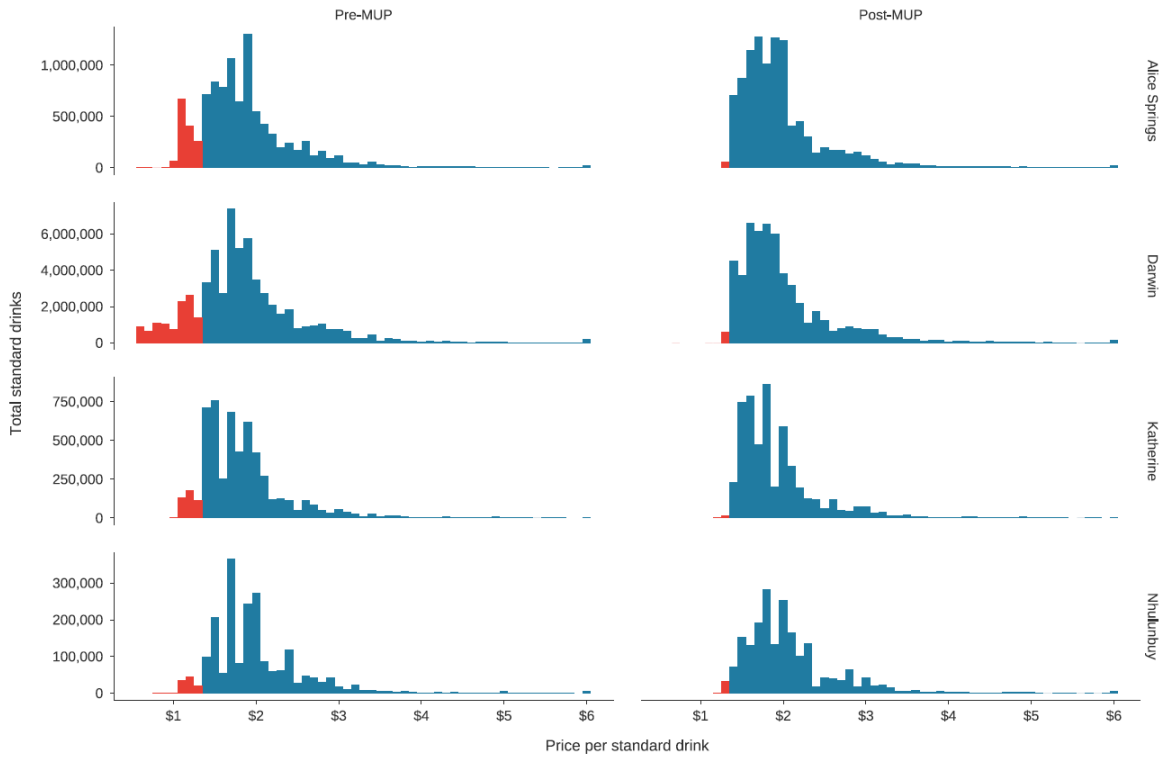
5.1 Impact of MUP on prices

The proportion of drinks sold below the MUP differed by region, and fell after the MUP was introduced

As the MUP imposes a minimum price, the most direct impact of the MUP is on the price of alcohol drinks that would have been sold below the MUP threshold. The potential impact of the MUP therefore depends on the proportion of drinks sold below the $1.30 threshold pre-MUP, which may differ across regions and beverage category.

In this section we analyse the impact of the MUP on the prices and sales of alcohol products using data provided by two major retailers. The datasets provide details of the quantities and prices of alcohol products sold by product.[63] **Figure 10** shows sales of alcohol drinks at different retail prices in the 52 weeks before and after the introduction of the MUP by region. The panels on the left of the figure show sales at different retail prices in the 52 weeks before the introduction of the MUP, and the panels on the right of the figure show the sales at different retail prices in the 52 weeks after the introduction of the MUP.

Figure 10: Distribution of prices before and after MUP by region



Source: Frontier Economics analysis

Note: Drinks sold below $1.30 per standard drink are shaded red

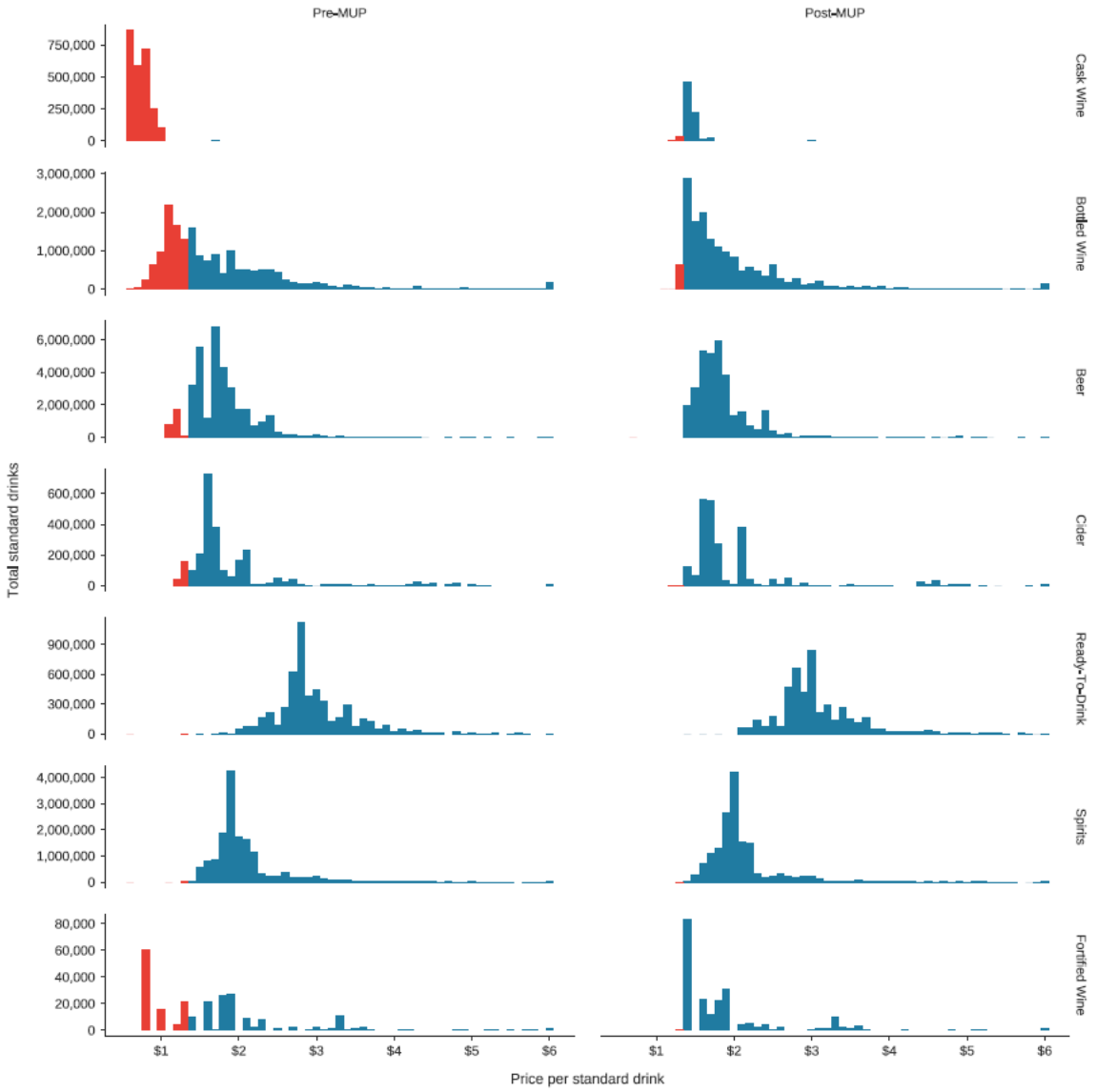
63 We note, however, that the datasets do not provide complete coverage of sales in any region. In Section 5.2.3, we present results based on wholesale supply data provided by NT Licensing. The NT Licensing dataset does have full coverage of wholesale sales by region, but this data does not contain any information on prices or sales for individual products.

Across the regions, 19% of alcohol drinks sold before the MUP were sold below the $1.30 threshold, compared with only 1% in the 52 weeks after. The figure shows that this shift was particularly significant in Darwin and Alice Springs. In Darwin the proportion of sales below $1.30 decreased from 20% to 1%, and in Alice Springs the proportion of sales below $1.30 decreased from 17% to 1%. The figure also shows that, before the MUP, the proportion of drinks sold below the MUP in Katherine and Nhulunbuy was quite small, 13% and 8% respectively. Hence only a small proportion of sales would have been directly affected by the MUP in these regions.

The prices of all cask wine products increased after the MUP was introduced

Figure 11 shows the sales of alcohol drinks at different prices pre-MUP and post-MUP by beverage category. We observe that cask wine was primarily sold below $1.30 before the MUP, making it the product category most impacted by the MUP. Virtually all cask wine products would have had price increases as a result of the MUP. The low volumes of cask wine sales shown in the histogram for cask wine post-MUP (in the right-hand panel) indicates these price increases led to a dramatic reduction in the number of drinks sold after the MUP.

Figure 11: Distribution of prices before and after MUP by product



Source: Frontier Economics analysis

Note: Drinks sold below $1.30 per standard drink are shaded red

We can see in **Figure 11** that the effect of the MUP was not isolated to cask wine – other notable categories impacted by the MUP are bottled wine (most likely due to cleanskin bottles) and fortified wine. Over 40% of bottled wine was sold below $1.30 prior to the MUP. After the MUP, bottled wine sales at around $1.30 increased significantly. But it is notable that bottled wine sales increased for all price levels between $1.30 and $2, not just the products concentrated near the $1.30 threshold. By comparison, fortified wine consumption below $1.30 appears to have been diverted almost exclusively to products priced close to $1.30.

Beer and cider were impacted by the MUP; however, the overall distribution of prices and consumption were not substantially altered by the introduction of the MUP.

Products that were priced well below the MUP before the MUP was introduced experienced significant declines in sales after the MUP

Figure 12 presents the prices of the top 100 most popular products in each region in the 52-week period before and after the MUP. The average price per standard drink before the MUP is shown on the X- axis and the average price after the MUP is shown on the Y-axis. The figure only shows products that were sold for prices below $2.00 before the MUP. The prices have been adjusted for inflation.

The sloped solid black line represents equality between the before and after prices in real terms, such that products with points above the black line have had an increase in price after the MUP, and products below the line have had a decrease in price. The grey horizontal line and the light red vertical line mark the MUP at $1.30. The colour of each dot in this graph indicates whether the number of drinks sold for this product has increased or decreased over this period. Some products in the dataset were discontinued; these are shown as grey dots.[64]

From this figure we can see that the products directly impacted by the MUP, those priced below $1.30 prior to the MUP, increased their prices and generally saw significant decreases in sales (red dots).[65] However, the prices for these products did not all shift uniformly to the MUP threshold of $1.30. In particular, products that sold for close to (but below) $1.30 typically increased their prices above the new limit, and in some cases saw increases in sales. This is likely due to the fact that their formerly cheaper competitors increased their prices by a significant amount or were eventually discontinued.

The discontinuations shown in **Figure 12** are generally consistent with what stakeholders informed us during consultation. Stakeholders noted that many retailers had stopped stocking cask wine after the MUP was introduced, as it was no longer economically viable to do so due the reduced levels of demand.

There was a consistent view among stakeholders that the cost of living in the NT is higher than in other parts of Australia. Consequently, the high price of the cheaper, high alcohol-content

64 A product was treated as discontinued if no sales were recorded in the 52 weeks post-MUP. We note that products may have been discontinued as a consequence of the MUP, but still have some sales recorded in the period immediately following the introduction of the MUP.

65 Nhulunbuy is an exception. Some very low-priced products increased their price above $1.30 and had a large increase in sales. However, this region saw a large change in population around the time of the introduction of the MUP. Since it is difficult to match population data to the regions covered by the retail data, we have not adjusted sales figures for changes in population.

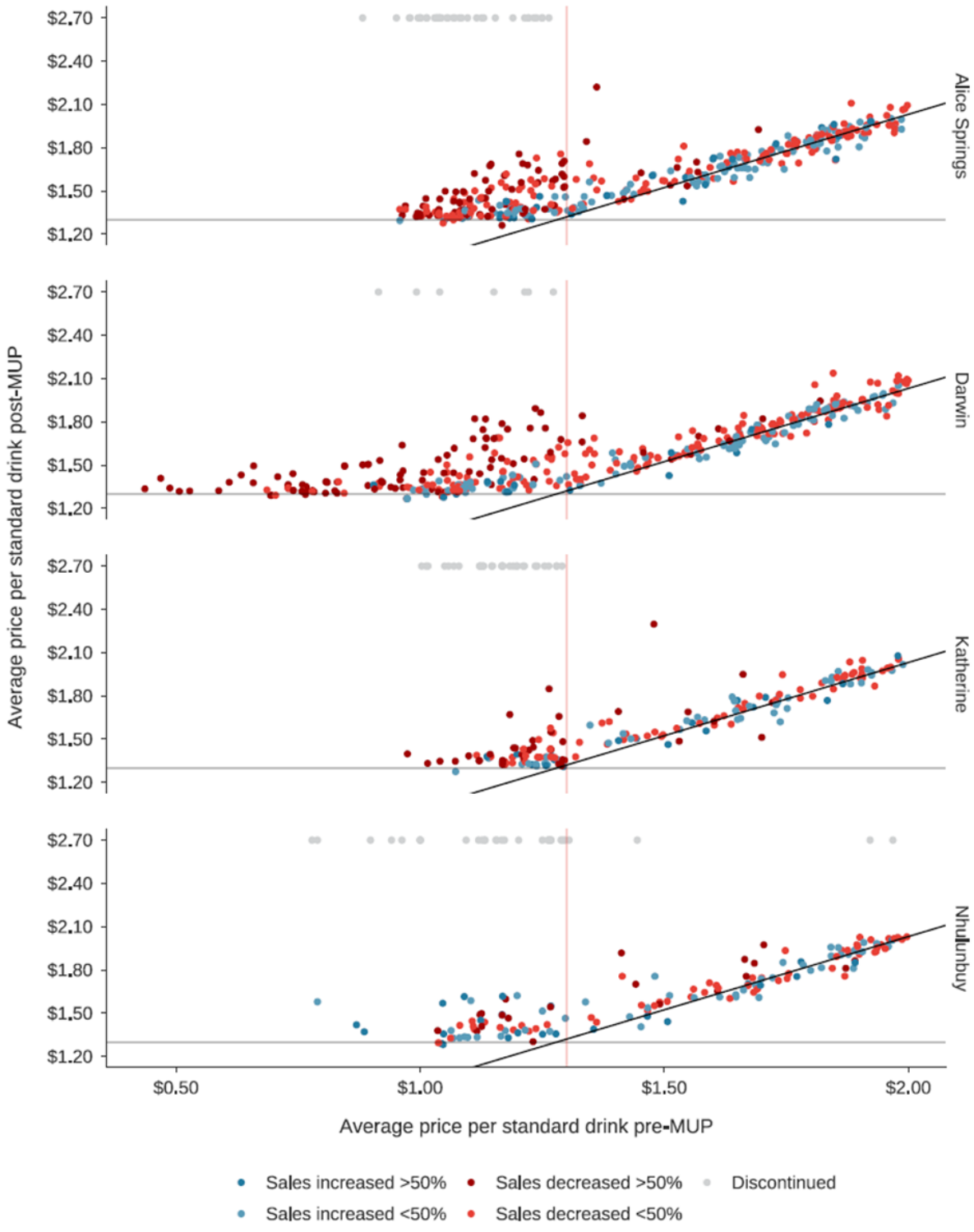
beverages was perceived to be due to high freight costs or a shortage of supply, rather than as a result of the MUP.

Products that were priced above the MUP before the MUP was introduced experienced significant impacts on prices and sales after the MUP

We observe that some products which were priced between $1.30 and $1.60 pre-MUP increased their prices in real terms without significant decreases in sales. This is consistent with the theory that an increase in the price of a cheap product has a cascading effect as prices are rebalanced across the market segment. Products priced slightly above the cheap product are likely to increase their prices to maintain a margin between their product and their 'cheap' competitor; this will put pressure for products priced slightly higher to also increase their prices. This impact is seen most strongly for products close to the MUP threshold. Further, **Figure 12** supports the general economic intuition that decreases in price will typically result in increased sales (as shown by the higher proportion of blue points below the black line).

Finally, there is no discernible difference in the impact on drinks close to but below $1.30 and those close to above $1.30. This suggests that the impact of the MUP is not restricted to those priced below $1.30, rather the impact is strongest on the lowest price drinks, but the impact reduces as the price pre-MUP increases.

Figure 12: Post-MUP vs pre-MUP prices by product (for products sold below $2 pre-MUP) [66]



Source: Frontier Economics analysis

[66] Note that the black lines are approximately the 45° line. They differ slightly from the 45⁰ line because prices have been adjusted for inflation

The grey dots in the figure show that a large number of products in the dataset were discontinued, particularly in the regions outside Darwin. Apart from 3 products in Nhulunbuy, all the discontinued products are products that were sold for prices at or below $1.30 prior to the introduction of the MUP. This indicates that the MUP had quite a significant impact on the range of products sold.

A previous study had also investigated the price impacts of the MUP, but for a significantly shorter time period

Only one other major study has been conducted on the impact of the MUP on alcohol prices in the NT. The 2020 Deakin study monitored price data in online catalogues from the two biggest off-premise alcohol retailers in the NT: Liquorland, and BWS (Beer, Wine and Spirits), owned by Coles and Woolworths, respectively. There were 2,054 alcoholic products included in the analysis (979 from Liquorland and 1,075 from BWS) and price data was obtained for the two months prior to the MUP (July and September 2018) and for the three months after (October, November and December 2018).

The study found that following the MUP's introduction the average price per standard drink of cask wine approximately doubled from $0.70 to $1.30. However, a limitation of this approach is that, prior to 2020, some major spirits had highly variable prices. We have also observed this in the sales data we received from retailers. Without knowing sales volumes, it is difficult to estimate changes in alcohol prices appropriately.

5.2 Impact of MUP on prices and sales

This section describes the impact of the MUP on prices and the demand response to the price changes in more detail. The analysis makes use of data on retail prices and sales quantities provided by two large retailers as well as data on the wholesale supply of alcohol provided by NT Licensing. We have also had access to wholesale sales and price data by product provided by a major wholesaler.

5.2.1 Price changes and demand response

To gain further insight into the impact of the MUP on prices, and the resulting impact on sales, we have undertaken a more detailed analysis of the retail data provided to us. **Figure 13** through **Figure 16** summarise the impact on prices and sales for five main beverage categories (cask wine, bottled wine, beer, cider and spirits). For this analysis we have grouped products into 10 cent price bands based on the product's average price in the 52 weeks before the introduction of the MUP. This ensures that the set of products in each price band remain the same before and after the introduction of the MUP, enabling pre- and post-MUP prices and sales to be compared on a like-with-like basis.[67]

The top panel in each figure compares the average price of products in each price band in the 52 weeks before the MUP's introduction with the average price in the 52 weeks after the MUP. Both the before and after prices are weighted by the quantity of sales before the MUP's introduction. The percent change in the average price in each price bin is shown in the figure. This percent

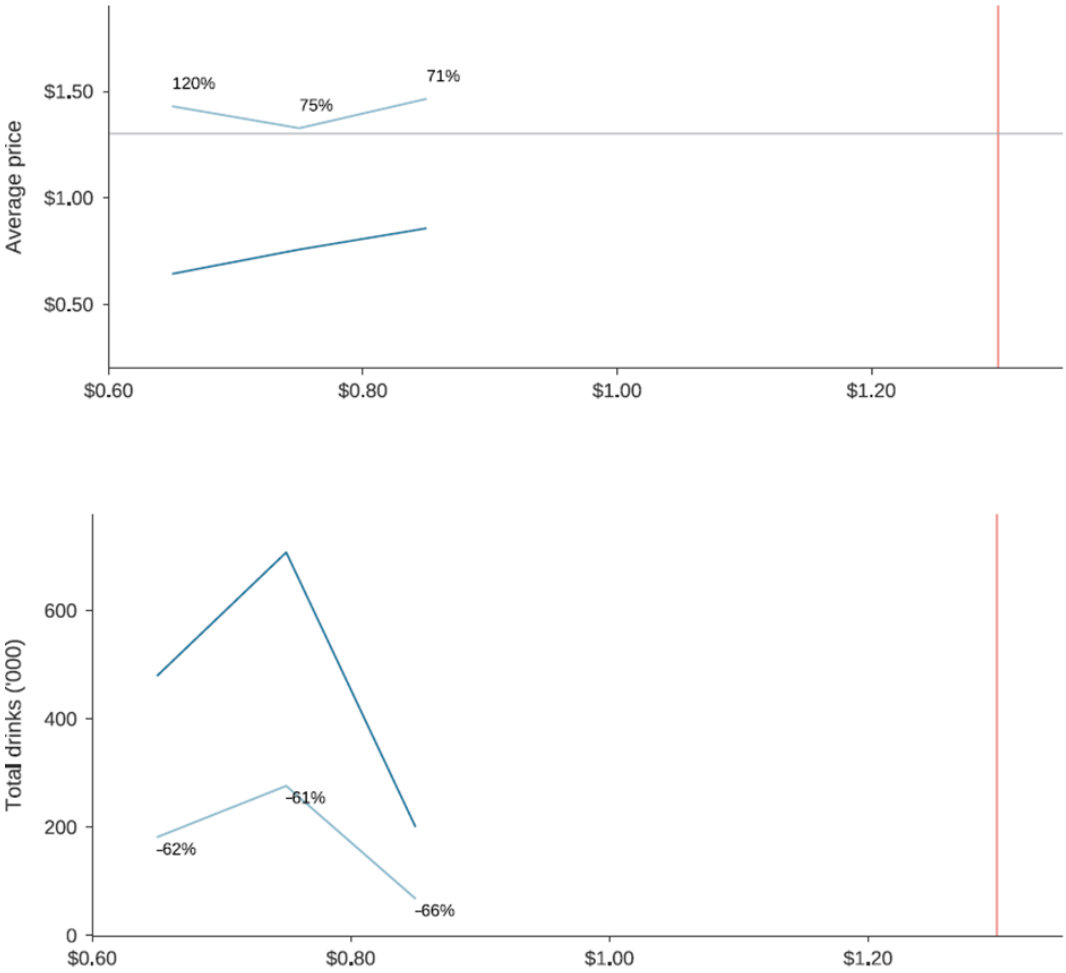
[67] To ensure like-with-like comparisons of prices, pre-MUP prices have also been adjusted for inflation using the alcohol component of the national CPI.

change in the prices is analogous to how price changes are calculated in the consumer price index.[68]

The middle panel in each figure shows the before and after comparison of the total number of drinks sold of products in each price band. The products included in each price band are the same as in the top panel.

The grey horizontal line in the top panels of **Figure 13** through **Figure 16**, at placed at $1.30. Similarly, the vertical red lines in both panels of the figures are placed at $1.30.

Figure 13: Changes in prices and sales of cask wine



Source: Frontier Economics analysis

Prices rose, including products in price bines above the MUP, but cask wine was the beverage that was most impacted by the MUP

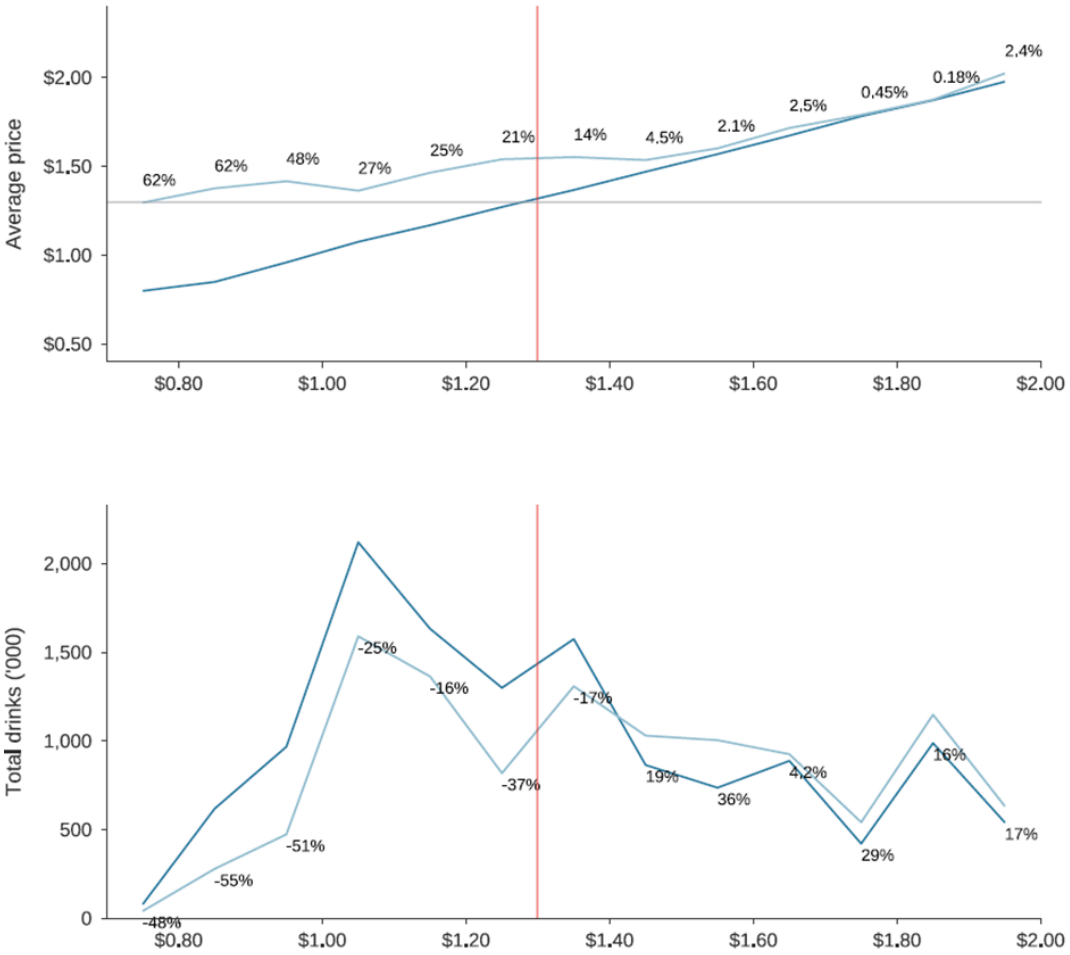
Cask wine is the beverage category most directly impacted by the MUP since virtually all pre-MUP sales were below $1.30 per standard drink. **Figure 13** shows the impact of the MUP on the prices

[68] This approach is known as the Laspeyres Index.

and sales of cask wine.[69] Although prices increased in all price bins, the increase was not uniform. The products in the lowest price bin ($0.60-$0.70) increased prices by 120% to end up well above the MUP after the introduction of the MUP. The products in the next two price bins ($0.70-$0.80, and $0.80-$0.90) only increased prices by about 70%. This led to a post-MUP change in the ranking of the products in the 3 price bins in terms of price, the lowest price bin ending up with a post-MUP price only just below that of the highest price bin.

One would expect that, given these price changes, sales of products in the ($0.60-$0.70) price bin would have decreased much more than sales of products in the two higher price bins. But **Figure 13** shows that this was not the case. Sales in all 3 price bins decreased by about the same percentage.

Figure 14: Changes in prices and sales of bottled wine



Source: Frontier Economics analysis

Figure 14 shows the results of our analysis for bottled wine. Bottled wine is sold over a much wider price range per standard drink than the other product categories. The figure shows that before the introduction of the MUP, the highest sales of bottled wine occurred in the ($1.00-$1.10) and ($1.10-$1.20) price bins, but sales were relatively high across the whole $1.20-$1.90

[69] Note that the pre-MUP average price line closely approximates the 45° line. They do not lie exactly on the 45° line because the prices have been adjusted for inflation, and the average pre-MUP price for each price bin is usually not exactly equal to the mid-point of the price bin.

price range. After the introduction of MUP, the products which were originally priced between $0.70-$1.30 increased in price by between 20% to 60% to post-MUP prices at, or above, the $1.30 threshold.

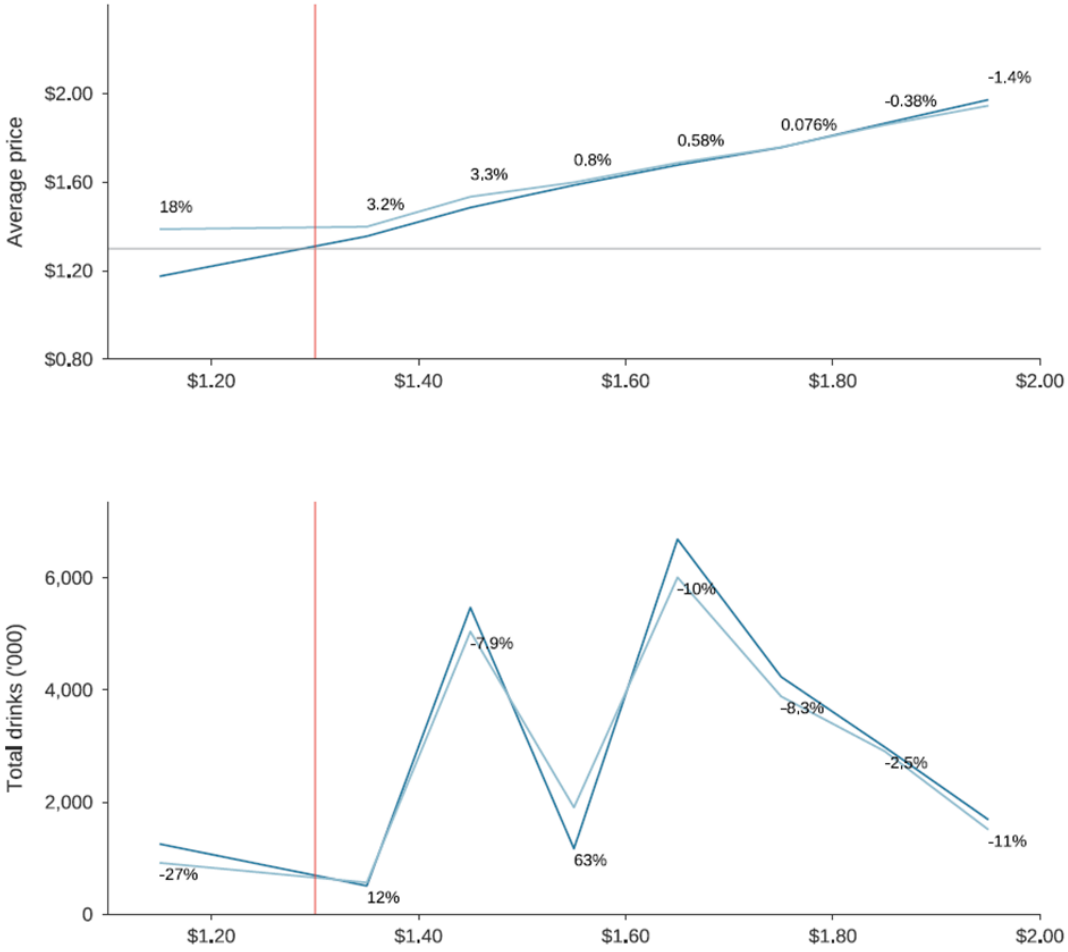
The top panel of **Figure 14** clearly shows a cascading effect due to the rebalancing of prices as a result of the MUP. Only the products in the lowest price bin increased their prices to $1.30. Products in higher price bins mostly raised their prices enough to end up with a post-MUP price a bit higher than the price bin below them. This effect can be clearly seen up to the ($1.40-$1.50) price bin but continues in a more muted way through to the highest price bins.

The bottom panel of **Figure 14** shows that there were large decreases in sales of about 50% for the 3 lowest price bins. The decrease in sales gradually diminishes as sales are pushed into higher price bins. For price bins above $1.40, post-MUP sales actually increased after the MUP despite prices having increased. This is likely due to the fact that the post-MUP price gaps between adjoining bins have decreased, making it more attractive for customers to upgrade their wine purchases.

Figure 15 and **Figure 16** show the results of our analysis for beer and cider products. The price changes for both these categories show a similar cascading pattern as bottled wine, but with smaller price changes. This is likely due to the fact that the cheapest pre-MUP products in these categories were priced only slightly below the MUP threshold. Moreover, sales of the cheapest products were very low. Hence, the pressure for products in higher price bins to increase post-MUP prices, so as to stay above the post-MUP prices of products in lower price bins, would have been much smaller than for bottled wine.

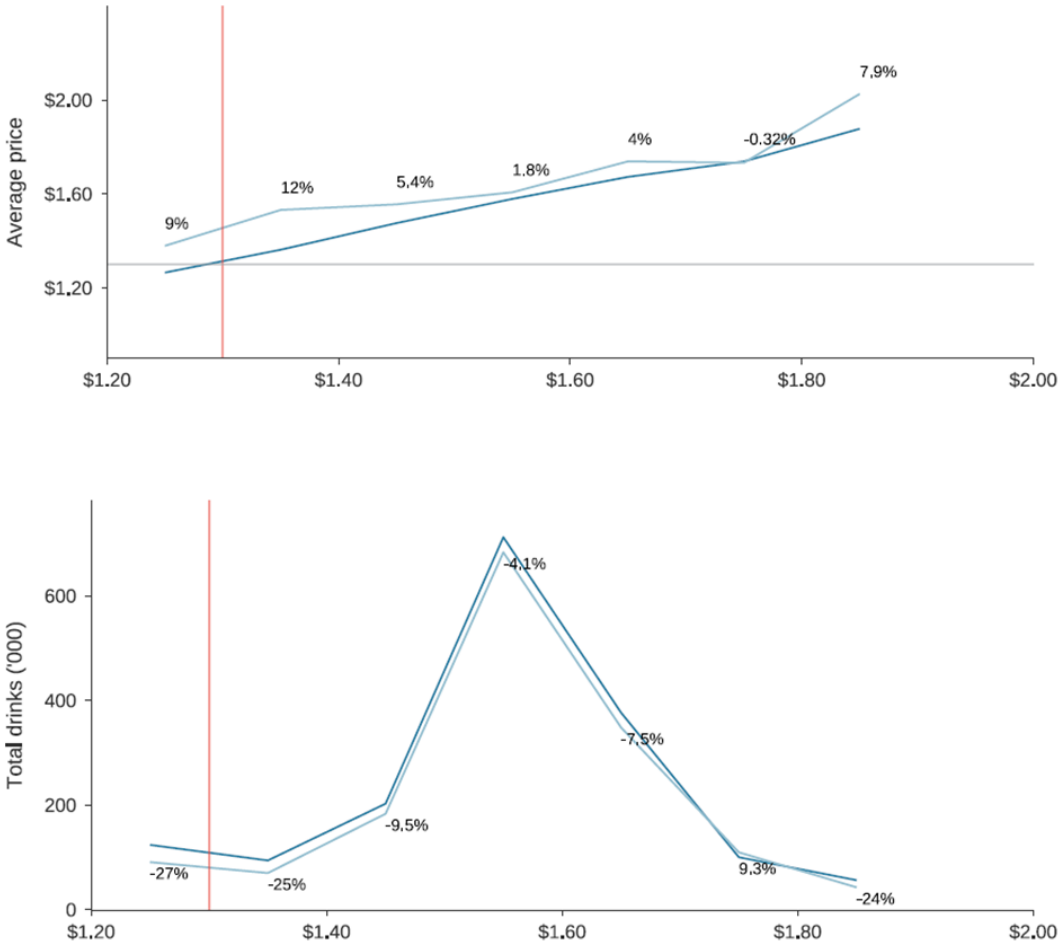
For both the beer and cider beverage categories, the impact of MUP-induced prices on sales has been quite small. Sales for the price bins with pre-MUP prices below $1.30 decreased by 27% for both categories. However, pre-MUP sales of these low-priced products were relatively low. Changes in beer sales for higher price bins don't show a consistent pattern, with both sales increases and decreases in adjoining price bins. Sales of cider, on the other, decreased for all price bins up to $1.70, with sales in the ($1.30-$1.40) price bin decreasing by 25%, about the same percentage as sales in the ($1.20-1.30) price bin.

Figure 15: Changes in prices and sales of beer



Source: Frontier Economics analysis

Figure 16: Changes in prices and sales of cider



Source: Frontier Economics analysis

5.2.2 Wholesale pricing and retail margin impact

In this section we investigate whether the increase in retail prices induced by the introduction of the MUP also led to higher wholesale prices. For this analysis we use data provided by two large retailers and a wholesaler operating in the NT.[70]

The wholesale dataset does not used the same product IDs as the retail datasets. Hence products can only be matched using product descriptions. Moreover, products are not described in a consistent manner between datasets. This makes it difficult to match products between the datasets. Hence, we restricted our analysis to cask wine products. There are fewer products in the cask wine category than in other categories, data for cask wine was available in both the retail and wholesale datasets, and cask wine experienced the largest price due to the MUP.

Both retail and wholesale prices for cask wine increased after the MUP but retail prices increased significantly while wholesale prices only increased marginally

Using the average wholesale and retail prices for cask wine in the 52 weeks before and after the introduction of the MUP we find that while retail prices for cask wine increased by over 100%

7070 This wholesale dataset provided by the wholesaler is not the same as the wholesale dataset made available by NT Licensing. We present the results of our analysis of the NT Licensing wholesale dataset in section 5.2.3.

after the introduction of MUP, wholesale prices increased by only a small percentage above inflation. The increase in the wholesale price may also be partly driven by a reduction in economies of scale due to reduced volumes (resulting, for example, in increased transport costs). Based on this limited analysis, it therefore appears that the benefits of the increased price of cask wine likely accrued almost completely to retailers rather than wholesalers or producers. This can be partially explained by the competitive market in which wholesalers operate, whereby retailers may be able to switch suppliers or contact producers directly.

5.2.3 Wholesale supply[71]

While the retail data analysed in sections 5.2.2 and 5.2.3 is detailed with respect to price and product information, it only includes information on the sales of the two large alcohol retailers, and hence it does not have full coverage of sales for the whole NT or any of the regions in the NT. Indeed, there are some regions that are not served by any of the major alcohol retailers and would not be included in the retail datasets.

For this reason, we have also analysed the wholesale supply dataset made available by NT licensing. This dataset has more complete coverage of sales at the wholesale level in the NT. It does not, however, contain any information on prices, and it has far less information on products.

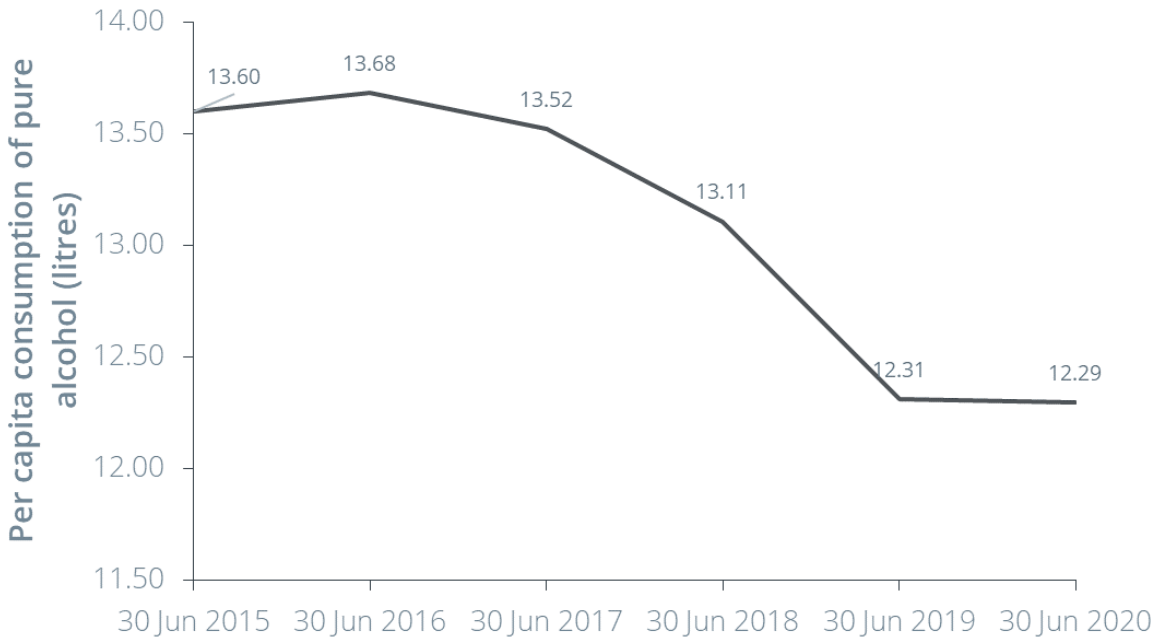
The NT Licensing dataset contains quarterly data on the wholesale supply of alcohol products by beverage category. The information is available for the whole NT and also for the main NT regions. The same dataset was analysed in the 2020 and 2021 Deakin studies on the impact of the MUP. Their analysis used data covering the period from Q4 2018 to Q3 2019. We have analysed data from Q4 2018 to Q1 2020; hence our analysis covers a slightly longer time period. We have not analysed data after Q1 2020 due to the confounding effect that the impact of COVID-19 would have on the analysis.

Wholesale supply of total alcohol in the NT declined immediately after the MUP

Figure 17 shows the annual wholesale supply of alcohol per capita in the NT. Annual wholesale supply of alcohol per capita decreased by 9.6% over the June 2015 to June 2020 period. The figure shows this was due to a steady decline between 2015 and 2018, followed by a steeper decline following the introduction of the MUP. The population in the NT has been relatively stable over the period, hence the same declining trend pattern would apply to total wholesale supply of alcohol.

[71] Throughout this section, a red vertical line in the graphs represents the introduction of the MUP (October 2018) and the black vertical line represents the start of the COVID-19 outbreak (April 2020).

Figure 17: Wholesale alcohol supply per capita in the NT (year ending 30 June)[72]



Source: Frontier Economics analysis using NT Licensing and ABS data

Note: Y-axis of graph does not start from zero

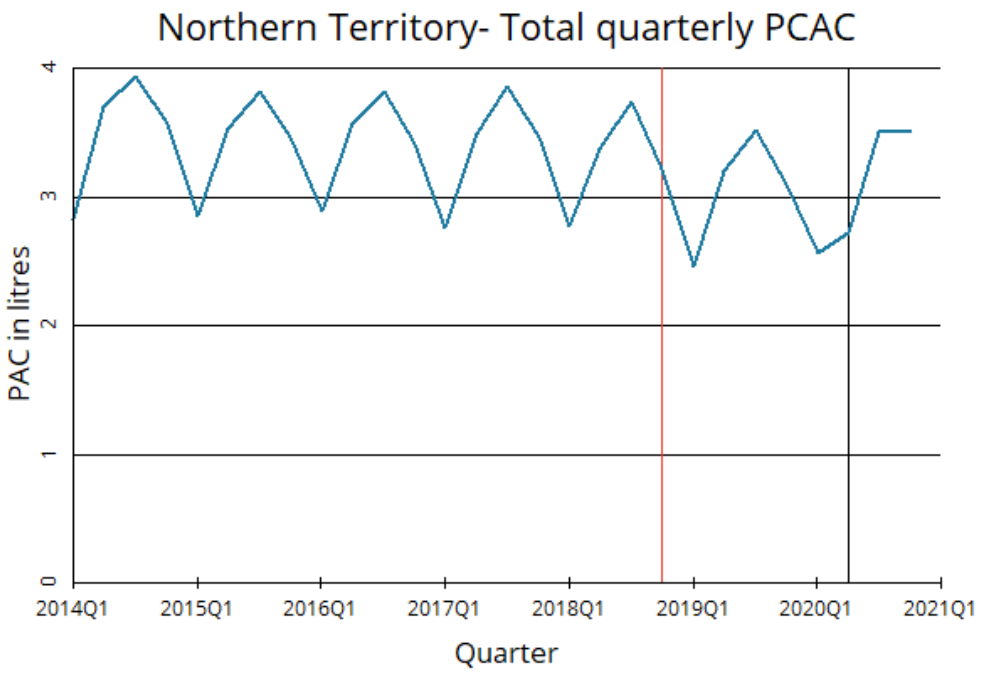
Figure 18 shows the same wholesale supply data on a quarterly basis. The figure shows that there is strong seasonal variation in the wholesale supply of alcohol, with supply peaking in the third quarter (Q3) of each year and being lowest in the first quarter (Q1) of each year. Although following the introduction of the MUP, quarterly per capita alcohol consumption fell slightly, the seasonal trend continued. Based on our statistical modelling, which controlled for a trend and seasonality, we estimate that in the quarters immediately following the MUP total alcohol consumption per capita in the NT declined by 0.194 litres per quarter or 6.3%.

Both the 2020 and 2021 Deakin studies found significant step declines in total alcohol per capita after the MUP. Our estimate of a 0.194 litres per quarter decrease in total alcohol per capita is broadly consistent with the 0.22 litres and 0.15 litres decrease immediately after the MUP found by the 2020 and 2021 Deakin studies, respectively. In Scotland, the MUP was associated with a 3.5% reduction in alcohol consumption per adult. [73]

[72] The population used to calculate per capita consumption is the ABS series "Resident Population for individuals ages 15 and above" for the NT. Refer to Appendix E.

[73] Robinson, M., Mackay, D., Giles, L., Lewsey, J., Richardson, E. and Beeston, C., (2021). Evaluating the impact of minimum unit pricing (MUP) on off-trade alcohol sales in Scotland: an interrupted time–series study. *Addiction*, *116*(10), pp.2697-2707.

Figure 18: Per capita total alcohol consumption (PCAC) in the NT on a quarterly basis



Source: Frontier Economics analysis of NT Licensing and ABS data

The overall decline wholesale supply of total alcohol was largely driven by decreases in cask wine, beer and bottled wine in the NT

In **Figure 19** and **Figure 20**, we show the same data for different beverage types, with the higher selling categories in **Figure 19** and the lower selling categories in **Figure 20**. The figures show that for a majority of the beverage types, wholesale supply peaked in Q3 and was lowest.

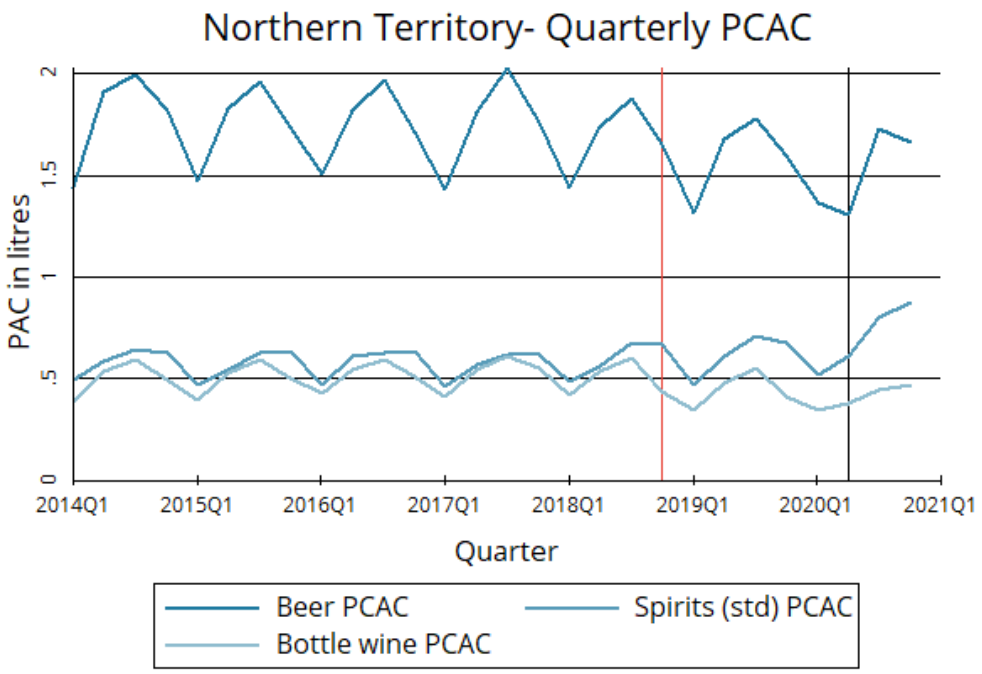
Figure 19 and **Figure 20** show the wholesale NT-wide alcohol supply per capita by high- and low-volume categories of beverages on a quarterly basis. Our statistical analysis found that the wholesale supply of cask wine per capita decreased by 47.0% after the MUP, although cask wine accounts for a relatively small proportion of total sales. Wholesale supply of cask wine accounts for 3.4% of total quarterly wholesale supply of alcohol, on average, over the Q1 2014 to Q4 2020 period. Per capita consumption of beer and bottled wine declined by 5.0% and 16.9% post-MUP, respectively. We also estimate that there was a 6.7% increase in per capita wholesale supply of standard spirits associated with the MUP. Our statistical analysis found no significant declines in fortified wine and cider, after the MUP.

There is mixed evidence from consultation about the impact of the MUP on consumption habits:

- Several stakeholders confirmed that many individuals were not aware of the MUP and its potential impact. Many communities in the NT also have a limited understanding of what a standard drink is and what low risk drinking is defined as.

