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# Realist evaluation for programs designed to reduce demand and harms of substance misuse at the community level in Australian remote Indigenous community settings

Thesis submitted by

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# **Declaration of Ethics**

The Human Research Ethics Committees of James Cook University (Protocol H3072) and the Cairns and

Hinterland Health Services District (Protocol #516) provided ethical approvals. An extension to H3072

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# Contributions

| | |
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# Abstract

**Background and aims**

Cape York's Indigenous communities, small (<1000 people), very remote and socially complex experience significant excess health burden due to substance misuse, in particular alcohol, tobacco and cannabis. Cannabis is the main psychoactive substance available where alcohol is controlled. Data from the Cape York Cannabis Project (CYCP) exemplified a lack of convincing effect of substance misuse programs in these contexts with controlled and quasi-experimental study designs. This thesis considered theory-driven evaluation for substance misuse harm and demand reduction programs in the context of Indigenous Australian communities.

Conceived in the decade after rising and then endemic cannabis use was documented in remote Indigenous communities in the Northern Territory, the CYCP aimed to stimulate local action to reduce demand for cannabis with three Cape York communities. Implemented 2010-12, the CYCP incorporated a multiple-component community-level intervention espousing values of community engagement, partnership and self-determination (feedback of local prevalence data; public meetings, social marketing; school prevention programs; support for workplaces and families; and training clinicians in brief intervention) within a quasi-experimental study design, more robust than the commonly-available descriptive measures of preventable illness. Hypothesising 10% fewer cannabis users after intervention, a staggered multiple baseline study design aimed to detect changed cannabis use in a cohort before and after the intervention, with each site as its own control. Across three sites, 429 people aged 15-49 years participated in semi-structured interviews, reporting current and lifetime cannabis use, and perceived cannabis impacts on themselves and their communities. Process evaluation would assess implementation fidelity, to further support the hypothesis that changes in use were the effect of intervention components.

A modest reduction in current users (~15%) could not be unequivocally attributed to the planned intervention since nearly 20% of the 429 baseline participants were lost to follow-up, and continuous sampling clouded the effects of a discrete intervention phase. Two local community councils, however, instigated cannabis demand reduction policy, and some workplaces encouraged cannabis testing and other support for workers. With an inevitably variable and flexible implementation process, a highly structured assessment of fidelity could not add useful knowledge. With these limitations of study design and process evaluation in mind, the thesis reviewed the CYCP data through a realist lens.

Realist evaluation theorises program mechanisms as causal processes embedded within dynamic relational context. In contrast, controlled testing of intervention effects in experimental and quasi-experimental designs intentionally seeks to neutralise contextual influences, such that underlying causal processes (including stakeholder reasoning) can be obscured. Realist evaluation, with a critical realist ontological and epistemological foundation, systematically tests how well program mechanisms explain observed outcomes within the implementation contexts. Context-mechanism-outcome (CMO) clusters are tested in implementation and research cycles to achieve explanatory power to account for regularities in outcome patterns.

This thesis aimed to:

i) Examine substance misuse intervention research in remote Australian Indigenous communities, and the empirical data from one project through a realist lens.

ii) Redesign the CYCP within a realist evaluation paradigm.

**Approach and data**

Realist theoretical construction deployed Pawson and Tilley's heuristic for mechanism: 'intervention resources stimulate stakeholder reasoning', within the CMO cluster. The rationale, feasible outcomes, relevant context, and plausible mechanisms for the realist redesign were informed by data and findings from the CYCP collated in the following chapters and publications:

- Chapter 2: Summarises the CYCP implementation.
- Chapter 4: Reports a review of articles from NHMRC-funded substance misuse intervention projects (2003-13) in remote Indigenous Australian communities (Publication 1) and an update to include projects funded 2014-20. The review synthesised: measured outcomes; program resources and intended stakeholder reasoning; influential implementation context; and, common assumptions. More recent projects highlighted intervention co-design and/or components intended to upskill clinician capacity to implement substance misuse intervention with Indigenous clients. Theory-driven evaluation was lacking.
- Chapter 5: Cross-sectional quantitative data were analysed (Publication 2). Median age of current users was 24 years, with higher prevalence and expenditure among males (69% vs 31%; $50 pw vs $30 pw). Cohort analysis of self-report data alone showed that cessation was more

likely for baseline users who said that they were trying to quit, did not meet dependence criteria and who were not using tobacco.

- Chapter 6: Qualitative analysis of interview information (standard inductive approaches and attitudinal coding) illuminated participant reasoning and attitudes towards cannabis, reported in the interviews (Publication 3). Users and non-users had personal experience with and views about cannabis, contributing to the collective experience. Participants offered insights into how these social resources in individuals and institutions can inspire and possibly sustain cessation efforts.

- Chapter 7: Theorised realist mechanisms  for outcomes: i) cessation and abstinence from cannabis use; and ii) an environment conducive to cessation and abstinence, and proposed feasible strategies to test CMOs within an overall program theory.

**Discussion**

Specific CMO clusters: i) policy levers; ii) meaningful engagement in work, education, cultural activities; and iii) denormalisation of cannabis use, were theorised for intermediate outcomes in relation to stratified social contexts (individual, micro and meso system). Strategic intervention supported by local councils was proposed to test these within an initial program theory. The program theory focused on male engagement, potentially leading to sustained denormalisation of cannabis uptake and use.

The use of retrofitted data without concurrent community engagement, non-Indigenous author worldview and emphasis on male current users, were limitations that could probably be addressed through co-design with Indigenous community residents and reflexive, iterative program adaptation. Avoiding costly and impractical randomisation or other experimental controls is strength of the proposed approach. Future research considering realist informed synthesis for mechanisms at the meso-level of the Indigenous community context, and description of the stratified social system idiosyncratic to remote Indigenous Australian communities would enhance realist designs in these contexts. The proposed program does not seek to replicate rigorous epidemiological approaches, nor to complement them, but is proposed as an option where epidemiological approaches have been shown to be costly and inadequate for assessing system changes. Barriers to the use of realist methodology include three-year funding cycles and privileging of controlled designs as a test of reality as opposed to a process of uncovering demi-regularities in outcome patterns.

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## List of abbreviations

| | |
|---|---|
| ACCCHO | Aboriginal Community-Controlled Health Organisation |
| ACCHS | Aboriginal Community-Controlled Health Service |
| CBPAR | Community-based Participatory Action Research |
| CI | Chief Investigator |
| CMO(C) | Context-Mechanism-Outcome(-Cluster) |
| CYCP | Cape York Cannabis Project |
| FASD | Foetal alcohol spectrum disorder(s) |
| JCU | James Cook University |
| LGA | Local Government Area (Australian Bureau of Statistics) |
| MBS | Multiple Baseline Study |
| MET | Motivational enhancement therapy |
| NAIDOC | National Aborigines and Islanders Day Observance Committee |
| NDSHS | National Drug Strategy Household Survey conducted nationally in Australia ~ 5 yearly |
| NCIPC | National Cannabis Information and Prevention Centre (University of New South Wales) |
| NHMRC | National Health and Medical Research Council |
| NRT | Nicotine replacement therapy |
| PAR | Participatory action research |
| QPS | Queensland Police Service |
| RCT / cRCT | Randomised Controlled Trial / Cluster Randomised Controlled Trial |
| SDS | Severity of Dependence Scale, five questions indicating dependence on cannabis |
| WiO | Weed it Out Queensland Community Policing strategy to reduce cannabis supply to remote Indigenous communities |

## Glossary

**Indigenous people, custom**

| | |
|---|---|
| Indigenous and indigenous | Capitalised, by convention, refers to the Indigenous peoples of the Australian mainland (collectively Australian Aboriginal) and The Torres Strait (collectively Torres Strait Islanders). Uncapitalised, refers to any people indigenous to a region, country or continent. |
| Sorry business | Cultural custom after a death, mourning |

**Cannabis use, harms and dependence**

| | |
|---|---|
| Bucket bong | Negative pressure device consisting of a bottomless plastic bottle plunged into a larger vessel of water. A metal cone is inserted into the mouth of the bottle to hold plant material, which is burned, pulling the bottle out of the water to contain the |

| | smoke in the bottle. The cone piece is removed, and the smoke is inhaled through the mouth of the bottle. |
|---|---|
| Cannabinoids | Family of compounds concentrated in Cannabis *sativa* or *indica* plants with bioactive and psychoactive properties. Cannabinoid receptor agonists. |
| Cannabis use disorder | Cannabis users experience symptoms of dependence. Cannabis use disorder (CUD) is well described with diagnostic criteria in the DSM-V and ICD-10. |
| Cannabis withdrawal syndrome | Documented cluster of symptoms expressed when a person experiencing cannabis use disorder abruptly ceases cannabis use. Characterised by psychological and physical symptoms, including sweating, dysphoria, restlessness, insomnia and gastrointestinal symptoms, usually more severe in long-term heavy users. |
| Cone | Metal cone of approximately 0.5-1 ml volume used in pipes and water pipes. It also serves as an approximate dose, as they tend to be consumed in one or several inhalations, as opposed to cannabis cigarettes rolled in paper. |
| Gunja | Cannabis *sativa* or *indica* plants and plant products for recreational drugs use |
| Severity of Dependence Scale | Four item scale to determine the presence of a substance misuse disorder. |
| Stressing out | A phenomenon of 'stressing out' has been described by Indigenous Australians with heavy cannabis use histories as a state of heightened anxiety and aggression, consistent with withdrawal symptoms. |

**To describe evaluation**

| | |
|---|---|
| Abductive reasoning | Deriving the likely explanation for empirical observations, where the cause is a likely explanation of the effect. |
| Deductive reasoning | Application of general laws to specific empirical observations, where the effect is a logical consequence of the cause. |
| Effectiveness | Efficiency, pragmatic or real-world utility and impact of an intervention |
| Efficacy | The effect purely due to proximal causal factors of a given intervention within a defined set of conditions. |
| Fidelity (of intervention delivery) | Fidelity of intervention implementation to the design, including its timing, dose or other unit of delivery, the training of intervention agents, data collection, participant selection, recruitment or randomization, and use of controls. |
| Hypothetico-deductive | Controlled hypothesis testing, the experimental method. |
| Inductive reasoning | Developing general patterns from specific empirical observations, effect is inferred but does not exclude alternative explanations. |
| Intervention research | Research implementing and evaluating interventions to address a health concern in a given population. |
| Realist | Evaluation approach taking an ontological position that reality exists independent of the observer, and indeed of actual or observable events.  Realist evaluation also holds the epistemological position that reality can be partially observed, and that retroductive theorising can reveal reality that is not readily observable or measurable. |
| Retroductive reasoning | Inferring the mechanisms capable of producing events or empirical observations. |
| Successionist causation | Linear causation based on independent and dependent variables, positivism. |
| Theory-driven | Intervention research driven by and evaluated in terms of a theoretical understanding of how the intervention will work; as opposed to an atheoretical experimental or quasi-experimental design. |
| Translation research | Research to translate efficacious intervention to real-world settings. |

**Realist terms**

| | |
|---|---|
| Actual (ontological layer) | Ontological layer of events that actually transpire, whether they are observed or not. |
| Black box | Mechanism of cause and effect of a complex social intervention that is not made explicit and evaluation design that does not explicitly examine mechanism. |
| Context | Dynamic relational forces within a system in which causal processes are embedded. For the sake of a practical starting point for thinking about participant responses to programs, context is approximately the stratified social, material and policy environment in which actors reason or respond to intervention strategies, and which influence the possible responses that agents can have to intervention resources those strategies produce. |
| Context-mechanism-outcome cluster | Heuristic proposed by Pawson and Tilley to apply a critical realist ontology to understanding how complex social interventions produce outcomes via mechanism mediated by intervention context. |
| Critical Realism | Philosophy of science which accepts a realist epistemology and advances ontological layers: empirical (observable), actual (events, observed or not) and real (all mechanisms for all potential events). |
| Empirical (ontological layer) | Actual events that are observed. |
| Mechanism | Potential for mechanism is always present (ontologically real), mechanisms are activated under the appropriate conditions (ontologically actual), and they may or may not be observable / measurable (ontologically empirical). For the purposes of behaviour change program evaluation, Pawson & Tilley approximated this to the heuristic *'actor reasoning in response to program resources'*. |
| Outcome | The outcome of an intervention, a change in behaviour. |
| Real (ontological layer) | Ontologically real, consisting of all possible mechanisms, independent of context. |
| Scientific Realism | Pawson and Tilley introduced an approach to apply critical realism to the evaluation of complex social intervention. Influenced by Campbell's critical realism, initially termed 'Scientific Realism' this has become more widely known as the simplified, Realist Evaluation |

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# 1 Introduction

> *'Need everybody helping to keep off because everybody helping to keep on.'*
>
> *Cape York community resident, male*

The author recorded the above response in an interview with a young man in a remote community in Cape York in 2011. He was referring to how much easier it would be to stop using cannabis if his male friends and relatives of similar age could stop together. Almost anyone who has lived in a culture of regular substance use could relate to that sentiment—cue exposure, boredom, habit, ease of access all make it harder to stop using any substance. In remote Cape York, however, these things take on different dimensions to most Australian towns and cities. Clan and family connections are strong, houses are generally crowded,[1, 2] and jobs can be scarce.[3] There are barriers to completing education and training[4] and mental health problems are common.[5, 6] Cannabis is widely used in the remote communities of Cape York;[7, 8] and where alcohol is strictly controlled,[9, 10] similar to patterns previously demonstrated in the Northern Territory,[11, 12] cannabis is likely the most common drug of misuse.[4] How does one break out of their use patterns in this environment? Because some people do—one quarter of lifetime users were former users, according to data from the Cape York Cannabis Project.[7] Can research intervention projects, driven by institutional demands for evidence, offer anything to support users who want to stop?

This thesis is concerned with improving the evaluation of health and social intervention in addressing substance misuse in the context of remote Indigenous Australian communities. Mindful of the diversity of culture, language and relationships with land, it advocates for intensive and effective responses to reduce substance misuse harms, supportive of and congruent with Indigenous people's views on the matter of their own health and welfare. Substance misuse harms are ubiquitous in these complex

milieux, which might suggest that general population-based strategies will produce desirable harm reduction. This thesis evaluates evidence from a cannabis-use intervention project to demonstrate how responses sensitive to local patterns of use—engaged with multiple levels of context—may be more likely to stimulate desirable harm reduction, cessation of use and reduced uptake.[13, 14]

Scientific realism is considered as a theoretical lens for the design and evaluation of substance misuse intervention programs in remote Aboriginal and Torres Strait Islander communities. The scientific realist approach to hypothesis formulation, data collection and analysis (detailed in Section 1.4.2) holds potential to strengthen intervention design and evaluation in this area, where controlled experimental study designs rarely produce convincing results. The Cape York Cannabis Project (NHMRC#601002), implemented 2010-12 in far north Queensland, is an example of an intervention study and multi-method evaluation designed using conventional epidemiological principles. Applying a realist lens to data compiled for the Cape York Cannabis Project (CYCP), the intervention research project and its evaluation are redesigned using principles of scientific realism.

Chapter 1 will briefly introduce the following topics:

1.1  Substance use and misuse among Australian Aboriginal and Torres Strait Islander people: an overview of the epidemiology of substance misuse in remote Indigenous Australian communities with a focus on patterns of cannabis use.

1.2  Social-historical determinants of health and substance misuse patterns in remote Cape York in far north Queensland: the 20th century socio-political history of remote Cape York communities briefly summarised as the backdrop for contemporary substance misuse.

1.3  The Cape York Cannabis Project: its original rationale and design

1.4    The research questions posed in this thesis and the contribution of this work.

## 1.1    Substance use and misuse among Australian Indigenous people

Aboriginal and Torres Strait Islander Australians (henceforth, respectfully, Indigenous to mean both cultures / groups) carry a clear and persistent health burden, disproportionate to that of the wider Australian population.[15-17] The gap is wider for Indigenous people living in remote communities,[18, 19] including in Cape York in far north Queensland.[5, 19, 20] Substance misuse harms contribute significantly to poor health,[21] with widespread alcohol,[22, 23] tobacco,[24-27] volatile substance[28, 29] and cannabis[30, 31] use.

### *1.1.1    National substance use data for Indigenous and non-Indigenous Australians*

The Australian National Drug Strategy Household Surveys (NDSHS) between 1998 and 2019 reported sustained and elevated alcohol, tobacco and cannabis use among Indigenous Australians compared to the data available for the general population.[18, 32, 33] No reliable data is available for Australian Indigenous people's use of other illicit drugs, including cocaine, heroin, ecstasy and methamphetamine. Among the small samples of Indigenous participants in the national survey, exposure to these drugs appeared to be similar to that of the wider population.[34]

As for other populations, tobacco and alcohol contribute the greatest burden of disease due to substance misuse (12% and 5% respectively of the total burden in 2003).[15] Indigenous Australians have consistently been more likely than non-Indigenous Australians to report alcohol abstinence; but, among drinkers, more likely to report drinking to excess.[18] In national data, the proportion of Indigenous drinkers reporting drinking to excess decreased from 28% to 18% between 2016 and 2019. The proportion of Indigenous drinkers exceeding lifetime risk compared to non-Indigenous drinkers decreased from 1.5 in 2010 to 1.2 in 2019.[18] Indigenous survey participants reported decreased daily tobacco use from 35% in 2010 to 25% in the most recent national data, however Indigenous people remain more likely to use tobacco daily (25% versus 10%).[18]

Past-year cannabis use among Indigenous NDSHS participants declined from 19% to 16% between 2016 and 2020.[18] Non-Indigenous participants reported a steady decline in past-year cannabis use to around 9% by 2010, with a small but significant increase to 11% in 2019.[18] The median age of all people who used cannabis was 26 years in 2001, and increased to 31 years in 2019—a cohort effect of declining uptake in younger age groups overall during that period.[18]

Petrol sniffing has also caused serious harms, and was widely addressed with the introduction of low aromatic (Opal™) fuel in 2005.[28, 35] Volatile substance misuse continues to be a problem among adolescents, usually obtained legally as glue, paint or deodorant containing solvents such as toluene or butane,[36] and most problematic among disengaged or at-risk young people, including those living in Cape York.[37-39]

Few social-behavioural programs have demonstrated sustained supply, demand or harm reduction for substances used in Indigenous communities, despite generally widespread recognition of harms among local leaders and residents,[40] and despite resources invested by health,[41, 42] research,[43] police[44] and justice[45] systems.[46-48] Aggressive supply-side interventions appear to have had the most significant impact on substance use throughout these decades, for example: the introduction of Opal™ fuel;[28] Alcohol Management Plans;[49] and, tobacco pricing and plain packaging.[50, 51] Prohibition and pricing can clearly reduce harm, but are not comprehensive solutions to alcohol and drug demand[52, 53 54 55] and can lead to unintended harm.[56] For example, riskier methods may be used to acquire a banned substance;[56]or, persons living in homes where prohibited substances are present may resist or avoid services, including police assistance.[52, 57]

### 1.1.2    *Patterns of cannabis and other substance use in remote Indigenous communities*

Data for prevalence and patterns of substance misuse among Indigenous Australians living in remote regions was scarce in 2010 when the CYCP was initiated; and this remains true at time of writing, eleven

years later. The Australian Institute of Health and Welfare (AIHW) National Drug Strategy acknowledges that its 2019 data included 2.4% Indigenous participants from *non-remote* centres, with a sample from Indigenous people living in remote communities for the first time, and all of these in the Northern Territory.[58] Sampling approaches were sufficiently different in remote areas to preclude direct comparison with data from wider sampling.[18] The most recent Australian Bureau of Statistics (ABS) data shows prevalence of cannabis use among Indigenous Australians in both remote and non-remote areas as similar, around 24%.[59] AIHW data from 2016-17, however, showed 17% of Indigenous people living in remote and very remote locations using cannabis within the past year, compared to 10% of Indigenous people living in non-remote locations.[60] Discrete studies with remote populations, including the CYCP[7, 10, 61] as well as earlier work in the Northern Territory[12, 62] suggest that prevalence and patterns of cannabis use in remote Indigenous communities are likely to be considerably higher compared to the national estimates for Indigenous Australians.

### 1.1.3    Cannabis in remote communities

This thesis is concerned principally with cannabis use in remote Indigenous communities in Cape York in far north Queensland, Australia, where there is some evidence that cannabis use rates are probably underestimated. Cannabis use was not detected in remote Indigenous Australian communities in the 1980s;[63] therefore heavy cannabis use, particularly among women or younger age-groups, is relatively new. By 2001 a rapid expansion of cannabis trafficking networks led to cannabis use rates as high as 60% in younger age groups in some remote communities, double the national average at that time.[30] CYCP data from three Cape York communities suggests that cannabis use in the preceding 12 months in 2011-12 was much higher than the 18.5% reported among Indigenous Australians in the NDSHS 2010.[7]  For example, in a first wave of sampling in three Cape York communities in 2011, 44% of 15-44 year old participants reported using cannabis within the preceding 12 months, similar to rates recorded in the national data for males 18-29 years old in 1995.[34] Importantly, 69% of remote community users

reported at least six 'cones'[1] per day,[12] indicating heavy daily use. In the national data, only 47.4% of recent users reported weekly use in the NDSHS 2010,[64] and 36% reported daily use in 2019.[18] Selected data from the NDSHS 2010-19 and relevant studies from remote communities during the same period demonstrated persistently higher rates of cannabis use in remote communities, against a general decline in the national data over this period (Table 1.1).

Like elsewhere in Australia, cannabis is used alongside other substances in remote communities. Tobacco is used at higher rates than elsewhere; however, patterns of use differ with more sharing and greater fluctuation across cycles in the availability of cash (pay-day cycles).[53, 65, 66] There is evidence of an association between cannabis and tobacco use in remote communities, probably because tobacco is most often mixed with cannabis, and cannabis can be sold pre-mixed.[67] Alcohol was restricted in remote Indigenous communities in Queensland in 2003, then prohibited in 2008, which appears to coincide with an increase in cannabis use according to community perception[52] and in private interviews.[10, 53] Cannabis use also overlaps with illicit drugs available in powdered forms, which may be smoked in conjunction with cannabis. For example, cannabis in a pipe with powdered stimulants ('snow-cones'); or, cannabis on its own to ease withdrawal from other substances. Concerns have been raised in remote communities for increased availability of methamphetamine in particular,[44, 54] although no firm evidence exists for any surge in methamphetamine use in remote communities.

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[1] A small metal cone of around 0.5 ml volume, sourced either commercially or constructed of aluminium can or foil inserted into a pipe or water pipe. Dried plant material is smoked either with or without mixing with tobacco.

Table 1.1    Proportions of samples reporting cannabis use in studies conducted since 2000 by Indigenous status, age, and gender, where available.

| Year data collected | Sample | Most recent use | Indigenous (%) | Non-Indigenous, (%) | ≥ age years | Males | Females | Reference |
|---|---|---|---|---|---|---|---|---|
| 2000 | National | ≤12 months | 36% | 23.5% | ≥14 years | 23.8 | 23.5 | NDSHS 2001[32, 68] |
| 1999 | Remote Northern Territory | ≤1 month | 19.5% (n=689) | - | ≥15 years | 31% | 8% | Clough, Guyula, Yunupingu, & Burns (2002)[30] |
| 2000 | Remote Northern Territory, one site | ≤1 month | 29.5% (n=101) | - | ≥15 years | 39% | 20% | |
| 2001-5 | Remote Northern Territory | ≥3months | 37-49% (n=83-100) | - | ≥13 years | - | - | Lee, Conigrave, Clough, Dobbins, Jaragba & Patton (2009)[12] |
| 2010 | National | ≤12 months | 18.5% | 10.3% | ≥14 years | 12.9% | 7.7% | NDSHS Report 2010[64] |
| 2011 | Remote Cape York, one site | ≤12 months | 49.9% (n=133) | - | ≥16 years | 66.2% | 30.5% | Bohanna & Clough (2012)[10] |
| 2016 | National | ≤12 months | 19.4% | 10.4% | ≥14 years | 13% | 8% | NDSHS 2016[52] |
| 2019 | National | ≤12 months | 16% | 11.6% | ≥14 years | 14.7% | 8.6% | NDSHS 2019[18] |

### 1.1.4 *Cannabis burden on health and additional burdens in remote Indigenous Australian communities*

Cannabis use is increasingly recognised as a preventable risk factor for chronic health issues in the general population,[69-73] particularly in the context of rising tetrahydrocannabinol content and increased availability of legal cannabis.[74] Cannabis mediates psychosis onset, duration and relapse in a dose-dependent manner[75] and there is some evidence of a causal role in schizophrenia.[76] Cannabis has concerning potential developmental impacts on the young.[77] For example: initiation prior to 16 years of age may cause lower educational attainment;[78] and, longitudinal data has demonstrated cannabis' implication in a spectrum of neuroteratological and paediatric cardiological deficits,[79, 80] mediated by wide distribution of cannabinoid receptors in embryonic tissue.[80] Heavy cannabis use is implicated in road accidents and other injury,[74] and reversible cognitive impairment in adults.[81] Cannabis is also most often used in conjunction with alcohol, tobacco and other substances, potentially augmenting harm.[74]

The addictive potential of cannabis has been known since at least the 1970s.[82] Cannabis use disorder (CUD) is well described with diagnostic criteria in the DSM-V and ICD-10,[83, 84] and CUD is reported in 11-30% of users (in population samples from the United States).[84] Twin studies have demonstrated a 50-70% heritability rate for susceptibility to CUD, via numerous genes and environmental interactions.[71, 85, 86] For example cannabinoid receptors,[86] dopamine regulation pathways[85] and specific subunits of cholinergic receptors have all been implicated in CUD susceptibility.[71] To date, no clear molecular biological mechanism for predispositions to CUD or other cannabis health consequences, such as psychosis, have been identified.[85-88] Cannabis withdrawal syndrome,[83] is characterised by psychological and physical symptoms, including sweating, dysphoria, restlessness, insomnia and gastrointestinal symptoms, usually more severe in long-term heavy users.[89, 90] Age and sex can also influence the severity of withdrawal symptoms, for example women experience more severe withdrawal symptoms, but adolescents experience less severe symptoms.[90, 91]

The additional health burden of cannabis use for Indigenous Australians, where rates of chronic disease are exceptionally high,[15, 92] has not been assessed. The available evidence indicates that cannabis use is associated in these populations with symptoms of dependence[12] and depression,[93] auditory hallucinations and suicidal ideation,[62, 93] imprisonment,[29, 94] community dysfunction,[44] a heavy financial burden,[95] violence[11] and child safety.[94]  A phenomenon of 'stressing out' has been described by Indigenous Australians with heavy use histories as a state of heightened anxiety and aggression, consistent with withdrawal symptoms.[96]  High cannabis use prevalence has persisted in Australia's remote Indigenous communities since first detected over twenty years ago,[12] which stands in stark contrast with an apparent general trend for a decline in cannabis use in the Australian population over the same period.[64]  There is a well-established association between long-term cognitive and psychiatric adverse consequences of frequent, heavy exposure to cannabis in adolescence.[97] Cannabis exposure *in utero* is associated with affective disorders and ADHD for the child.[98] Median age of uptake has been consistently around 16 years of age,[12, 53] but earlier uptake and potential use among young pregnant women could be particularly harmful.

## 1.2 Socio-historical determinants of substance misuse in Cape York communities

First, Indigenous Australians are not alone among colonised indigenous peoples in experiencing a disproportionate health burden. Colonised indigenous societies worldwide grapple with poor health[13] linked to diet,[99] substance misuse,[8] stress[100] and trauma.[13, 101-103] Health problems are deeply rooted in displacement and disrupted social structures,[13, 104-106] inadequate housing,[1, 106, 107] barriers to employment,[108-111] and racism[107, 112-114] which persist centuries after the disastrous effects of initial invasion.[13, 16, 73, 115]  Supporting resilience in these environments is clearly important, where policies insensitive to historical and social circumstances could do more harm.

 To bring patterns of heavy substance use in Cape York into perspective, and to avoid any temptation to draw simplistic assumptions about Indigenous Australians or their circumstances, a broad appreciation

of the sociopolitical factors affecting Indigenous people in Queensland through the late 20th century is necessary, particularly the history of Cape York's Aboriginal missions. In the remote former church missions and government reserves of Cape York prior to 1967, Indigenous residents rarely used alcohol and cannabis was relatively unknown.[30]

Prior to the 1967 national referendum on the inclusion of Indigenous Australians as Australian citizens and to be counted in the census, the States strictly managed the Indigenous population. In Queensland the Queensland Office of Native Affairs, its Director and appointed 'Protectors of Aborigines or Islanders' controlled almost all aspects of Indigenous people's lives. With an overarching policy underpinned by 'protection', segregation and assimilation,[116] church missions and government reserves administered community level resources and activities; Indigenous people had little autonomy, enduring severe disruption of their families, clans and cultural practices.[14, 105, 116, 117] The referendum[118] made way for State government to supplement funding for the remote communities, with some arguing that to a great extent this was facilitated through the sale of alcohol by local councils.[119] The introduction of canteens was widely resisted by local residents,[119] but sale of alcohol commenced in the mid-eighties as the church missions withdrew.[119] Alcohol caused such great harm in terms of social disarray and violence that policies were introduced to restrict and eventually ban alcohol carriage or sale in Cape York between 2003-8.[120, 121] Alcohol supply and consumption left a legacy of mental health harms thought to be mediated principally by the developmental impacts from the stress and loss of structure that ensued.[5, 8, 53, 54, 122]

This thesis examines a health intervention implemented in 2010-12, in communities administered as Local Government Areas (with elected local governments), and with Alcohol Management Plans fully implemented.[52, 123] Ongoing challenges to education, employment, housing, chronic disease and family violence, and how they relate to cannabis demand will be revisited as intervention contexts in Chapter 6. It is stressed from the outset that, first, the structures and opportunities that would normally limit

extensive and heavy substance use can be absent or compromised in remote Cape York communities. Second, as discussed in Martin (1993),[14] substance use and gambling in remote Indigenous Australian communities should not be seen as simple, inevitable effects of colonisation, but as having developed in a complex interplay with traditional custom and relationships among local people.

## 1.3    The Cape York Cannabis Project: design and rationale

The National Health and Medical Research Council (NHMRC) awarded James Cook University (JCU) a research project grant in 2009 for the proposal entitled *Indigenous community action to reduce harms associated with heavy cannabis use in Cape York*, which commenced in 2010 as the *Cape York Cannabis Project* (CYCP).[124] The CYCP proposed to work with three Cape York Communities to implement multiple component, community level interventions to reduce cannabis demand and harm. Summarised in Figure 1.1, the study design involved three steps at three locations: 1 - a baseline survey of cannabis use status and patterns; 2 - a multiple component community level intervention; 3 - a follow-up survey of participants interviewed at baseline to describe post-intervention cannabis prevalence and patterns.

CYCP Aims & components

    i)    Implement a multiple-component, community-action intervention to reduce cannabis use in participating Cape York Indigenous communities; and,

    ii)    evaluate its effectiveness via a before and after multiple baseline cohort study and process evaluation.

CYCP hypothesis

Among community residents aged 16-34 years after a multiple component community-level intervention, there would be fewer current users, fewer heavy users and fewer users reporting symptoms of dependence than there were at baseline.

CYCP intervention components

A multiple component intervention that would target: social cues; local understanding of cannabis; community priorities; service needs; and, cannabis dependence related problems.

(From the Cape York cannabis Project Study design, submitted to the NHMRC, 2010)

CYCP study design, 2010

**Figure 1.1**    CYCP aims, hypothesis and key components.

### *1.3.1 CYCP hypothesis and study design*

The CYCP hypothesised that 12 months after intervention, compared with a baseline period, there

would be:

    i)    a decrease in the number of cannabis users (aged 16-34 years) by at least 10%;

    ii)    a decrease in the number of users reporting symptoms of cannabis dependence; and,

    iii)    a decrease in the number of heavy cannabis users (smoking six cones / day, daily).

A controlled before-and-after (multiple baseline) study design was chosen to evaluate these outcomes.

Thus, the proposed study consisted of three phases: first, a baseline survey of cannabis use in three

remote Cape York communities; time was then allowed to return the data to each community and

facilitate community-based demand reduction interventions; and lastly cannabis use would be reassessed after the interventions by following up the baseline participants at each site. With a staggered implementation at three sites, and a before and after cohort of over 100 people aged 15-49 at each site, the impact of the multiple component community-level intervention could be measured at each site, with each site serving as its own control (the multiple baseline design is described in detail in section 2.2.8).[125] In its original form, written in 2009, the robust, quasi-experimental design would neutralise the effects of context in order to enable reliable inference that the intervention caused any observed or measured change.

### 1.3.2 *Conception of the thesis and the author's transition from project officer to doctoral student*

The author of this thesis was the project officer coordinating the field trips and undertaking nearly a quarter of the baseline surveys for the Cape York Cannabis Project in three communities in 2011-12. She left the project prior to the intervention phase, then participated in several follow-up survey field trips. In the intervening months, anecdotally and reflected in travel diaries and voluminous field notes, the project team expended much effort implementing the CYCP's intervention components. Problems were apparent without detailed analysis of processes. Not all of the intervention components had been delivered and those that were, appeared to be driven by project staff rather than at the local level.

This thesis does not focus directly upon these issues. Rather, the thesis is concerned with the problem that the funded design allowed little flexibility to respond to immediately perceived needs or relational capital. Even without detailed data analysis, it was clear that the intervention components had limited impact. With funds remaining from the NHMRC grant, and data left to analyse, the Chief Investigator sought to produce useful recommendations from what had been a difficult project on many levels. Rather than simply produce the required data analysis. A proposal to review the project through the realist lens was conceived when realism was brought to his attention by a member of the research team, and the opportunity to undertake the work as a PhD was offered to the author.

## 1.4    Rationale and aims of this thesis

### *1.4.1    The challenge addressed*

The CYCP's data and outcomes demonstrate particular limitations of quasi-experimental designs with parallel-process evaluation. This thesis considers the potential contribution of theory-driven evaluation as a response to such methodological challenges.

In the field of health behaviour-change intervention research, withholding a potentially beneficial treatment from the control group may not meet ethical standards. And therefore a randomised controlled trial (RCT) may be inappropriate.[126] Quasi-experimental designs—the cluster randomised controlled trial (cRCT), stepped-wedge cRCT, interrupted time series, multiple baseline study (MBS, as used in the CYCP), and controlled pre-post studies—retain the robust measure of a program's absolute impact on the prevalence of a health issue. They reveal little, however, about behaviour change and participant reasoning, even when the intervention has the intended effect. If there is no apparent effect, these designs are unhelpful for understanding intermediate or incremental changes in the reasoning underlying behaviour, where such reasoning is understood as the program 'mechanism'.[127-129]

Process evaluation assesses the implementation of the program and how this relates to the outcomes produced.  Process evaluation has emphasised assessment of *fidelity to intervention design*,[130] seeking to understand the implementation contexts only insofar as they explain whether the designed intervention was implemented (or not). Across experimental and quasi-experimental approaches, therefore, context is viewed as an extraneous variable to be controlled or accounted for, leaving little room for flexible responses to align with actor reasoning or changeable context during the intervention. Taking this approach, even if the methods were rigorously applied as per the design, but they were ineffective, then time and resources have been wasted, possibly with few advances in knowledge.

Theory-driven evaluation has gained attention in implementation science,[127, 131] whereby mechanism-based explanations for social phenomena become part of the process of enquiry, rather than products or variables.[131] The aim is not to neutralise context but to gain a nuanced understanding of how intervention processes interact with contexts, and influence stakeholder reasoning.[127, 132, 133] The unit of analysis is the theory of why the change should occur at all; as opposed to testing one, highly constrained strategy aiming to bring about that change.

### 1.4.2    *The CYCP as an example of the limitations of quasi-experimental designs*

The CYCP investigators understood in 2010 that relationships and priorities can change rapidly in response to any number of community events. For instance: fluctuations in the availability of cannabis and other substances; turnover of incumbent mayors or chief executive officers in local councils or directors of health services; deaths and other traumatic incidents; family and clan conflict; or employment opportunities. The flexibility to respond to needs as they arise in health promotion was acknowledged in the CYCP design and approach.

The research team viewed the baseline survey interviews as the first intervention, where people could report their perceptions of cannabis impacts on themselves, their families and their communities and related concerns. Returning this local data in a readily understood format was the first resource that aimed to stimulate or leverage local agency. A set of intervention components was proposed *a priori*, with the research team acting as enablers, advocates or mediators. Local data was returned to the community framed as: '*Does the data sound right? What, if anything should be done? Can we help?*'  The intention of the program architects was a design that would respond to local opportunities and stimulate the will for change.

The evidence for change would be measured before and after the intervention as: the total number of current users; evidence of a proportion of baseline participants who had ceased using cannabis; and

reduced number of current users reporting symptoms of cannabis dependence. Qualitative data collected sought general information on participants' motivations to change their cannabis use, and a process evaluation was planned that would assess intervention fidelity.

At no time did the evaluation methodology explicitly test the role or value of returning the data to stimulate community resolve or other stakeholder responses.  The process evaluation aimed to estimate implemented intervention components in terms of 'dose', and to simplify the research context enough that evidence for an intervention effect could be demonstrated across three sites. The quasi-experimental study design attempted to 'cut through' the inevitable complexity of a multiple component intervention in three communities, to detect evidence of an overall change. However, the wide-angle approach adopted in the CYCP aimed to measure impact at the community level, with little attention to variations in latent propensity to change cannabis use for different subsets of the population. Whether the CYCP's overall impetus was to provoke or support community level readiness to change, individual level readiness to change, or both, was not explicit.

We shall see that a good proportion of individuals using cannabis said that they wanted to change their cannabis use. Had the intervention components focused on those individuals, better use of time and project resources may have been possible. With researchers visiting communities, local opportunities to reduce cannabis demand or harm often became apparent, but the study design restricted the available responses from the CYCP. The CYCP's quasi-experimental design produced quantitative and qualitative data that were intended to fulfil a conventional epidemiological study and process evaluation. The thesis considers realist evaluation as a potential alternative, specifically applied to substance misuse in Australian remote Indigenous community contexts.

### 1.4.3    *Theoretical lens for a retrofitted evaluation and study design—realist evaluation*

This thesis uses the CYCP's setting and data to examine realist evaluation as a theory-driven approach in response to the methodological gap between the robust hypothesis testing potential of experimental designs and context-sensitivity of qualitative enquiry.

Realist evaluation (initially called scientific realism in Pawson and Tilley's seminal text[143]) is an approach to hypothesis formulation, data collection and analysis adopting the realist ontology described in Bhaskar's *critical realist* theory of science.[134] Critical realism accepts the existence of a reality external to subjective experience that can be partially known. Consistent with Popperian falsifiability, the epistemological position of critical realism acknowledges that reality is observable but only incompletely.[135] Realist ontology, however, is different to critical rationalism in its stratification of reality to three domains: the *real* domain, where causal powers reside for possible mechanisms, given enabling circumstances, all of the mechanisms for all of the possibilities exist in the *real* (Figure 1.2). The *actual* domain of events, whether observable or not is a subset of the *real*; and, the *empirical* domain is a subset of the actual that can be measured and observed. Explicit acknowledgement of the *real* recognises psycho-social mechanisms as key to producing outcomes, which can then be subjected to theory-driven hypothesis testing. Being theory-driven, the hypothesis testing cycle is not limited to cause-and-effect variables in constant conjunction, as in the hypothetico-deductive approach. Thus, critical realism can account for human agency and uncertainty in complex systems, without resorting to a relativist position.[136-138] British criminologists Pawson and Tilley first adapted critical realism as *scientific realism* for program evaluation in the field of criminology over 30 years ago[139] and *realist evaluation* has seen significant adoption in the last decade.[133, 140-147] 'Realist evaluation' and 'realist synthesis' review methods have gained momentum in an effort to overcome some of the limitations of experimental approaches for measuring the effects of social behaviour change programs.[142, 147, 148]
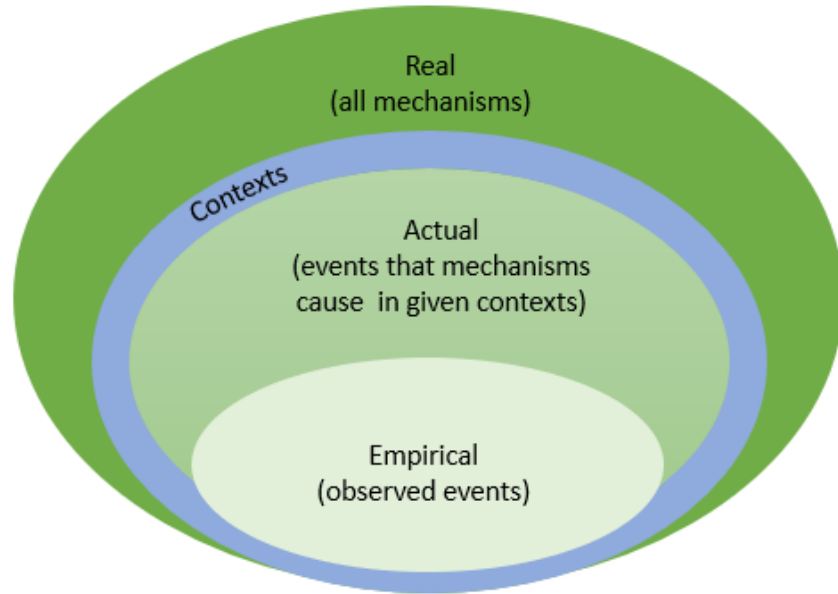
Figure 1.2    Critical realist layered ontology.

In realist evaluation 'outcomes' are understood as the product of 'mechanisms', operating within the specific 'context', the *context-mechanism-outcome* (CMO) cluster is the unit of analysis (Figure 1.3), a mini-theory for how the program will produce effects.[139, 141, 147, 149, 150]
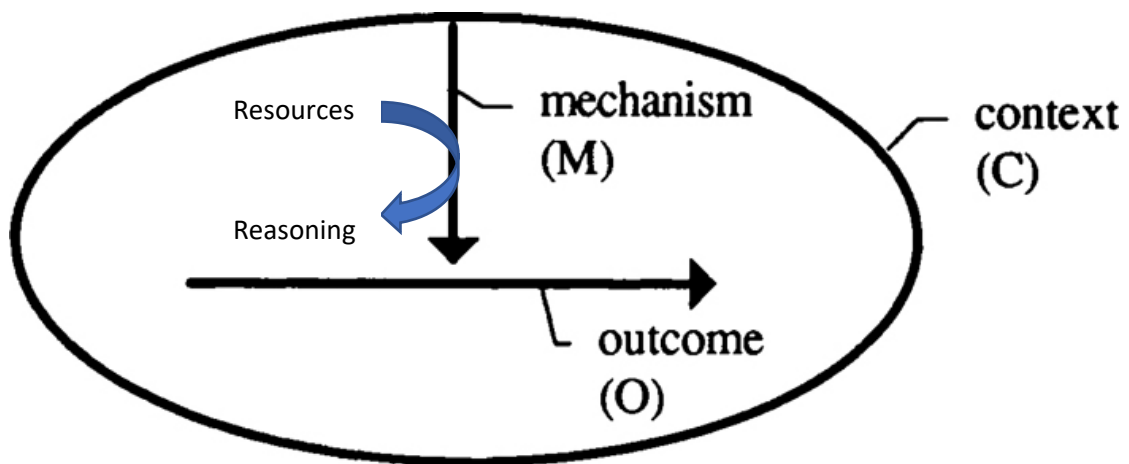


Figure 1.3    Context-mechanism-outcome cluster as a pragmatic heuristic for program evaluation. (Adapted from Pawson, R. and Tilley, N. Figure 3.6. Basic ingredients of realist social explanation. *Realistic Evaluation.* 2013, p72.)

In practical terms, in the Pawson and Tilley model, the *context-mechanism-outcome* cluster is an heuristic device used to produce testable theoretical explanations. The following brief explanation will be elaborated on in Chapter 3. *Outcomes* are empirically observable products, often a change in behaviour.[139, 147, 150] Pawson argued that empirical observations are interpreted, comparative and intersubjective, but that outright relativism could be by-passed by testing theories of social processes against and connecting to better understood parts of the system.[151] *Context* is a comprehensive account of factors in the social, economic, political or other relevant layer of the system that influences whether the mechanisms fire. Specific and evidence-based, the program *contexts* are more than simply a description of the intervention environment;[142] rather, contexts are considered systematically in relation to mechanisms. *Mechanisms* are mini-theories of how resources introduced by the program influence stakeholders to produce outcomes. Pawson and Tilley's original work represented mechanism in social programming as actor *reasoning* in response to program *resources*, shown in Figure 1.3. In this formulation the *responses* available are constrained by the particular *context* to produce *outcomes*.[128, 139, 140, 152] This serves an approximation of the structure and agency of sophisticated sociological theory, but it is a useful construct to support realist thinking and practical application, especially when starting out in realist evaluation. Constructs for realist mechanisms relevant to group and institutional level reasoning are also applicable and will be discussed in more detail in Chapter 7.[132] The hypothesised CMO clusters can be purposefully tested in prospective theory-driven evaluation.[143, 148]

With very few examples of realist evaluation applied to indigenous health interventions up to 2010, and none identified by this author in Australia at that time, today there is a growing literature employing realist evaluation approaches in Indigenous health.[144, 153-159]

### 1.4.4    Research aims, questions and approach

The thesis examined NHMRC-funded substance-misuse intervention research methodologies and the

health issues to which they have been applied in remote Indigenous communities or populations. The

aims of this thesis were as follows:

i)      To review substance misuse intervention research in the particular context of remote

        Australian Indigenous communities;

ii)     To examine the empirical data from one project through a realist-informed lens.

iii)    To redesign (within pragmatic limits) an already implemented community-level intervention

        project, the Cape York Cannabis Project (CYCP), within a realist paradigm.

### 1.4.5    Thesis overview

The thesis chapters are built around three peer-reviewed publications:

- Publication 1: *Substance misuse intervention research in remote Indigenous Australian*

  *communities since the NHMRC 'Roadmap'.* Published in 2017 in the Australian and New Zealand

  Journal of Public Health, with co-authors, this article reviewed publications resulting from

  NHMRC-funded substance misuse interventions in the ten years after the 'Roadmap' (Appendix

  1).[43]

- Publication 2: *Cannabis use among remote Indigenous Australians: opportunities to support*

  *change identified in two waves of sampling.* Published in 2018 in Frontiers in Public Health, this

  article presents an analysis of quantitative data from the CYCP (Appendix 2).[7]

- Publication 3: *"Need Everyone Helping to Keep Off Because Everyone Helping to Keep On"*–

  *Reducing Harms from Cannabis use in Remote Indigenous Australian Communities Involves More*

*Than Just Users.* Published in 2018 in the Journal of Substance Use & Misuse, this article

presents an analysis of qualitative data from the CYCP ([Appendix 3](#)).[160]

The body of this multiple methods thesis is organised in six chapters, culminating in a realist redesign of

the CYCP (Chapter 6), grounded in the existing data, as follows:

- ***Chapter 2, Description of the Cape York Cannabis Project***

  Description of the Cape York Cannabis Project: hypothesis; setting; consultation; community

  engagement for an intervention study; study design and outcomes evaluation; survey methods;

  data summary; and process evaluation.

- ***Chapter 3, Methods***

  This chapter includes: amendments to the Human Research Ethics approval for the CYCP that

  enabled analysis of the data after the CYCP end-date and use of the findings in a doctoral thesis;

  restated thesis aims; review methods (Chapter 4); quantitative and qualitative methods applied

  to measure CYCP outcomes (Chapter 5-6); the theoretical lens of scientific realism (Chapter 7);

  and, the author's critical reflection on being a researcher in this field and her experiences while

  engaged with the CYCP.

- ***Chapter 4, Literature review:***

  The literature review chapter frames and enhances the 2017 review (Graham et al , 2017;

  [Appendix 1](#))[43] of NHMRC-funded substance use intervention projects conducted during 2000-13.

  The chapter updates this review using literature published up to and including 2019. A narrative

  synthesis of realist-informed evaluation designs that have been used in Indigenous health

  research or health programming in Australia during the past two decades completes this

  chapter. The development of thinking regarding community-based implementation, ownership

and agency in health interventions in disadvantaged and vulnerable populations, in particular, is

assessed.

- ***Chapter 5, Quantitative data from the CYCP***

  Chapter 5 is based on Graham and Clough's (2018)[7] CYCP data from two waves of sampling in

  three remote communities (Appendix 2).  It presents analyses of the quantitative data compiled

  for the CYCP accompanied by a qualitative content analysis exploring the reasons for cessation

  among participants who had ceased cannabis in the previous 12 months from follow-up

  interviews, i.e. during which time the intervention was implemented.  The chapter considers the

  challenges of compiling robust quantitative outcomes in this study context; and frames the need

  for evaluation methods with explanatory power about the relationship between intervention

  programming community-level outcomes.