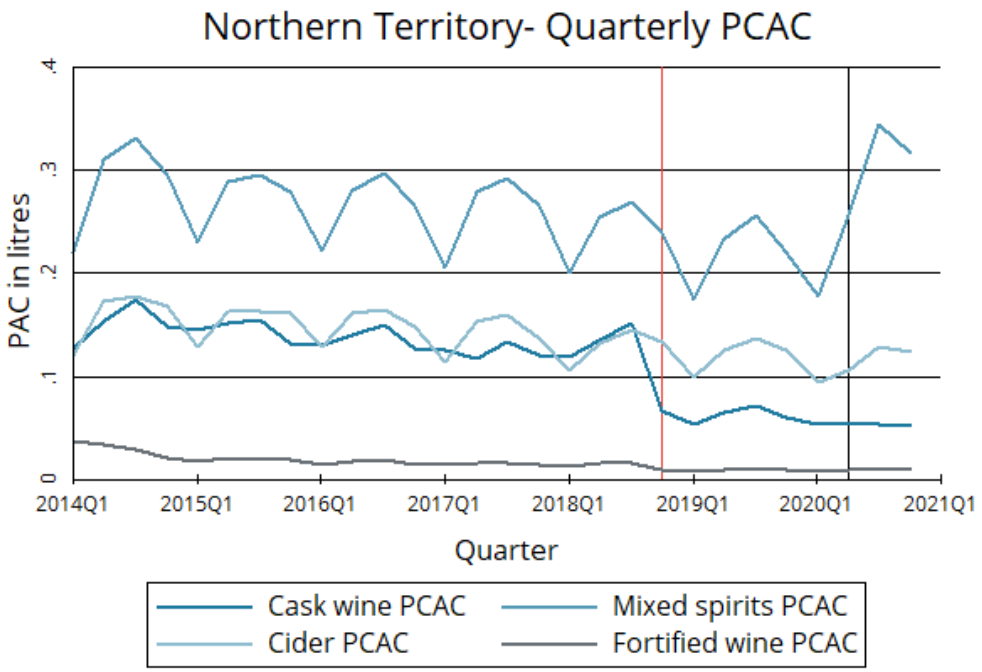
- Several stakeholders confirmed that as soon as the MUP was introduced, widespread price rebalancing occurred and working groups had noticed drinkers substituting away from cask wine and to spirits instead.
- Another stakeholder noted that many retailers have discontinued the sale of cask wine since the MUP.

Figure 19: PCAC in the NT on a quarterly basis – high volume categories



Source: Frontier Economics analysis using NT Licensing data

Figure 20: PCAC in the NT on a quarterly basis – low volume categories



Source: Frontier Economics analysis of NT Licensing data

Overall, our findings are consistent with previous literature in that cask wine, beer and bottled wine in the NT decreased significantly post-MUP. The 2021 Deakin study found that per capita consumption of cask wine in the NT decreased by 50.6% and total wine consumption decreased by 21.4% in the year following the MUP. The 2020 Deakin study found similar significant decreases in the supply of cask wine (decrease of 0.05 litres per capita per quarter), bottled wine (decrease of 0.09 litres per capita per quarter) and beer (mid-strength) after the introduction of the MUP. Neither Deakin study found any significant increase in spirits for the NT as a whole. Given that we have a longer time series of wholesale data than was used in the Deakin studies, it is likely that the increase in spirits would have only occurred in the months much later after the MUP was implemented.

Strong declines in cask wine were observed in all regions, apart from Alice Springs, post-MUP

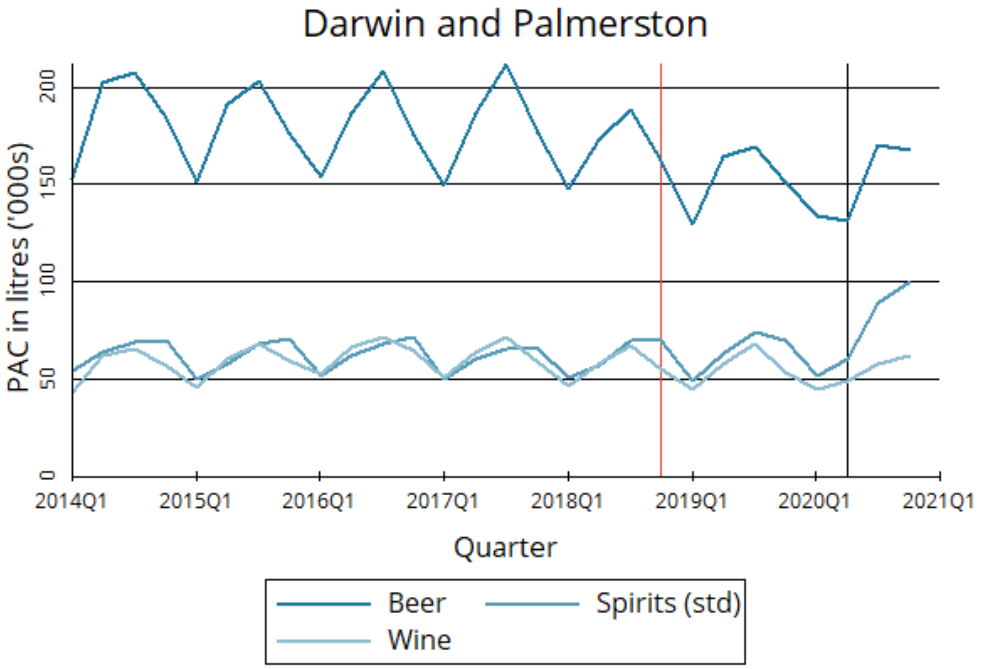
Turning to specific regions in the NT, the estimated declines in cask wine wholesale supply following the introduction of the MUP were statistically significant in all regions, apart from Alice Springs. This likely reflects the influence of existing alcohol policy settings in Alice Springs. The 2020 Deakin report also found no significant changes in cask wine consumption in Alice Springs (as well as in Tennant Creek).

Figure 21 and **Figure 22** show the total wholesale alcohol supply in Darwin and Palmerston by high- and low-volume categories of beverages.[74] For Darwin and Palmerston, where there were no PALIs, we estimate a 42.0% decrease in the wholesale supply of cask wine post-MUP, which is highly statistically significant and similar in magnitude to the decline identified in the 2021 Deakin

[74] For the regional analysis we use data for the regional total rather than on a per capita basis since data on regional populations is far less reliable than for the whole NT.

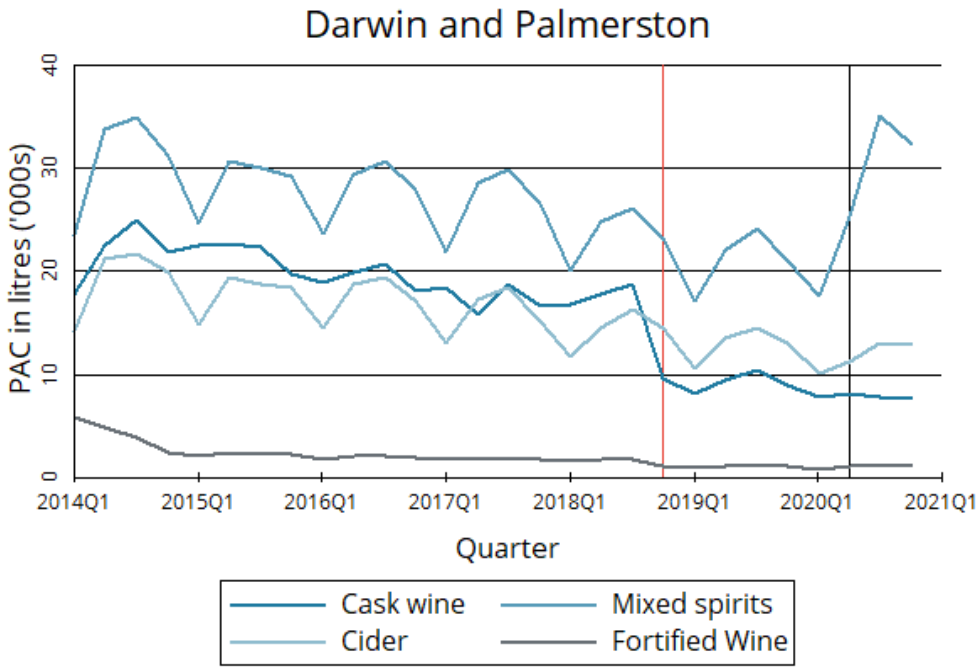
report. Further, we estimate a 6.0% increase in standard spirits post-MUP in Darwin and Palmerston. The 2021 Deakin report explained that the increase in standard spirits was likely a continuation of an upward trend that began in early 2018 (pre-MUP).

Figure 21: Wholesale supply of alcohol in Darwin and Palmerston by category – high volume



Source: Frontier Economics analysis of NT Licensing data

Figure 22: Wholesale supply of alcohol in Darwin and Palmerston by category – low volume



Source: Frontier Economics analysis of NT Licensing data

A comparison of prices suggests the MUP is unlikely to have resulted in a shift to alternative substances

Stakeholders suggested that there was an increasing shift towards alternative substances such as vanilla essence, Listerine and hand sanitiser:

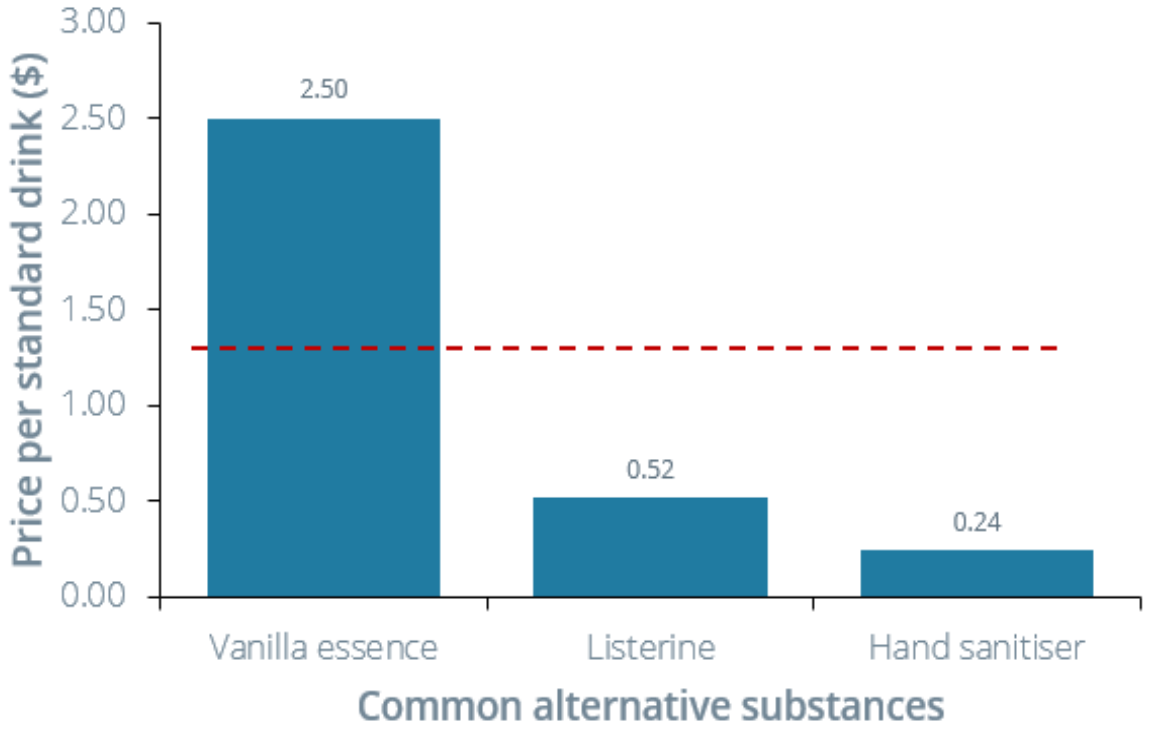
- One stakeholder confirmed that there has been a move from regulated to unregulated alcohol such as mouthwash and hand sanitiser
- Several stakeholders noted that there has been a significant shift to hard liquor, deodorant sniffing, Listerine, vanilla essence and hand sanitiser (which has been an especially popular choice amongst drinkers since the COVID-19 outbreak started)
- One stakeholder informed us that there was a notable increase in the number of hospital patients who had consumed high amounts of hand sanitiser, mouthwash and food essences.

"The rubbish bins in public spaces have been overflowing with empty Listerine bottles at 8am in the morning."

- NT Hospitality

Key substitutes, including Listerine and hand sanitiser, are priced well below the MUP (**Figure 23**); suggesting the MUP is unlikely to have impacted the demand for these products. Limitations on access to alcohol, including licensing restrictions and the BDR, have a stronger influence on the use of alternative substances than price. **Box 2** explores the recent experience of alternative substance use in Darwin.

Figure 23: Prices of alternative substances compared to the MUP in the NT



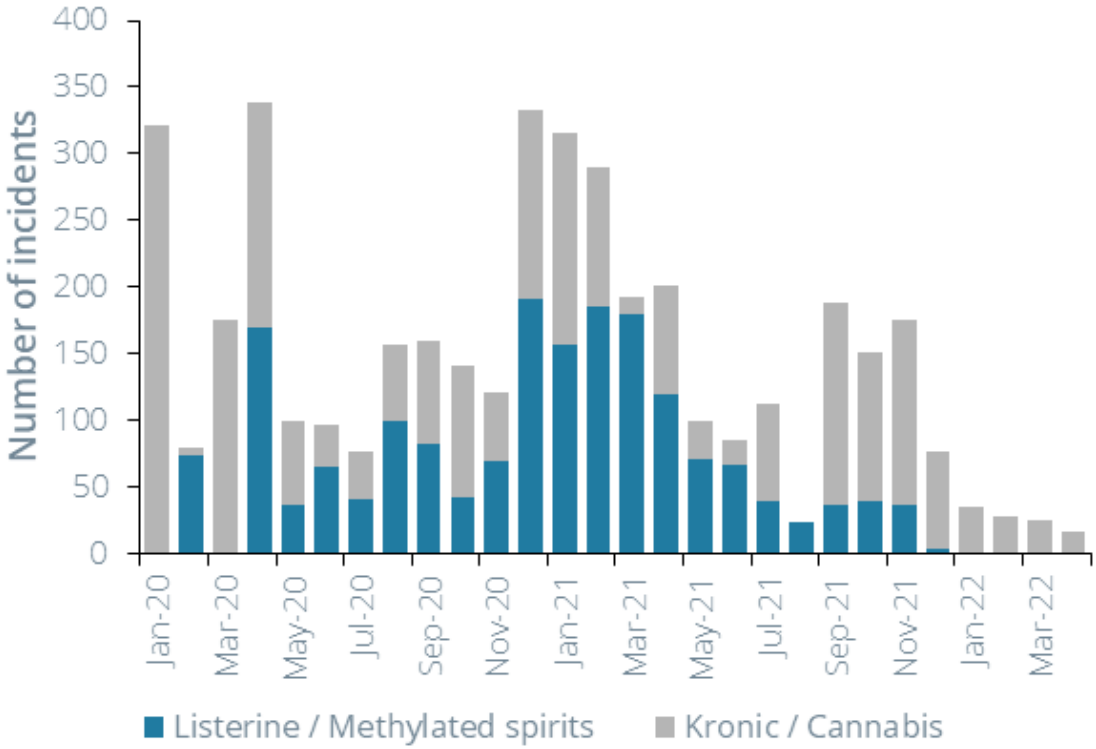
Source: *Coles and Woolworths online catalogue for Darwin (https://www.coles.com.au/; https://www.woolworths.com.au/)*

Note: *The horizontal dotted line represents the MUP ($1.30 per standard drink)*

Box 2: Alternative substances

Security patrols in Darwin have recognised a greater shift towards alternative substances. The Department of Chief Minister and Cabinet (CM&C) for the NT highlighted in a brief that there has recently been a shift towards consuming mouthwash, methylated spirits, vanilla essence and Kronic (synthetic cannabis) in recent years. The graph presents the number of incidents recorded by security patrols in Darwin where individuals were found to be consuming alternative substances. Note that the data is representative of the security officers' experience only and do not accurately reflect the frequency and volume of this type of alcohol substitution.

Figure 24: Number of incidents recorded by security patrols in Darwin



Source: Department of Chief Minister and Cabinet (CM&C) for the NT

"In Palmerston City, itinerants have been seen to be pouring Listerine into Coke bottles around the city centre".

- Department of Chief Minister and Cabinet for the NT

"Parks and wildlife have reported a spike [of mouthwash abuse] at Casuarina coastal reserve."

- Larrakia Patrols in Darwin

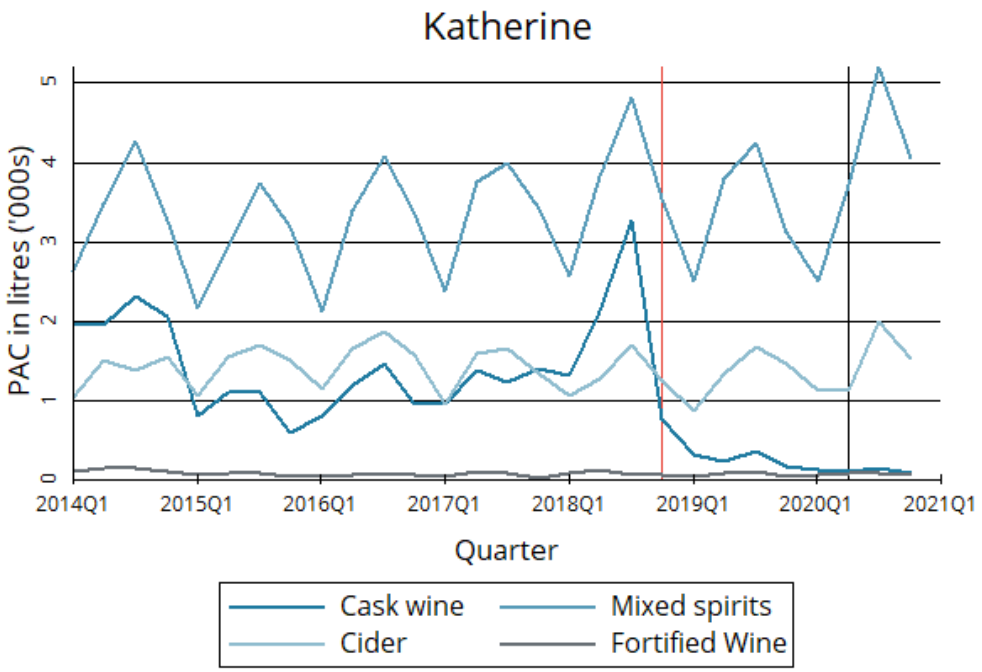
Note that the figures that we discuss in this section are estimates and we only discuss and present our figures that are statistically significant.

The decline in wholesale supply of cask wine was greatest in Katherine

Figure 25, **Figure 26** and **Figure 28** show the wholesales supply of alcohol by category in other regions of the NT. There were statistically significant reductions in the supply of cask wine following the introduction of the MUP in Katherine, Nhulunbuy and Tennant Creek. The biggest estimated impact was in Katherine – a sharp 76.6% decrease in cask wine, which was statistically significant. The 2020 Deakin study found similar results in that the Katherine region exhibited the greatest decline in cask wine consumption per capita (0.16 litre decrease per quarter), post-MUP, compared to other regions in the NT.[75]

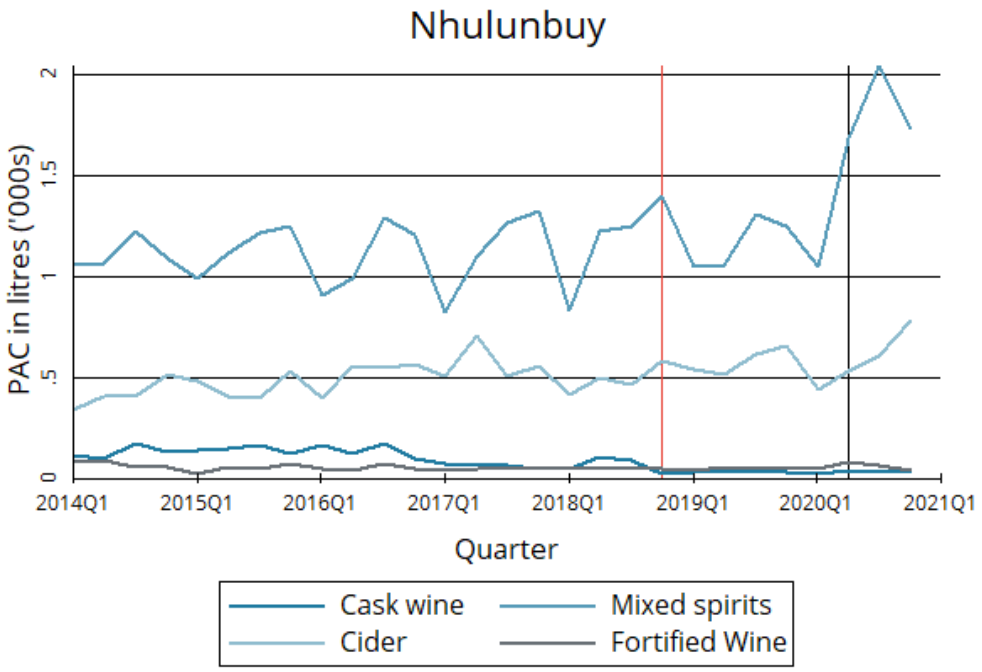
[75] The 2020 Deakin study found statistically significant decreases in per capita cask wine consumption in the NT as a whole, Darwin and Palmerston, Katherine and the rest of the NT, but not in Alice Springs and Tennant Creek.

Figure 25: Wholesale supply of alcohol in Katherine by category – low volume



Source: Frontier Economics analysis of NT Licensing data

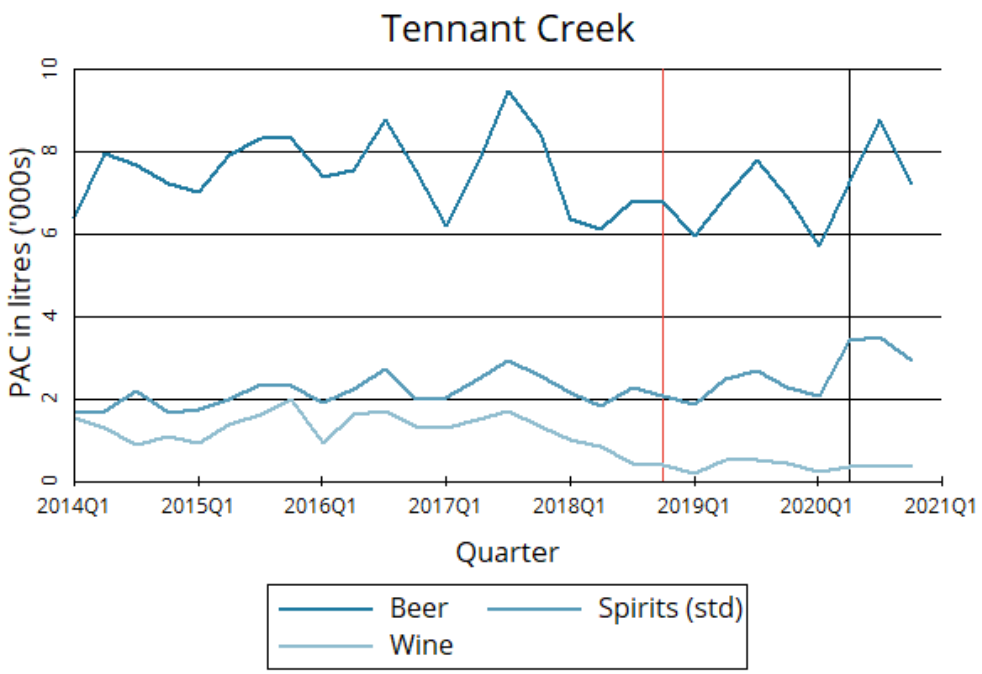
Figure 26: Wholesale supply of alcohol in Nhulunbuy by category – low volume



Source: Frontier Economics analysis of NT Licensing data

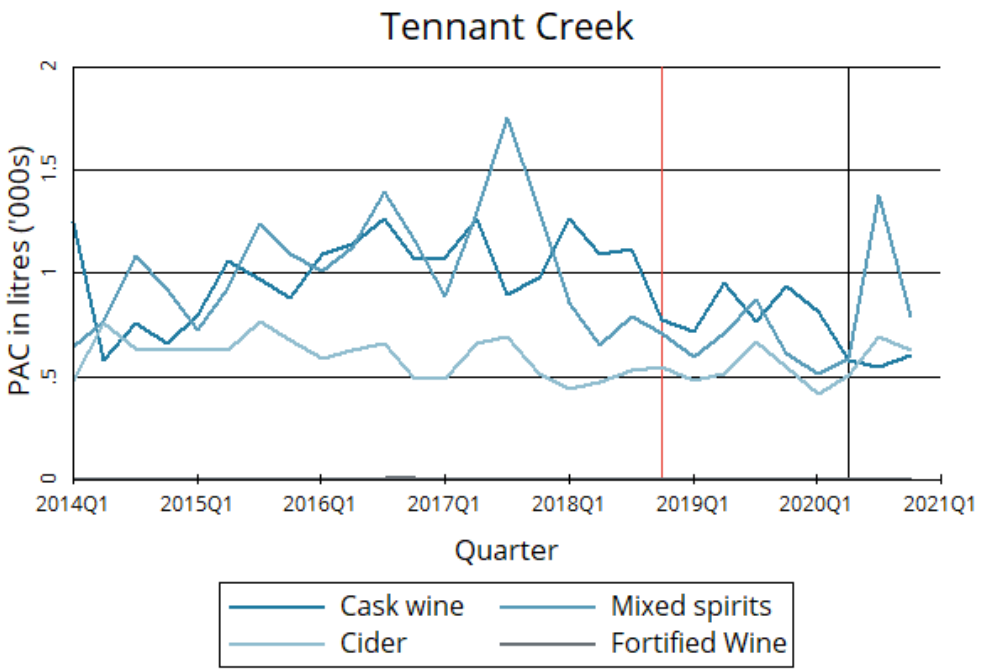
In Tennant Creek, we estimate that cask wine and bottled wine decreased by 36.7% and 62.3% after the MUP, respectively. There was also a 38.1% decrease in supply of mixed spirits after the MUP, though this decrease appears to have started well before the MUP.

Figure 27: Wholesale supply of alcohol in Tennant Creek by category – high volume



Source: Frontier Economics analysis of NT Licensing data

Figure 28: Wholesale supply of alcohol in Tennant Creek by category – low volume



Source: Frontier Economics analysis of NT Licensing data

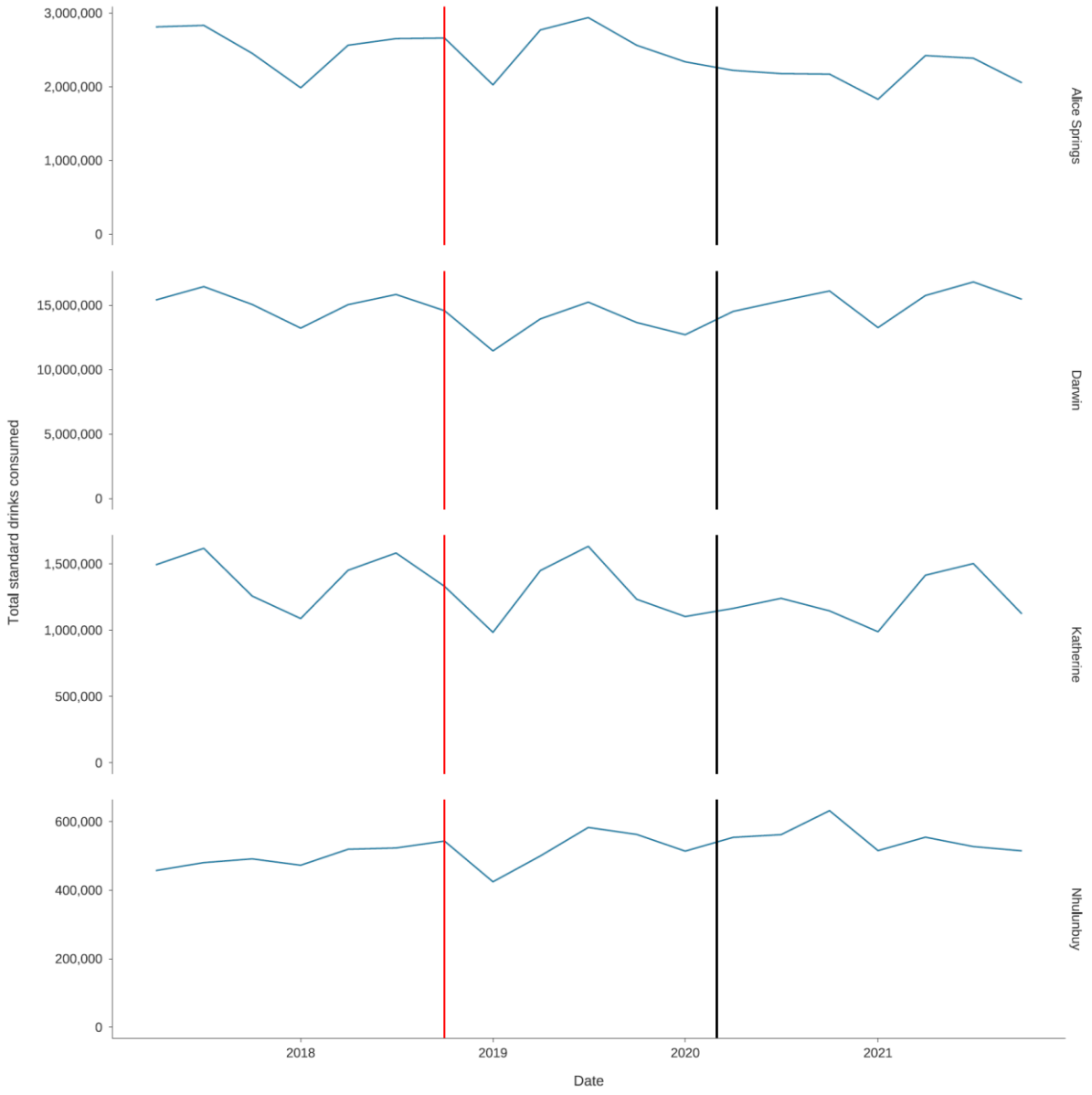
5.2.4 Retail sales

In this section we discuss retail sales data for alcoholic drinks aggregated to a higher level than presented in section 5.1.

Trends in total drinks sold by region

Based on the weekly and monthly retail data provided, we have aggregated the data in order to present drinks sold per quarter in **Figure 29**, with the introduction of the MUP and the start of the COVID-19 pandemic denoted by red and black vertical lines. According to the data presented, the introduction of the MUP is not obviously associated with a change in total drinks consumed in either Alice Springs of Darwin. The changes immediately before and after the policy are consistent with the random variation seen across the entire period.

Figure 29: Total drinks quarterly sold



Source: Frontier Economics analysis

We were also provided with data on the supply of alcohol from a major alcohol wholesaler. The data shows that the wholesale supply of alcohol increased slightly in the period immediately after the MUP, however this increase is not statistically significant. There seems to be a more sustained decrease in the wholesale supply of alcohol in Alice Springs in the years following the MUP. However, this decrease, while statistically significant, cannot necessarily be attributed to the MUP.[76]

[76] The impact of the MUP was significant and negative at the 1% level while controlling for a time trend and a post-COVID-19 dummy variable.

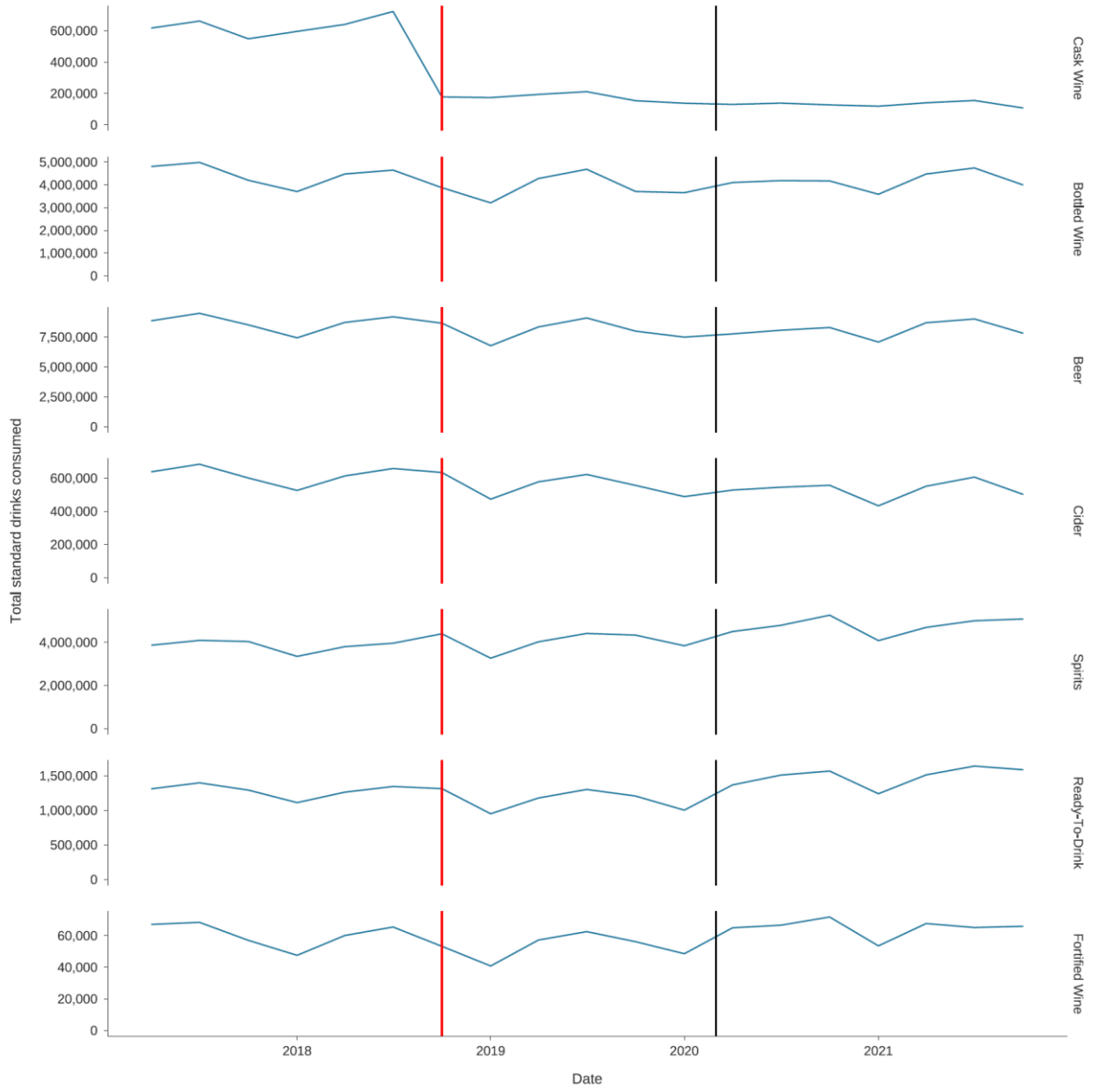
Trends in total drinks sold by type

However, total retail consumption of alcohol by product shows that cask wine saw an immediate and permanent decline following the introduction of the MUP. This is consistent with the results presented in Section 5.1 which identified that cask wine had the highest proportion of drinks below the $1.30 threshold, and hence the largest price (and therefore quantity) response. The consumption of cheap cask wine does not appear to have shifted towards more expensive cask wine, nor did it result in a significant reduction in overall alcohol consumption.

In the week immediately prior to the MUP, purchases of cask wine increased markedly, according to the weekly retail data; similar effects were not observed for other alcohol categories. **Figure 30** presents the rapid and permanent decline of cask wine consumption in the following quarter.

Given the relatively small contribution of cask wine to the overall consumption of alcohol before the MUP, we cannot establish whether the consumers of cheap cask wine diverted towards other products or reduced consumption.

Figure 30: Total drinks sold quarterly by product type



Source: Frontier Economics analysis[77]

We found evidence from our consultation with retailers to suggest that after the MUP, harmful drinkers had moved from drinking beer and cask wine to consuming spirits instead. While there does appear to be a shift towards spirits, the timing appears to be inconsistent with a proposition that the MUP caused the shift – sales do not appear to be immediately impacted and appear to increase in early 2020.

5.3 Alcohol related harms impact

In this section we discuss the impact of the MUP on alcohol related harms in the NT. We examine whether the MUP had an impact on alcohol related assaults, drink driving crashes, emergency

[77] Dates presented on x axis are based on the beginning of the quarter

department presentations, SUS attendance, child protection substantiations, protective custody episodes and school attendance. Where possible, we also present results on a regional or demographic basis.

Consultation highlighted that most drinkers had low awareness of the MUP. This adds to the difficulty of establishing a clear causal link between the MUP and some of these alcohol related harms such as school attendance. One stakeholder in particular raised that there are less severe alcohol related harms that are not reflected in the data we were provided. The data used in our analysis only considers alcohol related harms that typically sit at the extreme end of the spectrum of alcohol related harms.

More generally, several stakeholders also informed us that they believed:

- PALIs to be effective at reducing harmful alcohol consumption (although it is costly);
- that the BDR should be improved given that there are currently too many workarounds (e.g., family members and friends purchasing alcohol for individuals on the BDR, secondary supply of alcohol, etc.); and
- that the MUP should be removed because it is ineffective at reducing harmful alcohol consumption.

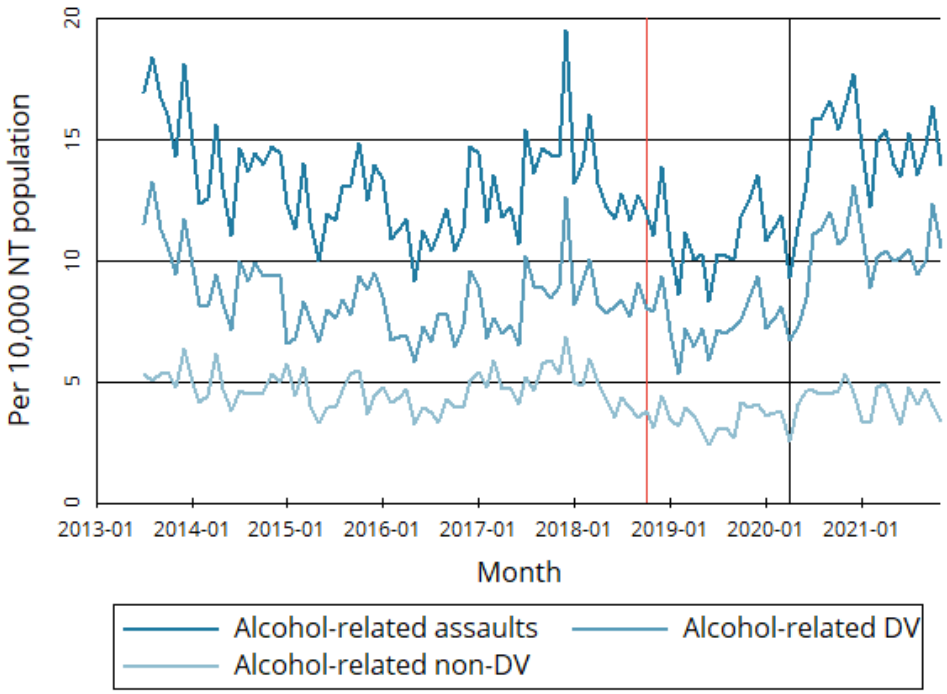
5.3.1 Assaults

Total alcohol related assaults in the NT declined following the MUP

Figure 31 presents the total number of assaults in the NT with alcohol involved from 2013 to 2021. Total assaults consist of alcohol related domestic violence (DV) and alcohol related non-DV offences. Total alcohol related assaults per capita decreased immediately following the introduction of the MUP but started to rise sharply after the COVID-19 outbreak began in early 2020. We estimated a statistically significant 13.1% decline in total alcohol related assaults post-MUP. The 2020 Deakin study had also estimated a significant decrease in the rate of alcohol related assault offences per capita in the NT after the MUP.

There was limited evidence from stakeholders that crime had reduced after the MUP was introduced. One stakeholder had instead informed us that policies such as the BDR and PALIs have developed a black market for alcohol, which they believe to be in relation to the 70% surge in commercial breaking and entering offences in the NT, over the last few years.

Figure 31: Total number of alcohol related assaults in the NT per 10,000 population



Source: Frontier Economics analysis using NT Police and the Department of the Attorney-General and Justice data

We estimated a statistically significant decrease in alcohol related non-DV assaults per capita of 25.8% after the MUP. One stakeholder informed us that when the PALIs, BDR and MUP were operating concurrently, crime rates had fallen in Alice Springs. However, the MUP had no statistically significant impact on alcohol related DV assaults in the NT. Data providing a regional breakdown of these assaults is not available.

Many stakeholders noted that the increased price of low cost, high alcohol-content beverages due to the MUP may have led to harmful drinkers shifting from fermented high alcohol-content beverages (e.g., cask wine, beer) to distilled high alcohol-content beverages (e.g., spirits). It was observed that the increased consumption of distilled alcoholic-beverages resulted in harmful drinkers becoming intoxicated more quickly, which could lead to more erratic, unpredictable, and aggressive behaviours.

One stakeholder informed us that there was evidence to suggest that the steep decline in alcohol related assaults prior to the MUP was likely influenced by the PALIs, which were operationalised around this time.

"There are more drunk people in the streets, earlier in the day due to increasing consumption of rum. This makes them more aggressive and unpredictable."

- Community Worker in Darwin

5.3.2 Drink driving crashes

After the MUP, the number of drink driving crashes declined in Alice Springs and the rest of the NT apart from Greater Darwin

Our statistical models estimated that there were decreases in the number of drink driving crashes in Greater Darwin after the MUP, where a driver had a BAC range between 0.01 to 0.049 and a BAC range greater than 0.05, but they were not statistically significant. However, after the MUP there was a statistically significant reduction in the number of drink driving crashes in Alice Springs and the rest of the NT (excluding Greater Darwin). [78]

Most alcohol related crashes occurred near the city centre. Our model estimates that in Alice Springs there were statistically significant reductions of 56.2% and 54.2% after the MUP in the number of crashes where the driver had a BAC within the range of 0.01-0.049 and number of crashes where the driver had a BAC of greater than or equal to 0.05, respectively.

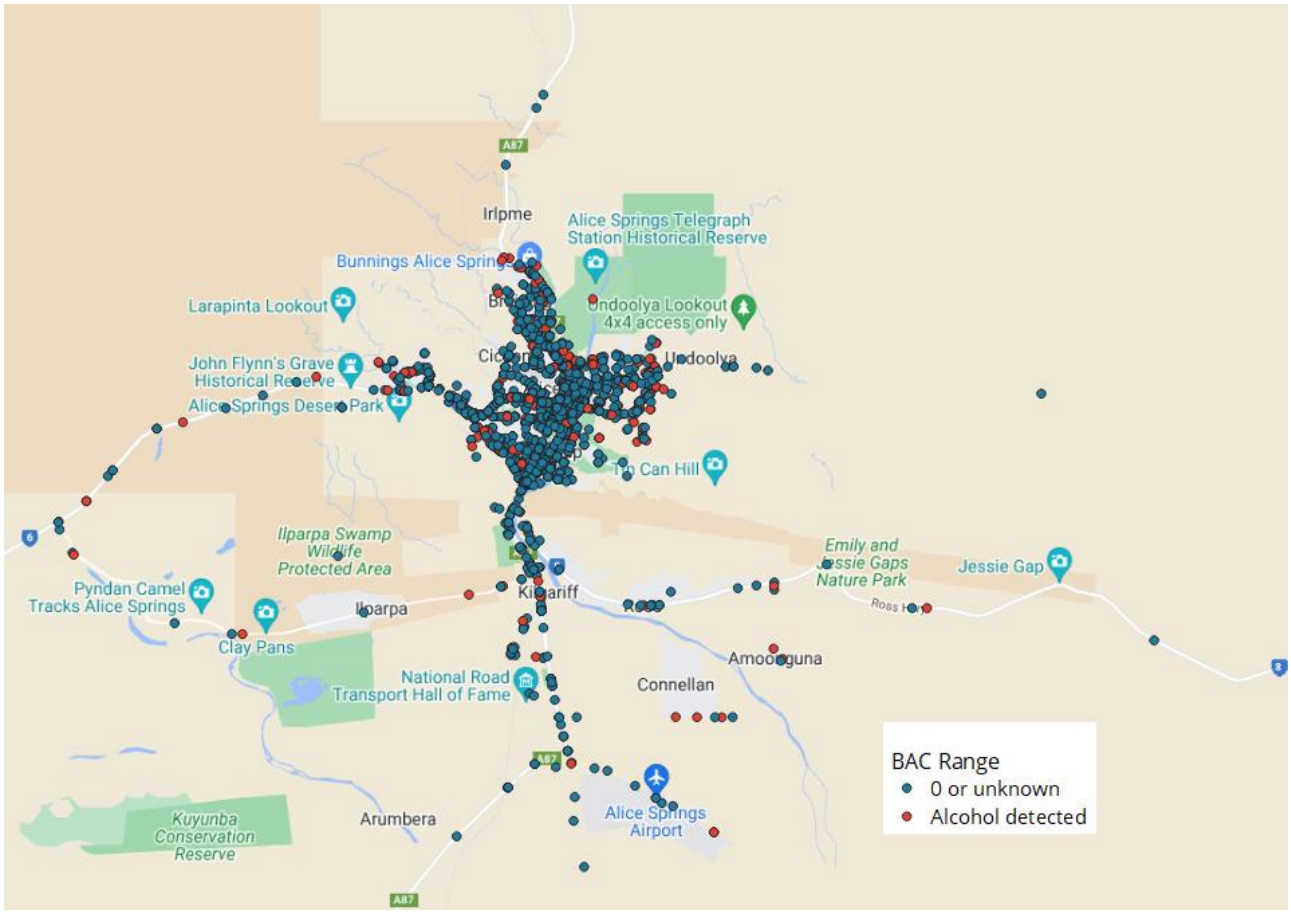
The 2020 Deakin study found a significant decrease in the rate of crashes after the MUP for the NT as a whole, but previous studies were unable to carry out analysis of road traffic crashes in the NT's individual regions.[79]

We mapped the geographical locations of all alcohol related crashes in the NT from 2014 to 2021. **Figure 32** shows the distribution of crashes in Alice Springs. The red dots represent crashes where the driver recorded a blood alcohol content (BAC) greater than 0, i.e., crashes where alcohol was involved. Maps for other regions can be found in Appendix E.

[78] Note that in Alice Springs only a small proportion of drinks were sold below MUP, before the MUP was introduced.

[79] Coomber et al (2020) noted that the number of crashes in each region of the NT was too small to conduct any further analysis on.

Figure 32: Map of crashes in Alice Springs



Source: Frontier Economics analysis using NT Police and the Department of the Attorney-General and Justice data

5.3.3 Emergency department presentations

Per capita alcohol related emergency department presentations in the NT decreased significantly after the MUP

We analysed alcohol related emergency presentations data at a monthly level by hospital across the NT from 2014 to 2021. **Figure 33** shows the number of alcohol related emergency department presentations across the NT from 2014 to 2022. There is a seasonal trend, with presentations peaking in January and dipping mid-year. The BDR was implemented throughout the NT on 1 September 2017 and may have contributed to the continuous drop in per capita alcohol related presentations from January 2018 onwards. Previous studies have found that there was a decline in alcohol related harm within the NT that has been attributed to the BDR.[80]

The number of alcohol related emergency department presentations in the NT are primarily driven by the number of presentations in Darwin and Palmerston and Alice Springs, together accounting for around 85% of total NT presentations in January 2018.

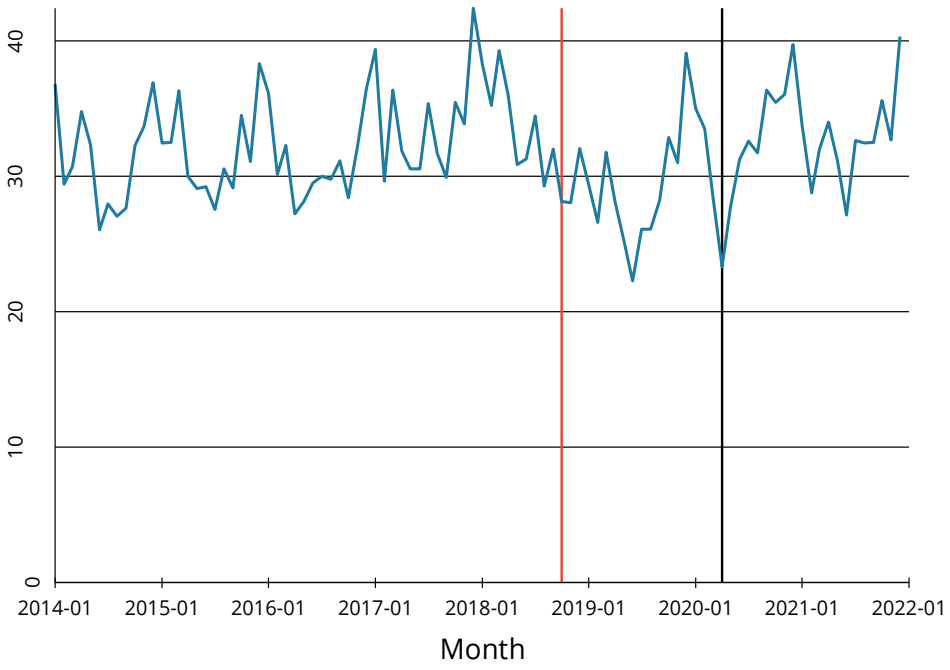
[80] Buckley, T. (2014). *A criminal shift: Alcohol regulation in the Northern Territory. Indigenous Law Bulletin*, 8, 20-23.

Overall, our analysis found that there was a 19.4% reduction in per capita alcohol related emergency department presentations across hospitals in the NT, after the MUP. The 2020 Deakin study identified a similar decrease in alcohol related ED presentations in the NT after the MUP.

Emergency department presentations started to rise in the months following the start of the COVID-19 outbreak in early 2020. This trend coincides with the increase in total assaults in **Section 5.3.1**. Further data on the level of severity of assaults recorded are required to determine the relationship between total assaults and emergency department presentations.

A few stakeholders noted that there has been a noticeable increase in the amount of broken and shattered glass throughout public places in the NT due to the increased consumption of fermented high alcohol-content beverages, and that this poses a significant safety risk for members of the general public. However, not all stakeholders agreed with this finding as one stakeholder informed us that they had not noticed an increase in injuries associated with glass bottles amongst hospital patients.