- ***Chapter 6, Qualitative data from the CYCP***

  Based around Graham and Clough's article published in Substance Use & Misuse[160] (Appendix

  3), a data-driven understanding of community resident participants' attitudes to cannabis, this

  chapter explores what was contained in the qualitative data compiled during the study and how

  we have used it to understand potential resources for reducing cannabis use in the community,

  with or without intervention.

- ***Chapter 7, Realist redesign of the CYCP***

  Chapter 7 summarises the findings and limitations of the CYCP. It then considers the original

  hypothesis, intervention strategies and process evaluation through a realist philosophical and

  methodological lens. A program theory and several plausible and testable mechanisms are

proposed for community level intervention with the aim of reducing cannabis demand and harm in Cape York communities.

- ***Chapter 8, Discussion***

Chapter 8 overviews the Chapters 4-7 findings and interprets the significance. The contribution of the thesis to Indigenous substance misuse intervention research and potential advantages of realist methods is discussed. The methodology proposed in Chapter 6 is discussed in relation to the major current themes for operationalising realist approaches, particularly in public health programs. The limitations of the thesis are described, identifying gaps that could be addressed in future work and some recommendations are proposed with concluding remarks.

# 2   Description of the Cape York Cannabis Project

This chapter is a brief description of the Cape York Cannabis Project, necessary to frame the realist retrofit that is the work of this thesis. It is organised into the following sections:

## 2.1   Raising the issue of cannabis misuse in Cape York and project rationale

The Cape York Cannabis Project (CYCP) was conceived and designed during 2008-10, its Chief

Investigator (CI), Professor Alan Clough, is the Principal Advisor of this thesis. It drew its inspiration from

four lines of knowledge, experience and understanding held at the time the study was designed:

i) The CI's prior research, and that of his students and colleagues, demonstrating the neglect of heavy cannabis use which seemed to have become endemic in remote Indigenous communities in the Northern Territory, and the demonstrated feasibility of measuring cannabis use in these contexts.[12, 40, 95]

ii) Queensland Police Service (QPS) concerns about methamphetamine supply via existing cannabis marketing networks in Cape York, and their willingness to implement innovative community policing strategies.[161]

iii) The principles of working in partnership with local residents and key community support agencies to achieve health gains in intervention research.[162]

iv) A commitment among the project collaborators and across the health intervention research field more generally to developing and implementing robust measurement in public health research.[163, 164]

The assumptions and contemporary wisdom influencing the study design and implementation of this multiple component intervention will be explored more thoroughly in this chapter. By way of brief introduction, the four points noted about the conditions under which the CYCP was realised are explained in the following sections.

### 2.1.1 *The CI's prior research, and that of his students and colleagues, demonstrating the neglect of heavy cannabis use*

First, the CI (and his students and colleagues) conducted research in Arnhem Land 1999-2007 which documented rising and persistent cannabis use in remote Indigenous populations.[12, 29, 30, 165]  That body of work demonstrated that:

- Community residents would discuss a potentially sensitive topic, especially with researchers who '*keep coming back'* (personal communication in a conversation with J. Robertson, 2011) and are able to build trust.

- Direct, face-to-face surveys were both feasible and reliable in remote Indigenous community contexts.[12, 29, 95]

### *2.1.2   Queensland Police Service (QPS) concerns about methamphetamine supply via existing cannabis marketing networks*

Second, police held concerns at that time of an emerging epidemic of methamphetamine use after a sizable seizure in Cape York 2007.[161] Cape York's sparsely populated land mass is geographically close to south-east Asian producers, as well as the market among potential users among fly-in / fly-out mine workers.[44] Police were concerned that existing cannabis supply networks would facilitate amphetamine trafficking. Therefore, with a focus on reducing cannabis supply and demand:

- JCU, the Queensland Police Service and the peak bodies for leadership in Cape York and Torres Strait (Regional Coordination Council for Cape York and the Island Coordination Council) committed to a partnership to combat illicit drug trafficking.

- The police initiated a community policing strategy called *Weed it Out* across the Cape-Torres region, with federal funding from the Department of Communities. *Weed it Out* applied harm minimisation assumptions at the community level, in order to reach lucrative supply networks managed by outsiders.

- Demand reduction intervention by health researchers was instigated to complement *Weed it Out*'s innovative approach to community policing.[161]

### 2.1.3 *Principles of working in partnership with local residents and key community support agencies to achieve health gains in intervention research*

Third, the CYCP approach addressed contemporary notions of participation and self-determination in design and delivery of the health intervention components, which it fulfilled as follows:

- Community participation and partnership was extended by consultation with community members across Cape York, and a workshop of key stakeholders held in Cairns throughout 2007-8.

- Participants endorsed community-based strategies used to good effect elsewhere, such as employing local researchers to progressively feedback study findings and develop social marketing materials;[166] diversionary activities for youth;[167] increased investment in local employment and training; more thorough workplace drug testing and community action to marginalise drug dealers;[62] and implementing evidence-based psychosocial approaches.[168, 169]

### 2.1.4 *Robust study design*

Fourth, the study design emphasised fidelity of implementation[170] and robust quantitative measurement of impact.[163, 164] It thus aimed to contribute to the literature measuring intervention effects and causal associations, where more accessible descriptive studies of preventable illness were more common.[163]

## 2.2 Neglect of heavy, endemic cannabis use in remote Indigenous Australian communities in the Northern Territory

Clough, Lee, Conigrave and colleagues conducted studies with Aboriginal communities in Arnhem Land (Northern Territory) laying the foundation for cannabis intervention research with remote Indigenous Australian communities.[12, 29-31, 62, 93, 95, 165] Over a ten-year period, their work documented the emergence[29] of cannabis use and its endemic,[31] heavy use[12, 93] in very remote Aboriginal communities in Arnhem Land. Clough and colleagues demonstrated feasible approaches to measurement of exposure in

these environments, including: proxy assessment of changes in use[95]; establishment of a benchmark of

six 'cones' per day to define 'heavy' use[12, 165]; and an association between depressive symptoms and

heavy use.[93] A cohort study in the Northern Territory (2001-06) reported that 28% of users at baseline

had quit at follow-up three years later, and 77% of continuing users expressed a desire to quit.[12]

Between 2001 and 2004 the number of users reduced by 10%, with fewer regular, daily users.[62]

Importantly, Lee's doctoral work demonstrated effective dissemination of research findings in remote

communities, advancing principles of '*comprehensive community liaison…common conceptual*

*understandings…and to build the skills of local Indigenous researchers*'.[167]

## 2.3  The Queensland Police Service, concerns for amphetamine supply and the Weed it Out initiative

Cannabis supply and use is prohibited under Queensland law[171] and in 2010, it accounted for almost 70%

of drug-related arrests in Queensland, mostly for cannabis possession rather than the more serious

offence of trafficking.[172] The Queensland Police Service (QPS) held concerns for amphetamine supply

networks infiltrating Cape York along drug supply chains already-established for cannabis after a large

seizure of amphetamine in 2007.[161] This provoked a novel community policing approach in the interests

of identifying trafficking networks from outside the Cape-Torres Indigenous communities. *Weed it Out*

(WiO), designed and implemented by the QPS, embraced a harm-minimisation approach at the

community level, more aligned with health promotion than classic drug policing. This included social

marketing with WiO branding, role modelling and a focus on developing relationships at the community

level. WiO encouraged community informants to report activities of trafficking networks (predominantly

non-Indigenous people not living in the communities) taking advantage of the communities,[161] and calls

to 'Crime Stoppers' (a free call in Australia) subsequently increased (Crime Stoppers and QPS,

unpublished data). The QPS and JCU formed a partnership to simultaneously address the supply and

demand sides of harm reduction, with JCU to provide more locally-focused, community-level health promotion and evaluation.[161]

## 2.4    Principles of community partnership and research conferring tangible health benefits

The approach described in the CYCP study design aligned with principles of partnership and self-determination stated in the 2002 landmark document *The National Health and Medical Research Council road map: A strategic framework for improving Aboriginal and Torres Strait Islander health through research.*[162] In 2010, intervention research was considered an important way to make a contribution to Indigenous health through the application of research methods carrying with them the explicit intent of ameliorating the health issue in question. The CYCP investigators based the project's design on a pragmatic understanding of how to work with remote Indigenous communities to address substance use issues; knowledge gained throughout more than ten years working in the Northern Territory, first with cannabis[29, 30, 62] and later tobacco.[24, 65, 173] The consultative, multi-level approach included a multiple-component intervention that intended to provide focussed advocacy, enhanced community agency across domains of policy, enhanced personal skills, health service orientation towards the issue, community action and, ultimately, the creation of supportive environments for cessation. Although not explicitly stated in the funded study design, these principles aligned with the Ottawa Charter for Health Promotion.[174]

JCU and the QPS/WiO consulted with 231 people (57% Indigenous) across 16 sites (Cairns, three service centres and 12 remote communities in Cape York and the Torres Strait) to demonstrate community perception of need for a cannabis cessation support and/or intervention[2] project in Cape York and the Torres Strait. Local spokespersons  emphasised the need to support heavy users in Cape York who may suffer withdrawal, as well as better understanding of harms to promote cessation or prevention of

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[2] 'Intervention' in this work is used in the sense of health research intervention, and not in the spirit of the Federal Government's 2007 Northern Territory Emergency Response, known informally as 'The Intervention' (175.    Korff J. Northern Territory Emergency Response (NTER) - "The Intervention".  2021; Available from: https://www.creativespirits.info/aboriginalculture/politics/northern-territory-emergency-response-intervention.)

uptake in younger users.[161] In 2008, the QPS and the Cape-Torres leadership peak bodies (The Regional Organisation of Councils of Cape York and the Island Coordination Council for Torres Strait leadership group) signed shared responsibility agreements to implement more stringent cannabis control strategies.[161]

Later the same year a workshop was held with 21 participants working in health, allied health, community justice and community governance; invited from nine far north Queensland communities. The Arnhem Land cohort study and follow-up methods were presented and endorsed.[176] The QPS/LGC partnership selected three, de-identified Cape York communities to receive the demand reduction multiple component intervention and its evaluation, in addition to the WiO supply-reduction strategies implemented across the region by the QPS.

## 2.5    Setting of the CYCP

Cape York in far northern Queensland, Australia, covers an area of ~110,000 km$^2$ with a population of ~7054. This included 3501 who identified as Aboriginal, Torres Strait Islander, or both at the 2011 census (1846 aged 15-49  years) when data was collected, mostly living in 10 communities of <200-2500 people[177, 178] (Figure 2.1). Another several thousand Torres Strait Islander people live in 15 small communities on islands distributed across ~50,000 km$^2$ between Papua New Guinea and the tip of Cape York on the Australian mainland.[177] At time of writing, ten years on, the population is of similar size with 7513 and 3876 Indigenous people reported in the 2016 census in Cape York and the Torres Strait, respectively.[179]

The regions together are approximately the same size as the United Kingdom, but the sparse population is distributed among small, isolated communities amidst vast areas of tropical savannah, pastoral lands, wet tropical forests and swamps. Vehicle access to most communities is via well-maintained, unsealed

government-managed roads, which close for several months in the tropical wet season. Regional airlines

provide flights connecting the communities to the major regional centre (Cairns) multiple times per week.

There is usually a local community store along with a range of government services including a police

station, primary health clinic (PHC) and school. A range of community-controlled positions administered

through local councils include: Justice Groups, Health Action Teams, women's shelters, youth leaders,

men's sheds and Land and Sea Rangers. During the 2020 COVID-19 pandemic, Cape York was closed to all

but essential service providers, behind a biosecurity zone with strict quarantine.[180]
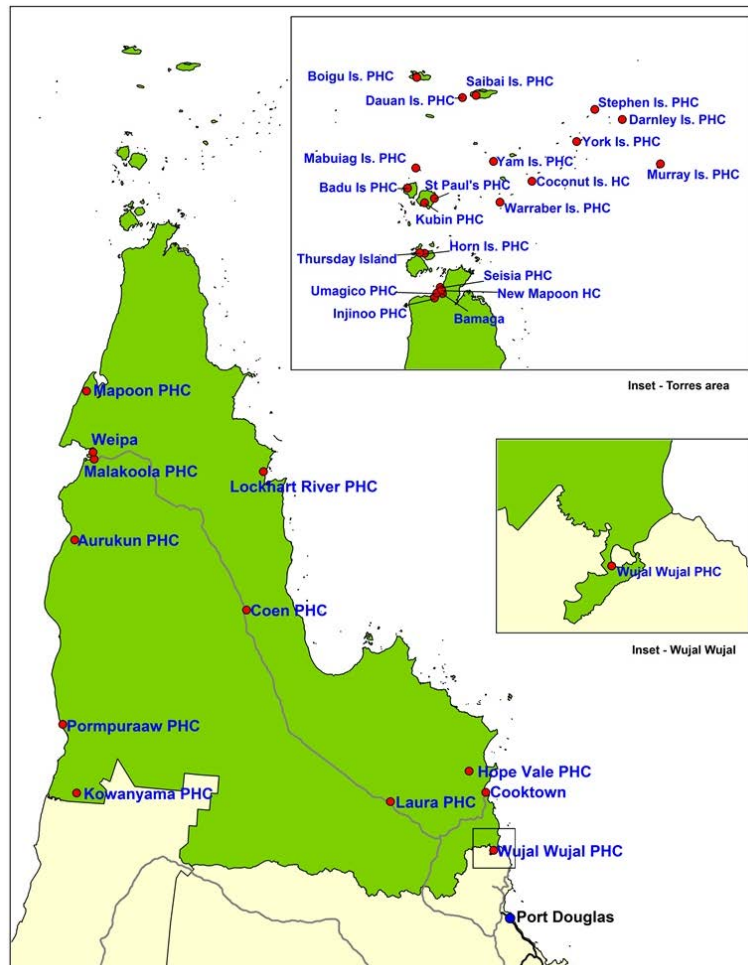


Figure 2.1   The Queensland Health Torres and Cape Health Service Map showing the communities in Cape York and the Torres Strait with a primary health clinic (PHC). The three study communities are among the Indigenous communities of Cape York.[181]

### 2.5.1   Communities historical and political context

Now self-governing with elected local councils, Cape York Indigenous communities are former church missions or government reserves (also described in Section 1.2), but practices and beliefs distinctive to various Indigenous clans and peoples remain very strong.[182, 183] Community residents can generally communicate in English and all official communication is in English. English is rarely the first language of local residents and Cape York Creole and surviving Aboriginal languages (notably Umpila and Wik branches of the Paman Aboriginal language group[184]) are more commonly spoken among community members. The communities are each comprised of several clan groups, the original inhabitants, together with descendants of people/families who were often forcibly moved from other areas, e.g. workers from the South Pacific islands north and east of Australia.[185]

All communities had and still have a low score on an *Index of Relative Socio-economic Disadvantage* compared with the rest of Australia, which is generally true of Australia's remote Indigenous communities.[2] Imposed control from outside may be diminishing over time, but likely had residual effects during the CYCP that persist at time of writing a decade later. Under the early to mid-20th century policy of 'protection and assimilation'[116] the control exerted over Indigenous people extended to removal of people, including children,[186] at the discretion of the Protector of Aborigines and the community superintendents. After the withdrawal of the mission and reserve system followed by the 1967 referendum for inclusion of Indigenous people in the census, restrictions to Indigenous self-determination continued through legal and policy frameworks. For example, through the 1980s and 90s, these communities were *Deed-of-Grant-in-Trust* (DOGIT) communities, a system that tightly restricts land use.[187, 188] Introduction of alcohol in the 1970s and its control in the early 2000s were enacted with outside powers and interventions.[9] The alcohol management plans (AMPs) implemented several decades later introduced a variety of unintended consequences, for example excessive binge drinking.[189] At the time of the project, the three participating communities' elected councils came under the *Local*

*Government (Community Government Areas) Act 2004* with similar rights and benefits as those afforded to shire councils in Queensland under the *Local Government Act 1993,* freehold land can now be made available.[187] Despite these incremental changes, the historical interference in Indigenous people's lives, current disparities, hegemony and institutional racism[190, 191] sustain mistrust for government institutions, intergenerational trauma and disrupted social structures.[109 192, 193]

### 2.5.2 Participating community demographics, geography and target age-groups

Three communities participated in the Cape York Cannabis Project, selected to broadly represent the communities within the region, but separated from each other by several hundred kilometres of unsealed roads and with no direct flights, to minimise contamination of intervention effects between sites.[125] These communities were chosen because they were, and still are:

- of similar size among the larger Cape York communities, i.e., populations ≥ 400, with balanced numbers of males and females in targeted ages;

- located at or near the margin of the area to minimise the effects of intervention strategies at any particular site impacting on neighbouring sites while maximizing the geographical distribution of potential positive effects of implementing intervention strategies; and

- discrete and isolated, separated by wet season river rises and by at least 250km of unsealed roads and not linked to each other by scheduled direct air-passenger or freight services.

While part of the same broad geographical region in tropical northern Australia, the communities are historically, socially, linguistically and culturally distinct. They have some of the least social or economic interaction between them of any three communities that could have been chosen in the region for inclusion in the study.

The study design approved by NHMRC peer-review processes targeted people aged 16-34, in three communities with a combined population of ~2200 in 2006 and 692 people in the target age-group.[125] The age-range interviewed expanded to 15-49 years during the course of baseline data collection as it

became apparent that cannabis was widely used in these age groups.  In 2011, a total

of 2187 Indigenous people lived in the three communities, approximately 1172 of these aged 15-

49 years (578 males, 594 females, Table 2.1).[178]

Table 2.1        Study communities' population by age and sex in 2011.[178]

| Age-group (years) | Community A | | Community B | | Community C | | All communities | |
|---|---|---|---|---|---|---|---|---|
| | **Males** | **Females** | **Males** | **Females** | **Males** | **Females** | **Males** | **Females** |
| **15-19** | 52 | 38 | 22 | 28 | 47 | 42 | 121 | 108 |
| **20-24** | 38 | 31 | 22 | 28 | 29 | 47 | 89 | 106 |
| **25-29** | 28 | 33 | 17 | 21 | 28 | 39 | 73 | 93 |
| **30-34** | 22 | 22 | 17 | 11 | 23 | 27 | 62 | 60 |
| **35-39** | 31 | 33 | 16 | 12 | 41 | 40 | 88 | 85 |
| **40-44** | 26 | 27 | 13 | 15 | 43 | 41 | 82 | 83 |
| **45-49** | 27 | 18 | 11 | 12 | 25 | 29 | 63 | 59 |
| **Total** | **262** | **233** | **140** | **155** | **265** | **312** | **578** | **594** |

In the three evaluation communities, the possession, consumption and carriage of alcohol became

tightly restricted from 2002 and totally prohibited after 2008.[49]  Cannabis use appeared to surge at this

time and there is evidence for consequential effects for particular subgroups, for instance people with

psychotic disorders.[49, 52, 53] The sample in 2011 therefore included older adolescents, vulnerable to

cannabis initiation, [194] as well as people who were potentially exposed to any shift towards cannabis use

in response to alcohol restriction. [52, 53, 161]

Cannabis supply to any individual community was influenced by seasonal fluctuations due to road

closures, as well as geographical proximity to various supply routes. For example, the western Cape may

be more likely to interact with illicit drug trafficking via the Northern Territory, possibly originating in

South Australia. The eastern Cape may be closer to local production sites, and northern communities

with access to fishing boats have a greater potential to interact with supply routes through the Torres

Strait.

## 2.6 Quasi-experimental measurement of intervention effect—robust study design of the CYCP

Discussed in Chapter 1, the Cape York Cannabis Project (CYCP) was an NHMRC-funded intervention study targeting heavy cannabis use in three remote Indigenous communities in Cape York, Queensland. The following sections describe the CYCP's design, implementation and data analysis. The findings are presented in Chapters 4 and 5.

The CYCP study design:

- proposed a multiple component suite of community-level intervention strategies;

- hypothesised that the intervention would bring about a 10% reduction in the number of cannabis users;

- aimed to measure effect via a multiple baseline study; and,

- proposed to evaluate implementation processes, over three years (2010-2013) in the three remote Indigenous communities in Cape York.

In 2010, influential publications in the literature on program evaluation in public health grappled with:

- context as an uncontrollable external variable; the need to apply health interventions across multiple layers of a complex system;[163, 195, 196]

- an emphasis on participatory approaches to enhance intervention acceptability to stakeholders, as well as sustainability;[196] and,

- the NHMRC upheld explicit expectations for Indigenous Health research support to enable self-determination and demonstrate clear benefits to communities involved.[33, 197]

The multicomponent intervention (summarised in Table 2.2) aimed to enable a variety of evidence-based and community-inspired actions. These would be evaluated by a robust measurement in a quasi-experimental study design and a process evaluation assessing fidelity to the intervention design.[170, 198]

Progressive feedback of study results in community workshops constituted the primary intervention component mediated by researchers. Laminated flipcharts with pictorial representations of proportions and rates assisted researchers to translate findings to local community residents, similar to the approach used in earlier studies in the Northern Territory.[167] Feedback to the communities reported: the proportions of current, former and never users in the community; use status by gender and age-group; weekly and monthly expenditure on cannabis; and, current users expressing the desire to quit.[93] Six workshops and quarterly reports were planned for each of the three communities.

There were no published interventions for treatment for cannabis dependence or withdrawal in Indigenous populations at that time; however, Cognitive Behavioural Therapy (CBT) and Motivational Enhancement Therapy (MET) had been effective for adults[168, 199] and adolescents[200] in the general population. Therefore, offering training in MET to clinic staff was included, with the assumption that they would use their contextual practice knowledge to adapt the strategy to the remote health service context.

Feedback received during consultation with communities across the region[125] determined the rationale for other intervention components included in Table 2.2. Research partners would deliver intervention components tailored to local needs during 2010-11. The multiple intervention components listed in Table 2.2 were assumed to act together locally, complementing the region-wide activities of Queensland Police and Local Government Council partnerships. The overall intended outcome resulting from the implementation of these components acting together was to produce an environment more favourable for cessation.

Table 2.2　　Summary of core intervention components endorsed by the consultation and design workshop that informed the NHMRC grant awarded in 2010.

| Component | Description | Implementation | Rationale & reference |
|---|---|---|---|
| 1. **Progressive feedback of study findings** | Laminated flipcharts with visual representations of prevalence by gender and age-group; community spending; and, dependence symptoms. | Six workshops over three years; quarterly reports. | Lee et al. 2008[125, 166] |
| 2. **Public meetings & support for events to enhance community resolve** | As per Arnhem Land approaches, community champions and leaders liaised with project staff to open public discussion about the issue. | Project attended public meetings when invited, at least once | Lee et al. 2008[125, 167] |
| 3. **Motivational enhancement therapy training for health services** | One to two training sessions in motivational enhancement therapy with a psychologist from the National Cannabis Prevention and Information Centre. | Health service staff participated in a session at the PHC in each community. Members recruited through employment service providers or LGC's participated in a general session at each site. | Copeland et al[201]; Denis et al[202] in the CYCP study design[125] |
| 4. **Develop & disseminate culturally-valid information resources** | Support awareness-raising workshop with regional community leaders | Achieved via the 'Everything you wanted to know about cannabis' workshop and hall activities (detailed below); distribution of project flipcharts and feedback data; distribution of NCPIC resources. | Lee et al[166, 167] in study design[125] |
| | (i) Information workshops: 'Everything you wanted to know about cannabis' | From project staff prior experience with community workshops around cannabis and tobacco— Delivered at least once at all three sites to: employment placement providers; PHCs; local government councils. The workshop package (presentation slides, social marketing and facilitator notes) was distributed to service providers and LGCs | Lee et al [166, 167, 203]Robertson et al[204] |
| | (ii) Community hall activities and logo competition, | Half day event in the community hall with food and art-supplies and a prize offered for the best logo for raising awareness of cannabis harms. | Inspired by the community champion in community 1, the strategy was extended to all three |
| 5. **School-based prevention programs** | Team members used participatory approaches based around theatre and role-play, as well as distributing social marketing at sports events. | Two schools, two occasions | Curriculum links to wellbeing policies in The Department of Education |
| 6. **Consultations with workplace managers, families and households** | Information workshops: 'Everything you wanted to know about cannabis' in conjunction with supply of cannabis self-tests to employment providers. | Three employment providers participated, one at each of the three communities | CYCP Study design[125] |
| **Support for families & households** | Nil | Nil | Tsey et al[205] in study design[125] |

### 2.6.1    Measurement / outcomes evaluation

The CYCP's *multiple baseline study* design[163] provided a robust, quasi-experimental alternative to randomised experimental designs for monitoring outcomes in public health intervention research,[164] already being used by the CI to evaluate community-wide tobacco interventions in the Northern Territory (The 'Top End Tobacco Project', see Chapter 2 and Graham et al, 2017 in Appendix 1).  Shown in Figure 2.2, the multiple baseline design concept implements a staggered intervention start across baseline and intervention phases, with each community serving as its own control. The potentially beneficial intervention effects are not withheld from any population; and the pre-post design across multiple sites provides greater confidence that any changes reproduced across the communities are reasonably attributable to the intervention.
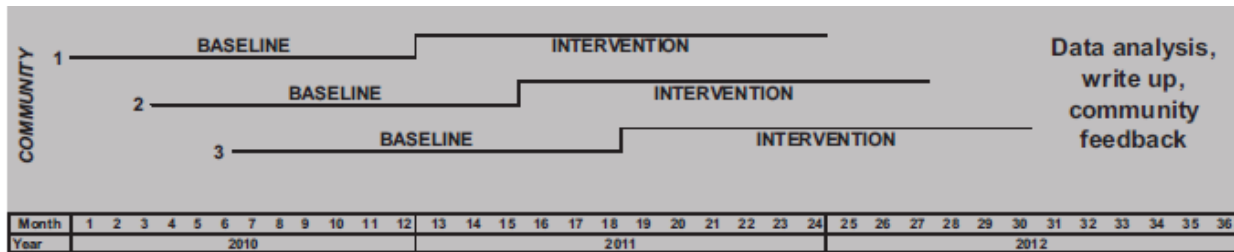


Figure 2.2    Timetable for intervention and multiple baseline study in three communities.[125]

### 2.6.2    Baseline and follow-up survey methods and data

CYCP researchers recorded quantitative and qualitative data in semi-structured interviews along with field notes, reflections, meeting notes and communication diaries. Throughout the implementation, researchers documented the project's contact with the community, dates of contacts, meetings with stakeholders, and the extent of implementation of intervention components.

### 2.6.3    Researcher etiquette in the communities

Teams of two to five researchers visited each site 2-3 times for data collection between May 2010 and October 2011, constituting the baseline phase of the study design; and between May 2011 and February 2012, at least one year after baseline interviews, by way of follow-up at the end of an intervention phase (Figure 2.2). The research team engaged communities at least two weeks in advance of visits, traveling from the regional centre (Cairns, 800–1,000 km by road or by air in the wet season), and spending three to five days in the community each time. Visits to communities always began with informal visits to key stakeholders, in particular the local Council, to obtain permissions to commence research in the community. Efforts were also made to form relationships with health clinics, schools, multipurpose community centres, environmental management groups (for example the Land and Sea Rangers in each community), local employment and training agencies, youth centres, women's and men's shelters and other local employers. Police were notified but researchers minimised interaction with the police during community visits to avoid the perception that the project members were police officers or informants.

Paid brokers were willing community members either involved in local programs, recommended by service stakeholders or who were initial survey participants wanting employment and who offered to assist. The brokers located and approached potential participants, described the study rationale and consent forms to them in local language and helped secure family permissions with written informed consent for those under 18 years of age (Appendix 4).

### 2.6.4    Participants and sampling at two time points

Random sampling was not used because to do so appears to have the effect of implying that some people are singled out or stigmatised because of their drug use.[206] Recruitment was therefore opportunistic, following strategies used in the Arnhem Land (NT) studies,[30, 95] and targeting younger age groups. Sampling at baseline, however, aimed to include and represent the local population in participating communities with a balance between males and females included in the sample in each community.

Research staff recruited interview participants in public spaces or in private homes when invited, usually with the brokers assisting. Participants were asked to recommend appropriate community members for interview in a snowball approach. Younger males in the harder-to-reach and vulnerable age groups were purposively included, where possible.[206, 207]

In the follow-up survey, as many baseline participants as possible were re-interviewed after the intervention phase, and additionally assessed by up to three proxy informants nominated by the participant during the baseline interview. In particular, where participants could not be located during the follow-up phase, their cannabis use status was discussed with the nominated proxy informant, a strategy used previously in Arnhem Land.[95] New participants were recruited at follow-up when the opportunity arose to ensure an adequate sample size at follow-up and to accommodate those who wished to be included in the study and who volunteered to be interviewed.

### 2.6.5  *Interview content*

Semi-structured interviews used a conversational approach, employed routinely in these localities to work across cultural barriers,[12] including the words commonly used locally for cannabis use and supply. Participants were asked only about their own recent cannabis use, with no enquiries made about current possession. Participants were informed that conversations were private, and that they would not be identified in project reporting. Participants were also warned not to discuss any potentially criminal activity, as researchers were obliged to report ongoing or future criminal activity to the authorities.[206] Interviews lasted from ten minutes—if participants had little or no experience with cannabis or offered only brief responses—to 30 minutes, if participants engaged in rich 'yarning'[208, 209] about their experiences with cannabis.

The baseline / first wave of data collection documented participant demographics, and lifetime cannabis use. Current users were asked about frequency of use, their preferred style of use, age of first/last use,

estimated quantity used and weekly expenditure on cannabis and tobacco use. Following procedures used in the Arnhem Land studies, five severity of dependence scale (SDS) questions were administered to current users (Appendix 5).[200] Open-ended questions elicited qualitative information from current and former cannabis users about any intentions to change and reasons why.

At the follow-up/second wave of data collection, in addition to lifetime cannabis use and SDS for current users, participants provided data about current and lifetime use of alcohol, tobacco, volatile substances and other illicit drugs. Proxy assessments were recorded for cannabis use status for baseline participants who could not be contacted at follow-up. Hand-written interviewer records were transcribed into a secure data base contained in a spreadsheet, consistent with the protocol approved by the JCU and Cairns and Hinterland HHS ethics committees.

### 2.6.6    Ethics approvals for the CYCP

The Human Research Ethics Committees of James Cook University (Protocol H3072) and the Cairns and Hinterland Health Services District (Protocol #516) provided ethical approvals.

## 2.7    Summary of data collected during the CYCP

Data from the CYCP included quantitative and qualitative data from semi-structured interviews conducted in the three communities at two time points. Researchers collected reflections and meeting notes in the field or in Cairns, timelines (Appendix 6), records of the design and implementation of intervention components and associated resources produced (Table 2.3).

Table 2.3      Data collected during the Cape York Cannabis Project 2010-13.

| Method | Dates | Source | Content |
|---|---|---|---|
| **Interviews** | 2010-11 | Before and after survey of a cohort of community members aged 15-49 years at baseline recruitment | <ul><li>Age, gender, employment & training</li><li>Use status</li><li>Among current users: amount; frequency; SDS score; expenditure; and desire to change use</li><li>Concerns about their own or others' cannabis use</li><li>A proxy contact was nominated for follow-up</li></ul> |
| | 2012 | Follow-up survey of baseline participants | <ul><li>Current cannabis, tobacco, alcohol and volatile substance misuse</li><li>Among current users:  amount; frequency, SDS score; expenditure; and desire to change cannabis use</li></ul> |
| | 2012 | Proxy follow-ups | Proxy reports were collected for baseline participants use status at that time point |
| | 2012 | Newly recruited participants | Participants who did not participate in the baseline cohort, recruited during follow-up survey |
| **Field notes** | 2010-13 | During 20 field trips by the research team to three communities | Daily activities and relationships with stakeholders were documented, including meetings and conversations with key stakeholders, researcher reflections, intervention activities and resources |

## 2.8    Process evaluation

A focus on fidelity of strategy and dose in the intervention supported the underlying epistemological assumptions of the quasi-experimental design. In this study design, each community's baseline measures served as their own controls,[125, 170, 198] and fidelity of the intervention would ensure that effects were likely attributable to the intervention. Appendix 6 outlines a series of field trips to the three communities in 2010-12 designated as belonging to data collection or intervention phases of the MBS. Figure 2.3 shows the process evaluation plan as it appeared in the 2010 study design, and this aimed to answer process evaluation questions:

1.   How does the availability of cannabis vary across the region and in study communities?
2.   What types of activities comprise the intervention in each location?
3.   Have the study populations actively engaged with the intervention components?
4.   Were the study outputs achieved and were these linked with existing programs?

The CYCP intervention components aimed to stimulate agency at the community level with strategies implemented across health, work, family and young people, consistent with community perceptions heard in the consultation.[161]  Rather than prescriptive processes designed in advance, these were suggested in alignment with consultation, community data and engagement, with project support available. In the course of CYCP implementation, adequate quantification of intervention dose proved infeasible. The narrative summary of the intervention components is provided here, corresponding to the components summarised in Table 2.2, and following the process evaluation in the CYCP project proposal.

| Component | EVALUATION QUESTIONS | DATA SOURCES | TIMING OF DATA COLLECTION | DATA ANALYSIS - SYNTHESIS |
|---|---|---|---|---|
| DOSE RECEIVED | 1 Public meetings conducted? | Records of meetings | | |
| | 2 Training sessions in motivational enhancement therapy? | Register of training sessions conducted | | |
| | 3 Study results returned to communities? | Records of feedback workshop sessions | Observations during baseline phase | Summarise observations |
| | 4 Information resources developed and disseminated? | Resurces developed and records of dissemination | | |
| | 5 Enhanced community resolve demonstrated? | Council meeting records, resolutions and community events | | |
| | 6 Consultations with workplace managers, families and households conducted? | Study participants, community members, key community residents. | Observations and interviews during implementation and maintenance phase | Percentage of interviewees assessing 'yes' or 'no' |
| | 7 School-based prevention programs enhanced? | Interviews with scholteachers | | |
| PROCEDURES | 8 What procedures were followed to mobilise service agencies? | Records of meetings | Observations at baseline | Narrative description of observations |
| | | | Observations in implementation phase | |
| | | Register of communication with service system personnel | Observations in intervention maintenance | Frequency of communication |
| CONTEXT | 9 How has cannabis availability varied across the region and in the study communities? | Study participant interviews | Baseline and follow-up | Compare baseline and follow-up |
| | | Key local community residents/service providers-focus groups | Interviews on 3 occasions before intervention phase and 3 occasions after + monthly | Assess changes in cannabis availability progressively |
| | | Queensland Police Service | Monthly advice | |

Figure 2.3    Process evaluation design from the CYCP study design.[125]

### 2.8.1    *Dose—intervention components implemented*

The process evaluation stipulated that an approximation of dose would be summarised for seven components, as shown in Figure 2.3. A brief narrative overview of implementation of each of these components follows.

*1.    Public meetings and support for events to enhance community resolve*

Meetings were held with community and agency leaders to discuss the findings, the implementation of planned strategies and possibility of any locally-inspired measures. Project staff attended public meetings from time-to-time when invited, but no meetings were held specifically to plan community level strategies in response to cannabis issues. A stall was present at NAIDOC week celebrations in one community providing local data feedback, disseminating information resources and Weed-it-Out merchandise.

## 2. *Motivation enhancement therapy training for health services*

Motivational enhancement therapy (MET) training was delivered by an expert psychologist from the National Cannabis Prevention and Information Centre, based in Sydney.

- The primary health clinic in each community participated in a brief workshop on this approach, enabling the majority of staff working on the day to attend.

- Several MET workshops were also conducted, with small groups of local residents engaged with workplace readiness providers. These consisted mainly of decisional balance exercises around 'good things' and 'not so good things' about cannabis use.

- There was no evidence that MET training resulted in ongoing use of the approach in practice or even that it was welcome information. For example, and at least one clinic employee refused to participate because the person delivering the training was only present for a one-off visit, and local adaptation of the workshop was viewed as insufficient.

- Clinic employees expressed general agreement with the issues raised and suggested responses of brief intervention using MET approaches, but there was no evidence that this was embedded in day-to-day practice. On the contrary their expressed workload and competing priorities would suggest that cannabis brief intervention was not a high priority at any time for clinic staff.

## 3. *Progressive feedback of study results in community workshops*

As intended in the study design, each community received at least one 'feedback' visit to allow project staff to present data about local cannabis use prevalence and patterns. Research workers attended public spaces and talked to people using flipcharts presenting proportions of users as numbers of individual users out of ten who said they wanted to quit. Community expenditure was depicted as material articles of equivalent value (as used in the Northern Territory[167]). Flipcharts were left at the primary health clinic, council office and other workplaces.

*4. Development and dissemination of culturally-relevant information resources*

Social marketing material was distributed to any stakeholders that would accept them, including the local councils and health clinics, schools, organisations involved with child protection, women's and men's 'sheds', and workplace training and employment agencies.

- Local social marketing materials were created by young people participating in a 'logo' competition, the design of which was used to produce stickers, refrigerator magnets and posters.

- Some community residents took exception to the cannabis logo competition because it exposed very young people to cannabis imagery and other ideas such as how it is used. However, the idea was initiated by the local research worker in one community; and project observations and earlier consultation indicated that exposure to cannabis use, paraphernalia and harms was relatively universal in these communities, compared to mainstream communities.

- Shown in Figure 2.4, the winning logos included messages of strength, use of Indigenous symbolism, animals, flags and colours. The judges were well known community or church leaders. Social marketing materials that were designed elsewhere (for example materials developed in Sydney or South Australia) were distributed in the community. Local residents generally viewed them as irrelevant because they did not relate to Cape York communities. Locally produced material showing Cape-Torres artists' work, symbolism of strength and culture, as well as direct responses of experiences with cannabis were more engaging and sought after.

Figure 2.4    Messages produced by young people in a logo competition instigated by a community research assistant.

5. *Was enhanced community resolve demonstrated?*

Two local councils responded to the feedback of cannabis data, social marketing and police partnership by instigating local policies. These included cannabis testing all council employees in one community and incorporating a commitment to address cannabis supply and demand in the Community Safety Plan of a second community. Few if any other community organisations (health action teams, men's and women's shelters or sheds, youth groups) demonstrated prioritisation of cannabis issues.

6. *Consultations with workplace managers, families and households conducted*

Engagement of workplaces and engagement of families involved different relationships and levels of trust. The non-Indigenous visiting research team was able to engage workplaces via managers, or councils via elected representatives and paid administrators. The project did not engage a suitable intermediary to speak with or support families, as the planned intervention relied on implementation of the family empowerment project, which was not available in the communities during the intervention phase. The following therefore pertains only to workplaces.

- Workplaces, including employment and training agencies received the most intensive interventions in the form of a half-day workshop overviewing cannabis biology, potential mental health harms, legal aspects and impact of its misuse on employment and families.

- Workplaces also received the local data, social marketing materials and cannabis self-tests to distribute to clients, particularly those who would be attending training or work at nearby mines. Workplace training and recruitment agencies reported varying impact, with the practical capacity to self-test for cannabis being viewed positively.

- There was no evidence that the social marketing intervention in these places translated to increased knowledge or that the resources were used by local residents or organisations to facilitate conversations about cannabis. The project design was not geared to test for such mechanisms.

Local councils did engage with the project and the cannabis prevalence and expenditure data:

- One community council included cannabis drug testing as a requirement for all employees.

- Another council embedded the requirement to address cannabis demand in their Community Safety Plan, a legislated document produced by the community council against which they are obligated to demonstrate actions.

- Recognition of the issue from community leadership, embedding cannabis prevention strategies into policy, was the most direct evidence of any level of community mobilisation during the project. This was clearly demonstrated in two communities through their community safety policy and introduction of cannabis testing for cannabis among council employees.

7. *School-based interventions*

Schools invited the CYCP team to provide one-off presence at sports carnivals or similar events to distribute the locally produced social marketing materials or engage in dramatic play around peer pressure and or resilience. School nurses, aides and health workers suggested that competing health

issues, including sexual health, trauma and truancy superseded cannabis in importance. No interviews were conducted with school teachers, and there was no evidence that any school-based health promotion programs were systematically mobilised or supported.

### 2.8.2    Procedures—what procedures were followed to mobilise service agencies?

Procedures in place ensured that community engagement, respect and permissions were maintained and upheld, as well as the integrity of records and data.

- A project communication diary and meeting notes show that research staff were in regular contact with, at a minimum: the council; primary health clinic directors and Indigenous Health Workers; employment agency; and community organisations including men's sheds, women's shelters, PCYC, and Land and Sea Rangers

- Contacts in each community were alerted at least one week in advance of all visits, including placing posters on council and workplace noticeboards.

### 2.8.3    Context—how did cannabis availability vary across the region and in the study communities?

Cannabis price and availability influences accessibility to users, rates and intensity of use among a proportion of users. No changes due to large cannabis seizures or sustainable changes to supply chains were detected during the life of the project. One of the communities located in western Cape York Peninsula appeared to pay more for their cannabis, which was more often premixed with tobacco in sachets rather than cannabis plant material alone. Those on the eastern Cape York Peninsula were closer to regionally grown sources and appeared to be more likely to access pure cannabis plant material. Those closer to the sea were more likely to access cannabis transported by boat. This is important because it suggests that users in respective communities were exposed to different amounts of cannabis. Implications of this could be that those in the western Cape were exposed to a lower cannabis dose, and that cannabis would be more sought after by the users and less likely to be shared.

### *2.8.4 Summary of the process evaluation*

In answer to the process evaluation questions:

1. How does the availability of cannabis vary across the region and in study communities?

Cannabis purity, price and seasonal availability varied across the three communities located on or near the eastern and western coastline of the Cape York Peninsula, and with various land routes in-land, to regional centres and interstate. Large seizures or stops in supply were not recorded during the life of the project. Little contextual data was available regarding cannabis availability in the communities, but the before and after survey data did not suggest that there was a significant change in supply during the life of the project. WiO could provide information about large seizures that may have influenced supply and pricing across the region. Unlike licit substances like tobacco[66-77], however, cannabis within specific communities cannot be tracked precisely. The CYCP could not, therefore, gather evidence that this outcome was produced in relation to the specific study communities (Section 2.2.10).

2. What types of activities comprise the intervention in each location?

Activities in each location were similar, and often research led. These comprised of: data feedback; maintaining a relationship with local elected representatives and meeting regularly during community visits; social marketing; engaging workplaces and providing information and cannabis testing products; facilitating several motivational enhancement therapy workshops for clinic staff and job readiness services.

3. Have the study populations actively engaged with the intervention components?

Engagement by community organisations varied, with some councils and workplaces more vigorously engaged in specific intervention strategies. Community-based groups such as Justice Groups, Health Action Teams, women's shelters, youth leaders, men's sheds and Land and Sea Rangers displayed varying degrees of activity in different communities throughout the life of the project, and individuals in these organisations displayed varying degrees of engagement with the project. The men's and women's sheds / shelters were not necessarily operating, either due to a lack of infrastructure or the role being vacant.  Interactions with these organisations were therefore sporadic or limited to one or two visits.

Feedback of local survey data to the communities was comprehensive—over at least two days the local stakeholders were exposed to intense feedback and flipcharts of local data were left in multiple prominent locations such as council offices, libraries and PHCs. Intervention components were delivered as described, but no sustainable inertia or enhanced community or service provider resolve was apparent. The exception to the latter point being that some local councils and workplaces did take measures to instigate workplace testing for cannabis and, in one community, to integrate cannabis in the Community Safety Plan.

4.  Were the study outputs achieved and were these linked with existing programs?

Findings were equivocal. Reduction in cannabis demand in the community was not clearly demonstrated in the quantitative survey data (shown in Chapter 5). However, the community safety plans and cannabis workplace testing constituted observable changes in the community context.

## 2.9    Discussion—methodological limitations and ways forward

### 2.9.1    *Fidelity of the intervention was insufficient to draw conclusions*

The concept of fidelity is primarily relevant when the evaluation relies on an experimental / quasi-experimental, or 'evidence-based' model. This is so because in order for a controlled study to meet

standards of scientific rigour, to be valid or to produce meaningful findings that suggest transferability, the contexts and external variables need to be controlled or neutralised. As discussed in the introduction to this chapter, it was impossible to provide a controlled intervention. Some of the main reasons for this were:

- *Project team:* The study design relied on a research team regularly visiting from Cairns to accrue community knowledge, relationships and trust when outsiders 'keep coming back'. However, the project team experienced changes, including three key project officers over three years, with associated variations in interpretation of the role, capacity, team dynamic and training requirements.

- *Community character:* The context of each community was substantially different from the others in terms of local culture and clan mixes. The dispositions of clan or family members in significant leadership or community positions can influence the overall dynamic of a community and how the different functions work together, or not. For example, a young adult leader would be unlikely to challenge an uncle in an elected role. The historical influence of the Christian missions (Section 1.3 and 2.2.5.1) varies between communities and, although all are very remote, isolated communities, the degree of isolation varies with local geography (e.g., coastal communities are different from those further in-land, Section 2.2.6). The CYCP study design selected communities to represent broad regions of Cape York and to minimise interaction between the populations. However, the region's geography influenced the main cannabis supply routes, (distance to producers and how the cannabis was likely to be sold, Section 2.2.6) as well as the types of employment opportunities and access to alcohol, with some communities closer than others to regional centres, mines or other industry (Section 2.2.5).

- *Temporal environmental fluctuations:* The communities were also different from one visit to the next, for example: wet season, dry season, sorry business, changes in leadership, new facilities or loss of facilities, presence of illicit alcohol, and special occasions.

These factors were understood from the outset, and part of the assumption was that the community stakeholders themselves would equilibrate and modify local level actions to respond to fluctuations in context. The intervention's stated objective was to stimulate local level intervention strategies, and it assumed that project staff and resources would lower the barriers to this, without specifying a mechanism by which this would occur.  Selected interview excerpts at consultation[165] (see also Section 6.3.2.1) illustrated that for some, cannabis was often viewed as a calming agent, with less potential to induce violence than alcohol. Even if these limitations became apparent during implementation, the project did not have the flexibility to respond within the constraints of a study design that demanded fidelity to a fairly limited dose of intervention components, rather than a relationship with ongoing close support and responsive resourcing. There was no evidence of sustainable local momentum or stimulation of agency. In hindsight exerting this level of control was difficult or impossible under the circumstances.

The process evaluation documented limited impact of the intervention component as follows:


- Clinic employees expressed general agreement with the cannabis-related issues raised throughout the project. Brief intervention using motivational enhancement approaches were endorsed at consultation and the clinics cooperated in workshops with that focus, but there was no evidence that this was embedded in day-to-day practice. On the contrary, their expressed workload and competing priorities suggested that cannabis brief intervention was not a high priority at any time for clinic staff.

- Social marketing activities were conducted with the schools, but there was no evidence that any school-based health promotion programs were systematically mobilised or supported.

- Community-based groups such as Justice Groups, Health Action Teams, women's shelters, youth leaders, men's sheds and Land and Sea Rangers displayed varying degrees of activity in different communities throughout the life of the project. Individuals in these organisations displayed varying degrees of engagement with the project. The men's and women's sheds / shelters were not necessarily operating, either due to a lack of infrastructure or the co-ordinating role being vacant.

- The community organisations that most engaged with the project were the employment agencies and elected Local Government Area councils. Two communities introduced policy levers. Pre-employment and random cannabis testing was incorporated into council drug and alcohol policy documents during the project. A second community incorporated the commitment to respond to cannabis in the Council's Community Safety Plan with a clause explicitly acknowledging cannabis as a safety concern, and commitment to respond with cannabis harm and supply reduction action. There was no evidence that these outcomes translated into further community-level strategies.

### 2.9.2    *Salvaging data and ways forward*

The CYCP exemplified the research and evaluation challenge of determining causation in an open system,[133, 138, 139, 143, 152, 210-212] where experimental controls may be unethical, or entirely impossible.[138] Even if it were possible to use controls, the study design offers limited information about how, why and for whom cessation occurs due to the way the question was framed form the outset. Intervention strategies were described broadly as 'support for workplaces and families' or 'enhance community resolve' (Section 2.11.1). Thinking in terms of mechanisms, the question becomes not whether the

intervention component was delivered with fidelity but, more precisely, what was it about how the

activities and support were implemented that could potentially enable cannabis abstinence or cessation,

for whom, how and when?

# 3   Methods

The reader will find in this chapter the methods used in the separate chapters of the thesis:

3.1     Introduction and restated thesis aims

3.2     Ethics amendment for analysis of the Cape York Cannabis Project data after the end-date of the original proposal and use of its outputs in a doctoral thesis.

3.3     Literature review methods for Chapter 3 including methods used for the paper published in the *Australia and New Zealand Journal of Public Health*, 2017; and the methods used to update the review up to and including 2020.

3.4     Quantitative and qualitative methods applied to the Cape York cannabis Project data:

3.4.1     Survey methods

3.4.2     Quantitative variables published in *Frontiers in Public Health,* 2018 describing cannabis use status and patterns of use in two waves of sampling reported in Chapter 4 together with an unpublished before and after analysis of cannabis use in the cohort assessed at both time points.

3.4.3     Qualitative methods used to assess community attitudes to cannabis reported in Chapter 5; published in the *Journal of Substance Use and Misuse*, 2019.

3.5     Rationale and aims of the theory-driven redesign.

## 3.1   Introduction and restated thesis aims

The introductory chapters described the rationale for retrofitting program design for a community level intervention to a realist frame. The study design Cape York Cannabis Project (CYCP) comprised a baseline and follow-up survey in three participating communities which were completed in the first half of 2011 and the second half of 2012, respectively. The intervention phase had a staggered start across three communities, comprised of multiple, pre-defined components implemented or attempted between the second half of 2011 and the first half of 2012. At the beginning of 2013, the data analysis and process evaluation of the CYCP remained to be completed, as required by the funding body and written into the CYPC study design.

Preliminary data analysis and review of the major project milestones and activities indicated that effect would be limited, at best. Multiple intervention components and processes were hindered or not implemented, and the project recorded little or no sustainable change in policy, practice or behaviour. At this point the decision was made to use the data to inform a revised program design, with a realist lens to inform both intervention and study design.

The discrete aims of the thesis, therefore, were as follows:

   i)       To review substance misuse intervention research in the particular context of remote
            Australian Indigenous communities.

   ii)      To examine the empirical data from one project through a realist-informed lens.

   iii)     To redesign (within pragmatic limits) an already implemented community-level intervention
            project, the Cape York Cannabis Project (CYCP), within a realist paradigm by:

            1.  Analysing the CYCP data to find evidence of possible resources for cannabis cessation
                that could be invoked in program design to produce particular reasoning in context.

2. To outline a basis for producing a realist program theory and study design for prospective substance misuse intervention in remote Indigenous communities, exemplified by a partial protocol grounded in the CYCP data.

## 3.2    Ethics

The Human Research Ethics Committees of James Cook University (Protocol H3072) and the Cairns and Hinterland Health Services District (Protocol #516) provided ethical approvals. An extension to H3072 enabled analysis and publication.  This amendment consisted of an extension of the original ethics approval to analyse the data within the constraints of the original project proposal and to use that within a doctoral thesis.

## 3.3    Aim 1— review substance misuse intervention research in the particular context of remote Australian Indigenous communities

Section 4.3 presents the methods employed in the published article *Substance misuse intervention research in remote Indigenous Australian communities since the NHMRC 'Roadmap' (*Australia and New Zealand Journal of Public Health, 2017)[43] ([Appendix 1)](#) and its update, the findings of which are presented in Chapter 3.

### 3.3.1    *Justification of review method and inclusion criteria*

The review set up a comparator for the retrofitted design by assembling the most stringent available substance misuse intervention research, highlighting assumptions within evidence-based intervention research and the need for methodological solutions. Substance misuse intervention research funded by the NHMRC in the decade prior to the commencement of the thesis was examined and published first. The thesis was written some years later, therefore this was extended to include the years between thesis commencement and one year prior to completion.

The author considered conducting a realist synthesis as a systematic review method. In 2013-14, with few relevant programs available to review and limited realist expertise in the team, attempting realist review would have been time-consuming and risked producing redundant CMO propositions with little real-world utility.  A realist synthesis would be valuable for theory-building, whereas the work of the thesis was to lay a foundation that demonstrates why (or why not) to attempt realist design at all. The review therefore applied Pawson and Tilley's resource-reasoning pair heuristic to tentatively identify resources already existing in the communities that a theory-driven approach may seize upon, possibly to inspire an incremental shift to thinking in terms of realist mechanism. The decision was taken to perform a traditional synthesis informed by realist thinking about mechanism, as a first pass. This proved to be of interest at peer review and was published without alteration.

### 3.3.2    Review objective and definitions

The review examined NHMRC-funded substance misuse intervention research conducted with rural and remote Indigenous Australians since the 'Roadmap' for Indigenous Health.[33] The first iteration of the 'Roadmap' published in 2003 set out a framework for conducting research with Indigenous people obliging researchers to respect particular ethical standards such as self-determination and the need to conduct research leading to meaningful improvement in people's lives that had potential to shape the study designs and assumptions of subsequent research in the field of Indigenous health.[33] The review, published in 2017, focused on research funded 2003-13, where all the included studies were at a stage where they had produced at least preliminary findings. For the purposes of Chapter 3 in this thesis, a similar procedure was repeated for research funded during the period 2013-19.

The review objectives were to:

1. overview the thinking, evidence standards and evaluation approaches in the Australian health research community with respect to community-level intervention in remote Indigenous community settings;

2. summarise the impacts and limitations of successfully funded and implemented research; and,

3. overlay a plausible generic program theory for each of the categories programs identified.

For the purposes of this thesis a program theory is understood in a manner consistent with Pawson and Tilley's use of the term: it describes how the program architects intend the program to work, for whom and under what set of circumstances.[139] Program theory embeds implicit or explicit assumptions about how participants will respond to intervention strategies in context.[128, 143] The review sought to understand the strategies of each program as attempts to produce 'outcomes' by stimulating 'mechanisms' comprised of *stakeholder reasoning* in response to intervention *resources* produced by the intervention strategies. 'Resources' were tangible or intangible products of intervention strategies[139, 143] mediated by the implementation context.[128, 143] Each intervention program was therefore described in terms of its intended *Outcomes* (O), produced by *Mechanism* (M), in a given *Context* (C), and the CMO clusters described in words.

### 3.3.3    Review procedure: grants awarded 2003-13

The published review was prepared as follows:

1. Project Grants awarded 2003-2013, which directly targeted substance use among Indigenous Australians living in regional and remote Indigenous communities, were identified from databases at the NHMRC website *Outcomes of funding rounds.*[124] Projects that targeted substance misuse indirectly (community, family or service capacity building projects) or interventions targeting Indigenous participants living in metropolitan areas were excluded.

2. Relevant peer-reviewed publications were sought in PubMed, Scopus, Google Scholar and the 'Health Infonet' website.

3. Search terms included the 'primary chief investigator name' and 'topic' or 'key words' from the grant title. Citations included in the reference lists of articles reporting eligible studies were manually reviewed to identify additional publications. Only peer-reviewed literature was included. Accordingly, grey literature, evaluation reports, theses, conference proceedings, posters, tangible resources developed for the intervention, social marketing materials and magazine articles were not included for the published article, for the sake of brevity and to focus on the most impactful findings.

4. For each research project, the study designs, interventions and intended outcomes were summarised.

5. Intervention hypotheses and strategies were examined to produce a statement of how each program was intended to work to achieve explicit outcomes. This analysis considered program mechanisms for change as implicit or explicit resources and responses resulting from the documented project strategies, activities and outcomes.

6. Program theories underlying each study's design were outlined by speculating on the resources program designers intended their strategies to produce, and the anticipated response to the program by participants and other stakeholders.

The full list of NHMRC grant numbers, Principal Investigators and Institutions is included in Appendix 7. To manage the information, publication outputs for each project were assigned to case nodes according to project grant in NVivo™11.

### 3.3.3.1  *Data extraction and synthesis*

To achieve steps 4 and 5, data extraction and synthesis followed the steps described in Table 2.4, as they appeared in the published review ([Appendix 1]).[43] The flow-chart in Figure 3.1 summarises the process.
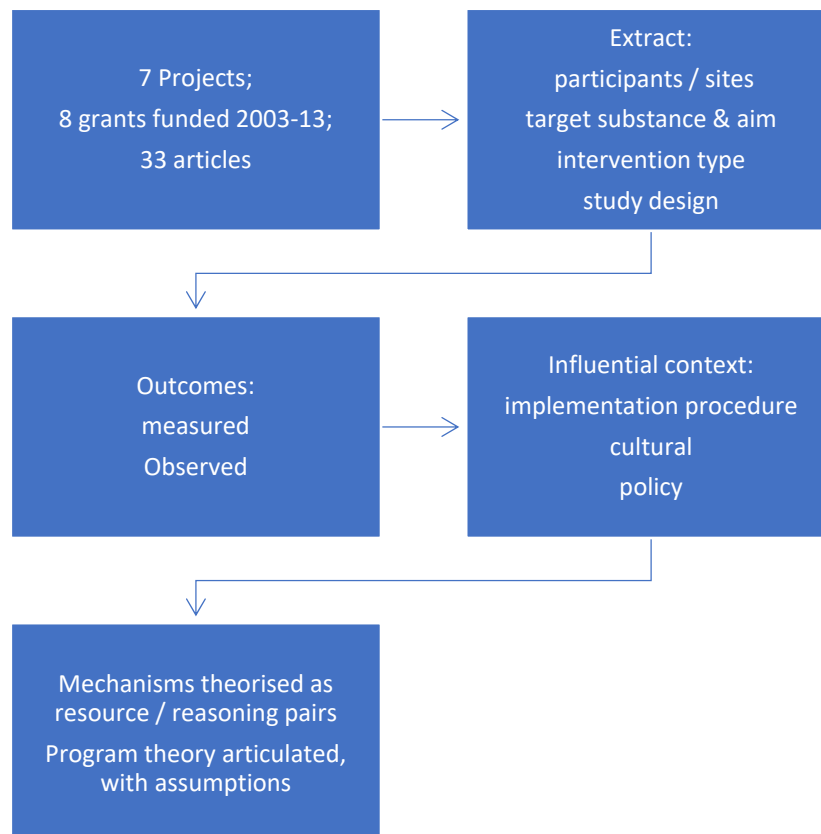


Figure 3.1      Data extraction and synthesis for the review published in 2017.[43]

Table 3.1        Data extraction and synthesis from Indigenous substance misuse NHMRC intervention project publications 2003-13.

| Data extraction & synthesis steps | Detailed data extraction |
|---|---|
| 1. **Descriptive information was extracted for each project by reviewing resultant publications relating to each** | • Explicitly stated aims of the study • total funding<br>• substance or activity targeted • type of study design<br>• number of participants • intervention strategies<br>• number of sites • measured or observed outcomes<br>• length of study (years) • any process evaluation design |
| 2. **Articles were read in detail (by the review's authors VG and AC) and searched for subthemes (VG) in the specified categories** | • Theory and theoretical framework: any specification of a theoretical basis for the strategy<br>• Mode of delivery: participatory, brief intervention at the clinic, multiple-component, action research<br>• Practitioners: the agents responsible for delivering the intervention components at the community level (doctors, local health workers, research staff, other professional)<br>• Participants: target population/s who received the intervention resources and at what level in the community (i.e. residents, service providers or community organisations). |
| 3. **Outcomes were identified** | • Main outcomes: reported participant responses or main outcome measures<br>• Unintended outcomes: unanticipated participant or stakeholder responses<br>• Broad indication of fidelity of intervention: components implemented as designed designated as 'most', 'some' or 'few'. |
| 4. **Contextual factors influencing implementation fidelity or uptake were identified** | • Observations published by investigators in their evaluation of success of intervention components including: feasibility of design; staffing; cultural or political factors, influencing implementation or participant / stakeholder response. |
| 5. **Speculation on intended mechanisms** | • Published evidence of the hoped-for change in participant thinking, in response to the resources that were intended to be mobilised by the intervention strategy.<br>• Additionally, distinct from the tangible intervention resources, we searched for evidence of any changes in the environment, structure or relationships arising from intervention strategies. |
| 6. **Key assumptions, and formulation of the program theories they implied** | • The methodological assumptions found in the literature for the individual study designs employed.<br>• Program assumptions were also derived by considering the aims of the intervention in relation to the actual outcomes and observations reported.<br>• A program theory was articulated for projects in statements prepared, discussed and agreed upon by this author and the publication co-authors. |

### 3.3.4    Review update: grants awarded 2014-20

A similar procedure as that for the published review, described in 2.3.2, was followed in 2021 to identify substance misuse interventions with Australian Indigenous stakeholders in the NHMRC Outcomes of Funding Rounds 2014-20.[124]

1.  Working in Excel spreadsheets downloaded from the NHMRC Website, Project and Partnership grants involving 'Indigenous' or 'Aboriginal' or 'Torres Strait Islander' stakeholders were selected.

2.  Project titles and summaries were scanned to identify substance use interventions and evaluations.

3.  Peer-reviewed publications were found on Google Scholar by searching chief investigator names, focus area and grant numbers. Grey literature associated with the projects was considered in this search, particularly since some of the projects were new and may have been delayed in implementation during the 2020 COVID pandemic. Therefore, project webpages, summaries on sites such as the Indigenous Health Infonet and consultation reports were examined where this assisted to understand the program theory.

4.  Additionally, in the review update, the Chief Investigators for all projects funded were contacted by email or telephone to:

    a.  verify that their projects were relevant to remote Indigenous communities and that they did, in fact, evaluate an intervention;

    b.  describe the intervention strategies, progress and limitations; and,

    c.  describe their study design, evaluation approach and prospective publications.

5. Articles were loaded to Endnote to facilitate data extraction, and data were extracted to tables as described in section 2.3.2.1.

The full list of NHMRC grant numbers, Chief Investigators and Institutions for included grants funded 2014-20 can be found in Appendix 7.

## 3.4 Aim–2 - Analysis of survey data from the Cape York Cannabis Project with a realist-informed lens

Analyses of the quantitative measures of cannabis use and the qualitative components of the semi-structured interviews were published in separate articles (Appendices 2 and 3). The quantitative methods in 3.4.1 relate to Chapter 5; and the qualitative methods in 3.4.2 relate to Chapter 6.

### 3.4.1 Quantitative data

Quantitative data for lifetime cannabis use was collected at the baseline and follow-up surveys. The project aimed to interview as many of the people in the age-group as possible, originally designated 16-34 years. The age-group at baseline was expanded to include participants aged 15-45 years. Approximately half  of baseline participants were lost to follow-up and a relatively small sample of new participants were recruited at follow-up.

The study power was calculated assuming that approximately 65% of baseline participants would be current users, and that there would be a 10% reduction in current users at follow-up.  A sample size of 372 was needed to achieve power in excess of 80% to detect a reduction of 10% in cannabis users from 65%-55% (adjusted for multiple tests, paired two-sided test, overall significance level of 0.05). Based on the assumption that around 65% of people may be current users, then 761 people may have been current users in a baseline sample of all community members in the age-group. The project assumed an attrition rate of 20% or that up to 609 baseline users might be available in the follow-up data. With a hypothesised reduction of 10%, there could be 61 people who had ceased cannabis use, 548 continuing

users and 937 non-users. The project successfully interviewed 429 participants at baseline, and 364 of these were followed up in-person or by-proxy.

The level of agreement between self-reported past-year cannabis use at follow-up and the proxy assessments was assessed using the kappa (κ) statistic.[213] Following established techniques,[95] proxy assessments were used to confirm self-report to allocate participants to cannabis use categories. Follow-up rates and characteristics of those lost to follow-up were assessed using information for both those followed up with interviews and those for whom only proxy assessments were possible. A range of categorical variables were designated to describe current, and lifetime use as well as any changes in use at follow-up (Section 2.4.1.1), and the characteristics of each sample at baseline and follow-up were then summarised in terms of gender, age and community. Changes in patterns of use between the two time points were assessed using two alternative approaches, one using all of the data as cross-sectional studies at two time points or waves, and a secondary analysis using the smaller sub-sample of continuing cannabis users and former users who provided self-report data at both baseline and follow-up.

### 3.4.1.1   *Cannabis use variables*

The variables detailed in this section are summarised in Table 2.5.

**'Use status'** described current and lifetime use at baseline and at follow-up compared to baseline. Consistent with national data,[64] *current use* was defined  as having used cannabis at least once in the previous 12 months, which was also about the length of the eventual intervention phase. Similarly to previous studies,[12, 165] interviews categorised self-reported use status:

- *Never*:   never tried cannabis.

- *Former*: tried cannabis once or had not smoked it for ≥12 months.

- *Current*: had tried or used cannabis within the past 12 months.

Cannabis use status at follow-up included:

- *Non-user:* Those who reported no past-year cannabis use at baseline and at follow-up, confirmed by proxy assessments, were categorised as 'non-users'.

- *Former user:* Those who reported no cannabis use during the 12 months before the baseline interview and also before the follow-up interview but who had used cannabis at some time in their lives before the study commenced, were classified as 'former users'.

- *Ceased cannabis use:* Participants who reported not smoking any cannabis since the baseline interview, that is, during the 12 months before follow-up, but who reported they were cannabis users at baseline, were defined as having ceased cannabis use.

- *Cannabis user:* Participants reporting they had used cannabis at some time during the 12 months before their baseline interview and also during the 12 months before their follow-up interview were included in this group. The group included continuing cannabis users, i.e. people who had apparently continued to use cannabis throughout the study period and those who had taken it up or relapsed between baseline and follow-up.

**'Mean duration of use'** in years was the age last used less the age of uptake, less significant breaks due to e.g., hospitalisation, pregnancy, working or studying away from the community, prison or detention.

**'Frequency of use'** among current users was described, as in previous studies: 'daily' (5–7 times/week); 'weekly' (1–4 times/week); or, 'monthly' (1–2 times/month).[12]

**'Heavy cannabis use'** was defined in the CYCP, as for previous studies in Arnhem Land, as consumption of ≥6 cones per session, at least once per week.[93]

**'Expenditure on cannabis'** was determined by asking current users to estimate the usual number of

units of cannabis bought on a regular basis, the price ($AUD) and amongst how many people it was

usually shared. Usually this was described as 'foils' or 'sachets' (~1 gram of cannabis or cannabis mixed

with tobacco) either weekly or fortnightly.

**'Dependence in current users'** at baseline and follow-up was assessed using the five-item Severity of

Dependence Scale (SDS).[214] A coloured chart assisted to address communication barriers surrounding

the frequency and intensity with which symptom items were experienced ([Appendix 5](#)).  A

binary variable described a cut-off score ≥3 symptoms experienced in the preceding 3 months, that is,

Martin and colleagues' previously determined cut-off for adolescents.[200] The SDS is designed to reflect

impaired control over a behaviour and continued behaviour despite harms experienced.  The SDS has

been shown to have high internal consistency for cannabis dependence ($\alpha$=0.83) and test-

retest coefficients (intra-class correlation coefficient=0.88) in adolescents in the general population.[200]

Though not validated for Indigenous populations, the SDS had been used successfully with Indigenous

participants in previous studies.[200, 215]

**'Age-group'** categories used throughout the analysis included: 15-24 years; 25-34 years; and 35-

49 years.

The '**desire to change'** cannabis use among current users was assessed as:

- 'not trying to quit', an expressed desire to continue using the same amount;

- 'wanting to cut-down', an expressed desire to reduce cannabis use;

- 'desire to quit', wanting to stop using completely;

- 'trying to quit', those who reported current, active quit attempts or who reported avoiding

  cannabis use at some time during the preceding 12 months.

'Trying to quit' cannabis included current users at baseline and follow-up who expressed any desire to change or who described recent attempts to quit or abstain. Current users reporting no recent attempt to quit or abstain, or who said they were 'thinking about it' were assigned 'not trying to quit'.

**'Reasons for Cessation'** were determined qualitatively in the sample at the first and second time point. Reasons offered were coded inductively into broad categories, collapsing into five main categories: health, mental health, family, work and money/cost.

Table 3.2　　　Categorical variables in baseline and follow-up Cape York Cannabis Project data.

| Variable | States | Definition |
|---|---|---|
| **Baseline variables** | | |
| **Use status** | Never used / Former user / Current user | Never used, not even once<br><br>At least one occasion of lifetime use<br><br>Used cannabis at least once in the previous 12 months |
| **Age-group** | 15-24 years<br>25-34 years<br>35-49 years | Age at time of recruitment to the study |
| **Heavy use** | Heavy / not heavy | >6 cones per day / <6 cones per day |
| **Severity of Dependence** | Dependent / not dependent | Measured by the SDS scale with a cut-off ≥3 for dependence in current users |
| **Follow-up variables** | | |
| **Cannabis change status** | Never<br>New<br>Continuing<br>Ceased<br>Former | Never used, not even once<br>Baseline non-users who used on at least one occasion between baseline and follow-up<br>Used cannabis at least once in the previous 12 months<br>Current users at baseline who had ceased cannabis for at least 12 months at time of follow-up survey<br>Former users at baseline who had not relapsed |
| **Other substance use** | Tobacco / Alcohol / Volatile Substances | Any use of substance in the previous 12 months |

### 3.4.1.2   Analysis of cross-sectional data from two waves of sampling in three communities

This analysis, published in *Frontiers in Public Health* ([Appendix 2](#))[7] used all of the available data from

the baseline and follow-up surveys at the three sites collected in two waves of sampling (Figure 3.2).
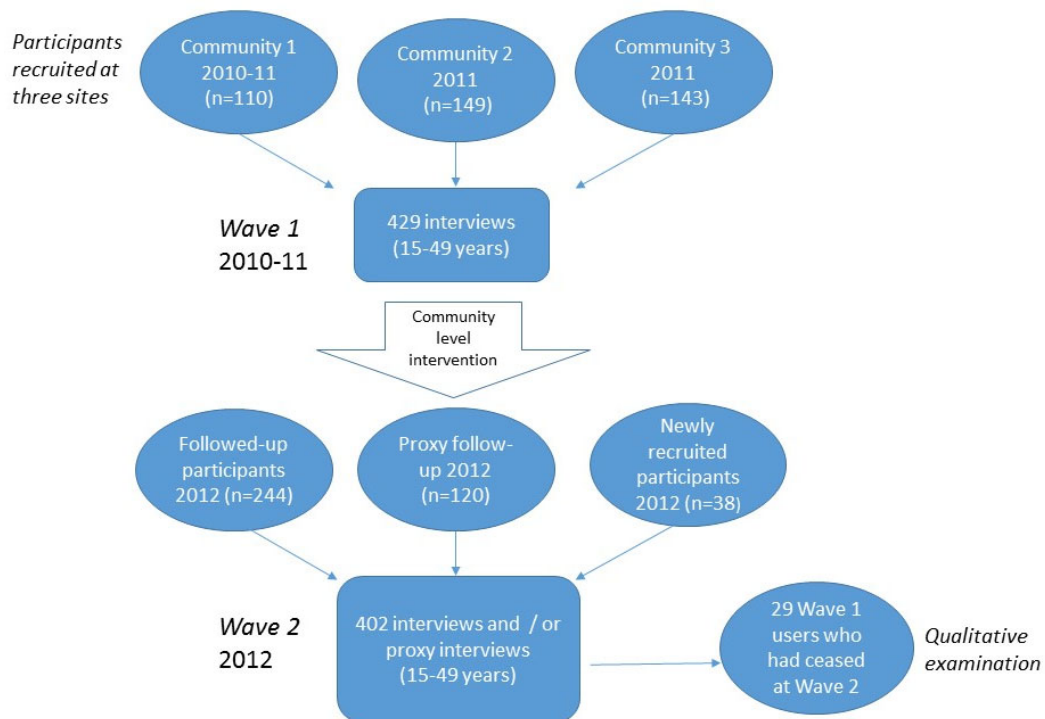


Figure 3.2      Inclusion of data from three Cape York communities in two waves of sampling
2010-2012.[7]

Hypotheses tested in this study were as follows:

1. The intervention brought about an overall reduction in current cannabis use, as a result of growing awareness of cannabis harms suggested in the consultation, together with the effects of social marketing activities that occurred between sampling waves.

2. Qualitative examination of information provided by those who had ceased using cannabis between the first and second waves would suggest common underlying factors influencing the decisional balance involved in cannabis use behaviours.

The two-wave analysis therefore tested the main hypothesis that there would be an overall reduction in cannabis use and explored some inter- and intra-community variations.

At each wave, the proportion of lifetime and current users, cannabis users (Tables 4.1 and 4.2), as well as dependent and heavy use, median expenditure, age of uptake and intentions towards use (Tables 4.3 and 4.4) were compared between categories:

- three communities;

- males and females;

- age-group.

Data was examined using SPSS (IBM Corp. Released 2017. IBM SPSS Statistics for Windows, Version 25.0. Armonk, NY: IBM Corp). Categorical data were compared using the Chi square statistic with 95% confidence intervals. Ordinal variables were compared using the Wilcoxon rank-sum test.

### 3.4.1.3    Analysis of data as a follow-up study

This analysis has not been published.  The before and after analysis of the cohort of participants assessed on two occasions examined the following hypothesis:

> *The relative risk of being a cannabis user at the wave 1 baseline (compared with the group who reported they had ceased cannabis use between baseline and follow-up at wave 2) would be higher in males, younger people, and with any past-year cannabis use, any experience of cannabis dependence symptoms; and less if there were any attempts to quit cannabis in the 12 months before the follow-up interview, taking into account any effects of tobacco and alcohol use.*

The group of continuing cannabis users was compared with those who ceased cannabis use, first in univariate analyses, and then in multivariable multinomial logistic regressions (Table 4.6). Modelling compared the risk of being a continuing cannabis user at follow-up relative to the risk of having ceased cannabis since baseline (reference category); again, to account for gender and age differences and influences of recent tobacco use and alcohol use, but also heavy cannabis use, cannabis dependence symptoms experienced and efforts to quit cannabis.

In regression analyses, the variable 'age group' (at baseline) was treated as a factor variable to show any discrete changes across the age groups.  Clustered robust standard errors were estimated (Stata's vce (cluster) option) to allow for the clustering effects of data from three communities; labelled: #1, #2 and #3.

Among the continuing cannabis users who were re-interviewed, McNemar's $\chi^2$ was also used to compare self-reported changes in the number of heavy users, dependent users and numbers trying to quit between baseline and follow-up (Table 4.7).

### 3.4.2    *Qualitative methods used to analyse interview data*

A subset of participants who had ceased cannabis use between wave 1 and wave 2 of the cross-sectional data was examined qualitatively. Qualitative methods reported in Chapter 4 are described in Section 2.4.2.1. Methods used to analyse all qualitative baseline participant interview data, published in 2019 (Appendix 3)[160] and reported in Chapter 5 are described in Section 2.4.2.2.

#### 3.4.2.1    *Qualitative methods associated with self-reported use data*

Participants reporting that they had stopped using cannabis between wave 1 and wave 2 of data collection were examined for factors influencing their decisional balance. The data for this analysis came from interview questions, which were asked at both baseline and follow-up:

- Why did you start using cannabis / why did you stop?

- What do you like about cannabis?

- Describe any dislikes about using cannabis or others' use.

- Please describe any concerns you have about cannabis or about the community in general.

Each participant's interview was examined for: reasons for quitting; barriers to quitting; and resources or strategies used to support quitting. Themes were summarised and selected responses for each predefined category were selected for men and women (Table 4.5).

#### 3.4.2.2    *Attitudes to cannabis across the baseline sample*

Anecdotal information compiled during consultation suggested that the overwhelming majority of community residents across the region had some knowledge or direct experience of the local impacts of widespread cannabis use and many had been affected in some way. The level of awareness and the type of concern appeared to vary across individuals, families and the local community as a whole. The article published in the Journal Substance Use and Misuse[160] (Appendix 3) took into account all of the baseline survey interviews in order to understand community level attitudes.

Accordingly, the objectives were to:

1. Summarise concerns about cannabis use and the perception of harms and impacts for individuals, families, or communities communicated during interviews;

2. Categorise study participants into groups which reflect latent attitudes to cannabis based on themes derived in (1); and,

3. Examine concerns across the range of attitudes to cannabis as indicators of active social resources that may be mobilised for harm reduction and to reduce demand.

The thematic analysis was unusual in that it examined short (one word) to medium length (several paragraphs) -length responses from a large number of semi-structured interviews.

### 3.4.2.3 Inductive content analysis of concerns and perceived harm

Interviews with negligible qualitative responses were removed from the full sample of 429 participants, to create an Excel spreadsheet with the remaining 407 interviews, which was imported into NVivo 11™ for further analysis as text entries. Theory-neutral, general inductive content analysis, as described by Thomas (2006) identified qualitative themes describing participant concerns about cannabis.[216] Using a sub-sample of data for 50 randomly selected participants, VG completed one round of open coding guided by the analysis questions. Those ideas were organised into more than 20 initial categories, assigned to nodes in NVivo. This set of nodes was supplied to the second author (AC) as a frame to code the same content in the 50 sources and a coding comparison produced inter-rater reliability scores of greater than 0.7 at all nodes. After discussion and adjustment of the initial coding frame, VG analysed the information for a further 20 participants, yielding no new themes. VG and AC collapsed and reorganised the categories to produce a reduced set of agreed-upon nodes, which permitted a re-reading of the data through two successive rounds of coding. The final themes were summarised and key examples collated by VG from the transcribed text.

### 3.4.2.4 Deductive attitudinal categories

Coded material from the inductive content analysis was examined across the individual interviews in Excel. Themes appearing in each interview were noted, and each participant classified into one of three attitudinal categories: 'low concern', some concern' and 'high concern'. A rubric was prepared describing the attitudinal categories according to the themes associated with each category, contextualised with participant characteristics.

## 3.5 Aim 3 — Theory-driven process evaluation and re-design in the CYCP

Chapter 7, not published at time of thesis submission, examined the CYCP from a theoretical perspective, with the following objectives:

- to redesign the CYCP with a realist orientation;

- to identify a small number of plausible, theoretical mechanisms for changed cannabis use, grounded in the data;

- to produce a suitably comprehensive description of contexts influential to the proposed mechanisms; and,

- to produce a program theory and *context-mechanism-outcome* clusters that could be operationalised in future intervention research in remote Indigenous communities.

### 3.5.1 Rationale

Summarised in 2.2.10, the project supported a number of activities across the sites, and two local area government councils demonstrated engagement with the issue of cannabis on a local policy level. Nevertheless, no sustainably embedded strategies, changes to practice or changes in attitudes could be demonstrated.

The study design assumed that the intervention would produce a set of local actions, where implementation fidelity was limited to research team engagement with local stakeholders and

participants in order to acquire local cannabis data and then return that data to the communities.
The intervention protocol didn't stipulate how or why communities would trust the research team,
or the relationship context in which supporting resources would be provided during the intervention
period. Impact on practice or outcomes produced in government departments such as State Health
or Education Departments is difficult, more so in the case of multiple project-driven interventions,
with multiple barriers to obtaining ethics and permission. With the modest quantitative changes
presented in Chapter 5, little information was available to demonstrate why current users in the
three communities decided to cease cannabis use, what could help others or how to prevent young
people progressing to sustained heavy use.

Theoretical approaches have been used to open the 'black box' of the intervention for at least two
decades.[139, 217-221] Ten years on from the CYCP, adaptable evaluation methodologies which consider
measurement and process together are being more widely applied in the research community.[126, 133]
The essential tensions between fidelity and adaptation, controlled conditions and real-world, efficacy
and effectiveness, experiment and translation, remain.[196, 222] Theory-driven approaches enable the
researcher to focus on *mechanisms* of change as a unit of analysis, rather than fidelity to a defined
strategy and dose. Theoretical approaches emphasise the mechanisms leading to actor volition and
behaviour, rather than control of all variables.[223] Human relational factors are acknowledged as
critical, they cannot be dispensed with simply by including a control site.[223, 224]

Implementation science acknowledges that a theoretical framework is insufficient, and that it is the
relationships, context, implementer qualities or psychological and organisational mechanisms[129, 139,
219, 220] that determine an intervention's effectiveness.[217, 218] Kislov, Pope, Martin and Wilson argued
three directions for enhanced theory use in implementation science.[131] First, theorising empirical
data, beyond simply adopting and applying existing theory in a 'theoretically informed' approach.
Second, seeking selective, mechanisms-based explanations for observed relationships and effects in
complex interventions, where the unit of analysis and test of fidelity centres on mechanisms of

change, rather than strategies and dose. Kislov and colleagues (2019) described this as a focus on '*functions and purposes*' rather than 'form'.[131] Third, they argued for implementation science to encompass a broader selection of theoretical schools.  That is, deductive analysis continues to dominate where evaluators are frequently inadequately trained in social sciences.[131]

Chapter 7 presents a reformulation of the CYCP study design using realist evaluation, that attempts to meet the Kislov and colleagues recommendations mentioned above, employing the empirical data from the CYCP to formulate selective, mechanisms-based explanations, and open to sociological theory and analysis. The test of whether this aim has been achieved will be a program design where the unit of analysis is not intervention dose, nor changes in current reported cannabis use, but based on consistency with putative *mechanisms* of changed behaviour. The theoretical mechanisms will be testable hypotheses at the level of program theory which, with repeated testing, have the potential to accrue evidence for semi-predictable outcome patterns, or demi-regularities across multiple contexts. Mechanisms that apply across a variety of contexts constitute middle (or mid-) range theories; many of which will already be described in the social science or other literature.[131, 139, 225]

### 3.5.2    *Theoretical orientation—Realism*

Like experimental and quasi-experimental designs, realist evaluation uses hypothesis testing to ascertain the effects of an intervention program. Unlike experimental designs focusing on a single set of outcomes, the basic unit of analysis is the *context-mechanism-outcome* (CMO) cluster. As described in the introduction, this construct has its philosophical foundation in *critical realism.*

First advanced in Roy Bhaskar's *Realist Theory of Science*,[134] critical realism adopts an epistemological position that there is a 'real world' and reality is observable to some limited extent. Though our perception of that reality is contingent on time, place and position of the knower (for example see Al-Amoudi and Willmott, 2011)[137] critical realism is not wholly relativist because of this grounding in observable reality.

Ontologically, critical realism describes three embedded layers of phenomena:

- the 'real'—which is comprised of actual and latent possible mechanisms;

- the 'actual'—events, relationships and other phenomena played out in the real world; and,

- the 'empirical'—observable phenomena, experienced by the knower .[134]

The 'real' is therefore not only what occurs, but what may occur given the necessary conditions, independent of actual events.[134, 137] This understanding of a latent reality is the basis of *retroductive* theorising of *mechanisms* in realist evaluation.[149] Hypothesis testing cycles can then be implemented with a given mechanism as the unit of analysis.[139, 225] Mechanisms activated to produce real-world outcomes (whether observable or not) produce *actual outcomes*; mechanisms producing observable, measurable outcomes (whether desired or not) produce *empirical* outcomes; and, mechanisms that could potentially fire if the conditions were right, are ontologically *real*.[226, 227] In this way, the critical realist theory of science sought to transcend the 'positivist versus humanist' dualism in the philosophy of social science.[227] Its value in the current thesis is that assumptions about *how* named strategies should work must be scrutinised. Fidelity can't be assumed or eliminated from the equation because the *how* of the implementation and the real human responses are the subject of the evaluation. Qualitative evaluations of controlled trials will often comment on aspects of implementation, relationships, service structures, cultural influences on how well the intervention worked. In realist evaluation, these aspects are empirically observable, and relevant and to be accounted for in the CMO construct.

### 3.5.3    *Applying realism to produce a theory-driven intervention*

The redesign followed these steps:

- Outcomes relevant to cannabis demand and harm reduction were specified.

- The author theorised plausible, data-driven mechanisms for changed cannabis use from interviews conducted with residents in remote Cape York Indigenous communities, prioritised to present a manageable set for further consideration.

- Levels of context were considered in layers consistent with Bronfenbrenner's ecological systems theory[228] to identify relevant influence on mechanism activation.

- Through an iterative, reflexive process, *context-mechanism-outcome* clusters were assembled that could be operationalised in future intervention research in remote Indigenous communities.

## 3.6    Realist evaluation method

Already stated in Chapter 1, realist evaluation was introduced by Pawson and Tilley[139] as an approach to enquiry in complex social programs, with epistemological and ontological assumptions of critical realism, described by Bhaskar[134] and Campbell.[148, 229] Realist evaluation adapted a pragmatic approach to testing theory with the assumption of generative causation.[148] This section provides a more in-depth description of Bhaskar's critical realist ontology, because thinking in terms of the 'real', mechanisms are not necessarily observable. It is this ontological grounding that distinguishes realist evaluation most from the controlled trials because it views the analysis as revealing reality through demi-regularities. Pawson and Tilley's conception of the *context-mechanism-outcome* configuration as a pragmatic heuristic for program evaluation is then explained, where thinking in terms of *program mechanism* may apply the *resource-reasoning* pair as a construct to assist in theorising mechanisms.

### 3.6.1    Applying realist thinking

Critical realism offers an alternative to the controlled experiment but with the equivalent potential for systematic rigour and reference to an external reality, appropriate for scientific investigation of social phenomena.[127, 131, 230]  Where human behaviour is under consideration, critical realist *mechanism* is conceptualised as involving human agency within structural enablers or constraints within the *context*, to produce *outcomes*.[140, 231] This concept of socially-embedded mechanisms can account for subjective experience as well as unseen and potential reality, whilst epistemologically

acknowledging an external reality.[137, 226] Incorporated into theory-driven evaluation, it offers an alternative systematic approach to hypothesis testing .

A realist *epistemology* acknowledges and can account for the existence of the 'real' world to a limited extent.[134, 139] *Ontologically*, critical realism conceives of multiple domains or layers, first made explicit in these terms by Bhaskar in 1975[134] (also discussed in Sections 1.5.3 and 2.5). These are: i) the *empirical,* which can be experienced, observed and documented; ii) the *actual* consisting of events, whether they are experienced and observed or not; and, iii) the *real* which comprises events and their mechanisms, including mechanisms that have not fired, or the potential for events to be realised,[134] summarised in Table 3.3, theoretical mechanisms are putatively *real* but they may not be directly observable. Mechanisms may be known through cumulative hypothesis testing to reveal demi-regularities of outcome patterns and the conditions under which they are produced. Critical realism allows for the open system and choice but can avoid relativism by systematically testing reality.[232]

Table 3.3        Bhaskar's stratified ontology.[134]

| | *Domain of real* | *Domain of Actual* | *Domain of Empirical* |
|---|---|---|---|
| *Mechanisms* | Yes | | |
| *Events* | Yes | Yes | |
| *Experiences* | yes | Yes | yes |

Methodologically, whereas rational empiricism strives to determine actual phenomena from empirical data, and constructivism strives to understand multiple realities interpreted by the observer, critical realism facilitates understanding events in terms of mechanism, which are not necessarily visible, not necessarily active, but nonetheless real.[233] Causality is viewed as generative mechanisms acting under particular circumstances, the outcomes of which may be seen as demi-regularities in variable contexts, without the assumption of linear (successionist) cause and effect.[128, 142] This is different to a controlled experimental approach which attempts to isolate a causal

mechanism that precedes the outcome and is in constant conjunction with it.[234, 235] Using a realist approach, controls and randomisation are not required to establish a causal mechanism. This is suitable for any program evaluation as it potentially gives access to different information to a controlled trial. It is suitable for the small community contexts that are the focus of this thesis where the controlled trial also encounters significant limitations to statistical power and randomisation.

### 3.6.2    Mechanism in realist evaluation

Briefly described in Chapter 1, mechanisms by which social interventions operate may be formulated as 'stakeholder reasoning in response to program resources as they manifest in a defined context'. [148] Figure 3.3 shows Dalkin et al's well-known schematic to describe the construct [128, 139] which is similar to the heuristic first described by Pawson and Tilley in 1994.[139] Strategies produce *resources, opportunities or constraints* that are meaningful to stakeholders.
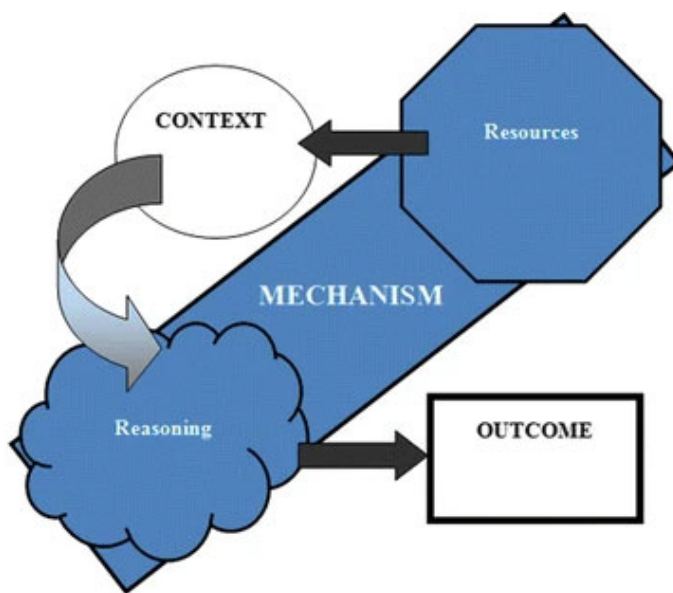


Figure 3.3  :    Framework of the context-mechanism-outcome cluster (Reproduced from Dalkin SM, Greenhalgh J, Jones D, Cunningham B, Lhussier M. What's in a mechanism? Development of a key concept in realist evaluation. Implement Sci. 2015; 10:1-7)[128]

**To summarise:**

Mechanism is activated when the resources and reasoning interact with the program context, thus:

$$mechanism = [resources + stakeholder\ reasoning]\ in\ context.[128]$$

Rather than conceptualising interventions as:

$$strategy + stakeholder \rightarrow outcome$$

Realist evaluation understands interventions as:

$$strategy \rightarrow [resources + stakeholder\ reasoning]\ in\ context \rightarrow outcomes.[129,\ 139]$$

The *context-mechanism-outcome* (CMO) cluster is a discrete theory for how an outcome is produced in that context. A cluster implies neither linear chains of causality, nor cause and effect in constant conjunction. Rather, a cluster of causal powers which can produce demi-regularities in outcome patterns is contemplated.[139, 143] Through iterations of testing theoretical CMO clusters, Pawson and Tilley described how we can approach a level of evidence for a theory that holds across defined contexts. These *midrange* theories are transferable, within the limits of the context in which they are shown to operate. The CMO as unit of analysis is the basis for hypothesis testing at the program level in realist evaluation.[129, 139]

### 3.6.2.1 *Other constructs for realist mechanism*

Discussed in detail by Westhorp,[132] the construct shown in Figure 3.3 best describes mechanisms of individual actor reasoning. Constructs to describe collective mechanism incorporate resources available at multiple layers of the system, which would include, at least, collective mechanism of a group (e.g., a family) and institutional mechanisms (e.g., local government agencies), and may also include relationships, time, or other relevant elements. Westhorp[132] identified five constructs of mechanism: powers and liabilities; forces; interactions; feedback and feedforward processes; and reasoning and resources, that can be across levels of systems (Table 3.4). If the construct for mechanism is congruent with a realist ontological and epistemological foundation, then it can facilitate realist enquiry.

While mechanisms cannot be directly observed in complex health intervention involving behaviour change and choice, mechanisms can be theorised, and framed within a hypothesis testing cycle to incrementally develop reliable, effective, transferrable strategies.

Table 3.4    Constructs of mechanism at levels of systems.[132]

| Construct of mechanism | Material | Psychological / cognitive | Social-group | Social-individual |
|---|---|---|---|---|
| Powers and liabilities | Trees can grow, e.g. photosynthesis | Humans can learn, e.g. sensitisation, motivation | Groups can make agreements | States can make laws |
| Forces | Gravity | Love | Peer pressure | Laws, regulations |
| Interactions | Gunpowder explosion | Reasoning and resources | Contracts | New technologies and market systems |
| Feedback and feed-forward processes | Genetic inheritance | Developing attachment style | Negotiation | Stock market crash |
| Reasoning and resources | Neurons firing electrical signals | Logic-in-use; affective response | 'Groupthink' | Cultural assumptions |

(Reproduced from: Westhorp G. Understanding mechanisms in realist evaluation and research. In: Emmel N, Greenhalgh, J., Manzano, A., Monaghan, M., & Dalkin, S., editor. Doing realist research London: Sage: Sage; 2018. Table 3.1.).

### 3.6.3    Context in realist evaluation

Recognising that mechanism is dependent on context, and that it operates at group or individual levels, any realist enquiry needs to examine mechanisms across levels of the system. Bhaskar characterised this understanding of the stratification of agent personality  as well as simultaneous engagement in (a) material transactions with nature; (b) social interactions between agents; and, (c) social relations and institutions.[233] In realist evaluation, levels or layers of context are viewed in terms of powers and liabilities and outcomes under examination. Greenhalgh and Manzano's[236] recent review identifies two broad narratives as to what constitutes 'context' in realist analysis. One is observable environment and structure (things, place, people), and the other views contexts as emergent phenomena that influence and are influenced by stakeholder reasoning. Therefore, the analyst can consider the relevance of both material and intangible context.

Discussed at length elsewhere, distinguishing mechanism from context is not straight forward, the lines between them are blurred and interchangeable.[237-239] Jagosh and colleagues describe 'ripple effects'[237] where outcomes, context and mechanism can move from one to the other at different stages; Westhorp describes 'upwards and downwards' influences of contexts and mechanisms throughout the system, for example from individual to group levels or vice versa.[132, 240] In Chapter 7, mechanism was theorised by abduction from the empirical data and author experience to produce plausible resource-reasoning pairs accounting for observed outcomes.

Various models of social systems are already described that can facilitate the systematic consideration of mechanisms at various levels of context; Bronfenbrenner's ecological systems theory is a notable example.[228, 241-243] An essential consideration as we move to the design and formulation of hypotheses related to cannabis demand reduction in remote Indigenous communities is that contexts *and* mechanisms are conceptualised across multiple subsystems; they are not static entities but can be incorporated into the heuristic to suit the activities or outcomes under scrutiny. Therefore, we can also consider how a given outcome may influence the context or provide resources to subsequent program strategies, and we can theorise CMO for intermediate steps to produce an outcome of interest.

### 3.6.4    *Context in the Cape York Cannabis Project participating communities*

Context was understood as multiple layers, consistent with Pawson and Tilley's original approach[139] and the more recent realist evaluation standards.[147]  Bronfenbrenner's ecological systems theory[244] with its understanding of concentric, interconnected systems at the individual, family or household, community and broader societal levels was an appropriate model for examining contexts systematically for its influence on individual mechanisms; and it has been used elsewhere in realist evaluation.[228, 241]

Bronfenbrenner's typology describes the macro-, exo-, meso-, micro- and chronosystems as interacting systems around an individual. [228] Applied to the remote Indigenous communities of Cape York:

- The macrosystem comprises the wider societal and institutional context, cultural norms and values—for example laws, institutional presence, relative economic disadvantage—were likely to be similar across all sites. The familiar social determinants, as well as the broader history of disempowerment and distrust for institutions briefly described in Section 1.3 and 2.2.5 constitutes the macrosystem.

- The exosystem comprises those systems beyond the individual's immediate personal engagement. For the purposes of the remote community context, this could include service provision and economic climate. Institutional factors such as staff number and turn-over in health services; proportions of Indigenous and / or local staff; the distribution of services between government department and community-controlled organisations; education system policies and procedures; and how non-Indigenous staff are trained. Major policy such as alcohol management plans,[9] the recent return of stolen wages[245] and impacts of COVID restrictions on community functioning[246-249] could be included in the exosystem, and is unlikely to be influenced by the type of community-level intervention under consideration.

- The mesosystem is comprised of those structures and relationships which their immediate family and friends may be directly engaged. For small, remote communities, all individuals would have some interaction with, and relationship with the people working in the local councils, health clinics, employers and other service providers. This level was understood as possibly within the influence of project strategies and resources. Local council policies may be influenced by feedback of data because they have a duty of care for producing a safe community and reducing health burden. Workplaces have an interest in reliable and safe workers, and employment services need options for their clients. The type of work available,

its acceptability and meaning forms part of this level of context, as do the management

structures, timing and other aspects of working conditions. These motivations and

obligations maybe similar for community level agencies with the mandate to engage young

people.

- The microsystem includes those relationships and systems immediately around the

  individual: community and family groups that might include intergenerational factors,

  potential for cooperation, relationships with local dealers or users, presence or absence of

  elders, partners, or children and their colleagues in the workplace. An individual's family and

  community relationships are likely to have a marked impact on the resources available to

  them for cannabis cessation and abstinence. These socio-ecological factors would interact

  with physical context, notably housing quality and crowding as well as physical and dietary

  habits.

- At the centre of the ecological system is the individual, for the purposes of the community

  level intervention in question, the person who may change their cannabis use. Individual

  factors including their age and gender; childhood development factors; personality, cognitive

  capacity, and mental health will all influence their decisional balance and the uptake of

  program resources to produce behaviours. The quantitative association of continuing

  cannabis use with symptoms of cannabis dependence and current tobacco use suggest

  individual physiological contexts that will influence individual response to intervention

  resources and inform what may be influential at other levels of context, for example, access

  to mental health primary care in the mesosystem.

- Across all these layers, Bronfenbrenner conceived of the chronosystem, or changes over

  time. The timing of major events in any of these domains can influence their

  interrelationships. At the microlevel alone, the impact of significant events in a child's life are

  mediated by the developmental stage, and therefore, the chronosystem. A relevant example

across ecological systems is the introduction of alcohol to the communities in the late 1970s. Gynther and colleagues demonstrated that psychosis in Cape York populations, in former DOGIT communities in particular, increased over time from 1992-2015.[5] Their findings suggest that environmental factors in child neurodevelopment played an important role in the rise in psychosis, since the birth of those affected coincided with the era of community dysfunction that followed the introduction of alcohol. In this case, the exosystem policy and political environment impacted on child microsystem, and consequently their neurodevelopment. For children born after alcohol management plans were introduced in 2003, those in young adulthood at time of writing, there would be residual effects of these events in their parents' lives, as well as the current circumstances.