Figure 33: Total alcohol related ED presentations across the NT per 10,000 NT population



Source: Frontier Economics analysis using NT Health data

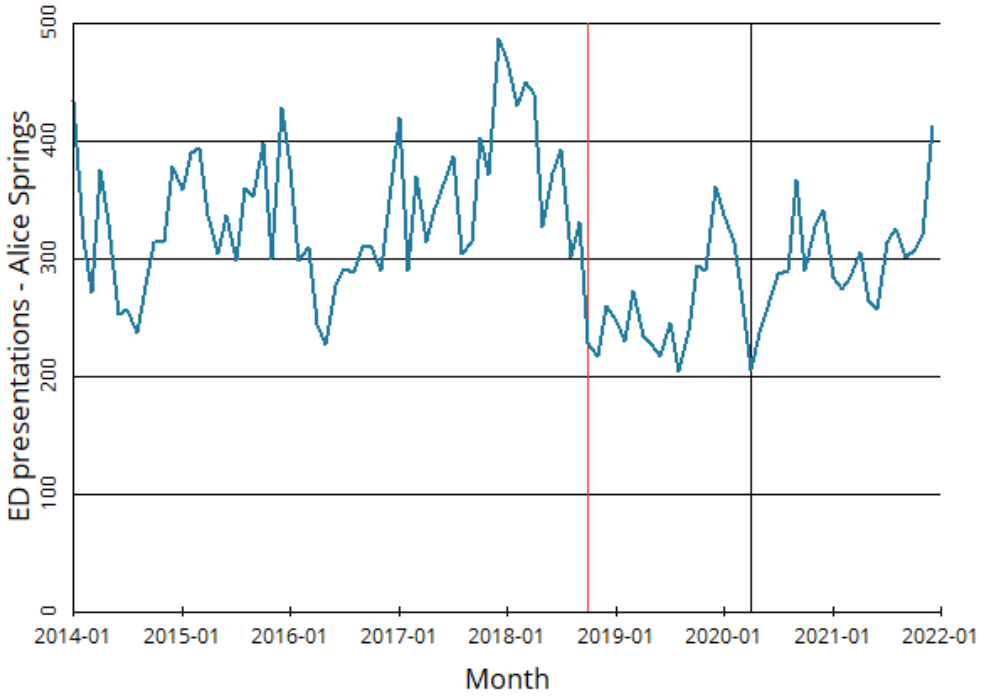
There were no significant decreases in emergency department presentations in Darwin and Palmerston

We found that there was no significant decline in emergency department presentations in Darwin and Palmerston as a result of the MUP. In addition, we are also unable to identify any significant decreases in emergency department presentations in Katherine and Nhulunbuy. This is consistent with the findings of the 2020 Deakin report.

The MUP may have reinforced the positive impact of other interventions such as PALIs on emergency department presentations in Alice Springs

Figure 34 below presents the number of alcohol related emergency department presentations in Alice Springs from 2014 to 2022. The first group of PALIs graduated on 20 August 2018 in Alice Springs and this, alongside the MUP, may have contributed to the decline in alcohol related emergency department presentations in 2018. Our results showed that there was a 37.6% reduction in alcohol related emergency department presentations in Alice Springs Hospital following the MUP. The 2020 Deakin study similarly showed that Alice Springs Hospital experienced the greatest decrease in emergency department presentations post-MUP, compared to other hospitals in the NT.

Figure 34: Alcohol related ED presentations in Alice Springs



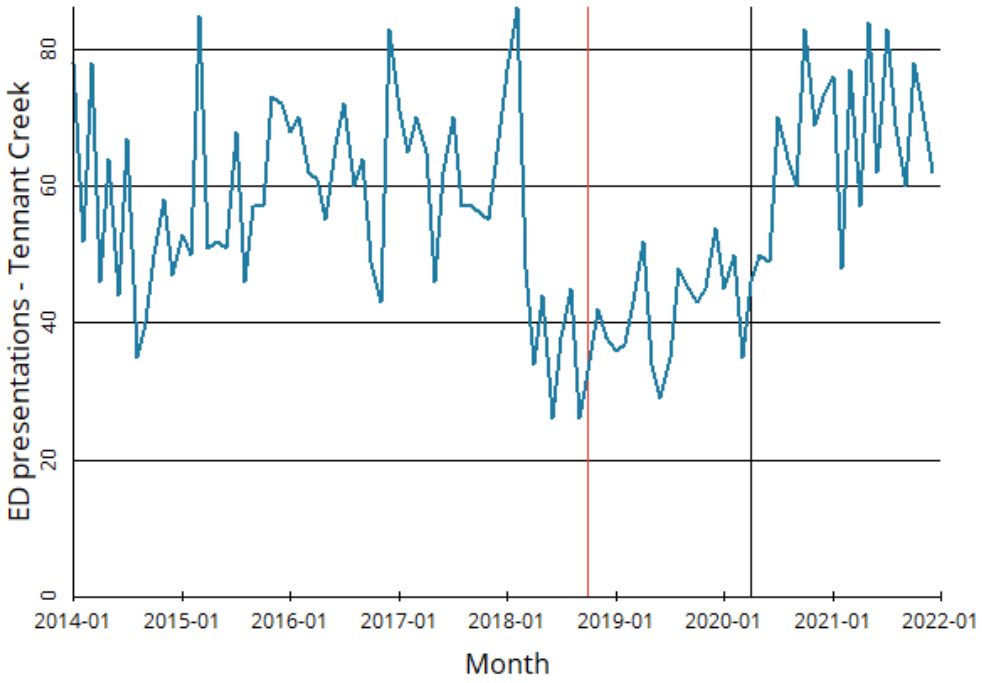
Source: Frontier Economics analysis using NT Health data

Other policy interventions might have been the main driver of the decline in emergency department presentations in Tennant Creek

Given Tennant Creek's relatively small population (3,292 residents in 2021), its emergency department presentation figures are subject to greater volatility. [81] There is a 50% drop in alcohol related presentations in early 2018 that may have been driven by other interventions. There was a 24.2% decrease in alcohol related emergency department presentations after the package of interventions including the MUP in Tennant Creek.

[81] Australian Bureau of Statistics (ABS), Estimated Resident Population

Figure 35: Alcohol related ED presentations in Tennant Creek



Source: Frontier Economics analysis using NT Health data

5.3.4 SUS attendance

SUS admissions across the NT increased significantly after the MUP was implemented

Figure 36 below presents the rate of SUS admissions over time in the NT per capita. Monthly SUS admissions have continued to rise since mid-2017, reflecting changes in policy and service delivery. Immediately after the MUP was introduced, there was a spike in total SUS admissions across the NT. Our analysis shows that there was a 111.7% increase in admissions in the NT, following the MUP. There was a decrease in SUS admissions in early 2020 which is likely the result of the COVID-19 biosecurity zones and travel restrictions imposed to protect remote communities in the NT. SUS admissions increased in all regions of the NT apart from Alice Springs, following the MUP.

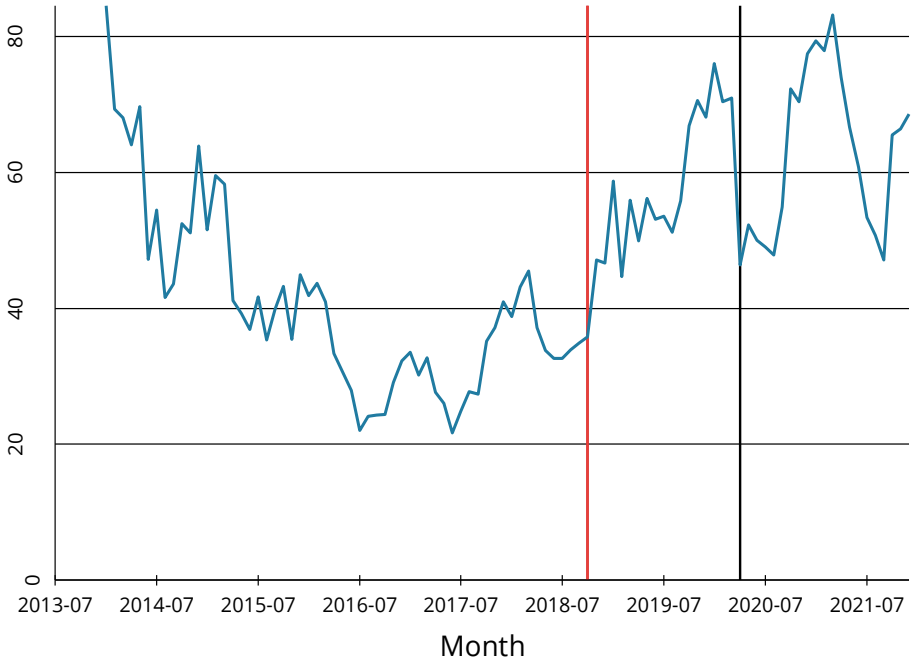
Care must be taken when attributing changes in SUS attendance to the MUP. In practice SUS attendance will reflect a range of factors including the availability of shelters and policing strategies. For example, in November 2018 several initiatives were introduced in Darwin (e.g., 24 hour opening for the Darwin shelter, increased police patrols) which resulted in increased SUS admissions that were not attributable to the MUP. Tennant Creek SUS also experienced changes which resulted in greater admissions to the SUS, and not attributable to the MUP.

SUS, emergency departments and watch house operations work closely together. Therefore, an increase in SUS admissions may suggest a decrease in watchhouse or emergency department presentations. However, data was not available for us to be able to investigate this relationship.

One stakeholder informed us about police picking up harmful drinkers earlier in the day post-MUP as harmful drinkers would become intoxicated quicker as a result of the shift to consuming spirits

and away from cask wine. They noted that there were more than 20,000 events of police picking up people in the NT to bring to SUS earlier in the day.

Figure 36: SUS admissions in the NT per 10,000 NT population



Source: Frontier Economics analysis using NT Health data

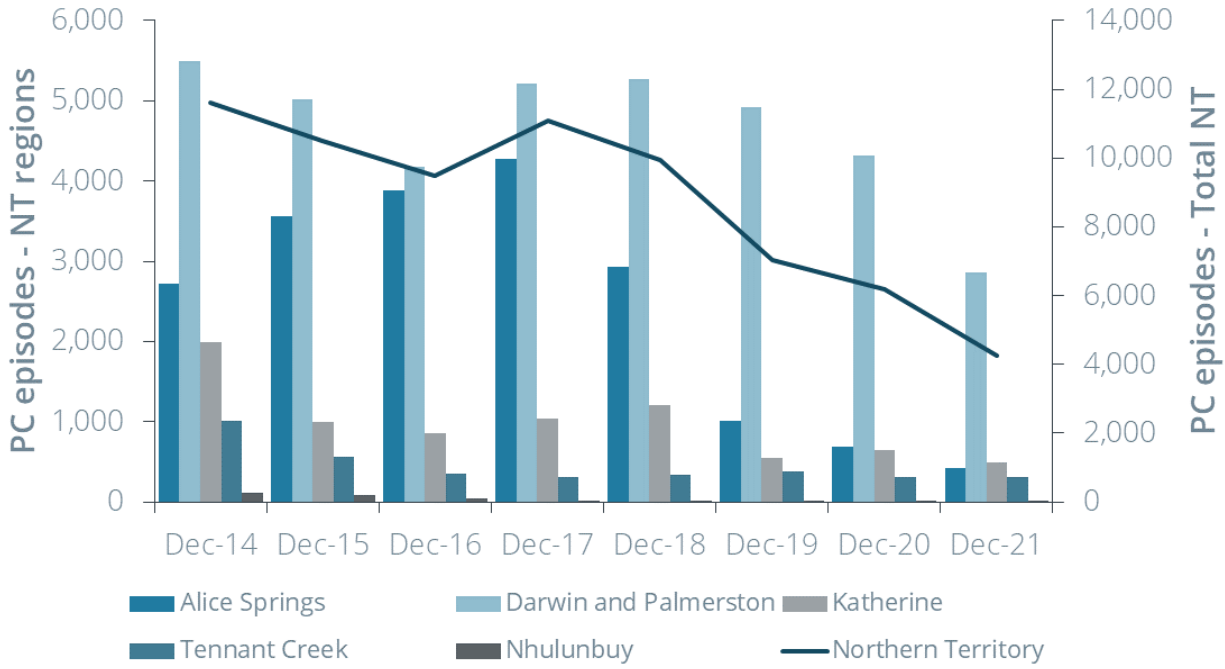
5.3.5 Protective custody episodes

The number of protective custody episodes declined in all regions of the NT

Across the NT protective custody episodes have steadily declined from 11,617 to 4,241 episodes (63% decrease) over the 2014 to 2021 period.[82] Following the introduction of the MUP the number of protective custody episodes continued to decrease. A notable decline is observable in 2020 and 2021, which may reflect police resources being diverted to enforce biosecurity zones in the NT. The number of protective custody episodes has decreased across all regions in the NT, although to varying extents. For instance, while protective custody episodes in Alice Springs fell significantly by 85% from 2014 to 2021, episodes in Darwin and Palmerston fell by only 48% over that same period.

[82] Note that the dataset that we were provided includes both alcohol- and non-alcohol- related protective custody episodes

Figure 37: Annual number of protective custody episodes in NT regions and entire NT



Source: Frontier Economics analysis of NT Police and the Department of the Attorney-General and Justice data

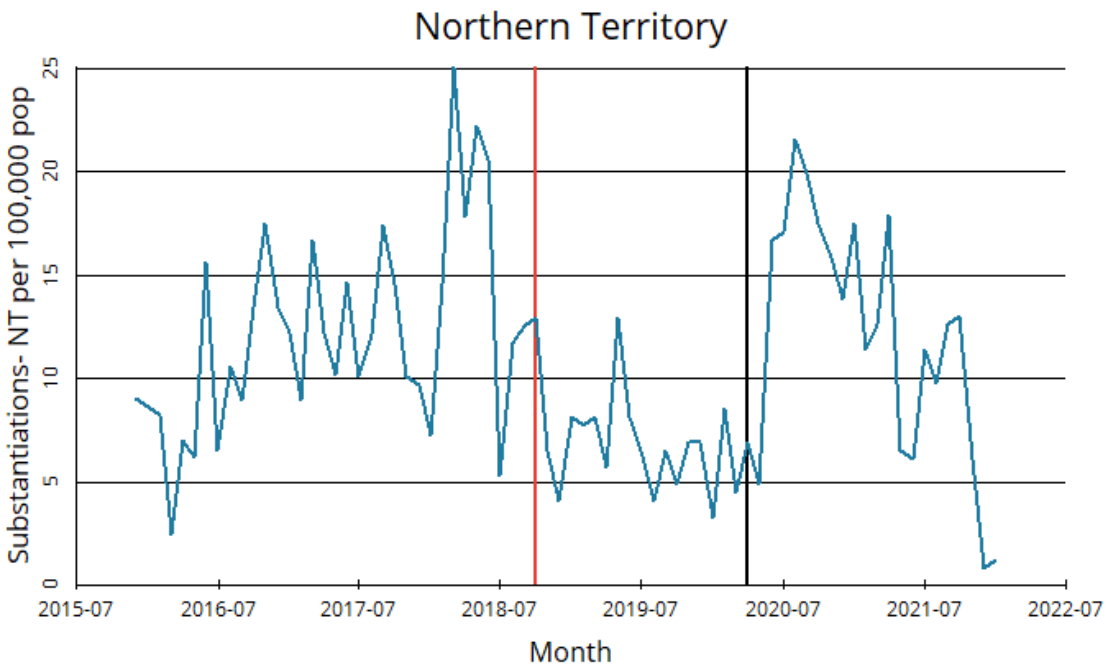
5.3.6 Child protection substantiations

It is difficult to attribute changes in child protection substantiations to the MUP

We analysed alcohol related child protection substantiations across the NT to examine the effect of the MUP. **Figure 38** shows the number of substantiated child protection investigations across the NT in which alcohol may have been a contributing factor. The number of substantiations over time is volatile but following the MUP, substantiations per capita fell by 60.3%.

Stakeholders noted during consultation that immediately after the COVID-19 outbreak in early 2020, a large number of Public Housing Safety Officers (PHSOs) were reallocated to work on enforcing border restrictions and other COVID-19 related rules, reducing the number of substantiated investigations. There was also evidence from consultations to suggest that the COVID-19 outbreak led overcrowding in public housing as more people were displaced. However, it was raised that the MUP did not cause any increase in complaints of alcohol abuse in public housing.

Figure 38: Alcohol related child protection substantiations per 100,000 NT population



Source: Frontier Economics analysis using NT Health data

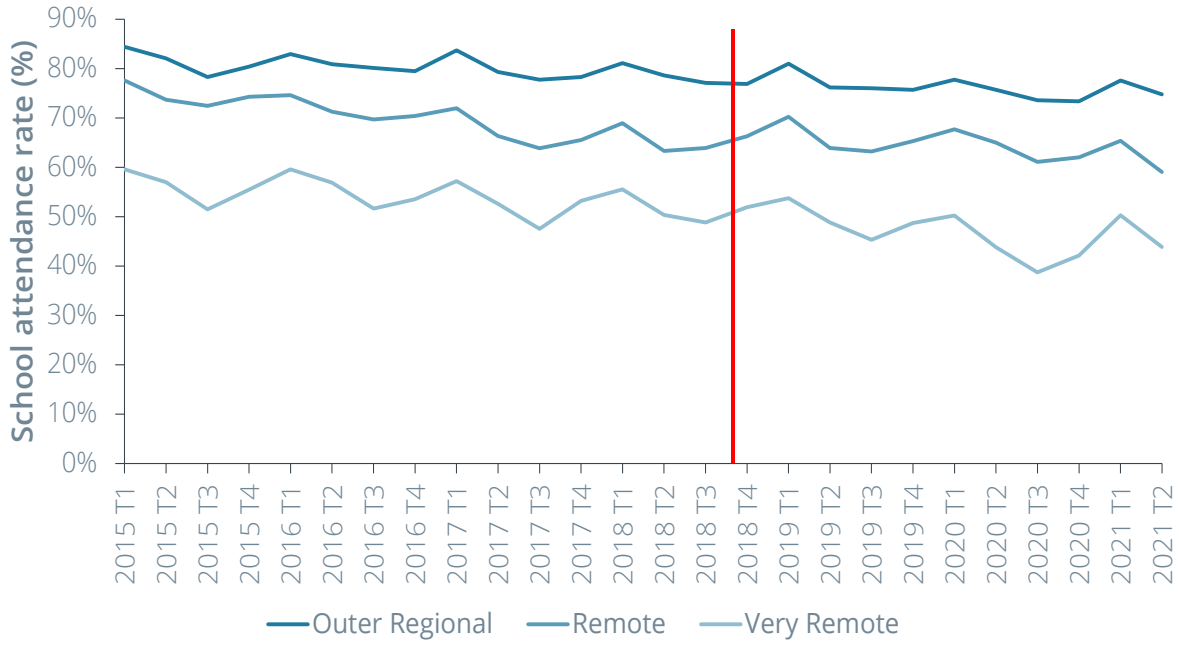
Whilst child protection substantiations decreased in most regions of the NT, the extent of the decrease differs between regions. Our regression analysis found no statistically significant impacts of the MUP on the number of substantiations in both the Greater Darwin and East Arnhem (where Nhulunbuy is located) regions. In all other regions of the NT, we found statistically significant impacts. This suggests changes in child protection substantiations cannot be attributed to the MUP.

5.3.7 School attendance

It is difficult to attribute changes in school attendance to the MUP

Figure 39 below shows the school attendance rates across different regions, categorised by remoteness, in the NT over the 2015 to 2021 period. We found no statistically significant impact of the MUP on school attendance in the NT for outer regional and very remote regions. However, our results show that after the MUP, there was an increase in school attendance rates for Indigenous communities in the remote regions and for non-Indigenous communities in outer regional regions.

Figure 39: School attendance rate by remoteness in the NT (%)



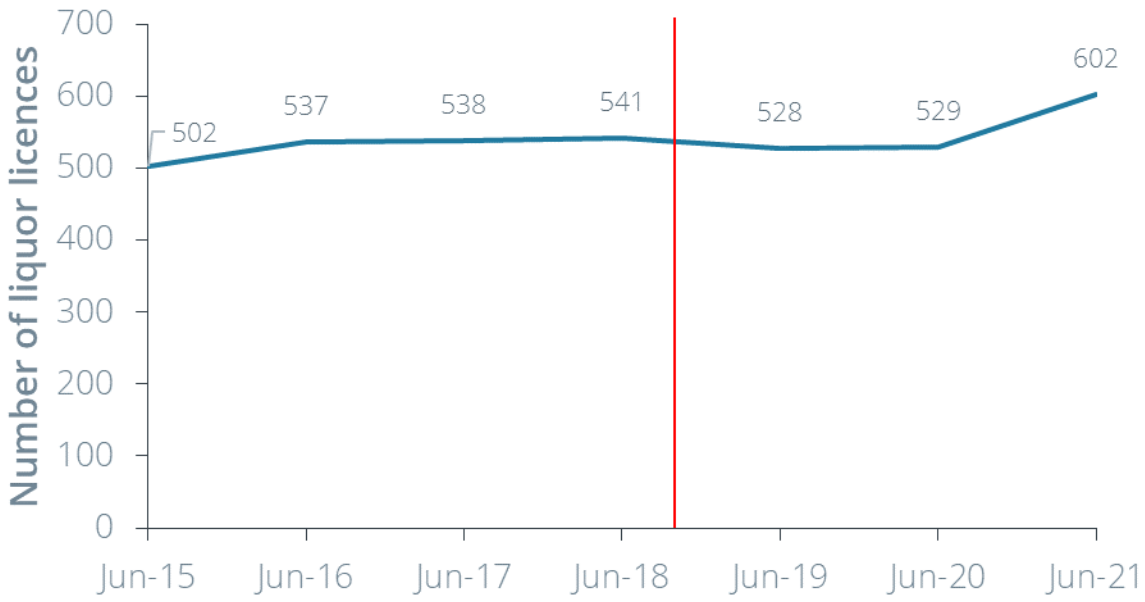
Source: Frontier Economics analysis of NT Department of Education data

5.4 Impact on industry and the economy

The annual number of liquor licences in the NT have remained stable over time

Figure 40 presents the total number of liquor licences across the NT from 2015 to 2021 (as of 30 June annually). The total number of licences has remained relatively stable from 2015, with a 13.8% increase in the number of retailers from 2020 to 2021. We understand this increase is attributed to the new Liquor Act which required a significant number of venues to convert from a special licence to a full liquor licence.

Figure 40: Number of liquor licences across the NT from 2015 to 2021

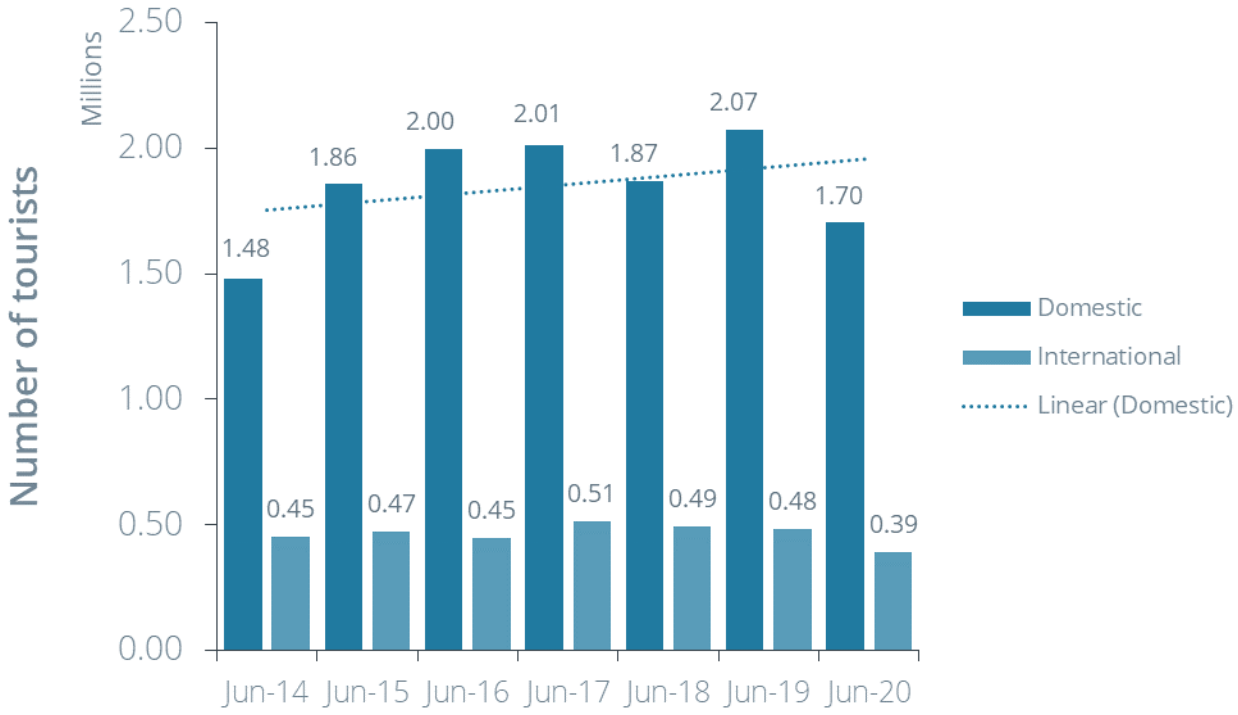


Source: Frontier Economics analysis of NT Licensing data

We were unable to identify the impact of the MUP on tourism in the NT

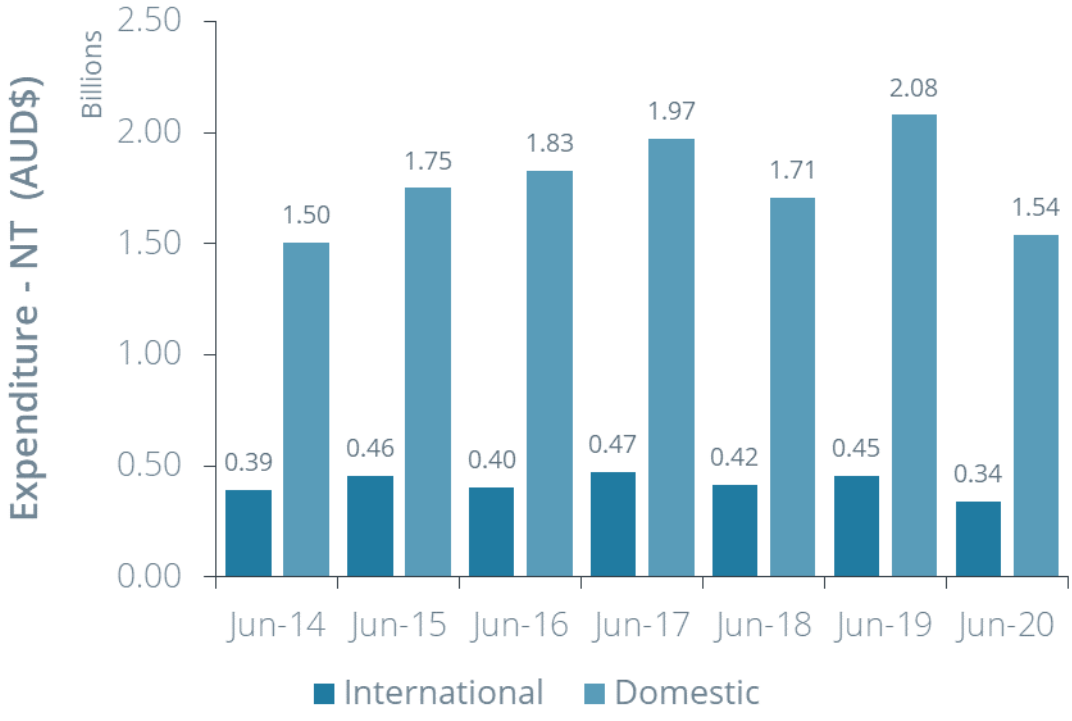
Figure 41 presents the total number of domestic and international visitors to the NT for each financial year from 2013/14 to 2019/20. The number of annual international visitors remains relatively stable over the period to 2018/19. However, international visitors fell by 19.6% to 389,258 in 2019/20 from 484,187 in 2018/19 likely because of the COVID-19 pandemic. The number of domestic tourists in the NT appears to be following a slight upward trend with the exception of the drops in 2017/18 and 2019/20. The trend in tourist expenditure in the NT adopts a similar profile (**Figure 42**). We were unable to identify a relationship between the MUP and tourism in the NT based on available data.

Figure 41: Number of domestic and international visitors - Total NT



Source: Frontier Economics analysis using NT Department of Industry, Tourism and Trade data

Figure 42: Tourist expenditure ($billions) categorised by domestic and international visitors - Total NT

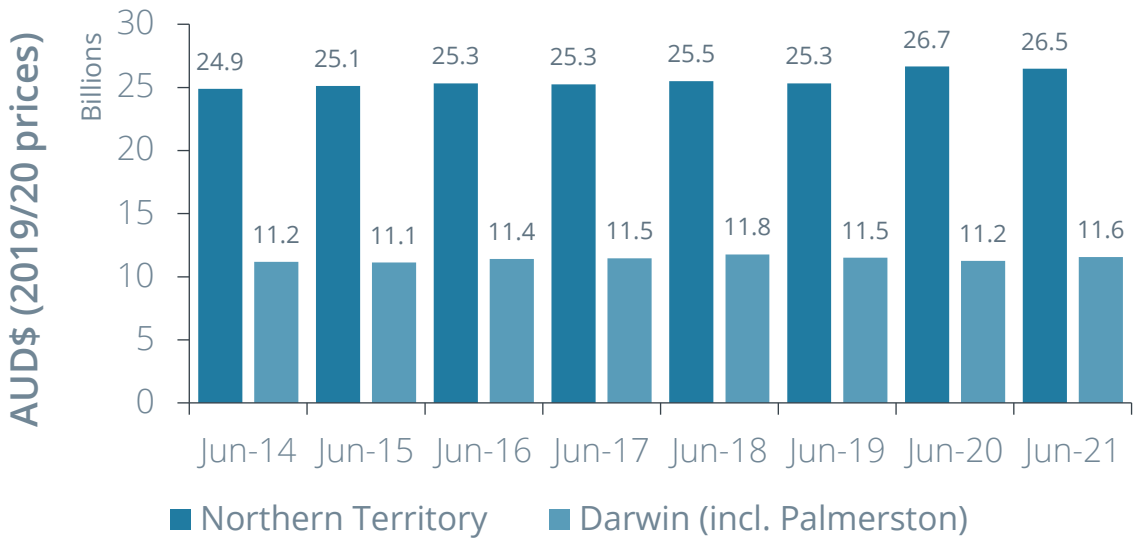


Source: Frontier Economics analysis using NT Department of Industry, Tourism and Trade data

We were unable to identify the impact of the MUP on gross regional product

We found no systematic changes in the NT or in Darwin's gross regional product following the MUP's introduction (**Figure 43**). Gross regional product remained relatively stable over the 2014 to 2021 period. On average over the period, Darwin contributed to approximately 45% of the NT's total GRP. There were no structural breaks in the gross regional product of other regions in the NT.

Figure 43: GRP ($billions) – Total NT and Darwin area

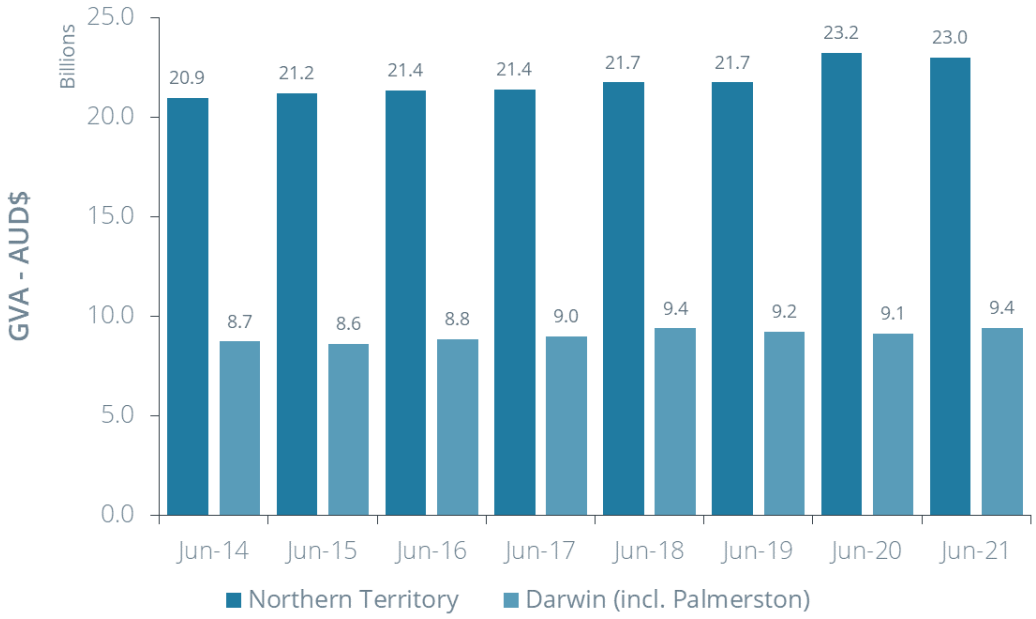


Source: Frontier Economics analysis using Economy ID data

We were not able to identify any impact of the MUP on gross value added in the NT

Figure 44 show the GVA of all industries in the NT and Darwin, and other LGAs in the NT, respectively. The charts demonstrate that the MUP had no discernible impact on total GVA in the NT or any of its individual LGAs. GVAs in the entire NT and its individual regions remain relatively stable over the 2014 to 2021 period.

Figure 44: GVA for all industries ($billions) – Total NT and Darwin area



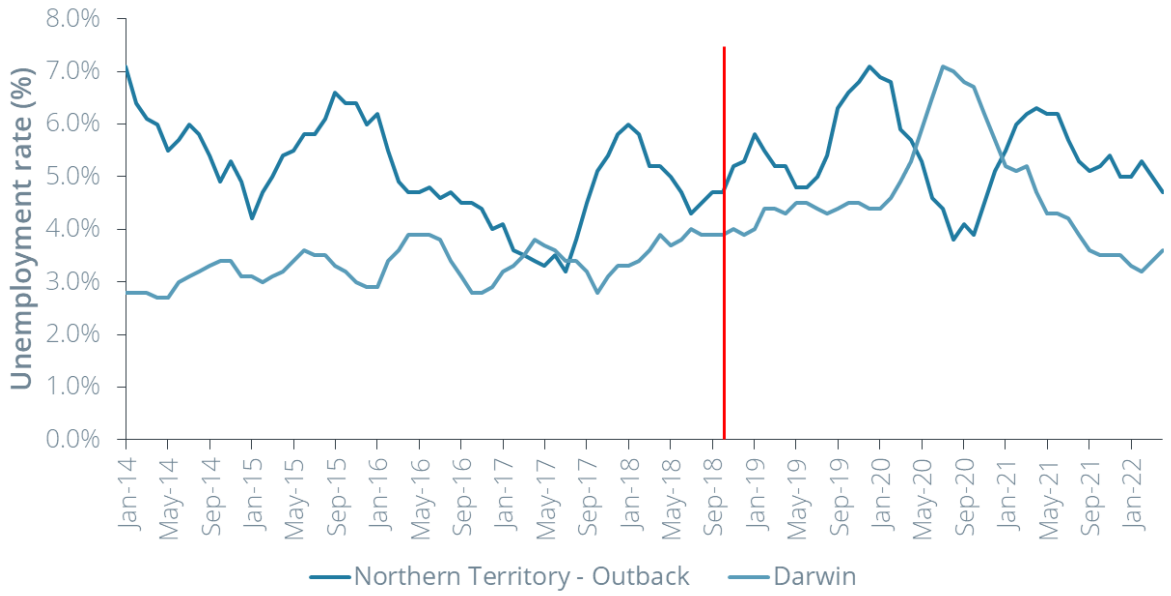
Source: [Insert reference source text here]

We were unable to identify the impact of the MUP on unemployment in the NT

Figure 45 shows the monthly unemployment rates in the Darwin and Outback regions of the NT.[83] The average monthly unemployment rates over the January 2014 to April 2022 period in Darwin and NT- Outback are 3.9% and 5.2%, respectively. There were no systematic changes in the unemployment rates in the NT following the introduction of the MUP.

[83] The unemployment rate is defined as the number of unemployed individuals divided by the number of individuals in the labour force.

Figure 45: Monthly unemployment rates in the NT (%)



Source: ABS Labour Force, April 2022, 6-month moving averages of original data

6 Findings and conclusions

This section presents our findings and conclusions. We begin by presenting a summary of our key findings before discussing our key findings against the key evaluation questions.

6.1 Summary of key findings

- The MUP was effective in reducing the consumption of cask wine, almost immediately. There is evidence of substitution to other low priced alcohol products. The MUP resulted in a small reduction in total alcohol sales.
- There was significant price rebalancing following the introduction of the MUP, across a range of alcohol products. This significant price rebalancing means the impact of the MUP was not restricted to harmful drinkers.
- There is evidence of a reduction in alcohol related harms following the suite of policy interventions introduced around the time of the MUP. It is difficult to attribute this reduction to the MUP, although the MUP may have made a contribution.
    - For those impacts where regional data is available (drink driving and alcohol related emergency department presentations) there is no reduction in Greater Darwin but significant reductions in other regions – suggesting that the reduction in alcohol related harms is likely related to other alcohol related interventions, such as the PALIs.
- The impact of COVID-19 means that it is not possible to identify the medium to long term impact of the MUP.
- During consultations, stakeholders suggested that alcohol related policies should be consistent with the principles of:
    - a consistent approach for all drinkers; and
    - an incentive-based approach rather than punitive approach.

6.2 To what extent has the MUP achieved its intended effects?

The MUP has been effective in reducing supply of low-cost, high-alcohol products, but drinkers have shifted to other products

Our analysis finds that the MUP has been effective in reducing purchases of low-cost, high alcohol products across the NT as a whole. Immediately after the MUP was introduced, quarterly total alcohol wholesale supply per capita declined by 23.2% from 3.2 litres in 2018 Q4 to a new low of 2.5 litres in 2019 Q1 (noting that the lowest quantities of wholesale supply typically occur in Q1 every year). This fall was primarily driven by a 47.0% reduction in per capita supply of cask wine, as well as a decreases in the per capita supply of bottled wine (-16.9%), beer (-5.0%) and mixed spirits (-6.2%). However, this decrease was partially offset by a 6.7% increase in standard spirits. There is no evidence to suggest that the MUP had an impact on the wholesale supply of fortified wine or cider.

The impact of the MUP on alcohol sales varied across the NT. The greatest impact was in Katherine where wholesale supply of cask wine fell by 76.6%, whilst little to no impact was found in Alice Springs, reflecting the impact of existing policy measures.

These results are consistent across our analysis of wholesale data available from NT Licensing and more detailed product data provided by the major retailers and wholesalers.

Some of the impacts of the MUP may be difficult to differentiate from confounding trends in the market. There is a high degree of seasonality associated with the sale of alcohol in the NT. The consumer-led 'health agenda' may be contributing to long term reductions in sales of alcoholic drinks and increased switching to lower alcohol by volume 'premium' products. Similarly, changing consumer preferences may be contributing to increased sales of spirits.

There is evidence of a reduction in some alcohol related harms, but it is not possible to attribute this to the MUP

There was a 25.8% reduction in alcohol related non-domestic violence assaults per 10,000 population in the NT following the introduction of the suite of policy interventions around the time of the MUP.

There is no evidence of any change in alcohol related domestic violence assaults associated with the policy interventions introduced around the time of the MUP.

There is a significant increase of 111.7% in total SUS attendance in the NT per 10,000 population, and a corresponding 60.3% decrease in protective custody substantiations across the NT. This reflects widespread changes in policy implementation consistent with the focus on harm minimisation and cannot be attributed to the MUP.

For those impacts for which regional data is available there is no reduction in Greater Darwin and significant reductions in other locations – suggesting the reduction in alcohol related harms is likely to be related to other interventions such as PALIs rather than the MUP. There is no significant impact on the number of drink driving crashes in Greater Darwin following the introduction of the MUP, in contrast to the significant reduction in Alice Springs and in other areas of the NT. Similarly, there is no significant reduction in alcohol related emergency department presentations in Greater Darwin, while reductions of 37.6% and 24.2% can be observed in Alice Springs Hospital and Tennant Creek Hospital after the MUP's introduction, respectively. While it is difficult to draw a relationship between child protection substantiations and school attendance rates and the MUP based on available data, similar trends exist – no statistically significant impact in Greater Darwin and generally significant impacts in other regions.

There is evidence of widespread price rebalancing

The MUP had the immediate effect of increasing the price for products below the MUP. Our analysis found evidence that the prices of many of these products increased beyond the MUP.

There is evidence of widespread price rebalancing across a wide range of products as the industry moves to a new equilibrium. Our analysis shows products that were priced above the MUP tended to increase in real terms, especially for products that were priced close to the MUP.

It is likely the MUP had an impact on moderate as well as harmful drinkers

The effectiveness of the MUP is based on the assumption that harmful drinkers tend to drink the cheapest alcohol. However, the rebalancing of prices across a range of products suggests the impact of the MUP was likely not limited to harmful drinkers.

During consultation we heard several examples of the MUP impacting on a wide range of drinkers. For example, interstate wineries and wine stores who ceased shipping to the NT, and the removal of discounts historically applied to purchases of bottled wine (for example, buy 6 bottles and receive a 10% discount) to avoid breaching compliance with the MUP. We heard that 'grey nomads' travelling through the NT, who often purchased cask wine, were also impacted by the MUP.

Across all consultations stakeholders did not directly attribute any change to harmful drinking to the MUP, however most suggested that, in combinations with other measures, the MUP may be having an impact in reducing the harmful levels of problem drinking.

Whilst the MUP may make it harder to access the low-cost high-volume alcoholic beverages consumers are still making the choice to consume alcohol in harmful way by purchasing higher cost alcohol or through the use alcohol substitutes (mouthwash, hand sanitizer).

Cask wine sales in NT remain well below pre-MUP volumes, suggesting the MUP has had an enduring effect

It is not possible to make definitive comments on the effectiveness of the MUP over time due to the impact of COVID-19. However, it is notable that cask wine sales in the NT remain below pre-MUP volumes. In contrast there has been an increase in the sales of all other alcohol types, most notably spirits, sales of which increased substantially from March 2020.

There is some evidence from stakeholders to suggest that moderate drinkers were negatively affected by the MUP. NT Hospitality confirmed that there are moderate drinkers who are suffering from the higher alcohol prices caused by the MUP.

6.3 What other effects has the MUP had?

The overall impact of the MUP on retailer revenues was small

Overall, the effect on retailer revenues was small as increased margins compensated for decreased volumes (though the impact depended on the mix of alcoholic drinks sold pre-MUP). The wholesale prices appear to have risen marginally, consistent with cost increases due to loss of volume, suggesting minimal impact on wholesale and manufacturer margins. Thus, without a margin increase to compensate for the loss of volume wholesalers and manufacturers would be worse off.

We did not conduct a detailed review or survey to test whether retailers or producers reported closing local units, reducing staff numbers or reducing investment as a result of the MUP.

There is no evidence the MUP has had a negative effect on tourism or the NT economy, based on available information

Overall, we found no relationship between the MUP and key macroeconomic indicators for the NT, including gross regional product, gross value added (for all industries), tourism and the unemployment rate.

It is likely the MUP had some impact on interstate supply

There is some evidence from the consultation that NT consumers increased cross-border purchasing behaviour, primarily affecting retailers in the immediate vicinity of the NT border, particularly Mt Isa (Queensland) and Kununurra (Western Australia). It is difficult to determine the

extent to which this relates to the MUP, as opposed to other alcohol policies including the BDR, PALIs and *Stronger Futures*.

It is unlikely the MUP materially impacted the use of alternative substances

There is very limited information about the use of alternative substances to inform our analysis. Many substitutes, including Listerine and hand sanitiser, are priced well below the MUP; suggesting the MUP is unlikely to impact the demand for these products. Evidence from consultation suggests limitations on access to alcohol, including restricted opening hours and the BDR, have a stronger influence on the use of alternative substances than price. It is therefore unlikely that the MUP materially impacted the use of alternative substances.

It is difficult to assess the impact of the MUP on secondary supply

There is evidence from consultation of an ongoing concern with the secondary supply of alcohol in the NT. During consultation stakeholders reported that a bottle of Jim Beam retailed for as much as $600 during COVID-19 lockdowns.

By its nature secondary supply is likely to be a function of policies that limit access to alcohol, including *Stronger Futures* and the BDR, rather than the MUP.

6.4 How has the MUP had its effects?

Compliance with the MUP is high

We found evidence of high compliance with the MUP. Our analysis of retail prices found the vast majority of prices complied with the MUP after it was introduced. This is consistent with feedback from NT Licensing that compliance with the MUP is high.

The MUP is cost-effective for Government

The MUP is a relatively cost-effective policy from the perspective of Government. Retailers are responsible for administering the MUP and are compensated for these costs in the form of higher retail prices for products previously priced below the MUP. During consultation industry advised there were some set up costs associated with complying with the MUP, but that ongoing costs were limited.

Consumers bear the cost of the MUP through higher prices for alcohol products; while the impact is strongest for consumers that purchased alcohol priced below $1.30, there is still a substantial impact on alcohol priced above $1.30. Drinks formerly priced in the $1.40-$1.50 range appear to have increased real prices by around 5%.

An alcohol tax is likely to be more cost-effective for Government, since it would raise revenue that could be directed to policy while revenue from the MUP is recovered by industry.

Stakeholders inform us that the MUP may have reinforced the shift to spirits

There is evidence of a small increase in spirits purchases around the time of the MUP. However, there is also evidence of a trend towards spirits that started before the introduction of the MUP, reflecting changes in consumer preferences. The shift to spirits is most notable around the time of COVID-19, with spirits sales increasing by significantly more than the change following the introduction of the MUP.

During consultation stakeholders emphasised the increasing consumption of spirits was resulting in a negative impact through anti-social behaviour and glass litter. While there is evidence of a

small increase associated with the MUP, our analysis suggests it was not the primary cause of the increase in spirits sales.

However, our quantitative analysis suggests that drinkers may have shifted not only spirits but a wide range of beverage types

Our results show that immediately after the MUP was implemented and the subsequent price rebalancing that followed, the increase in retail sales across a wide variety of alcohol types increased, offsetting the decrease in cask wine sales.

The interaction between the MUP and other alcohol related policies is unclear

It is difficult to establish the relationship between the MUP and other policies, including the BDR and PALIs. It is difficult to see how the MUP could influence policies aimed at managing supply to harmful drinkers including the BDR and PALIs. This is consistent with evidence from stakeholder interviews.

The impact of COVID-19 is more significant than the impact of the MUP

COVID-19 had a more significant impact on many key outcomes, including alcohol sales and related assaults, than the suite of policy interventions introduced around the time of the MUP. Over the 2019 Q2 to 2020 Q2 (the quarter immediately after the COVID-19 outbreak started) period, there was a 15.2% decline in total wholesale alcohol supply in the NT. By comparison, total wholesale alcohol supply deceased from 2017 Q2 to 2018 Q2 and 2018 Q2 to 2019 Q2 by 2.5% and 4.9%, respectively.

Stakeholders suggested a range of other policies that could be used to manage harmful alcohol consumption

Yarning engaged with a wide range of stakeholders about potential policy solutions to manage harmful alcohol consumption in the NT. Stakeholders suggested policies ranging from prohibition to enhancement of existing programs (see **Box 3**). There was considerable interest in community-led solutions that empower communities to manage access to alcohol.

Several important policy principles emerged during consultation:

- Programs should be designed on an incentive-based approach rather than a punitive approach
- A consistent approach should be adopted for all drinkers.
- Current policies viewed as discriminatory by a significant number of stakeholders
- Policies and programs need to address the root causes of harmful drinking

Box 3: Potential policy solutions suggested in consultation

Community led solutions:

- More permits/ licenses in communities to be able to access/purchase and drink alcohol

- This is recognised as an opportunity to be able to reduce negative perceptions of behaviours regarding the granting of permits/licenses and to further incentivise and promote responsible drinking behaviours in communities
- Incentive-based approach

- Social clubs with access requirements:
  - Those wanting to access facilities (and alcohol) would be required to meet certain criteria
  - These included being, employed, kids attending school, etc.
  - Using access requirements to promote responsible drinking behaviours and promoting positive community member participation – incentive-based approach
- More Indigenous designed, led and delivered programs targeting the cause of harmful drinking
  - Local decision-making processes used
  - Local Cultural authority involved
  - Provides for community to be at the forefront of addressing community harmful drinking behaviours
  - Ensures Cultural protocols, responsibilities and obligations are incorporated
  - Greater acceptance, endorsement and potential for participation

Enhance existing programs:

- More funding for programs that address the root cause of harmful drinking
- Teaching responsible drinking behaviours
- More emphasis on policing responsible service of alcohol

Prohibition:

- Stop selling alcohol

Source: Yarning

6.5 Key recommendations

The MUP has had a small impact on alcohol consumption

Our evaluation has found that the MUP had significant impact on the consumption of low-cost, high- alcohol products, most notably cask wine. However, this represents a very small proportion of total consumption and there is evidence of substitution offsetting this impact to some extent. The impact of the MUP is very small in the context of other influences on consumption – including for example COVID-19.

Changes in patterns of consumption reflect widespread changes in the prices and products and quantities sold. Accordingly, the impact of the MUP was not limited to harmful drinkers.

Our evaluation found evidence of reductions in alcohol related harms, but it is hard to attribute that to the MUP. Our evaluation did not find evidence of an adverse impact of the MUP on industry or the economy.

We recommend retaining the MUP at its current level

We make several recommendations aimed at improving the implementation of alcohol policy in the NT with the aim of minimising alcohol related harm:

- On balance we do not recommend removing the MUP. There is some evidence it has impacted consumption.
- We do not recommend increasing the level of the MUP, since it is likely to result in widespread price rebalancing that will impact both harmful and moderate consumers.
- The NT Government should define the harmful consumption of alcohol and the moderate consumption of alcohol.
- The NT Government should take advantage of opportunities to collect systematic data about the consumption of alcohol and alternative substances. For example, SUS could be used to collect data on the type and quantity of alcohol consumed, in particular, secondary supply and alternative substance substitutes.
- The NT Government should ensure data collection methodologies support robust policy analysis. For example, ensuring data is consistent across regions (different methodologies were adopted to record emergency department presentations between different locations) and reflects policy settings (it was difficult to determine the timing of policy interventions, including, for example, the final rollout of PALIs).
- Many of the alcohol related harm impacts can possibly be attributed to the PALIs. Consultation identified concerns that this policy may target Indigenous consumers. An evaluation of this policy could inform future policy implementation and development.
- Alcohol policy interventions should be community led and consistently applied across all drinkers.

A List of stakeholders consulted

In this section we present a list of the stakeholders we consulted with as part of our evaluation.