Contexts are dynamic, and the intervention is only present for a moment in time but considering historical determinants can be important. With this initial understanding of what the context of the individual changing their use is likely to be, the actual contexts relevant to outcomes identified in the data were used to reflexively refine the understanding of context as it aligned to particular theoretical mechanisms, and to consider data collection for the proposed study.

## 3.7    Analysing CYCP data for context, mechanism and outcome

The CYCP did not use interview designs[250] or case studies[147, 251] with program theory or mechanism in mind. Nevertheless, where an outcome of abstinence or cessation was identified in the data, it was accompanied by a 'why' and sometimes a 'how' statement.  In realist analysis, the analyst searches for plausible mechanisms for change, either as direct statements or implied within the text or narrative or from the analyst's own knowledge and experience of the phenomenon or context.[251, 252] These plausible mechanisms for change are aligned with the context that is thought to enable a mechanism to overcome liabilities in order to produce that outcome. The resultant CMO is the unit of analysis for hypothesis testing.

In this section, theoretical or hypothetical mechanisms for actual changes in use status, self-reported desire to cease cannabis use, or putative enabling environment for cessation or abstinence were assembled by considering all of the data available. The qualitative interview data, observations and reflections of research staff and the author's own experience of participating in the CYCP were brought to bear in a retroductive process to hypothesise change processes.[149]

The following retroductive steps were followed:

- Outcomes relevant to cannabis demand and harm reduction were drawn from the results of both qualitative and quantitative study components (for example, quantitative information about those who ceased using cannabis; qualitative information about their reasoning).

- The author theorised plausible, data-driven mechanisms for changed cannabis use from interviews conducted with residents in remote Cape York Indigenous communities, prioritised to present a manageable set for further consideration.

- Levels of context were considered in layers consistent with Bronfenbrenner's ecological systems theory[228] to identify relevant influence on mechanism activation.

- Through an iterative, reflexive process, *context-mechanism-outcome* clusters were assembled that could be operationalised in future intervention research in remote Indigenous communities.

## 3.8 Critical reflection—positioning the researcher

In this section, I present my personal reflections in the first person to give the reader an understanding of my role in the original project and its translation to a thesis focused on methodological issues.

The second of three key project officers employed on the Cape York Cannabis Project, I worked mainly during the baseline data collection and feedback phase. With basic training in biochemistry, this was my first role in health promotion of any kind, and certainly Indigenous health, and my first

experience with remote communities. Over thirteen field trips 2011-12, I developed relationships with community members and service providers, collected more than 100 of the 429 baseline interviews, participated in data feedback to the community, distributed social marketing material and supported implementation of the first 'logo competition' at the behest of a paid community liaison. I can't name her due to community de-identification, but I count her as a friend.

As a well-meaning non-Indigenous research worker (and like so many before me),[253] I brought with me what was in hindsight a simplistic and linear attitude towards what would 'help'. Few intervention resources appeared to attain their intended objectives. Deficits are stark and obvious, but helpful resources are not. Added to that, the relevant resources probably reside in the wealth of cultural capital, historical knowledge, lived experience and relationships within the communities; mostly out of reach for visiting researchers. If we are service providers, researchers or policy makers, how, without resorting to ideological positions, do we decide what particular actions or resources are most pragmatically and ethically sound?

We assumed that in acting according to the consultation findings, we were adhering to both community wishes and needs. We assumed that any material resources conforming to a particular recommendation would be engaged and employed. We assumed any help was better than nothing. Ten years on the sense of urgency to achieve responsive health policy and to resource appropriate action in Cape York, remains. That is never more present than when we engage with young people, whether among community and family or through a service or system—schools, health, justice. Services deliver immediate solutions in crisis. They fulfil the — sometimes narrow — mandates and funding requirements. Demonstrating that a program supports human agency, however, requires a closer engagement to the substrate.

The process evaluation work as it appeared in the study design did not appeal; it simply represented more of the same process which we had already observed was not effective use of our time or resources. A member of the research group had developed an interest in realist evaluation. Although

highly theoretical and unfamiliar, its apparent potential to embrace this complexity whilst respecting principles of falsifiability did appeal.

Critical realism's view of mind as emergent of the material world[242] explicitly acknowledges that human agency as being simultaneously shaped by, and in turn, shapes social structures.[242] Outsiders introduce material resources into Indigenous communities—programs, policies, information, research processes—anticipating that the intended beneficiaries will respond in some detectable way and their lives will be thus improved. A realist informed view obliges accountability for those assumptions. Of course, researchers and service providers do consider the perspective of program beneficiaries, many consciously seek to empower and decolonise. Nevertheless, engaging with beneficiary / client reasoning may not always be explicit or challenged through explicit reflexive processes. Realist evaluation does not reduce statements about reality to statements about our knowledge of reality. [254,134] The analyst is compelled to consider knowledge to which she does not have access, to acknowledge mechanisms outside of her view, a potentially humbling and uneasy process. Price and Martin in their introduction to their special issue in applied critical realism, in the Journal of Critical Realism, note that critical realism recognises the need to engage stakeholders hermeneutically.[136] This is the only way to access rich data about the program, its participants and the implementation context.  The reassuring element of this approach is that once we have our CMOs— the hermeneutic empirical data, and what we think is probably the influential context— is then tested against reality.  Does it produce the outcomes, or does the theory require refinement?

Conceptualising human agency as a product of the mind emergent of the material world and as the mind responding to the social structure provides a tool for examining patterns of behaviour in complex social programming which does not divorce behaviour and thought from the material world. It liberates us to use retroductive reasoning[149] to theorise about how the system can shift by engaging explicitly with this inner world of stakeholder reasoning, then evaluating the explanatory power of the theory against reality (understood through a realist ontology), to hypothesis test.

# 4   Review of current and recent health intervention research targeting substance misuse in remote Indigenous Australia

With few realist evaluations available to review, and very few cannabis use interventions in remote Indigenous Australian communities, the initial review focused on intervention research projects that targeted any substance misuse in remote Indigenous Australian communities. The review examined National Health and Medical Research Council (NHMRC) funded projects in order to identify methodological types found to be worthy in this highly competitive, leading edge research community. Publication of the NHMRC Roadmap for Indigenous health in 2003 formalised expectations that intervention research should: work *with* Indigenous Australians; promote self-determination; and be accountable to participants and communities with demonstrable benefit or recompense for participant time.[197] Therefore the review examined projects awarded after 2003, over the decade up to and including 2013 during which time much of the work of the identified projects was conducted. This chapter presents the published findings of that review in Section 3.1. The published paper titled *Substance misuse intervention research in remote Indigenous Australian communities since the NHMRC 'Roadmap',* and published in 2017 in the Australia and New Zealand Journal of Public Health,[43]is included in Appendix 1. An update with similar details about the design, contexts and outcomes of NHMRC-funded intervention research funded after 2013 is provided in section 3.2.

## 4.1   Substance misuse intervention research in remote Indigenous Australian communities since the NHMRC 'Roadmap'

The published review explicitly sought to propose plausible program theories, in realist terms, for the implemented intervention projects. It was the first synthesis to examine substance misuse intervention in Indigenous contexts from a realist perspective. It therefore laid the foundation to applying realist thinking to data from the CYCP, the focus of this thesis.

*'Consistent with the initial steps recommended for a realist synthesis, this review of substance misuse interventions in remote Australian Indigenous communities categorises program theories of the included projects in realist terms.' Graham et al., 2017.[43]*

The review sought theoretical explanations of how interventions were expected to achieve their intended outcomes. It proposed plausible initial program theory consistent with the initial steps of a realist synthesis of substance misuse intervention research.[142, 255]

Data extraction used the realist CMO heuristic to infer program theories. Explicit and implicit outcomes were identified in the program designs. Mechanism, usually implicit in grant proposals and publications, was understood as 'stakeholder reasoning' which researchers anticipated or assumed would occur in response to 'program resources'. Resources were understood as tangible or intangible stimuli resulting from implemented strategies, clearly distinguishing explicit strategies described in the project summaries and publications from 'resources' in the realist sense.

### 4.1.1 Research programs and projects included

The published review identified seven intervention research projects funded by eight NHMRC Project Grants awarded between January 2003 and December 2013. The studies worked with communities in the Northern Territory, Queensland, and Western Australia. At time of publishing the review, most of the project grants were listed as 'current' on the NHMRC National Register of Public Health Research (accessed February 2016). Together they represented a total budget of over five million dollars for 30 project-years. These had produced 33 peer-reviewed publications by 2016, and 35 by 2021 (the two additional publications being the quantitative[7] and qualitative[160] articles from the CYCP, Appendices 2 and 3). Table 4.1 provides an overview of the projects examined in the review, their designs, outcome measures and citations to published articles, amended with the two articles published after this review.

**Table 4.1** Overview of project grants funded by the NHMRC 2003-2013 that implemented and or evaluated an intervention at the remote community level that targeted substance misuse or related activities.

| Year | Grant title | Life of grant | Intervention name | Type of intervention | Study design, outcome measures | No. sites | Articles |
|---|---|---|---|---|---|---|---|
| 2003 | Impact of a multi-intervention anti-tobacco strategy in 8 Indigenous communities | 5 | The North Queensland Tobacco Project | Pragmatic, multiple components and stakeholders | Cohort survey of tobacco use, intentions to quit; RCT and process evaluation | 8 | 256, 257 |
| 2005 | Helping Indigenous women to stop smoking during pregnancy | 2 | Tilly's Tracks | Clinical brief intervention plus social support from a health worker | Tobacco use, urinary cotinine; implementation RCT and fidelity of sample of implementers | 2 | 258-260 |
| 2007 | Community action for smoking cessation in remote Aboriginal communities | 5 | The Top End Tobacco Project | Pragmatic, multiple components | Before and after cohort survey in three locations; prevalence, patterns of tobacco use and sales data; multiple baseline study and process evaluation | 3 | 10, 24, 65, 125, 203, 204, 261-266 |
| 2008 | Years 4 & 5 of an RCT psychosocial tobacco intervention in urban pregnant Indigenous women | 2 | Tilly's Tracks | Clinical brief intervention plus social support from a health worker | RCT tobacco use, urinary cotinine; process evaluation | 2 | 258, 259 |
| 2008 | Randomised Controlled Trial of an intensive smoking cessation intervention in Kimberley Aboriginal primary health clinic setting | 3 | Be Our Ally Beat Smoking (BOABS) | Clinical brief intervention plus social support from a health worker | Tobacco use, urinary cotinine; meta-analysis with Tilly's Tracks data; RCT and process evaluation | 2 | 267-269 |
| 2009 | Randomised controlled trial of a family tobacco control program to reduce respiratory illness in Indigenous infants | 5 | Healthy Starts (in Australia) | Clinical brief intervention plus social support from a health worker | Acute respiratory events, urinary cotinine; qualitative interview; RCT and process evaluation | 2 | 270-274 |
| 2010 | Indigenous action to reduce harms associated with heavy cannabis use in Cape York | 3 | The Cape York Cannabis Project | Pragmatic, multiple components and stakeholders | Before and after cohort survey in three locations; prevalence, patterns of cannabis use; multiple baseline study and process evaluation | 3 | 7, 10, 160, 161§ |
| 2013 | Intervention trial to reduce alcohol related harms among high-risk young Indigenous Australians | 2 | Beat da Binge | Community-initiated diversionary strategies | Before and after survey of alcohol consumption patterns; process evaluation | 1 | 275, 276 |

§ Quantitative and qualitative data analysis published since the original review

Intervention programs for each project were classified into two groups according to the physical site of program implementation as follows:

A) Clinic-based interventions; and,

B) Community-focused interventions

Labelled respectively 'A' and 'B', the explicitly stated elements of the intervention strategies and the implied theoretical components, summarised in Tables 4.2 and 4.3, are discussed.

Table 4.2    Program theories of the psycho-social, clinic-based interventions within a controlled study design (group a).

| Intervention | What was the program supposed to do? | | Outcomes in context | |
| --- | --- | --- | --- | --- |
| | *Intended outcome / Aims* | *Detailed strategies* | *Observed outcome as reported* | *Influence of context reported in evaluations* |
| A1 | Tobacco cessation among pregnant women | • Home visits or intensive counselling with local health workers or Aboriginal researchers as complementary to evidence-based clinical brief intervention including behavioural approaches and NRT.<br><br>• Local Indigenous health workers received training for their component. | Not significant; significant in meta-analysis with BOABS | • High willingness to participate among pregnant women |
| A2 | Cessation or intentions to quit | | Double usual care, not significant; significant in meta-analysis with Tilly's tracks | • High level of control of smoke-free cars and homes with infants |
| A3 | Parental and family behaviours that minimize exposure of infants to second-hand smoke, including cessation. | | Not significant; self-reported high control of smoke-free spaces; higher exposure in the infants of breastfeeding mothers. | • Recruitment and / or retention was challenging<br>• Low fidelity, particularly of health worker components<br>• High staff turn-over and high researcher input<br>• Barriers to health worker engagement reported in some instances. |

| *Program theory / ies* | How and why? | | Assumptions |
| --- | --- | --- | --- |
| | **Kinds of resources intended** | **Intended responses** | |
| *Local Indigenous health workers augment, extend and sustain the effects of conventional clinical brief intervention by engendering social and cultural resources.* | • Biomedical relief; clinical authority<br>• Cultural safety and relevance; structure; self-reflexivity<br>• Shared understandings or goals among family; time out gender-specific health worker support; shared understandings<br>• Shared and culturally relevant understanding of harms; or goals amongst family members. | • Reinforced and informed concern for infant; trust medical authority<br>• Motivated to abstain<br>• Reaching out to family for support or offering support<br>• Enhanced capacity to change; set goals; effect changes or enforce limits. | • Local health workers hold latent capacities and knowledge that can fulfil needs for culturally appropriate strategies<br>• Brief intervention strategies in health clinics serving Indigenous people will work in a similar way as elsewhere<br>• Respect for clinical authority and a western-European conception of risk and deleterious consequences will influence behaviour<br>• Health workers have the capacity or influence to interpret and implement these concepts<br>• Health workers and participants can and will prioritise the intervention outside the clinic<br>• Sufficient capacity or desire among health workers to deliver an externally driven intervention, with limited training and management<br>• Health worker authority or cultural mandate is valid to encourage behaviour change, educate or assert role with fellow community members. |

### 4.1.2 Clinic-based programs – brief intervention at the clinic augmented by social support

Three studies targeted tobacco with intervention strategies primarily focused on the local primary

health centre (the 'clinic') combining evidence-based behavioural counselling and social support

components.  All used a tightly controlled trial (RCT) design. The interventions were designed to

support tobacco cessation or to prevent exposure of infants to second-hand tobacco smoke through

cessation by parents and household members (projects labelled A1, A2 and A3 in Table 4.2).  In each

study, participating clinic patients allocated to the intervention group, received a brief intervention

different to usual care, plus nicotine replacement therapy (NRT), where appropriate. A social support

component was delivered by local health workers either at the clinic, in homes, or by phone. The

main outcome measures were current tobacco use at follow-up, time to last cigarette, urinary

cotinine concentration and admission to hospital for acute respiratory events in infants.

#### 4.1.2.1  Outcomes in context

Summarised and highlighted in Table 4.2, none of the three evaluations reported statistically

significant effects attributable to the intervention.[259, 268, 277] However, meta-analysis of the pooled

data from two projects (A1 and A2) found a significant effect of intensive health worker support on

tobacco cessation.[267]  Program A1 established that pregnant women who had already quit smoking

independently of an intervention remained non-smokers at the end of their pregnancy.[258] This cohort

also contributed data for measurement studies of the Fagerström Test for Nicotine Dependence and

self-reported tobacco use validated with urinary cotinine concentrations among pregnant Indigenous

women.[278, 279] Project A3 found that infants of breastfeeding mothers had higher exposure to tobacco

smoke than infants of non-breast-feeding mothers in the study, despite successful and willing

management of smoke-free homes and cars.[30, 31]  Encouraging outcomes suggested by the qualitative

data included high willingness to participate[256, 259, 270, 273] and the value of local ownership, flexibility

and cultural safety.[267]  These aspects are outcomes, or intermediate outcomes relevant to the

ultimate program aim, but not captured in a systematic or reliable manner  by the designed outcome

measures, and therefore cannot be distinguished from alternative explanations such as socially reliable responding.

It appeared that in all contexts, participants' home environments and local relationships exerted powerful influences that were difficult for intervention components to influence, even with the participation of qualified local Aboriginal and Torres Strait Islander Health Workers (here after Indigenous health workers, IHW), trained in the intervention, and face-to-face counselling or home visits by clinicians and counsellors.[258, 267, 280] The challenges of isolation, the absence of a local project manager to maintain project impetus,[267] staff turn-over[256, 268], significant investment in retraining IHWs,[268] and low fidelity of IHW-delivered components[256, 259, 268] were variously reported. For example, two of the psychosocial interventions (A1 and A2) were challenged by high staff turn-over and the effort required for retraining, together with other barriers to IHWs engaging with participants.[258, 268] Adaptations to the original study designs included altered follow-up schedules due to participant attrition[259] and extending the time allocated for recruitment due to underpowered samples and deviation from original recruitment criteria.[268] Possible contamination of control with intervention[259] was observed in study A1, leading the researchers to recommend the use of an alternative design, *i.e.* a cluster RCT.  Project A2 reported '*cultural obligations that restricted access of Aboriginal researchers to some community members'*, for example jealousy or family relationships that precluded offering advice.[268]

### 4.1.2.2  *Program theory, underlying assumptions*

The clinical components of these interventions have an independent evidence-base, mostly derived from non-Indigenous contexts.  The underlying program theory acknowledging the emphasis on complementary social support components of the interventions could be framed as:

> '*Local Indigenous health workers augment, extend and sustain the effects of conventional clinical brief intervention by engendering social and cultural resources.'*

Summarised and highlighted in Table 4.2 under the heading 'How and why?' are the types of resources and responses intended in the intervention design. The clinical components offer potential resources such as authoritative information and guidance as well as relief from withdrawal symptoms. This assumes that participants and local IHWs accept the rationale for tobacco cessation benefits and that they can or will prioritise the intervention outside the clinic setting. Participant time taken to receive health advice could potentially support reflexivity at the individual or family levels and help participants to feel better able to employ strategies such as setting goals and limits. The intention of providing social support was to help alleviate cue exposure and reduce stress during nicotine withdrawal. Providing structure, encouragement and information about smoking harms aimed to create environments that would favour sustained cessation. Assumptions seemed to be made that social support was relevant to cessation, about who can increase this resource and how this occurs. Considering program intentions alongside actual outcomes in context, in Table 4.2, suggests an assumption that IHWs have capacities such as knowledge, relationships or local authority to provide the support that might augment evidence-based clinical intervention. The mechanisms by which this was intended to happen were not specified in any of the published outputs. However, mechanisms were implied in some of the strategies used to support health workers to deliver their components, such as employing female IHWs to work with pregnant women[259] and using 'culturally appropriate' resources and discourse as well as providing training.[274, 281]

### 4.1.3 *Community-focused programs—multi-component, multi-site community level interventions and participatory action research*

Four community-focused intervention studies targeted tobacco (n=2), cannabis (n=1) and alcohol (n=1). One of the tobacco studies was a cluster RCT and the other used a multiple baseline design (MBL). The intervention to address cannabis, the focus of retrospective redesign in this thesis, also employed a MBL. The intervention targeting binge drinking among young people featured community-based participatory research (CBPR) in a single community with no experimental control and a pre-post study design, plus process evaluation (Table 4.3).

All four projects in this category aimed to use multiple components implemented at various levels of the community through action research. Three of the community-focused interventions (B1, B2 and B3) used a pragmatic, multiple-component approach to whole-of-community interventions. Evidence-based intervention components (e.g., motivational enhancement therapy to enhance readiness to change) were brought to bear; combined with local strategies stimulated by the intervention or during consultation (e.g., raising awareness in schools; implementing local policies in safety plans or changed workplace practices; local diversionary strategies). The cluster RCT tobacco intervention (B1) delivered a suite of pre-planned evidence-based components, several of which were highly structured strategies delivered by professional service providers (e.g. clinic-based interventions or embedding anti-tobacco content into school curriculum). The interventions in the MBL studies (B2 and B3) incorporated loosely defined intervention components at the outset. The MBL studies conducted baseline prevalence surveys and feedback of study results immediately followed, viewed as a potential strategy to leverage local concern and stimulate locally inspired intervention strategies.

The intervention targeting binge drinking among young people (B4) was reportedly initiated by local community members, with researchers participating as invited partners. The project was described as having evolved from local awareness raising and diversionary strategies into a campaign for youth advocacy, leadership and training.[276] The study design was a straightforward before-and-after evaluation by opportunistic survey, a planned cohort study not being feasible in the circumstances under which the project progressed.[275] A four-stage approach was used in which local Aboriginal knowledge was integrated with the evidence-base.[275] As invited partners, researchers' intended roles, in addition to providing specialist knowledge and skills for monitoring and evaluation, appear to have been to reinforce partnerships, advocate for the project to policy makers and funding bodies, and to supply or interpret information from the literature or evidence-base.

### 4.1.3.1  *Outcomes in context*

Summarised and highlighted in Table 4.3, all of the included community-based projects reported some moderate impacts and described similar processes mediating implementation fidelity across the four intervention designs.

The tobacco-control cluster RCT (B1) reported a modest but significant reduction in tobacco use. However, changes could not be definitively attributed to the intervention. In addition, the evaluation described low fidelity of delivery of all intervention components.[256] Many study participants in both tobacco control studies (B1 and B2) were at pre-contemplation stage, suggesting that (in order to be relevant to the majority of participants) interventions should have been directed at people who had not yet considered quitting.[256] Study B2 reported enhanced efforts to create tobacco-free spaces and policies to support cessation.[203, 282] The same study observed that local Indigenous health workers needed more support and strongly encouraged clinicians to participate in brief intervention at every available opportunity.[24, 204] Both the tobacco intervention evaluations (B1 and B2) reported qualitative effects such as raised awareness of harmful patterns of use and resentment of the financial burden of tobacco plus enhanced desire to quit.  No sustainable, whole-of-community or practice changes were observed for any component in either intervention.

## Table 4.3  Multi-component at multiple levels of the community pragmatic action research mode (group b).

| Intervention | What was the study supposed to do? | | Outcomes in context | |
| --- | --- | --- | --- | --- |
| | *Intended outcome / Aims* | *Detailed strategies* | *Observed outcome as reported* | *Influence of context reported in evaluations* |
| B1 | Tobacco cessation | Multi-level, multi-component, action research. Social, clinical and policy components planned. Information; brief intervention; advocacy, repeated visits; community discussion and feedback of local data; legislative support. | Significant reduction in current use and people thinking about quitting not definitively attributable to interventions. | • Some or most planned components partially implemented<br>• Low uptake of opportunities for locally driven intervention strategies<br>• High awareness of issue with resentment for financial burden<br>• Retailers very engaged<br>• Clinic services not always fully engaged in tobacco reduction strategies<br>• Local health workers sometimes lacking support<br>• Existing anti-tobacco resources sometimes limited to the clinic and not in the community as such<br>• Communities cynical about high rates of use and large profits from sales<br>• Trust and sense of ownership endorsed as essential to participation. |
| B2 | Tobacco cessation | Pre-planned with stakeholders and services in the North Queensland Tobacco Project and in response to local survey data in the Top End Tobacco Project and the Cape York Cannabis Project. | Not significant but qualitative impact | |
| B3 | Reduce heavy and dependent cannabis use | All were pragmatically driven using community consultation / engagement, data feedback and evidence-based components. | Decline in use > hypothesised | |
| B4 | Reduced youth binge drinking; enhanced local youth engaged in locally initiated activities. | Local people initiated diversionary strategies to reduce binge-drinking, recruiting academic and other partners in a community-based participatory approach. Components focused on social belonging and local ownership. | Significant decline not definitively attributable to intervention; high community engagement. | |

| *Program theory / ies* | How and why? | | Assumptions |
| --- | --- | --- | --- |
| | Kinds of resources intended | Intended responses | |
| • *A suite of evidence-based interventions across a community will change attitudes and produce a more favorable environment for cessation.*<br><br>*Local data and relevant information will stimulate and or support local agency to take action on a recognized issue.*<br><br>• *Community owned and initiated diversionary strategies can reduce youth binge drinking by providing social resources that are more highly valued than the effects of alcohol.* | • Component-specific, generally involving enabling environments or attitudes for cessation<br>• Community-wide attitudinal or awareness changes<br>• The issue is brought out for discussion - outsiders are neutral listeners<br>• Translation of community needs to policy language and vice-versa<br>• Fun and belonging<br>• Raised awareness and capacity to auto-evaluate<br>• Genuine control and ownership. | • Component-specific<br>• Easier to prioritise quitting; stimulated to want to quit<br>• Confirmation of issue; Taking action; Community resolve<br>• Various depending on component<br>• Develop a deeper appreciation or a different perspective on the extent or severity of issue<br>• Perceive alternative choices, think through consequences, regulate drinking behaviours<br>• Desire to participate greater than desire to consume<br>• Organise and reflect<br>• Persistence and purposeful participation in cyclical change processes. | • Partnerships will create trust and operate synergistically<br>• Local partners will confer cultural specificity<br>• Strategies initiated locally will more precisely target latent mechanisms<br>• Stakeholders have the capacity and will to act according to a mandate<br>• Issue and strategies will be realised because high need was identified by local stakeholders. |

The program targeting heavy cannabis use (B3) reported a decline in cannabis use in all three communities that was greater than hypothesized[7] (discussed in Chapter 4) with no published process evaluation data available at the time of writing. Since the published review, the qualitative analysis of interview data from this project also demonstrated substantial social resources present in the community for reducing cannabis demand,[160] but it did not demonstrate that the intervention leveraged these resources.

Intervention study B4 reported modest but significant changes in risky drinking behaviours and raised awareness of binge drinking harms in young people 18-24 years of age. The pre-post study design in one location could not definitively attribute this change to the intervention.[275] The qualitative evaluation observed constructive processes in the development of partnerships and community participation with a local perception that the participatory nature of the project conferred ownership, motivated youth participants and was thereby empowering.[276]

### 4.1.3.2    Program theory, underlying assumptions

Though three similar but distinct theories are proposed for the 'clinic-based' interventions (Table 4.2), a general program theory for the community-based intervention studies (Table 4.3) could be:

> *'Discrete intervention components targeting locally defined substance misuse issues will activate latent capacities to create an environment that favours cessation.'*

The resources offered by the community-focused programs aimed to provoke and support non-specific local responses such as raised awareness and self-awareness, provide opportunities for open discussion of the issue via the presence of nominally neutral outsiders and creating cessation-enabling environments (summarised in Table 4.3). Diversionary strategies as individual components or as a key strategy of B4's CBPR project potentially offered resources such as relief from boredom and a sense of belonging. The intended resources related to raised awareness and desire to quit; but also: reflexive processes at the individual and group level; new perspective; empowerment or self-

regulation; and participation in action research cycles. Though all research projects partnered with and consulted the local residents and stakeholders, study B4 differed in that it was integrated with actions occurring in an already-mobilised community context, whereas studies B1-3 aimed to stimulate action using local understandings of the issue. Three candidate program theories were considered relevant for 'group b: community-focused' programs, specified in Table 4.3.

A core tenet of the pragmatic approach of B1-3 seemed to be that equitable and effective local solutions would be derived from interventions designed and implemented in partnership with community members. There were no explicit theories underpinning these research programs, nevertheless, community engagement was viewed as both ethically and pragmatically essential within action research cycles incorporating progressive feedback on program outcomes as the research was being conducted.

The program theories of intervention studies B2 and B3 (which includes the CYCP under examination in this thesis and the 'Top End Tobacco Project', with the same CI) explicitly included a component of presenting local prevalence information back to the community as a key to supporting or stimulating local agency and action. The action research approach was designed to have this effect,[24] working in partnership to provide feedback.[203, 283] Researcher-provided evaluation evidence and advocacy were also activities intended to enable and mobilise local action or create a more supportive environment for tobacco cessation.[203] Somewhat similar to the 'clinic-based programs', the 'community-focused programs' began from the assumption that social support stimulated by the intervention would encourage individual level change.[24, 256] It was also assumed that local stakeholders would seize on intervention opportunities in response to the study evidence. In reality, it proved difficult to initiate or sustain focused action. Participant and stakeholder intended responses were unspecified; the substance use intervention was often not prioritised by the agencies responsible for a given component; and local capacity to engage in project strategies was possibly lacking.

CBPR that is initiated by community members, as in study B4, proposed local strategies and incorporated external and local partners. Locally determined diversionary strategies that confer ownership and involvement by youth aimed to reduce their binge drinking. These could potentially offer resources that programs translated from elsewhere cannot; for example, local concepts of harm or responsibility; genuine control of the processes; sense of ownership; and choice and control over intervention components. Observed and described at evaluation, the effects of these processes could not be captured in a prospective, controlled study design. The authors suggest that positive outcomes reported could have been related to increasing the locus of control of participants and that empowering participants could directly improve the determinants of health, citing Wallerstein.[284] A candidate program theory might be expressed in these terms:

> *'Community owned and initiated diversionary strategies can reduce youth binge drinking by*
>
> *providing social resources that are more highly valued than the effects of alcohol.'*

Offering social or physical opportunities that are more highly valued than drinking is similar to specific individual components intended in programs of the other intervention studies in group b. Studies B1-3 were not CBPR but involved action research in externally formulated intervention designs. Two related resources potentially offered by CBPR are 'empowerment' and 'enhanced locus of control'. All group b projects made assumptions about participant capacity; authentic buy-in of partners, trust and collaboration. Jagosh *et al.* (2012) have referred to this as 'partnership synergy', a mid-range theory derived from realist synthesis describing fair and equitable distribution of resources and a sense of trust leading to partnership sustainability and enhanced collaboration over time.[141]

## 4.2 Review update—substance misuse intervention projects relevant to remote Indigenous communities 2014-20

Using methods similar to the review published in 2017, NHMRC intervention studies targeting substance misuse in remote Indigenous communities funded 2014-20 were identified and collated (Table 4.4). Four projects funded in 2015, one project in 2016 and one in 2017 were included. All worked directly with primary health clinics, in contrast with the earlier set of studies which mainly worked with the community populations directly, but their approaches and objectives varied.

Three intervention studies targeted tobacco (n=2) or alcohol (n=1) with evidence-based treatment, brief intervention or management within RCT study designs; categorised as 'group a: clinic-based' interventions, consistent with the 2017 review. One of the tobacco interventions[285-288] and the alcohol intervention[289-292] were implemented across more than 20 health clinics in South Australia and Australia-wide, respectively, about a third of participating health services were in remote communities. A second, hospital-based, tobacco intervention[293, 294] targeted Indigenous patients, including a proportion of people usually living in remote communities. All three of these aimed to enhance delivery of screening, brief intervention and referral for support, but the intervention under examination was not just the brief intervention itself, but the effect of training and translation of evidence-based practices on clinician bicultural capacities and service-wide quality improvement strategies. In contrast with the projects identified in the earlier review, the upskilling of healthcare providers to implement the treatment was a core intervention component in all three studies, described in Section 3.2.1.

Table 4.4 Overview of project grants funded by the NHMRC 2014-2019 that implemented and or evaluated an intervention at the remote community level that targeted substance misuse or related activities.

| Year | Grant title | Life of grant | Intervention name | Type of intervention | Study design, outcome measures | No. sites | Articles |
|------|-------------|---------------|-------------------|----------------------|--------------------------------|-----------|----------|
| 2015 | Social media to enhance Indigenous tobacco control | 3 | - | Participatory social media marketing | Grounded Action§ and factor analysis; emotional impact and leverage of social capital | 2 (One remote) | Hefler et al[295-297] |
| 2015 | Increasing uptake of evidence-based management of unhealthy alcohol use in Aboriginal primary health care services | 5 | - | Training, regular data feedback, collaborative support, and funding for resources | cRCT delayed-intervention measuring application of AUDIT-C and brief intervention. | 22 (7 very remote) | Lee et al[289, 290, 292, 298] |
| 2015 | Making Fetal Alcohol Spectrum Disorders History in the Pilbara: An evidence-based prevention intervention | 5 | Hedland FASD project | CPAR, Social-ecological, multipronged | | 1 | Telethon kids, ongoing[299] |
| 2015 | Training health professionals in tobacco cessation and evidence translation for Aboriginal Australians | 3 | | Opportunistic training: various methods opportunistic approach to training existing health professionals in tobacco cessation with a number of methods to reduce tobacco prevalence | cRCT measures screening, brief intervention and post-intervention and pre-post tobacco use. | | van Agteren , ongoing [294] |
| 2016 | Title: 'Indigenous Counselling and Nicotine (ICAN) QUIT in Pregnancy' - a cluster randomised trial to implement culturally competent evidence-based smoking cessation for pregnant Aboriginal and Torres Strait Islander smokers | 3 | Sista Quit | Three stages recommended in Michie et al.'s "Behaviour Change Wheel" guide with health service provider training. | Healthcare professional: <br>• screening<br>• referral<br>Pre-post tobacco use among clients<br>Qualitative checklist client feedback | 20 (11 control; 9 intervention) | Barzeev et al, ongoing[286, 288] |
| 2017 | Looking Forward - Moving Forward Project: Transforming systems to improve mental health and drug and alcohol outcomes for Aboriginal peoples (Partnership grant to extend an existing intervention) | 4 | Looking Forward – Moving Forward | Indigenous PAR; shared storytelling between Aboriginal Elders, researchers, senior management and clinicians. | Qualitative / thematic interviews. | 11 organisations | Wright et al[300, 301] |

§Grounded Action is a combination of PAR and grounded theory

The second group, summarised in 3.2.2, included several intervention projects explicitly targeting substance misuse treatment or prevention, without a clinical intervention or pre-post measures of effect. All are, or were, PAR projects, and therefore comprised a third category 'group c: PAR projects'. One intervention study focused on anti-tobacco social marketing in Alice Springs and Darwin, evaluated by factor analysis and grounded theory.[296, 297, 302] One community-based participatory action research (CBPAR) project in the Pilbara[299] with qualitative evaluation aimed to translate the methodology of a foetal alcohol spectrum disorder (FASD) prevalence, prevention and support strategy implemented 2008-12 in the Fitzroy Valley (Kimberley, WA).[303-305] One Partnership Grant enabled expansion of an intervention targeting healthcare provider capacity to relate to their Indigenous clients, originally implemented in Perth[300, 301] and extending to remote Broome (WA) at time of writing - it will be evaluated qualitatively.

Two other projects were considered but excluded as the review was bounded by remote community implementation contexts, and these programs were implemented in urban contexts. These were: development of a smartphone app for methamphetamine use;[306, 307] and a school-based intervention targeting resilience to alcohol and other drug uptake.[207] Certainly, if considering those specific substances or approaches these programs would  inform theories relevant to similar programs implemented in remote communities, but for the purposes of the review the interest was in what had already been implemented.

### 4.2.1    *Clinic-based substance misuse intervention projects funded 2014-20*

In the 'clinic-based' group, two projects targeted better uptake and implementation of 'culturally appropriate' tobacco and alcohol management (labelled A4-A6 in Table 4.5). All three projects explicitly employed participatory approaches to develop feasible and acceptable intervention components. All three provided explicit, co-designed training to healthcare providers.

Project A4's cluster Randomised Controlled Trial (cRCT) aimed to increase alcohol screening and brief intervention delivered by clinicians working at 22 participating primary health clinics with Aboriginal Community-Controlled Health Organisations (ACCHOs), including at seven very remote communities in various states and territories. Researchers engaged each clinic through two local champions. Support included data feedback and $9000 to support bimonthly meetings with the champions, onsite training and participation in a national training workshop.[290] Their research identified the AUDIT-C as a culturally acceptable and feasible alcohol screening instrument for Indigenous clients.[292]  Its uptake, as well as the frequency and consistency of a brief intervention were the main outcome measures. The cRCT (in pre-publication at time of writing)[290] reported increased odds of use of AUDIT-C across the sites, but more than five-fold effect at intervention sites relative to controls (5.52, 95% CI 4.–1 - 7.07)[290]. The intervention did not appear to enhance use of brief intervention, but confidence in the findings was limited because baseline screening activity between controls and intervention clinics was highly variable.[290]

Related systematic reviews by A4's research team highlighted essential elements of their program theory. First, the importance of cultural and bicultural care and community involvement to facilitate delivery of evidence-based clinical care[308] in a non-stigmatising and relevant manner for Indigenous clients. They also explicitly acknowledged mechanisms of enhancing staff capacity for cultural and bicultural practice, which their intervention sought to encourage through a continuous quality improvement (CQI) approach. Their systematic review of CQI impact identified that programs implementing three critical features of CQI (data-guided activities; considering local conditions; iterative development) produced: increased uptake of brief tobacco intervention; longer implementation and follow-up durations; and multifaceted designs targeting both practice and health system levels, compared to studies without the three essential CQI elements.[289]

Study A5 focused explicitly on the processes of translation of a brief intervention for tobacco to hospital settings. This project is ongoing at time of writing, with no publications. The project underwent a significant redesign after consultation, when the research team discerned that the intervention originally proposed was inappropriate because it did not align with an Indigenous perspective. They reoriented themselves with perspectives understood through consultation; and co-designed with an Aboriginal reference group and a range of health stakeholders to develop an 'augmented reality' resource to support quitting, which is still under evaluation at one hospital, to be up-scaled to an RCT at multiple hospitals (Carson, K., 2021, personal communication in a conversation). Consultations established that patients felt they were seldom asked about tobacco use and cessation, and health service providers reported a sense of futility with tobacco brief intervention in this context. Provider training was thus deemed essential to this project gaining traction.

Project A6's RCT of the 'Sista Quit' program developed a flipchart to facilitate tobacco intervention with pregnant Aboriginal women, accompanied by training for healthcare providers at 20 South Australian primary health clinics, approximately one third remote. This RCT was extended due to the COVID pandemic with data collection expected to finish in September 2021. Their program theory was informed by an earlier pilot study (ICAN QUIT Smoking in Pregnancy).[285-287, 308, 309] ICAN QUIT targeted provider reticence with respect to tobacco cessation assistance and referral, as well as uncertainty with respect to the appropriateness of prescribing nicotine replacement therapy (NRT) to pregnant women.[310] They employed a PAR approach at two ACCHOs to develop webinars for healthcare professionals. The content of these focused on confidence and capacity to initiate conversations and provide ongoing assistance in a culturally safe and appropriate manner. Flipcharts were developed to assist brief intervention in a 'Behaviour Change Wheel' framework.[288, 309] The pilot was tested across six ACCHOs in a step-wedged RCT in NSW, QLD and SA, measuring breath carbon monoxide (CO) and NRT prescribing, and reporting on staff feedback.[309] Three of 13 pregnant participants demonstrated

abstinence confirmed by breath CO. Staff reported reduced CO measures as motivating,[309] and localised practice changes affording the opportunity and capability to create safe and engaging structures for pregnant Aboriginal clients. Translation of these effects is to be examined in the larger RCT. The importance of the accuracy and brevity of the training webinars for healthcare professionals was highlighted, and number of improvements were recommended for the full RCT design.[286]

### 4.2.1.1 *Mechanisms, assumptions and program theory*

Stakeholder reasoning intended to be stimulated among the group 'a' projects included:

- Translation of evidence-based processes to culturally appropriate and reliable, routine implementation, not very different to the three projects identified in the 2017 review.

- Co-design to capture Indigenous perspective, implying mechanisms of trust, interest and relevance for the intended beneficiaries, sometimes mediated through enhanced cultural competence of health practitioners. This is exemplified in projects A5 and A6.

- A4 exhibits a reflexive approach to culturally appropriate delivery through CQI, engagement with individual ACCHSs and adaptation to their specific needs.

- Upstream mechanisms addressing healthcare provider capacity to form relationships and dialogue were explicit in three clinic-based RCTs funded after 2013 (projects A4-6).

The RCT study designs of the group 'a' projects assumed that recruitment of large samples ensured validity and sensitivity. A program theory to describe the general approach of these three intervention projects might be:

> *'Local co-design and participatory practices tailored to complex factors determining*
>
> *intervention efficacy by targeting gaps in provider knowledge, producing genuinely*

*culturally appropriate resources and cross-cultural knowledge / practice. These upstream mechanisms enable effective delivery of evidence-based screening, treatment and referral to clients.'*

Table 4.5     Program theories of the psycho-social, clinic-based interventions within a controlled study design 2014-20 (group a).

| Intervention | What was the program supposed to do? | | | Outcomes in context |
|---|---|---|---|---|
| | *Intended outcome / Aims* | *Detailed strategies* | *Observed outcome as reported* | *Influence of context reported in evaluations* |
| A4 | Healthcare professional confidence and capacity to use AUDIT-C & brief intervention among heavy drinkers. | • Review screening tools<br>• Co-design screening and intervention tools (A5 in particular)<br>• Understand current practice gaps and health practitioner reasoning | 5X increased odds of AUDIT-C at intervention sites; no clear outcome for brief intervention; baseline uncertain. | • Health service provider knowledge: e.g., interpretation of standard drinks; knowledge of appropriate pharmacotherapy for pregnant tobacco users. |
| A5 | Translation of evidence-based tobacco interventions. | • Participatory intervention development with ACCHOs, communities and clinicians<br>• In-place targeted training of healthcare professionals | Co-design produced more engaging resources as well as explicitly addressing gaps in health provider capacity | • Health provider assumptions about Indigenous substance use, for example low expectations of capacity or will to cease use.<br>• Health provider discomfort initiating conversations about substance misuse. |
| A6 | Health care professional confidence and capacity to increase assistance and referral for tobacco among pregnant women. | • Regular support of clinicians or local champions<br>• Tools to facilitate systematic, culturally appropriate approach<br>• Strong relationships and communication to enhance capacity and control of ACCHOs<br>• Explicit integration of conventional treatment into cultural framework. | Pilot— no clear measured outcome; high acceptability; RCT in progress. | • Relationships and trust central but not always sufficient time in the funded period to ensure this foundation.<br>• Limited opportunity for non-Indigenous clinicians to experience cross-cultural environment prior to posting. |

| | How and why? | | Assumptions |
|---|---|---|---|
| *Program theory / ies* | Kinds of resources intended | Intended responses | |
| *Local co-design and participatory practices tailor complex factors determining intervention efficacy by targeting gaps in provider knowledge, producing genuinely culturally appropriate resources and cross-cultural knowledge / practice. These upstream mechanisms enable effective delivery of evidence-based screening, treatment and referral to clients.* | • Clarifying social rules and expectations<br>• Accessible processes—intervention brought to the healthcare providers by either webinar or workshop in-place<br>• Service users sense greater understanding of their circumstances and needs | • Healthcare provider enhanced confidence and self-efficacy to provide cross-cultural and culturally appropriate care.<br>• Actual interaction is consistently considerate, polite, non-confronting<br>• Increased authenticity in cross-cultural relationships—empathy, trust, safety. | • Stakeholders have the capacity and will to act according to a mandate<br>• Relationships with community or ACCHS are adequately established<br>• Precision of baseline measures sufficient for RCT design. |

Table 4.6    Program theories of participator action research interventions 2014-20 (group c).

| Intervention | What was the program supposed to do? | | Outcomes in context | |
|---|---|---|---|---|
| | *Intended outcome / Aims* | *Detailed strategies* | *Observed outcome as reported* | *Influence of context reported in evaluations* |
| C1 | Understand the reach, shares and reaction as a function of content. | • 13 Indigenous Participant-researchers / ACCHSs shared one Facebook post per week for 26 weeks. | • Child-focused, practical, relevant and credible, unambiguous message, were most likely to be shared; non-locally produced and First-Nations focused content favoured. | • ACCHOs were viewed as worthwhile organisations in the community<br>• High rates of use of Facebook across community members. |
| C2 | Stakeholder commitment and raised community consciousness to reduce prenatal alcohol exposure. | • Leadership group; liaison with external partners; locally driven social marketing; robust prevalence study. | • Sustainable raised consciousness of the issue, with a strong sense of community ownership; no reported measures of reduced FASD at tine of writing. | • Prevalent, highly visible and emotive health issue<br>• Harms to children<br>• Alcohol Management Plans in place. |
| C3 | Transformative reflexivity among non-Indigenous clinicians in the AOD space. | • Long-term committed participating Elders<br>• Narrative / story-based facilitated workshops around 7 attributes in a non-linear process. | Sense of comfort and trust observed in non-Indigenous participants; no institutional take-up at tie of writing. | • Elders consistently involved in the project increasing capacity over time<br>• Constant challenge of staff turn-over<br>• Institutional barriers to uptake in policy. |

| *Program theory / ies* | How and why? | | Assumptions |
|---|---|---|---|
| | **Kinds of resources intended** | **Intended responses** | |
| *Locally endorsed messaging and local actor involvement in the intervention can promote community level processes advancing readiness to quit tobacco.* | • Local participant-researchers doing the intervention with research support<br>• Topical, relevant messaging. | • Local ownership and enhanced capacity<br>• Agency to engage and promote. | • Facebook presence of ACCHOs<br>• ACCHO is respected and trusted in the community |
| *Community owned and initiated strategies can reduce prenatal alcohol exposure by providing non-stigmatising communal knowledge and social resources.* | • Self-directed, natural concern for children's wellbeing<br>• De-stigmatising knowledge and support to pregnant women<br>• Quantitative prevalence data<br>• De-centralised momentum. | • Reflexive avoidance of alcohol among pregnant women<br>• Prioritised across multiple stakeholders, sustainable. | • Problem targeted is of sufficient importance to the community<br>• Co-design counters research and health service hegemony. |
| *Circular narrative workshop with Nyoongar Elders, supports transformative integration of Indigenous worldview, translating to enhanced respect, communication and relationships with clients.* | • Relational accountability to individuals in Elder workshops<br>• Health providers listen and communicate with greater awareness of Nyoongar experience of receiving health services. | • Empathic reflection through Nyoongar or health provider lens<br>• Clients feel trust, non-judgement. | • Sufficient cooperation from health services and individual clinicians<br>• Enhanced capacity can support change – health providers with cross-cultural worldview may still face structural barriers to offering effective support. |

**PAR interventions with a substance misuse focus in remote Indigenous communities funded 2014-20**

Summarised in Table 4.6, the 'PAR interventions' included: one social marketing program administered by 13 Indigenous participant-researchers at 13 ACCHOs over 26 weeks in Darwin and Alice Springs[295] (C1); one CBPAR approach addressing FASD, including prenatal alcohol exposure, implemented in the Pilbara and ongoing at time of writing[299] (C2); and, one Partnership Grant which extended a PAR approach to enhancing healthcare provider capacity to work with Indigenous clients in Broome[301] (C3).

Project C1's intervention entailed 13 Indigenous participant-researchers posting one anti-tobacco message on Facebook per week for 26 weeks.[295] Participants had access to high quality, locally produced audio-visual material, as well as material produced elsewhere, either targeted to Indigenous people (or other First Nations) or not. Evaluation was by a grounded theory qualitative analysis, and a factor analysis was used to assess the 'reach', 'shares' and 'reaction' for the posts within community networks. The factor analysis showed that locally produced content was not favoured across community networks of Facebook users, but Indigenous or First-Nations focussed messages were. The qualitative analysis found that posts were shared more if messages focussed on harms to children, and / or they were perceived as direct, clear and practical. They also reported that 'strengths-based' messages were not necessarily favoured, in contrast to now widely accepted principles of Indigenous health promotion.[297, 302]

The Hedland FASD Project is a broad social marketing campaign which aims to reduce prenatal alcohol exposure, ongoing at time of writing.[299] The CBPAR methodology aimed to ensure local ownership of the project and increase its sustainability.[299] With no evaluation published at time of writing, the program theory was informed by the *Liliwan* and *Marulu* strategies (2008-12) implemented in the Fitzroy Valley (Kimberley, WA).[304] In the Kimberley project, community leaders had prioritised FASD, and sought strategic partners to overcome a significant, locally identified problem, impacting multiple agencies.

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Challenges to continuity and momentum (e.g. high staff turnover and lack of funding) were addressed

via formation of the *Marulu FASD Strategy Leadership Team*, which then secured interim resources

including volunteer time and in-kind contributions from organisational stakeholders until the project

acquired designated funding. Through this process, researchers obtained community support to engage

in a prevalence study, the *Liliwan Project*, granted NHMRC funding in 2012,[303] the findings of which

leveraged preventative interventions targeting prenatal alcohol exposure, as well as related school-

based and community strategies to support children living with FASD in the community and their

families.[305] Finally, translation of the strategy to the Pilbara is the subject of the NHMRC Project Grant

identified here.[299, 304] The investigators were not able to be contacted at time of writing, but there will

presumably be a follow-up prevalence study for FASD at these sites.

C3 was a Partnership Project funded in 2017 which targeted cultural transformation among clinicians

working at 11 health clinics in Perth. Led by a Nyoongar social scientist this process sought to unpack

and translate Western and Nyoongar worldviews in facilitated workshops with Nyoongar Elders. The

objective was to produce the conditions for reflexivity, mutual understanding and trust (Wright, n.d,

personal communication in a conversation). In spite of its urban location, this intervention was worth

considering due to the significant ongoing connection between Perth-based Nyoongar Aboriginal people

and rural and remote former missions or reserves in the region. The NHMRC Partnership Project Grant

funded extension of the same program in remote Broome (WA), ongoing at time of writing. Funded for

four years, this project has no publications at time of writing, but its program theory is based on the

'Looking Forward – Moving Forward' project published in 2015.[300, 301] In partnership with participating

Nyoongar elders, the intervention consisted of interactive workshops supporting the *Minditj Kaart-*

*Moorditj Kaart* (Deadly Walking-Talking) framework—conceptualised as seven attributes fostering

engagement between Indigenous clients and non-Indigenous clinicians. Qualitative evaluation identified

outcomes such as clinician comfort with cross-cultural expectations, humility and reflexivity, which may then translate to more effective health provider drug and alcohol treatment.[301]

### 4.2.2.1  Mechanisms, assumptions and program theory

The mechanisms apparent in the PAR projects were:

- Locally perceived need as an initiator of action, driving uptake and sustainability.

- Researchers leveraged existing research resources to implement research methods, including prevalence studies and qualitative evaluation, to facilitate acceptance, uptake and participation.

- Indigenous worldview was privileged explicitly and implicitly; obligations to Indigenous self-determination were assumed to be upheld and to promote Indigenous people's agency with the potential to lead to self-sustaining behaviour change that would be accessible, feasible and culturally safe.

These approaches did not prioritise linking with robust experimental or quasi-experimental evaluation of impact on substance exposure, demand or harm. Nevertheless, relationships and power dynamics between various stakeholders and services in context were unclear, and systematic, testable account of such would have added to explanatory accounts of program processes.

The program theory for these projects which would encompass such mechanisms might be framed as:

*'Participatory approaches that fully embrace Indigenous worldviews, self-direction and understanding of the program can translate to safer, more effective health promotion and brief intervention. This can be achieved if Indigenous researchers or research partners at all stages of design and implementation* **are afforded sufficient opportunity to direct and implement the strategies.'**

## 4.3    Discussion

The NHMRC continues to fund efforts to produce meaningful strategies for working with Indigenous people to reduce substance use, including in remote settings. Comparing projects funded 2003-2013 (Section 4.1) with those funded 2014-20 (Section 4.2), the earlier projects demonstrated Indigenous engagement, self-determination and control through consultation and engagement of health workers or families, while the later projects moved towards explicit co-design approaches. Project B4 in the published review was explicitly initiated by the participating Indigenous community residents, potentially fitting with group c in the later projects, but they also measured impact in a before and after community sample.

For the clinic-based RCTs (group a), it appeared that there was a shift in assumptions about the capacity of a given agent to deliver an intervention strategy. This was not only about 'fidelity' but about capacity to connect with the intervention recipient, to understand their needs and communicate appropriately. Though the word *mechanism* was not used in these publications, this does speak to mechanisms in terms of impact on beneficiary reasoning in response to resources, and not just an intervention strategy. Projects funded 2003-13 focused on intervention dose delivered, with assumptions that the practitioners and health workers could work within a cross-cultural, cultural or participatory manner and otherwise deliver strategies with fidelity to the design. Projects funded after 2013 included program resources targeting how practitioners work with Indigenous clients who use substances (Section 3.3). This suggests increasingly nuanced attention to how the intervention is received by agentic beneficiaries interacting with structures such as health services, which are not, of course, value-neutral or completely efficient.

Where RCTs funded after 2013 reflected greater emphasis on co-designed intervention and intentional focus on practitioner capacity, the RCT designs nevertheless sought to demonstrate quantitative, context-neutral change.  Randomisation and large sample size were assumed to neutralise context and

demonstrate the intervention's causal character. Three projects explicitly used theoretical approaches to identify theory or reposed on a theory of how an effect would occur, although these have not been linked to quantitative evaluations. No theory-driven evaluations were identified.

### 4.3.1  *Significance and concluding remarks*

The tentative program theories offered in this review require substantial refinement which might be achieved through realist synthesis and theory-driven empirical research.  The absence of such a synthesis in this work is a limitation. The work presented in this chapter provides an initial reorientation of thinking about the assembled publications from these programs. As a general comment, Indigenous voices are sparse, and the qualitative or hermeneutic data, as for the CYCP, was not collected with realist theorising in mind. A synthesis from these publications may risk being too diffuse, and risks redundant or hollow theorising.  These ideas could, however, be picked up as a starting point for synthesis and CMO construction for specific substances and sites. A more detailed synthesis would benefit from the participation of real stakeholders, sources capturing lived experience, particularly that of Indigenous persons living in remote communities.  For the purposes of the thesis, the chapter highlights that the publications arising from the dominant paradigm *do not* offer this, and the study designs applied off not rigorous way to incorporate such content.

# 5 Quantitative measures of cannabis use from the Cape York Cannabis Project

## 5.1 Chapter overview

This chapter is built around the quantitative analysis published in *Frontiers in Public Health* in 2018, titled *Cannabis use among remote Indigenous Australians: opportunities to support change identified in two waves of sampling* (see Appendix 2). The cannabis use prevalence and cessation data across sites and demographic categories is presented, employing both a cross-sectional analysis (see the analysis from two waves of sampling, Section 4.2) and a before and after cohort analysis (see the baseline-follow-up analysis, Section 4.3). The significance and limitations of the findings, as well as the implications for future study design and evaluation are discussed in Section 4.4.

### 5.1.1 The uniqueness of the data

There is a dearth of reliable information on cannabis prevalence and patterns among Indigenous Australians living in Cape York or other similar remote regions. Community-level surveys measuring illicit substance use are challenging, costly and uncommon. The CYCP's Chief Investigator led the only other intervention and follow-up studies in eastern Arnhem Land (NT), providing the template for the CYCP feasibility and study design. That earlier work was published more than ten years ago[12, 62] in a cohort first recruited in 2001, twenty years ago at time of writing.[29, 67] Apart from these, several cross-sectional surveys in the last ten years[11, 271, 311-313] examined particular correlates of cannabis use with: poly-substance use during pregnancy and birth outcomes,[271, 314] multi-substance use among young people,[311] dependence and withdrawal among prison inmates,[315] violent behaviour,[11] adverse mental health effects [316] and treatment seeking.[312] Cannabis use status, along with alcohol has been shown to correlate with psychosis in the Cape York and Torres Strait regions, in data going back to 1992.[5] Less is known about cannabis prevalence and patterns of use in the wider Indigenous Australian population. In

2019, for the first time, The Australian Institute of Health and Welfare National Drug Strategy Household

Survey included Indigenous Australians living in eight remote communities.[58] The data presented here is

therefore the only intervention-follow-up study for cannabis in remote Indigenous communities in the

last ten years, and the only direct prevalence data collected in Cape York's remote communities.

### 5.1.2    Data included

To satisfy the multiple baseline design, CYCP researchers opportunistically recruited a cohort of people

to provide information before and after the intervention phase in the three participating Cape York

Communities (labelled A-C in this analysis). Consenting participants provided information about their

own lifetime cannabis use as well as their perceptions of cannabis in their community in semi-structured

interviews. Researchers obtained permission to follow-up the same participants after approximately 12

months, or to seek proxy assessments of their cannabis use status from nominated peers.

At baseline, 429 participants (235 males and 194 females, aged 15-49 years) participated in semi-

structured interviews with project staff visiting from Cairns. At follow-up, 244 baseline participants were

re-interviewed, 120 proxy reports were provided for participants who could not be located, and 38 new

participants were recruited and interviewed for the first time. At the second time point, data was available

for a total of 402 participants (228 males, 174 females) aged 15-49 years at the time of recruitment.

#### 5.1.2.1   Agreement between self-reported cannabis use and two proxy assessors

Two to three proxy assessments of self-reports about cannabis use were available for the 244

participants at follow-up.  There was universal agreement among all three sources of information on

45% of assessments and agreement between at least two sources on 83% of assessments.  With two

ratings and from two to three proxy assessments or self-reports, this level of agreement overall ($\kappa$=0.65)

was 'substantial'.[317]

### 5.1.3   Choice of analytic method

With fewer than 150 participants in each community overall, a proportion of baseline participants lost to

follow-up, and a small sample of participants recruited at the second time point, the challenge in the

quantitative analysis was to make the most of the available data. The main hypothesis stated that

the multiple-component, community-level intervention implemented during 2010-2011 would bring

about a decrease, by at least 10% at follow-up relative to baseline, in the number using cannabis in the

targeted age groups. For any continuing cannabis users, it was also hypothesised that there would: be

fewer reporting recent use; be fewer reporting symptoms of cannabis dependence; and more current

users would be trying to quit.

As described in Chapter 2, community survey sampling occurred between May 2010 and October 2011,

constituting the baseline phase of the study design; and between May 2011 and February 2012, at least

one year after baseline interviews, and at the end of an intervention phase. However, with the

staggered implementation and brief time between samples in each community, sampling was more-or-

less continuous across the three communities overall, with no clear demarcation of the intervention

phase. A proportion of baseline participants did not participate at follow-up and a proportion of

participants surveyed at follow-up were not baseline participants. The 'baseline and follow-up' phases

(implying a particular statistical approach with the same cohort at both time points) effectively became

a before and after sample in three communities, using all the data for each community, at two time

points.

Section 4.2 reports the quantitative findings from two cross-sectional samples which treated the

baseline and follow-up data as independent community samples. Compared to the before and after

cohort approach, this strengthened the analysis with inclusion of all baseline participants regardless of

their participation at follow-up, as well as participants recruited for the first time at follow-up, and

therefore with no baseline data. Published in the journal *Frontiers in Public Health* in 2018,[7] this analysis

suggested a modest reduction in cannabis use between the two time-points at all three sites.

Section 4.3 presents an alternative, logistic regression analysis of data provided by participants for

whom data was available at follow-up, either from direct re-interview or proxy interviews with other

community members. A statistically significant reduction in cannabis use between the two time points

was also suggested in this analysis, but the small sample size limited confidence in the findings, in

particular, confidence in the hypothesis that this reduction was a direct effect of the intervention.

## 5.2    Cross-sectional analysis of data collected in 'two waves'

Analysing the data as two independent, but sizable waves of sampling about 10-18 months apart, rather

than as a before and after cohort, allowed inclusion of all the available data, including baseline

participants with no follow-up data (n=34) and participants recruited during the follow-up with no

baseline data (n=38).

Hypotheses about baseline characteristics relative to cessation at follow-up were not possible. Rather,

this study hypothesised:

3.  An overall reduction in current users, as a result of growing awareness of cannabis harms
    suggested in the consultations, as well as social marketing activities that occurred between
    sampling waves.

4.  Qualitative examination of those who had ceased using cannabis between the first and second
    waves would suggest common important factors influencing their decisional balance.

### 5.2.1    Sample

In total, 429 participants aged 15-49 years were interviewed in the first wave of data collection,

equivalent to 37% (=429/1172) of the estimated total community populations in this age group (Table

5.1). The sample included 55% males (n=235) and 45% females (n=194). This differed from the 2011

census[43] proportions of 49% males and 51% females ($|z|$=2.06, p=0.033) in these age groups in the

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study communities. The proportion of participants (49%=203/429) aged 15-24 years in the sample was considerably greater than recorded in the census (28%) (|z|=7.28, p<0.001).

In the second wave, approximately 12 months later, data were collected for 402 people, including: 244 wave 1 participants who completed follow-up interviews; 120 proxy assessments of wave 1 participants; and 38 new participants (Table 5.2). Proportions of males (n=228, 57%) and females (n=174, 43%) were similar to the first wave (|z|= 0.56, p= 0.575), and similarly different to the 2011 census (|z|= 2.68, p=0.007). Overrepresentation of younger participants aged 15-24 years (37%=149/402) compared to the census data (28%) (|z|= 3.42, p> 0.001) was more pronounced than at wave 1 (|z|=2.99, p=0.003).

Table 5.1 Demographic characteristics and cannabis use in 429 people (235 males and 194 females, aged 15-49 years) interviewed at wave 1 in three Cape York communities, far north Queensland, Australia, 2010-2011.

| | | Community A n=139 | Community B n=135 | Community C n=155 | Total n=429 | p* |
|---|---|---|---|---|---|---|
| **Gender** | Female | 63 (45.3%) | 65 (48.1%) | 66 (42.6%) | 194 (45.2%) | |
| | Male | 76 (54.7%) | 70 (51.9%) | 89 (57.4%) | 235 (54.8%) | p=0.636 |
| | | | | | | |
| **Age group** | 15-24 | 65 (46.8%) | 66 (48.9%) | 72 (46.5%) | 203 (47.3%) | |
| | 25-34 | 39 (28.1%) | 42 (31.1%) | 39 (25.2%) | 120 (28.0%) | p=0.543 |
| | 35-49 | 35 (25.2%) | 27 (20.0%) | 44 (28.4%) | 106 (24.7%) | |
| | | | | | | |
| **Cannabis use** | Non-user | 27 (19.4%) | 36 (26.7%) | 72 (46.5%) | 135 (31.5%) | |
| | Former user | 38 (27.3%) | 40 (29.6%) | 28 (18.1%) | 106 (24.7%) | p=0.001 |
| | Current user | 74 (53.2%) | 59 (43.7%) | 55 (35.5%) | his means there may have been 514 (43.8%) | |

* Pearson chi²

Table 5.2    Demographic characteristics and cannabis use in 402 people (228 males and 174 females, aged 15-49 years) with data at wave 2 (followed-up, 244; proxy, 120; or newly recruited, 38) in three Cape York communities, far north Queensland, Australia, 2012.

| | | Community A<br>n= 110 | Community B<br>n=149 | Community C<br>n=143 | Total<br>n=402 | p* |
|---|---|---|---|---|---|---|
| **Gender** | Female | 50 (45.4%) | 65 (43.6%) | 59 (41.3%) | 174 (43.3%) | |
| | Male | 60 (54.6%) | 84 (56.4%) | 84 (58.7%) | 228 (56.7%) | p=0.796 |
| | | | | | | |
| **Age group** | 15-24 | 42 (38.2%) | 58 (38.9%) | 49 (34.3%) | 149 (37.1%) | |
| | 25-34 | 37 (33.6%) | 57 (38.3%) | 47 (32.9%) | 141 (35.1%) | p=0.451 |
| | 35-49 | 31 (28.2%) | 34 (22.8%) | 47 (32.9%) | 112 (27.9%) | |
| | | | | | | |
| **Cannabis use (402)** | Non-user | 25 (22.7%) | 30 (20.1%) | 71 (49.6%) | 126 (31.3%) | |
| | Former user | 43 (39.1%) | 53 (35.6%) | 23 (16.1%) | 119 (29.6%) | p=0.001 |
| | Current user | 42 (38.2%) | 66 (44.3%) | 49 (34.3%) | 157 (39.1%) | |

\* Pearson chi$^2$

### 5.2.2 Patterns of use at wave 1

This section reports lifetime and current use patterns and user characteristics (Table 5.3) in data from the first wave of participant interviews (Table 5.1).

#### 5.2.2.1 Reported lifetime cannabis use varied across the communities and gender groups

The proportions of the sample reporting cannabis use at least once in their lifetime ranged from 54% to 81% across the communities (69% overall) (Table 5.1). In community C, almost half the participants (46%) had never used cannabis, whereas in community A, this was true of fewer than one in five (19%) (Table 5.1).

Overall, males (77%) were more likely to report lifetime use than females (59%) ($p<0.001$). Age-standardised rates were 78% of males, 52% of females and 65% overall. However, the differences in the crude proportions of lifetime users also varied across communities: A (86% males, 75% females, $p=0.105$); B (79% males, 69% females, $p=0.299$) and with women less likely to have ever tried cannabis in community C only (69% males, 33% females, $p<0.001$). The proportion of lifetime users (71%) in the younger participants (aged 15-24 years) was similar (66%) to older participants (aged 25-49 years) ($p=0.221$) and varied little across the communities.

#### 5.2.2.2 Current users

Males were generally more likely to report current cannabis use in the sample in all three communities: A (66% males, 38% females, $p=0.001$); B (51% males, 35% females, $p=0.060$) and C (49% males, 17% females, $p<0.001$) and around three times more likely overall (55% males, 30% females, $p<0.001$). Age standardised rates were 55% for males and 26% for females, 40% overall.

### 5.2.2.3 *Age of uptake and duration of use among current users*

Table 5.3 describes the patterns of cannabis use among 188 current users, comprised of 69% males (n=130) and 31% females (n=58). Their median age was 24 years, with males around 2 years older than females (p=0.063). Participants had used cannabis for up to 30 years (median=11 years for males, =6 years for females, p=0.003). Age of first use was similar in males and females (median=16 years, p=0.714).

### 5.2.2.4 *Patterns of current use*

Almost half (48%) of the 168 current users, for whom information was available were 'heavy users' with similar proportions in males (47%) and females (51%) (p=0.640, Table 5.3).  Half (52%) of 184 current users reported using cannabis on a daily basis, another 43% used it on a weekly basis. The majority used cannabis regularly, with little difference between males (97%) and females (93%) (Table 5.3).

### 5.2.2.5 *Style of cannabis use and expenditure by current users*

The nominated preferred style of use in all three communities was hand-made 'bucket bong', a negative pressure device constructed from a bottomless bottle with a cone piece inserted into the lid, plunged into a larger container of water to draw the smoke in to be inhaled from the bottle. Almost all current and former users reported that they mixed tobacco with cannabis.

Across the communities, participants reported that cannabis was purchased from dealers (i.e., not cultivated in the community), with further distribution within the community through on-selling or sharing. Cannabis was mostly supplied in aluminium 'foils' or plastic 'sachets' with prices ranging from $AUD20 to $AUD50 per unit. Users reported considerable variation in the unit quantity and quality of cannabis material, often premixed with tobacco.

Males tended to spend more on purchasing cannabis than females, $AUD50/week compared with $AUD31/week (|z|=2.45, p=0.014, Table 5.3). With current users comprising 44% (=188/429) of the sample, this means there may have been 514 (=188/429*1172 people in the age group at census) current users in the 15-49 years age group in the three communities overall. A crude estimate of total expenditure on cannabis in this age group in these three communities is $AUD39,000 per week (=514/188*$AUD14200/week) equivalent to just over $AUD2.0 million/year.

### 5.2.2.6   *Severity of cannabis dependence (SDS) in current users*

Three quarters (73%) of the current users met criteria for cannabis dependence (SDS≥3), with similar proportions in males (77%) and females (66%) (p=0.145, Table 5.3). Similar proportions of current users met dependence criteria in both the younger (74%, 15-24 years) and older (73%, 25-49 years) age groups (p=0.813). Those in the 'heavy use' category were no more likely than other current users to meet criteria for cannabis dependence (p=0.787). Current users who met dependence criteria, however, spent more on cannabis (median spend=A$50/week) than those who did not (median spend=A$38/week) (|z|=2.09, p=0.036).

Table 5.3    Patterns of cannabis use by gender in 188 current users (aged 15-49 years) interviewed at wave 1 in three Cape York communities, far north Queensland, Australia, 2010-2011.

| | | Male n=130 | Female n=58 | Total n=188 | p* |
|---|---|---|---|---|---|
| **Median age** | Years (min-max) | 25 (16-49) | 23 (15-47) | 24 (15-49) | $\|z\|$=-1.86, p=0.063† |
| **Median age of first use** | Years (min-max) | 16 (8-30) | 16 (12-37) | 16 (8-37) | $\|z\|$=-0.37, p=0.714 |
| **Median duration of use** | Years (min-max) | 10.8 (1.20-28.9) | 6.20 (0.20-30.0) | 7.95 (0.20-30.0) | $\|z\|$=-3.50, p=0.003 |
| **Heavy user** | ≥6 cones/session at least once/week | 56 (47.1%) | 25 (51.0%) | 81 (48.2%) | p=0.640 |
| **Frequency** | Daily | 71 (55.0%) | 25 (45.5%) | 96 (52.2%) | |
| | Weekly | 54 (41.9%) | 26 (47.3%) | 80 (43.5%) | p=0.289 |
| | Monthly | 4 (3.10%) | 4 (7.27%) | 8 (4.35%) | |
| **Median weekly spending** | $AUD/week (min-max) | 50 (0-1050) | 31 (0.0-350) | 50 (0.0-1050) | $\|z\|$=-2.45, p=0.014† |
| **Severity of Dependence Scale** | ≥3 symptoms | 95 (76.6%) | 35 (66.0%) | 130 (73.4%) | p=0.145 |
| **Intentions towards cannabis** | None | 65 (56.0%) | 29 (60.4%) | 94 (57.3%) | |
| | Trying or wishes to quit | 51 (44.0%) | 19 (39.6%) | 70 (42.7%) | p=0.606 |

\*  Pearson chi$^2$ unless otherwise specified

†  Wilcoxon rank-sum test

### 5.2.3    Patterns of use at wave 2

Patterns of use were assessed among the 402 participants in the second wave of data collection (244 followed-up; 120 proxy-only; and 38 newly recruited), as follows.

#### 5.2.3.1    Reported lifetime cannabis use varied across the communities and gender groups

Shown in Table 5.4, the proportions of the sample reporting cannabis use at least once in their lifetime ranged from 79% to 50% across the communities (69% overall) which was not different to wave 1 ($|z|$=0.04, p=0.968). In community C, half (50%) had never used cannabis, whereas in community A, this was true of less than a quarter (23%). No significant differences in proportions of non-users were recorded between wave 1 and wave 2 samples across the communities: A (19% wave 1, 23% wave 2 $|z|$= 0.64, p=0.522); B (27% wave 1, 20% wave 2, $|z|$=1.30, p=0.194) and community C (46% wave 1, 50% wave 2, $|z|$= 0.55 p=0.582).

Overall, at wave 2, males (78%) were more likely to report lifetime use than females (56%) (p<0.001). Age standardised rates of lifetime cannabis use were 80% for males and 53% for females overall. However, the differences in the crude proportions of lifetime users also varied across communities: A (85% males, 68% females, p=0.034); B (86% males, 72% females, p=0.043) and strongest in community C (67% males, 27% females, p<0.001). As for the sample at wave 1, the proportion of lifetime users at wave 2 (68%) in the younger participants (aged 15-24 years) was similar (69%) to older participants (aged 25-49 years) (p=0.947) and varied little across the communities.

#### 5.2.3.2    Current users at wave 2

No statistically significant difference was detected in the proportion of cannabis users in the overall sample at wave 1 (n=188, 44%) compared to wave 2 (n=157, 39%) ($|z|$=1.39, p=0.164). Age standardised rates of current use among males was 52% and 21% for females. A significant reduction of 15% in

current users (53% to 38%, |z|=2.36, p=0.018) was recorded in community A. The proportion of heavy

users in the sample at wave 2 (63%) was higher than at wave 1 (51%) (|z|=2.40, p=0.016). Compared to

wave 1, the proportion of males (71%, |z|=0.91, p=0.363), females (62%, |z|=0.36, p=0.719) and

younger users (69%, |z|=0.62, p=0.535) reporting more than three symptoms of dependence were not

different at wave 2. The median weekly spending at wave 2 of $50 per week was not different to wave 1

overall. The difference between male and female expenditure—$55 and $30 per week, respectively

(|z|=2.57, p=0.010)—was also similar to wave 1.

### 5.2.3.3  *Lifetime and current substance use at wave 2*

Lifetime use of cannabis was linked with lifetime use of tobacco, alcohol and other illicit substances

(p<0.001). Current use of cannabis (39%) was strongly associated with current use of tobacco (74%,

p<0.001) and alcohol (64%, p<0.001). Seven participants reported current inhalant use and all of these

were current cannabis users.

**Table 5.4** Patterns of cannabis use by gender in 157 current users (aged 15-49 years) with data wave 2, either followed up (88) or newly recruited (27) in three Cape York communities, far north Queensland, Australia, 2010-2011.

| | | Male n=117 | Female n=40 | Total n=157 | p* |
|---|---|---|---|---|---|
| **Median age** | Years (min-max) | 27 (16-49) | 25 (15-46) | 26 (15-49) | \|z\|=-2.06, p=0.039† |
| **Median age of first use** | Years (min-max) | 16 (8-30) | 16 (12-37) | 16 (8-37) | \|z\|=-0.51, p=0.607 |
| **Median duration of use** | Years (min-max) | 8.1 (1.20-28.9) | 7.15 (0.20-26.1) | 7.80 (0.20-28.9) | \|z\|=-1.80, p=0.072 |
| **Heavy user** | ≥6 cones/session at least once/week | 50 (63.3%) | 18 (62.1%) | 68 (63.0%) | p=0.907 |
| **Frequency** | Daily | 35 (43.8%) | 9 (32.1%) | 44 (40.7%) | |
| | Weekly | 41 (51.2%) | 16 (57.1%) | 57 (52.8%) | p=0.393 |
| | Monthly | 4 (5.00%) | 3 (10.7%) | 7 (6.48%) | |
| **Median weekly spending** | $AUD/week (min-max) | 55 (0-800) | 30 (0-300) | 50 (0-800) | \|z\|=-2.57, p=0.010† |
| **Severity of Dependence Scale** | ≥3 symptoms | 56 (70.9%) | 18 (62.1%) | 75 (63.0%) | p=0.968 |
| **Intentions towards cannabis** | None | 31 (56.4%) | 11 (47.8%) | 42 (53.8%) | |
| | Trying or wishes to quit | 24 (43.6%) | 12 (52.2%) | 36 (46.2%) | p=0.619 |

* Pearson chi$^2$ unless otherwise specified

† Wilcoxon rank-sum test

No data for proxy (n=42)

### 5.2.4 Qualitative information from those who had ceased cannabis between wave 1 and wave 2

The qualitative data for participants with baseline and follow-up data who had ceased at follow-up was examined for information about why they quit.

#### 5.2.4.1 Quit intentions among current users

Of 188 current users at wave 1, 164 provided information about their intentions to stop or reduce cannabis use.  Overall, 43% current users (n=70) indicated they were trying or wanted to quit (Table 5.3), including 10% (n=16) actively trying to quit at wave 1. At wave 2, 46% (36/78) said they wanted to change (Table 5.4).

#### 5.2.4.2 Reasons for change among participants who ceased using cannabis between wave 1 and wave 2

Twenty-nine participants who were 'current users' at wave 1 (2011) were no longer using cannabis at wave 2 (2012).  This included 14 women and 15 men, with no obvious differences in distribution across age groups, genders or communities. Qualitative categories for their reasoning for cessation are summarised (Table 5.5).

Among 15 men, 11 said they wanted to quit when first interviewed in 2011, including five who were then making a quit attempt. Two had said they wished to cut down and only one had said that he did not want to quit. Nine of these men explained their reasoning: it was too expensive or a waste of money (3); family as the principal reason for quitting, particularly concern for their children (4); and health reasons or getting older (2). Among 14 women who had ceased cannabis use, five had indicated a desire to quit at wave 1, including two actively trying to quit. A further two said they would like to cut down and three who did not answer the question nonetheless discussed earlier quit attempts. Seven explained their reasoning: family (including children and pregnancy) (4) or for work (3).

Table 5.5    Participant reasoning for successful quit attempts between wave 1 and wave 2 and enablers and barriers mentioned.

| | *Reasoning for quitting* | *Enabling context* | *Barriers in the context* |
|---|---|---|---|
| *Women* | *Had a baby and needed to go my own way.*<br><br>*I want to give up and focus on work.*<br><br>*…because looking after lots of kids.* | *Thinking about giving up, would like to get help from sisters and brother because they understand.*<br><br>*Job would keep me from staying in the house smoking* | *[When cannabis unavailable] makes you feel like you want to go look for more [cannabis]. Stressing out.* |
| *Men* | *Spending money on wrong things - no food in the house. 'It's all about cash, that thing getting expensive.*<br><br>*Daughter told me to stop smoking, she was 3 at the time.*<br><br>*Used to smoke all day long. I've given up for my son. Realised important things in life were work and family.* | *I never buy it.*<br><br>*Long as I got the job I've got no stress - always up early.*<br><br>*Mum wants me to give up.*<br><br>*[I want to] slowly give up— work keeps you occupied.*<br><br>*Get people busy—mentor younger boys and men.* | *Fighting and stressing out when* [there is] *no gunja, look for credit if none get wild with the dealer*<br><br>*Relaxes me… want to get stress down before I bring it out on my family*<br><br>*Pulled out from school for fighting at age 14 and became a steady smoker since.*<br><br>*Other boys temptation*<br><br>*Calms you and you're not annoyed.* |

Only men in this group of successful quitters mentioned the expense of cannabis as a reason to stop, perhaps reflecting the tendency for men to spend more on cannabis and suggesting that women are probably more likely to source cannabis from partners or family members. One young man described how he demonstrated for himself how much money he was wasting by collecting the packaging:

> *'Started collecting sachets this year. Ten sachets is $500. I've spent $1000 on that*
>
> *silly thing this year.'*

Resources that enabled cessation mentioned by these 29 participants included: keeping busy with work; childcare or cultural activities; or spending time with non-using friends and family. For example, a young woman said that she would *'get help from sisters and brothers because they understand'* (Table 5.5).

Conversely, cue exposure and normalisation was a barrier to cessation for the young man referring to "*other boys, temptation*" (Table 5.5 'Barriers in context'). Only one person mentioned health services as a possible strategy to support cessation.

This 22-year-old man described a variety of arguments and opportunities that he believed would support cannabis cessation:

> '*Put food on the table; buy power card; get the outstations going; get cattle; hunting.* [It causes] *fighting and stressing out…*'

## 5.3    Cohort analysis of cannabis use at baseline and follow-up using self-report data alone

Shown in Tables 4.3 and 4.4, current cannabis use at wave 2 (39.1%) was reduced compared with wave 1 (43.2%), a modest difference of 4.7% during the 12 months between the waves. However, analysis of what is effectively two independent samples does not tell us how many of the cannabis users at baseline had quit 12 months later at follow-up; to achieve this, a cohort approach is required.

The 29 participants who were categorised as 'current users' at wave 1 (2011) but who were no longer categorised as cannabis users at wave 2 (2012) constitutes 15.4% (=29/188) of those categorised as current cannabis users at baseline.  Together with these 29 participants, there were 131 participants who were categorised as cannabis users at both time points on the basis of proxy assessments and/or self-report.  Amongst this cohort, using self-reported data alone, there were 24 participants who stated in interviews that they were cannabis users at wave 1 but who declared at wave 2 that they were no longer using cannabis at follow-up, and 82 cannabis users at baseline who reported that they were still using cannabis at follow-up.  These self-reports were all confirmed with proxy assessments.  With self-reported cannabis use verified by proxy assessments and with similar confidence in other self-reported measures, it was possible to examine the following hypothesis for this cohort (described in Section 2.4.1).

### 5.3.1    Hypothesis

The relative risk of being a cannabis user at the wave 1 baseline (compared with the group who reported they had ceased cannabis use between baseline and follow-up at wave 2) would be higher in males, younger people, and with any past-year cannabis use, any experience of cannabis dependence symptoms and less if there were any attempts to quit cannabis in the 12 months before the follow-up interview, taking into account any effects of tobacco and alcohol use.

### 5.3.2    Comparing the 82 continuing users with the 24 who had ceased cannabis use

The 82 who were cannabis users at follow-up were compared with the 24 who had ceased cannabis use in univariate and multivariable regression models. Consistent with the data in Table 5.6, in multivariable analyses, males were more likely to be continuing cannabis users at follow-up compared with baseline (RRR=3.8, 95%CI=1.0, 14.5, p=0.047). While age had no effect in the model, Table 5.6 also shows that there was a higher relative risk for tobacco users to be continuing cannabis users (RRR=2.0) with no association for alcohol users (RRR=1.1). Any quit attempts in the preceding 12 months reduced the risk of continuing cannabis use at follow-up (RRR=0.5). Those who self-reported heavy use (RRR=4.6) or experiencing symptoms of cannabis dependence (RRR=3.1) were at considerably greater risk of reporting continuing cannabis use compared with those who reported they had quit (Table 5.6).

### 5.3.3    Changes in the number of heavy users, dependent users and number trying to quit

It was also possible to examine any changes in the number of heavy users, dependent users and those trying to quit in the subgroup of 82 who were cannabis users at both time points. Information was provided by: 72 (88%) about heavy use; 75 (91%) about cannabis dependence symptoms; and 78 (95%) about trying to quit at both baseline and follow-up, but there were no statistically significant changes in any of these outcomes (Table 5.7).

### 5.3.4 Summary of changes in the before and after cohort

The number of cannabis users in the cohort reduced by around 15% (24/82) between initial recruitment in 2010 and follow-up in 2012, potentially bringing about a 5% (24/244) reduction in prevalence of current cannabis use in the community populations. Greater than hypothesised, a reduction occurred in all three communities. Similar numbers of males and females had ceased cannabis use at follow-up, but many more males were continuing users, a pattern also seen in all communities. Importantly, around 80% of those who ceased cannabis were aged 15-24 years, again in all communities.

Among the continuing users, on the other hand, there were no changes in the number of heavy or dependent users and no change in the number trying to quit. Trying to quit in the year before the follow-up showed favourable effects on the likelihood of ceasing cannabis use while recent heavy use and dependence symptoms as well as past-year tobacco use were each strongly associated with continuing cannabis use. The combined effects of heavy use and dependence symptoms on reducing the likelihood of quitting cannabis were strong, suggesting that the influence of exposure to cannabis use is mediated by dependence in this population of users; a highly plausible pathway.[318, 319]

Table 5.6    Multinomial logistic regression modelling compares the characteristics of cannabis users who self-reported they had ceased cannabis use at follow-up (n=24) with cannabis users at baseline or follow-up (n=82) (the reference category).

| | Ceased cannabis use at follow-up n=24† | Cannabis user at follow-up n=82 | Univariate | | | Multivariable | | |
|---|---|---|---|---|---|---|---|---|
| **Gender** | | | RRR | 95%CI | p* | RRR | 95%CI | p* |
| Female† | 14(58%) | 25(30%) | - | - | - | - | - | - |
| Male | 10(42%) | 57(70%) | 3.2 | 1.6, 6.5 | 0.001 | 3.8 | 1.0, 14.5 | 0.047 |
| **Age group at baseline (years)** | | | | | | | | |
| 15-24 | 15(62%) | 40(49%) | 0.9 | 0.4, 2.2 | 0.891 | 2.6 | 0.5, 13.8 | 0.272 |
| 25-34 | 3(12%) | 25(30%) | 2.9 | 0.4, 21.3 | 0.286 | 3.6 | 0.6, 22.9 | 0.182 |
| 35-49† | 6(25%) | 17(21%) | - | - | - | - | - | - |
| **Smoked any tobacco - preceding 12 months** | | | | | | | | |
| No† | 3(13%) | 6(7%) | - | - | - | - | - | - |
| Yes | 20(87%) | 75(93%) | 1.9 | 0.3, 10.9 | 0.484 | 2.0 | 1.3, 3.0 | 0.001 |
| **Drank any alcohol - preceding 12 months** | | | | | | | | |
| No† | 8(35%) | 17(22%) | - | - | - | - | - | - |
| Yes | 15(65%) | 60(78%) | 1.9 | 0.9, 3.8 | 0.081 | 1.1 | 0.5, 2.5 | 0.875 |
| **Heavy cannabis use (<12 months) at follow-up** | | | | | | | | |
| No† | 14(74%) | 39(43%) | - | - | - | - | - | - |
| Yes | 5(26%) | 43(52%) | 3.1 | 1.8, 5.4 | <0.001 | 4.6 | 1.3, 16.1 | 0.016 |
| **Cannabis dependence symptoms (<3 months) at follow-up** | | | | | | | | |
| No† | 10(48%) | 19(23%) | - | - | - | - | - | - |
| Yes | 11(52%) | 63(77%) | 3.0 | 1.9, 4.8 | <0.001 | 3.1 | 1.6, 6.1 | 0.001 |
| **Trying to quit (<12 months) at follow-up** | | | | | | | | |
| No† | 8(44%) | 48(59%) | - | - | - | - | - | - |
| Yes | 10(56%) | 34(41%) | 0.6 | 0.2, 2.0 | 0.373 | 0.5 | 0.3, 0.8 | 0.003 |

† Reference categories

**Table 5.7** Changes between baseline and follow up in the number of heavy cannabis users, the number reporting symptoms of cannabis dependence and numbers trying to quit in 82 participants who reported using cannabis both at baseline and at follow-up.

| N=82 participants reported using cannabis both at baseline and at follow-up | | | | |
|---|---|---|---|---|
| **Used ≥ 6 cones/session once/week (n=72)** | | | | |
| | | | Follow-up | |
| | | No | Yes | p* |
| Baseline | No | 15 | 21 | 0.077 |
| | Yes | 11 | 25 | |
| **Severity of dependence score >=3 (n=75)** | | | | |
| | | | Follow-up | |
| | | No | Yes | p* |
| Baseline | No | 5 | 15 | 0.433 |
| | Yes | 11 | 44 | |
| **Trying to quit cannabis (n=78)** | | | | |
| | | | Follow-up | |
| | | No | Yes | p* |
| Baseline | No | 26 | 20 | 1.000 |
| | Yes | 20 | 12 | |

* McNemar's χ2

## 5.4    Discussion

The two-waves analysis indicated a modest reduction of 4.7% in prevalence of current cannabis use between the two time points (Section 4.2). The 29 people (or 24 by self-report alone) who were categorised as cannabis users at wave 1, but not at wave 2, constituted around 15% of the 188 current users at the first time point. Of 294 lifetime users at baseline (wave 1), more than a third (36%) were former users (see Table 5.1). Among 89 current users at the end of the project who had baseline data, only two were new users, while five were relapsed users (see Section 4.3). Although this is encouraging, with multiple variables outside the experimenters' control, these analyses demonstrate little or nothing about why change occurred. The multiple baseline study assumed fidelity of implementation across three sites, and required a significant change to occur in order for any effect to be inferred. In practice, it was difficult to maintain a longitudinal cohort, some baseline participants could not be followed-up, and their thinking about cannabis was lost to the study.

 The 24 baseline participants who stopped using during the project timeline provided reasons for cessation, emphasising family and work. However, apart from the suggestion that cost influences males more than females, these findings did not expand substantially on preliminary data from the first community surveyed.[10] The methodology focused on sensitivity to quantitative changes. Participants were asked for their personal experiences but there was no systematic approach to capture how their personal experiences and motivation linked with context or local resources. A greater proportion of men were current cannabis users (Table 5.1), with greater median spending and longer duration of use than women (Section 4.2.2.2 and Table 5.3). In qualitative data from 29 baseline users who ceased using by the second time point, only men said that cost influenced their cessation (Table 5.5).

Taken together with the process evaluation, conclusions could not be drawn as to whether the intervention contributed to apparent reduction in current use. The cohort analysis, using direct interview data only, and therefore underpowered to draw conclusions about reduction in current use,

nevertheless suggested that cessation was more likely for baseline users who said that they were trying to quit, did not meet dependence criteria and who were not using tobacco.

### 5.4.1    Utility of quantitative survey in realist program design

From the outset, the quantitative analysis was underpowered and then limited by the lack of intervention fidelity or complete implementation. The reporting of median data is not revealing of mechanism, and measuring variations between the communities at baseline tells us little about why those variations existed. What might be taken from this to be used in theory-driven designs?

Of possible utility, similar proportions of dependence and heavy use among current users across sexes and age-groups predicted continuing use at the second time point (see Section 5.2.3.2) and  higher expenditure among those reporting symptoms of dependence (see Section 5.2.2.6).  These findings suggested that programs seeking to support cannabis cessation need to consider addressing symptoms of dependence and current tobacco use (Table 5.6 and 5.7), as well as decisional balance to influence cannabis users who are not ready to quit without intervention.

Data demonstrating variations in current use, duration of use and expenditure between the sexes aligns with anecdotes emerging during the study suggesting that females were not usually dealers, or not key dealers, and men appeared to be the main buyers.  This information is also potentially relevant to formulation of CMOs. For example, it suggests that targeting male use will produce higher overall impact. It hints at particular ways in which men and women could be influenced to change, or how their values and behaviours. If men are using more, and spending more, how might that impact on women, and therefore women's inclination to effect changed use patterns? And what are the constraints between the sexes that might limit or facilitate plausible mechanisms?

# 6 Searching for local resources for change in the qualitative data

## 6.1 Introduction

This chapter is built around a qualitative paper, published in the journal *Substance Use and Misuse* in 2019 (Appendix 3) that explored participant attitudes towards cannabis, described through qualitative themes expressed in the interviews. The data is ten years old at time of writing, but it is the only data of its kind to my knowledge. There is no evidence available or reason to believe that the overall circumstances have shifted significantly in the region.  The title of this publication is:

*"Need Everyone Helping to Keep Off Because Everyone Helping to Keep On"–Reducing Harms from Cannabis use in Remote Indigenous Australian Communities Involves More Than Just Users."*

The CYCP's 429 baseline survey participants provided data in semi-structured interviews, including their lifetime use, intentions to quit and reasons for quitting. After exclusion of interviews with negligible qualitative responses, a total of 407 participants provided the qualitative information that was used in this study. Although individually comments were often brief, collectively they provided rich data about their experiences with cannabis, and its impact on their lives, their families, and their community overall.

The manner of data collection— ranging from one-word responses, many brief responses and a few extended conversations to a semi-structured questionnaire— was not suited to realist qualitative analysis. Realist mechanisms in social programming are those resource-reasoning pairs that drive a change in the system, and particular contexts under consideration,[134, 152] ideally qualitative data would be analysed to identify evidence of CMO clusters. Since the data was somewhat limited for such an approach, the focus was to identify likely existing resources that could enhanced and supported, rather

than theorising whole CMOs with a high likelihood of error. In an effort to theorise or predict potential mechanisms relevant to cannabis cessation within the Cape York Indigenous community context, the analysis reported here cross-referenced inductively coded themes with deductively coded attitudinal categories across 407 individual participants' interviews. This provided an understanding of how themes about cannabis uptake, persistence, cessation, and harms were spread across community members. It therefore may inform theory about resources present in the community that may support change and gives clues as to how theory for change may be targeted in the context of these three communities. Though generalisation to other communities in the Cape York region cannot be assumed, the similarity of historical, social and cultural antecedents and influences suggests that understanding a subset of these communities might inform specific theory development for other communities in the region.

## 6.2    Thematic qualitative analysis and discernment of attitudinal codes

Details of the thematic analysis were briefly presented in the published article, with tables of the intermediate qualitative findings provided in the supplemental files.[43] It is appropriate to elaborate on this process here. The 'general inductive' approach applied to this data was conceived by Thomas[216] as a theory-neutral, straight-forward inductive content analysis for evaluators, who often have limited social science expertise. It was an appropriate approach for this type of analysis with high volume of brief interviews, since any one interview did not provide a comprehensive exploration of that participant's experiences, nor their responses to an intervention strategy under examination. It assumes that considering the body of data together can illuminate commonly experienced phenomena.

Inductive thematic coding was guided by overarching questions of whether local will and resources for cannabis harm and demand reduction were demonstrated. The analysis yielded three key themes:

Theme 1 – 'Cannabis use harms my community';

Theme 2 – 'It is hard to quit cannabis in the community'; and

Theme 3 – 'Wanting to quit and coping with stress from cravings'.

The process leading to the final themes is summarised in Table 6.1. The fifty randomly selected

interviews were sufficient to achieve saturation after the first two rounds of coding, and examples of the

subthemes were transcribed from the NVivo files to produce the rubric for deductive attitudinal coding

(Table 6.2).

Table 6.1    Inductive thematic content analysis of the social dimensions of harms and resilience to cannabis.

| Initial read through text data | Identify specific Meaning units to create categories | Reduce overlap and redundancy among the categories: 3 themes and 13 sub-themes | Major emergent themes that describe cannabis harms and impacts |
|---|---|---|---|
| **Sorted data into broad 'negative effects'; 'why use'; 'reasons to not use'** | Meaning units coded to over 20 initial themes | **Costs, risks & harms**<br>• Financial<br>• Health and mental health<br>• Family & Culture<br>   - Family, couples, parenting<br>   - Youth<br>• Work & engagement<br>   - Lack of motivation<br><br>**Drivers of use**<br>• Cues, peer pressure<br>   - Available, normalised<br>   - Peer pressure<br>• No alternative<br>• Stress relief<br>   - Difficulties when unavailable<br>   - Depressed, stressed, angry<br>   - Distract myself when unavailable<br>• Energy, fun, eases pain<br>   • Laughs, fun<br>• Relax, sleep, calm anger<br><br>**Protective factors and strategies**<br>• It was easy to quit / don't like it<br>• Engagement & social factors<br>• Parenting & childcare<br>• Work | **Cannabis harms & impacts**<br>• Financial<br>• Health & mental health<br>• Stress & stress relief (includes anger and aggression)<br>• Like cannabis, no harms identified<br>**Social dimensions of harms & impacts**<br>• Peer pressure & normalisation<br>• Family, couples & parenting<br>• Youth – heavy, early use<br>• Work & engagement impacted<br>**Strategies to manage use & impacts**<br>• Non-using peers<br>• Parenting as a strength<br>• Work and engagement as a strength (includes culture)<br>• None – no stress, cannabis does not affect me personally<br>• No association, strong aversion |

Note: Based on Creswell, Figure 9.4 *in* Thomas[216]

Table 6.2    Rubric for categorising community members' attitudes towards heavy cannabis use mediated by their concerns for community level impacts, social effects and reported need for harm and demand reduction strategies.

| Attitudinal category | Definition | Example total qualitative content of interview in the category |
|---|---|---|
| **Category 1 – LOW CONCERN Cannabis is not a health and wellbeing priority and causes no or limited harm** | Cannabis is not a serious community-wide problem and not at all a problem for the participant; Intentions to quit 'keep using the same'(intention to quit code 4); cannabis users express no desire to cut down or quit; may state outright that cannabis is not harmful (uncommon); MAY discuss combinations of: 'specific impacts only as a problem for others'; 'strategies to manage negative impacts'; 'self-medication' and why cannabis better than alcohol. Like using cannabis a lot, and do not want to change their use. Explicit statements that cannabis use in the community is not an issue. Indicate that cannabis use is not desirable under some circumstances but that this does not apply to themselves. | Relaxes and chills out; No dislike; no, happy smoking; Didn't worry [when no cannabis available], stayed calm and relaxed; Friends, socialising and peer pressure [made it hard to quit]; Alright, bad for young people and when, mix with alcohol [Any concerns?].  Male 38, former user |
| **Category 2 – SOME CONCERN  Tolerant of cannabis but perceive cannabis harms that demand individual and / or community level action** | Tolerant of cannabis use but it causes certain problems demanding personal and community-wide responsibility; Cannabis users desire to change code 'actively trying to quit', 'wish to stop', 'wish to cut down' (intention to quit code 1-3); Former users did not describe very serious issues for themselves or others; demonstrated personal concerns for cannabis impacts, not emphatic; may demonstrate tolerance for use. Never-users perceive no harms or strong aversion. Clearly describe cannabis harms at the community level relevant or important with respect to themselves personally, their family or the community as a whole. Describe strategies used to avoid cannabis to manage overuse (as opposed to the stress of not having any. E.g. Avoiding cue exposure by staying away from users, keep their mind occupied, cannabis users in active quit attempt. | Gave up in 2011 for kids, wants to have a good effect on them; feels good; distracts himself, go hunting or yarn with someone who doesn't smoke; lost appetite; no problems giving up; Said he would wake up, have a coffee then go looking for gun–a - was concerned that he had no appetite. Male, 32, former user. |
| **Category 3 – HIGH CONCERN tolerance, cannabis causes significant harm that must be addressed at all levels** | Very strong aversion to all cannabis use; very concerned about its impact on the community, family or self; Personal perspective that cannabis is harmful expressed emphatically or explicitly; Never-users, or non-users reporting total resilience to uptake or relapse; Cannabis users excluded, even those trying to give up. Made statements that indicated they would never take up cannabis or relapse. Never, users, former users and, exceptionally, cannabis users who had only used once but <12 months prior to interview. | Need to get better jobs for young people; Different 20 years ago; Recent years people came from outside, use Indigenous boys to sell to our people; We talk to our nephews - you filling the pockets of the deal–r - should be working for yourself.  Female, 38, never used cannabis. |

### 6.2.1    The sample

Described in Table 5.3, the 407 participants included 221 (54%) males and 186 (46%) females, equivalent

to 35% (=407/1172) of the estimated total community populations aged 17-51.  Males were older

(median age=29 years) than females (median age=26 years) ($|z|$=2.41, $p$=0.016, Wilcoxon rank sum

test), reflecting the anticipated difficulties of recruiting the younger, dis-engaged males to this kind of

study.