Government Stakeholders

- NT Government Department of Health
- NT Government Department of Education
- NT Government Department of Families Housing and Communities
- NT Government Department of Infrastructure, Planning, and Logistics
- NT Police, Fire, and Emergency Services
- NT Government Department of the Attorney General and Justice
- NT Government Department of Industry, Tourism, and Trade
- NT Government Department of the Chief Minister and Cabinet
- Royal Darwin Hospital
- Alice Springs Hospital
- City of Darwin
- Katherine Town Council
- Easter Arnhem Regional Council
- Alice Springs Town Council
- Tennant Creek Town Council

Treatment Providers

- FORWAARD
- BRADAAG
- Kalano
- CAAAPU
- DASA
- Holyoake
- Harmony Group
- Mission Australia
- Roper Gulf Regional Council
- Salvo's Sunrise Centre
- Warlpiri Youth Development Aboriginal Corporation

- Amity Community Services
- Bush Mob
- Catholic Care NT
- CAAPS
- Banyan House

Aboriginal Community Controlled Health Organisations (ACCHOs)

- Central Australia Aboriginal Congress
- Danila Dilba
- Miwatj
- Anyginyi
- Wurli Wurlinjang

Others

- ADAANT
- North Australian Aboriginal Justice Agency
- Aboriginal Medical Services Alliance NT
- Foundation for Alcohol Research and Education
- Australian Drug Foundation
- People's Alcohol Action Coalition
- Larrakia Nation Aboriginal Corporation
- Larrakia Development Corporation
- Hospitality NT
- Retail Drinks Australia

Informal engagements where also conducted with consumers of alcohol at the following locations during the consultation process:

- Darwin
- Adelaide River
- Nhulunbuy
- Pine Creek
- Katherine
- Mataranka

- Daly Water
- Dunmarra
- Elliot
- Renner Springs
- Threeways
- Tennant Creek
- Wauchope
- Wycliffe Well
- Barrow Creek
- Ti Tree
- Aileron Roadhouse
- Alice Springs

B Consultation findings

The consultation for this evaluation was wide-ranging and undertaken as a combination of formal engagements with identified key stakeholders, in conjunction with informal conversations with community members from across the NT to ensure a large and diverse range of feedback could be obtained, given the broad impact the MUP could have across all parts of the NT.

It is worth noting that as the MUP is not a stand-alone measure and sits within a general suite of policy initiatives designed to reduce the impact of harmful drinking behaviour across the NT. It is important to state that the MUP was discussed by stakeholders alongside the other measures (Banned Drinking Register (BDR) and Police Auxiliary Licensing Inspectors (PALIs)) in many consultations. An all occasions our engagements sought to ensure the MUP was at the centre of discussions, however it was hard for many stakeholders to differentiate the impacts of the MUP outside of those other measures.

Consultations were undertaken between 28 February 2022 and 10 June 2022 with a total of approximately 41 organisations providing feedback from 18 communities within the NT.

Engagements were undertaken in a 2-stage approach to ensure stakeholders had multiple opportunities to participate with the Yarning team undertaking in-person engagements with stakeholders in Alice Springs, Tennant Creek, Katherine, Nhulunbuy, and Darwin on at least two separate occasions.

To commence the consultation process, a series of 3 workshops were held in Darwin on 28 February 2022, one with Government stakeholders, one with industry representatives, and one with community and social interest groups.

The purpose of these workshops was to raise awareness and provide some background information about the MUP and why this evaluation was being undertaken, outline the evaluation and consultation process, and to seek further buy-in from these stakeholder groups for the next phase of the consultation process. Limited feedback was obtained from these workshops, however that feedback that was obtained is reflected in the relevant stakeholder tables that follow.

Individual organisational based consultations were then undertaken. Once again these were conducted with Government Stakeholders, industry representatives, and community and social interest groups, along with frontline stakeholders who manage alcohol related harm, and consumers of alcohol and their families on a one-on-one basis.

To begin with consultations focussed on those key stakeholders and contacts which had been provided by NT Health. These consultations quickly lead to additional consultations due to referrals by these key contacts, or additional consultations with other stakeholders within the same organisation. The Yarning team also used its extensive network of contacts across the NT to ensure representatives from all stakeholder groups where engaged.

The high-level outcomes of consultations across all stakeholder groups are set out below.

Table 6: Feedback from government stakeholders

Key Issues	Feedback
Impact of MUP	Government stakeholders couldn't definitively identify the impacts that the MUP has had on the levels of harmful drinking within the NT, however overall, they were supportive of the MUP as a policy measure.
Impact on alcohol related harm	The observed levels of alcohol related harm during the period the MUP has been in place has been in decline, however this can't be directly attributed to the MUP, with many stakeholders believing COVID-19 played a greater role in this reduction.
Impact on Government Services	Stakeholders felt the MUP had a minimal impact on Government Services both from an implementation perspective given its low cost and resourcing levels to put in place, and also its ability to reduce the number of harmful drinkers who have a need to access Government services.
Relationship to other policies and initiatives	Overall, Government stakeholders felt the MUP was a good complimentary policy measure in conjunction with the BDR, and PALIs, however would not be effective as a stand-alone policy measure to reduce the levels of harmful drinking
Impact on other stakeholders	Feedback from the NT Police was that night patrol had reported a reduction in anti-social behaviour over the period the MUP has been in place, however this reduction couldn't directly be attributed to the MUP.

Table 7: Feedback from industry representatives

Key Issues	Feedback
Impact of MUP	Lots of retailers stopped stocking cask wine after the MUP was introduced and rebalanced the prices of other products as their sales mix changed. Some pubs and bottle shops also chose to destock. However, feedback provided was that there hasn't been any noticeable change in the amount of alcohol purchased because of the MUP being put in place.
Impact on industry and consumers	There is a negative community perception that the MUP is driving industry profit as many customers think the MUP affects all products, and get confused with excise tax, or freight costs which can cause an increase across all product lines. NT Locals are supportive of the MUP as they understand the need for the policy measure, however many tourists don't understand and complain that low-cost high-volume alcohol costs more in the NT then is does in other parts of Australia.

Table 8: Feedback from community and social interest groups

Key Issues	Feedback
Impact of MUP	No stakeholders could attribute any noticeable change in the levels of harmful drinking to the implementation of the MUP. The majority felt that it wouldn't make any positive difference.
Impact on consumers and communities	Some stakeholders commented that the increased cost of alcohol could mean that there is less money available for parents to spend on living expenses and education costs for children. Community groups commented that responsible service of alcohol practices in many licensed venues in NT communities were not followed correctly and can actually enable harmful drinking which potentially can undo any positive differences the MUP may have been able to achieve.

Table 9: Feedback from frontline stakeholders who manage alcohol related harm

Key Issues	Feedback
Impact of MUP	Frontline stakeholders who manage alcohol related harm did not notice any changes because of the MUP. In fact, these stakeholders advised that the MUP as a standalone policy measure doesn't address the root cause of harmful drinking, however in conjunction with other measures it may be useful as a restrictive prevention measure.
Impact on alcohol related harm	Many frontline stakeholders felt the MUP was driving harmful drinkers to pool their money with others to continue to buy alcohol (and in many cases higher concentrate alcohol) or turn to alcohol substitutes (mouthwash, hand sanitizer) instead. The MUP had not stopped people from consuming alcohol.
Impact on stakeholders managing alcohol related harm	No change had been observed because of the MUP as there still remains a problem with the levels of the harmful drinking across the NT.
Impact on consumers and community	Frontline stakeholders have noticed a shift in the type of alcohol being consumed, with spirits now being more prominent, however they cannot confirm if this is because of the MUP. The increased consumption in spirits has led to an increase in the amounts of broken glass throughout public spaces in the NT which poses a safety risk to members of the public. The increase consumption in spirits, as well as alcohol substitutes has seen an observed increase in the number of people intoxicated in public spaces, earlier in the day, who display more aggressive and unpredictable behaviour as to when cask wines and beer was the more highly consumed type of alcohol.

Table 10: Feedback from consumers of alcohol and their families

Key Issues	Feedback
Impact of MUP	Consumers of alcohol had no idea what the MUP was, or the impact that is has on alcohol prices. Those stakeholders that had noticed the increased price of low-cost high-volume alcoholic beverages thought that it was due to increased freight costs or the higher cost of living experienced within the NT.
Impact on consumers and community	Some consumers advised they had seen a reduction in the supply of cask wines in retailers, however they put this down to supply issues not the MUP.
Impact on alcohol related harm	Consumers could not determine or form an opinion on whether the MUP has made any difference when it came to the alcohol related harm.

Across all consultations undertaken stakeholders did not directly attribute any change to harmful drinking to the MUP, however most suggested that, in combinations with other measures, the MUP may be having an impact in reducing the harmful levels of problem drinking.

Whilst the MUP may make it harder to access the low-cost high-volume alcoholic beverages consumers are still making the choice to consume alcohol in a harmful way by purchasing higher cost alcohol or through the use alcohol substitutes (mouthwash, hand sanitizer).

C Literature review

Studies of the MUP in the NT

Impact of the MUP on prices, consumption and harmful effects

Deakin University carried out an evaluation of the MUP in the NT about one year after the policy's introduction.[84] The study sourced data from administrative agencies, a population telephone survey and interviews with key stakeholders. The authors assessed how the MUP impacted the prices of different types of alcohol by comparing price data from two months before the MUP (July and September 2018) with data three months after the MUP (October to December 2018). They analysed alcohol price data and product information (e.g., product name, alcohol content, volume) from Liquorland and BWS's online catalogues for six types of alcoholic beverages (beer, bottled wine, cask wine, spirits, cider and pre-mix). Each beverage price was converted into a price per standard drink (PPSD) and grouped into three different categories based on the July 2018 PPSD: $0.00-$1.30 (low), $1.31-$2.00 (medium), and $2.01+ (high).

The study estimated the impact of the MUP on alcohol prices and wholesale volumes by category of beverage and assessed whether the introduction of the MUP contributed to a reduction in alcohol consumption, focussing particularly on cask wine.

The study also investigated the potential impact of the MUP on a large number of variables that could be affected by the harmful consumption of alcohol, including alcohol related assaults, protective custodies, ambulance attendances, emergency department (ED) presentations, sobering-up shelter (SUS) attendance, alcohol treatment, drink driving, child protection, school attendance, licensing, price monitoring and tourism.

The analysis was conducted for the NT as a whole, as well as by region where possible (Darwin and Palmerston, Alice Springs, Katherine, Tennant Creek and the rest of NT). An interrupted time series analysis was undertaken to assess the impact of the MUP using the itsa module in Stata 15. The MUP intervention was specified as a dichotomous 'event' variable (MUP = 0 pre-MUP and 1 post-MUP). The models also included several control variables to account for other factors that could have impacted prices, namely, a time variable to control for long-term trends, interaction terms for MUP*time to allow for a potential change in the slope of the trend as a result of the MUP, a variable for the number of people on the BDR per month across the NT, and a seasonal effects variable (coded as 0 = May-September (dry season) ; 1= October-December (first half of wet season); and, 2 = January-April (second half of wet season)).

The study found that after the MUP was introduced, the average price per standard drink of cask wine across the NT almost doubled, from $0.70 to $1.30. The prices of other types of alcohol were left relatively unaffected. The study found that, using wholesale supply of alcohol data from NT Licensing for the whole NT, there was a very significant decline in the wholesale supply of cask wine following the introduction of the MUP. This also applied to the Darwin/Palmerston, Katherine and the Rest of the NT regions. In Alice Springs, supply of cask wine was very low prior to the MUP, and no significant change was found after the MUP. However, there was a very significant decline in the supply of bottled wine. In Tennant Creek, there was no significant

[84] Coomber, K., Miller, P., Taylor, N., Livingston, M., Smith, J. and Buykx, P., (2020). Investigating the introduction of the alcohol minimum unit price in the Northern Territory: final report. *Prepared for the Northern Territory Department of Health: Deakin University, Geelong Australia*.

change in the supply of cask wine or any other type of beverage after the introduction of the MUP.

With respect to the impact of the MUP on behavioural and social indicators, the study found that the introduction of the MUP was associated with significant declines in alcohol related assaults, drink driving, child protection notifications, ED presentations and SUS admissions. The study found no significant changes in the number of liquor licenses and tourism numbers. These impacts occurred across all regions in the NT, and the reports concludes that the MUP gave rise to a wide range of benefits to the NT community following its introduction.

The report notes several challenges in evaluating the MUP. Firstly, as the MUP was introduced at around the same time as a suite of other alcohol related interventions (PALIs/POSIs and the BDR), the researchers found it difficult to isolate the impact of the MUP. Secondly, because this study was carried out little over a year after the policy's introduction, it was unable to draw any robust conclusions about the long-term impacts of the MUP.

Members of the same research team published another paper using the same data as in the previous study.[85] This paper focussed on the impact of the MUP on wholesale alcohol supply in the NT. Wholesale supply of alcohol was used as a proxy for alcohol consumption.

The authors posed three hypotheses:

- Hypothesis 1: Quarterly estimates of cask wine consumption would significantly decrease immediately after the introduction of MUP in: i) Darwin/Palmerston and ii) the whole of NT;
- Hypothesis 2: Quarterly estimates of total wine consumption would significantly decrease immediately after the introduction of MUP in: i) Darwin/Palmerston area and ii) the whole of NT; and
- Hypothesis 3: Quarterly estimates of total liquor consumption would significantly decrease immediately after the introduction of MUP in: i) Darwin/Palmerston area and ii) the whole of NT.

The results of the study support all three hypotheses. In 2018-19, the year immediately after the MUP was introduced, there were statistically significant decreases in the consumption of cask wine and total wine compared to 2017-18. Per capita alcohol consumption (PCAC) of cask wine decreased by 48.8% and 50.6% in the Darwin/Palmerston and NT regions, respectively. Similarly, total wine and total liquor PCAC decreased in both in Darwin/Palmerston and the NT regions, though not nearly to the same extent as cask wine. The study found no significant evidence that the MUP affected the consumption of alcoholic beverages not targeted by the MUP.

As in the previous Deakin study, the authors note the challenge of isolating the impact of the MUP from other alcohol related initiatives. They also point out that the data used in the analysis as a proxy for consumption, i.e., wholesale alcohol supply data, may not accurately reflect the actual level of demand for/consumption of alcohol as it does not account for stockpiling, breakage, legal and illegal unrecorded alcohol sales (e.g., black-market and home-brewed alcohol).

[85] Taylor, N., Miller, P., Coomber, K., Livingston, M., Scott, D., Buykx, P. and Chikritzhs, T., (2021). The impact of a minimum unit price on wholesale alcohol supply trends in the Northern Territory, Australia. *Australian and New Zealand Journal of Public Health*, *45*(1), pp.26-33.

Assessment of MUP by community organisations

The Foundation for Alcohol Research and Education (FARE) and the People's Alcohol Action Coalition (PAAC) carried out an evaluation of the MUP one year after the implementation of the MUP. Their report details the year-on-year percentage change in a number of measures relating to alcohol consumption from the pre-MUP to the post-MUP period.[86] [87] The outcome variables include alcohol related assaults, alcohol related domestic violence, and alcohol related Emergency Department (ED) presentations in each of the major centres in the NT.

Overall, the results show that the NT's alcohol reform measures are having a beneficial impact on all reported outcome variables, including a reduction in alcohol related assaults and alcohol related domestic violence. Across the entire NT, alcohol related assaults decreased by 26%, with Alice Springs exhibiting the greatest decrease (43%), and Darwin exhibiting the smallest decrease (16%). The reason put forward in the report for these differences is that in Alice Springs alcohol reform measures have been in place for the longest period (since August 2018), relative to other regions of NT. Further north, alcohol reform measures were introduced later, and the smaller reduction in assaults reflects this.

A wastewater-based assessment of the impact of the MUP in the NT

This study assessed the impact of the MUP on overall alcohol consumption in the NT by testing whether there was a reduction in alcohol in wastewater samples in the NT after the MUP was implemented in October 2018.[88] Wastewater sample data were collected from August 2016 to February 2020 across 66 sites in the NT as well as all other states and territories in Australia.

The results from a linear mixed model showed that there was a significant decline of 38.75% in per capita alcohol consumption immediately after the MUP was introduced in the NT, compared to all other regions in Australia. Other regions in Australia did not experience any decline in alcohol consumption, apart from Queensland which experienced a marginal decline. However, after 15 months, the per capita consumption of alcohol returned to the pre-MUP consumption level.

The authors outlined several limitations of the study, including that there were limited numbers of daily wastewater samples from all catchment areas and the precision of estimates were poorer in the NT because of the smaller populations in its catchment areas. As a result, there is uncertainty around the estimated decline in population alcohol consumption in the NT. The researchers also did not take into account the seasonal variation in alcohol consumption in the NT.

86 Foundation for Alcohol Research and Education (FARE) and the People's Alcohol Action Coalition (PAAC) (2019), *Northern Territory Alcohol-Harm Reduction Report*.

87 Pre-MUP is defined as the period from 1 October 2017 to 31 July 2018, and post-MUP from 1 October 2018 to 31 July 2019.

88 O'Brien, J. et al (2021), A wastewater-based assessment of the impact of a minimum unit price (MUP) on population alcohol consumption in the Northern Territory, Australia, *Addiction*, 117, 243–249.

Studies of MUPs in other jurisdictions

In other parts of the world, MUPs have been introduced in Scotland, the Republic of Ireland, eastern Europe, Wales, Canada and the USA. In these regions, the primary objective of the MUP is to reduce self-inflicted alcohol related harms.

Scotland and Wales

In Scotland, a MUP was introduced on 1 May 2018 set at £0.50 per unit (10ml or 8 grams) of alcohol. An initial investigation into the immediate impact of the MUP in Scotland on household alcohol purchases found that the MUP was associated with a price increase of 0.64p per gram of alcohol and a reduction in weekly alcohol purchases of 9.5g per adult in a single household.[89] The increase in purchase price was greater in lower income households and in households that purchased the most alcohol. Overall, the study found that the MUP achieved its objective of only reducing the amount of alcohol purchased by households that bought the most alcohol in Scotland, leaving households which consumed moderate levels of alcohol unaffected. The authors undertook controlled, interrupted time series analyses of the impact of MUP on Scottish household purchases, using purchases made by English households as control for possible time varying confounders that occurred during the study period, and purchases made in northern England to control for potential cross border effects. Household purchase data was sourced from Kantar Worldpanel's (KWP) consumer panel covering the four years from 2015 to 2018. As a result, the study is only able to evaluate the impact of the MUP in the eight months following the MUP's introduction and does not consider any long-term impacts. Another limitation of the paper is that it does not consider the changes in alcohol related health and socioeconomic outcomes.

A study by NHS Health Scotland provides a descriptive analysis of the impact of the MUP for the 12-month period since the MUP's implementation in Scotland.[90] The paper relied on weekly off-trade alcohol sales data for Scotland and England and Wales from Nielson, for the period May 2011 to May 2019. The volume of alcohol sold (litres) was provided across eight alcohol types: spirits, wine, beer, cider, ready to drink beverages (RTDs), perry, fortified wine and 'other'. Category-specific data for the percentage alcohol by volume (ABV) provided by data suppliers was used to determine the pure alcohol volume for each category of drink. The results show that consumption was decreasing even prior to the MUP, as the volume of pure alcohol sold per adult in Scotland declined from 7.4 litres per adult in 2017/18 to 7.1 litres per adult, a 3.6% decrease compared with the previous year. By contrast, per-adult alcohol sales in England and Wales rose from 6.3 to 6.5 litres per adult, a 3.2% annual increase, over the same 12-month period post-MUP in Scotland.

Public Health Scotland also commissioned a more advanced statistical analysis to evaluate the impact of the MUP on off-trade alcohol sales in Scotland after its first year of implementation.[91] In this study, off-trade alcohol sales are used as a proxy for alcohol consumption. Weekly alcohol

89 O'Donnell, A., Anderson, P., Jané-Llopis, E., Manthey, J., Kaner, E. and Rehm, J., (2019). Immediate impact of minimum unit pricing on alcohol purchases in Scotland: controlled interrupted time series analysis for 2015-18. *bmj*, *366*.

90 Giles, L., Robinson, M., & Beeston, C. (2019). Minimum Unit Pricing (MUP) for alcohol evaluation. *Sales-based consumption: a descriptive analysis of one-year post-MUP off-trade alcohol sales data*.

91 Robinson, M., Mackay, D., Giles, L., Lewsey, J., Richardson, E. and Beeston, C., (2021). Evaluating the impact of minimum unit pricing (Mup) on off-trade alcohol sales in Scotland: an interrupted time–series study. *Addiction*, *116*(10), pp.2697-2707.

sales estimates in Scotland, England and Wales, North East England and North West England from January 2013 to May 2019 were sourced from Nielson and converted to standard drinks by category. As in O'Donnell et al (2019), this study also uses controlled interrupted time-series regression to evaluate the MUP and uses sales in England and Wales as a control group. The paper concludes that the MUP in Scotland was associated with a 3.5% reduction in off-trade alcohol sales per adult. The reduction in alcohol sales was driven by reduced purchases of spirits, cider and perry. By contrast, there was a 2.4% increase in sales over the same time period in England and Wales.

Another study, published in 2021,[92] assessed the medium-term impacts of the MUP in Scotland and the immediate impacts of the MUP in Wales. A MUP, also set at £0.50 per unit (10ml) of alcohol, was introduced in Wales on 2 March 2020. Using the same type of daily purchase data sourced from KWP as in O'Donnell et al (2019),[93] the study estimated non-seasonal and seasonal autoregressive integrated moving average (ARIMA) models. Purchases made by households in neighbouring regions were used to control for the impact of COVID-19 lockdowns (northern England as a control for Scotland and western England as a control for Wales).

The study found that, in Scotland, the price increases and purchase decreases in alcohol in the eight months following the MUP's introduction in 2018 observed in the previous study were maintained during the first half of 2020. The increase in the purchase price of alcohol was maintained in the first half of 2020 (two years-post MUP in Scotland) and was associated with a 7.6% decrease in the mean price per gram of alcohol in Scotland.

In Wales, the introduction of the MUP had a similar immediate impact in Scotland; alcohol prices increased immediately, and alcohol purchases fell.[94] The MUP was associated with an 8.2% increase in price per gram of alcohol and an 8.6% decrease in the quantity of alcohol purchased, controlling for changes in western England and using data from March to July 2020.

Public Health Scotland also commissioned Manchester Metropolitan University to evaluate the impact of the MUP on crime and disorder, public safety and public nuisance in Scotland.[95] The evaluation relied on crime data from Police Scotland and Greater Manchester Police to generate several output measures at a variety of geographical and temporal scales. A range of statistical methods were used, including change point detection analysis, uncontrolled interrupted time series analysis (regression with ARIMA errors), Integrated Nested Laplace Approximation (INLA) and a synthetic control. The data covered the period from January 2015 to January 2020 to avoid any influence of COVID-19 on the data. The study found that alcohol related crime, disorder and public nuisance in Scotland were declining prior to the MUP and that there was no statistically significant change in trend direction or level found for all alcohol related crime and disorder and alcohol related incidents, associated with the MUP.

92 Anderson, P., O'Donnell, A., Kaner, E., Llopis, E.J., Manthey, J. and Rehm, J., (2021). Impact of minimum unit pricing on alcohol purchases in Scotland and Wales: controlled interrupted time series analyses. *The Lancet Public Health*, *6*(8), pp.e557-e565.

93 The study used data from January 2015 to July 2020 but excluding May 2018 to December 2019 due to data limitations.

94 Anderson, P., O'Donnell, A., Kaner, E., Llopis, E.J., Manthey, J. and Rehm, J., (2021). Impact of minimum unit pricing on alcohol purchases in Scotland and Wales: controlled interrupted time series analyses. *The Lancet Public Health*, *6*(8), pp.e557-e565.

95 Krzemieniewska-Nandwani, K., Bannister, J., Ellison, M. and Adepeju, M., (2021). Evaluation of the impact of alcohol minimum unit pricing (MUP) on crime and disorder, public safety and public nuisance.

Frontier Economics Ltd was commissioned by NHS Health Scotland to evaluate the economic impact of the MUP on producers and retailers of alcoholic drinks in Scotland.[96] The study involved carrying out qualitative and quantitative analyses and is divided into three phases: Phase 1 (2018) involved developing a theory of change; Phase 2 (2019) involved data collection and analysis of baseline secondary statistical evidence on the alcohol industry pre-MUP; and Phase 3 (2021-22) involves a refreshed and updated analysis of industry statistical evidence post-MUP. The report presents the results of Phases 1 and 2 of the evaluation. For the quantitative analysis section of the report, Frontier draws on firm-level datasets collected by the Office for National Statistics (ONS) to determine the impact of the MUP on the following outcome variables: number of businesses; total turnover; total employment; total value of output; and total GVA. This report only presents baseline data for the pre-MUP period while Phase 3 will offer insight into the post-MUP impacts. However, the preliminary conclusions from the consultations held with a sub-set of firms that participated were that the overall effect on retailer revenue and prices was small as increased margins compensated firms for decreased volumes sold, although the impact depended on the mix of alcoholic drinks sold pre-MUP.

Most recently, the Scottish Government commissioned NHS Health Scotland to evaluate the impact of Scotland's MUP policy on harmful drinkers. [97] Harmful drinking is defined in the UK as consuming more than 35 units a week of women and more than 50 units for men in a week. [98] The study investigated several areas and compared any changes in Scotland with changes in Northern England (control). These areas included impacts on consumption patterns and purchasing habits of harmful drinkers, any unintended positive or negative effects of the MUP, health impacts, health impacts, family members impacts and responses to MUP via alcohol treatment services.

To examine the MUP's impact on people accessing treatment services and on communities (and families or carers of harmful drinkers), the study relies on survey data and qualitative interviews with relevant stakeholders. To determine the impact of MUP on levels and patterns of harmful drinking in Scotland, the researchers use statistical techniques to analyse time series data from a long-running market research survey. To do this, the study used individual-level survey data, collected over a 12-year period, within a controlled interrupted time series design. The data was sourced from Alcovision (survey conducted by Kantar). Alcovision used a behavioural survey as well as a one week drinking diary to collect information on the drinking behaviours of 30,000 adults in Great Britain, annually.

The analysis used Seasonal AutoRegressive Integrated Moving Average (SARIMA) models to estimate the impact of MUP on each set of outcomes: proportion of adults consuming alcohol at harmful levels, and ten secondary outcomes including examining consumption at lower levels, the types of alcohol consumed, and number of units consumed per occasion. However, the plan to examine the impact of the MUP on health outcomes of harmful drinkers was incomplete and therefore not discussed in the report.

Overall, the paper found that alcohol dependent drinkers paid more for drinks post-MUP compared to pre-MUP and there is evidence suggesting that harmful drinkers switched from consuming stronger ciders to spirits, as a result of the MUP. However, there was no evidence to

96 Frontier Economics Ltd (2019), *Minimum Alcohol Pricing - Evaluating the impacts on the alcoholic drinks industry in Scotland: baseline evidence and initial impacts*.

97 Public Health Scotland (2022), *Evaluating the impact of Minimum Unit Pricing in Scotland on people who are drinking at harmful levels.*

98 1 unit = 10 ml or 8g of pure ethanol

suggest that the MUP led to an overall decrease in consumption among harmful drinkers or those with alcohol dependence. Further, the study found that MUP led to increased financial strain for alcohol dependent drinkers as they would reduce spending in other areas to be able to maintain their alcohol consumption habits.

Ireland

In the Republic of Ireland, a MUP, set at €1 per standard drink (10 grams of pure alcohol), was introduced on 4 January 2022. However, as the MUP was only introduced recently, no studies have been conducted on its impact.

Canada

All 13 provinces and territories in Canada have some form of minimum pricing on alcohol. However, there is huge variation in the way minimum prices on alcohol are set across the country. Most provinces in Canada have some form of government control over alcohol distribution.[99]

In the Canadian province of Saskatchewan, [100] for example, the Saskatchewan Liquor and Gaming Authority (SLGA) introduced minimum prices for alcohol on 1 April 2010 which vary according to the alcoholic strength of alcoholic beverages. The average minimum price per standard drink (17.05ml of pure alcohol) in April 2010 was CAD$1.37 for a 750ml bottle of spirits with 35% to 44.9% of alcohol content, but CAD$1.84 for a 750ml bottle of liqueur with less than 22.9% alcohol. The MUP ranged between $1.16 and $1.84 per standard drink.

Stockwell et al (2012)'s paper aimed to report the impacts on alcohol consumption following the increased minimum alcohol prices in Saskatchewan, Canada, in April 2010. The study found that a 10% increase in minimum prices was associated with an 8.4% decrease in total alcohol consumption. In particular, the consumption of high strength beer (beer containing more than 6.8% alcohol volume) and wine exhibited the greatest decline. Autoregressive integrated moving average (ARIMA) time series analyses of alcohol sales and price data from 2008/09 through to 2011/12 were conducted.

Compared to Saskatchewan, British Columbia (BC) has relatively low minimum prices per standard drink across all beverage types. Stockwell et al (2012) assessed the impacts of changes in minimum alcohol prices in BC using alcohol prices and sales data from 1989 to 2010 provided by the BC Liquor Distribution Branch. [101] The study used ordinary least squares (OLS) to estimate coefficients and natural log transformations were conducted on the dependent variable of per capita consumption in all models. The longitudinal models estimated that a 10% increase in minimum price of an alcoholic beverage reduced its consumption relative to other beverages by 14.6-16.1%. Further, time series estimates showed that a 10% increase in minimum prices reduced spirits and liquor consumption by 6.8%, wine by 8.9%, beer by 1.5% and all alcoholic types by 3.4%.

99 Thomas, G., (2012). Price policies to reduce alcohol related harms in Canada: Current context and recommendations for targeted policies. *Ottawa, Ontario, Canada: Canadian Centre on Substance Abuse*.

100 Stockwell, T., Zhao, J., Giesbrecht, N., Macdonald, S., Thomas, G. and Wettlaufer, A., (2012). The raising of minimum alcohol prices in Saskatchewan, Canada: impacts on consumption and implications for public health. *American journal of public health*, *102*(12), pp.e103-e110.

101 Stockwell, T., Auld, M.C., Zhao, J. and Martin, G., (2012). Does minimum pricing reduce alcohol consumption? The experience of a Canadian province. *Addiction*, *107*(5), pp.912-920.

A separate study investigated the relationship between minimum alcohol price increases and hospital admissions in British Columbia found that a 1% increase in minimum price was associated with a 1.3% reduction in total chronic alcohol related hospital admissions two years later and a 1.6% reduction in acute alcohol related hospital admissions immediately.[102]

Other jurisdictions

Selected states in the USA, Russia, Moldova, Ukraine and Uzbekistan also have some form of minimum alcohol pricing in place. [103]

Impact of COVID-19 on alcohol consumption and alcohol related harms

Public Health Scotland investigated how the COVID-19 pandemic impacted alcohol sales and alcohol related health harms in Scotland. [104] COVID-19 restrictions limited the availability of alcohol for consumption on licensed premises (e.g., pubs, clubs, restaurants) in Scotland in 2020 and 2021. The paper found that total alcohol sales (litres of PCAC) were 9% and 16% lower than the 2017-19 average in 2020 and 2021, respectively. As expected, on-trade alcohol sales were affected dramatically, with sales being 66% and 95% lower than the 2017-19 average in 2020 and 2021, respectively. However, this was offset to some extent by increases in alcohol sales in off-trade premises of 13% and 15% compared to the 2017-19 average in 2020 and 2021, respectively.

The decrease in total alcohol sales during the COVID-19 restriction period was driven by lower beer sales as beer is typically consumed in on-trade premises. Sales of spirits, wine, cider and perry also decreased during the pandemic. However, sales of fortified wine and ready-to-drink beverages increased.

With respect to alcohol related harms, the study found that alcohol related hospital stays fell the most during the periods when the most stringent COVID-19 restrictions were in place. There was a 7.3% decrease in alcohol related hospital stays in 2020 compared to the 2017-19 average.

Studies of other alcohol related interventions in the NT

Reviews of the NT Banned Drinker Register

The NT Health commissioned the Menzies School of Health Research to carry out reviews of the BDR in the NT six-months and 12-months post-implementation and subsequently Ernst & Young (EY), to evaluate the BDR 24-months post implementation.

102 Zhao, J. and Stockwell, T., (2017). The impacts of minimum alcohol pricing on alcohol attributable morbidity in regions of British Colombia, Canada with low, medium and high mean family income. *Addiction*, *112*(11), pp.1942-1951.

103 Stockwell, T. and Thomas, G., (2013). Is alcohol too cheap in the UK? The case for setting a Minimum Unit Price for alcohol. *Institute of Alcohol Studies http://www. ias. org. uk/uploads/pdf/News% 20stories/iasreport-thomas-stockwell-april2013. pdf*.

104 Richardson, E., Giles, L., & Fraser, C. (2022). Alcohol sales and harm in Scotland during the COVID-19 pandemic.

In the first review of the BDR, [105] six-months post-implementation, a mixed-methods approach was adopted to evaluate the BDR. This involved the following: performing descriptive analysis of administrative data relating to the BDR; desktop audit of the planning processes (e.g., utilisation of the program funding) and key informant interviews with relevant stakeholders. While the report summarises alcohol related data series from September 2017 to February 2018, including data on alcohol related assaults, drink driving, alcohol-attributable ED presentations and SUS admissions, it notes that six-months is too early for significant behavioural change to be measured as a result of the BDR.

In December 2018, the first part of the second review of the BDR was published, [106] approximately 12 months post-BDR implementation. The evaluation was divided into two phases: Part 1 involved the NT Government preparing the quantitative and descriptive analyses of relevant administrative data; and Part 2 focused on the qualitative evaluation of the BDR via stakeholder consultations.

The first part of the 12-month BDR evaluation includes a latent class analysis examining shared characteristics noted among particular groups of people on the BDR in relation to their engagement with the justice system in the NT and the health system (specifically alcohol related ED presentations, SUS admissions and alcohol treatment services. The review found that of the 3,682 individuals on the BDR on 31 August 2018, 93% were banned due to alcohol related contact with the NT justice system (either primarily of the non-criminal type such as protective custody or infringement, or the criminal type such as apprehension or prison). The BDR may have positively impacted some individuals as 40% of those with predominantly non-criminal alcohol related events in the year prior to the BDR had no alcohol related events in the justice system in the year post-BDR implementation. Overall, the BDR is found to have primarily impacted individuals who have relatively frequent alcohol related contact with the justice system. In relation to the health system, there is considerable regional variation in alcohol related ED presentations since the BDR as presentations in Royal Darwin Hospital declined slightly immediately post-BDR whilst Tennant Creek Hospital's presentations decline only in February 2018. The evaluation notes that the introduction of other alcohol and health and social policy interventions may have also impacted ED presentations.

Subsequently, EY published a review of the BDR 24-months post-implementation,[107] which examined the 24-month outcomes of the BDR. The evaluation involved a review of relevant policy documents, analysis of administrative data, stakeholder consultations and two online surveys of Therapeutic Service Providers and Licensed Premised Managers. Similar to the previous reviews of the BDR, a latent class analysis was carried out to classify individuals on the BDR by types of contacts with the justice system e.g., criminal contact, non-criminal contact etc. The results showed that over 57% of the individuals who had predominantly criminal contact with the justice system prior to the BDR had no further recorded alcohol related contact after being placed on the BDR. However, it is noted that this figure may be inaccurate as some individuals may have left the NT, been incarcerated, or relocated to an area where they are less likely to engage with the justice system for alcohol related events. The report emphasises that analysis of the

105 Smith, J. and Adamson, E., (2018). Process evaluation of the banned drinker register in the Northern Territory. *Menzies School of Health Research: Darwin.*

106 Department of Health. (2019). Twelve-month evaluation of the Banned Drinker Register in the Northern Territory Part 1-Descriptive analysis of administrative. and Part 2–A qualitative analysis of selected stakeholder perspectives

107 Ernst & Young (EY) (2020), *Medium term (24 months) outcomes and impacts of the Banned Drinker Register*, A report for NT Department of Health.

administrative data may be limited because of multiple alcohol related policy interventions occurring simultaneously.

In a study undertaken by the Menzies School of Health Research, industry stakeholders were interviewed to gain insight into the extent to which the Banded Drinkers Register (BDR) is achieving its objectives of reducing alcohol related harms.[108] The interviews (as well as one focus group) involved 66 alcohol industry stakeholders across urban and rural locations in the NT. The purpose of the interviews was to understand the BDR's effectiveness in reducing crime and improving safety, as well as health and therapeutic support for individuals from the perspective of industry stakeholders.

There were mixed views about the BDR's effectiveness in reducing antisocial behaviour and crime, and in improving public amenity. Some participants acknowledged the positive aspects of the BDR as a tool to prevent crime. But some participants expressed the view that the BDR led to increases in theft and break-ins of both licenses premises and residences to obtain alcohol for banned drinkers. Further, some participants attributed changes to public amenity and antisocial behaviour to the impact of the BDR on the secondary supply of alcohol in the NT. Tourists and taxi drivers were flagged as two groups of people who potentially facilitated the secondary supply of alcohol to individuals on the BDR.

A key limitation of this study is the absence of views from other stakeholder groups, including banned drinkers (and their relatives), health professionals and other government stakeholders.

Secondary supply of alcohol in the NT

NT Health commissioned the Menzies School of Health to examine the distinctiveness of secondary supply in the context of the BDR, as well as in the broader context of alcohol consumption in the NT.[109] The researchers relied on interviews from previous studies to determine how and why addressing the secondary supply through the BDR poses complex challenges.

Secondary supply is the act of supplying alcohol to a banned person who is on the BDR. The study categorises the secondary supply of alcohol as either 'sharing' between friends and family, or alcohol being sold to banned persons for profit. Interviewees highlighted how easy it is for people on the BDR to request a family member, friend or a member of the general public to purchase alcohol for them. In addition, licensed premises face challenges in restricting alcohol purchases to individuals on the BDR, as individuals on the BDR can still go to bars and pubs to drink. However, the study found that some premises were actively restricting individuals if they were aware of the individual being on the BDR.

Data collected from the interviews identified key barriers to the effectiveness of the BDR in accurately identifying and confirming that secondary supply has taken place. To determine whether secondary supply has occurred, multiple transactions in the supply process need to be accurately identified: at the point of sale; at the point of transfer to the banned person; and at the point of consumption by the banned individual. The study concludes that the key barrier to determining whether secondary supply of alcohol has occurred is the challenge faced by a

108 Adamson E. et al (2021), Industry views about the Banned Drinker Register in the Northern Territory: Early lessons from a qualitative evaluation, *Drug and Alcohol Review*, 40,

109 Adamson E. et al (2021), Understanding the secondary supply of alcohol as a wicked policy problem: The unique case of the Banned Drinker Register in the Northern Territory, *Australian Journal of Public Administration*, 80, 283–299.

person of authority to confirm whether the recipient and consumer at the end of this chain of transactions is on the BDR.

A disproportionate number of Aboriginal people are on the BDR. Given that approximately 30% of the NT population identify as Aboriginal and Torres Strait Islanders, it would therefore seem important to consider Aboriginal cultural values such as sharing of resources, which directly link to the challenge of addressing the secondary supply of alcohol in Aboriginal communities. It is a limitation of this study that the data only represents the views of takeaway bottle shop owners and managers, and not members of the Aboriginal community.

Sobering Up Shelters

Prior to the introduction of the MUP, PriceWaterhouseCoopers' Indigenous Consulting unit (PIC) was commissioned by NT Health to carry out a review of Sobering Up Shelters (SUS) in the NT. PIC worked together with the NT Health's Mental Health, Alcohol and Other Drugs Branch (MHAODB) team to hold workshops with relevant stakeholders.

The review includes key findings and recommendations on a site-by-site basis.[110] It focuses on identifying opportunities for improving SUS, determining whether current infrastructure is adequate, developing a high-level SUS service model, and determining whether the current screening tool is appropriate.

As of October 2017, there were four different service providers operating SUS in five areas: Alice Springs, Tennant Creek, Katherine and Darwin, and Nhulunbuy. One provider (Mission Australia) operated SUS in two areas (Katherine and Darwin); in the other three areas, SUS were operated by a single provider.

The operating model at the time had three main mechanisms of referral to a SUS – referral and transportation to the SUS by police (58%), by night/day patrol (27%) and self-referral (14%). Other methods included referrals via relatives or community members. The review found that there was a total of 96 SUS beds across all five locations. On average across the NT, 32 people stayed in an SUS on any given night. Of these, 99% were Indigenous, 57% were women and 81% were people who have previously stayed in a SUS.

Examples of some of the key recommendations and possible enhancements made by PIC include that the MHAODB should coordinate and organise regular workshops with all stakeholders to ensure a coordinated Alcohol and Other Drug (AOD) service systems approach that is consistent with current guidelines. Additionally, the review encourages SUS service providers to collect more information on how many clients are registered on the BDR and to report this as part of performance reporting.

Other alcohol related studies

Alcohol excise taxes as a percentage of retail alcohol prices

This study examined alcohol excise taxes as a percentage of final retail prices of alcoholic beverages (beer, wine and liquor) sold in stores in 26 OECD countries (including Australia) from

[110] PWC Indigenous Consulting (2018), *Review of the Northern Territory Sobering Up Shelters*, A report for the NT Department of Health.

2003 to 2018. [111] The analysis relied on the Economist Intelligence Unit (EIU) for a sample of alcoholic beverage price data for a range of brands of beer, wine and each type of liquor (Cognac, Gin, Liqueur and Scotch) across various cities over the study period, and information on OECD excise taxes of various alcoholic beverages from OECD's Tax database, to determine trends in the percentage of excise taxes in alcohol retail prices. For each country, the percentage of excise taxes in prices was calculated as a ratio of excise taxes to prices at three different price levels: maximum price, mean price and minimum price for beer and wine, and at a high end and low end for liquors. The researchers employed fractional logit regressions to determine the percentage of excise taxes over time.

The results showed that in most OECD countries, the excise tax as a percentage of beer and wine prices (tax burden) was lower than 30%. 89% of OECD countries had excise taxes which accounted for less than or equal to 25% of beer prices at the maximum level. Similarly, in 19 out of 20 countries, excise taxes accounted for less than or equal to 25% of average wine prices. In majority of the sample, the proportion of excise tax remained relatively unchanged over time. In Australia, excise taxes accounted for 56% of scotch and liqueur prices at the high end, and 63% at the low end.

One of the limitations highlighted by the authors is that the EIU data only surveys alcohol prices in major cities and does not consider prices in rural areas.

Demand for alcohol treatment services in the NT

The NT Government commissioned the Menzies School of Health Research, the University of New South Wales and the Aboriginal Medical Services Alliance Northern Territory (AMSANT) to carry out a study of the demand for alcohol treatment services in the NT. The study provides an assessment of how much treatment was provided to individuals at the time of the study and how much should be provided to meet demand. [112] It also discusses the challenges and opportunities associated with the planning and delivery of alcohol treatment services in the NT.

The study found that, out of the total 42,871 episodes of care in the NT in 2016/17, 41% of treatments were provided by ACCHOs (Aboriginal Community Controlled Health Organisation), 18% by GP, 16% by self-help,13% by SUS and the remaining 12% were provided in specialist settings including specialist NGOs.

However, given that most people receiving alcohol treatment will undergo multiple episodes of care or be admitted to a SUS or an ACCHO more than once in a year, the total episodes of care in a year differs from the number of people receiving treatment. As a result, to determine the number of people receiving treatment within each service, the researchers converted number of episodes into number of individuals within each dataset by applying various assumptions and arrived at a figure of 11,782 individuals receiving alcohol treatment in the NT across all treatment services. Noting that this figure does not represent the number of unique individuals receiving alcohol treatment in the NT in any one year (there is double counting of individuals), further assumptions about treatment pathways and any one individual's movements between treatment settings over the course of a year were made to determine the number of unique treatment recipients. By applying assumptions which varied across different datasets (e.g., 75% of

[111] Ngo, A.P., Wang, X., Slater, S., Chriqui, J.F., Chaloupka, F.J., Yang, L., Smith, L., Li, Q. and Shang, C., 2021. Alcohol excise taxes as a percentage of retail alcohol prices in 26 OECD countries. *Drug and Alcohol Dependence*, *219*, p.108415.

[112] Stephens, D. et al (2019), *Demand Study for Alcohol Treatment Services in the NT*, Report prepared for the Northern Territory Government.

individuals on the SUS dataset do not receive any other services in that year to determine a 'high' scenario; and 50% of individuals on the same SUS dataset do not receive any other services in that year to determine a 'low' scenario), the results suggest that between 6,400 ('low' scenario) and 7,997 ('high' scenario) individuals receive treatment in the NT in any one year for alcohol related problems. The researchers highlighted the challenges faced in removing double-counting of individuals between data sources to determine the extent to which individuals seek care from multiple services either simultaneously or within the same year.

Further, the study found that the gap between the number of people who are currently receiving alcohol treatment in the NT and the projected total demand for treatment is relatively small. For instance, the modelled projection of total demand for alcohol treatment (excluding screening and brief intervention for withdrawal, counselling, rehabilitation) in any one year was between 5,723 and 7,745 people, which was consistent with the number of people who were receiving alcohol treatment in the NT at the time of the study. However, there is large unmet demand for screening and brief intervention (mostly delivered in non-specialist treatment settings by GPs, primary health care providers etc), in the range of 18,500 to 19,000 people. Overall, the paper finds that more treatment capacity is required to respond to mild and moderate alcohol treatment needs.

The study relied on the Drug and Alcohol Planning Model (DASPM), a national planning model developed in 2013, to estimate demand for alcohol treatment in the NT. The authors note that there are significant limitations to the DASPM and its NT demand projections. Examples of limitations with the model include the definition of 'diagnosis' within DASPM; there are likely individuals who may require, or may already receive treatment, who do not formally meet the DASPM diagnostic criteria for alcohol use disorder.

Further, the model does not carry out any gender–specific analysis. Given the known differences in treatment between males and females, this could affect forecasts of future demand for treatment services. The paper notes that a survey of alcohol use disorder in the NT to establish accurate population prevalence estimates would have been valuable and should be considered in future studies.

Patterns of drinking amongst Indigenous Australians

The Grog Survey Application was developed to collect self-reported alcohol use data from Indigenous Australians to address the prior challenges faced in obtaining accurate data relating to the alcohol consumption habits of Indigenous communities in Australia. This paper describes the drinking patterns (including preferred types of alcohol) reported by a stratified sample of Aboriginal and Torres Strait Islander communities.[113] The sample consisted of 263 Indigenous Australians (44.1% female) from four communities (1 urban Queensland; 3 remote/regional South Australia). The sample was stratified by the levels of alcohol consumed and found that individuals from non-remote areas (55%) were significantly more likely to consume alcohol at levels which place them at short-term risk of harms from drinking compared to those in remote areas. The results showed that beer (60.7%), premix (46.6%) and spirits (19.9%) were consumed by most drinkers and remote drinkers were 2.6 times more likely to report beer. Overall, most people either consumed nothing (21.7%) or consumed alcohol in quantities which placed them at short- (95.6%) or long-term risk (47.8%) of harms.

[113] Lee, K.S., Conigrave, J.H., Wilson, S., Perry, J., Hayman, N., Zheng, C., Al Ansari, M., Doyle, M., Room, R., Callinan, S. and Chikritzhs, T., (2019). Patterns of drinking in Aboriginal and Torres Strait Islander peoples as self-reported on the Grog Survey App: a stratified sample. *BMC medical informatics and decision making*, *19*(1), pp.1-11.

Box 4: Cardiff Model

The Cardiff Violence Prevention Model provides a framework for hospitals, law enforcement agencies, public health agencies, community groups, and other relevance stakeholders to develop collaborative violence prevention strategies.

The model introduces the concept of data sharing between relevant community stakeholders such as healthcare providers and law enforcement to help facilitate solutions to violence such as changes in the environment of violent places e.g., increased streetlights and more pedestrian-friendly streets or policy changes e.g., switching from glass to plastic barware in pubs.

The basis of the model is information sharing. In healthcare settings, violence-related injury data including location, time, date and mechanism of injury are collected. This information is shared with law enforcement to help communities map where violence frequently occurs. However, personal information (i.e., name, date of birth) is not collected, shared or used.

A study[114] compared violence outcomes in Cardiff, Wales with 14 similar cities and found that Cardiff experienced a 32% reduction in assaults and a 42% reduction in hospital admissions for violence-related injuries.

Source: Centers for Disease Control and Prevention (CDC) (2018) Cardiff Model Toolkit: Community Guidance for Violence Prevention

[114] Florence, C., Shepherd, J., Brennan, I., & Simon, T. (2011). Effectiveness of anonymised information sharing and use in health service, police, and local government partnership for preventing violence related injury: experimental study and time series analysis. *Bmj*, *342*.

D Quantitative data sources

The table below presents a summary of our datasets and the respective agencies that provided us with the data.

Table 11: Summary of datasets

Agency	Datasets
Retailers	Retail price and quantity data from source 1 – Weekly average sale data by product ID and store for period January 2016 to the week starting January 2022, across Darwin, Alice Springs, Katherine and Nhulunbuy Retail price and quantity data from source 2 – Monthly average sale data by product ID for period April 2017 to April 2022, across Darwin and Alice Springs
Wholesaler	Wholesaler alcohol supply – Weekly average sale data by product ID and customer type for period January 2014 to the week starting January 2022 across the Northern Territory
Licensing NT	Wholesale alcohol supply – Quarterly basis from quarter ending March 2014 to quarter ending December 2020 for regions: Alice Springs, Darwin, Katherine, Nhulunbuy, Palmerston, Tennant Creek and the rest of NT. Liquor licences – Annual basis from year ending June 2015 to year ending June 2021 for the entire NT only.
NT Police and the Department of the Attorney-General and Justice	Alcohol related assaults and DV – Monthly data ranging from July 2013 to November 2021 for the entire NT only. Protective custody episodes – Annual data from calendar year 2014 to 2021 for Alice Springs, Darwin, Katherine, Palmerston, Nhulunbuy, Tennant Creek and rest of NT. Drink driving crashes – First dataset contains individual-level data with information including geographical coordinates of crashes and the BAC ranges of drivers. The data ranges from January 2014 to January 2022 for up to nine regions in the NT including Alice Springs and Darwin. Second dataset contains annual drink driving apprehensions and infringements by levels of severity with demographic data from 2013 to 2021 for the entire NT.
NT Department of Health	Alcohol related ED presentations – Monthly data from January 2013 to December 2021 for six hospitals across regions of the NT, including Alice Springs and Darwin.