Those who had ever used cannabis comprised 97% (n=104) of LOW CONCERN, 94% (n=132) of SOME

CONCERN and 38% (n=60) of HIGH CONCERN.  Those who reported recently using cannabis comprised

more than 80% of those with any history of cannabis use in LOW CONCERN, around half (55%) in SOME

CONCERN and just 10% in HIGH CONCERN (data not shown).

LOW CONCERN participants were predominantly male recent users, though some former and never

users were included. Recent users with no intentions to quit were allocated to LOW CONCERN unless

they emphatically described harms at the community level.  SOME CONCERN comprised roughly equal

proportions of recent and former users and a diversity of age and gender groups. HIGH CONCERN

included participants who gave emphatic and detailed descriptions of cannabis harms or expressed a

very strong aversion to cannabis. This category mainly comprised females who had never used cannabis.

Table 6.3   Characteristics of 407 participants compared across three categories reflecting attitudes and concerns towards cannabis use in three Cape York communities, far north Queensland, Australia, 2010-2012.

| | | Category 1 'Low concern' n=107 | Category 2 'Some concern' n=141 | Category 3 'High concern' n=159 | Total n=407 |
|---|---|---|---|---|---|
| **Gender** | Male | 72 (67%) | 93 (66%) | 56 (35%) | 221 (54%) |
| | Female | 35 (33%) | 48 (34%) | 103 (65%) | 186 (46%) |
| **Age group** | 17-24 | 55 (51%) | 68 (48%) | 69 (43%) | 192 (47%) |
| | 25-34 | 34 (32%) | 38 (27%) | 45 (28%) | 117 (29%) |
| | 35-51 | 18 (17%) | 35 (25%) | 45 (28%) | 98 (24%) |
| **Cannabis** | Never used cannabis | 3 (3%) | 9 (6%) | 99 (62%) | 111 (27%) |
| | Used cannabis | 104 (97%) | 132 (94%) | 60 (38%) | 296 (63%) |

## 6.3   Qualitative findings

### 6.3.1   Theme 1. 'Cannabis use harms my community'

Of 407 interviews that contained coded qualitative material, 324 contained material assigned to the theme 'Cannabis use in the community is associated with harms'. Participants described harms across four apparent subthemes of: 'Users stress for cannabis; 'Cannabis costs a lot of money'; 'Cannabis makes people sick'; and 'Worry for young users'.

#### 6.3.1.1   'Users stress for cannabis'

Across concern categories and use status, participants reported 'stress' or 'stressing out' as a behaviour associated with craving for cannabis. This young woman described users' short temper and aggression (to "lose it" or "go off their head") as a result of withdrawal or being "stressed out for gunja".

> "*Some people lose it when they 'on't have gunja. Most of them get stressed out for gunja and go off their head.*"  Female, 22 years old, former cannabis user. HIGH CONCERN.

Those participants categorised as HIGH CONCERN seldom discussed *managing* stress. Rather, participants described 'stress' of withdrawal and associated behaviours as a key harm. Participants described mood effects, aggression and violent or coercive behaviour among users during periods of abstinence. Two excerpts below illustrate concerns about violence:

> "*A lot of young kids are angry and they can be violent when there's none around. Hard to get out here.*" Female, 33 years old, never used cannabis. HIGH CONCERN.

> "*See a lot of violence at the clinic as a result of gunja.*" Female, 40 years old, never used cannabis. HIGH CONCERN.

This young woman described her partner's behaviour when craving, and coercion to source his cannabis, possibly using her family connections:

> "*Partner is not easy to talk to. Stresses out a lot. Pregnant and have to go get* [cannabis] *for him.*" Female, 23 years old, never used cannabis. HIGH CONCERN.

### 6.3.1.2  *'Cannabis costs a lot of money'*

Any mention that cannabis was expensive or a 'waste of money' was assigned to this subtheme. Quantitative estimates of expenditure indicated median weekly spending of individual current users was around $50, but was as high as $300. Among 407 participants, median individual  spending was $50/week, whilst unemployment in the study communities exceeded 30% at the time of data collection.[178]   This current user lamented the high cost of canna bis:

> *'Started collecting bags this year. 10 bags - $5–0 - spent $1000 on that silly thing this year.' Male, 33 years old, cannabis user. SOME CONCERN.*

LOW CONCERN participants seldom connected financial impacts to other concerns apart from high cost making cannabis harder to access. This young male made a typical observation that cannabis was expensive and mixing it with tobacco diluted the cannabis:

> *'Spend too much money on it, with too much tobacco, 'don't taste the [cannabis]. Especially when you've got no money, the other boys are tight with it.' Male, 17 years old, cannabis user. LOW CONCERN.*

'Other boys are tight with it' refers to friends and family being unwilling to share limited supplies. Participants reporting SOME CONCERN or HIGH CONCERN described financial impacts combined with user stress and spending. This younger user described his own pressuring of others to help access cannabis when he had no money:

> *'[I don't like that I] waste a lot of money. It's all about cash, that thing getting expensive. No money for [cannabis], stressed out go ask my cousin brother. [I worry because I get] angry, cranky with my girlfriend for her to go ask her family. [My concerns are] … been living in [another community], fighting and stressing out when there's no [cannabis]. Look for credit and if there's none get wild with the dealer.' Male, 21 years old, cannabis user. SOME CONCERN.*

The above excerpt describes not only this user's personal stress, but community level tensions resultant of limited cannabis supply. The relationship to financial stress is clearly articulated in the reference to anger or '*getting wild*' with local dealers if they refuse to supply cannabis on credit.

Participants with HIGH CONCERN, usually non-users, reported diversion of family financial resources to purchase cannabis. For example:

> *'Never really liked it. Waste of time and money; [worry] for my brother -'he's a heavy smoker with two [children]. My niece comes over and sees my kids' bikes.  My brother*

*can spend all his money on it and it's only $150-200 for a bike but they can't afford it.'*

*Female, 29 years old, former cannabis user. HIGH CONCERN.*

In the following two extracts, a woman and a man who had never used cannabis described the connection between money and pressure on families at the community level:

*'Money issues - lot of people asking for loans. Small kids 13 and up starting – different [to before]; argue with parents or other siblings over money. Gunja has gotten worse - now nearly everyone - smokers don't have jobs - put pressure on family stressing.' Female, 37 years old, never used cannabis. HIGH CONCERN.*

*'Causes domestic violence when one partner is spending too much and not putting the children first.' Male, 33 years old, never used cannabis. HIGH CONCERN.*

The following participant's comments echo themes of money for children and domestic violence as well as cannabis' involvement in prostitution (mentioned in two interviews):

*'Sex for gunja happens. Young girls, older men… threats for domestic violence. Kids' money goes to men for drugs.' Female, 26 years old, former cannabis user. HIGH CONCERN.*

Financial impacts were also mentioned in the context of cannabis use preventing or interrupting employment. For example,

*'Gunja is a big problem. Can't apply for any jobs. That thing slows [them] down.' Male, 18 years old, never used cannabis. HIGH CONCERN.*

'*That thing slows them down*' refers to cannabis as a barrier to applying for mine work because the mining industry requires regular drug testing.'

## 6.3.1.3    *'Cannabis makes people sick'*

Participants in the LOW CONCERN category did not usually associate cannabis with mental health impacts, tending to report that they liked cannabis and that they managed stress in various ways. Across

participants reporting SOME CONCERN or HIGH CONCERN, issues such as paranoia, anxiety, depression or, less often, suicide attempts and memory loss appeared in the interviews. For example, a young current user described the perceived association of cannabis with mental ill health:

> *'Depression, stressing out when I can't get it. Six or seven people in the community with*
> *mental illness. People get mentally ill either from gunja or black magic. People smoke*
> *by themselves - can cause mental health problems.' Male, 19 years old, cannabis user.*
> *SOME CONCERN.*

The above excerpt demonstrates an attribution of mental ill health to spiritual or superstitious beliefs. Nevertheless, participants vividly described discrete, specific symptoms such as 'seeing things', 'hearing things' and 'paranoia'.

Below, a mature woman and a young man with HIGH CONCERN described cannabis' implication in suicide and psychosis:

> *'… heard people can hallucinate from it, hate the smell. I tell anyone smoking it to go*
> *away. Partner doesn't smoke was given gunja without knowing several years ago and*
> *became psychotic.'  Female, 40 years old, never used cannabis. HIGH CONCERN.*

> *'Been around a lot of smokers. Bad for your health, most of my cousins smoke. One of*
> *my cousins just drifts away when he smokes. An auntie tried to commit suicide, other*
> *problems too but gunja must have some effect on the emotions.' Male, 20 years old,*
> *never used cannabis. HIGH CONCERN.*

The excerpts above demonstrate the perception of cannabis use exacerbating existing mental health vulnerability, and that this view was held at least among people who had never used cannabis.

Less frequently identified, some participants made general statements about health, specifically referring to impacts on the lungs. The negative pressure devices used to inhale cannabis smoke are constructed from bottomless, plastic soft-drink bottles submerged in a larger container of water. Using this method, all the smoke from several milligrams of plant material is forced into the lungs under a light

pressure. Shared among all users in the session, the water may or may not be cleaned from day-to-day, and the plastic surfaces accumulate black-brown, residue or 'resin' from plant oils and soot. This man referred specifically to the potential health impacts of using this method:

> *'Health, killing our insides sharing one bottle.' Male, 33 years old, cannabis user. HIGH*
> *CONCERN.*

A former female user described cleaning the equipment as a harm-minimisation strategy.

> *'Now just clean the bottles when my family smokes as don't want them smoking from*
> *dirty water.' Female, 24 years old, former cannabis user. LOW CONCERN.*

### 6.3.1.4 *'Worry for young users'*

Higher prevalence among young people was perceived as a relatively new phenomenon, and particularly problematic for many concerned participants.

> *'It's out of control. In the eighties only men [smoked cannabis]. Today teenagers are*
> *smoking.' Female, 33 years old, never used cannabis. HIGH CONCERN.*

Participants across the categories reported disproportionate impact on young users, or specific concerns about youth cannabis use compared to use among older people. In the following excerpts, participants expressed concern for use among youth with implications for the broader community and culture:

> *'Bad for young people, stops them going bush to hunt. Instead, they just sit in rooms*
> *and smoke. Don't help out with the housework.' Female, 28 years old, cannabis user.*
> *SOME CONCERN.*

Cannabis was viewed as having a damaging effect on youth prospects and engagement, with wider cultural implications. For example, in the excerpt below, a woman expressed particular concern for youth and placed responsibility on non-using local dealers:

*'This needs to be stopped for the young ones. Older ones giving it to the young ones. Ones that don't smoke are selling it.' Female, 33 years old, former cannabis user. HIGH CONCERN.*

Young people were perceived as more likely to be involved in very heavy use and less likely to manage stress and financial impacts. This current user's statement provides an example:

*'Young kids smoking and can't handle it, they stress out. The older smokers handle it better.' Female, 38 years old, cannabis user. SOME CONCERN.*

Participants expressing low concern sometimes perceived cannabis stress as a youth problem, for example this man's perception of stress among youth using cannabis and, conversely, that older users like himself can manage their own use.

*'See a lot of young people around here get stressed for gunja. If they are then that's their own problem.' Male, 34 years old, cannabis user.  LOW CONCERN.*

### 6.3.2    Theme 2. 'It is hard to quit cannabis in the community'

This theme described the barriers to demand reduction with two main sub-themes. The sub-theme 'People like cannabis or need it to stay calm' described the desire to use cannabis because it is pleasurable or has perceived benefits. 'Cannabis is hard to avoid in the community' described constant cue exposure, high supply, high prevalence of use and normalisation of use in communal spaces, peer pressure and reported boredom in the community.

#### 6.3.2.1    *'People like cannabis or need it to stay calm'*

Many current and some former users described enjoying the effects of cannabis. This man described only the good effects of cannabis:

> *'Cannabis makes me healthier. Makes me eat more. Feel relaxed and chill.' Male, 28 years old, cannabis user. LOW CONCERN.*

> *'Makes you high and makes you laugh…just hang out, not stressful. It keeps you happy.' Female, 15 years old, cannabis user. LOW CONCERN.*

Sometimes participants described how they managed their use to avoid negative impacts. For example:

> *'Don't like smoking too much. Good place sometimes [if you] keep it low, smoke little by little so you don't get into trouble.' Male, 20 years old, cannabis user. SOME CONCERN.*

This man expressed strong concerns for individual and community level harms, and despite being in an active quit attempt at the time of interview, he described cannabis as a relaxing, social drug that reduced stress:

> *'Like the feeling. Smoking with family and friends is a good feeling. De-stress - makes you happy.' Male, 35 years old, cannabis user. HIGH CONCERN.*

Participants in LOW CONCERN and SOME CONCERN categories acknowledged cannabis as a means to manage more serious distress or regulating anger. For example:

> *'Family been broken up and I used it to cope.' Female, 26 years old, cannabis user. LOW CONCERN.*

> *'[Cannabis] puts you back in place, takes stress away from arguments.' Male, 43 years old, cannabis user. LOW CONCERN.*

> *'Used to it calming me down. Forget how to calm myself down.' Male, 23 years old, cannabis user. SOME CONCERN.*

The two excerpts above describe using cannabis as a means for self-regulation. It is unclear as to whether the initial anger would be related to withdrawal stress.

Some current users described cannabis as an alternative, or coping means when tobacco or alcohol

were not available, like this man who said he used cannabis to ease cravings for tobacco:

> *'Makes me stay calm; takes my worry away from not having cigarettes; Laugh, crack some jokes.' Male, 23 years old, former cannabis user. HIGH CONCERN.*

Or this man, who used cannabis in place of alcohol or *'grog',* which posed a greater risk for him becoming violent:

> *'[Cannabis] helps with [my] alcohol problem, found [cannabis] better than drinking, have to stay off grog, I get too angry. Cannabis calms [me]. Use [cannabis] instead of drinking.' Male, 34 years old, cannabis user. SOME CONCERN.*

### 6.3.2.2 *'Cannabis is hard to avoid in the community'*

In the excerpt below, a cannabis user described the community environment as a source of stress and pressure, including an obligation to share substances and money to buy them:

> *'Smoke when tired, makes working around home more interesting. Don't smoke when going to work. Used to be worried about how much I was using but have cut down… Hard to give up because of the habit, friends all smoking and offer it. Liked rehab because it was a simple life, could budget because family weren't always asking for money like when in the community. People stress out when they can't get it.' Male 41, cannabis user. LOW CONCERN.*

For the participant interview excerpts above, drug rehabilitation ('*rehab*') in the regional centre some 800 km away from the community (usually offered for alcohol problems), represented respite from community-related stress including better control of his financial resources. This very young participant who had never used cannabis described community level impacts:

> *'Friends hassle a bit, but don't feel pressured, all friends in [community] except one smoke, some people go off and stress.' Male, 16 years old, never used cannabis. SOME CONCERN.*

Despite his resilience the participant response, above, described normalisation of cannabis use and peer pressure among adolescent boys to use cannabis ('*friends hassle a bit'*).

### 6.3.3    Theme 3. 'Wanting to quit and coping with stress from craving'

Three subthemes were allocated within this theme, which generally described drivers of cannabis cessation and the local resources that influenced or supported quitting. 'Wanting to quit, wanting others to quit' grouped general statements about the desire or need for cannabis cessation. This included current users who said that they wanted to quit and statements from any participants endorsing the need for demand reduction measures.  'Quitting for family and culture' describes important social resources that drive cessation or abstinence. 'Staying occupied' described engagement in work and other meaningful activities as a key resource driving the decision to quit or sustaining abstinence.

#### 6.3.3.1    'Wanting to quit, wanting others to quit'

A proportion of the people interviewed described active quit attempts or having made a decision to quit. This man in his twenties described a typical use history starting in adolescence but three weeks' abstinence at the time of interview:

> '[Quit] three weeks ago, never going back to smoking. [Used from] 14 – 25 years [of age], very heavy.  Feel a bit better now, it was hard at first.' Male, 25 years old, cannabis user. SOME CONCERN.

The HIGH CONCERN category included most participants who had tried cannabis only once or never tried it.  This young woman described complete intolerance for cannabis' smell and effects:

> 'Seen gunja, seen people use it. Really don't like the smell. Usually walk away when I smell it. Don't like to hang with people that smoke gunja.' Female, 22 years old, never used cannabis. HIGH CONCERN.

Participants in the LOW CONCERN category were usually current users who expressed little desire to

quit for health or intrinsic reasons, but they did sometimes describe other people wanting them to quit

as a concern about their own cannabis use. For example, this man described a perceived social sanction

by women to protect children:

> *'[I worry about my smoking because] women don't want you around with the kids.'*
> *Male, 43 years old, cannabis user. HIGH CONCERN.*

### 6.3.3.2    *'Quitting for family and culture'*

Social relationships and responsibilities underpinned a desire to quit and supported abstinence for many

current and former users. This current user described wishing that her son did not use cannabis, in spite

of her own use:

> *'[My] youngest is 18, [he] smokes [cannabis]. If he lived with me, I would've stopped*
> *him.' Female, 40 years old, cannabis user. LOW CONCERN.*

Participants categorised to LOW CONCERN rarely expressed concerns for family, youth or their cultural

obligations. However, the idea that children should not be exposed to use appeared to be universal, e.g.

"*should give up when you have kids."* (Male, 16 years old, cannabis user); "… *don't like kids getting*

*involved."* Male, 26 years old, cannabis user. Both were LOW CONCERN.

This recent user described a current quit attempt, the impact of his use on his family and how that

influenced his thinking, including a decision to enact a physical break from friends and family using

cannabis:

> *'Didn't like what it was doing to the family, too much money was getting spent on*
> *gunja, wanted a good job. My children are very happy about me stopping. Feel good*
> *about the decision, I stay away from people that are smoking gunja.' Male, 35 years*
> *old, cannabis user. SOME CONCERN.*

Below, a current user described culture as a resource driving a sense of responsibility to quit:

> *'Stops you continuing the culture, need to look up to elders who don't smoke. Do it to fit in, but really want to quit and be a role model.' Male, 26, cannabis user. SOME CONCERN.*

Likewise, a former user in the HIGH CONCERN category described parenting responsibilities as her principal reason for quitting:

> *'Future of my child; didn't want him to see that I was a druggie; caused problems in personal relationships.' Female, 39 years old, former cannabis user. HIGH CONCERN.*

And this young woman described being motivated to avoid all substance misuse, alluding to responsibilities to her unborn child:

> *'People smoke too much gunja here – should be stopped - [I'm] six months pregnant and don't want to ruin my life with tobacco or gunja.' Female, 16 years old, never used cannabis. HIGH CONCERN.*

In the following excerpt, a mother describes de-normalising family cannabis use in front of children or *'kids old enough to understand'*:

> *'I 'on't like people smoking around my kids when I'm out, like at my cousin's house; school age kids, old enough to understand.' Female, 30 years old, never used cannabis. HIGH CONCERN.*

This young man described his father as role model:

> *'Others find it hard [to quit]. I go fishing with dad and he makes us do a lot of hard work.' Male, 19 years old, cannabis user. SOME CONCERN.*

Below, a man described substance misuse as incompatible with culture, placing responsibility on local Indigenous dealers:

> *'Gunja, even alcohol, not our culture. Dealers, if they could see what they're doing, killing their own people.' Male, 28 years old, never used cannabis. HIGH CONCERN.*

### 6.3.3.3 'Staying occupied'

Participants described engagement in work, education or other activities as reducing or managing cravings for cannabis, for example:

> *'There needs to be more help in the community to stop gunja use and other problems like anger. Not working at the moment but don't need it or smoke it when I'm ringing (working with cattle).' Male, 23 years old, cannabis user. LOW CONCERN.*

Current users who wanted to quit or cut down were usually classified to SOME CONCERN. This group frequently mentioned work, and specifically drug testing policies as facilitating abstinence for themselves and others.  For example:

> *'Cut down for three years when working at [mine]. Haven't smoked over the past three months due to random drug testing at work.' Male, 35 years old, cannabis user. SOME CONCERN.*

Working and being on outstations or cattle stations was also viewed as strong cessation support. For example:

> *'Need more support and information. Cousin brother asked me how I ride so well. He was riding stoned. I said you must do it when you're clean. Take my advice. I got first place in a bull riding competiton - I couldn't have done it if I was on gunja. I want to take young kids to work with horses to get away from gunja. I used to ride rodeo - there was no gunja because the focus was sport. Young kids on streets - need to get them off the street. Calf-riding would keep kids away from gunja.' Male, 28 years old, former cannabis user. SOME CONCERN.*

The HIGH CONCERN category focused on work and engagement of youth as well as strong role models for reducing cannabis uptake and ongoing demand. Selected excerpts demonstrate this idea:

*'Not much for the kids. Used to be really family oriented. Used to be a movie theatre, blue light discos. If they grow up and see aunties doing it, they'll think it's normal.'* Female, 39 years old, former cannabis user. HIGH CONCERN

*'Program out at Katherine, stockman training. Good of the young fellas, there should be more things in the schools.'* Male, 35 years old, never used cannabis. HIGH CONCERN

## 6.4 Discussion

Most of the residents interviewed perceived cannabis as harmful to themselves or their community (Section 6.2.1, Table 6.3). Under 'Cannabis use harms my community' users and non-users alike recognised cannabis harms and impacts across financial, health, mental health, and withdrawal-like symptoms (Section 6.3.1). Social dimensions of cannabis harms and impacts in the theme 'It is hard to quit cannabis in the community' illuminated the importance that participants placed on peers, family, young people and work or training (Section 6.3.2). Under the theme 'Wanting to quit and coping with stress and craving' former and current users communicated their strategies to manage use and impacts. These operated across the social domains—non-using peers, the strength of parenting, work and general engagement in a meaningful activity. It is equally important to acknowledge that a sub-set of participants consistently expressed very limited concerns across their interview responses. A minority of mainly male current users, and even among those participants the importance of protecting children and the burden of financial impacts were still commonly acknowledged. There is nothing to support the idea that people need to be told that '*cannabis is bad for you*'. Bearing this message may even insult people's intelligence or trivialise the issue.

Participants offered insights into how social resources can inspire and possibly sustain cessation efforts among individuals and groups. To shift the equilibrium at a community level, as the CYCP intended to

do, specific mechanisms to engage and mobilise resources might be considered through stratified layers of community context described in Section 3.6.4: individual; family and peer group; community-level organisation; and institutional levels. Context in the program theory includes well-documented disadvantages and strengths of remote communities and specific local relationships. Nearly everyone who participated in the survey had some experience with cannabis use or exposure to its effects. Hence the title of the paper on which this chapter is built: *"Need Everyone Helping to Keep Off Because Everyone Helping to Keep On"–Reducing Harms from Cannabis use in Remote Indigenous Australian Communities Involves More Than Just Users*." The CYCP aimed to produce cessation enabling environments, therefore the program theory described in the next chapter will examine the strategies that might produce or make available mechanisms for cessation within an interrelated system the stratified social system.

# 7 Realist redesign based on the Cape York Cannabis Project data

Chapters 5 and 6 presented empirical data from direct community surveys, within a pragmatic, multiple component intervention study. These data were to be accompanied by a process evaluation of the multiple component intervention which would assess whether it was delivered with fidelity to the CYCP intervention design. The summary of intervention (Table 2.2 and Section 2.9) describes researcher actions, and stakeholder engagement and response in broad terms. The intervention components in Table 2.2 explicitly aimed to stimulate agency at the community level; and to enable community-level organisations (health services in the case of MET; employers and employment and training agencies) to implement strategies with cannabis users and other community members.

The findings were limited in two ways. First, although the cannabis use monitoring aimed to measure an effect, the study design did not measure effectiveness of the components or strategies. The brief narrative of the process evaluation is also not consistent with fidelity monitoring since, for the most part, the strategies were not discrete and quantifiable. Fidelity monitoring is a well-developed concept intended to enhance the purity of the experimental design. For example, in Gearing and colleagues' fidelity monitoring framework, four components: 1) intervention design and protocols; 2) intervention training; 3) monitoring of intervention delivery; and 4) monitoring of intervention receipt are assessed in terms of its *protocols, execution, maintenance, feedback, and threats*.[198] Such a framework with clearly defined and measurable dose of an intervention or therapy might be useful in psychosocial treatment or pharmacotherapies in clinical trials, but it was infeasible or redundant for the CYCP's multiple component intervention. Fidelity monitoring also does little to advance our understanding of how the intervention produces intermediate changes or causation, even where dose of a given strategy can be measured.[129, 131, 139, 220, 221]

For the CYCP data, therefore, although an intervention was implemented at each site, if we consider the

process evaluation information (Section 2.9), data pertaining to the quality of the relationships,

competing priorities, attitudinal changes and similar nuanced information was not systematically

collected. Because the intervention sought to stimulate local agency, the concept of controlling fidelity

from the outset does not align with the intuitive need to remain flexible and responsive to a dynamic

community context. Training or monitoring of delivery were not relevant, there were no structured

intervention processes and protocols to monitor. The policy outcomes at the local councils were

potentially sustainable, but few if any others were likely to be maintained after the project finished.

Therefore, the highly structured approach to fidelity monitoring described by Gearing et al. was unlikely

to add useful knowledge. With these limitations of process evaluation in mind, this chapter revisited the

available data using a realist lens to produce an alternative study design.

The aim of this chapter is, therefore, to redesign the CYCP from a realist theory-driven perspective. It

first discusses the limitations of data from the CYCP in Chapters 5 and 6. The data from the CYCP are

then used to inform a theory-driven evaluation of community level strategies to reduce cannabis

demand in remote Cape York Indigenous communities. The sections in this chapter are as follows:

7.1     Specifies empirical data from the interviews and the process evaluation congruent with

        the original funded CYCP study design, and relevant to the redesign

7.2     Defines feasible *outcomes,* plausible *mechanisms* that may produce them in *contexts*

        anticipated to influence whether they fire. Through retroduction, starting from observed

        or intended outcomes, mechanisms were theorised consistent with Pawson and Tilley's

        'resource-reasoning' construct, bringing to bear both project data and author experiences

        from the CYCP. Influential contexts are described at multiple levels of the social system.

7.3     Presents a proposal for an intervention project design, refining the CYCP assumptions and

         drawing together the material in Section 7.2 to articulate a program theory, and assemble

         *context-mechanism-outcome* clusters as hypotheses to be tested, with data collection and

         analysis strategies also described.

## 7.1    Salvaging Cape York Cannabis Project data

This section describes what was learned about cannabis use and demand in the three communities from

interviews with local residents during 2010-12.

With 43.8% of the sample of 429 men and women aged 15-49 reporting having used cannabis in the

past 12 months, rates were higher than those reported in the national data in 2011 (Table 1.1). The

difference was exacerbated by much higher rates of people using at least weekly (95.7%, Table 6.3). As

in the earlier Arnhem Land studies,[12, 93, 165] high proportions of current users reported using six cones per

day (48%, Table 6.3) and 'bucket bongs', which tend to deliver a rapid, heavy dose.

Nonetheless, 36% (n=106) of lifetime users (n=294) in the total wave 1 cohort reported having ceased

using cannabis for at least 12 months prior to interview (Section 5.2.1, Table 6.1). Of 188 participants

reporting current use at wave 1, 15% (n=29) with follow-up data said they had quit around 12 months

later (Section 5.2.3.1). These people were generally less likely to report symptoms of dependence, and

they were less likely to use tobacco than continuing users (Table 6.7). Their reported reasons for quitting

cannabis were categorised under themes of work, family, cost and health (including 'mental health',

Table 6.5).

In Chapter 6, the majority of the baseline cohort also expressed 'some concern' or 'high concern' for the

impacts of cannabis in the community (Table 6.3).  Most people who had never used cannabis and the

majority of people who had tried it but stopped, viewed cannabis as a financial burden and source of

interpersonal stress. The concern for young people, financial and health impacts was consistent with the consultation conducted in 2007-8.[161] The qualitative analysis provided further information about attitudes towards cannabis and users' reasoning for abstinence or cessation, including what made it difficult to quit. These were invariably mediated through social resources and systems such as family; peers; and work or other forms of meaningful engagement (Section 6.3).

Community groups need consistency of staff and capacity to sustain strategies. Crucially, strategies need to align with how people live and feel, how they see themselves, their sense of identity and their control over their own lives. The task of the realist intervention is to propose theoretical mechanism, and propose strategies that will either deliver the resource to fire in context, or modify the context to trigger the mechanism.

## 7.2   A theory-driven redesign may address the CYCP's limitations

Following the methods described in Section 3.5.3 discerned CMOs for outcomes in three domains. Feasible outcomes were identified at the policy level, at the level of engagement of users in meaningful (to them) activities. Denormalisation or reduced cue exposure and peer pressure was speculated as a third outcome domain or potential ripple effect. Mechanisms that could potentially produce the nominated outcomes were theorised as 'resource-reasoning' pairs and aligned with influential contexts according to the stratified Bronfenbrenner model (described in Section 3.6.4).

### 7.2.1   Outcomes

The original CYCP design incorporated an assumption of stimulating local agency by returning data, aligning with consultation findings and partnering with community leadership (Sections 2.1.1, 2.1.3, 2.8). The survey of attitudes and perceptions (Chapter 6) illuminated contexts and suggested potential 'resources' (in terms of mechanism) for changes in cannabis demand. As an accessible point of departure, this analysis focused on two outcomes consistent with cannabis demand and harm

reduction: i) production of conditions conducive to and supportive of cessation; and ii) individual cessation.

Two outcomes identified from the CYCP data were:

1. Local cannabis policy enacted: particular councils and workplaces formally recognised cannabis in their policy, including workplace cannabis testing and commitment to action in the community safety plan (Section 2.8).

2. Individual cessation: cessation of cannabis use among a proportion of lifetime users (Chapter 5).

Although there is no specific reason to conclude that one precedes the other, there is a practical logic to the idea that enhancing the environment supportive of cessation will increase the numbers of individual users who abstain or quit. This can be conceptualised as a 'ripple effect'[320] of the kind depicted in Figure 7.2. From the baseline outcome, depicted as caused by enactment of a local 'Policy' in this example, an enabling context is generated that is more favourable for mechanism leading to a second outcome (cessation) as the ripple propagates (Figure 7.1). In the new context, the mechanisms leading to individual cessation continue to operate, or a further mechanism may be enlivened within more individuals in the new context.
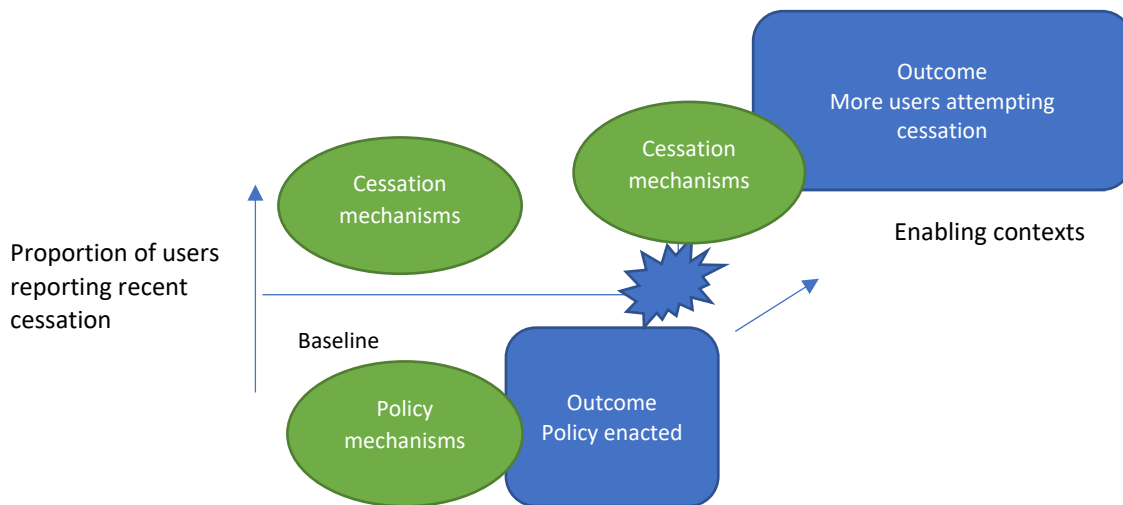
Figure 7.1     Policy as a primary outcome, generating a cessation-enabling contexts and more frequent firing of cessation mechanisms, or more types of cessation mechanisms firing to produce increased cessation attempts as secondary outcome.

### 7.2.2 Mechanisms in context of the nominated outcomes

Strategies to shift the overall equilibrium of use and cessation, therefore, might target working adults, and young people at risk of taking up cannabis, particularly males. The qualitative data also suggested other types of meaningful engagement in cessation outcomes, supporting family roles and engagement of adolescents who are liable to take up cannabis but unlikely to be working, could also be considered.

Therefore, the mechanisms considered for a potential study design:

- focused on the observed outcomes; and

- were those that could plausibly be influenced by intervention research.

Sites or structures within the community for strategy implementation included: workplaces; organisations involved in youth diversion and engagement; and families. Workplaces appeared to be

most amenable to implementing cannabis strategies, and possible mechanisms for influencing cannabis

cessation were explored in the following sections.

### 7.2.2.1 Mechanism for outcome 1 'Community level policy'

Similar to CYCP observations documented in Section 2.8, reasonable initial policy outcomes at the

community level might be: implementation of cannabis testing in workplaces; or, inclusion of cannabis

actions in Community Safety Plans.

Resources relevant to these outcomes may include: the credibility of the data and interpersonal

resources deployed during data feedback including accountability, transparency, honesty and integrity.

Resources that engendered community stakeholder trust in the research team and the data.  Data given

back privately in small meetings or wider stakeholder meetings or in a public arena have different

implications for accountability. The local character of the data is probably an important resource since

local data is relatable, directly relevant and may engender greater self-efficacy than data from

elsewhere. Similar mechanisms could possibly support collaborative efforts to translate the local

research data to social marketing materials produced in the community, by community people.

Strategies that incentivise translation of the data into policy responses may involve in-kind support

(liaising with experts, providing information, workshopping policy responses) or offering direct financial

support for programs or strategies targeting cannabis reduction.

Context to enhance the mechanisms for local policy enactment include the types and functionality of

workplaces and councils, as well as art centres, men's and women's sheds and so on.  A 'Community

level policy' set, summarised in Table 7.1, considered influential contexts primarily at the level of

community organisation, the council or workplace (exo-mesosystem).

Table 7.1    Community level policy set—theoretical mechanisms for policy implementation that may produce enabling context for cannabis cessation, abstinence, derived from data from the Cape York Cannabis Project**.**

| Why    Outcome | Resources | Reasoning | Context (exo-mesosystem) | Strategies raised in interviews or field notes | Possibly relevant theory |
|---|---|---|---|---|---|
| *Community leader responsibility* | Cannabis safety action written into local council policy | High local and regional data demonstrating high prevalence and harms | Elected member responsibility to constituency | Local council reasonably stable and trusted. Council capacity or incentive to prioritise cannabis | Meetings with local representatives and committees to present data. Partnership in supply reduction initiatives with the Queensland Police Service. | Community control[321] Self-interest[322] Various organisational theories[323] |
| *Safety on the job* | Introduction of cannabis testing routines | Manageable frameworks and information | Cost benefit ratio is lowered for introduction of such a policy | Engaged work readiness programs and trusted management | Supply cannabis self-tests to workplaces; deliver workshops in workplaces. | |

### 7.2.2.2   *Mechanisms for individual cessation*

Relevant questions for characterising mechanisms at this level were:

1. What kinds of participants expressed their reasoning to quit or cut down on cannabis?

2. What did they say they needed in order to quit or abstain?

Gendered patterns of use were clear, and reducing demand among males aged 15-35, where the rate of use and expenditure were highest (Table 6.3) may hold the most potential to have knock-on effects for community cannabis harm burden overall, so as to shift the equilibrium. This cohort can be further

subdivided into young males, who are less likely to have children, but more likely to be very heavy users, and to hold attitudes of low concern; and males 25-35 who are more likely to have children, to highly value employment and to hold a variety of concerns about cannabis. Participants reported that peers and cue exposure were important drivers of continued use, making it harder to quit, but it was not clear how adolescent and older males influenced each other.

Women reported distinct patterns of use, although also high by national standards at 26% (Section 5.2.2.2), women more often reported giving up when pregnant and/or having children to care for (Chapter 5). Shown in Tables 5.3 and 5.4, female current users' median expenditure was lower, and the proportion of female current users smoking more than six cones *daily* was smaller. Women were less likely to be engaged in any kind of systematic dealing (or purchasing) of cannabis, rather male relatives or friends supplied their cannabis, with implications for gendered roles in supply and demand. These findings may have been influenced by the intentional sampling of young males but were consistent with gendered patterns in all populations.[18, 32, 64, 68, 324, 325]

Example interview excerpts relating to resources that support cessation among men and women are summarised in Table 7.2. Key themes of engagement, employment, and social roles apply to both genders, and across age-groups.

Table 7.2    Summary of interview excerpts indicating mechanisms for cessation and abstinence.

| Excerpt of participant responses | Suggested resource-reasoning pair | Chapter, page |
|---|---|---|
| **Men's responses** | | |
| *'Long as I got the job I've got no stress - always up early.'* | | Ch5, p 136 |
| *'Not working at the moment but don't need it or smoke it when I'm ringing (working with cattle).'* | Work is valued and financial stress is reduced, lowering cannabis craving. | Ch6, p 161 |
| *'Cut down for three years when working at [mine]. Haven't smoked over the past three months due to random drug testing at work.'* | Engaged in work with routines and obligations that overcome the desire to use cannabis. | Ch6,P 162 |
| *'Used to smoke all day long. I've given up for my son. Realised important things in life were work and family.'* | Family and parenting are valued more highly than cannabis use overcoming the desire to use cannabis. | Ch5, P 136 |
| *'Put food on the table; buy power card; get the outstations going; get cattle; hunting.'* | Activities on country (outstations, cultural, cattle) are highly valued, reduce stress and overcome cannabis craving. | Ch5, p 137 |
| | Financial management capacity produces a sense of control that is more highly valued than cannabis craving, or use of cannabis reduces this sense of control and therefore becomes less desirable. | |
| *'I want to take young kids to work with horses to get away from gunja. I used to ride rodeo - there was no gunja because the focus was sport. Young kids on streets - need to get them off the street. Calf-riding would keep kids away from gunja.'* | Male role models influence the engagement of young males in healthier activities that replace the desire for cannabis. | Ch6, p 162 |
| **Women's responses** | | |
| *'Job would keep me from staying in the house smoking'* | Engaged in work with routines and obligations that overcome the desire to use cannabis. | Ch5, p 136 |
| *'Program out at Katherine, stockman training. Good of the young fellas, there should be more things in the schools.'* | Male role models influence the engagement of young males in healthier activities that replace the desire for cannabis. | Ch6, p 163 |
| *'Not much for the kids. Used to be really family oriented.  Used to be a movie theatre, blue light discos.  If they grow up and see aunties doing it they'll think it's normal.'* | Social activities and family orientation within the community enhance morale and influence child development so that cannabis is less appealing. | Ch6, p 163 |
| | Female role models normalise cannabis use for young people, lowering their inhibition to trying or sustaining cannabis use. | |

For the purposes of this proposed re-design, the general mechanism can be referred to as 'engagement'. Engagement in meaningful, reliable work, family oriented or youth activities may enhance desire to be present and / or reduce the desire to self-medicate. However, the specific resources and reasoning will be dependent on the activity and its focus. Working for money can provide financial control and freedom, and reasoning of pride and future orientation that leads to a lowered desire to use cannabis, if the work and workplace are acceptable to the participant. Safety awareness and rules incentivise abstinence by provoking concern, and can be facilitated in contexts where participants are not shamed but culturally safe and satisfied to be in the workplace. A parenting program is likely to involve reflexivity and healing past trauma promoting positive psychology (e.g. hope) where parents love their children and feel a sense of cultural responsibility, and are not overwhelmed by environmental health concerns or severe developmental disruptions. Youth programs offering resources of routine and the absence of cue exposure and a sense of belonging and fun can reduce boredom, stress and cannabis craving. In general, hope, future orientation, and enhanced locus of control, self-efficacy and resilience are all theoretical candidates for motivating cessation of substance misuse.

A 'Meaningful engagement' set summarised in Table 7.3, targeted working adults and young people using cannabis or at risk of taking it up and considered the social context—immediate family or social systems (micro-individual levels).

Table 7.3 'Meaningful engagement' set—theoretical mechanisms for adult and adolescent engagement supporting cessation and abstinence (particularly men up to 35 and boys), derived from data from the Cape York Cannabis Project.

| Why | Outcome | Resources | Reasoning | Context (individual-microsystem) where mechanism is expected to fire | Strategies raised in interviews or field notes | Possibly relevant theory |
|---|---|---|---|---|---|---|
| **To keep a job** | Cessation | financial incentives outweigh baseline financial resources | A sense of control over one's circumstances and future orientation. | Trust that the job is real and sustained and culturally safe workplace, no shaming. Tasks manageable, tasks enjoyable and valued, workplace tasks linked to country or involve working on country and away from the community. evelopment for the individual and individuals may be already concerned about cannabis and ready to quit | Training leading to sustained work; in-community development projects not outsourced to larger centres or corporations. | Syme's micro-control theory[323] Self-efficacy[326] |
| **Be safe at work** | Cessation | Safety awareness and rules. | Caution for self and others. | | Safety training and zero tolerance policies; daily and / or random drug-testing; provision of self-tests promoting self-regulation and privacy. | Social control [327] |
| **To be a role model for children** | Cessation | Reflection and healing from developmental trauma | Pride, hope, future orientation. | A high standard of environmental health and adequate child and maternal health are important to avoid being overwhelmed. Engaged education systems who listen and support parents. | Parenting programs; school engagement with fathers; engagement of fathers in 'mums and bubs' programs; resources for family-centred cultural or on-land activities. | Behaviour economics[327] Stress and coping[327] |
| **Outstation lifestyle; cattle station work; sport.** | Cessation / Abstinence | Routine and absence of cue exposure, fun, sense of belonging. | Boredom, stress and cravings are reduced. | Where there is appropriate leadership and role-modelling. Cooperation and relationships with education and training organisations likely would support this mechanism. | Working on cattle stations; rodeo; outstation stays. | Social learning[327] |

### 7.2.2.3    *Mechanism subsequent to initial mechanism firing and ripple effects*

The third mechanism, or set of mechanisms to consider, which are not data driven, arise as a result of the outcomes and contexts generated by the policy and engagement mechanisms discussed in the preceding sections (6.4.2.1 and 6.4.2.2). CYCP interview participants said that cue exposure and peer pressure make it hard to quit cannabis in the community (Section 5.3.2). With local government and workplace policies exerting mechanisms at the community level, and mechanisms resulting in users' cessation and abstinence, the contexts of the community may change to one where residents experience reduced cue exposure and peer pressure.

Summarised in Table 7.4, this could include supportive environments in homes where non-users are aware of and supportive of users' efforts to stop using, and where more controls are implemented in homes. It could include more discrete use by ongoing users, and less normalisation of offering cannabis to others. These speculative theoretical mechanisms could only be informed by the people involved. They may include cultural and family mechanisms that are well beyond the reach of this modest proposal.

From this range of possibly relevant theoretical explanations relevant to the empirical data collected during the CYCP, Section 7.3 draws on this realist explanation to propose a program theory and strategies to allow these hypothetical mechanisms to be tested in a community-level intervention design.

Table 7.4  'Denormalisation' set—theoretical mechanisms for generative denormalisation of cannabis across the community context as a result of local cannabis policy and engagement, speculative.

| Why | Outcome | Mechanism | Context (individual-micro-meso systems) | Possibly relevant theory |
|---|---|---|---|---|
| To preserve household resources | Implements hidden or absent from homes, therefore reduced cue exposure | When boundaries around cannabis use are implemented there is social normalisation of those standards. | Older non-users who are impacted by cannabis users eating food or taking money may have a stronger motivation to change use patterns. Also when multiple household members are abstaining or trying to quit and if there are children in the home and residents generally agree that they shouldn't be exposed to cannabis use. | Micro-level control[323] Community level empowerment[323]<br><br>Cultural continuity<br><br>Collective efficacy[323] |
| To protect youth | Reduced peer pressure | Normalisation of abstinence / denormalisation of use in shared spaces encourages older brothers, cousins and friends from encouraging their friends to use. | Senior household and community members have authority and control over their homes and public spaces and are able to implement the boundaries discussed above. This mechanism may be more likely to fire if young people are also engaged, in communities where education, training and drug-free entertainment is available and acceptable to the cohort. | |

## 7.3    A realist proposal

This section outlines a study design that could collect data to test these as initial mechanisms within a realist program theory. The steps in the realist evaluation cycle are similar to all research, summarised in Figure 7.2, the steps are iterative and not necessarily linear, as follows:

o   Identify a program theory for the intervention:

▪   Either or both the literature and preliminary data can be used to formulate a theory for how the intervention is supposed to work.  In this case, the proposed CMOs and program theory produced by the thesis could be used, but these are only examples.

- Previous research may include CMOs to be incorporated into the design.

o Design the program consistent with the program theory:

- formulate hypotheses; and

- introduce strategies intended to trigger hypothetical mechanisms.

o Collect the data:

- use realist interviews to assess participant and stakeholder reasoning.
- collect quantitative outcome data (i.e. substance use rates and intensity and spending).

o Analyse outcome patterns:

- search for CMOs for both intended and unintended outcomes; and

- comprehensively describe influential context.

o Refine the initial program theory and hypotheses.[328]
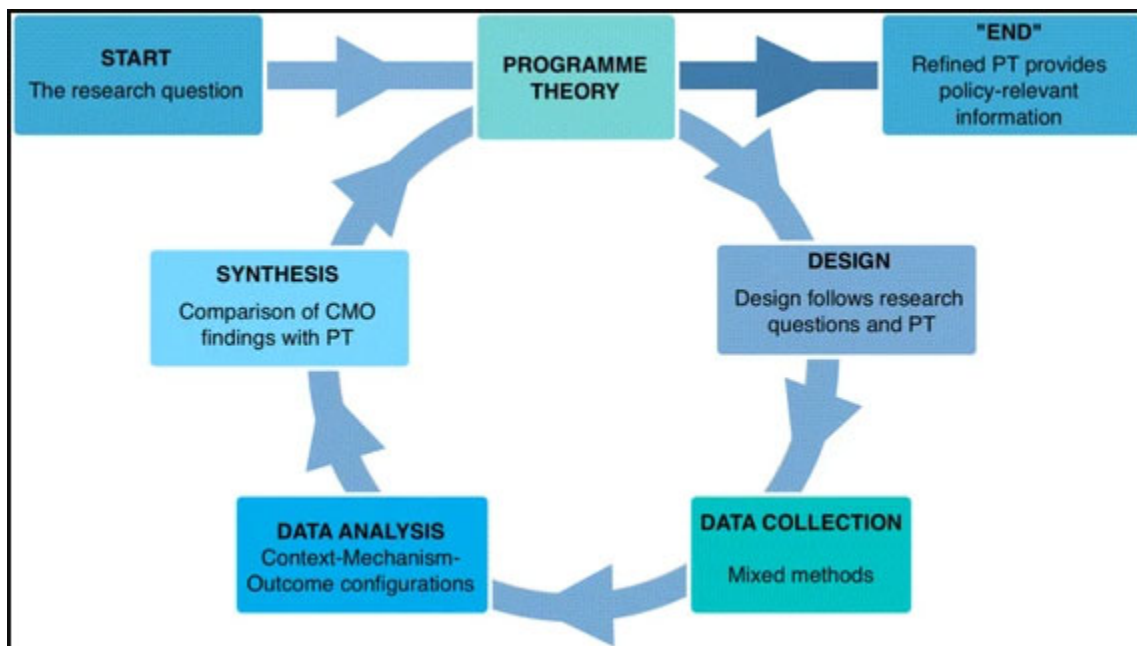


Figure 7.2      Realist evaluation research cycle (Reproduced from Van Belle et al, 2017, Figure 1).[328]

### 7.3.1 The program theory

The Cape York Cannabis Project employed thorough consultation, partnership, individual interviews and local data feedback in an effort to stimulate and support local agency. From the data and narrative presented in this thesis this aspect of the original program's goals is retained. However, the program theory needs to account for proposed mechanisms and context. Therefore, a program theory for the redesigned program could be:

> *High quality local data provided to Cape York remote community councils and workplaces will bring cannabis impacts into focus for community leaders and influential stakeholders. Strategic resources will be supplied to support responses to cannabis use in workplaces, for which acknowledgement of cannabis in Community Safety Plans and Work Health and Safety documents will be a necessary first step. Strategies focusing on those current users who sell, buy, use and share cannabis the most frequently, most often men aged 18 to 35, has the most potential to reduce the overall use of cannabis and promote complete cessation. Employment and engagement strategies will provide micro-level environments supporting abstinence and cessation, which may be developed, evaluated, and refined, contingent upon sustained relationships,* trust, and assured funding.

### 7.3.2    Strategies and CMOs

#### 7.3.2.1    Strategies targeting 'Community level policy' —CMO cluster 1

High quality, credible local survey data provided to community leaders and workplace managers will raise awareness of the extent and likely health and productivity impacts of the cannabis load.  Strategic information, funding and expertise will be offered when the local data and commitment to respond is acknowledged in community safety plans and work health and safety documents (*outcome 1*).  High quality local data provides the resource of relevance and credibility, by which community leaders will feel empowered and to initiate a response (*mechanism 1*). Advocacy for funding, partnerships and co-design of programming will be facilitated by leaders as a result of these policy pressures and incentivisation (*mechanism 2)* providing contexts where co-design and funding of programs targeting cannabis demand reduction mechanisms may fire (*outcome 2*).

#### 7.3.2.2    Strategies targeting outcomes of 'Adult engagement'—CMO cluster 2a

Working in collaboration with local leaders, workplaces and training organisations, financial resources will be made available to fund strategic employment targeting cannabis users aged 18-35. Such programs will seek to deliver resources reliability, accessibility and financial reward of the work proposed, through which participants will experience enhanced self-efficacy and reduced stress or anxiety (*mechanism).* The context anticipated to support mechanisms towards engagement are participant perception of a fair and respectful workplace, supportive social relationships with program leaders, friends and colleagues, and a level of individual self-regulation and mental acuity consistent with regular work and work health and safety. Individuals who obtain long-term employment will cease or reduce their overall use.

### 7.3.2.3 Strategies targeting 'Adolescent engagement'—CMO cluster 2b.

Working in collaboration with relevant community groups and organisations, strategies will be developed that seek to engage cannabis users aged 15-18 in on-land activities—for example working on cattle stations, fencing, land and sea ranger programs, outstation living. Young people engaged in these programs will cease or reduce their overall use (*outcome 4)*. Key resources these strategies may deliver will be a sense of belonging, cultural relevance, routine and healthy lifestyle which will reduce stress, enable greater emotional regulation and a reduced desire to use cannabis (*mechanism).* Contexts in which these resources are expected to induce the desired participant responses will demonstrate supportive social relationships with program leaders; friends and family; a level of individual mental acuity to comply with regular work and basic workplace health and safety, as well as the cooperation and support of families and schools, and reliability of program continuation.

### 7.3.2.4 CMO cluster 3 'Denormalisation of cannabis'

Reduced demand among people who are meaningfully engaged, fewer users and more individuals trying to quit, along with explicit messaging from community-level organisations about cannabis harms (*context)*, may reduce the inclination to use cannabis in homes or in front of non-users, and cannabis would not be offered as readily to non-users (*mechanism)*. This will facilitate and further reinforce abstinence and avoidance of uptake (*outcome 5*).

The overall program logic of CMO clusters 1-3 and their relationships to the ecological systems is depicted in Figure 7.3. In this initial program logic, CMO cluster 3 'Denormalisation of cannabis' is a potential endpoint with sustaining feedback into the community context.
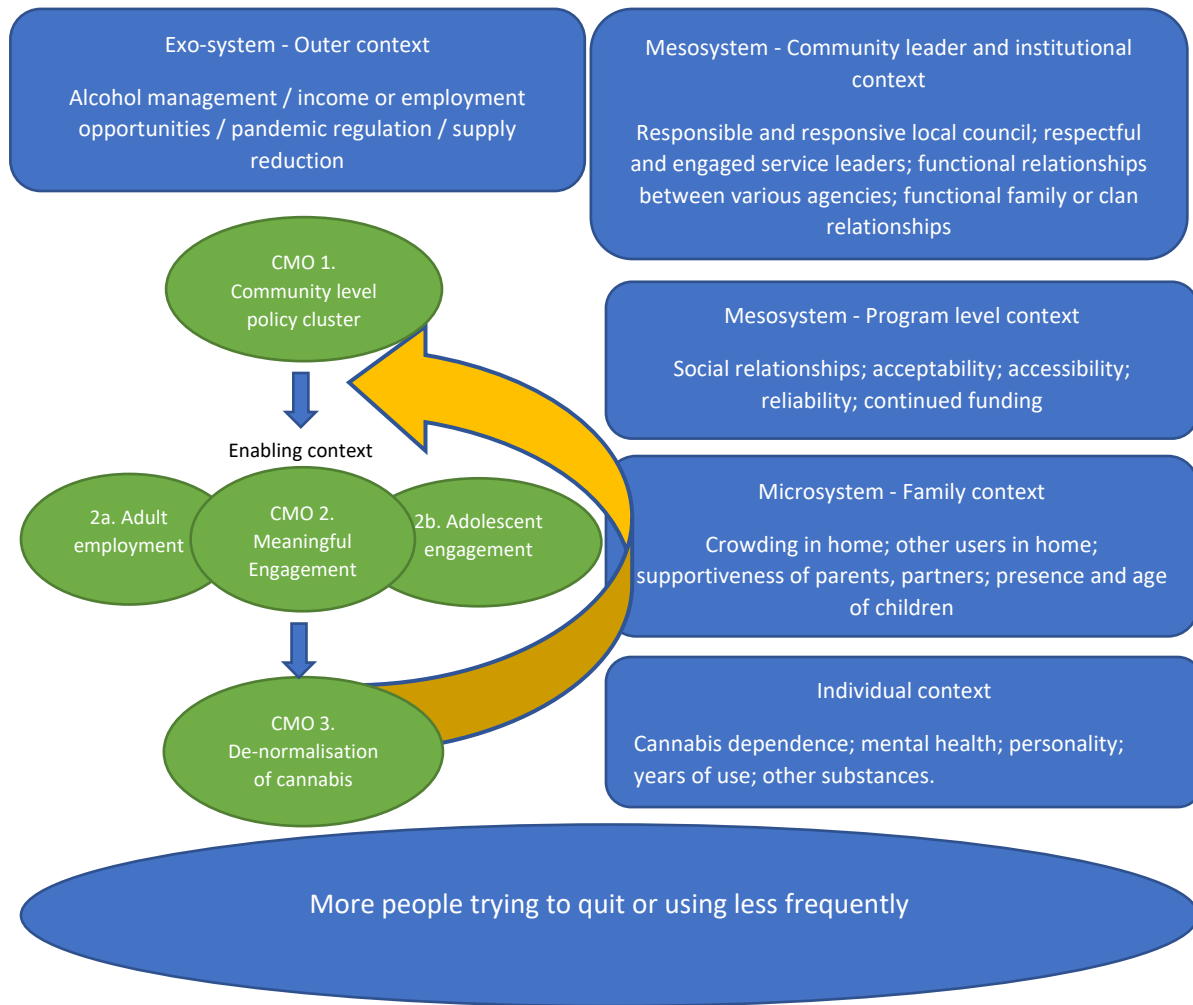
Figure 7.3  Program theory for a cannabis demand intervention project for Cape York remote Indigenous communities.

### 7.3.3   Program design

Comprehensive consultation, acquiring community permissions and ethics approvals would be standard, consistent with NHMRC guidelines and policies for Human Research and research involving Indigenous participants.[329, 330] Though the program theory has indicated the general intent and types of strategies that would be resourced, specific implementation can still (and should be) co-designed with local stakeholders. The co-design would determine the specific location within the community relationships,

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physical spaces, time of year and other context that may be less predictable or stable such as crises or new programs, all of which must be documented with a view to assessing for mechanisms firing and / or influential context. The co-design may produce strategies that could feasibly enable proposed mechanisms to fire as per the program theory, but could (and should) remain open to new strategies and mechanisms that become apparent to stakeholders or researchers in the course of implementation. Therefore, data about the manner in which the consultation, interviews and focus groups are performed must be systematically recorded with consideration for the quality of trust, communication and relationships, as these would form a part of the intervention context, or possibly produce resources.

For example, to implement an employment program, a cooperative and trusting relationship could be formed with a range of key stakeholders around cannabis using males. These might include key elders from several clans, workplace supervisors and potential program participants. Program funding and efforts would be informed by their knowledge and needs.

### 7.3.4    *Data collection and analysis*

A blend of observations, interviews and focus groups could be used, with a minimum sample of interviews would be designated at multiple stages of the research cycle, purposively conducted with community leaders, key stakeholders in management positions, program participants and their families. Specific strategies would include their own before and after interviews which would also examine self-reported use status, dependence and wellbeing. The responses of councils, managers and services and their uptake of project resources would be recorded.

#### 7.3.4.1    Interview design

Consistent with Manzano's 'theory gleaning, refinement and confirmation'[328] interviews would examine CMO clusters rather than a straightforward before and after interview schedule. Interview questions, therefore, would include questions directly speaking to whether the participant's reasoning is consistent with the proposed mechanisms, and what contexts influence these. For example, to uncover whether

participating in the program influenced the participant's cannabis use, one would ask whether they

smoke, or they smoke as much since being involved in the program, the hypothesised mechanisms

explained and tested against the participants' personal outcome and their interpretation of how a

strategy worked for them.

The structure of the interview would introduce the theoretical aspects, then explore the influential

contexts, the resources the program provides and participant reasoning systematically. The interviewer

would adjust the communication style to suit the participant being interviewed, and current cannabis

and other substance use, severity of dependence and other wellbeing content could be included.

The interview should introduce the research questions and desired outcome and invite the participant

to reflect on their own experiences of the program. Did it bring about specific changes? Did it not? Did it

some of the time? Why? Table 7.5 summarises content that could be systematically probed in a realist

interview.

### 7.3.4.2    Data analysis

Content analysis of qualitative data would be directed to uncovering evidence of CMO. Where a

mechanism is identified (theorised or new) program design may be adjusted towards firing of

theoretical mechanisms that better explain outcome.

Quantitative or categorical data about cannabis use and acquisition would triangulated with qualitative

data specifically probing the firing of theoretical mechanisms for individual and group outcomes,  as

encouraged by the RAMESES reporting standards for realist evaluations.[147] The feasibility of collecting

self-reported cannabis use and dependence data from program participants has been demonstrated in

the CYCP and Northern Territory studies.[7, 62] Ideally, participant self-reported cannabis use would be

validated biochemically with urine or saliva testing, although this would not be essential if proxy

assessments can be reliably used as was achieved in the quantitative studies reported in Chapter 5.

Table 7.5    Interview content, adaptable for participant position in the system and their role in the intervention.

| Program theory and mechanism | Purposive sample | Questions— language and conversation style can be adapted for the stakeholder |
|---|---|---|
| Mechanism 'Enabling policy levers' | Local policy makers; workplace managers; job readiness service providers; program leaders | • Are there any political, funding or policy conditions influencing how this has worked at this site?<br>• What are the major supply routes and which section of the community is involved? (It is likely community members know, and more important if community leaders are directly or indirectly involved in supply). |
| Mechanism 'Employment' | Program participants; Local policy makers; workplace managers; job readiness service providers; program leaders | • What is the role of your organisation / service in supporting cannabis cessation? How does your program or idea work? (Question for service providers, managers and leaders)<br>• Who occupies positions in the various organisations at present? What is the quality of their relationships with local community residents? How long have they been there? What is their relationship to the other services in the community?<br>• What is workplace culture and environment like? Is the program accessible, meaningful, acceptable? Do people who work here / does working here help people stay away from cannabis? How does it do that? |
| Mechanism 'Adolescent engagement' | Program participants; program leaders; parents; teachers | • How would you describe the level of engagement in training and education? What do young people like to do that gets them away from cannabis?<br>• What is the participant's family situation like? How many people live in the home, and how many are users? Where do they usually use cannabis and how do they source it? Can your home be cannabis free?<br>• Why do you use cannabis? How is your mental health? Do you have unresolved trauma that continues to impact on your behaviour? Are there other dependence issues? What are your interpersonal stressors? |

## 7.4   Summary

This chapter identified clues in the empirical data pointing to mechanisms for outcomes, some of these were observed and some are possible knock-on effects. The proposal demonstrates how initial program theory and CMO clusters could be applied to systematically test program effect, without costly and impractical randomisation or other experimental controls. The next chapter discusses the significance of this approach in the broader context of substance misuse intervention and remote Indigenous community health programming, the limitations of the empirical data accessed in this thesis and some potential future directions.

# 8 Discussion

This thesis examined substance misuse intervention research with remote Australian Indigenous communities through a realist evaluation lens. Applying the realist lens to data compiled for the Cape York Cannabis Project (CYCP), it redesigned a quasi-experimental, multiple component community intervention using realist principles.

This concluding chapter includes the following sections:

8.1  overviews the main findings of Chapters 3-6;

8.2  discusses the significance of the work, in particular any potential advantages or disadvantages of using realist evaluation in health programming for remote Indigenous communities;

8.3 describes the limitations of the thesis;

8.4 suggests recommendations for further work; and,

8.5 presents the thesis conclusions.

## 8.1    Main findings

The findings demonstrate that quasi-experimental research designs have dominated the monitoring and evaluation of NHMRC funded programs targeting substance use harm and demand reduction in remote Indigenous Australian communities. The thesis proposed that theory-driven designs may produce more targeted and accountable strategies.

### 8.1.1    Chapter 4—Literature review

Chapter 4 reviewed substance use intervention research with remote Indigenous communities in Australia since 2003. Providing an overview of 20 years of NHMRC-funded substance misuse intervention research with remote Australian Indigenous communities, it reflects the evidence

standards and paradigmatic assumptions upheld in the Australian community-based health research community; and highlights favoured methods with respect to community-level health interventions.

Comparing projects funded 2003-2013 (Section 3.1) with those funded 2014-20 (Section 3.2) showed the ongoing efforts to produce meaningful strategies for working with Indigenous people to reduce substance use, including in remote settings. Projects funded 2003-2013 accounted for Indigenous engagement, self-determination and control through consultation, culturally safe practices, participatory action principles, and engagement of Indigenous health workers or families; although the relative success of these practices was not the subject of the interventions *per se*. More recent projects exhibited co-design of the intervention; and / or components intended to upskill clinician capacity to implement substance misuse intervention with Indigenous clients (Section 3.3). The review observed a shift away from an intervention as 'dose delivered' to interventions targeting how practitioners work with Indigenous clients who use substances (Section 3.3). This suggests increasingly nuanced attention to how the intervention is received by agentic beneficiaries, addressing issues surrounding the capacity of health service structures.

### 8.1.2    *Chapter 5—Quantitative measures of cannabis use from the Cape York Cannabis Project*

Quantitative data from the CYCP (Chapter 5) showed that nearly a quarter (36%) of lifetime users in the baseline cohort were former users (Table 5.1). The 29 baseline participants who stopped using during the project timeline provided reasons for cessation, emphasising family and work (Section 5.2.4). Chapter 5 also highlighted that commitment to rigorous sampling procedures can impact on requirements for flexible and responsive project timelines and strategies (Section 5.1.3). The follow-up data suggested a modest reduction in current users in the sample, but the small numbers of direct interviews and proxy assessments undermined the power to draw conclusions. Also, due to insufficient separation of baseline and follow-up data collection, an assessment of two waves of data collection across the three communities achieved greater statistical power by including participants with data at

only one time point. Although both analytic methods (cross-sectional analysis and before and after

cohort) suggested a reduction in cannabis use across the communities, the effect could not be

attributed to the intervention. Data from the before and after cohort, using only self-report data,

indicated that those baseline users who used tobacco and who reported symptoms of cannabis

dependence were more likely to be continuing users at follow-up (Section 5.3.3).

### 8.1.3    *Chapter 6—Searching for local resources for change in the qualitative data*

The qualitative data from the CYCP (Chapter 6) revealed that most of the residents interviewed

perceived cannabis as harmful to themselves or their community (Section 6.3.1). The content analysis

illuminated the importance participants placed on work, family and young people. Participants offered

insights into how these social resources can inspire and possibly sustain cessation efforts at both

individual and institutional levels (Sections 6.3.2 and 6.2.3).

### 8.1.4    *Chapter 7—Realist redesign based on the CYCP data*

Chapter 7 provided a rationale for a theory-driven intervention and evaluation design, where

mechanisms were hypothesised for the outcomes observed in the CYCP data, as well as aspirational

outcomes.  The data available from the CYCP provided a basis for an initial program theory and

hypotheses about how the reasons for change interacted with project resources with respect to the

influential context. With this approach, the mechanisms are central to the evaluation, and can be tested

directly with nuanced attention to the specific contexts, which was understood through

Bronfenbrenner's ecological systems model (Section 3.6.4).

## 8.2    Significance

The CYCP multiple baseline study (MBS) design discounted context through each community serving as

its own control (described in Section 2.2). The MBS purportedly neutralised context, or minimised its

interference on effect measurement by staggered implementation across three sites.[125, 164] With its

program design relying on simplistic cause-effect assumptions about broad intervention effects across

the community, using data feedback as a primary stimulus, the CYCP did not incorporate an explicit

definition of individual stakeholder, group or institutional mechanisms. The qualitative data and process

evaluation did not reveal how any particular strategy could achieve a stable effect over time.

Failure to illuminate mechanisms is typical of the 'black-box' of experimental and quasi-experimental

design.[129, 217]  The CYCP's assumption that data feedback provided a stimulus for local action seemed

appropriate at the time, since local councils and workplaces responded to data feedback with new

policies (Section 2.8).

The qualitative data (Sections 5.2.4 and 6.3) suggested resources that could be promoted to influence

group behaviours, and to support individual decisional balance. Some local councils and workplaces

acknowledged or endorsed the need for community level strategies to support cessation, and many

individual participants acknowledged a need for cessation support through social systems. Participants'

accounts of why they want to quit and what makes that hard in the community, suggested that carefully

considered community-level intervention targeting those specific factors may influence current users

towards abstinence and cessation.  However, the intervention did not target these apparent

opportunities, it could not respond when they became apparent, and the study design could not

account for individual mechanisms.

The basic assumption that community systems can be engaged in health promotion seemed reasonable

in that it aligned with principles of the Ottawa Charter,[174]   which endorses strengthening community

action and reorienting health services. In practical terms, however, such actions can be outside the

immediate remit or capacity of a given organisation or service.  The redesign needed to redirect project

attention and energy purposively to community-level agencies that are strong candidates to initiate

sustainable strategies, mindful of the limitations encountered in the CYCP.

Rather than revisit a larger or more detailed quasi-experimental design, the thesis proposes a refined

*initial program* theory, and a theory-driven evaluation. Acknowledging that resources for cessation exist

for some residents already in the intervention context, an iterative and reflexive approach would enable

the hypothetical CMOs proposed in Chapter 7 to be reviewed for fit with empirical observations

throughout the intervention. Outcomes of iterative research and implementation cycles can be

incorporated as the contexts or mechanisms of the next cycle (Figure 7.2). Data collection in this model

would explicitly probe for CMO to be tested in subsequent research cycles through structured

interviews, purposive sampling and formative case studies. The overall process acknowledges a dynamic

system where mechanisms firing all the time may drive incremental change towards the intervention

goals.

Whereas the MBS identified precise, quantitative hypotheses (Section 1.4.1), the realist redesign

hypothesised two main outcomes: reduced cannabis use in a targeted cohort of those wishing to quit,

and changes suggesting an environment supportive of cessation (Table 8.1). Whereas a trial would select

people out, this approach assumes that the researcher considers the differing responses of the real

population. Statistical methods might well be one avenue of data collection including use of 95%

confidence intervals. However, the emphasis would not be on those methods alone as a source of

'truth'.  Rather the overall analysis would draw on the concept of a reasonable balance of proof, or a

threshold of clinical significance.[331] Even incremental changes in context, can be systematically

incorporated into the program theory and used to probe the demi-regularities in the system. This

respects a pragmatic and ethical obligation to account for incremental, but key changes in a dynamic

system, and not only statistically significant results of quantitative analyses.

Working cross-culturally and across stark material disadvantage in the context of historical and current

power imbalances, the explicit reflexivity of this approach, its methods neutrality and its capacity to

account for individual reasoning can support equity and cultural safety. Local and Indigenous knowledge

and reasoning are highly compatible with incorporation into the systematic, testable framework. The view of influential contexts across a stratified social system is consistent with Syme's view[332] that agentic interactions with context are a primary determinant of health behaviours.

Table 8.1.    Hypothesis for the multiple baseline study compared to the hypothesis in the realist design.

| Multiple baseline hypothesis | Realist hypothesis |
| --- | --- |
| The CYCP hypothesised that, compared with a baseline period, 12 months after intervention there would be: | To reduce the number of people using cannabis: |
| i)  a decrease in the number of cannabis users (aged 16-34 years) by at least 10%; | • Institutions will implement policy producing an environment supportive of cessation given resources of credible data and incentives such as funding and in-kind support. |
| ii)  a decrease in the number of users reporting symptoms of cannabis dependence; and, | • Individuals who are engaged in meaningful work, training or social activities will be less stressed, more in control and experience reduced craving for cannabis, abstain or quit. |
| iii)  a decrease in the number of heavy cannabis users (smoking six cones / day, daily). | |

## 8.3    Limitations of this thesis

As this thesis 'retrofitted' previously acquired data, it does not benefit from concurrent theory building with close involvement with the relevant communities or population. The mechanisms proposed in Chapter 7 are driven by the data collected during the CYCP and researcher experience working on the CYCP and in Cape York communities more generally, and a broad knowledge of the substance misuse literature.

Limited frameworks accessible to non-Indigenous researchers, as well as dynamic local contextual factors cannot be fully accounted for. Consultation, co-design and place-based adaptation of the hypothetical strategies are critical. The author is a female of European descent, highlighting that certain information, even particular epistemological positions, may not be available, or be limited, due to her position either as an outsider (to Indigenous people, English- speaking only or being female) or carrying certain privileges (of race, education and other structural factors) or lacking understanding of the taken-for-granted epistemological assumptions.[183]

The CYCP did not engage large numbers of young women. One reason for this could have been that women with babies or young children may have felt more stigmatised speaking to the project personnel in public places. Young girls may have felt more reticent about their substance use or about speaking to outsiders. Section 7.2.2 therefore did not attempt to deal with the types of mechanisms that might support young women's cessation. Appropriate consultation could reveal feasible strategies and probable initial theories for cannabis cessation and abstinence among women, beyond those identified in Chapter 7 that relate to employment or family.

Health services and schools, which seemed to be obvious institutions to engage in health promotion strategies, could not be mobilised around the particular issue of cannabis. Being already burdened with day-to-day priorities, the pressing needs of their clients at the community level and departmental requirements determined by external authorities. Similarly, small community organisations may have highly variable capacity to support intensive programs. Particularly where they are run by local residents, whose lives are subject to the same issues contributing to the substance misuse burden being targeted. These structural limitations notwithstanding, there are likely to be mechanisms applicable to the gamut of organisations, but they were outside the scope of the redesign that aimed to show what might have been achieved with similar resources and engagement that were available in the CYCP.

## 8.4   Future work

Future research applying the CMO heuristic in Indigenous health intervention could contribute to understanding demi-regularities in community agency. Syntheses of how interventions work in these contexts need not restrict themselves to single health issues, since a range of overarching principles are applicable. Porter notes that evaluations of health programs generally occur at a meso-societal level of the social system—neither concerning whole health systems, populations or nations; nor precisely controlled experiments that psychologists can execute in laboratory settings.[239] This was true of the CYCP *community*-level intervention program, and indeed all of the projects that appeared in the published review and its update in Chapter 4. A comprehensive, shared understanding of mechanisms at this level would potentially contribute to co-ordinated programming of research across a range of health issues.

Better description of the *meso*-layer of remote Indigenous communities' social systems is a potential subject for future work. Numerous, well-known constructs are available to support description of the stratified social system.[244, 323, 333] Bronfenbrenner's ecological framework used in Chapter 7 explicitly distinguished *exo*- and *chrono-systems* in this ecological model to differentiate the immediate family environment from the service system, and account for the relevance of historical antecedents in the structure, respectively.[244]  More recently, Snijder et al. demonstrate incorporation of a layer of 'cultural' context influencing Indigenous substance misuse interventions.[333] Future work might consider developing typologies describing Indigenous Australian communities with their idiosyncratic social dynamic and historical context to support health programming.

A third area for further investigation is the possibility of realist RCTs. The CYCP and other experimental and quasi-experimental trials reviewed in Chapter 3 are costly and often impose a great deal on community time and participation, often for very little benefit, showing marginal or insignificant effect. Bonell et al. observed that there is a predominance of high quality trials with little attention to how the

intervention programs work, and that introducing realist principles to understand the mechanisms operating within an RCT is a feasible approach.[210] Marchal, Van Belle and colleagues argued that contexts in a complex open system cannot be adequately controlled to satisfy the needs for internal validity of RCTs, and that mediation analysis is not the same as the realist conception of mechanism.[138, 212] Porter et al. further argued that, although all social systems are open and complex, an RCT is a proxy for a closed system, and that in suppressing or neutralising as many mechanisms as possible, controlled experimental arrangements legitimately test for mechanism.[334] They mention three ways to approach this: controlling (and thus neutralising) the influence of context on the intervention; examining mechanisms across a range of contexts to develop mid-range theories, which may then be tested in an RCT; or using realism to qualitatively examine participant responses to the 'resources and restrictions [the program] presents.'[334] The disadvantages of trying to control data collection in the remote Indigenous community environments described makes this prospect unappealing to this author's thinking, and potentially impossible. However, the realist RCT may be worth considering on a case-by-case basis for programs and implementation context, within the broader remote Indigenous health areas.

### 8.4.1    *Implications for future research*

Since this postgraduate project began, the British Medical Research Council has recommended that all evaluations of complex interventions incorporate theory.[124] No such recommendation currently stands in the Australian equivalent, the National Health and Medical Research Council. Theory-driven, or theory-informed approaches, including realist methodologies have gained attention, but rarely adhere to a realist methodology as described in this thesis. They may, as exemplified by Baillie and colleagues (2022) endorse methodological pluralism[335], promoting a more nuanced accounting of context and researcher reflexivity, but retain an emphasis on mixed methods without the synthesising power of testing for demi-regularities in outcomes patterns. Others may follow the lead of Fletcher et al (2016)[133]

retain an emphasis on the experimental measure of effect with a theory-informed approach to context

and patient characteristics, exemplified in a recent trial to prevent obesity in pregnant women, a

pragmatic trial that the authors consider as theory-driven.[336] Already discussed, this level of control is

prohibitive in the remote Indigenous community context anyway. Sarkies et al note that the power of

realist methodologies is to synthesise theory from various studies, providing an analytical tool that

explicates the role of context in causal processes.[337] Yet full application of realist approaches has been

slower to take off.

One reason for this is likely the lack of education in the social sciences and philosophy of science offered

to health scientists and professionals.[338] Medical and health researchers may be reluctant to undertake

any qualitative research and lack the philosophical understanding to discern realist from other mixed-

methods approaches. Those already using qualitative methods similarly may assume that grounded

theory and realist analysis are not that different, believing they already operate in a theory-informed

space. Such an approach, however, lacks the testing of outcome patterns and demi-regularities present

in realist methodology.

Added to these biases, funding cycles within political cycles that are probably shorter than what is

needed to fully develop realist theory mean that realist methodologies are probably less likely to gain

funding and recognition. As this work draws to a close there are more publications in the realist

paradigm than there were when it started. Tertiary education programs offering a fuller grounding in

underpinning philosophy of science and assumptions about knowledge and reality may assist progress of

the paradigm in the health sciences. Developing reliable and insightful frameworks embedding the

knowledge and language to describe the Indigenous context may greatly assist researchers attempting

to transition to realist methods within the Indigenous health space in Australia.

## 8.5    Conclusions

Substance misuse continues to underlie a significant burden of disease with accompanying social and economic harms for Indigenous Australians, with greater disparity in remote communities such as those in Cape York, in relation to regional and urban populations. Experimental and quasi-experimental designs have not demonstrated convincing effects in conventional epidemiological terms, despite more nuanced interventions, and larger, more expensive trials. Actual engagement of tangible resources is an ethical imperative for research, and there needs to be a way to understand how, and to ensure the right people are able to implement them. Realist evaluation seems to provide an approach that will enable responses to be provided that satisfy both the need to understand, empathise and empower with the need to demonstrate that the action being resourced is beyond potentially unfounded ideology.

This thesis has shown that despite not producing the numbers necessary to reflect 95% confidence intervals, that CYCP nevertheless generated data reflecting local resources to support cessation and indicated the most likely entry-points for influencing that system equilibrium towards more people quitting cannabis. Chapter 7 provides a feasible proposal for a design that can systematically test hypothetical mechanisms and enable interpretation of actor choice and reasoning around intervention components such that the intervention, actor reasoning and context are seen as a whole unit for evaluation, and not as separate variables. It does not aim to replicate rigorous epidemiological approaches, nor to complement them, but is proposed as an option that can uncover patterns in reality in a complex system.  Where epidemiological approaches have been shown to be too costly and inadequate for assessing changes in the system, they are no longer a rational choice. Realist methodology offers an alternative with an equivalent requirement to test its hypotheses against an external reality.

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# 10  Appendices

**Appendix 1** Literature review of NHMRC intervention research targeting substance misuse in Australian Indigenous communities 2003-2013, published in the Australia and New Zealand Journal of Public Health.

# Substance misuse intervention research in remote Indigenous Australian communities since the NHMRC 'Roadmap'

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Behavioural change intervention studies to reduce substance misuse among Australia's Aboriginal and Torres Strait Islander (Indigenous) populations have seldom demonstrated clear effects.[1,2] The lack of demonstrated effect is not limited to Indigenous health intervention research. For example, less than half all health intervention studies funded by Australia's National Health and Medical Research Council (NHMRC) from 2003 to 2007 produced convincing evidence of intended effects.[3] For Australia's Indigenous peoples, evidence from population-level intervention studies is essential to meet the national commitment to close the health gap with improved policy and evidence-based service delivery,[4,5] yet the bulk of research outputs have been descriptive.[6]

In Australia's remote Indigenous communities, the overall health gap compared to other Australians is extreme and persistent,[20] with a heavy burden of chronic disease and substance misuse.[21,22] A Strategic Framework for Improving Aboriginal and Torres Strait Islander Health Through Research (NHMRC 'Roadmap')[23] and its consultation document[24] were published in 2002. The documents consolidated the demands of stakeholders in Indigenous health for ownership and partnership in research to achieve direct health benefits. Since 2002, the NHMRC has committed up to 5% of its annual budget to Australian Indigenous health research.[25]

For health behaviour change generally, innovative, practical and pragmatic research approaches have been recommended to

## Abstract

**Objective**: Describe program theories of substance misuse interventions with Aboriginal and Torres Strait Islander (Indigenous) Australians funded by the National Health and Medical Research Council (NHMRC) since the 'Roadmap' for Indigenous health.

**Methods**: Projects funded 2003-2013 were categorised by intervention strategies. Realist concepts informed the program theory: intended resources and responses; influence of context on outcomes; explicit and implicit program assumptions.

**Results**: Seven interventions were included. Three randomised controlled trials targeted tobacco using psychosocial interventions in primary health centres using the program theory: "Local Indigenous health workers extend and sustain the effects of conventional clinical brief intervention by engendering social and cultural resources". Four pragmatic trials of multiple-component, community-based interventions using controlled, semi-controlled or before-and-after designs used the program theory: "Discrete intervention components targeting locally defined substance misuse issues will activate latent capacities to create an environment that favours cessation." Publications did not report clear effect, implementation fidelity or explicit mechanisms affecting participant thinking.

**Conclusions**: Rigorous intervention designs built on 'Roadmap' principles neither reduced substance use in the populations studied nor identified transferable mechanisms for behaviour change.

**Implications for public health**: Substance misuse impacts among Indigenous Australians remain severe. Theoretical mechanisms of behaviour change may improve intervention design.

**Key words**: program evaluation, substance abuse, indigenous population, intervention study

enhance the quality and transferability of complex interventions.[2,7,8] Theoretically informed intervention programs are also advocated because the evaluation of complex behavioural interventions often requires nuanced insights into processes of change within complex systems operating in real-world settings.[5,6,9-11] For Indigenous community settings, to date, no review has been published that describes or synthesises the theoretical underpinnings, i.e. program theories, of health intervention research.

We examined the published outputs of NHMRC funded research project grants from 2003-2013 that implemented or evaluated interventions directly targeting substance misuse in remote Australian Indigenous communities. We examined the available evidence through the lens of scientific realism. This approach has been increasingly applied

to theorise how and why complex health and social interventions affect the reasoning of behaviour change program participants,[12,13] and to strengthen translation of research into policy and practice.[14] A *program theory* of an intervention consists of the set of implicit or explicit assumptions about how participants will respond to the array of resources an intervention may precipitate.[16] Scientific realism makes the unique contribution of conceptualising intervention processes that a *program theory* implies as clusters of *mechanism, context* and *outcome*. *Mechanisms* are conceptualised as theoretically plausible responses of program participants to *resources* that arise from an intervention program.[11] In realist terms, *resources* are seen not just as discrete and tangible intervention components, but also intangible, intended or unintended elements that confront or become available to participants in the population for whom the intervention is intended. In this way, the realist *mechanism* provides an approach to explicitly theorising and elucidating underlying processes that could explain change.

A further important contribution of scientific realism is in conceptualising participant responses to resources as being mediated by *context*; which may not always be comprehensively described in an intervention design, or even be predictable.[11,15] However, realists seek credible evidence about how intervention programs exert their effects in varying *contexts*. Systematic examination of theorised mechanisms in relation to empirical outcomes in different contexts informs further theories about the transferable components of intervention programs and the contextual conditions that enable intended mechanisms to be activated to achieve intended *outcomes*.[16,17] Consistent with the initial steps recommended for a *realist synthesis*,[18,19] this review of substance misuse interventions in remote Australian Indigenous communities categorises program theories of the included projects in realist terms.

## Methods

### Identifying research projects for inclusion and articles published

The outcomes of funding rounds reported on the NHMRC website were searched for project grants that commenced from January 2003 and during the decade up to 2013 following publication of the first NHMRC 'Roadmap'.[23] Projects implementing a community-level

intervention targeting substance misuse, with a principal focus on Indigenous populations in rural and remote areas were selected by examining abstracts from key publications. Projects funded after December 2013 were not included as they would have had insufficient time to implement and evaluate an intervention study at time of synthesis and writing of this review. Status as 'current' or 'complete', and (if available) summary of outcomes were obtained from the NHMRC National Register of Public Health Research.[22]

### Overview of review methods

The review method involved the following steps:

1. Relevant peer-reviewed publications were sought for review in PubMed, Scopus, Google Scholar and the 'Health Infonet' website.[20] A systematic search used primary chief investigator name and topic or key words from the grant title as search terms. Citations included in the reference lists of articles reporting eligible studies were manually reviewed to identify additional publications. Only peer-reviewed literature was included. Accordingly, grey literature, evaluation reports, theses, conference proceedings, posters, tangible resources developed for the intervention, social marketing materials and magazine articles were not included.

2. For each research project study designs, interventions and intended outcomes were summarised.

3. How each program was intended to work to achieve specific outcomes was examined, i.e. the implicit or explicit mechanisms (potential resources and responses) within a program theory.

4. Program theories underlying each study's design were outlined by speculating on the resources program designers intended their strategies to produce, and the anticipated response to the program by participants and other stakeholders.

5. Data extraction and analysis

To manage the information, publication outputs for each project were assigned to case nodes according to project grant in NVivo™11.

First, general descriptive information was extracted (VG) for each project by reviewing publications relating to each study to identify:

explicitly stated aims of the study

- substance or activity targeted
- number of participants

- number of sites
- length of study (years)
- total funding
- type of study design
- intervention strategies
- measured or observed outcomes
- any process evaluation design.

Second, the selected articles were read in detail (VG and AC) and searched for subthemes (VG) in the following categories:

*Theory*

- theoretical framework: any specification of a theoretical basis for the strategy
- mode of delivery: participatory, brief intervention at the clinic, multiple component, action research
- practitioners: agents responsible for delivering the intervention components at the community level (doctors, local health workers, research staff, other professional)
- participants: who received the intervention resources and at what level in the community (i.e. residents, service provider or community organisation).

*Outcomes:*

- main outcomes: reported participant responses or main outcome measures
- unintended outcomes: unanticipated participant or stakeholder responses
- broad indication of fidelity of intervention: components implemented as designed designated as 'most', 'some' or 'few'.

*Contextual factors that influenced implementation fidelity or uptake:*

- observations published by investigators in their evaluation of success of intervention components including feasibility of design, staffing, cultural or political factors influencing implementation or participant/stakeholder response.

### Speculating on intended mechanisms

Consistent with the realist concept of *mechanism,* we searched the publications for any evidence of the hoped-for change in participant thinking in response to the resources that were intended to be mobilised by the intervention strategy.[21] Distinct from the tangible intervention resources,[13] we searched for evidence of any changes in the environment, structure or relationships arising from intervention strategies. These are

often not explicit in the aims or design of the intervention, but rooted more deeply in the assumptions (implicit or explicit) made by the program designers about how the program *should* work and in their speculations about any unintended resources imparted by an intervention.

### Key assumptions and articulating the program theories they imply

Key assumptions underpinning program theories for individual studies were derived by considering the aims of the intervention in relation to the actual outcomes and observations reported combined with methodological assumptions found in the literature for the study designs employed. A program theory was articulated for projects in statements prepared, discussed and agreed by the authors. Statements summarised our speculations for how and why a particular intervention strategy was intended to change a given behaviour in participants.

## Findings

### Research programs and projects included

A total of 33 peer-reviewed publications arising from seven intervention studies funded by eight NHMRC funded project grants awarded between January 2003 and December 2013 were included in this review.

Most of the project grants were listed as 'current' on the NHMRC National Register of Public Health Research (accessed February 2016). Together they represented a total budget of over five million dollars for 30 project-years. Table 1 provides an overview of the projects, their design, outcome measures and citations to published articles.

On the basis of their physical focal point, studies were categorised as 'Clinic-based' or 'Community-focused'. For each group, explicitly stated elements of the intervention strategies and the implied theoretical components are summarised in Tables 2a and b and are discussed below.

### a) Clinic-based programs – brief intervention at the clinic augmented by social support

Three studies targeted tobacco with intervention strategies primarily focused on the local primary health centre (the 'clinic') combining evidence-based behavioural counselling and social support components. All used a randomised controlled trial (RCT) design. The interventions were designed to support tobacco cessation or to prevent exposure of infants to second hand tobacco smoke through cessation by parents and household members (projects labelled A1, A2 and A3 in Table 2a). In each study, participating clinic patients, randomised to the intervention group, received brief

intervention different to usual care, as well as nicotine replacement therapy (NRT) where appropriate. A social support component was delivered by local health workers either at the clinic, in homes, or by phone. The main outcome measures were current tobacco use at follow-up, time to last cigarette, urinary cotinine concentration and admission to hospital for acute respiratory events in infants.

*Outcomes in context:* Summarised and highlighted in Table 2a, none of the evaluations of implementation reported statistically significant effects attributable to the intervention.[22-24] However, meta-analysis of the pooled data from two (A1 and A2) found a significant effect of intensive health worker support on tobacco cessation.[24] Program A1 established that pregnant women who had already quit smoking independently of an intervention remained non-smokers at the end of their pregnancy.[25] This cohort also contributed data for measurement studies of the Fagerström Test for Nicotine Dependence and self-reported tobacco use validated with urinary cotinine concentrations among pregnant Indigenous women.[26,27] Project A3 found that infants of breastfeeding mothers had higher exposure to tobacco smoke, despite successful and willing management of smoke-free homes and cars.[30,31] Encouraging behaviours reported qualitatively but not captured objectively by the designed outcome

| Table 1: Overview of project grants funded by the NHMRC 2003-2013 that implemented and or evaluated an intervention at the remote community level targeting substance misuse. | | | | | | | |
|---|---|---|---|---|---|---|---|
| Year | Grant title | Life of grant | Intervention name | Type of intervention | Study design, outcome measures | No. sites | Articles |
| 2003 | Impact of a multi-intervention anti-tobacco strategy in 8 Indigenous communities | 5 | The North Queensland Tobacco Project | Pragmatic, multiple components and stakeholders | Cohort survey of tobacco use, intentions to quit; RCT and process evaluation | 8 | 30, 37 |
| 2005 | Helping Indigenous women to stop smoking during pregnancy | 2 | Tilly's Tracks | Clinical brief intervention plus social support from a health worker | Tobacco use, urinary cotinine; implementation; RCT and fidelity of sample of implementers | 2 | 23, 25, 47 |
| 2007 | Community action for smoking cessation in remote Aboriginal communities | 5 | The Top End Tobacco Project | Pragmatic, multiple components | Before and after cohort survey in three locations; prevalence, patterns of tobacco use and sales data; multiple baseline study and process evaluation | 3 | 38-41, 48-56 |
| 2008 | Years 4 & 5 of an RCT psychosocial tobacco intervention in urban pregnant Indigenous women | 2 | Tilly's Tracks | Clinical brief intervention plus social support from a health worker | RCT tobacco use, urinary cotinine; process evaluation | 2 | 23, 25 |
| 2008 | Randomised Controlled Trial of an intensive smoking cessation intervention in Kimberley Aboriginal primary health clinic setting | 3 | Be Our Ally Beat Smoking (BOABS) | Clinical brief intervention plus social support from a health worker | Tobacco use, urinary cotinine; meta-analysis with Tilly's Tracks data; RCT and process evaluation | 2 | 24, 31, 57 |
| 2009 | Randomised controlled trial of a family tobacco control program to reduce respiratory illness in Indigenous infants | 5 | Healthy Starts (in Australia) | Clinical brief intervention plus social support from a health worker | Acute respiratory events, urinary cotinine; qualitative interview; RCT and process evaluation | 2 | 22, 28, 29, 33, 34, 58 |
| 2010 | Indigenous action to reduce harms associated with heavy cannabis use in Cape York | 3 | The Cape York Cannabis Project | Pragmatic, multiple components and stakeholders | Before and after cohort survey in three locations; prevalence, patterns of cannabis use; multiple baseline study and process evaluation | 3 | 59, 60 |
| 2013 | Intervention trial to reduce alcohol related harms among high risk young Indigenous Australians | 2 | Beat da Binge | Community-initiated diversionary strategies | Before and after survey of alcohol consumption patterns; process evaluation | 1 | 35, 36 |

measures were high willingness to participate in A2[23], A3[28,29] and B2[30] and the value of local ownership, flexibility and cultural safety in A1.[31]

It appeared that in all contexts, participants' home environments and local relationships exerted powerful influences that were difficult for intervention components to influence, even with the use of local trained health workers and face-to-face counselling or home visits.[25,31,32] The challenges of isolation, the absence of a local project manager to maintain project impetus,[31] staff turn-over[30,31] and significant investment in retraining health workers,[31] and low fidelity of health worker delivered components[23,30,31] were variously reported. For example, two of the psychosocial interventions (A1 and A2) were challenged by high staff turn-over and the effort required for retraining, together with other barriers to health workers engaging with participants.[25,31] Adaptations to the original study designs included altered follow-up schedules due to participant attrition[23] and extending the time allocated for recruitment due to underpowered samples and deviation from original recruitment criteria.[31] Possible contamination of control with intervention was observed in study A1,[23] leading the researchers to recommend the use of an alternative design, i.e. a cluster RCT. Project A2 reported "*cultural obligations that restricted access of Aboriginal researchers to some community members*", for example jealousy or family relationships that precluded offering advice.[31]

*Program theory, underlying assumptions:* The clinical components of these interventions have an independent evidence base, mostly derived from non-Indigenous contexts. The underlying program theory acknowledging the emphasis on complementary social support components of the interventions could be framed as:

> *Local Indigenous health workers augment, extend and sustain the effects of conventional clinical brief intervention by engendering social and cultural resources.*

Summarised and highlighted in Table 2a under the heading 'How and why?' are the types of resources and responses intended by the intervention. The clinical components offer potential resources such as authoritative information and guidance as well as relief from withdrawal symptoms. This assumes that participants and local Indigenous health workers will engage with a western biomedical model of harm to some degree, and that they can or will prioritise the intervention outside the clinic setting. Participant time taken to receive health advice could potentially support self-reflexivity at the individual or family levels and help participants to feel better able to employ strategies such as setting goals and limits. The intention of social support was to help alleviate cue exposure and reduce stress during nicotine withdrawal. Providing structure, encouragement and information about smoking's harms aimed to create environments that would favour sustained cessation. Assumptions seemed to be made that social support was relevant to cessation, about who can increase this resource and how this occurs. A key assumption deduced by aligning intentions with the actual outcomes in context in Table 2a seems to be that local health workers have capacities such as knowledge, relationships or local authority to provide the support that might augment evidence-based clinical intervention. The mechanisms by which this was intended to happen were not specified in any of the published outputs. However, mechanisms were implied in some of the strategies used to support health workers to deliver their components, such as employing female workers to work with pregnant women[23] and using culturally appropriate resources and discourse as well as providing training.[33,34]

*(b) Community-focused programs - multi-component, multi-site community level interventions and participatory action research*

Four community-focused intervention studies targeted tobacco (n=2), cannabis (n=1) and alcohol (n=1). One of the tobacco studies was

| Table 2a: Program theories of the psycho-social, clinic-based interventions within a controlled study design (group a). | | | | |
|---|---|---|---|---|
| **Intervention study** | **What was the program supposed to do?** | | **Outcomes in context** | |
| | **Intended outcome/Aims** | **Detailed strategies** | **Observed outcome as reported** | **Influence of context reported in evaluations** |
| A1 | Tobacco cessation among pregnant women | • Evidence-based clinical brief intervention including behavioural approaches and NRT | Not significant; significant in meta-analysis with BOABS | • High willingness to participate among pregnant women |
| A2 | Cessation or intentions to quit | • Social support components: | Double usual care, not significant; significant in meta-analysis with Tilly's tracks | • High level of control of smoke-free cars and homes with infants |
| A3 | Parental and family behaviours that minimize exposure of infants to second-hand smoke, including cessation | – Home visits or intensive counselling with local health workers or Aboriginal researchers as complementary<br>– Local Indigenous health workers received training for their component | Not significant; self-reported high control of smoke-free spaces; higher exposure in the infants of breastfeeding mothers | • Some components implemented with fidelity, few health worker components implemented as designed<br>• High staff turnover and high researcher input<br>• Barriers to health worker engagement reported in some instances<br>• Recruitment and/or retention was challenging |
| **Program theory/ies** | **How and why?** | | | |
| | **Kinds of resources intended** | **Intended responses** | **Assumptions** | |
| Local Indigenous health workers augment, extend and sustain the effects of conventional clinical brief intervention by engendering social and cultural resources | • Biomedical relief; clinical authority<br>• Cultural safety and relevance, including gender-specific health worker support<br>• Structure; time out<br>• Self-reflexivity<br>• Shared and culturally relevant understanding of harms; or goals among family members | • Trust medical authority<br>• Motivated to abstain<br>• Reaching out to family for support or offering support<br>• Reinforced and informed concern for infant<br>• Enhanced capacity to set goals; effect changes or enforce limits | • Brief intervention strategies in health clinics serving Indigenous people will work in a similar way as elsewhere; possibly entailing respect for clinical authority and a western-European conception of risk and deleterious consequence to influence behaviour<br>• Local health workers hold latent capacities and knowledge that can fulfil needs for culturally appropriate strategies<br>• Health workers have authority or cultural mandate is valid to encourage behaviour change, educate or assert role with fellow community members; specifically, the capacity or influence to:<br>– interpret and implement intervention concepts<br>– can and will prioritise the intervention outside the clinic<br>– deliver an externally driven intervention, with limited training and management | |

a cluster RCT and the other used a multiple baseline design (MBL). The intervention to address cannabis use also employed a MBL. The intervention targeting binge drinking among youth featured community-based participatory research (CBPR) in a single community with no experimental control and a pre-post study design, plus process evaluation (compared in Table 2b).

All four projects in this category aimed to use multiple components implemented at various levels of the community through action research. Three of the community-focused interventions (B1, B2 and B3) used a pragmatic, multiple-component approach to whole-of-community interventions. Evidence-based intervention components (e.g. motivational enhancement therapy to enhance readiness to change) were brought to bear combined with local strategies stimulated by the intervention or during consultation (e.g. raising awareness in schools; implementing local policies in safety plans or changed workplace practices; local diversionary strategies). The cluster RCT tobacco intervention (B1) delivered a suite of pre-planned evidence-based components, several of which were highly structured strategies delivered by professional service providers (e.g. clinic-based interventions or embedding anti-tobacco content into school curriculum). The interventions in the MBL studies (B2 and B3) incorporated loosely defined intervention components at the outset. In the MBL studies, baseline prevalence surveys were conducted and feedback of study results immediately followed with this viewed as a potential strategy to stimulate local concern and locally inspired intervention strategies.