	SUS attendance – Individual-level data containing demographic information, ages, admission time etc. The time period of the data ranges from 1 January 2014 to 31 December 2021 and data is categorised by shelter in the NT i.e., Alice Springs, Darwin, Katherine, Nhulunbuy and Tennant Creek. Alcohol related child protection substantiations – Monthly data from December 2015 to January 2022 categorised by the following NT regions: Alice Springs, Barkly, Big Rivers, East Arnhem, Greater Darwin and Top End.
NT Department of Education	School attendance – Attendance rate data provided by term from Term 1 2015 to Term 2 2021 categorised by levels of region remoteness: provincial, remote or very remote.
Department of Industry, Tourism and Trade	Tourism – Annual number of visitors and tourism expenditure from financial year 2013/14 to 2020/21, categorised by domestic and international traveller to the NT in six NT tourism regions: NT-wide, Darwin, Barkly, Alice Springs, Litchfield, Katherine and Lasseter. Expenditure figures are given in nominal terms.
Department of Industry, Tourism and Trade	GRP and GVA – Data from Economy ID showing annual GRP and GVA for different LGAs (including Alice Springs Town Council LGA and City of Darwin LGA) in the NT from year ending June 2001 to year ending June 2021.
Department of Industry, Tourism and Trade	Unemployment rate – Data from Labour Market Insights (Australian Government) consisting of quarterly unemployment rates for the Darwin region from April 2007 to April 2022.

Source: Frontier Economics

Population data

We present results pertaining to the entire NT on a per 10,000-population basis. We use estimated resident population (ERP) data of individuals 15 years and above in the NT, collected from the ABS from 2014 to 2020 (most recent year of data available). In the Deakin studies, the researchers also use data of individuals 15 years and above and present data on a 10,000-population basis for individual regions of the NT. Following discussions with stakeholders, we understand that individuals within the NT frequently travel between regions, as a result, it would be best practice to only use population data when studying the NT as a whole. We used linear extrapolation to estimate the 15+ population data for 2014/15 and 2020/21 as the data was unavailable on the ABS.

Table 12: NT-wide population data

	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21
Ages 15 and above	189,588	191,382	192,080	193,695	193,688	193,322	193,687
Total	242,894	244,692	245,678	247,517	247,058	246,143	246,235

Source: ABS, ERP by SA2 (ASGS 2016), Age and Sex, 2001 Onwards

Retail alcohol data

Retail sales data were provided by two major liquor retailers operating in the Northern Territory. The data consisted of excel files containing weekly sales data from January 2016 to December 2022 from one retailer, and monthly sales data from April 2017 to April 2022 from the other retailer. Sales were provided either by store, or by region (e.g., Greater Darwin region). Alcohol content of each product was provided for most products, for those products with incomplete information we used unique product identifiers to extract alcohol content information from retailer websites. Product category information was also provided for products. For each product, time period and location, sales data was provided with the total retail sales quantity and revenue. The data thus allowed derivation of quantity (by standard drinks) and price per standard drink for each product and time period.

We note that while one retailer had data for greater Darwin (i.e., including Palmerston and Humpty Doo), Alice Springs, Katherine and Nhulunbuy, the other only had data for greater Darwin and Alice Springs. Thus, while the data from the two major retailers captured a large proportion of Darwin and Alice Springs, the regional coverage was incomplete.

Wholesaler alcohol data

Wholesale sales data was provided by a major alcohol wholesaler operating in the Northern Territory. The data consisted of weekly sales data from June 2014 to December 2021, with each observations denoting sales of a product to a customer in the Northern Territory. Data included information on the product category, sales revenue and quantity, a description including volume and a product identifier. In some cases, the ABV was contained, facilitating calculation of alcohol content, whereas in others the product identifier was used to obtain content information from websites associated with the wholesaler.

Wholesale alcohol supply

Quarterly wholesale alcohol supply data were provided by NT Licencing for quarter ending March 2014 (Q1) to quarter ending December 2020 (Q4). The data consist of an excel file containing the litres of pure alcohol content (PAC) for different types of alcohol. The types of alcoholic beverages in the dataset include cask wine, bottle wine, fortified wine, cider, standard spirits, mixed spirits, low strength beer, mid strength beer and full-strength beer across the NT. Note that the data represents the amount of alcohol in wholesale supply and not the amount of alcohol sold by licensees. The data was categorised by the following locations: Alice Springs, Darwin, Katherine, Nhulunbuy, Palmerston, Tennant Creek and NT Balance.

Alcohol related assaults and DV

Monthly offences data containing the number of police recorded alcohol related assault offences each month categorised by domestic violence (DV) offences and non-DV offences. For each of these categories, the data can also be split by alcohol involvement, no alcohol involvement or

unknown. No demographic data is available for this dataset as it details the count of offences and not the number of individuals involved. The data ranges from July 2013 to November 2021. The data was only provided for the entire NT and not split by region in the NT.

Drink driving crashes

Two excel files on road traffic crashes were provided to us: annual number of drink driving apprehensions and infringements recorded by levels of severity from 2014 to 2021 (NT-wide data only) and monthly data on the individuals involved in crashes in the NT from January 2014 to January 2022. The first dataset includes demographic data on the gender and aboriginal status of those apprehended and who received infringements across the NT. Infringements are received for less "serious" offences, where the relevant legislation indicates that the offence can be dealt with via an infringement. Conversely, an apprehension suggests the Police issue formal charges and require the individual to appear in court to answer those charges. The second dataset provides detailed information on the individuals involved in a crash, including the coordinates of where the crash occurred, whether or not alcohol was involved, whether or not the individual involved was the driver, what the BAC range of the driver was and whether or not the crash resulted in any fatalities.

Alcohol related ED presentations

Monthly number of alcohol related ED presentations were obtained for the period January 2014 to December 2021. The dataset included the number of presentations recorded at the following hospitals in the NT: Alice Springs Hospital, Gove District Hospital, Katherine Hospital, Palmerston Regional Hospital, Royal Darwin Hospital and Tennant Creek Hospital. We were not provided with details of the diagnosis or demographic data. Note that the Palmerston Regional Hospital ED opened on 27 August 2018 and therefore the number of ED presentations in the Darwin and Palmerston region may have increased as a result of this.[115]

Sobering Up Shelter (SUS) attendance

SUS individual-level data were provided for the period 1 January 2014 to 31 December 2021. This dataset details the SUS in which region the individual attended (Alice Springs, Darwin, Katherine, Nhulunbuy and Tennant Creek), date and time of admission/discharge, demographic information (gender, Indigenous status, age) and the admission referral method. Note that an increase in SUS attendance does not necessarily suggest that problem drinking is worsening, instead, it could suggest that more individuals are seeking help at SUS or that watchhouse admissions have decreased. Additionally, the number of individuals admitted to SUS is controlled by the staff in individual SUS who can decide whether or not they want to turn an individual away. SUS admissions also depend on the maximum capacity of an individual SUS. For instance, the maximum number of beds available a week at the Darwin SUS is approximately 280 whilst in Nhulunbuy, it is 24[116].

Alcohol related child protection substantiations

Monthly count of alcohol related child protection notifications and substantiations were provided to us. The data is recorded based on the date in which the notification is received. The data

[115] Note that we were informed by a key stakeholder that ED presentation figures are not directly comparable. Darwin Hospital only records one cause per presentation whilst Alice Springs Hospital can record several. So, for instance, a broken arm caused by an alcohol related fight might be recorded as a broken arm in Darwin, but in Alice Springs it would be recorded as both a broken arm and an alcohol related presentation.

[116] PWC Indigenous Consulting (2018), *Review of the Northern Territory Sobering Up Shelters*, A report for the NT Department of Health.

ranges from December 2015 until January 2022 and provided for the following regions: Alice Springs, Barkly, Big Rivers, East Arnhem, Greater Darwin and Top End. Indigenous status of the individual involved is also recorded. The data is described as the number of investigations finalised in a financial year (July to June).

Following discussions with NT Housing and Community's data team, we were advised to present the number of substantiations each month instead of the number of notifications because the number of notifications does not appropriate represent the number of alcohol misuse incidents involving children. For instance, one incident involving inadequate basic care with alcohol misuse could give rise to four notifications but result in one recorded substantiation.

Police protective custody episodes

The annual number of protective custody episodes were provided for the period 2014 to 2021. The data was categorised by the following regions: Alice Springs, Darwin, Katherine, NT Balance, Nhulunbuy, Palmerston, Tennant Creek and Unknown. The dataset also contained demographic data according to aboriginal status and gender. Note that this dataset includes both alcohol- and non-alcohol- related protective custody episodes.

School attendance

We were provided with publicly available school attendance rate data from Term 1 2015 to Term 2 2021 organised by year, term and the level of remoteness by NT region. The level of remoteness was categorised by provincial, remote, and very remote, consistent with the ABS classification of remoteness.

Liquor licences

We were sent an email from NT Licensing with the total number of liquor retailers from 2015 to 2021 in the NT (data for 2014 was unavailable). In addition, the email included a breakdown of the liquor license authorities in 2021.

Tourism

NT Tourism provided us with tourism data from Tourism Research Australia (TRA) consisting of annual domestic and international visitors from 2013/14 to 2019/20 categorised by NT tourist region, as well as the annual tourist expenditure spent in the same 2013/14 to 2019/20 period, categorised by international and domestic travellers to various tourist regions in the NT. Note that we were also provided with 2020/21 data for both the number of visitors and expenditure data but due to low sample size of less than 40, we exclude 2020/21 from our analysis. Expenditure data (AUD$) was provided in nominal terms.

Gross Regional Product (GRP) and Gross Value Added (GVA)

We were advised by the NT Department of Industry, Tourism and Trade to analyse annual GRP data from 2014 up until 2021 for Darwin and the NT but 2017 to 2021 each of the NT regions from economy.id's website.[117] We also decided to include annual GVA data from 2014 to 2021 from the same website for the same NT regions. Economy.id's data is based on data from the National Institute of Economic and Industry Research (NIEIR). The GRP is the sum of all industries' estimated value added plus a factor for ownership of dwellings (e.g., actual rents received by landlords). The annual data is collected for the year ending June and is in 2019/20 prices.

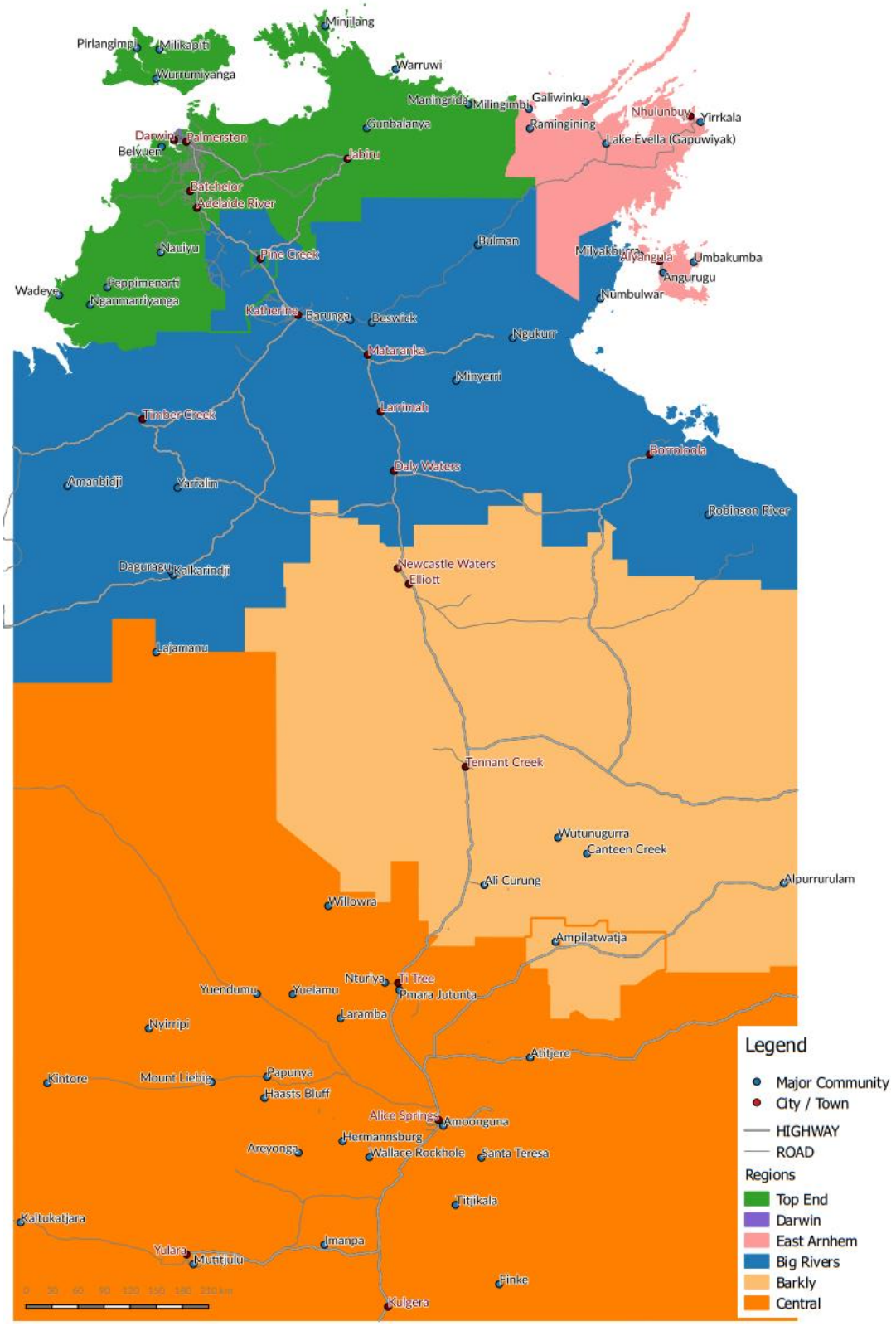
[117] Gross Regional Product | RDA Northern Territory | economy.id

Unemployment rate

We were advised by the Department of Industry, Tourism and Trade to analyse quarterly unemployment data (January 2014 to April 2022) from the National Skills Commission (Australian Government, Labour Market Insights).[118] The data is originally from the ABS Labour Force April 2022, seasonally adjusted data. The unemployment rate is calculated as the proportion of the resident labour force (those in work or looking for work and aged over 15) who are looking for work. Unemployment does not include people who don't have a job but are not seeking a job. We used SA4 & City Metro data and filtered for NT data, which was divided into the Darwin and Northern Territory-Outback (rest of the NT) regions.

118 Australian Government Labour Market Insights | National Skills Commission

Figure 46: Map of NT



Source: https://education.nt.gov.au/__data/assets/pdf_file/0011/901100/dcm-regions-map.pdf

E Detailed modelling methodology and results

In this section, we provide our complete regression outputs and further details on our methodology and results.

Wholesale alcohol supply

We summed up the PAC in litres across all beverage types to arrive at total alcohol in each region as well as added up full strength beer, mid-strength beer and low strength beer and present the total quantity of beer supplied only (variable 'beer'). We generate a post-MUP dummy variable that takes the value of '1' from quarter 2018 Q4 onwards, and '0' for the quarters before that. We use quarterly dummies to capture the seasonal variations in our model. For each of the NT regions, we take the log of the wholesale supply of each beverage type to be able to determine the percentage change in supply after the MUP, compared to pre-MUP.

All beverage types - Northern Territory

For the NT, we calculate the wholesale supply of alcohol on a per capita basis using ERP data from the ABS for individuals aged 15 and above.[119] We used linear extrapolation to estimate the 15+ population data for 2021 as the data was unavailable on the ABS.

For brevity, we present the results for the key explanatory variables and exclude time trend and quarterly dummy variables.

Table 13: Per capita wholesale supply of alcohol – Northern Territory (no log)

Beverage type	Cask wine	Bottle wine	Fortified wine	Cider	Standard spirits	Mixed spirits	Total beer	Total alcohol
PostMUP	**-0.054*** **	**-0.086*** **	**0.002**	**-0.002**	**0.040** **	**-0.012** **	**-0.081*** **	**-0.194*** **
Std error	*(0.006)*	*(0.011)*	*(0.002)*	*(0.004)*	*(0.016)*	*(0.006)*	*(0.028)*	*(0.037)*
P-value	*0.000*	*0.000*	*0.463*	*0.589*	*0.023*	*0.046*	*0.010*	*0.000*
Observations	25	25	25	25	25	25	25	25
R-squared	0.959	0.980	0.782	0.950	0.938	0.968	0.971	0.987

*Note: Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1*

We present our results for each of the beverage types across each region in the NT and total NT below. We take the natural log of the beverage types to be able to interpret the coefficients on a percentage change basis. For instance, we interpret the -0.545 coefficient for cask wine PostMUP in Darwin and Palmerston as 100 multiplied by EXP(-0.545)-1 to get a -42.0% decrease in cask wine immediately after the MUP.

[119] Population data is compiled on 30 June annually

Cask wine

Table 14: Wholesale supply of alcohol categorised by region – log cask wine

Regions	Alice Springs	Darwin and Palmerston	Katherine	Nhulunbuy	Tennant Creek	Northern Territory
PostMUP	**-0.165**	**-0.545*** **	**-1.454*** **	**-0.659*** **	**-0.458*** **	**-0.641*** **
Std error	*(0.177)*	*(0.045)*	*(0.376)*	*(0.216)*	*(0.110)*	*(0.045)*
P-value	*0.363*	*0.000*	*0.001*	*0.007*	*0.001*	*0.000*
Observations	25	25	25	25	25	25
R-squared	0.892	0.967	0.733	0.853	0.429	0.977

*Note: Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1*

Beer

Table 15: Wholesale supply of alcohol categorised by region – log total beer

Regions	Alice Springs	Darwin and Palmerston	Katherine	Nhulunbuy	Tennant Creek	Northern Territory
PostMUP	**0.050** **	**-0.085*** **	**0.057***	**-0.056**	**-0.052**	**-0.059*** **
Std error	*(0.020)*	*(0.023)*	*(0.031)*	*(0.033)*	*(0.072)*	*(0.016)*
P-value	*0.020*	*0.002*	*0.082*	*0.107*	*0.477*	*0.002*
Observations	25	25	25	25	25	25
R-squared	0.880	0.964	0.933	0.784	0.627	0.975

*Note: Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1*

Standard spirits

Table 16: Wholesale supply of alcohol categorised by region – log standard spirits

Regions	Alice Springs	Darwin and Palmerston	Katherine	Nhulunbuy	Tennant Creek	Northern Territory
PostMUP	**0.017**	**0.058****	**0.084**	**-0.013**	**-0.095**	**0.058****
Std error	*(0.026)*	*(0.025)*	*(0.062)*	*(0.051)*	*(0.093)*	*(0.025)*
P-value	*0.525*	*0.034*	*0.191*	*0.798*	*0.319*	*0.035*
Observations	25	25	25	25	25	25
R-squared	0.947	0.953	0.844	0.660	0.629	0.947

*Note: Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1*

Bottled wine

Table 17: Wholesale supply of alcohol categorised by region – log bottled wine

Regions	Alice Springs	Darwin and Palmerston	Katherine	Nhulunbuy	Tennant Creek	Northern Territory
PostMUP	**-0.618*****	**-0.092****	**-0.108**	**0.086**	**-0.976*****	**-0.192*****
Std error	*(0.091)*	*(0.037)*	*(0.128)*	*(0.059)*	*(0.299)*	*(0.027)*
P-value	*0.000*	*0.022*	*0.411*	*0.164*	*0.004*	*0.000*
Observations	25	25	25	25	25	25
R-squared	0.873	0.909	0.759	0.616	0.754	0.974

*Note: Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1*

Mixed spirits

Table 18: Wholesale supply of alcohol categorised by region – log mixed spirits

Regions	Alice Springs	Darwin and Palmerston	Katherine	Nhulunbuy	Tennant Creek	Northern Territory
PostMUP	**0.004**	**-0.085*** **	**-0.031**	**0.072**	**-0.480** **	**-0.071*** **
Std error	*(0.027)*	*(0.026)*	*(0.048)*	*(0.063)*	*(0.186)*	*(0.019)*
P-value	*0.870*	*0.004*	*0.530*	*0.265*	*0.018*	*0.002*
Observations	25	25	25	25	25	25
R-squared	0.949	0.967	0.903	0.759	0.612	0.977

*Note: Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1*

Cider

Table 19: Wholesale supply of alcohol categorised by region – log cider

Regions	Alice Springs	Darwin and Palmerston	Katherine	Nhulunbuy	Tennant Creek	Northern Territory
PostMUP	**0.071***	**-0.050**	**-0.067**	**-0.033**	**0.113**	**-0.037**
Std error	*(0.036)*	*(0.030)*	*(0.073)*	*(0.092)*	*(0.074)*	*(0.026)*
P-value	*0.063*	*0.115*	*0.375*	*0.724*	*0.144*	*0.160*
Observations	25	25	25	25	25	25
R-squared	0.677	0.965	0.824	0.534	0.659	0.958

*Note: Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1*

Fortified wine

Table 20: Wholesale supply of alcohol categorised by region – log fortified wine

Regions	Alice Springs	Darwin and Palmerston	Katherine	Nhulunbuy	Tennant Creek	Northern Territory
PostMUP	**-0.046**	**-0.086**	**0.341**	**0.206***	**-0.505**	**-0.170***
Std error	*(0.070)*	*(0.124)*	*(0.283)*	*(0.110)*	*(1.082)*	*(0.097)*
P-value	*0.521*	*0.494*	*0.243*	*0.078*	*0.650*	*0.096*
Observations	25	25	25	25	17[120]	25
R-squared	0.933	0.842	0.513	0.208	0.059	0.892

*Note: Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1*

Alcohol related assaults

We were only provided with NT-wide data for alcohol related assaults. Our data was categorised by DV and non-DV offences, as well as alcohol related and non-alcohol related assaults.

We present our variables on a per 10,000 NT population basis using ERP data from the ABS for total population.[121]

For brevity, we present the results for the key explanatory variables and exclude time trend and monthly dummy variables.

Table 21: Rate of alcohol related assaults per 10,000 NT population (no log)

VARIABLES	Per capita total alcohol related assaults	Per capita alcohol related DV assaults	Per capita alcohol related non-DV assaults
PostMUP	**-1.584****	**-0.339**	**-1.245*****
Std error	*-0.716*	*-0.513*	*-0.269*
P-value	*0.03*	*0.511*	*0*
Observations	81	81	81
R-squared	0.419	0.389	0.451

*Note: Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1*

120 There were 8 observations where wholesale supply of fortified wine was 0 litres. We excluded them from our analysis.

121 Population data is compiled on 30 June annually

Table 22: Rate of alcohol related assaults per 10,000 NT population (log)

VARIABLES	Per capita total alcohol related assaults	Per capita alcohol related DV assaults	Per capita alcohol related non-DV assaults
PostMUP	**-0.140*** **	**-0.056**	**-0.299*** **
Std error	*-0.052*	*-0.058*	*-0.059*
P-value	*0.009*	*0.337*	*0*
Observations	81	81	81
R-squared	0.443	0.396	0.495

*Note: Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1*

We also calculate the percentage of offences (for total assaults, DV offences and non-DV offences) that are alcohol related to examine how this trend changes over time.

Table 23: % of offences that are alcohol related (no log)

VARIABLES	% of total assaults that are alcohol related	% of DV offences that are alcohol related	% of non-DV offences that are alcohol related
PostMUP	**-3.804*** **	**-2.649**	**-6.497*** **
Std error	*-1.3*	*-1.654*	*-1.5*
P-value	*0.005*	*0.113*	*0*
Observations	81	81	81
R-squared	0.516	0.408	0.499

*Note: Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1*

Drink driving crashes

The dataset we received on drink driving crashes consisted of individual-level data across the NT. The data included longitude and latitude data which we could use to map out using QGIS. We present maps for NT-wide, Alice Springs and Greater Darwin below. Note that we also included parts of East Arnhem between Darwin and Palmerston in Darwin.

For brevity, we present the results for the key explanatory variables and exclude time trend and monthly dummy variables.

We retained observations where the road user was a driver, motorcyclist, cyclist, motorised scooter rider. We excluded observations where a road user was for example, a bus passenger, motorcycle pillion. Using the longitudinal and latitudinal coordinates we were able to determine the different regions in which the crashes occurred. Where BAC range data is available for the individuals involved in the crashes, we were able to determine the number of crashes where the driver in the accident had a BAC range that was 0, between or equal to 0.01 and 0.049 and

greater than or equal to 0.05. We assigned a BAC range of "Some" where the range was between or equal to 0.01 and 0.049 and "Over" where the range was greater than or equal to 0.05.

We present our results for drink driving crashes below for where a driver was assigned a BAC range of "Some" and a BAC range of "Over", for Alice Springs, Greater Darwin and the Rest of the NT. We take the natural log of the number of crashes to be able to interpret the coefficients on a percentage change basis. For instance, we interpret the -0.825 PostMUP coefficient for drink driving crashes in Alice Springs as 100 multiplied by EXP(-0.825)-1 to get a -56.2% decrease in drink driving crashes for BAC range "Some", after the MUP.

Table 24: Drink driving crashes - BAC range "Some" (0.01 and 0.049) – log Some

	Alice Springs	Greater Darwin	Rest of NT
PostMUP	**-0.825*** **	**-0.374***	**-0.589*** **
Std error	*-0.204*	*-0.209*	*-0.208*
P-value	*0*	*0.078*	*0.006*
Observations	70	75	74
R-squared	0.31	0.368	0.478

*Note: Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1*

Table 25: Drink driving crashes - BAC range "Over" (>0.05) – log Over

	Alice Springs	Greater Darwin	Rest of NT
PostMUP	**-0.781*** **	**-0.410***	**-0.512** **
Std error	*-0.22*	*-0.209*	*-0.215*
P-value	*0.001*	*0.054*	*0.021*
Observations	69	75	74
R-squared	0.272	0.323	0.488

*Note: Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1*

Table 26: Drink driving crashes – % of total crashes where alcohol was involved (>=0.01)

	Alice Springs	Greater Darwin	Rest of NT
PostMUP	**-0.101*** **	**-0.026**	**-0.097*** **
Std error	*-0.03*	*-0.018*	*-0.033*
P-value	*0.001*	*0.158*	*0.005*
Observations	75	75	75
R-squared	0.382	0.24	0.311

*Note: Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1*

Alcohol related ED presentations

We were provided with a dataset consisting of the monthly number of alcohol related ED presentations in different hospitals across the NT. We group presentations from Royal Darwin Hospital and Palmerston Regional Hospital together and refer to this variable as 'Darwin Total'.

We present our variables on a per 10,000 NT population basis using ERP data from the ABS for total population.[122]

For brevity, we present the results for the key explanatory variables and exclude time trend and monthly dummy variables.

Table 27: Rate of alcohol related ED presentations per 10,000 NT population (no log)

	NT
PostMUP	**-6.749*** **
Std error	*-0.864*
P-value	*0*
Observations	75
R-squared	0.715

*Note: Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1*

[122] Population data is compiled on 30 June annually

Table 28: Rate of alcohol related ED presentations per 10,000 NT population (log)

	NT
PostMUP	**-0.216*** **
Std error	*-0.027*
P-value	*0*
Observations	75
R-squared	0.708

*Note: Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1*

Table 29: Number of alcohol related ED presentations categorised by NT region (no log)

Regions	Alice Springs Hospital	Gove District Hospital (Nhulunbuy)	Katherine Hospital	Tennant Creek Hospital	Darwin Total	Total NT
PostMUP	**-148.780*** **	**-1.294**	**-9.603**	**-15.527*** **	**1.125**	**-174.080*** **
Std error	*-16.152*	*-2.316*	*-7.535*	*-5.543*	*-10.21*	*-21.127*
P-value	*0*	*0.579*	*0.207*	*0.007*	*0.913*	*0*
Observations	75	75	75	75	75	75
R-squared	0.643	0.633	0.161	0.429	0.675	0.723

*Note: Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1*

Table 30: Number of alcohol related ED presentations categorised by NT region (log)

Regions	Alice Springs Hospital	Gove District Hospital (Nhulunbuy)	Katherine Hospital	Tennant Creek Hospital	Darwin Total	Total NT
PostMUP	**-0.472*** **	**-0.096**	**-0.162**	**-0.277** **	**-0.003**	**-0.226*** **
Std error	*-0.046*	*-0.101*	*-0.103*	*-0.112*	*-0.033*	*-0.027*
P-value	*0*	*0.344*	*0.121*	*0.016*	*0.935*	*0*
Observations	75	75	75	75	75	75
R-squared	0.654	0.617	0.171	0.415	0.662	0.717

*Note: Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1*

SUS attendance

Using the individual-level SUS attendance dataset we received, we were able to create a dataset consisting of the number of monthly SUS admissions by shelter in the NT.

We present the total SUS admissions across the entire NT on a per 10,000 NT population basis using ERP data from the ABS for total population.[123]

For brevity, we present the results for the key explanatory variables and exclude time trend and monthly dummy variables.

Table 31: Rate of SUS admissions per 10,000 NT population (no log)

	NT
PostMUP	**33.081*** **
Std error	*-4.395*
P-value	*0*
Observations	75
R-squared	0.6

*Note: Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1*

Table 32: Rate of SUS admissions per 10,000 NT population (log)

	NT
PostMUP	**0.750*** **
Std error	*-0.098*
P-value	*0*
Observations	75
R-squared	0.613

*Note: Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1*

123 Population data is compiled on 30 June annually

Table 33: Number of SUS admissions categorised by NT region (no log)

Regions	Alice Springs	Darwin	Katherine	Nhulunbuy	Tennant Creek	NT
PostMUP	**18.642**	**484.204*** **	**66.291*** **	**14.293*** **	**217.820*** **	**801.809*** **
Std error	*-37.75*	*-47.466*	*-17.254*	*-4.433*	*-31.111*	*-106.689*
P-value	*0.623*	*0*	*0*	*0.002*	*0*	*0*
Observations	75	75	75	74	75	75
R-squared	0.653	0.775	0.571	0.526	0.804	0.602

*Note: Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1*

Table 34: Number of SUS admissions categorised by NT region (log)

Regions	Alice Springs	Darwin	Katherine	Nhulunbuy	Tennant Creek	NT
PostMUP	**-0.345** **	**0.790*** **	**0.525** **	**0.686* **	**0.998*** **	**0.740*** **
Std error	*-0.138*	*-0.074*	*-0.199*	*-0.384*	*-0.219*	*-0.098*
P-value	*0.015*	*0*	*0.01*	*0.079*	*0*	*0*
Observations	75	75	75	74	75	75
R-squared	0.715	0.765	0.553	0.397	0.729	0.611

*Note: Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1*

Alcohol related child protection substantiations

We were advised to only present child protection substantiations data. However, the figures for monthly child protection substantiations were very small (5.44 and 26.6 substantiated investigations on average per month in Greater Darwin and NT-wide over the Jan 2015 to Jan 2022 period, respectively).

We present the total substantiations across the entire NT on a per 100,000 NT population basis using ERP data from the ABS for total population.[124]

For brevity, we present the results for the key explanatory variables and exclude time trend and monthly dummy variables.

Table 35: Rate of child protection substantiations per 100,000 NT population (no log)

	NT
PostMUP	**-10.077*** **
Std error	*-2.415*
P-value	*0*
Observations	52
R-squared	0.506

*Note: Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1*

Table 36: Rate of child protection substantiations per 100,000 NT population (log)

	NT
PostMUP	**-0.925*** **
Std error	*-0.227*
P-value	*0*
Observations	52
R-squared	0.462

*Note: Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1*

[124] Population data is compiled on 30 June annually

Table 37: Number of child protection substantiations categorised by NT region (no log)

Regions	Alice Springs	Barkly	Big Rivers	East Arnhem	Greater Darwin	Top End	NT
PostMUP	**-4.338****	**-6.497****	**-7.152*****	**-0.278**	**-3.43**	**-3.431*****	**-25.126*****
Std error	*-1.822*	*-2.511*	*-2.447*	*-0.432*	*-2.41*	*-1.172*	*-5.982*
P-value	*0.022*	*0.014*	*0.006*	*0.524*	*0.163*	*0.006*	*0*
Observations	52	52	52	52	52	52	52
R-squared	0.39	0.296	0.389	0.41	0.224	0.471	0.506

*Note: Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1*

Protective custody episodes

We were provided with annual protective custody episodes data for the NT and its individual regions. Given that the data supplied are on an annual basis instead of a relatively more granular level i.e., monthly or quarterly, we did not carry out regression analysis on Stata 14 using this dataset. Instead, we examine the trends in protective custody episodes over the years to determine whether there were any structural breaks in the data. We also present the demographic data below. Note that the data provided were not the number of individuals taken into protective custody but were instead the number of episodes. For example, one unique individual could have been taken into custody several times in a single year. We were not provided with any unique individual identifiers, and as a result were unable to determine the number of unique individuals taken into custody.

School attendance rates

We were provided with termly school enrolment and attendance rate data by remoteness and region from 2014 to 2021.

In order to determine the attendance rates in the entire NT by level of remoteness for Indigenous students, non-Indigenous students and total students in NT. We first determine the number of students who attended school for each term by multiplying the attendance rates for each of these groups with the number of students enrolled in these same demographic groups in each level of remoteness in each region. For example, to determine the number of Indigenous students who attended school in the remote area of the Top End Region, we multiply the attendance rate for Indigenous students in that particular area and region with the average enrolment rate for Indigenous students in that same area and region. We can then tally up the total number of Indigenous students who attend school in the entire NT categorised by level of remoteness and divide this by the total number of Indigenous students enrolled in school cross the entire NT, also by level of remoteness, for each term. This gives us the NT-wide attendance rates by level of remoteness for the three groups: Indigenous students, non-Indigenous students, and total students.

We adjust for seasonality by subtracting each of the total attendance rate coefficients for Term 2, Term 3 and Term 4 from the total attendance rates and present this in our chart below. We also consider the "provincial" level of remoteness as "outer regional" in our dataset.

The attendance rate is the proportion of time students attend compared to the time they are expected to attend during the time period. These attendance rates are calculated based on primary and secondary school students across schools in the NT. The individual schools included in the dataset is generally kept consistent over the study period.[125]

Table 38: School attendance rates – Outer regional

	Indigenous	Non-Indigenous	Total
PostMUP	**-0.733**	**1.305****	**0.860***
Std error	*-0.545*	*-0.543*	*-0.443*
P-value	*0.194*	*0.026*	*0.066*
Observations	26	26	26
R-squared	0.946	0.726	0.861

*Note: Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1*

Table 39: School attendance rates – Remote

	Indigenous	Non-Indigenous	Total
PostMUP	**4.134*****	**0.054**	**2.515****
Std error	*-0.973*	*-1.118*	*-0.929*
P-value	*0*	*0.962*	*0.014*
Observations	26	26	26
R-squared	0.948	0.503	0.875

*Note: Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1*

[125] Occasionally schools are excluded from the dataset for reasons such as temporary closures (refer to https://education.nt.gov.au/statistics-research-and-strategies/enrolment-and-attendance)

Table 40: School attendance rates – Very remote

	Indigenous	Non-Indigenous	Total
PostMUP	*-1.883*	*-0.122*	*-2.080**
Std error	*-1.201*	*-1.299*	*-1.038*
P-value	*0.133*	*0.926*	*0.059*
Observations	26	26	26
R-squared	0.925	0.504	0.921

*Note: Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1*

Liquor licences

We were provided with the annual number of liquor licences for the NT. Given that the data supplied were on an annual basis instead of a relatively more granular level i.e., monthly or quarterly, we did not carry out regression analysis on Stata 14 using this dataset.

Tourism

We were provided with the annual number tourists and tourist expenditure (domestic and international) to the NT and its individual regions. Given that the data supplied were on an annual basis instead of a relatively more granular level i.e., monthly or quarterly, we did not carry out regression analysis on Stata 14 using this dataset.

GRP and GVA

We were provided with the annual GRP and GVA for the NT and its individual Local Government Authorities (LGAs). Given that the data supplied were on an annual basis instead of a relatively more granular level i.e., monthly or quarterly, we did not carry out regression analysis on Stata 14 using this dataset.

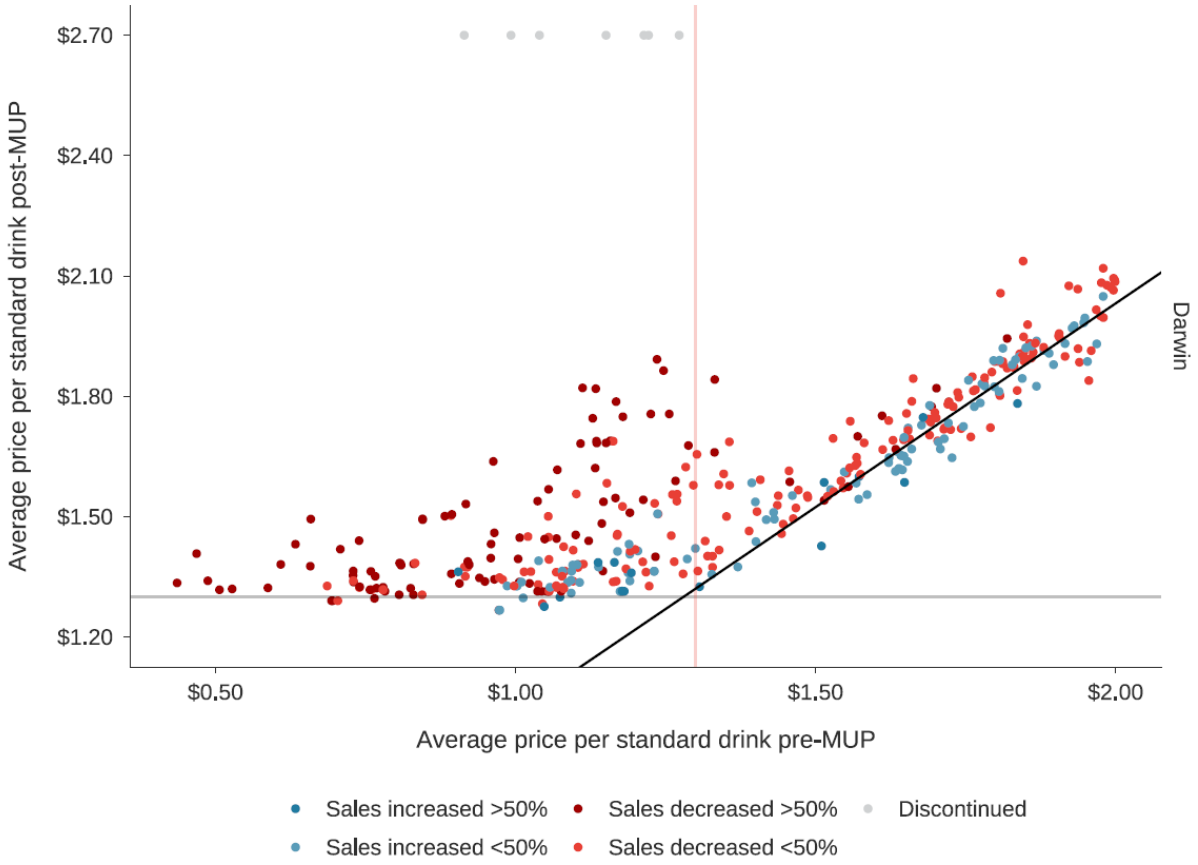
Unemployment rate

We were provided with the monthly unemployment rates for the NT-outback region and Darwin region. We did not carry out any regression analysis using Stata 14 using this dataset.

F Graphs

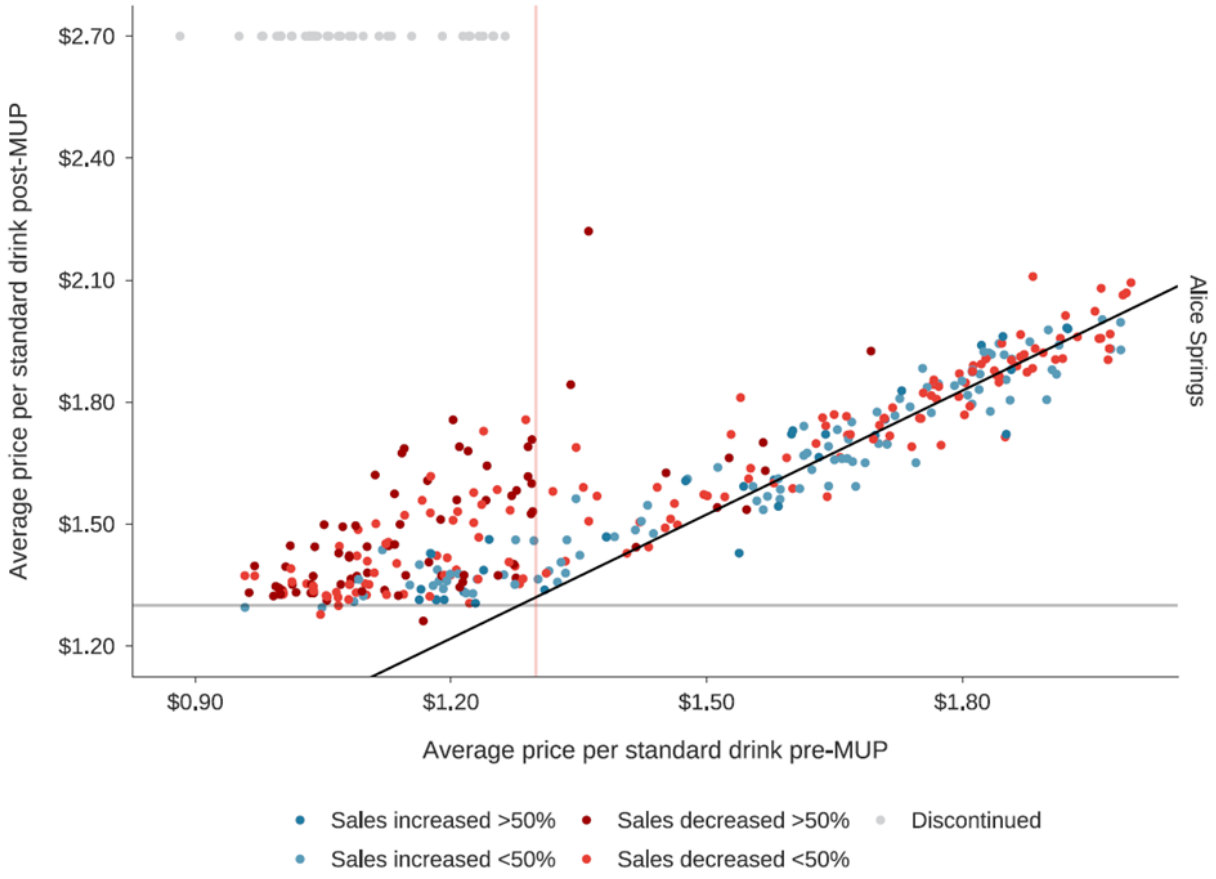
Price impact

Figure 47: Post-MUP vs pre-MUP prices by product (for products sold below $2 pre-MUP) - Darwin



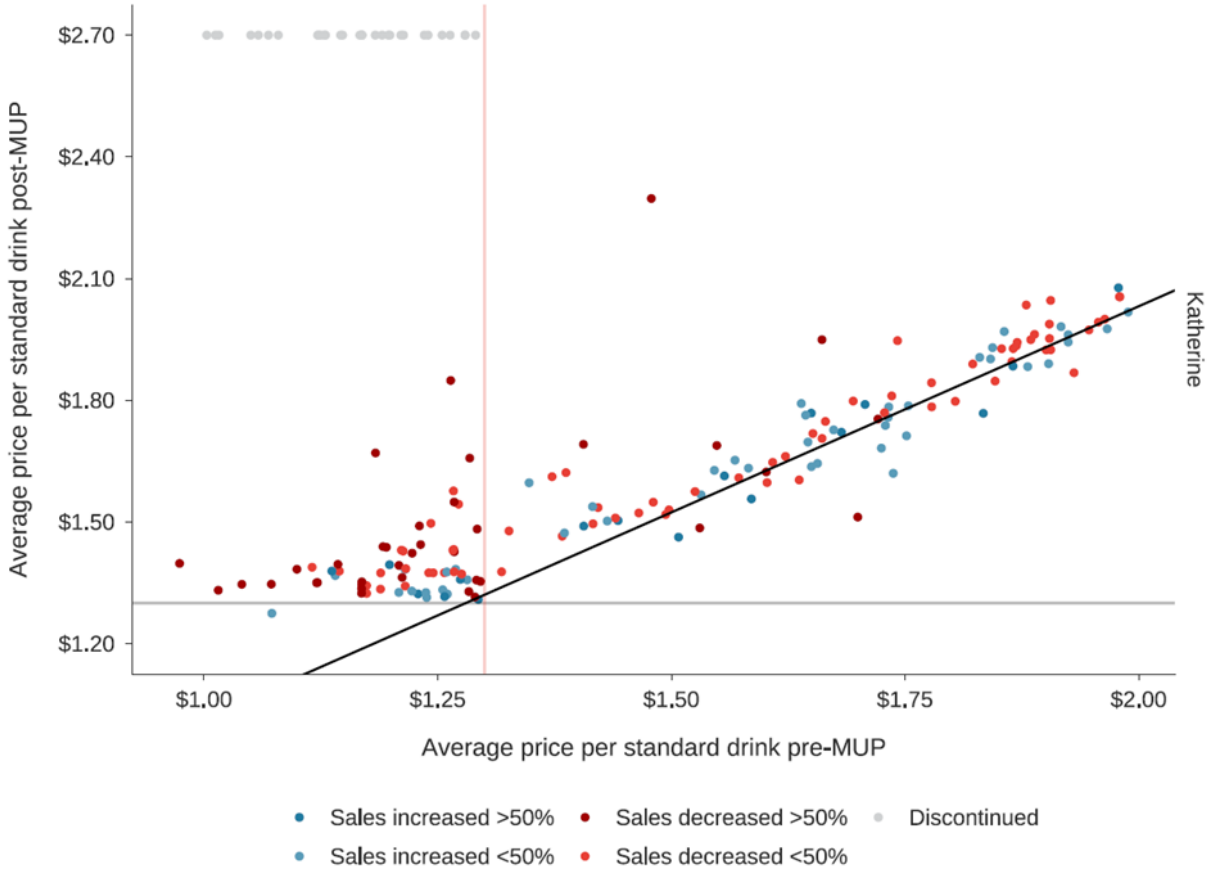
Source: Frontier Economics analysis

Figure 48: Post-MUP vs pre-MUP prices by product (for products sold below $2 pre-MUP) – Alice Springs



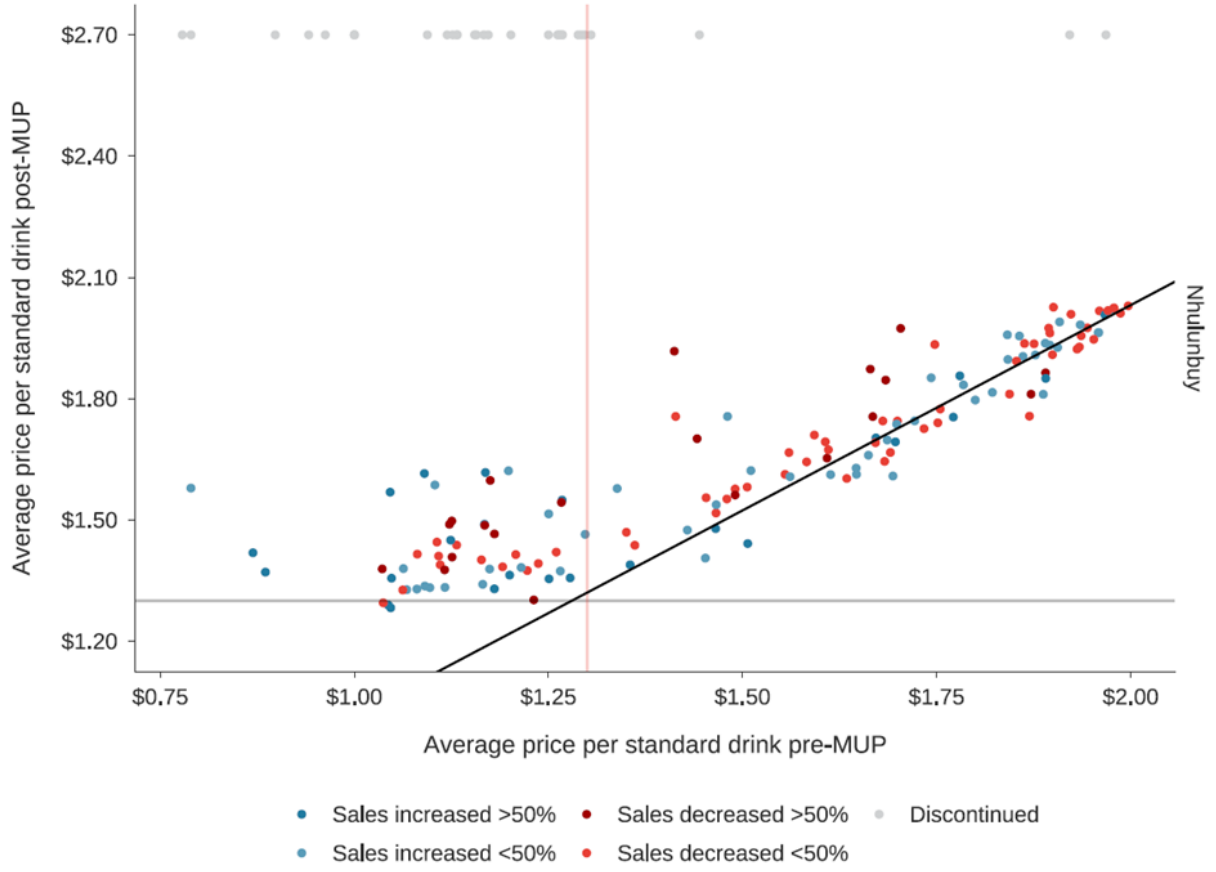
Source: Frontier Economics analysis

Figure 49: Post-MUP vs pre-MUP prices by product (for products sold below $2 pre-MUP) - Katherine



Source: Frontier Economics analysis

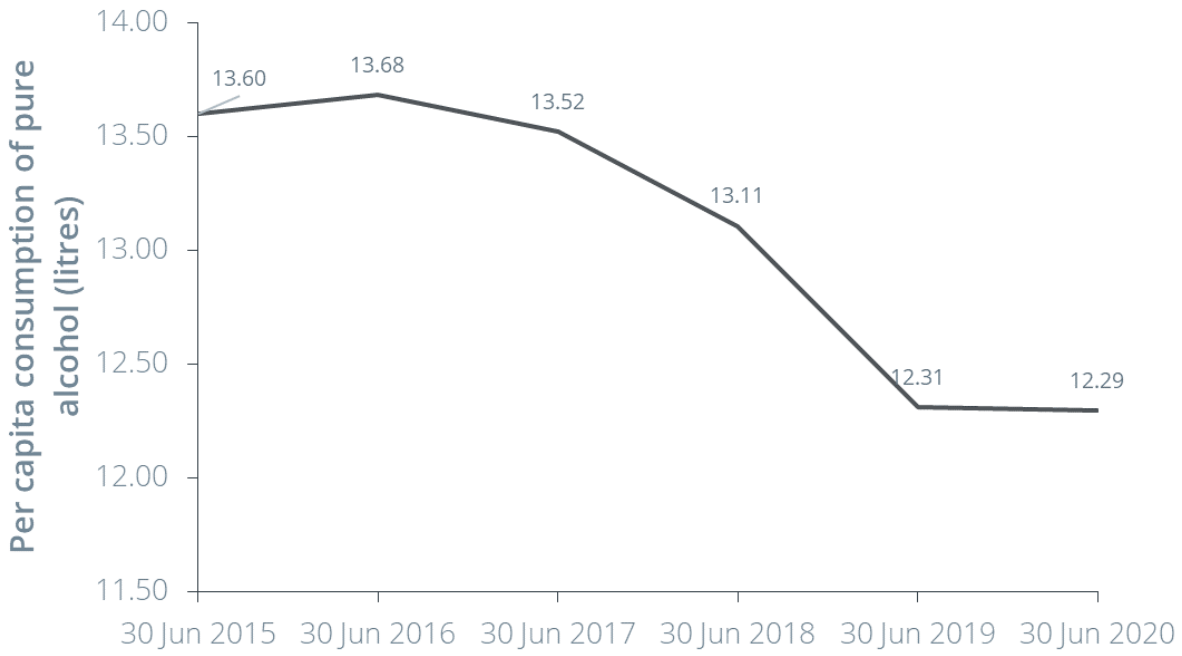
Figure 50: Post-MUP vs pre-MUP prices by product (for products sold below $2 pre-MUP) - Nhulunbuy



Source: Frontier Economics analysis

Wholesale supply

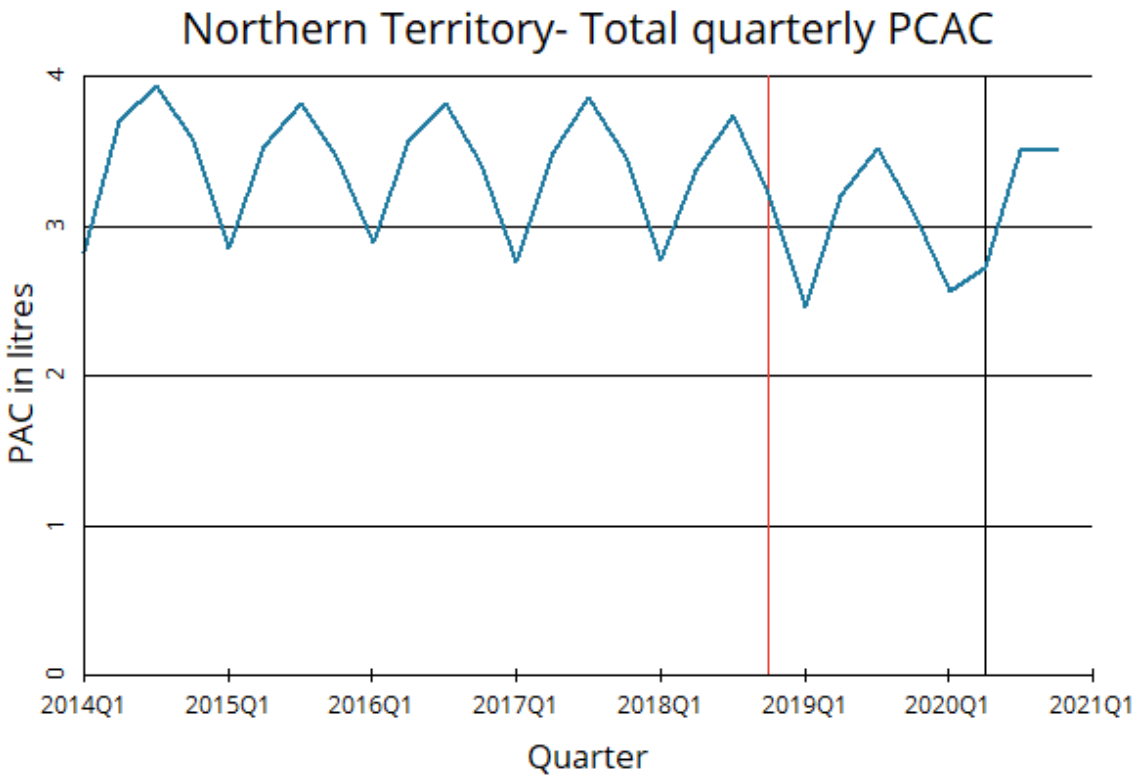
Figure 51: Wholesale alcohol supply per capita in the NT (year ending 30 June)



Source: Frontier Economics analysis using NT Licensing and ABS population data

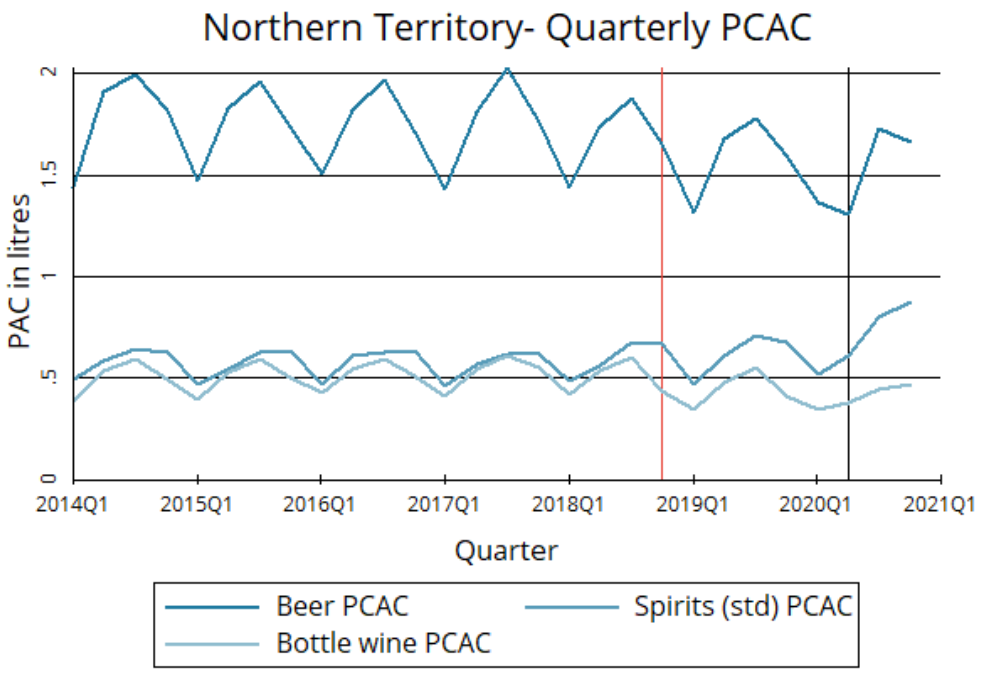
Note: Y-axis of graph does not start from zero

Figure 52: Per capita total alcohol consumption (PCAC) in the NT on a quarterly basis



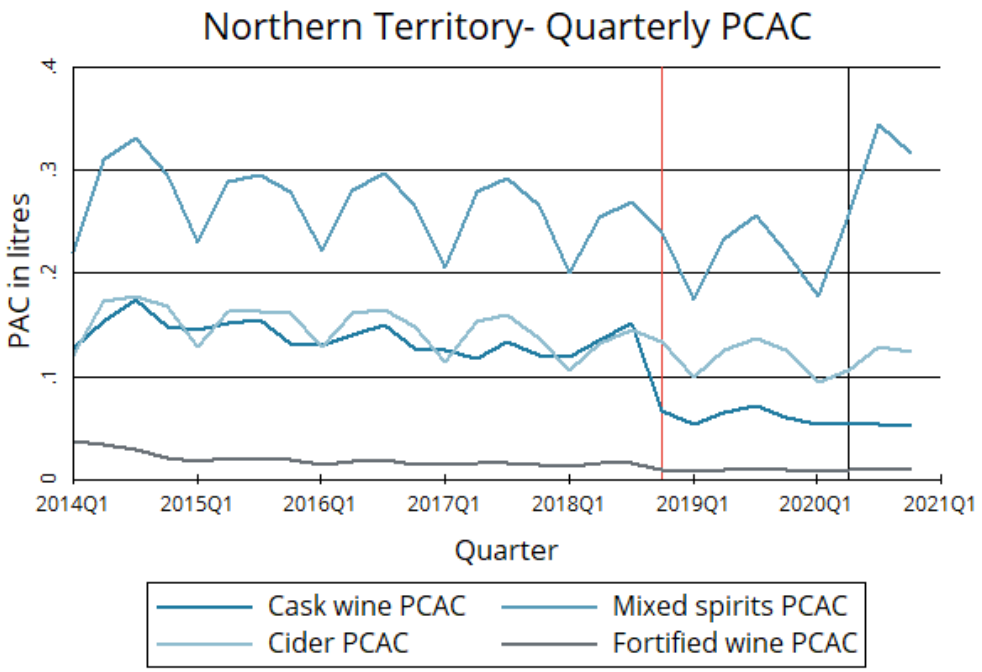
Source: Frontier Economics analysis of NT Licensing and ABS data

Figure 53: PCAC in the NT on a quarterly basis – high volume categories



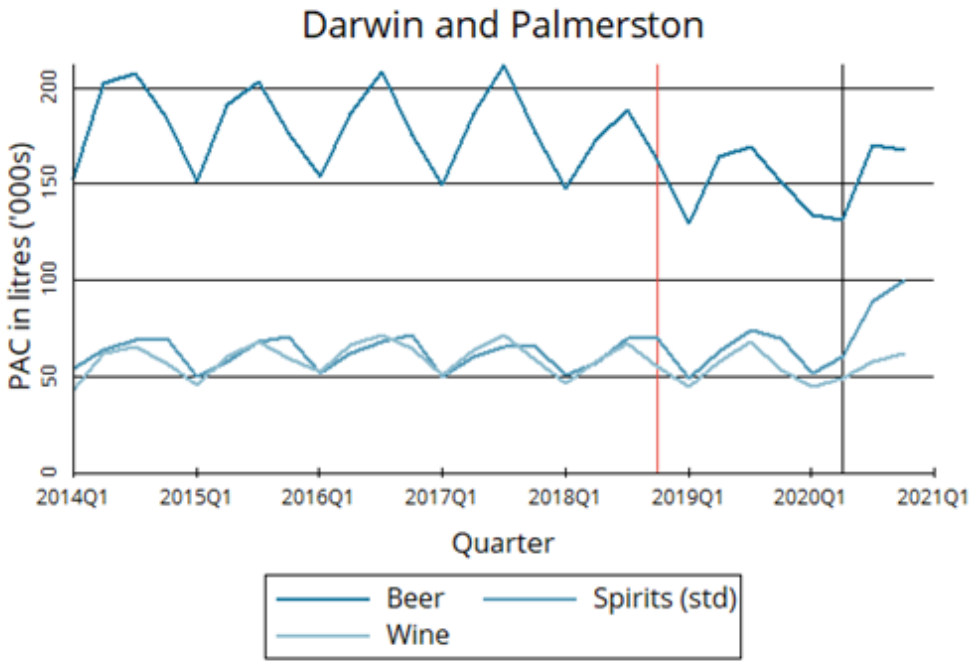
Source: Frontier Economics analysis of NT Licensing and ABS data

Figure 54: PCAC in the NT on a quarterly basis – low volume categories



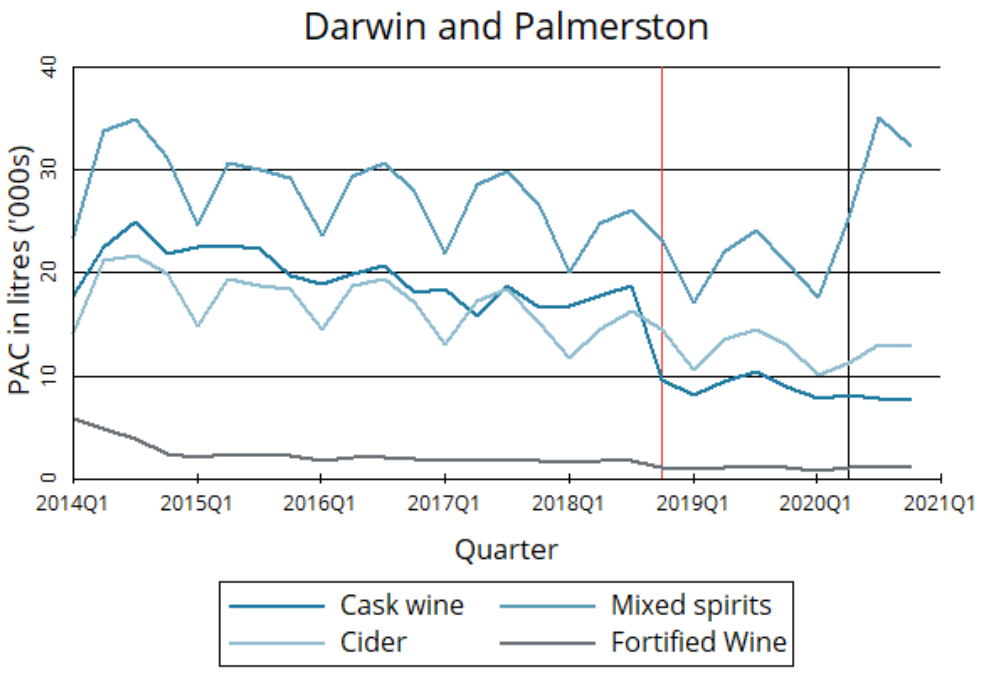
Source: Frontier Economics analysis of NT Licensing and ABS data

Figure 55: Wholesale supply of alcohol in Darwin and Palmerston by category – high volume



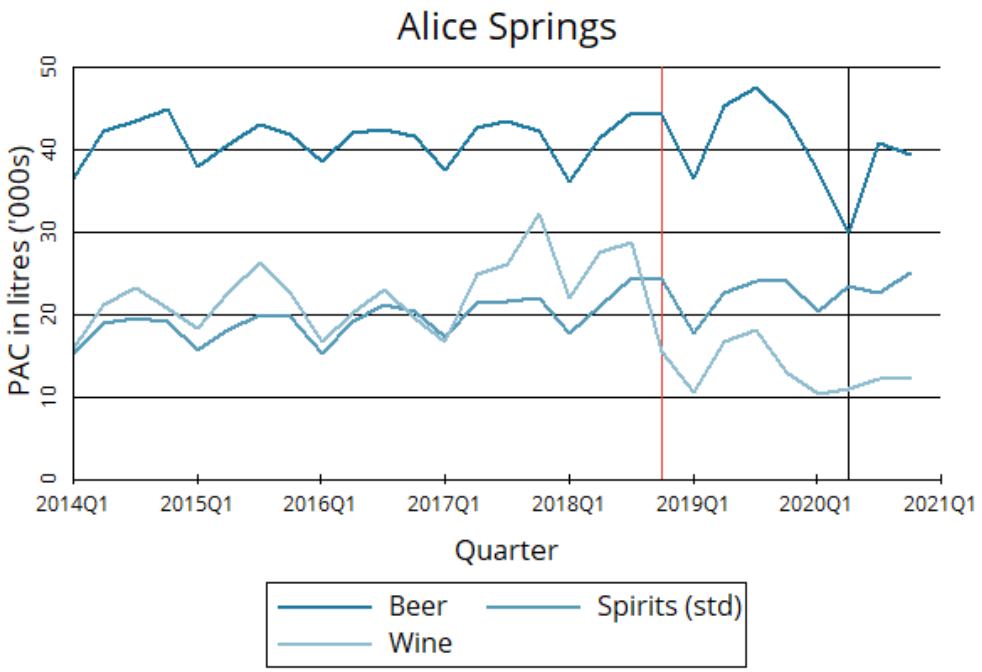
Source: Frontier Economics analysis of NT Licensing and ABS data

Figure 56: Wholesale supply of alcohol in Darwin and Palmerston by category – low volume



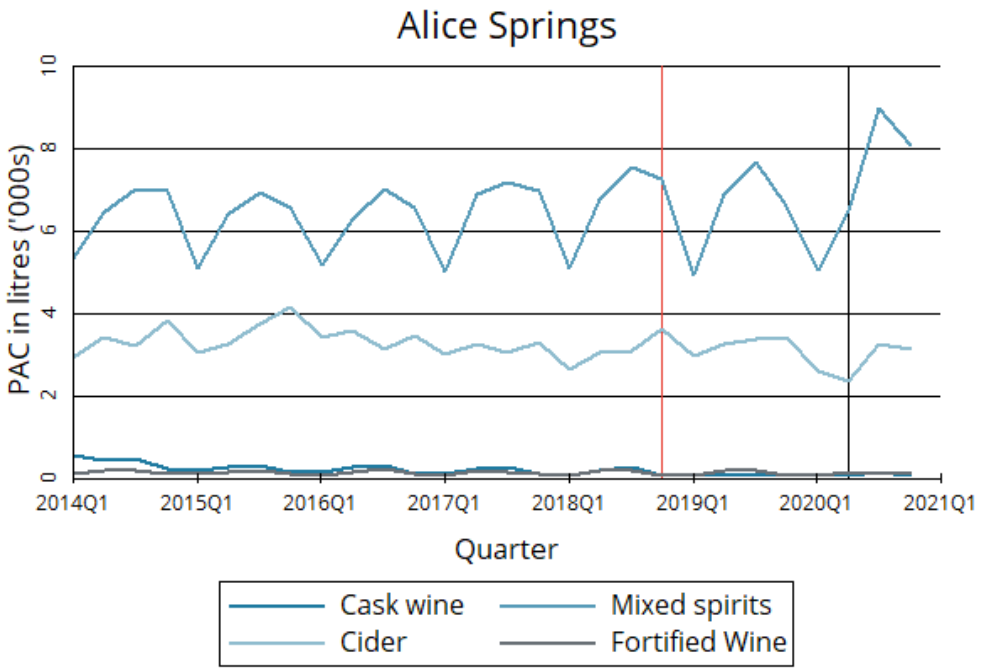
Source: Frontier Economics analysis of NT Licensing data

Figure 57: Wholesale supply of alcohol in Alice Springs by category – high volume



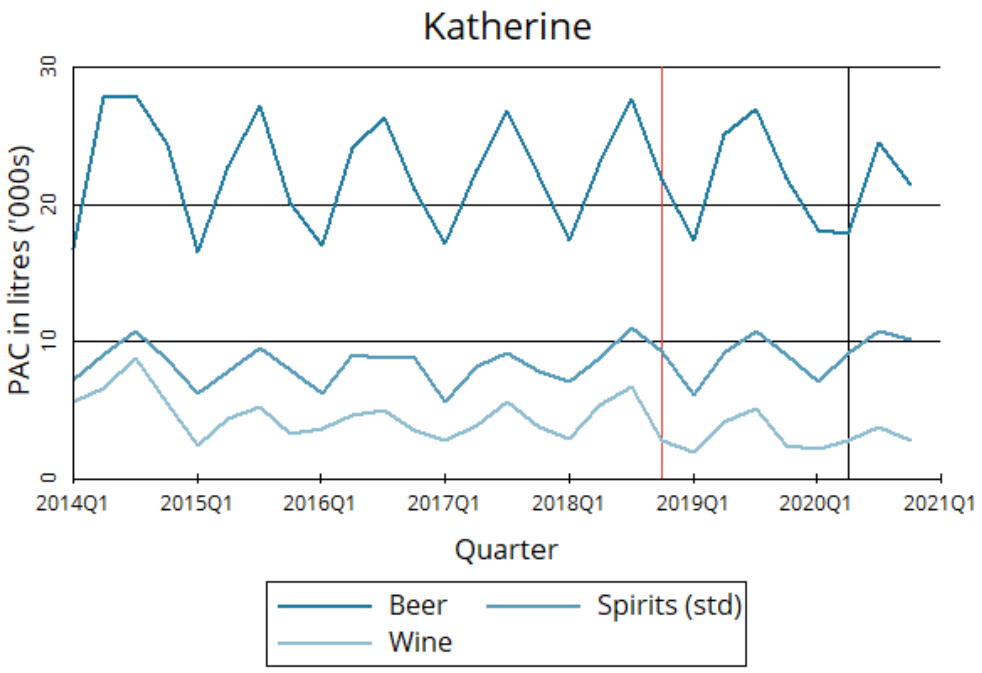
Source: Frontier Economics analysis of NT Licensing data

Figure 58: Wholesale supply of alcohol in Alice Springs by category – low volume



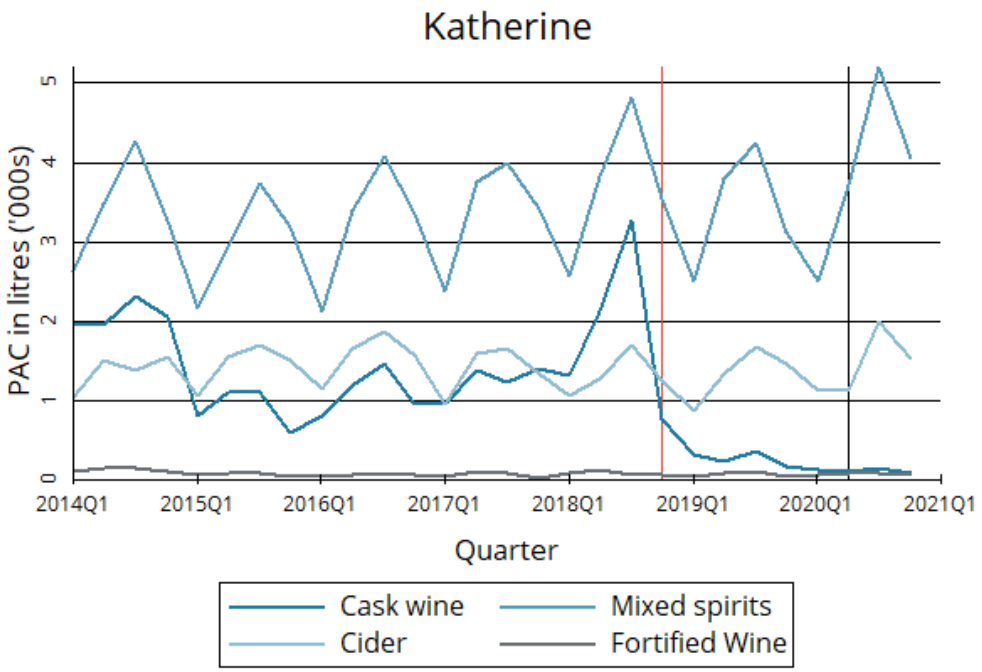
Source: Frontier Economics analysis of NT Licensing data

Figure 59: Wholesale supply of alcohol in Katherine by category – high volume



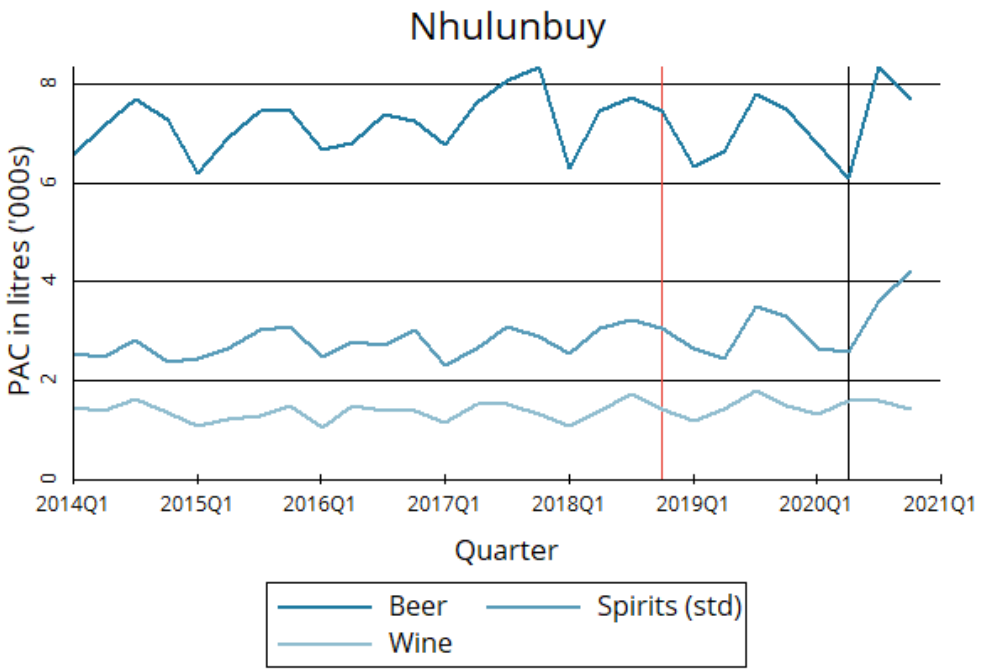
Source: Frontier Economics analysis of NT Licensing data

Figure 60: Wholesale supply of alcohol in Katherine by category – low volume



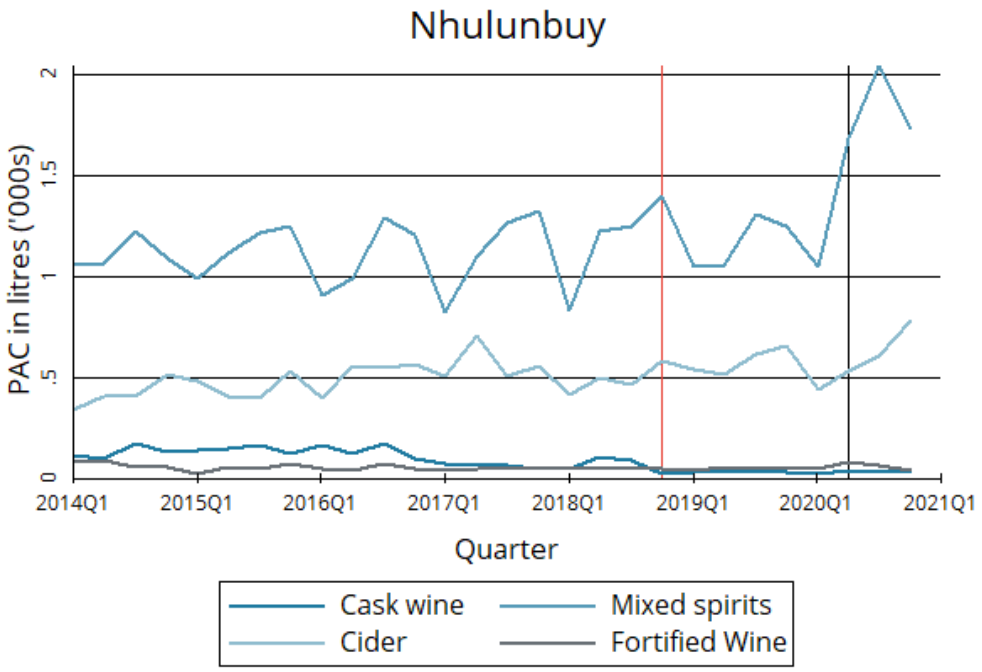
Source: Frontier Economics analysis of NT Licensing data

Figure 61: Wholesale supply of alcohol in Nhulunbuy by category – high volume



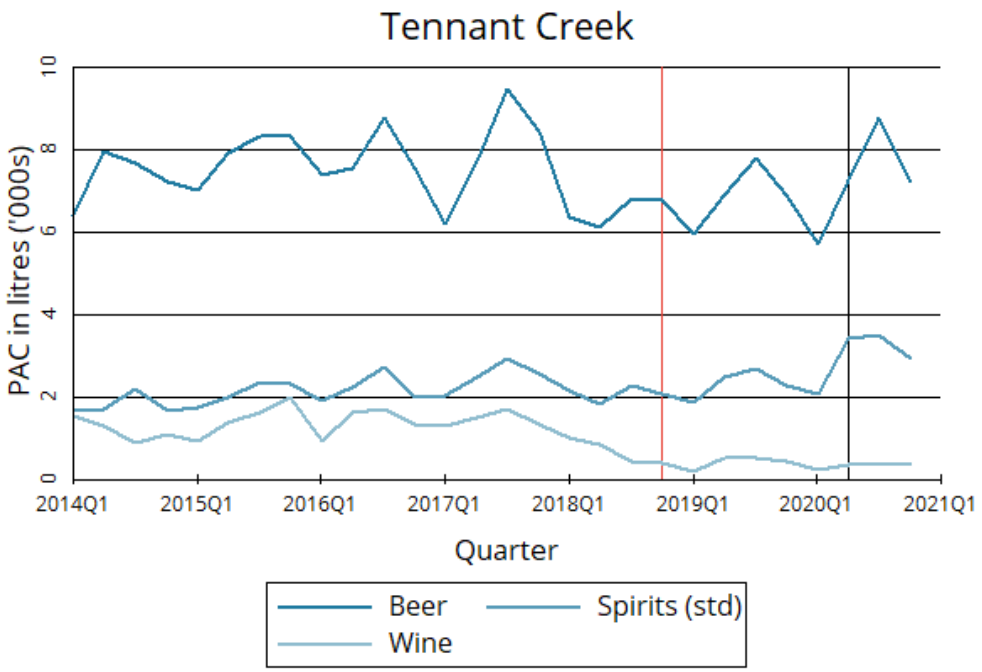
Source: Frontier Economics analysis of NT Licensing data

Figure 62: Wholesale supply of alcohol in Nhulunbuy by category – low volume



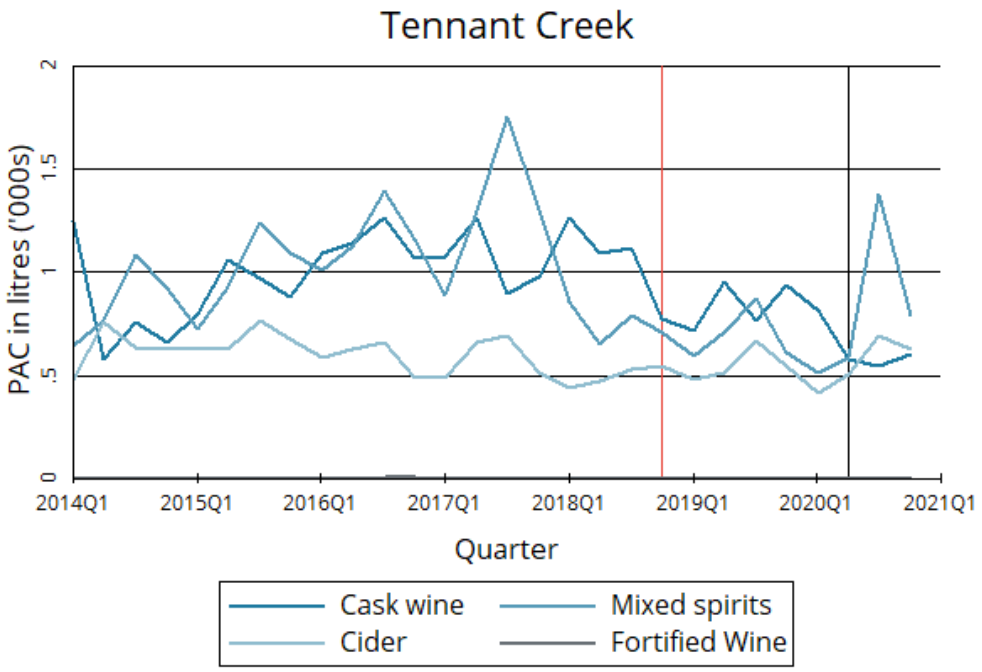
Source: Frontier Economics analysis of NT Licensing data

Figure 63: Wholesale supply of alcohol in Tennant Creek by category – high volume



Source: Frontier Economics analysis of NT Licensing data

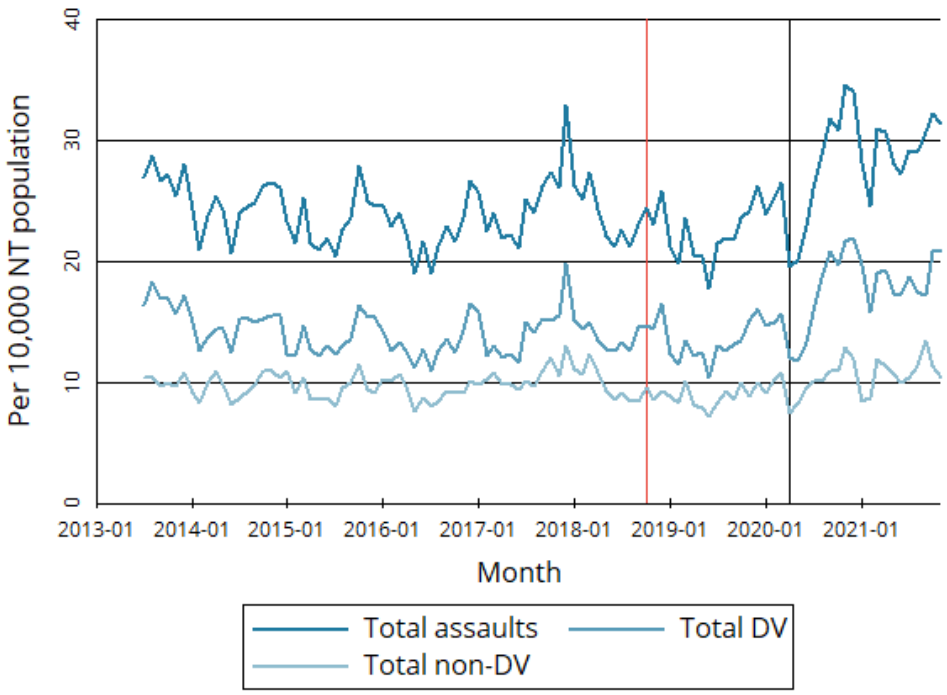
Figure 64: Wholesale supply of alcohol in Tennant Creek by category – low volume



Source: Frontier Economics analysis of NT Licensing data

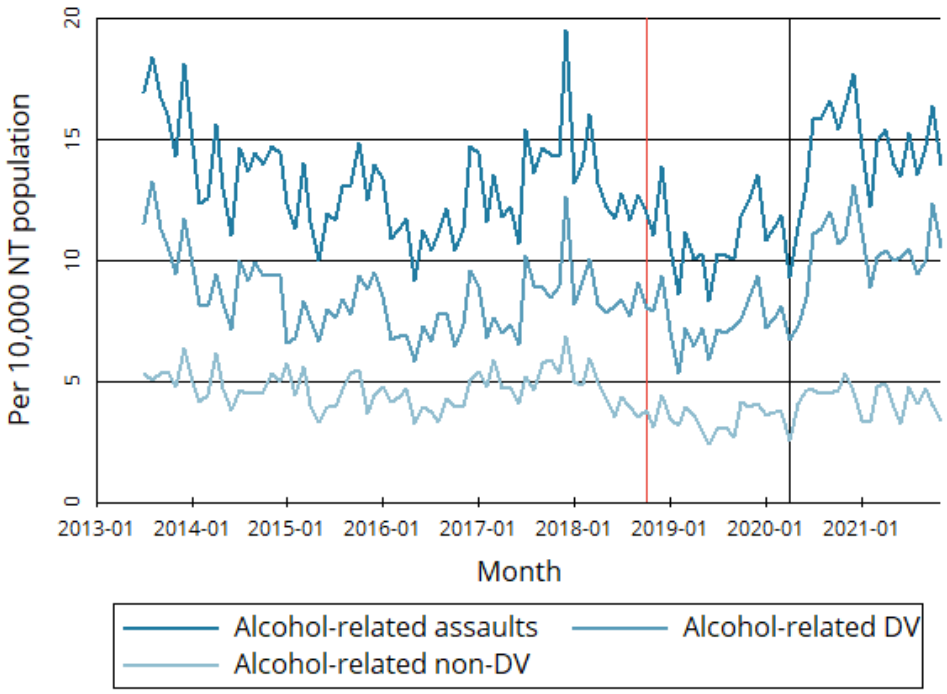
Assaults

Figure 65: Total number of assaults in the NT per 10,000 population- categorised by DV and non-DV offences



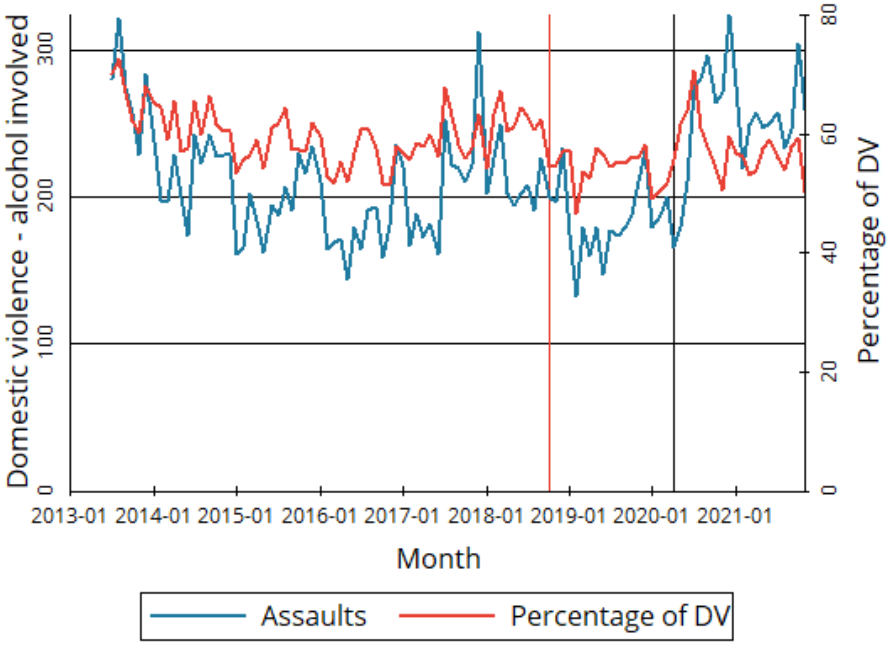
Source: Frontier Economics analysis using NT Police and the Department of the Attorney-General and Justice and ABS data

Figure 66: Total number of alcohol related assaults in the NT per 10,000 population- categorised by DV and non-DV offences



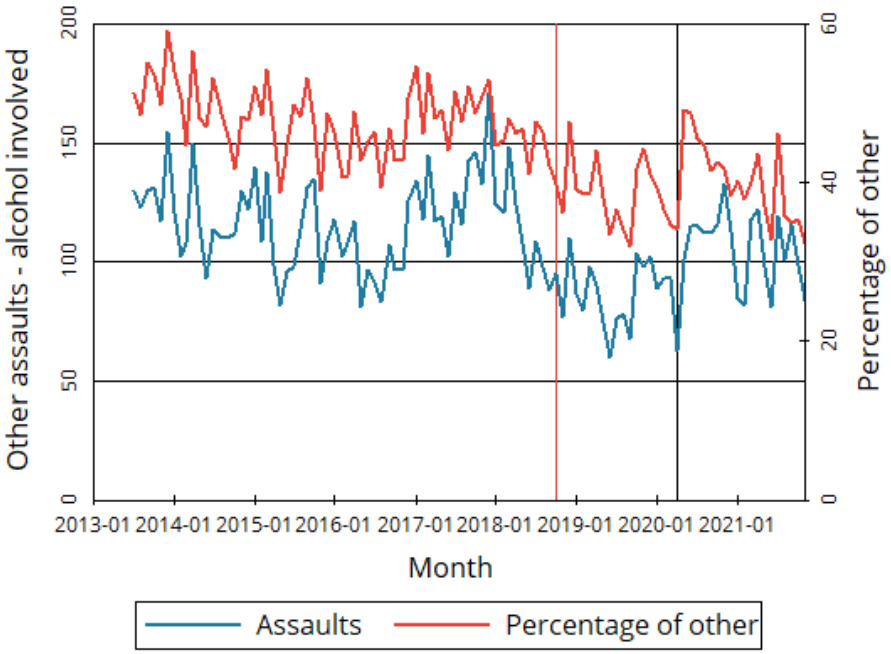
Source: Frontier Economics analysis using NT Police and the Department of the Attorney-General and Justice and ABS data

Figure 67: Percentage of DV offences with alcohol involved



Source: Frontier Economics analysis using NT Police and the Department of the Attorney-General and Justice data

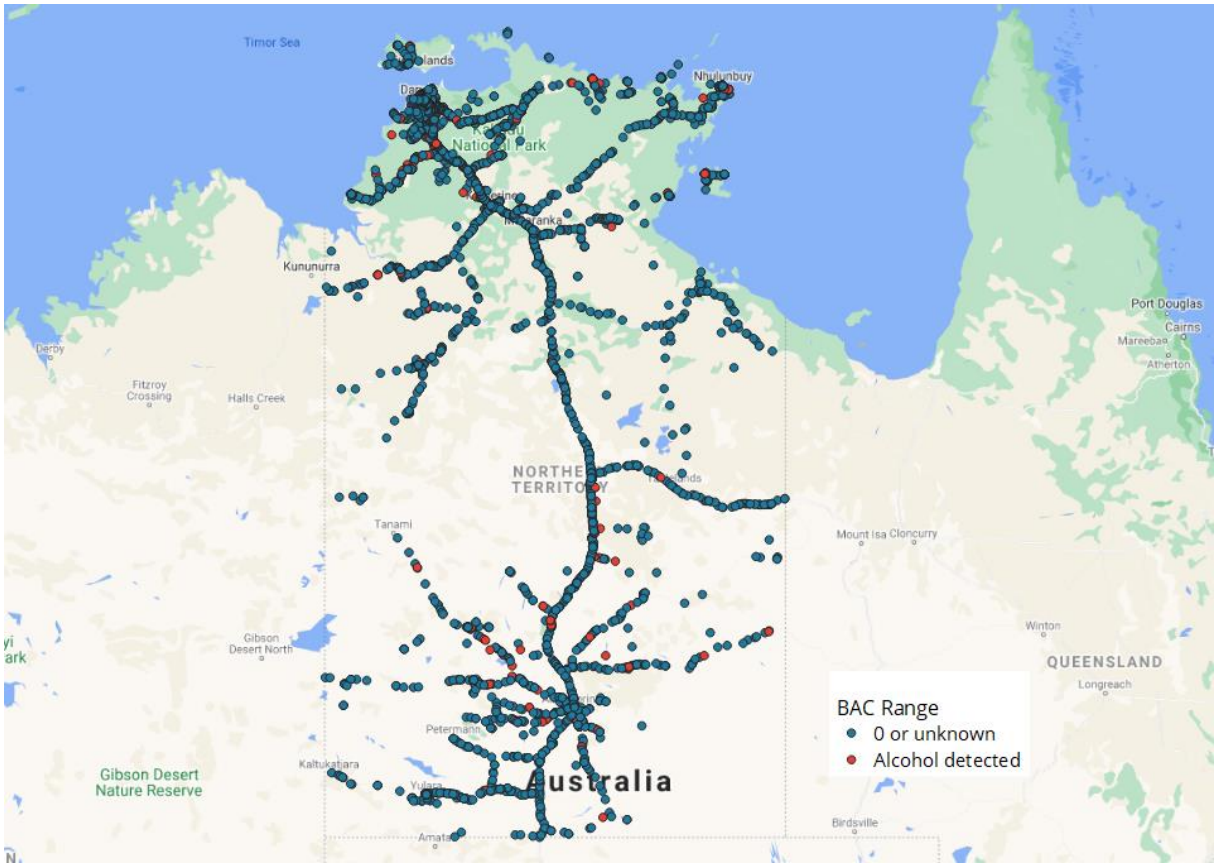
Figure 68: Percentage of non-DV offences with alcohol involved



Source: Frontier Economics analysis using NT Police and the Department of the Attorney-General and Justice data

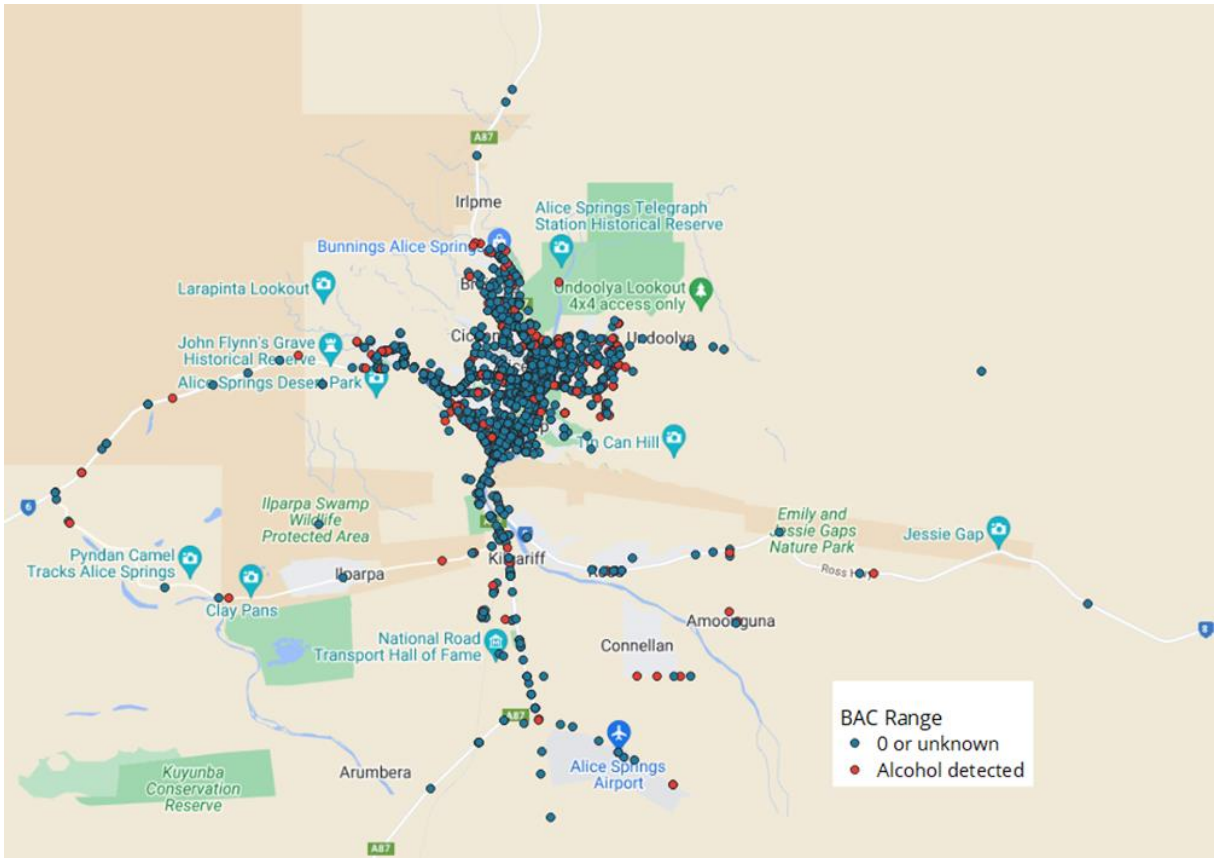
Drink driving crashes

Figure 69: NT-wide map of crashes



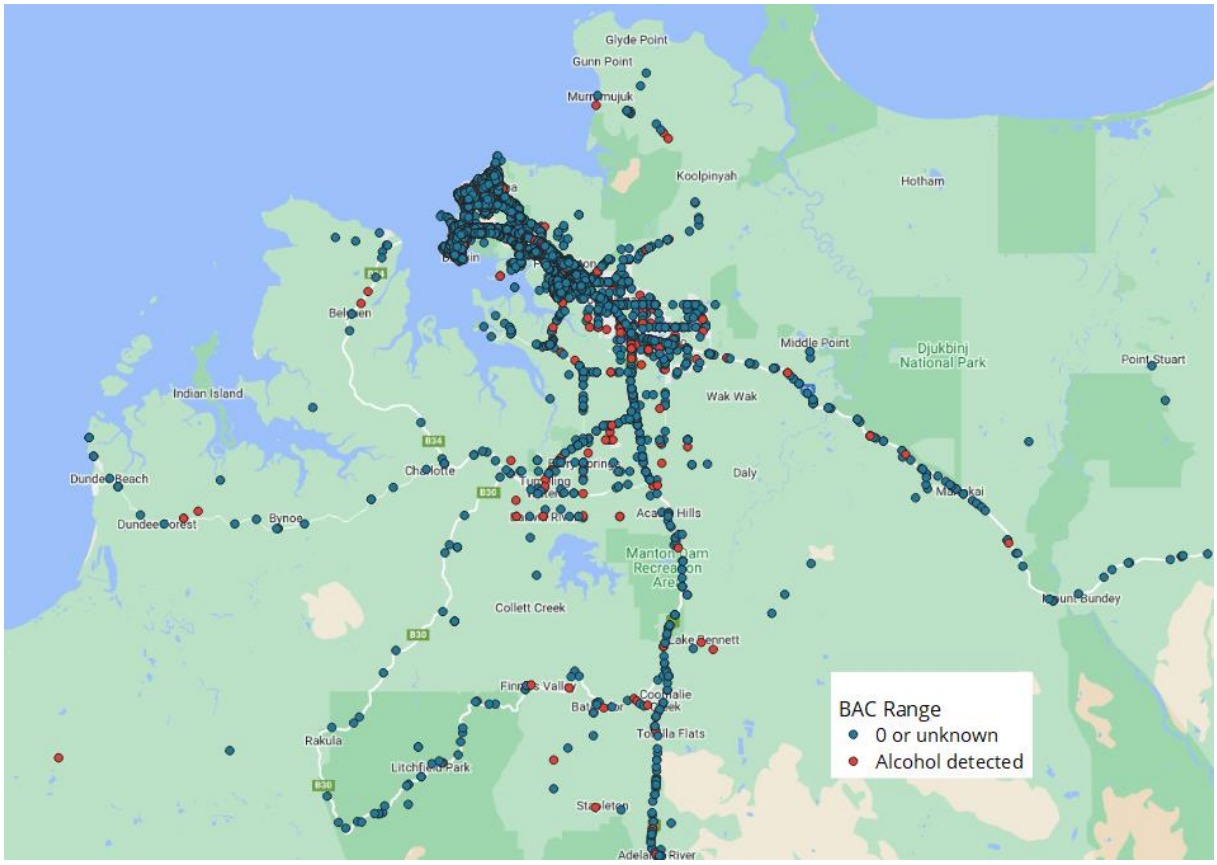
Source: Frontier Economics analysis using NT Police and the Department of the Attorney-General and Justice data

Figure 70: Map of crashes in Alice Springs



Source: Frontier Economics analysis using NT Police and the Department of the Attorney-General and Justice data

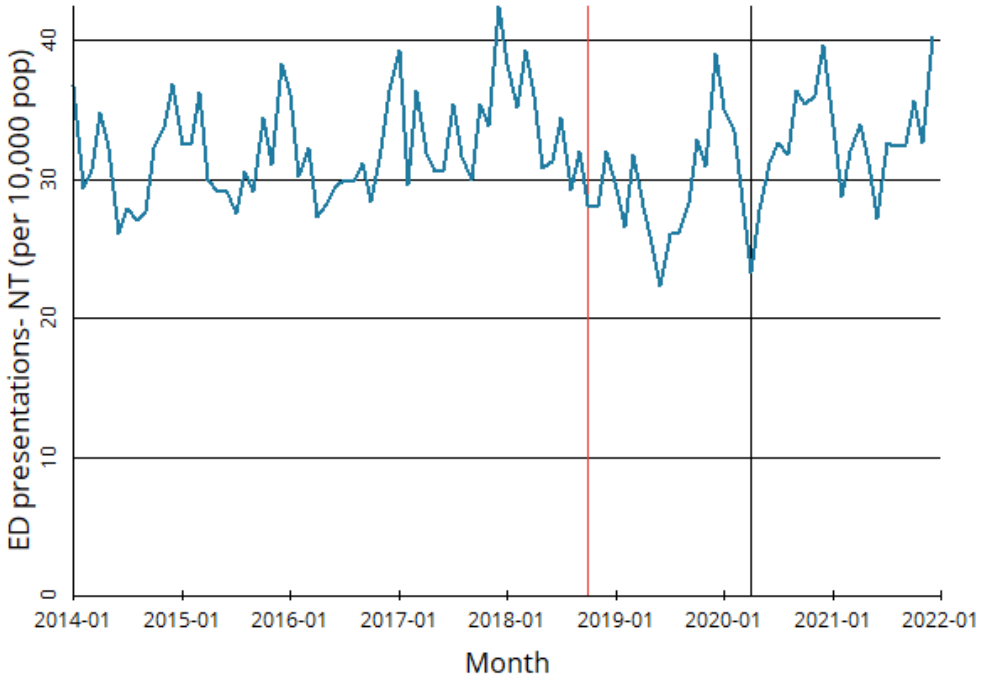
Figure 71: Map of crashes in Greater Darwin



Source: Frontier Economics analysis using NT Police and the Department of the Attorney-General and Justice data

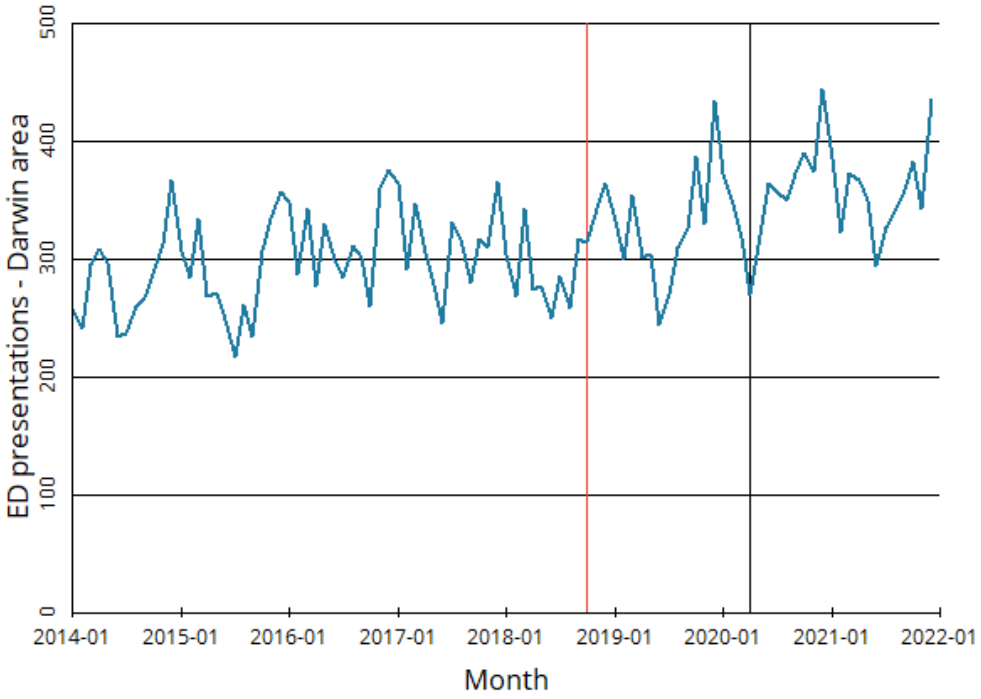
Alcohol related ED presentations

Figure 72: Total alcohol related ED presentations across the NT per 10,000 NT population



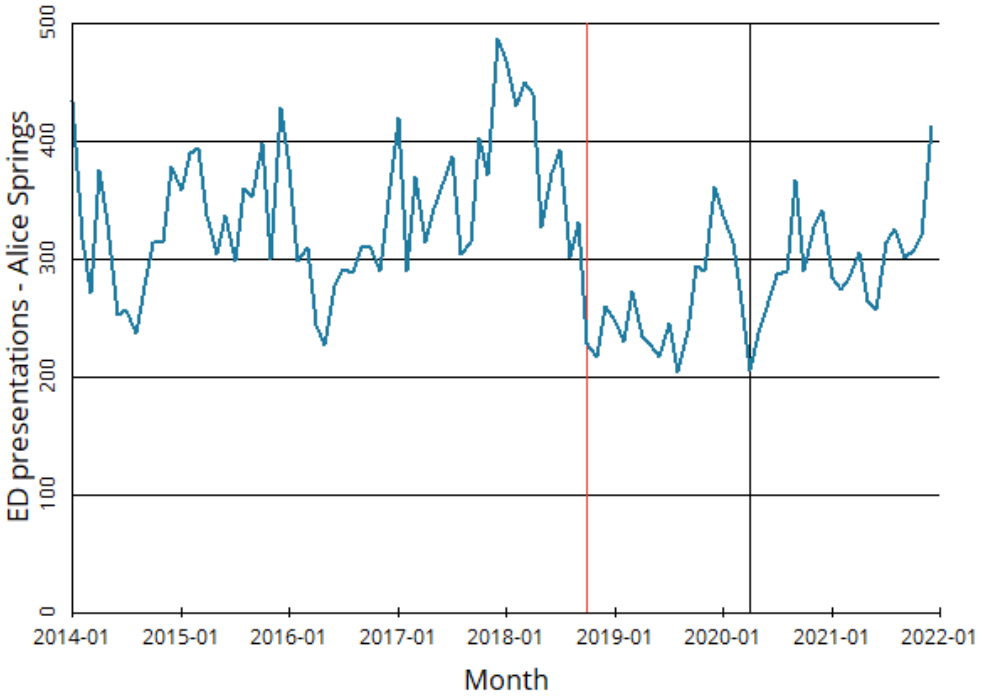
Source: Frontier Economics analysis using NT Health and ABS data

Figure 73: Alcohol related ED presentations in Darwin and Palmerston



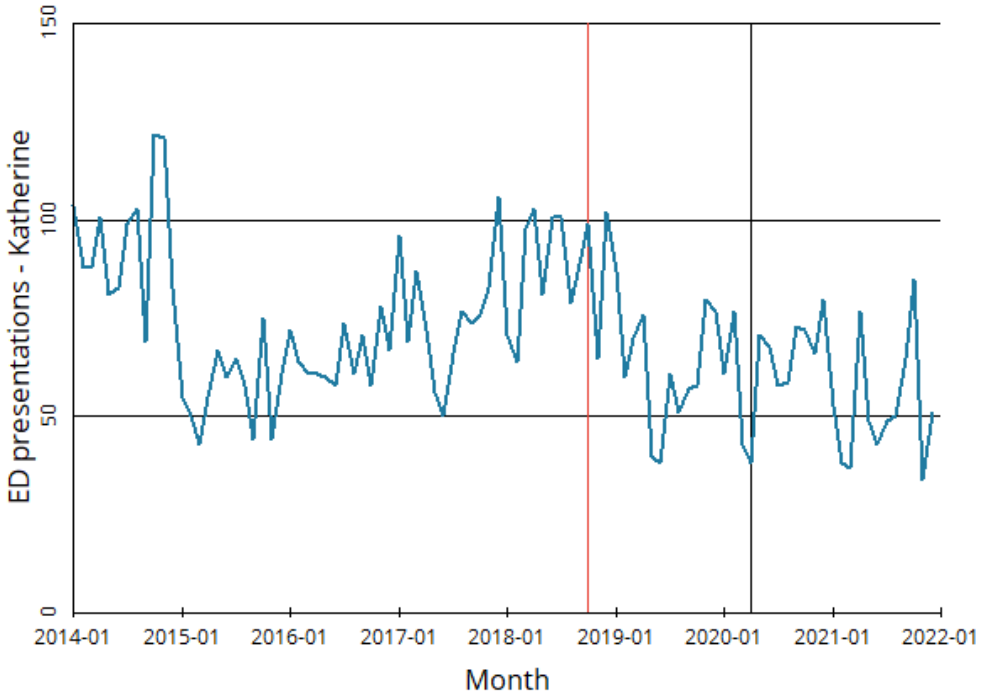
Source: Frontier Economics analysis using NT Health data

Figure 74: Alcohol related ED presentations in Alice Springs



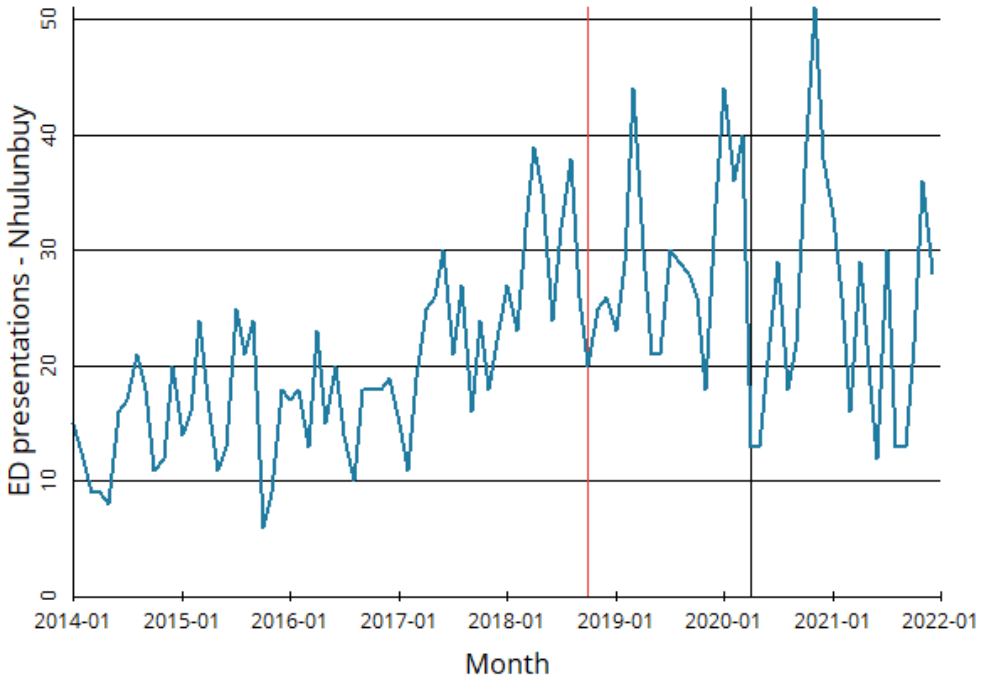
Source: Frontier Economics analysis using NT Health data

Figure 75: Alcohol related ED presentations in Katherine



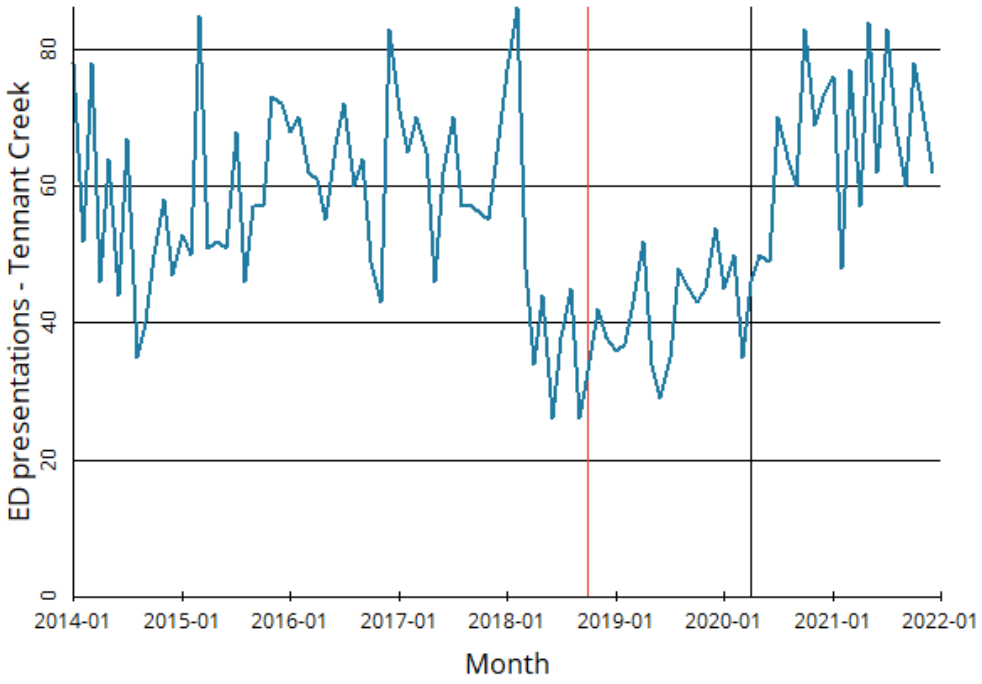
Source: Frontier Economics analysis using NT Health data

Figure 76: Alcohol related ED presentations in Nhulunbuy



Source: Frontier Economics analysis using NT Health data

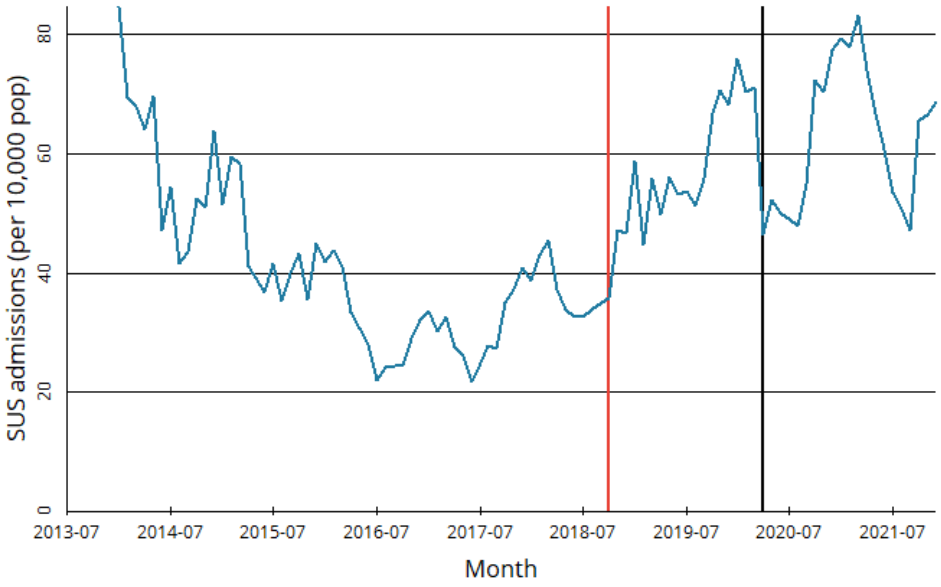
Figure 77: Alcohol related ED presentations in Tennant Creek



Source: Frontier Economics analysis using NT Health data

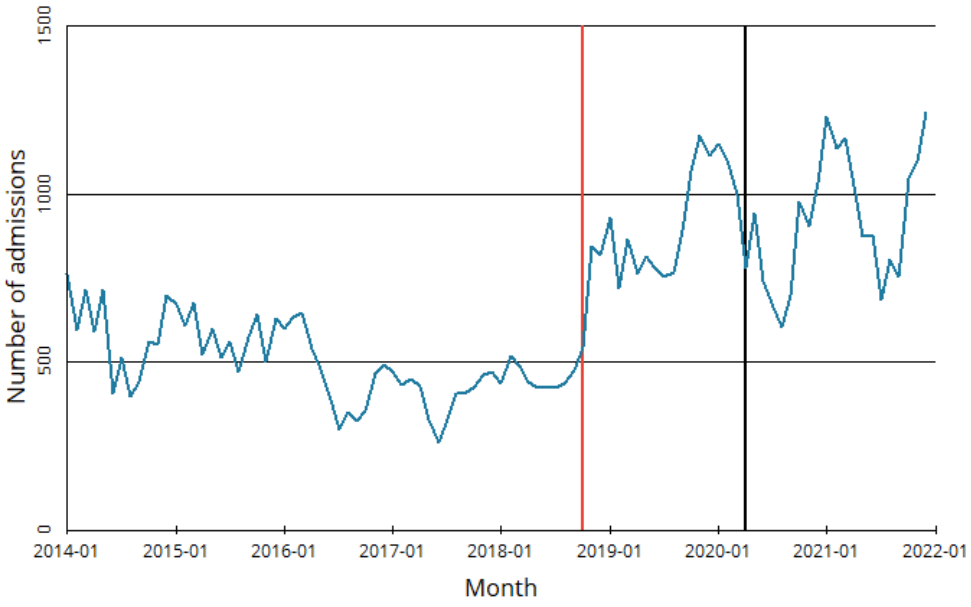
SUS attendance

Figure 78: SUS attendance per capita - NT



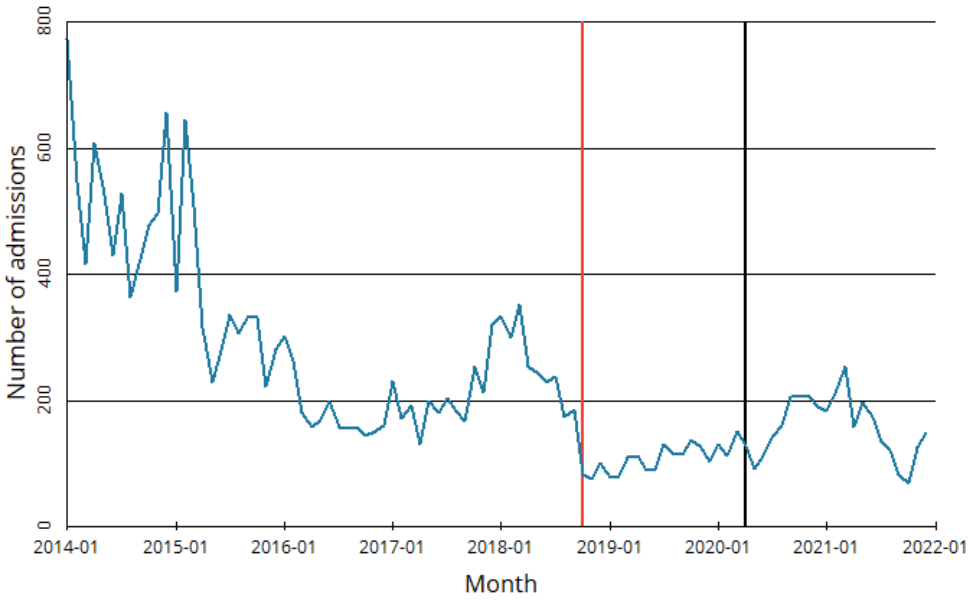
Source: Frontier Economics analysis using NT Health and ABS data

Figure 79: SUS attendance – Darwin



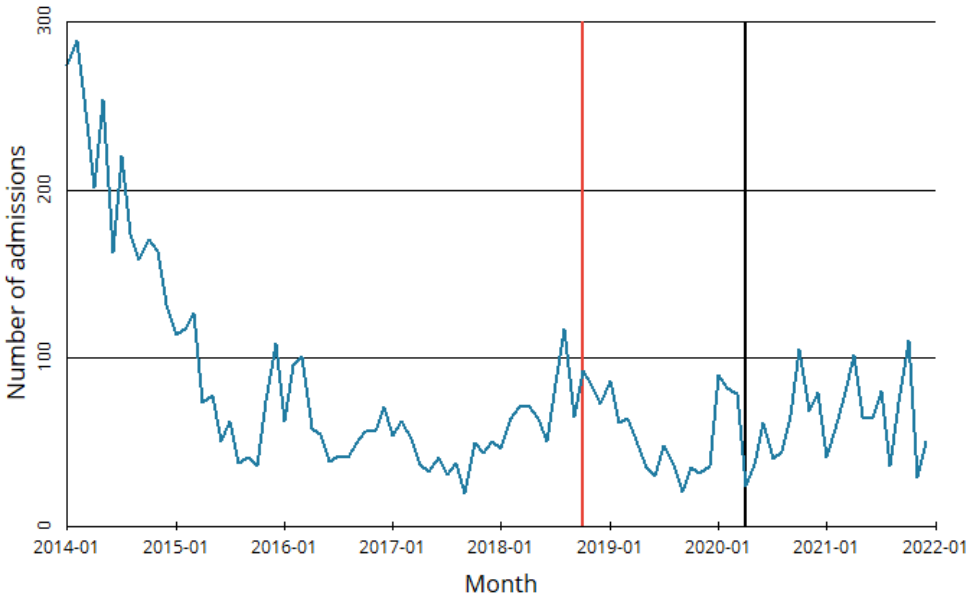
Source: Frontier Economics analysis using NT Health data

Figure 80: SUS attendance – Alice Springs



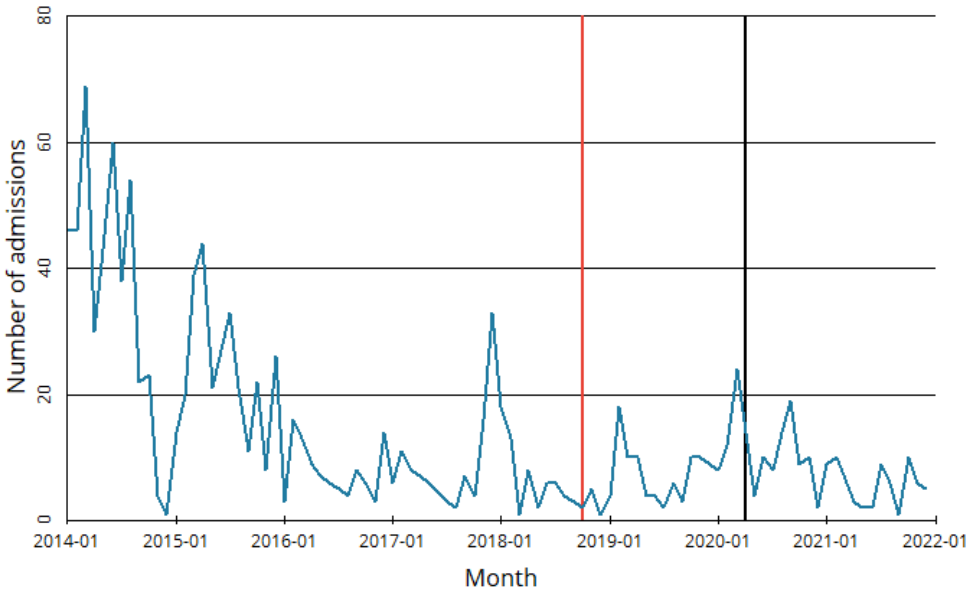
Source: Frontier Economics analysis using NT Health data

Figure 81: SUS attendance - Katherine



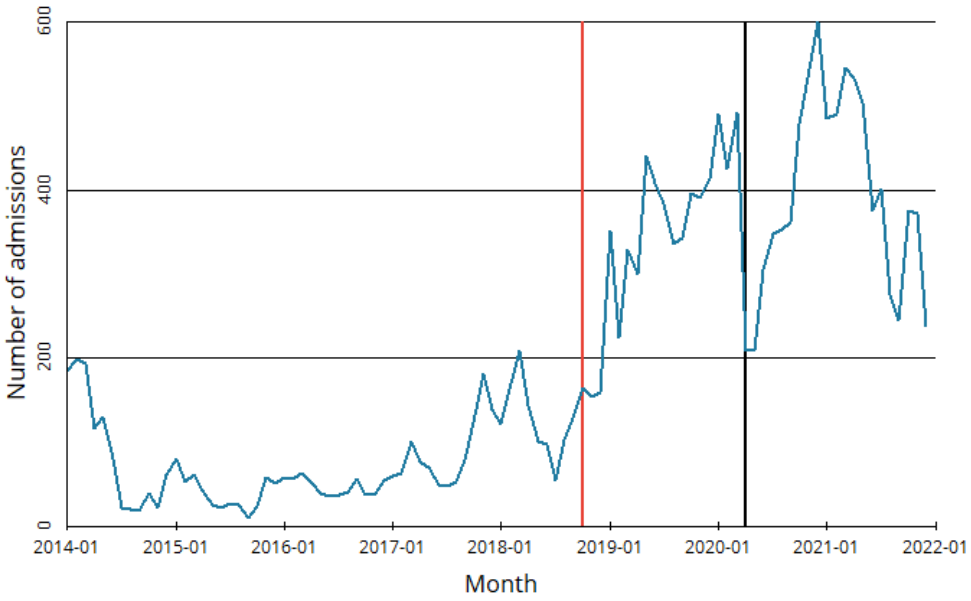
Source: Frontier Economics analysis using NT Health data

Figure 82: SUS attendance - Nhulunbuy



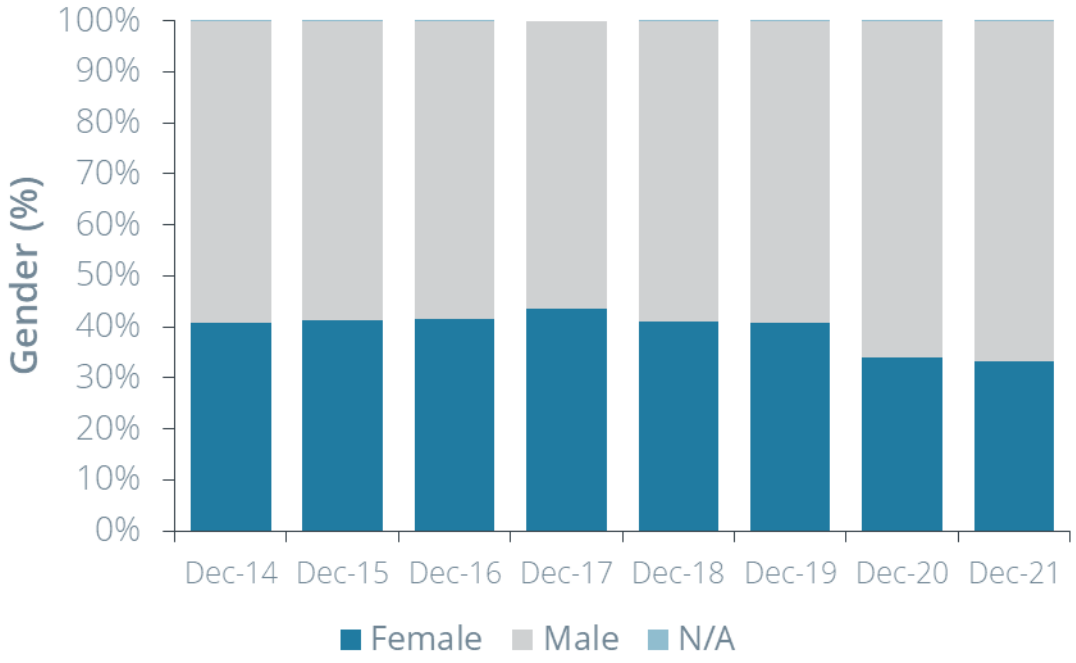
Source: Frontier Economics analysis using NT Health data

Figure 83: SUS attendance – Tennant Creek



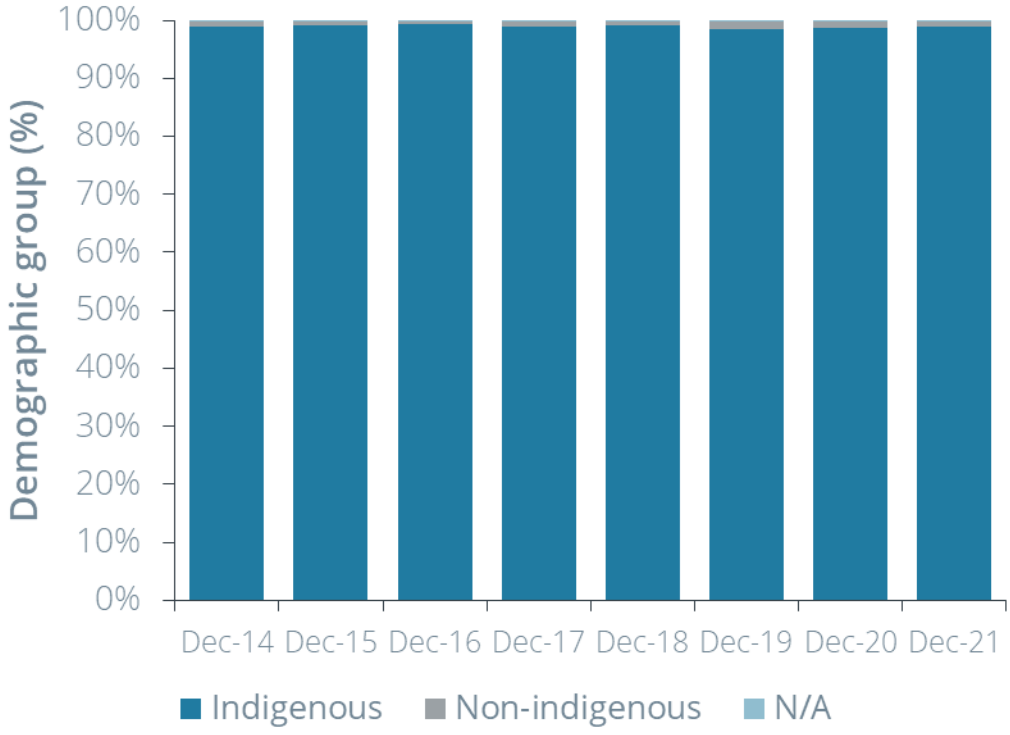
Source: Frontier Economics analysis using NT Health data

Figure 84: SUS attendance – categorised by gender



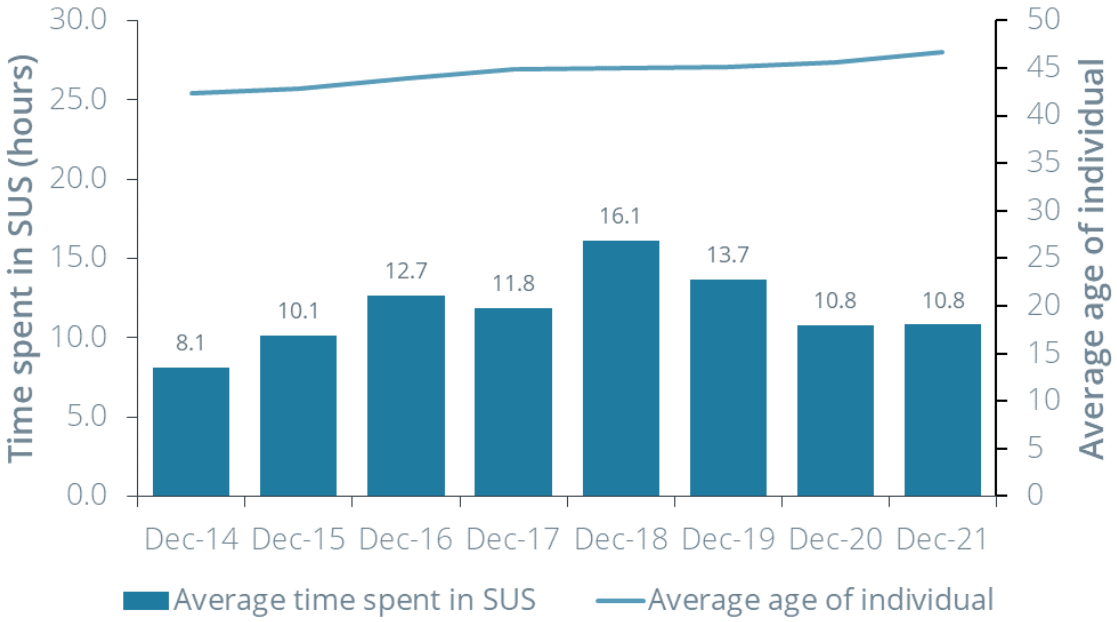
Source: Frontier Economics analysis using NT Health data

Figure 85: SUS attendance – categorised by gender



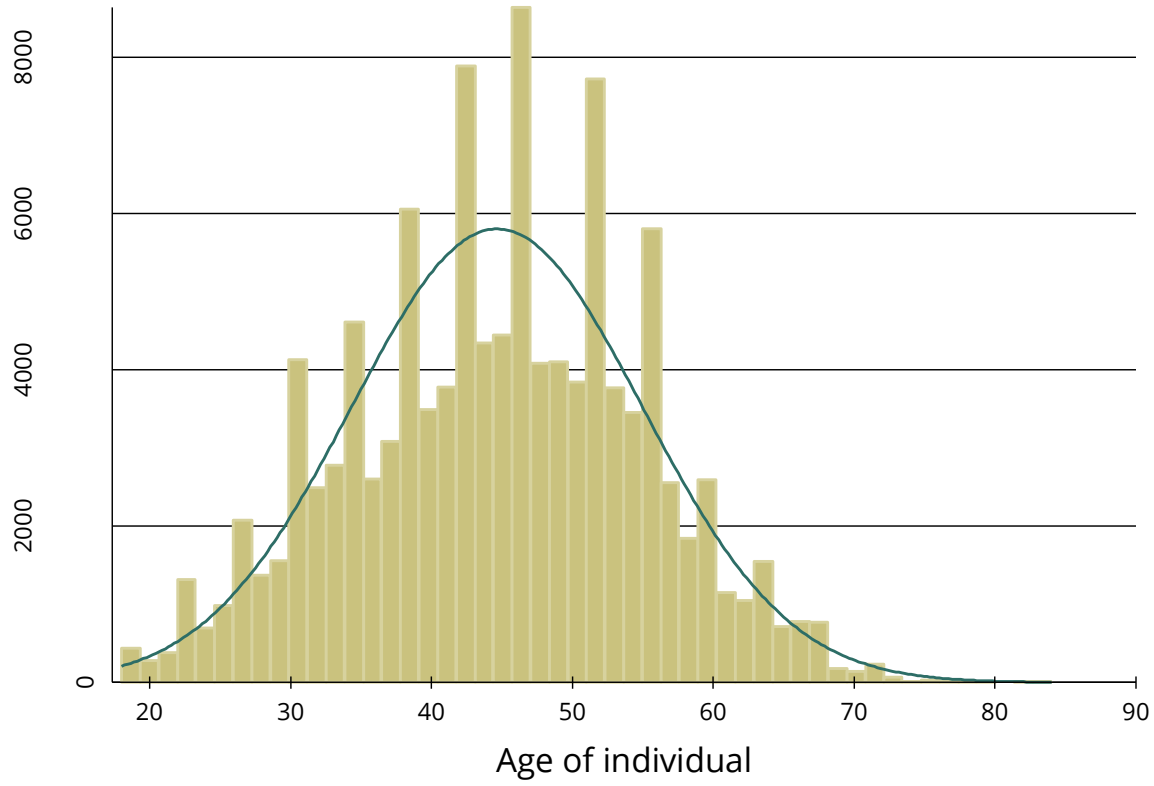
Source: Frontier Economics analysis using NT Health data

Figure 86: Average time spent and age of an individual in a SUS in the NT



Source: Frontier Economics analysis using NT Health data

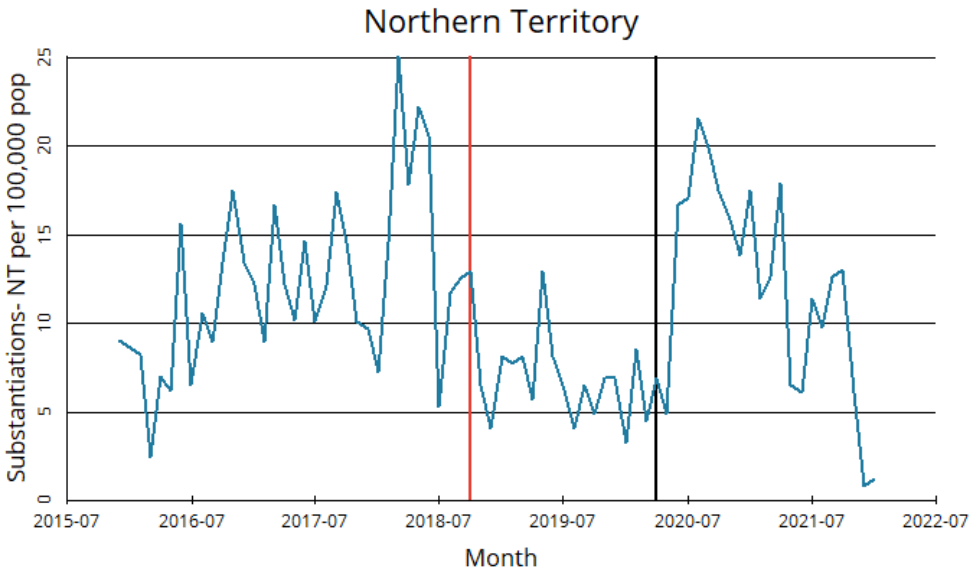
Figure 87: Age distribution of individuals in SUS in the NT



Source: Frontier Economics analysis using NT Health data

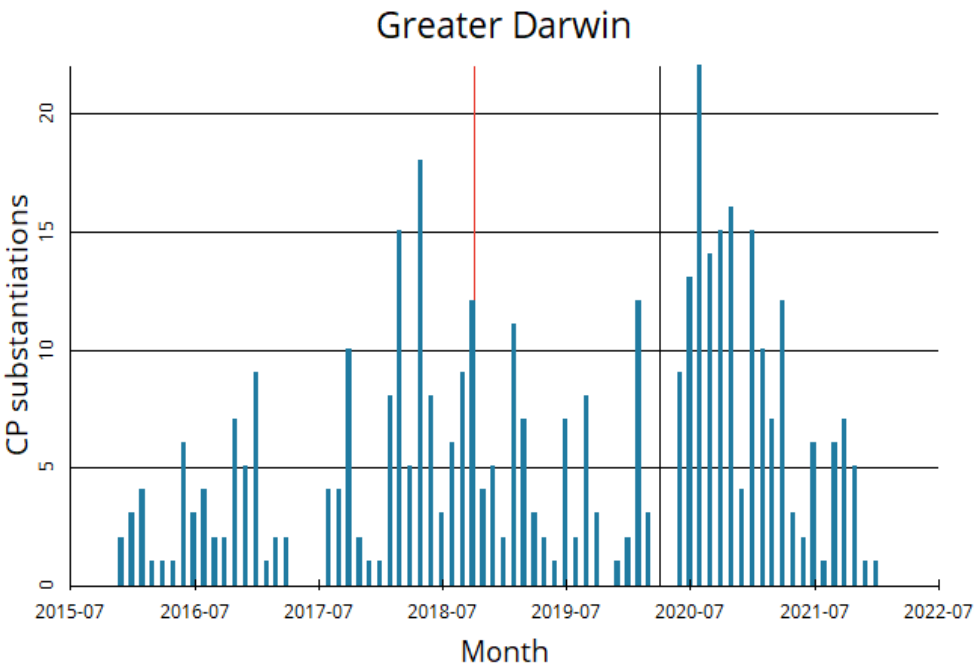
Alcohol related child protection substantiations

Figure 88: Alcohol related child protection substantiations per 100,000 NT population



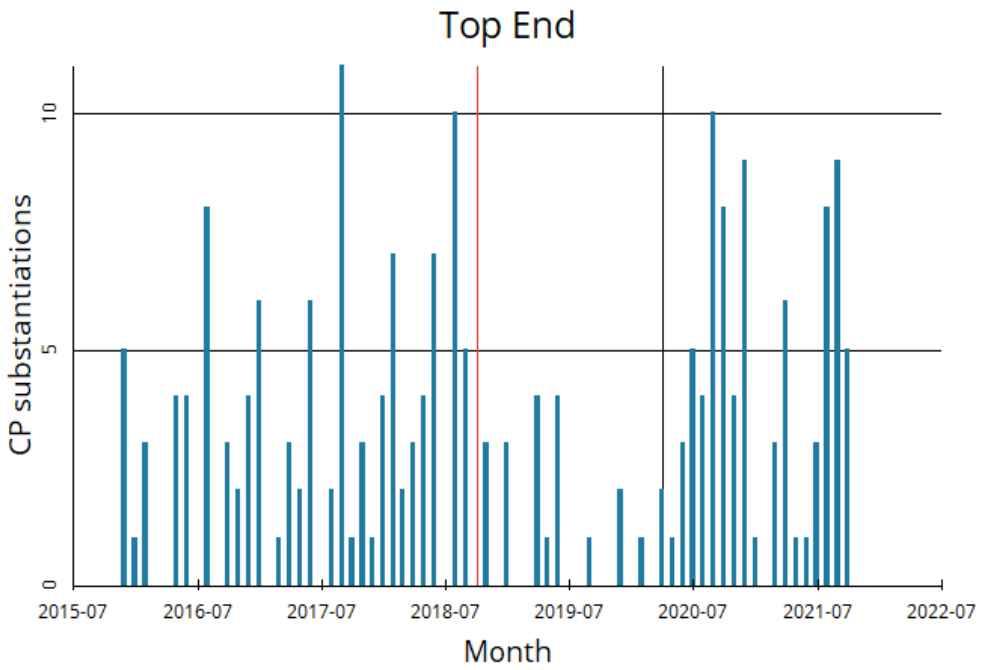
Source: Frontier Economics analysis using NT Health and ABS data

Figure 89: Child protection substantiations – Greater Darwin



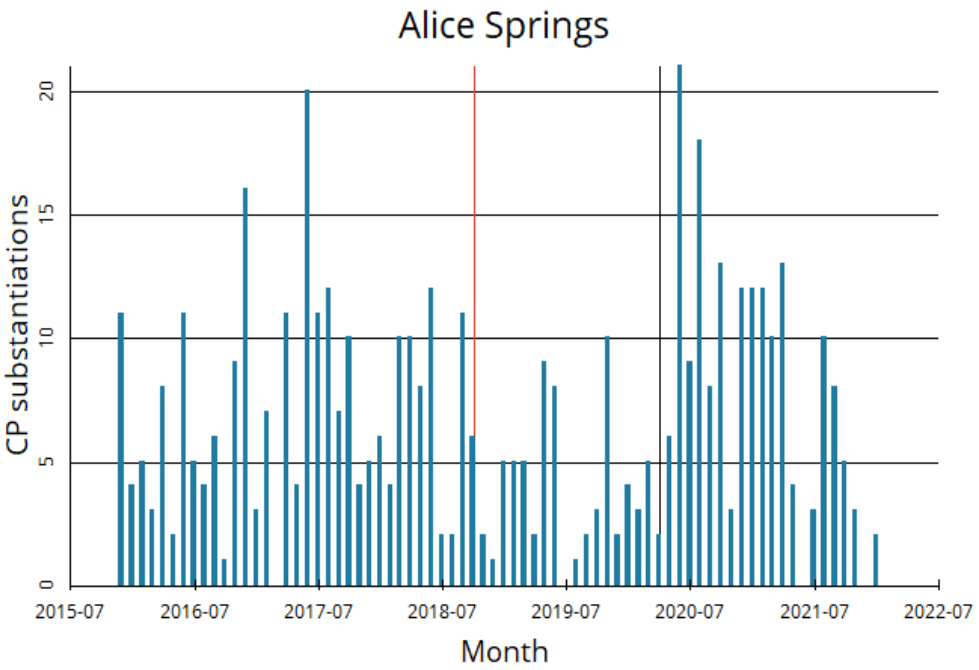
Source: Frontier Economics analysis using NT Health data

Figure 90: Child protection substantiations – Top End



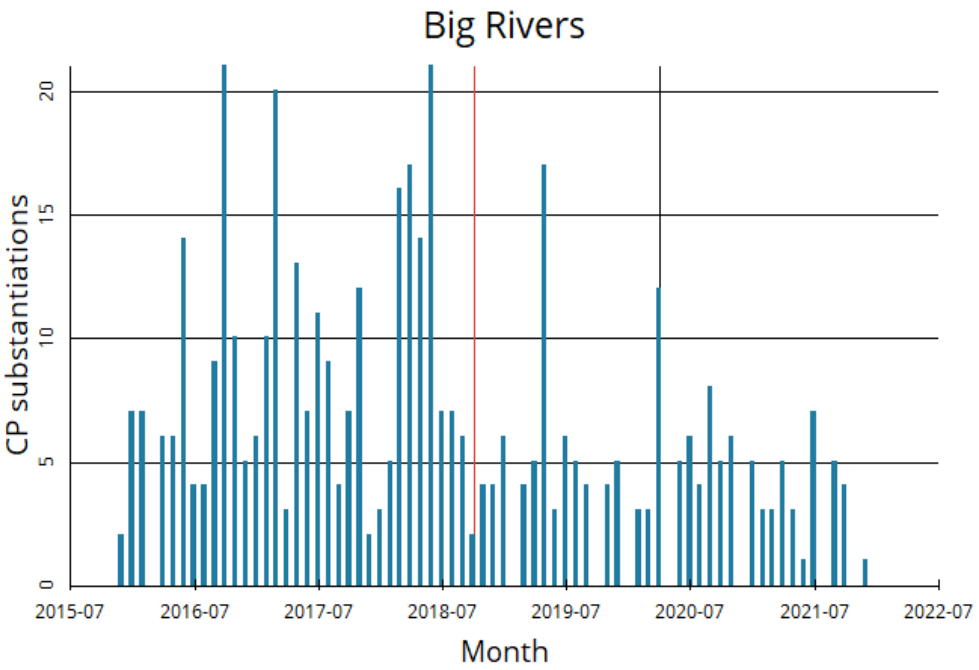
Source: Frontier Economics analysis using NT Health data

Figure 91: Child protection substantiations –Alice Springs



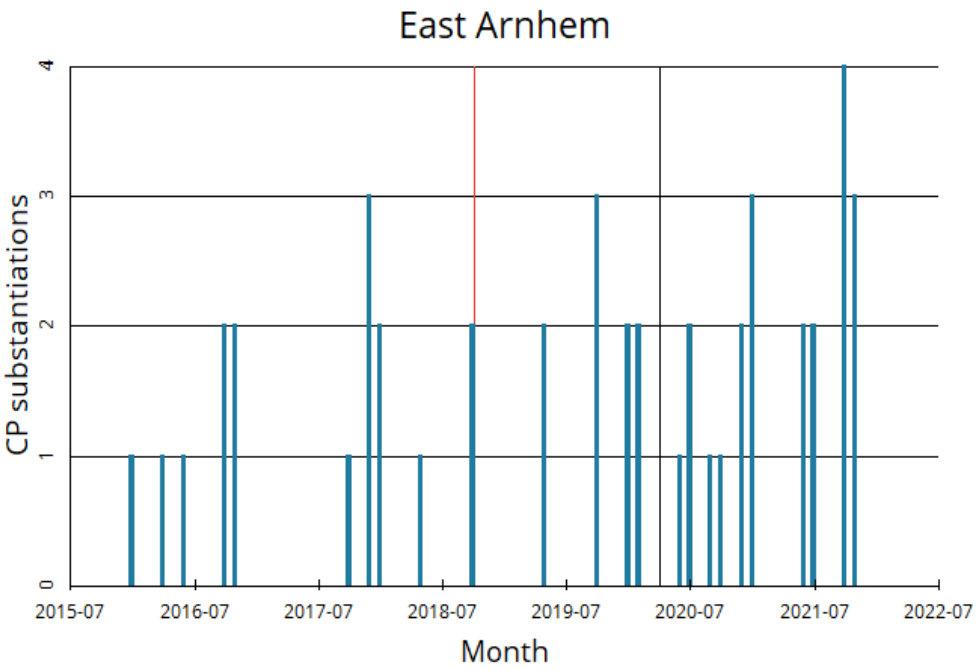
Source: Frontier Economics analysis using NT Health data

Figure 92: Child protection substantiations –Big Rivers



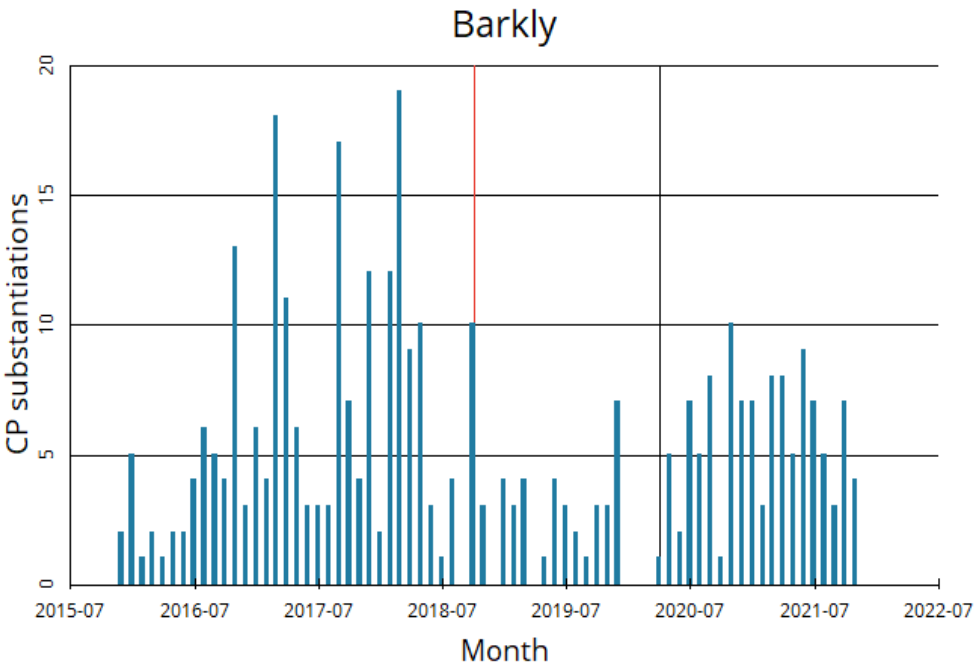
Source: Frontier Economics analysis using NT Health data

Figure 93: Child protection substantiations –East Arnhem



Source: Frontier Economics analysis using NT Health data

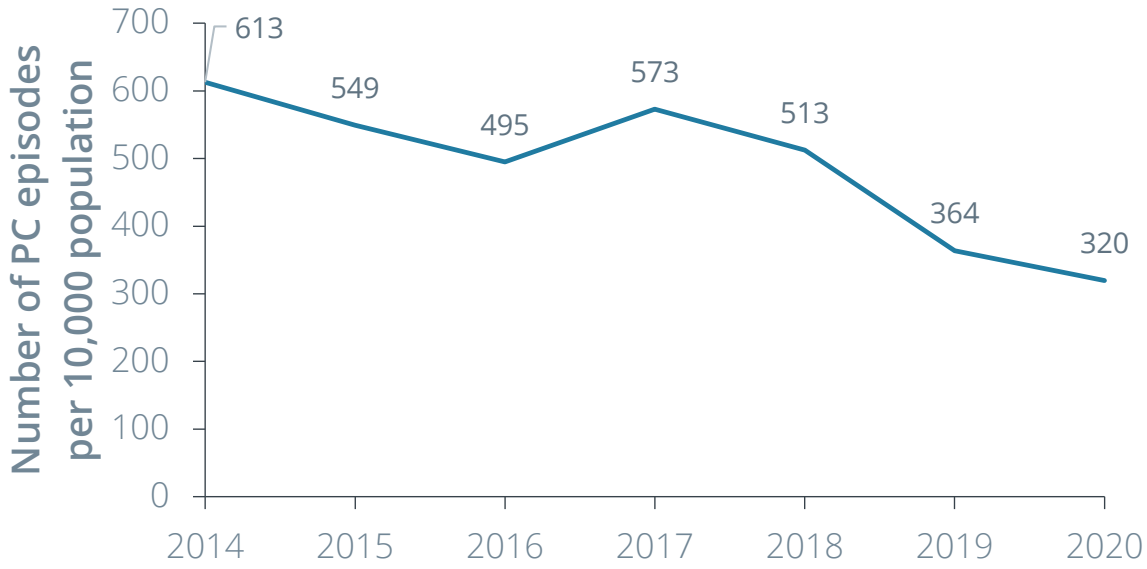
Figure 94: Child protection substantiations –Barkly



Source: Frontier Economics analysis using NT Health data

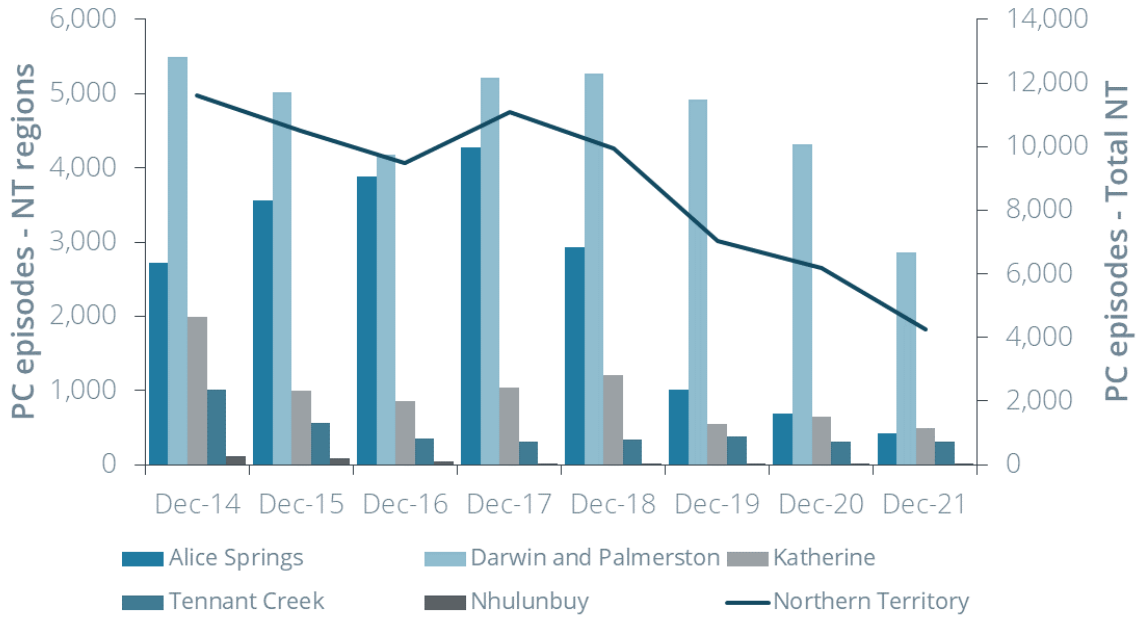
Protective custody episodes

Figure 95: Protective custody episodes per capita - NT



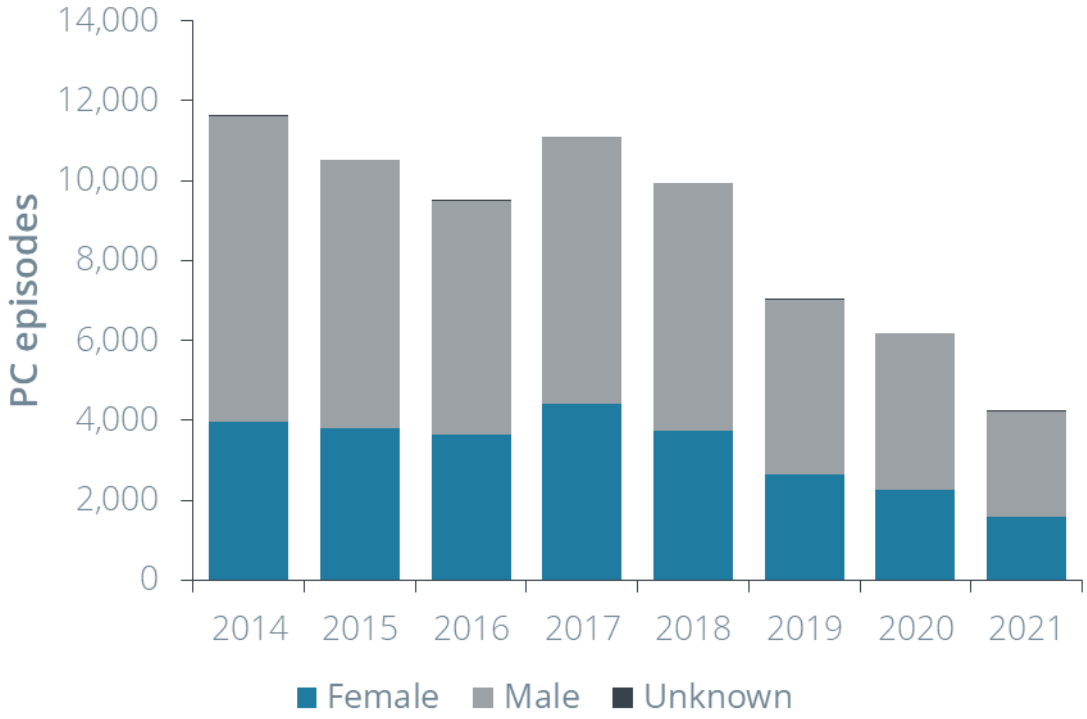
Source: Frontier Economics analysis of NT Police and the Department of the Attorney-General and Justice and ABS data

Figure 96: Protective custody episodes – NT regions



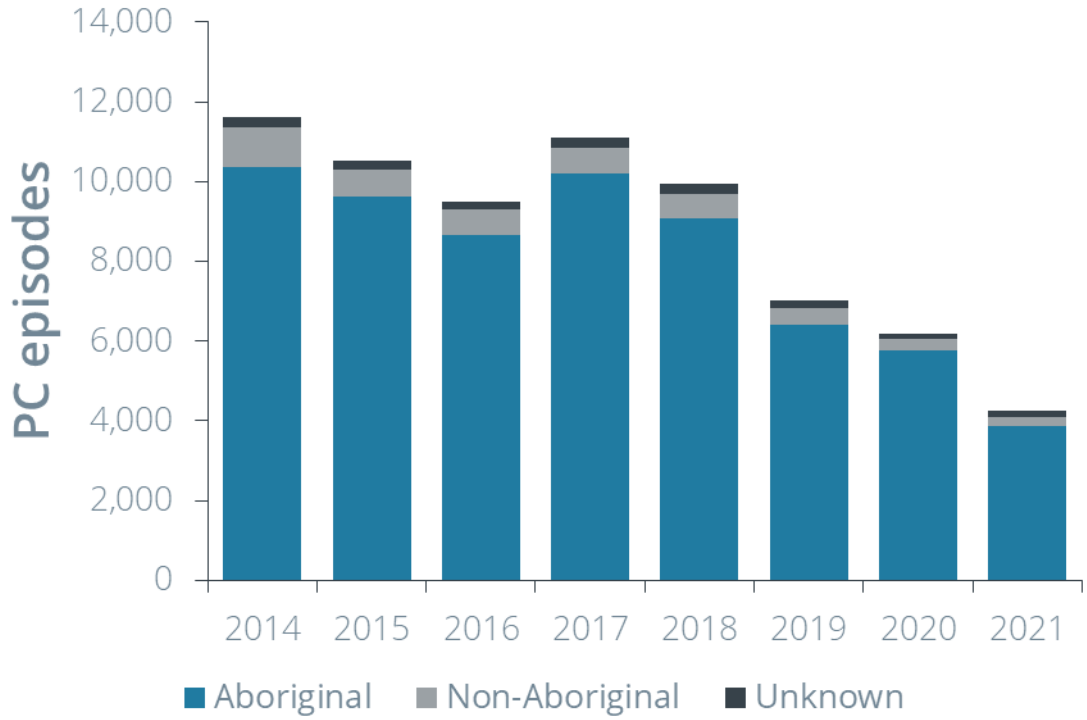
Source: Frontier Economics analysis of NT Police and the Department of the Attorney-General and Justice data

Figure 97: Protective custody episodes – categorised by gender



Source: Frontier Economics analysis of NT Police and the Department of the Attorney-General and Justice data

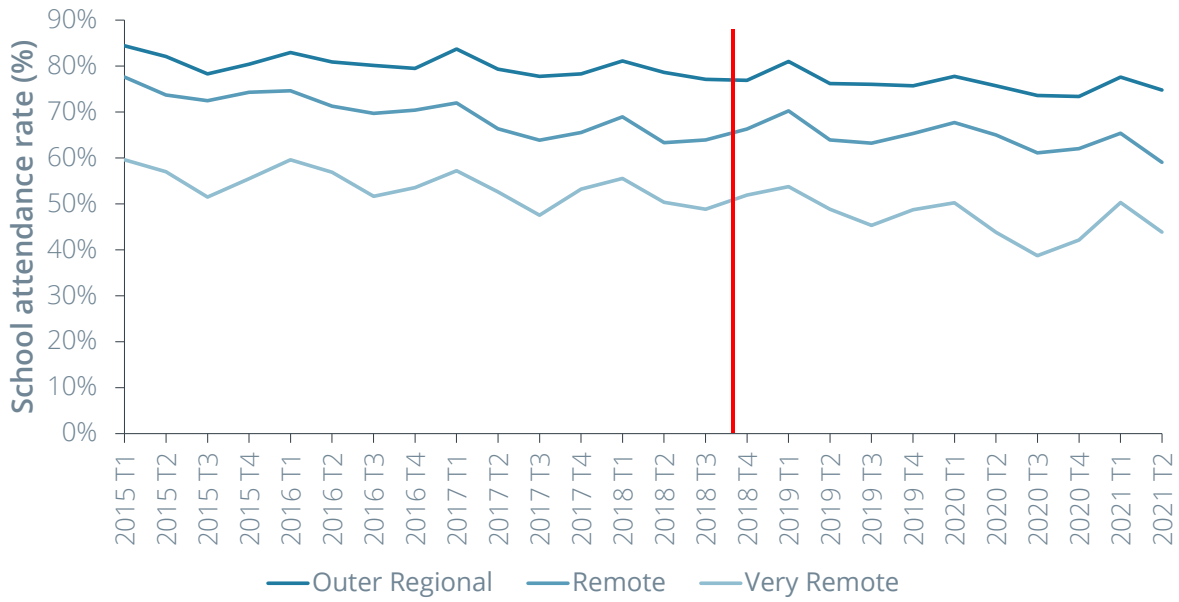
Figure 98: Protective custody episodes – categorised by aboriginal status



Source: Frontier Economics analysis of NT Police and the Department of the Attorney-General and Justice data

School attendance rates

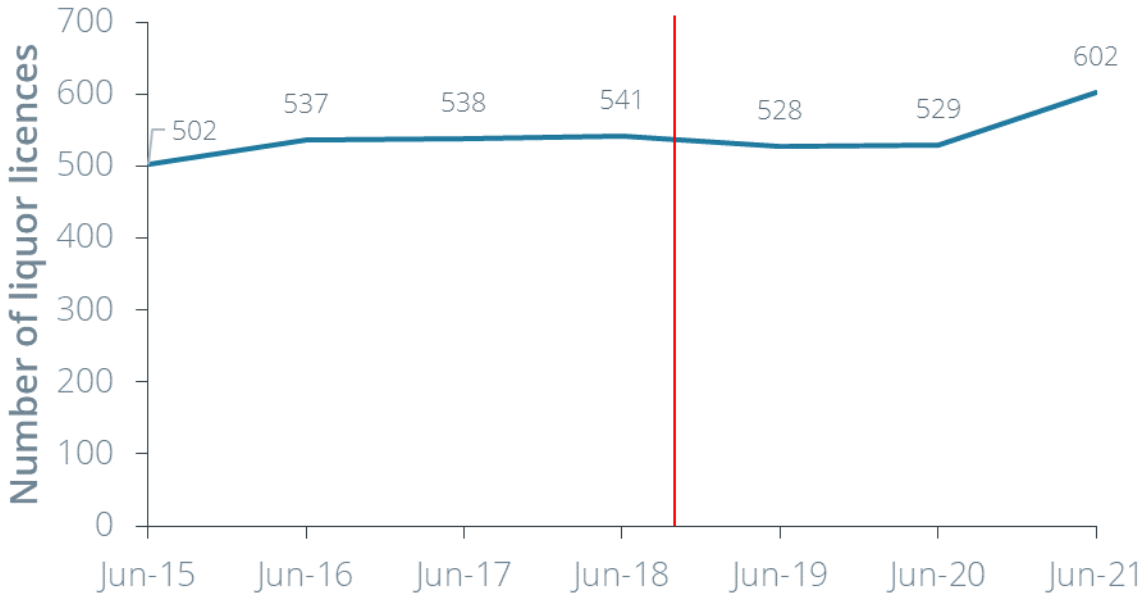
Figure 99: School attendance rate by remoteness in the NT (%)



Source: Frontier Economics analysis of NT Department of Education data

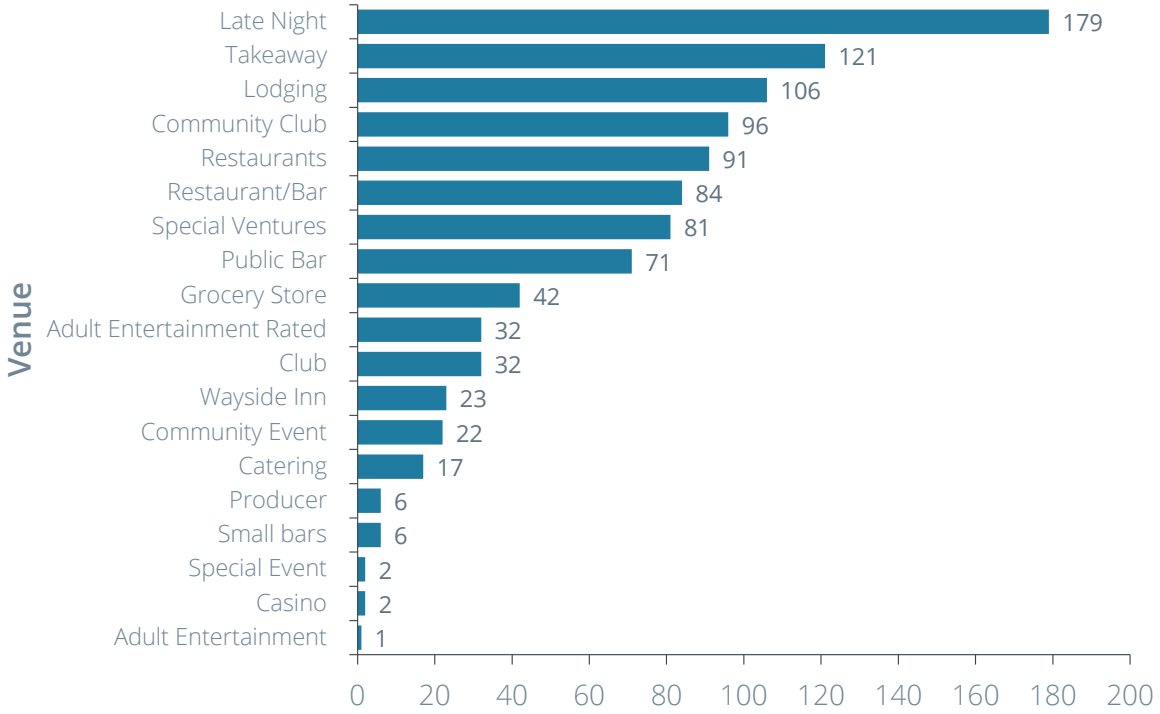
Liquor licences

Figure 100: Number of liquor licences across the NT from 2015 to 2021



Source: Frontier Economics analysis of NT Licensing data

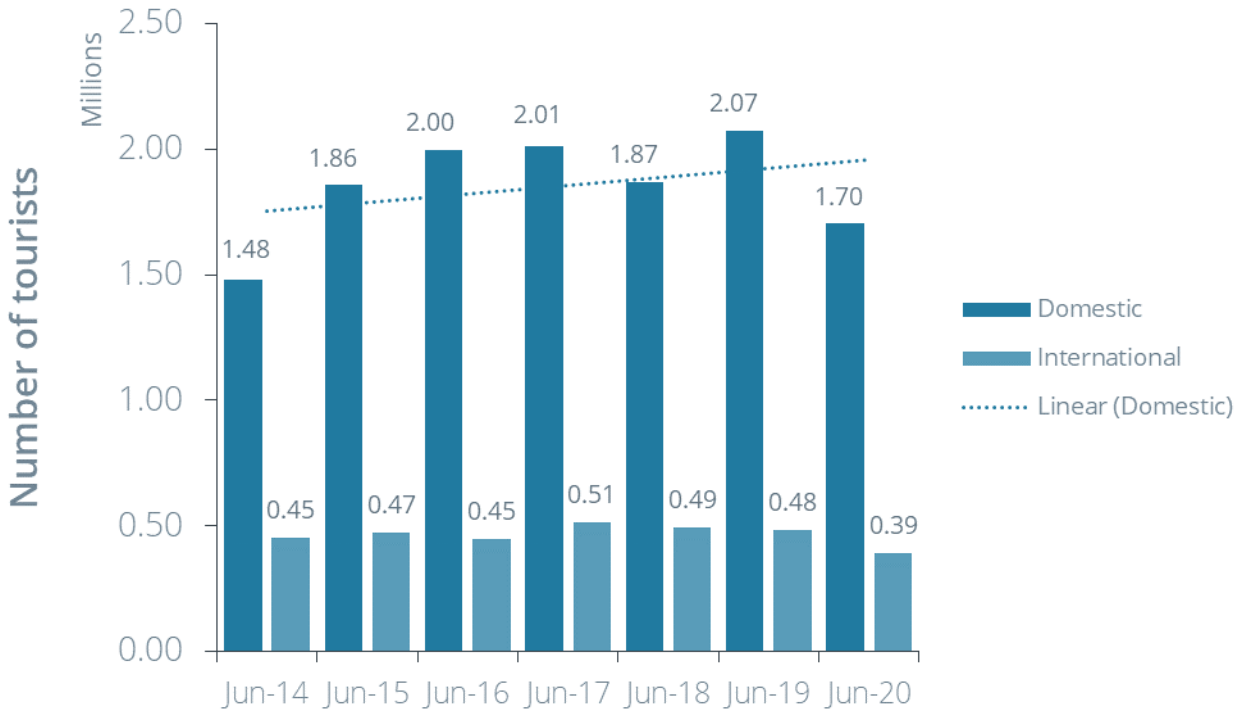
Figure 101: Breakdown of liquor licence authorities in 2021 across the NT



Source: Frontier Economics analysis of NT Licensing data

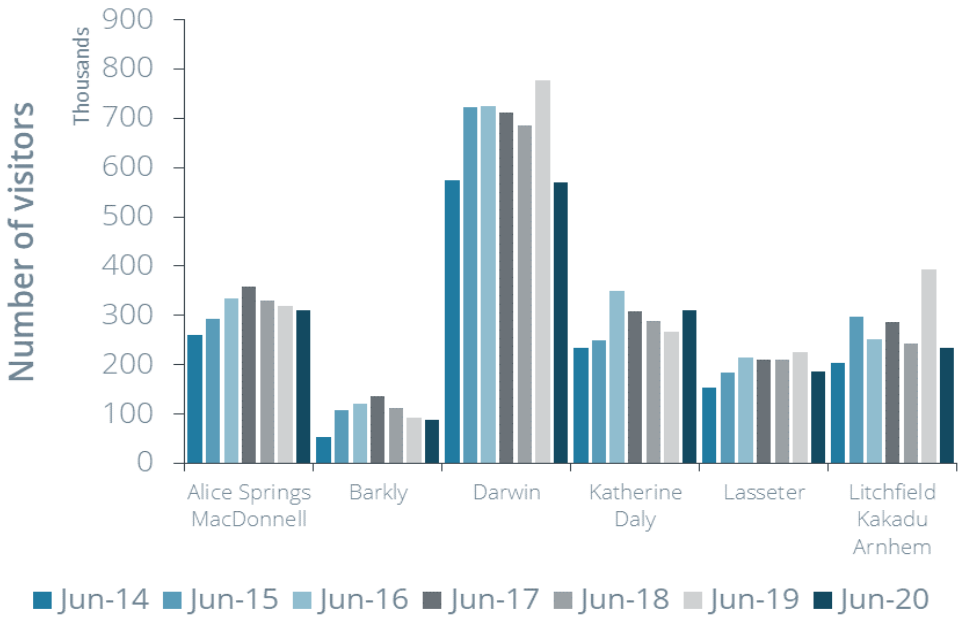
Tourism

Figure 102: Number of domestic and international visitors - Total NT



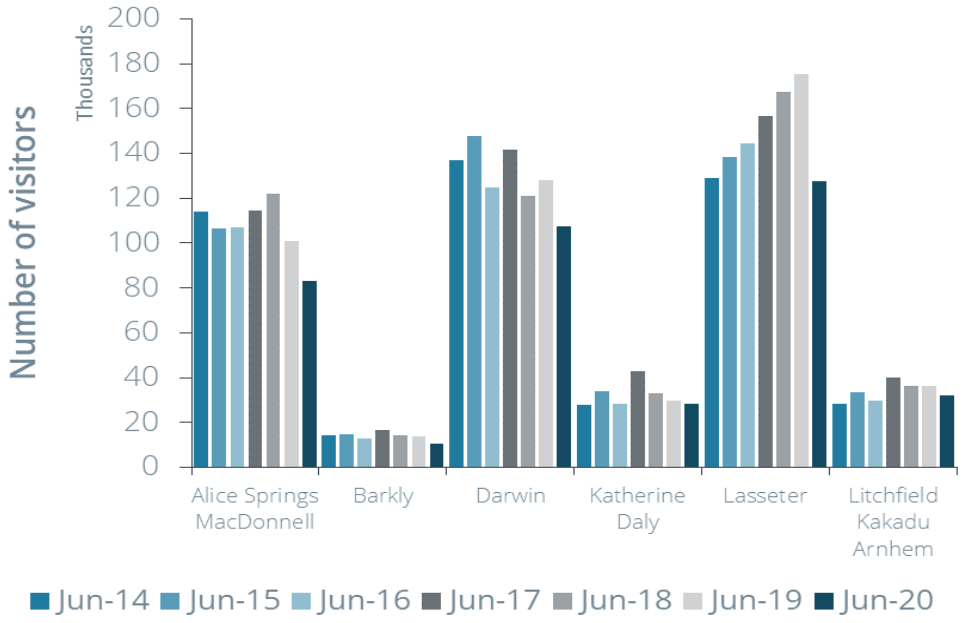
Source: Frontier Economics analysis using Tourism Research Australia data

Figure 103: Number of domestic visitors – categorised by NT regions



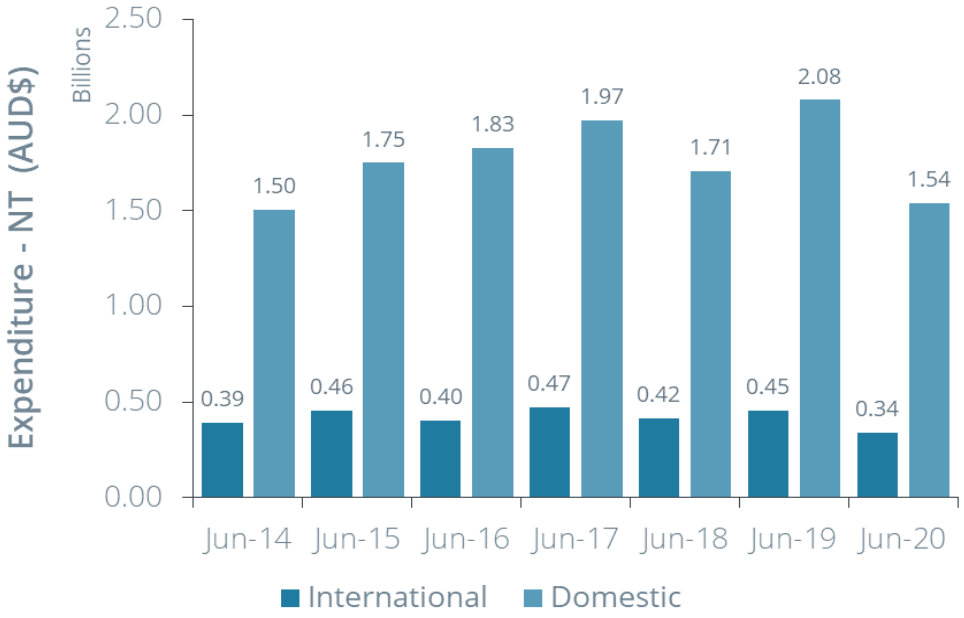
Source: Frontier Economics analysis using Tourism Research Australia data

Figure 104: Number of international visitors – categorised by NT regions



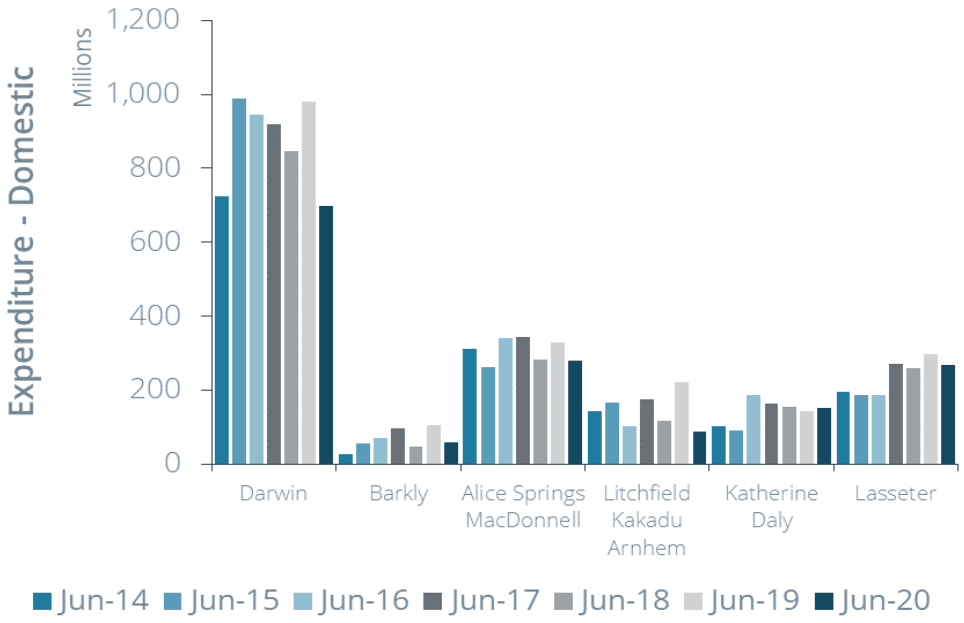
Source: Frontier Economics analysis using Tourism Research Australia data

Figure 105: Tourist expenditure ($billions) categorised by domestic and international visitors - Total NT



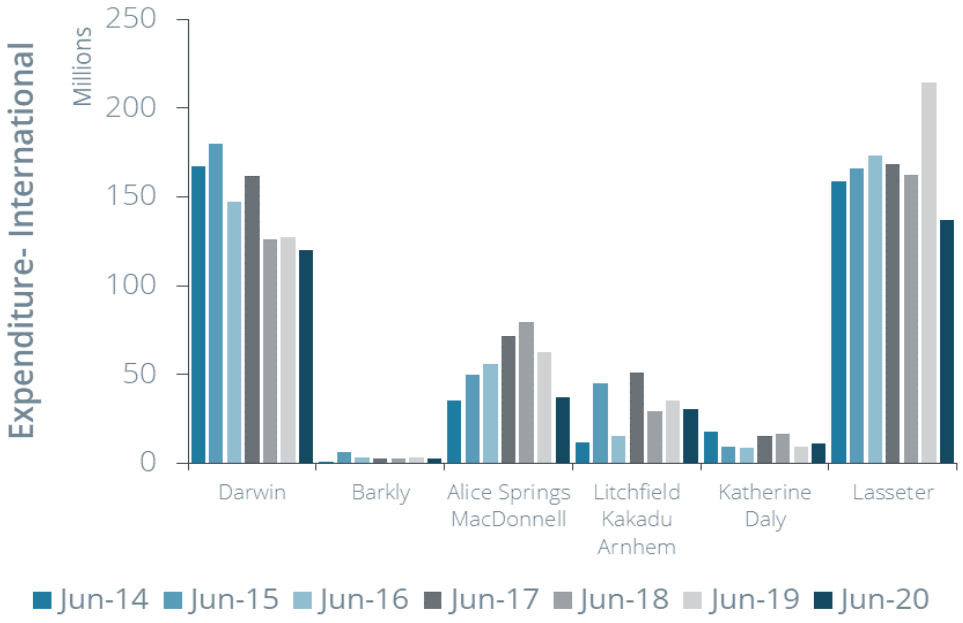
Source: Frontier Economics analysis using Tourism Research Australia data

Figure 106: Domestic tourist expenditure ($billions) categorised by NT regions



Source: Frontier Economics analysis using Tourism Research Australia data

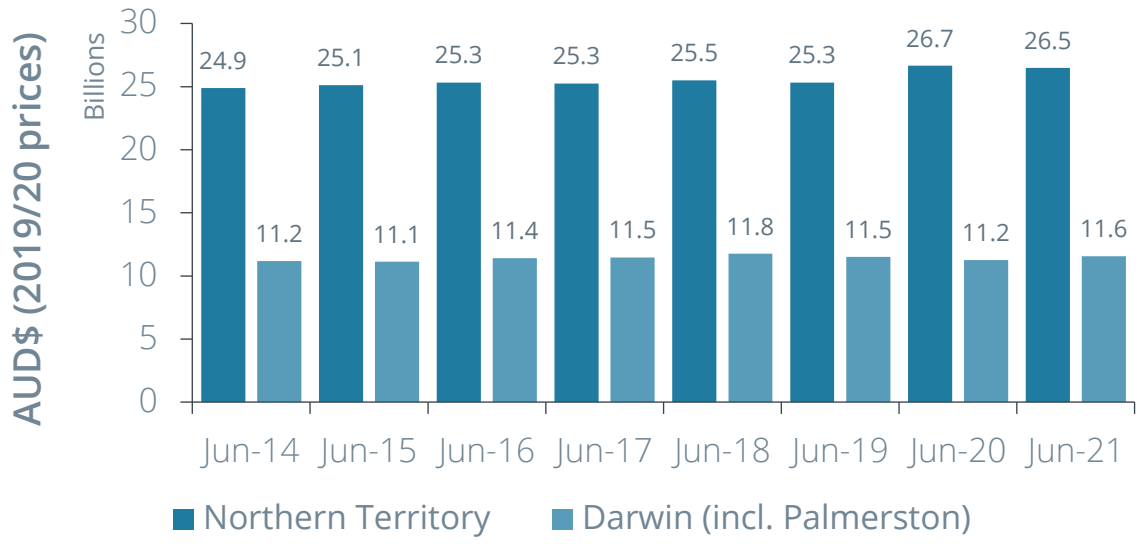
Figure 107: International tourist expenditure ($billions) categorised by NT regions



Source: Frontier Economics analysis using Tourism Research Australia data

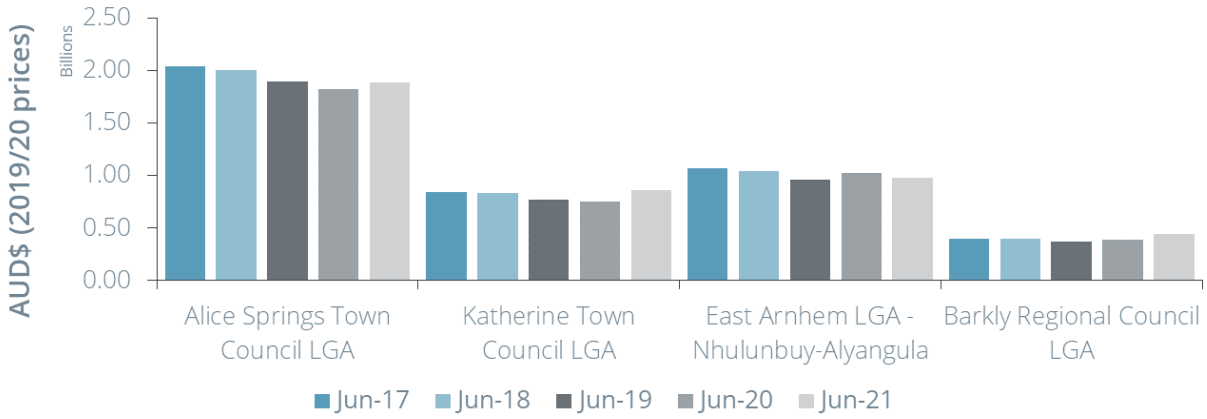
Gross Regional Product (GRP)

Figure 108: GRP – NT and Darwin region



Source: Frontier Economics analysis using Economy ID data

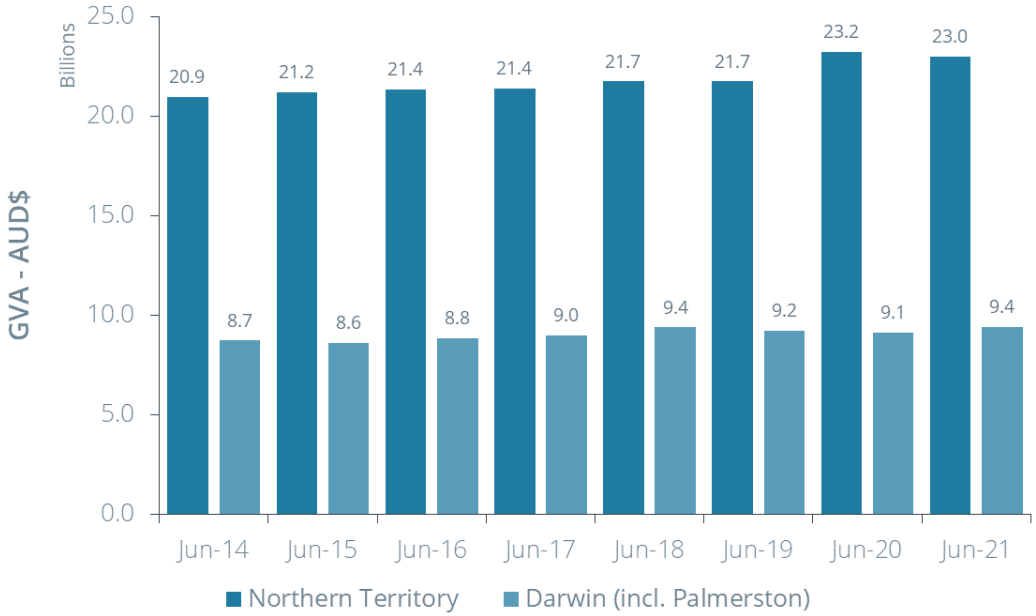
Figure 109: GRP – NT Local Government Authorities (LGAs)



Source: Frontier Economics analysis using Economy ID data

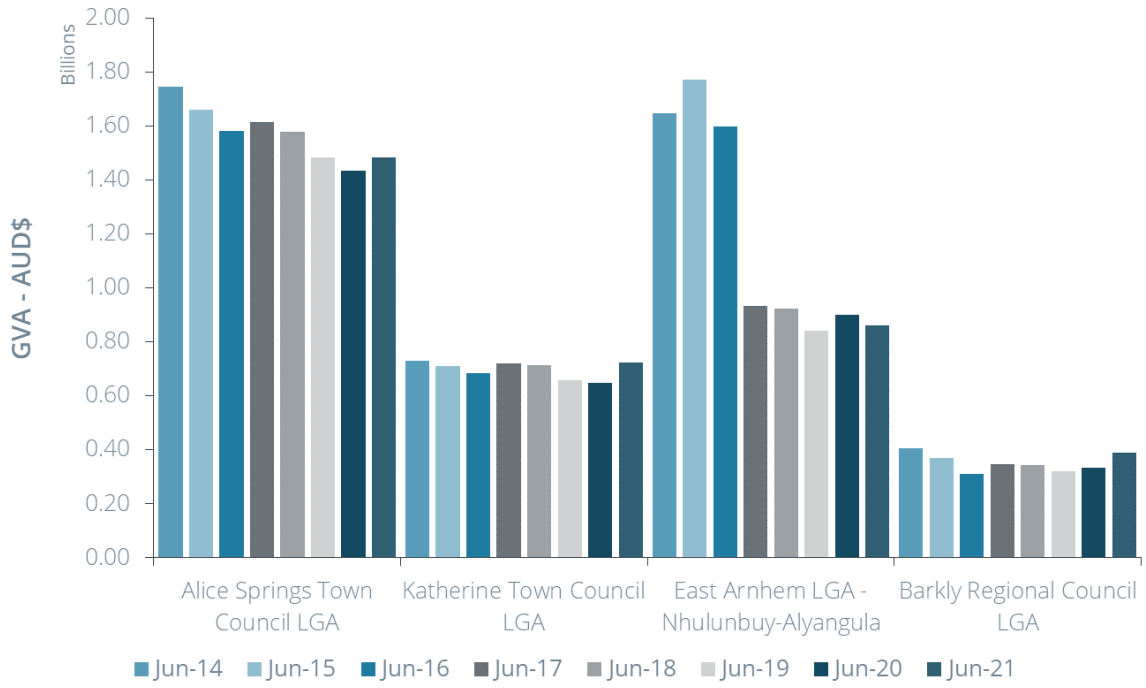
Gross Value Added (GVA)

Figure 110: Total GVA – NT and Darwin region



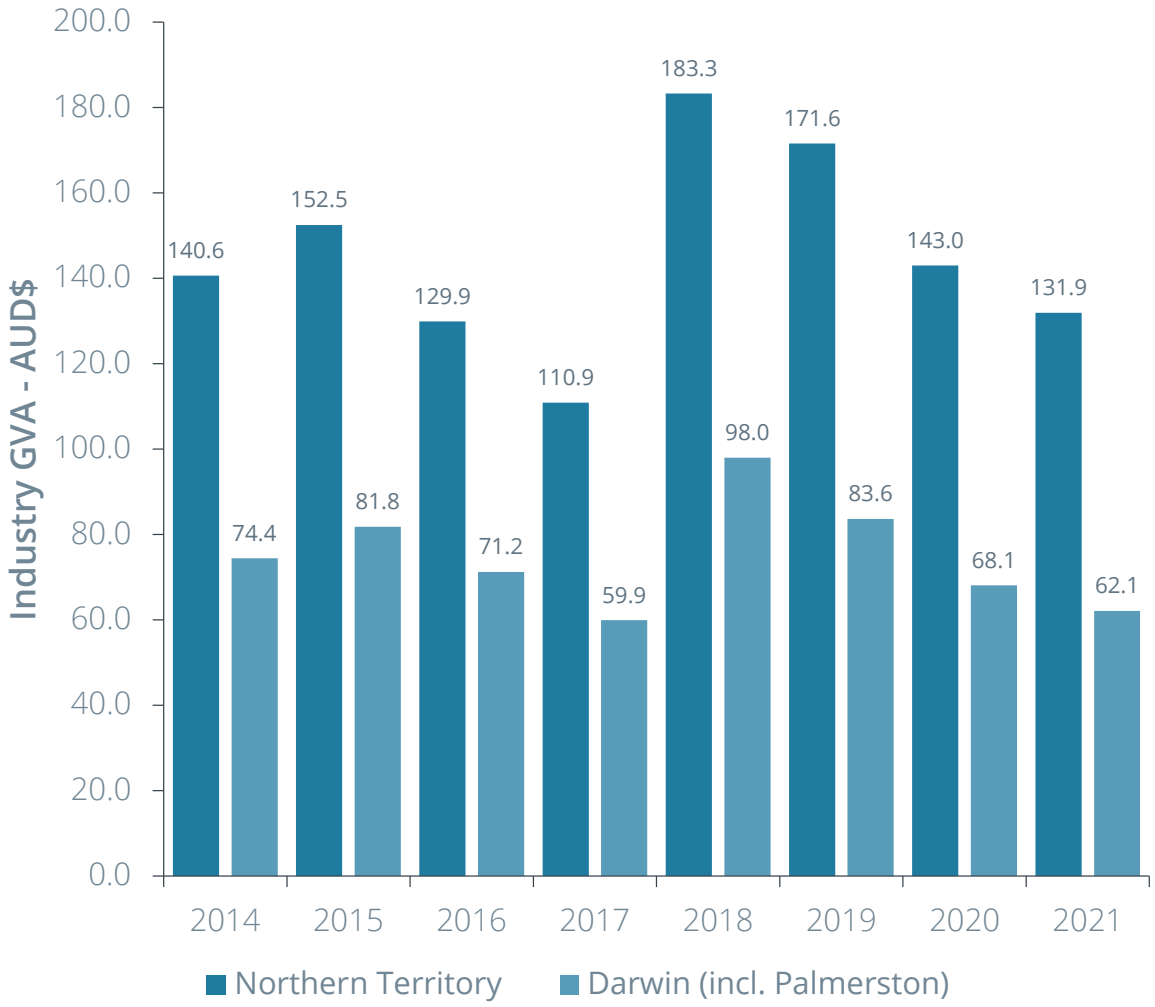
Source: Frontier Economics analysis using Economy ID data

Figure 111: Total GVA – NT Local Government Authorities (LGAs)



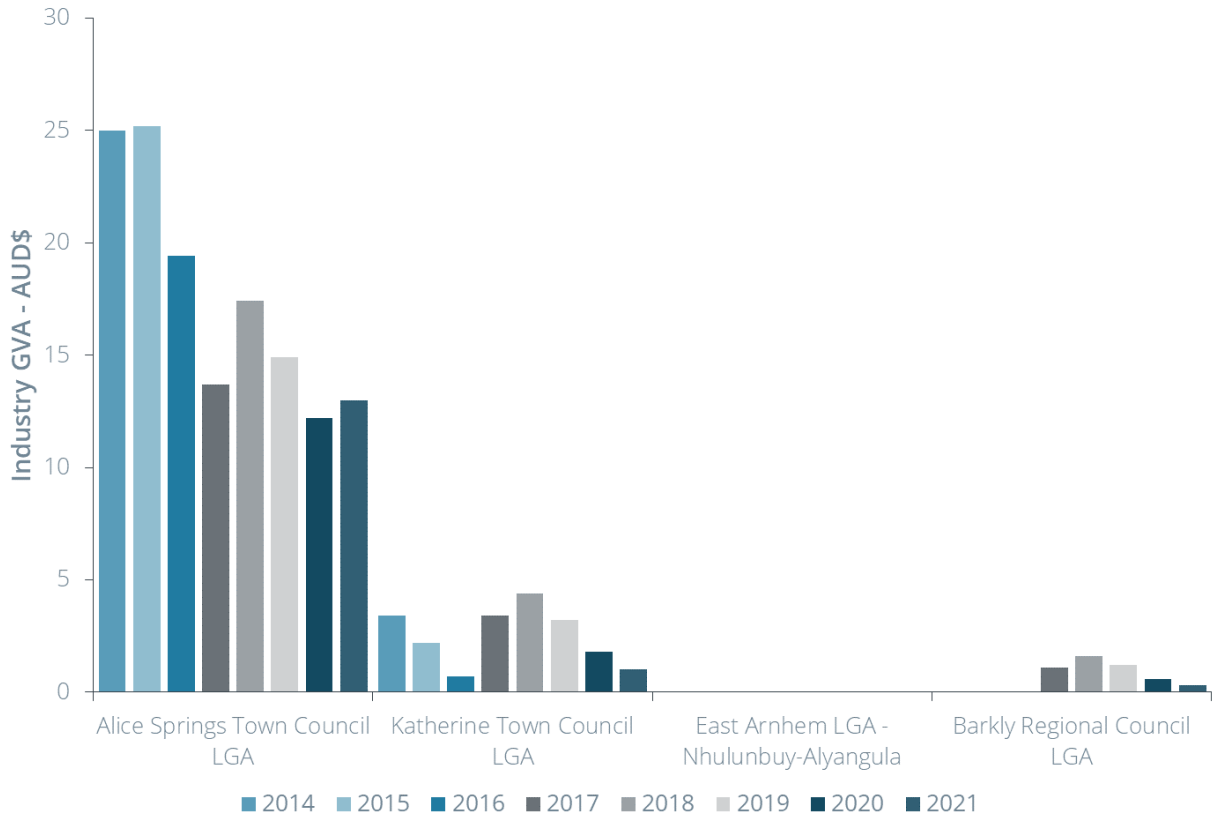
Source: Frontier Economics analysis using Economy ID data

Figure 112: Grocery, Liquor and Tobacco Product Wholesaling industry GVA – NT and Darwin region



Source: Frontier Economics analysis using Economy ID data

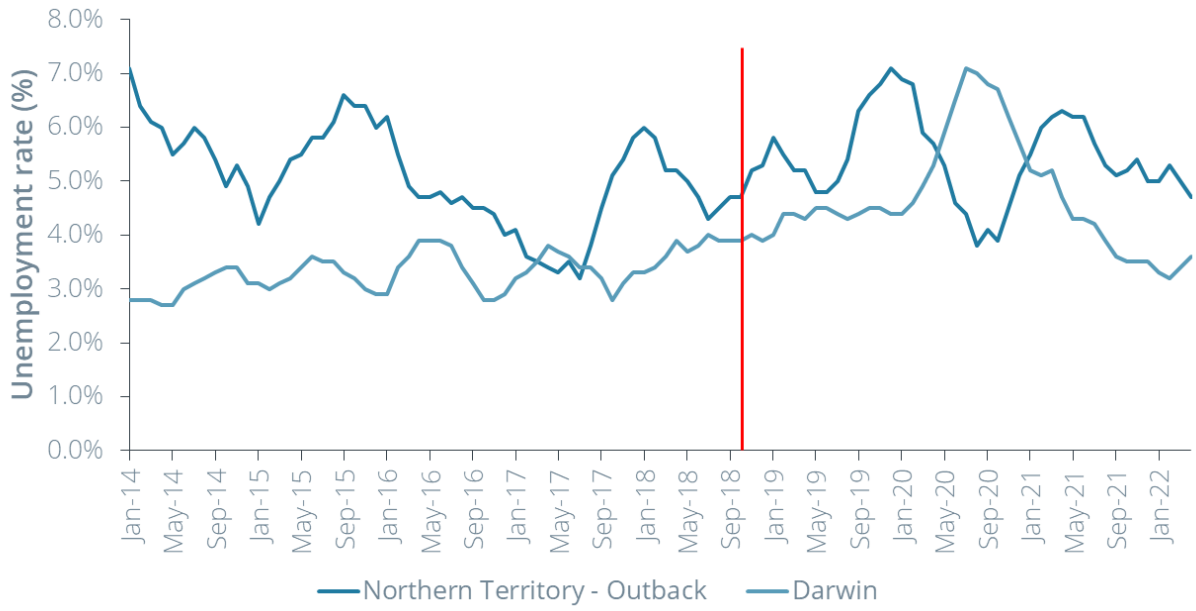
Figure 113: Grocery, Liquor and Tobacco Product Wholesaling industry GVA – NT Local Government Authorities (LGAs)



Source: Frontier Economics analysis using Economy ID data

Unemployment rate

Figure 114: Unemployment rate – NT (outback) and Darwin



Source: Frontier Economics analysis using ABS data

Frontier Economics

Brisbane | Melbourne | Singapore | Sydney

Frontier Economics Pty Ltd
395 Collins Street Melbourne Victoria 3000

Tel: +61 3 9620 4488
https://www.frontier-economics.com.au

ACN: 087 553 124 ABN: 13 087 553 124