The intervention targeting binge drinking among youth (B4) was reportedly initiated by local community members, with researchers participating as invited partners. The project was described as having evolved from local awareness raising and diversionary strategies into a campaign for youth advocacy, leadership and training.[35] The study design was a straightforward before-and-after evaluation by opportunistic survey, a planned cohort study not being feasible in the circumstances under which the project progressed.[36] A four stage approach was used in which local Aboriginal knowledge was integrated with the evidence base.[36]

**Table 2b: Multi-component at multiple levels of the community pragmatic action research (group b).**

| Intervention study | What was the program supposed to do? | | Outcomes in context | |
|---|---|---|---|---|
| | Intended outcome/Aims | Detailed strategies | Observed outcome as reported | Influence of context reported in evaluations |
| | | Multi-level, multi-component, action research, community consultation / engagement; data feedback, local social and evidence-based components | | • Some or most planned components partially implemented but few with high fidelity |
| B1 | Tobacco cessation | Pragmatic, cluster RCT; Social, clinical and policy components pre-planned with stakeholders and services | Significant reduction in current use and more people thinking about quitting not definitively attributable to interventions | • Low uptake of opportunities for locally driven intervention strategies (B1,2,4) <br> • Participants in pre-contemplation (B1-2) |
| B2 | Tobacco cessation | | Non-significant qualitative impact; policy initiatives, e.g. tobacco-free spaces | • High awareness, resentment for financial burden, high prevalence (B2-3) <br> • Retailers very engaged (B2) <br> • Clinic services not always fully engaged in tobacco reduction strategies |
| B3 | Reduce heavy and dependent cannabis use | Pragmatic, multiple baseline study; Minimal pre-planned, evidence-based components; Feedback local data, repeated visits; information, brief intervention, policy advocacy | Decline in use > hypothesized; process evaluation incomplete at time of publishing | • Local health workers sometimes lacking support <br> • Existing anti-tobacco resources sometimes limited to the clinic and not in the community as such (B2) <br> • Siloing, opportunism observed among services |
| B4 | Reduced youth binge drinking; enhanced local youth engaged in locally initiated activities | Participatory, pre-post survey; participant-initiated diversionary strategies, academic and other partners. Focused on social belonging, local ownership | Significant decline not definitively attributable to intervention; High community engagement | • Trust, sense of ownership endorsed as essential participation (B1,2,4) |

| Program theory/ies | How and why? | | Assumptions |
|---|---|---|---|
| | Kinds of resources intended | Intended responses | |
| • A suite of evidence-based interventions across a community will change attitudes and produce a more favourable environment for cessation <br> • Local data and relevant information will stimulate and or support local agency to act on a recognised issue <br> • Community owned and initiated diversionary strategies can reduce youth binge drinking by providing social resources that are more highly valued than the effects of alcohol | • Enabling environments or attitudes for cessation <br> • Community-wide attitudinal or awareness changes <br> • Issue is brought out for discussion - outsiders neutral listeners <br> • Translation between community needs and policy <br> • Fun and belonging <br> • Raised awareness, reflexivity and self-regulation <br> • Genuine control and ownership | • Prioritise quitting, desire to quit <br> • Community resolve <br> • Issue confirmed, new perspective of severity <br> • Reflection, perceive choice and consequences, regulate behaviours <br> • Desire to participate greater than desire to consume <br> • Persistence, purposeful participation in cyclical change processes | • Partnerships create trust, are synergistic <br> • Local partners confer cultural specificity <br> • Strategies initiated locally target latent mechanisms <br> • Adequate stakeholder capacity and will to uphold mandate <br> • Local stakeholders will prioritise issue and strategies which they identified as high need |

As invited partners, researchers' intended roles, in addition to providing specialist knowledge and skills for monitoring and evaluation, appear to have been to reinforce partnerships, advocate for the project to policy makers and funding bodies, and to supply or interpret information from the literature or evidence base.

*Outcomes in context:* Summarised and highlighted in Table 2b, some moderate impacts were observed for all of these studies with implementation fidelity mediated by similar processes across the four. The tobacco-control cluster RCT (B1) reported a modest but significant reduction in tobacco use. However, changes could not be definitively attributed to the intervention. In addition, the evaluation described low fidelity of delivery of all intervention components.[30] Many study participants in both tobacco control studies (B1 and B2) were at pre-contemplation stage, suggesting that interventions should have been directed at people who had not yet considered quitting.[37] Study B2 reported enhanced efforts to create tobacco-free spaces and policies to support cessation.[38,39] The same study observed that local health workers needed more support and strongly encouraged clinicians to participate in brief intervention at every available opportunity.[40,41] Both the tobacco intervention evaluations (B1 and B2) reported qualitative effects such as raised awareness of harmful patterns of use and resentment of the financial burden of tobacco plus enhanced desire to quit. No sustainable, whole-of-community or practice changes were observed for any component in either intervention. The program targeting heavy cannabis use (B3) reported a decline in cannabis use in all three communities that was greater than hypothesised (Clough et al, in press) with no published process evaluation data available at time of writing.

Intervention study B4 reported modest but significant changes in risky drinking behaviours and raised awareness of binge drinking harms in youth 18-24 years of age. The pre-post study design in one location could not definitively attribute this change to the intervention.[36] The qualitative evaluation observed constructive processes in the development of partnerships and community participation with a local perception that the participatory nature of the project conferred ownership, motivated youth participants and was thereby empowering.[35]

*Program theory, underlying assumptions:* Though three similar but distinct theories are proposed in Table 2a, a general program theory for these intervention studies could be framed as: Discrete intervention components targeting locally defined substance misuse issues will activate latent capacities to create an environment that favours cessation.

The resources offered by the community-focused programs aimed to provoke and support non-specific local responses such as raised awareness and self-awareness, provide opportunities for open discussion of the issue via the presence of nominally neutral outsiders and creating cessation-enabling environments (summarised and highlighted in Table 2b). Diversionary strategies as individual components or as a key strategy of B4 potentially offered resources such as relief from boredom and a sense of belonging. The intended resources related to raised awareness and desire to quit, but also auto-reflexive processes at the individual and group level, new perspective, empowerment or self-regulation and participation in action research cycles. Though all partnered with and consulted local residents and stakeholders, study B4 differed in that it was integrated with actions occurring in an already mobilised community context, whereas studies B1-3 aimed to stimulate action using local understandings of the issue. Three candidate program theories were considered relevant for 'group b'. These are specified in Table 2b.

A core tenet of the pragmatic approach of B1-3 seems to be that equitable and effective local solutions will be derived from interventions designed and implemented in partnership with community members. There is no explicit theory underpinning these research programs, nevertheless, community engagement was viewed as both ethically and pragmatically essential within action research cycles incorporating progressive feedback on program outcomes as the research was being conducted.

The program theories of intervention studies B2 and B3 explicitly included a component of presenting local prevalence information back to the community as a key to supporting or stimulating local agency and therefore action. The action research approach working in partnership to provide feedback[38,42] was designed to have this effect.[41] Researcher-provided evaluation evidence and advocacy were also activities intended to enable and mobilise local action or create a more

favourable policy environment for tobacco cessation.[40] Somewhat similar to 'group a' studies, 'group b' programs began from the assumption that social support stimulated by the intervention would encourage individual level change.[30,41] It was also assumed that local stakeholders would seize on intervention opportunities in response to the study evidence. In reality, it proved difficult to initiate or sustain focused action. Participant and stakeholder intended responses were unspecified; the substance use intervention was often not prioritised by the agencies responsible for a given component; and local capacity to engage in project strategies was possibly lacking.

CBPR that is initiated by community members, as in study B4, proposed local strategies and incorporated external and local partners. Locally determined diversionary strategies that confer ownership by and involvement of youth aimed to reduce their binge drinking. These could potentially offer resources that programs translated from elsewhere cannot; e.g., local concepts of harm or responsibility; genuine control of the processes; sense of ownership; and choice and control over intervention components. Observed and described at evaluation, the effects of these processes could not be captured in a prospective, controlled study design. The authors suggest that positive outcomes reported could have been related to increasing the personal locus of control of participants and that empowering participants could directly improve the determinants of health, citing Wallerstein.[43] A candidate program theory might be expressed in these terms:

Community-owned and initiated diversionary strategies can reduce youth binge drinking by providing social resources that are more highly valued than the effects of alcohol.

Offering social or physical opportunities that are more highly valued than drinking is similar to specific individual components intended in programs of the other intervention studies in 'group b'. Studies B1-3 were not CBPR but involved action research in externally formulated intervention designs. Two related resources potentially offered by CBPR are 'empowerment' and 'enhanced locus of control'. All 'group b' projects made assumptions about participant capacity; authentic buy-in of partners or a factor that Jagosh et al. have referred to as 'partnership synergy' in realist terms.[44]

## Discussion

Eight NHMRC-funded project grants supported seven intervention studies for rural and remote Indigenous populations since 2003 targeting: tobacco use (n=5); cannabis use (n=1); and binge-drinking (n=1). Three clinic-based tobacco intervention studies used RCT designs. Four community-oriented intervention studies used a cluster RCT, two MBL designs and one an uncontrolled before-and-after study. At the time of writing, their cumulative output was 33 peer-reviewed articles.

All of the interventions included components that would support individual change as well as ameliorate the social or environmental factors that could influence individual decisions about substance use behaviours. Partnership approaches were explicitly used in four of seven intervention designs. All included components delivered by or received by local Indigenous health workers or residents in the intervention communities. All of the intervention designs shared underlying principles consistent with recommendations in the NHMRC 'Roadmap' including measures to promote self-determination (e.g. consultation, involving communities in the research by feeding back data, employing local health workers).

### Outcomes of the interventions

Unfortunately, none of the studies were able to demonstrate a large or socially significant reduction in levels of use of the targeted substance, nor a clear effect attributable to the intervention. Low fidelity of implementation,[30] weak study designs[36] and inevitably small sample sizes[24] undermined the utility of the results of most studies.

### Study designs and program theories

A gradient of engagement with theoretical processes of change is apparent in the collated studies.

Group (a) clinic-based controlled trials implemented 'evidence-based' approaches theorising that intervention groups receiving higher doses of clinical and social support would change smoking behaviours. The program theory assumes that the intervention will create resources for the target population; primarily on the grounds that the approach worked elsewhere. Apart from offering some training, how or why local people who were engaged to deliver the intervention would respond was not

systematically examined. The study design aimed to create all or nothing conditions, like an on / off switch, either the intervention is present or it is not. Why participants did not respond as intended was not a focus of process evaluation.

Group (b) community-focused multi-level interventions appeared to incorporate implicit theories about how participants respond to project resources designed to stimulate local agency. This was usually via data feed-back and raised awareness that would empower participants to make better decisions about their health. Once again, there was no comprehensive discussion or assessment of the reasoning behind participants and stakeholder responses.

### Significance of the findings

The logic of a 'black box'[46] program design is especially apparent in controlled trials which tend to assume a linear chain of causation, whereas in reality substance misuse interventions, like most behavioural intervention programs, are complex and not unidirectional.[19] Interventions have attempted to account for specific structural,[45,47] cultural[48] and geographical contexts that may influence program design; however, embedding elements of interventions sustainably while rigorously measuring effect are ongoing methodological challenges.[7,46] Complex systems under study cannot be easily or ethically controlled and participatory programs face challenges gathering empirical evidence of their effects.[6,46] Theoretical approaches offer opportunities to fill these knowledge gaps by collecting evidence about the processes of change that conventional study designs have not furnished.

### Limitations

Although we have attempted to speculate broadly on the assumptions about resource-response pairs from the reported aims and outcomes, this is not the same as objectively uncovering the true theoretical mechanisms of these interventions. The program designers and partners would have more knowledge of the context, including: local relationships, local history, or timing of the intervention with respect to other significant events. Our review covers only one aspect of the major health concerns facing Indigenous populations living in remote communities, and only projects funded by one major funding body. Interventions targeting global

wellbeing, health promotion or health systems that may indirectly affect substance use in remote Indigenous communities were beyond the scope of our review.

## Conclusion

There have been significant efforts by NHMRC-funded researchers since 2003 to conduct intervention research to reduce substance misuse in remote Australian Indigenous communities, but the impact of this research has been very modest. The intervention studies included in this review were of high quality; well-funded and resourced; combining the efforts of excellent academics with the cooperation of community leaders and health practitioners. Despite this, the impacts of the significant investment described by these research outputs have been modest, translation to policy has been very limited and few sustainable effects have been documented. New and more comprehensive theories are needed in this difficult and complex area of behaviour change where even small changes could be important, if the mechanisms by which they occurred can be captured using an appropriate synthesis of all available evidence.

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Appendix 1 Literature review

**Appendix 2** Quantitative data two waves of data collection during the CYCP published in *Frontiers in Public Health*.

# Cannabis Use Among Remote Indigenous Australians: Opportunities to Support Change Identified in Two Waves of Sampling

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**Background:** Cannabis harms among Indigenous populations in Australia, New Zealand, Canada and the United States may be magnified by poorer health and heavy use. However, little direct evidence is available to evaluate cannabis' impacts. In communities in remote northern Queensland (Australia) where cannabis has become endemic, opportunities to support change were investigated.

**Methods:** Opportunistically recruited participants (aged 15–49 years) discussed their cannabis use history in interviews in two waves of population sampling in Cape York (Queensland). Wave 1 included 429 people (235 males and 194 females); and wave 2 included 402 people (228 males and 174 females). Current users (used cannabis during the year before interview) described frequency of use, amount consumed, expenditure and dependence symptoms. Other substance use was recorded for 402 people at wave 2.

**Results:** Wave 1: 69% reported lifetime use and 44% current use. Males (55%) were more likely than females (30%) to be current users ($P < 0.001$). Most (96%) current users described at least weekly use; nearly half (48%) were "heavy" users ($\geq 6$ cones/session at least once/week) and 77% met cannabis dependence criteria. Three communities spent up to \$AUD14,200/week on cannabis, around \$AUD2.0 million/year, or around 9% of community people's total income on cannabis. The majority (79%) of current users wanted to quit or reduce their cannabis use. Wave 2: no difference was observed in the proportion of lifetime (69%, $|z| = 0.04$, $P = 0.968$) or current cannabis users (39%, $|z| = 1.39$, $P = 0.164$); nor current use among males (71%, $|z| = 0.91$, $P = 0.363$) or females (62%, $|z| = 0.36$, $P = 0.719$). However, a significant reduction in current users by 15% ($|z| = 2.36$, $P = 0.018$) was observed in one community. Of 105 wave 1 current users re-assessed in 2, 29 (27%) had ceased use. These participants reported cost and family commitments as reasons to change and that social support and employment enabled abstinence. Current and lifetime cannabis use were closely associated with all other substance use, particularly tobacco and alcohol (both $P > 0.001$).

Appendix 2 Quantitative data

**Conclusions:** High rates of heavy cannabis use in remote Australian Indigenous communities warrant action. Successful cessation among some individuals suggests that significant opportunities are available to support change even where cannabis use may be endemic.

Keywords: cannabis (marijuana), indigenous, remote communities, substance use prevalence, cannabis abstinence, cannabis cessation

## INTRODUCTION

While cannabis remains the most widely used illicit substance worldwide, its use has generally decreased in countries like the United States, Canada, New Zealand and Australia (1). In contrast, rates of cannabis use in the Indigenous populations of these developed economies are 1.3–1.9 times higher than respective national averages (2–5). Systematic evidence is lacking on the specific impacts of cannabis in Indigenous populations, and on how to assist Indigenous peoples to reduce harms.

In the general population, cannabis use is associated with symptoms of: anxiety (6), depression (6–8), dependence (6, 7, 9), and withdrawal (10–12), acute cognitive impairment (13), possible long-term cognitive impairment (14), and schizophrenia (13, 15–17); with evidence that cannabis *causes* psychosis (15, 18–20) becoming stronger (17, 21, 22). Normalization of cannabis use within some sectors of the community (23), and polarized debates about cannabis policy (24), may have diverted attention from its impacts in marginalized and impoverished populations, where harms from most forms of substance use are magnified by the higher prevalence of heavier, riskier patterns of use. Heavier use and significant mental health impacts of cannabis are known in American Indian populations (25), for instance, with very early uptake first nations youth in the United States (26, 27) and Canadian (28). Indigenous Australians, according to national surveys, use cannabis at around 1.6 times the national rate (22). However, these estimates do not include the most remote community populations, such as those in Australia's far north (Northern Territory and north Queensland). These populations are among the more severely disadvantaged and socially excluded populations in the country and have a disproportionate share of a largely preventable chronic disease burden, including that linked with substance misuse (29).

Cannabis became more readily available in remote Indigenous Australian communities just over 20 years ago. Its use was undetected in the 1980s (30) and surged from the late 1990s to as high as 60% in some age groups, more than double national rates (31). Even with such brief exposure, in the Northern Territory's remote Arnhem Land region, high proportions of young users continued to report regular cannabis use between 2001 and 2006 (32, 33). Such use was associated with dependence (33), depression (7), auditory hallucinations, suicidal ideation (7, 32), and imprisonment (34, 35). In similar remote communities in north-eastern Australia (Queensland's Cape York), cannabis users and the communities in which they live may also suffer a heavy burden of cannabis-related harms (36, 37).

Cannabis use is a neglected public health issue in Australia's remote Indigenous communities (38), despite their consistently expressed concerns about its impacts (35, 39). This paper provides evidence from a survey of cannabis use in remote Indigenous communities in north Queensland that describes patterns of use, harms and attitudes toward cannabis.

## METHODS

### Hypotheses

Data included in the present analysis comprises semi-structured interviews conducted with participants before and after a community level intervention, with additional participants recruited at the second time-point. It is, therefore, not a before and after study, but represents a sizable sample from each site in two waves of sampling. This study hypothesized:

1. An overall reduction in current users as a result of growing awareness of cannabis harms suggested in the consultations, as well as social marketing activities that occurred between sampling waves.
2. Qualitative examination of those who had ceased using cannabis between the first and second waves would suggest common important factors influencing their decisional balance.

### Setting

Cape York in far north Queensland covers $\sim$211,000 km$^2$ with a population of around 20,000 (outside its major regional center and towns). Included are 11,700 Aboriginal and/or Torres Strait Islander (Indigenous) Australians living in 12 very small, self-governing communities with populations ranging from <200 to 2,500 people. Although English is widely spoken, it is usually a second language (or a creole), and many traditional practices are maintained (40). Vehicle access is via unsealed roads, which close for several months in the annual wet season.

Consultation throughout 2007–2008 established community permissions for the study (36). Communities were selected to broadly represent the contemporary settlement pattern for Indigenous people in the region: one near a regional center (Community A); another on Cape York's wet tropical east coast (Community B); and a third on the west coast in drier savannah country (Community C). The three study communities had a combined Indigenous population of 2,187, with 1,172 of these aged 15–49 years at census in 2011 (41).

Queensland Government departments of Health, Education and Police have a presence in all communities. All communities

have primary healthcare clinics (PHCs) staffed by allied health workers, including drug and alcohol treatment workers, who periodically fly in from regional centers during the working week. The PHCs also employ local Indigenous health workers and nurses who live in the communities.

There is no published evidence available for the use of illicit drugs other than cannabis in these communities. The sale of alcohol is locally prohibited and its possession and carriage has been tightly restricted since 2008 across Cape York (42).

## Participants and Sampling

### Participant Recruitment

Data collection at two time-points and its and use in the analysis is shown in **Figure 1**. Participants were approached for the first wave of interviews between May 2010 and October 2011 as a baseline for a community level demand reduction program. The second wave occurred between May and December 2012, including those participants who were followed up as well as newly recruited participants. This analysis uses all available data from the two waves of sampling to explore inter- and intra-community variations. In practice, because of the brief time between samples in each community, sampling was more-or-less continuous across the three communities as a whole. Research staff visited the communities for 3–5 days, traveling from the regional center (Cairns, 800–1,000 km by road). With stigmatized or illegal behaviors the subject of interest, random sampling in these small community settings is ethically unsustainable (32–34). Recruitment was therefore opportunistic, following strategies used in the Arnhem Land (NT) studies (31, 34), and targeting younger age groups. Researchers alerted communities at least 2 weeks in advance of visits, spending 3 to 5 days in the community each time. Project personnel approached participants outside of the PHC, the community store or in the street and at work places and homes, usually with the paid assistance of a local person.

### Wave 1 Interviews

We used a conversational approach, employed routinely in these localities to work across cultural barriers (33). Semi-structured interviews documented demographics, and lifetime cannabis use. Interviews lasted from 10 min—if participants had little or no experience with cannabis or offered only brief responses— to 30 min, if participants engaged in rich "yarning" about their experiences with cannabis. Current users were asked about frequency of use, age of first/last use, estimated quantity used and weekly expenditure on cannabis. Five severity of dependence scale (SDS) questions were administered to current users (40). Open-ended questions elicited qualitative information from current and former cannabis users about any intentions to change and reasons why.

### Wave 2 Interviews and Proxy Assessments

In the second wave, researchers recruited new participants to the study and attempted to follow-up all of the original participants. Proxy reports for current or former cannabis use were sought at wave 2 for all participants interviewed at wave 1. Proxy data for use status was used where the participant could not be interviewed at wave 2, a strategy used previously in Arnhem Land (43). In addition to lifetime cannabis use, participants provided data about current and lifetime use of alcohol, tobacco, volatile substances, and other illicit drugs. The SDS questions were administered to current users where the participants consented.

## Data

### Cannabis Use

As in previous studies (32), self-reported cannabis use was described as "never" (never tried cannabis), "former" [tried cannabis once or had not smoked it for ≥12 months, consistent with national data (22)] and "current" (had tried or used cannabis within the past 12 months). Mean duration of use, calculated from age first used and age last used, took account of any significant breaks due to e.g., hospitalization, pregnancy, working or studying away from the community, prison or detention.

### Frequency of Cannabis Use–Current Users

Self-reported frequency of cannabis use among current users was categorized as in previous studies: "daily" (5–7 times/week), "weekly" (1–4 times/week), or "monthly" (1–2 times/month) (33).

### Defining "Heavy" Cannabis Use

Reported quantities of cannabis used ranged widely from "*one cone a session*" to "*more than twenty*," making precise quantification difficult. To address a wide diversity of consumption levels and patterns (32), "heavy" use was defined as ≥6 cones per session at least once per week, in line with criteria used in the Arnhem Land (NT) studies.

### Weekly Expenditure on Cannabis

Current users were asked to estimate the usual number of "foils" or "sachets" purchased weekly or fortnightly, the price paid ($AUD) and how many people they shared with.

### Cannabis Dependence

Dependence in current users was assessed using the five-item SDS, with scores depicted as a colored chart to address literacy barriers and using a cut-off score ≥3 symptoms experienced in the preceding 3 months (40).

### Defining "Trying to Quit"

Further questions, asked of current users who expressed any desire to change, distinguished those who wished to reduce cannabis from those who wished to stop altogether. "Trying to quit" included those who reported current active quit attempts or who reported avoiding cannabis use at some time during the preceding 12 months.

### Reasons for Cessation

Qualitative examination of a subset of interviews with participants who were current users at wave 1 but had ceased cannabis use at wave 2, summarized the principal reasons reported for quitting, barriers to quitting and the resources used to support quitting.
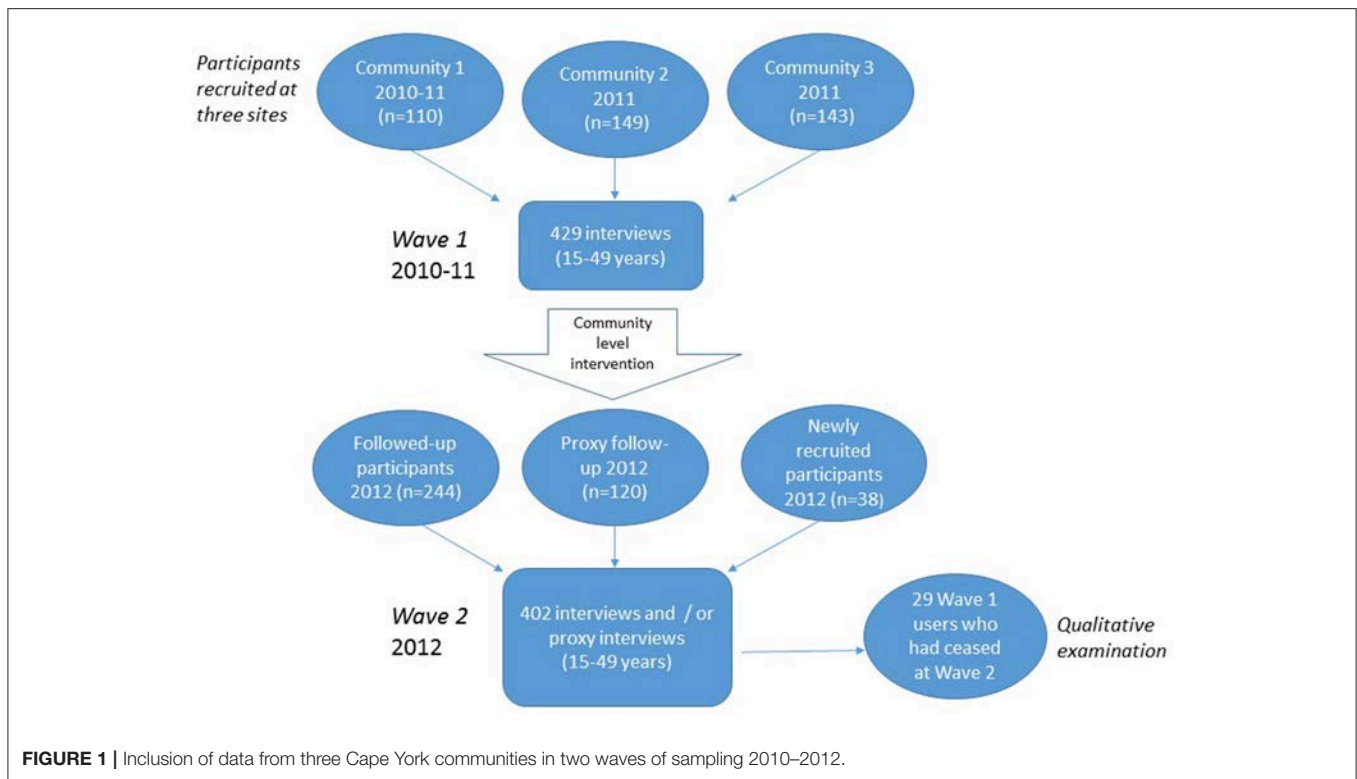
**FIGURE 1 |** Inclusion of data from three Cape York communities in two waves of sampling 2010–2012.

## Data Analysis

Quantitative data was analyzed in SPSS (IBM Corp. Released 2017. IBM SPSS Statistics for Windows, Version 25.0. Armonk, NY: IBM Corp). Qualitative data was stored in spreadsheets and imported into NVivo™. Categorical data were compared using the Chi square statistic with 95% confidence intervals. Ordinal variables were compared using the Wilcoxon rank-sum test.

## Ethics Approval

The Human Research Ethics Committees of James Cook University and the Cairns and Hinterland Health Services District provided ethical approvals. Study results were provided back to the study communities and their lead agencies after the survey was completed in order to stimulate local action and advocacy among key stakeholder groups.

## RESULTS

## Sample

In total, 429 participants aged 15–49 years were interviewed in the first wave of data collection, equivalent to 37% (=429/1,172) of the estimated total community populations in this age group. The sample included 55% males ($n = 235$) and 45% females ($n = 194$). This differed from the 2011 census (43) proportions of 49% males and 51% females ($|z| = 2.06$, $P = 0.033$) in these age groups in the study communities. The proportion of participants (49% = 203/429) aged 15–24 years in the sample was considerably greater than recorded in the census (28%) ($|z| = 7.28$, $P < 0.001$).

In the second wave, approximately 12 months later, data were collected for 402 people, including: 244 wave 1 participants who completed follow-up interviews; 120 proxy assessments of wave 1 participants; and 38 new participants. Proportions of males ($n = 228$, 57%) and females ($n = 174$, 43%) were similar to the first wave ($|z| = 0.56$, $P = 0.575$), and similarly different to the 2011 census ($|z| = 2.68$, $P = 0.007$). Overrepresentation of younger participants aged 15–24 years (37% = 149/402) compared to the census data (28%) ($|z| = 3.42$, $P > 0.001$), was more pronounced than at wave 1 ($|z| = 2.99$, $P = 0.003$).

## Patterns of Use at Wave 1
### Reported Lifetime Cannabis Use Varied Across the Communities and Gender Groups

The proportions of the sample reporting cannabis use at least once in their lifetime ranged from 54 to 81% across the communities (69% overall) (**Table 1A**). In community C, almost half the participants (46%) had never used cannabis, whereas in community A, this was true of fewer than one in five (19%) (**Table 1A**).

Overall, males (77%) were more likely to report lifetime use than females (59%) ($P < 0.001$). Age-standardized rates were 78% of males, 52% of females and 65% overall. However, the differences in the crude proportions of lifetime users also varied across communities: A (86% males, 75% females, $P = 0.105$); B (79% males, 69% females, $P = 0.299$) and with women less likely to have ever tried cannabis in community C only (69% males, 33% females, $P < 0.001$).

**TABLE 1A |** Demographic characteristics and cannabis use in 429 people (235 males and 194 females, aged 15–49 years) interviewed at wave 1 in three Cape York communities, far north Queensland, Australia, 2010–2011.

| | | Community A $n = 139$ | Community B $n = 135$ | Community C $n = 155$ | Total $n = 429$ | $P^*$ |
|---|---|---|---|---|---|---|
| Gender | Female | 63 (45.3%) | 65 (48.1%) | 66 (42.6%) | 194 (45.2%) | |
| | Male | 76 (54.7%) | 70 (51.9%) | 89 (57.4%) | 235 (54.8%) | $P = 0.636$ |
| Age group | 15–24 | 65 (46.8%) | 66 (48.9%) | 72 (46.5%) | 203 (47.3%) | |
| | 25–34 | 39 (28.1%) | 42 (31.1%) | 39 (25.2%) | 120 (28.0%) | $P = 0.543$ |
| | 35–49 | 35 (25.2%) | 27 (20.0%) | 44 (28.4%) | 106 (24.7%) | |
| Cannabis use | Non–user | 27 (19.4%) | 36 (26.7%) | 72 (46.5%) | 135 (31.5%) | |
| | Former user | 38 (27.3%) | 40 (29.6%) | 28 (18.1%) | 106 (24.7%) | $P = 0.001$ |
| | Current user | 74 (53.2%) | 59 (43.7%) | 55 (35.5%) | 188 (43.8%) | |

*Pearson chi²

The proportion of lifetime users (71%) in the younger participants (aged 15–24 years) was similar (66%) to older participants (aged 25–49 years) ($P = 0.221$) and varied little across the communities.

## Current Users

Males were generally more likely to report current cannabis use in the sample in all three communities: A (66% males, 38% females, $P = 0.001$); B (51% males, 35% females, $P = 0.060$) and C (49% males, 17% females, $P < 0.001$) and around three times more likely overall (55% males, 30% females, $P < 0.001$). Age standardized rates were 55% for males and 26% for females, 40% overall.

## Age of Uptake and Duration of Use Among Current Users

**Table 2A** describes the patterns of cannabis use among 188 current users, comprised of 69% males ($n = 130$) and 31% females ($n = 58$). Their median age was 24 years, with males around 2 years older than females ($P = 0.063$). Participants had used cannabis for up to 30 years (median $= 11$ years for males, $=6$ years for females, $P = 0.003$). Age of first use was similar in males and females (median $= 16$ years, $P = 0.714$) (**Table 2A**).

## Patterns of Current Use

Almost half (48%) of the 168 current users, for whom information was available were "heavy users" with similar proportions in males (47%) and females (51%) ($P = 0.640$ **Table 2A**). Half (52%) of 184 current users reported using cannabis on a daily basis, another 43% used it on a weekly basis. The majority used cannabis regularly, with little difference between males (97%) and females (93%) (**Table 2A**).

## Style of Cannabis Use and Expenditure by Current Users

The nominated preferred style of use in all three communities was hand-made "bucket bong," a negative pressure device constructed from a bottomless bottle with a cone piece inserted into the lid, plunged into a larger container of water to draw the smoke in to be inhaled from the bottle. Almost all current and former users reported that they mixed tobacco with cannabis.

Across the communities, participants reported that cannabis was purchased from dealers (i.e., not cultivated in the community), with further distribution within the community through on-selling or sharing. Cannabis was mostly supplied in aluminum "foils" or plastic "sachets" with prices ranging from $AUD20 to $AUD50 per unit. Users reported considerable variation in the unit quantity and quality of cannabis material, often premixed with tobacco.

Males tended to spend more on purchasing cannabis than females, $AUD50/week compared with $AUD31/week ($|z| = 2.45$, $P = 0.014$, **Table 2A**). With current users comprising 44% ($=188/429$) of the sample, this means there may be 514 ($=188/429*1,172$) current users in the 15–49 years age group in the three communities overall. A crude estimate of total expenditure on cannabis in this age group in these three communities is $AUD39,000 per week ($=514/188*$AUD14,200/week$) equivalent to just over $AUD2.0 million/year.

## Severity of Cannabis Dependence (SDS) in Current Users

Three quarters (73%) of the current users met criteria for cannabis dependence (SDS $\geq 3$), with similar proportions in males (77%) and females (66%) ($P = 0.145$, **Table 2A**). Data not shown indicates that similar proportions of current users met dependence criteria in both the younger (74%, 15–24 years) and older (73%, 25–49 years) age groups ($P = 0.813$). Those in the "heavy use" category were no more likely than other current users to meet criteria for cannabis dependence ($P = 0.787$). Current users who met dependence criteria, however, spent more on cannabis (median spend $= A$50/week$) than those who did not (median spend $= A$38/week$) ($|z| = 2.09$, $P = 0.036$).

# Patterns of Use at Wave 2
## Reported Lifetime Cannabis Use Varied Across the Communities and Gender Groups

Shown in **Table 1B**, the proportions of the sample reporting cannabis use at least once in their lifetime ranged from 79 to 50% across the communities (69% overall) which was not different to wave 1 ($|z| = 0.04$, $P = 0.968$). In community C, half (50%) had never used cannabis, whereas in community A, this was

true of less than a quarter (23%). No significant differences in proportions of non-users were recorded between wave 1 and wave 2 samples across the communities: A (19% wave 1, 23% wave 2 $|z| = 0.64$, $P = 0.522$); B (27% wave 1, 20% wave 2, $|z| = 1.30$, $P = 0.194$) and community C (46% wave 1, 50% wave 2, $|z| = 0.55$ $P = 0.582$).

Overall, at wave 2, males (78%) were more likely to report lifetime use than females (56%) ($P < 0.001$). Age standardized rates of lifetime cannabis use were 80% for males and 53% for females overall. However, the differences in the crude proportions of lifetime users also varied across communities: A (85% males, 68% females, $P = 0.034$); B (86% males, 72% females, $P = 0.043$) and strongest in community C (67% males, 27% females, $P < 0.001$). As for the sample at wave 1, the proportion of lifetime users at wave 2 (68%) in the younger participants (aged 15–24 years) was similar (69%) to older participants (aged 25–49 years) ($P = 0.947$) and varied little across the communities.

### Current Users at Wave 2
No statistically significant difference was detected in the proportion of cannabis users in the overall sample at wave 1 ($n = 188$, 44%) compared to wave 2 ($n = 157$, 39%) ($|z| = 1.39$, $P = 0.164$). Shown in **Table 2B**, age standardized rate of current use among males was 52% and 21% for females. A significant reduction of 15% in current users (53 to 38%, $|z| = 2.36$, $P = 0.018$) was recorded in community A. The proportion of heavy users in the sample at wave 2 (63%) was higher than at wave 1 (51%) ($|z| = 2.40$, $P = 0.016$). Compared to wave 1, the proportion of males (71%, $|z| = 0.91$, $P = 0.363$), females (62%, $|z| = 0.36$, $P = 0.719$) and younger users (69%, $|z| = 0.62$, $P = 0.535$) reporting more than three symptoms of dependence were not different at wave 2. The median weekly spending at wave 2 of $50 per week was not different to wave 1 overall, with a similar difference between males and females ($55 and $30 per week, respectively ($|z| = 2.57$, $P = 0.010$).

### Lifetime and Current Substance Use at Wave 2
Lifetime use of cannabis was linked with lifetime use of tobacco, alcohol and other illicit substances ($P < 0.001$). Current use of cannabis (39%) was strongly associated with current use of tobacco (74%, $P < 0.001$) and alcohol (64%, $P < 0.001$). Seven participants reported current inhalant use and all of these were current cannabis users.

## Qualitative Information
### Quit Intentions Among Current Users
Of 188 current users at wave 1, 164 provided information about their intentions to stop or reduce cannabis use. Overall, 70 current users (43%) indicated they were trying or wanted to quit (**Table 2A**), including 10% ($n = 16$) actively trying to quit at wave 1. At wave 2, 46% (36/78) said they wanted to change.

### Reasons for Change Among Participants Who Ceased Using Cannabis Between Wave 1 and Wave 2
Twenty-nine participants who were "current users" at wave 1 (2011) were no longer using cannabis at wave 2 (2012). This included 14 women and 15 men, with no obvious differences in distribution across age groups, genders or communities.

Among 15 men, 11 said they wanted to quit, including five who were then making a quit attempt when first interviewed in 2011. Two had said they wished to cut down and only one had said that he did not want to quit. Nine of these men explained their reasoning: it was too expensive or a waste of money (3); family as the principal reason for quitting, particularly concern for their children (4); and health reasons or getting older (2). Among 14 women who had ceased cannabis use, 5 had indicated a desire to quit at wave 1, including 2 actively trying to quit. A further two said they would like to cut down and three who did not answer the question nonetheless discussed earlier quit attempts. Seven explained their reasoning: family (including children and pregnancy) (4) or for work (3).

Only men in this group of successful quitters mentioned the expense of cannabis as a reason to stop, perhaps reflecting the tendency for men to spend more on cannabis and suggesting that women are probably more likely to source cannabis from partners or family members. One young man described how he demonstrated for himself how much money he was wasting by collecting the packaging:

> "Started collecting sachets this year. Ten sachets is $500. I've spent $1000 on that silly thing this year."

Resources that enabled cessation mentioned by these 29 participants included: keeping busy with work; childcare or cultural activities; or spending time with non-using friends and family. For example, a young woman said that she would "get help from sisters and brothers because they understand" (**Table 3**). Conversely, cue exposure and normalization was a barrier to cessation for the young man referring to "other boys, temptation" (**Table 3** "Barriers in context"). Only one person mentioned health services as a possible strategy to support cessation.

This 22-year old man described a variety of arguments and opportunities that he believed would support cannabis cessation:

> "Put food on the table; buy power card; get the outstations going; get cattle; hunting. [It causes] fighting and stressing out…"

Selected quotes summarized in **Table 3** describe reasons for quitting, and similar enablers and barriers in context.

## DISCUSSION

Although there was some variation in the crude rates across the participating communities in Cape York, age-standardized rates of lifetime cannabis use of 65% (78% for males and 52% for females) found in this study are higher than in the general Australian population where just under half of those in comparable age groups report lifetime use (22). The age-standardized proportions of current cannabis users at wave 1 in the study (55% of males and 26% of females aged 15–49 years), 40% overall, are similar to 67% males and 22% females (aged

Appendix 2 Quantitative data

**TABLE 1B |** Demographic characteristics and cannabis use in 402 people (228 males and 174 females, aged 15–49 years) with data at wave 2 (followed-up, 244; proxy, 120; or newly recruited, 38) in three Cape York communities, far north Queensland, Australia, 2012.

| | | Community A<br>n = 110 | Community B<br>n = 149 | Community C<br>n = 143 | Total<br>n = 402 | P* |
|---|---|---|---|---|---|---|
| Gender | Female | 50 (45.4%) | 65 (43.6%) | 59 (41.3%) | 174 (43.3%) | |
| | Male | 60 (54.6%) | 84 (56.4%) | 84 (58.7%) | 228 (56.7%) | P = 0.796 |
| Age group | 15–24 | 42 (38.2%) | 58 (38.9%) | 49 (34.3%) | 149 (37.1%) | |
| | 25–34 | 37 (33.6%) | 57 (38.3%) | 47 (32.9%) | 141 (35.1%) | |
| | 35–49 | 31 (28.2%) | 34 (22.8%) | 47 (32.9%) | 112 (27.9%) | P = 0.451 |
| Cannabis use (402) | Non-user | 25 (22.7%) | 30 (20.1%) | 71 (49.6%) | 126 (31.3%) | |
| | Former user | 43 (39.1%) | 53 (35.6%) | 23 (16.1%) | 119 (29.6%) | |
| | Current user | 42 (38.2%) | 66 (44.3%) | 49 (34.3%) | 157 (39.1%) | P = 0.001 |

*Pearson chi²

**TABLE 2A |** Patterns of cannabis use by gender in 188 current users (aged 15–49 years) interviewed at wave 1 in three Cape York communities, far north Queensland, Australia, 2010–2011.

| | | Male<br>n = 130 | Female<br>n = 58 | Total<br>n = 188 | P* |
|---|---|---|---|---|---|
| Median age | Years (min–max) | 25 (16–49) | 23 (15–47) | 24 (15–49) | $\|z\| = -1.86, P = 0.063^{†}$ |
| Median age of first use | Years (min-max) | 16 (8–30) | 16 (12–37) | 16 (8–37) | $\|z\| = -0.37, P = 0.714$ |
| Median duration of use | Years (min-max) | 10.8 (1.20–28.9) | 6.20 (0.20–30.0) | 7.95 (0.20–30.0) | $\|z\| = -3.50, P = 0.003$ |
| Heavy user | ≥6 cones/session at least once/week | 56 (47.1%) | 25 (51.0%) | 81 (48.2%) | P = 0.640 |
| Frequency | Daily | 71 (55.0%) | 25 (45.5%) | 96 (52.2%) | |
| | Weekly | 54 (41.9%) | 26 (47.3%) | 80 (43.5%) | P = 0.289 |
| | Monthly | 4 (3.10%) | 4 (7.27%) | 8 (4.35%) | |
| Median weekly spending | $AUD/week (min-max) | 50 (0–1050) | 31 (0.0–350) | 50 (0.0–1050) | $\|z\| = -2.45, P = 0.014^{†}$ |
| Severity of Dependence Scale | ≥3 symptoms | 95 (76.6%) | 35 (66.0%) | 130 (73.4%) | P = 0.145 |
| Intentions toward cannabis | None | 65 (56.0%) | 29 (60.4%) | 94 (57.3%) | |
| | Trying or wishes to quit | 51 (44.0%) | 19 (39.6%) | 70 (42.7%) | P = 0.606 |

*Pearson chi² unless otherwise specified.
†Wilcoxon rank-sum test.

**TABLE 2B |** Patterns of cannabis use by gender in 157 current users (aged 15–49 years) with wave 2 data, either followed up (88) or newly recruited (27) in three Cape York communities, far north Queensland, Australia, 2010–2011.

| | | Male<br>n = 130 | Female<br>n = 58 | Total<br>n = 188 | P* |
|---|---|---|---|---|---|
| Median age | Years (min–max) | 27 (16–49) | 25 (15–46) | 26 (15–49) | $\|z\| = -2.06, P = 0.039^{†}$ |
| Median age of first use | Years (min-max) | 16 (8–30) | 16 (12–37) | 16 (8–37) | $\|z\| = -0.51, P = 0.607$ |
| Median duration of use | Years (min-max) | 8.1 (1.20–28.9) | 7.15 (0.20–26.1) | 7.80 (0.20–28.9) | $\|z\| = -1.80, P = 0.072$ |
| Heavy user | ≥6 cones/session at least once/week | 50 (63.3%) | 18 (62.1%) | 68 (63.0%) | P = 0.907 |
| Frequency | Daily | 35 (43.8%) | 9 (32.1%) | 44 (40.7%) | |
| | Weekly | 41 (51.2%) | 16 (57.1%) | 57 (52.8%) | P = 0.393 |
| | Monthly | 4 (5.00%) | 3 (10.7%) | 7 (6.48%) | |
| Median weekly spending | $AUD/week (min–max) | 55 (0–800) | 30 (0–300) | 50 (0–800) | $\|z\| = -2.57, P = 0.010^{†}$ |
| Severity of dependence scale | ≥3 symptoms | 56 (70.9%) | 18 (62.1%) | 75 (63.0%) | P = 0.968 |
| Intentions toward cannabis | None | 31 (56.4%) | 11 (47.8%) | 42 (53.8%) | |
| | Trying or wishes to quit | 24 (43.6%) | 12 (52.2%) | 36 (46.2%) | P = 0.619 |

*Pearson chi² unless otherwise specified.
†Wilcoxon rank-sum test.
No data for proxy (n = 42).

13–36 years), and around 50% overall, documented in Arnhem Land (NT) in 2001 (34), most of whom were still users at follow-up in 2005–06 (38). Again similar to Arnhem Land (34), around half (48%) of the current users in this study were categorized as "heavy users," with most (>90%) using cannabis at least weekly (**Table 2A**).

Appendix 2 Quantitative data

TABLE 3 | Participant reasoning for successful quit attempts between wave 1 and wave 2 and enablers and barriers mentioned.

| | Reasoning for quitting | Enabling context | Barriers in the context |
|---|---|---|---|
| Women | *Had a baby and needed to go my own way.* | *Thinking about giving up, would like to get help from sisters and brother because they understand.* | [When cannabis unavailable] *makes you feel like you want to go look for more [cannabis]. Stressing out.* |
| | *I want to give up and focus on work.* | | |
| | *…because looking after lots of kids.* | *Job would keep me from staying in the house smoking* | |
| Men | *Spending money on wrong things - no food in the house.* | *I never buy it;* | *Fighting and stressing out when* [there is] *no gunja, look for credit if none get wild with the dealer* |
| | *It's all about cash, that thing getting expensive* | *Long as I got the job I've got no stress - always up early.* | |
| | *Daughter told me to stop smoking, she was 3 at the time.* | *Mum wants me to give up.* | *Relaxes me… want to get stress down before I bring it out on my family* |
| | | | *Pulled out from school for fighting at age 14 and became a steady smoker since.* |
| | *Used to smoke all day long. I've given up for my son.* | [I want to] *slowly give up–work keeps you occupied.* | *Other boys temptation* |
| | *Realised important things in life were work and family* | *Get people busy—mentor younger boys and men.* | *Calms you and you're not annoyed.* |

The highest rate of past year cannabis use reported nationally in 2010 was 25% for males (aged 20–29 years) and 19% for females (aged 18–19 years) (2). In this study, however, almost all the current cannabis users reported at least past month use, compared with <6% (aged ≥14 years) past month use nationally. It is noteworthy that between 1998 and 2007, in Australia generally, there was a sharp decline in cannabis use from 17.9 to 9.1%. This included a decline from 36.5 to 13.8% in the NT and from 17.5 to 9.5% in Queensland (2). At the same time in the NT (31), however, and now documented in far north Queensland, cannabis use probably increased to become the significant challenge for cannabis users and the general community population that it is today.

## Opportunities to Address Cannabis Use

Although crude rates of lifetime use found in the study were very high (69%), it is encouraging that more than a third of lifetime users had succeeded in quitting in the samples. Among 29 people who had ceased using cannabis at wave 2, pregnancy among women (44) and perceived barriers of withdrawal stress (45), limited recourse to clinical support and the importance of the social context (46) have been reported as challenges to quitting cannabis in other populations. Adults in other populations have seldom reported employment and financial impacts cessation drivers, perhaps reflecting the extremely limited employment opportunities and young age of many of the users in the current study.

Self-selection of a supportive environment, important in self-initiated cessation (44), is difficult in remote Indigenous Australian communities. Cannabis use is normalized among close-knit family groups living in generally overcrowded housing. Cue exposure is high and opportunities for meaningful long-term

employment are limited. Intensified cessation support from health services is warranted but, as noted in other high-risk populations (46, 47), these must be proactive in incorporating latent and active strategies already embedded in the local social context (13). For example, interventions may incorporate the effects of widespread trauma (48), cultural perspectives (49), and social support (50). Work readiness programs may assist those seeking to quit, especially if aligned with genuine employment opportunities.

Widespread community concern about youth uptake and its effects on mental health is a prevention opportunity. It is generally recognized that young people should be advised that early cannabis use may bring serious long-term harms (51) and, as the following quote demonstrates, Indigenous community members recognize this, exemplified by the following quote from an interview with a woman in her early twenties:

> *"Young kids start and then build up and don't stop. Get addicted early."*

Efforts to reduce adolescent uptake also need to target the social context in which cannabis is used to add strength to a focus on individual decisional balance (52). Social marketing to support others' cessation might be used to better effect than raising awareness of individual level harms. Resourcing and policy to support youth engagement in school or training and strong social supports are critical.

Local financial impacts are significant, with high cost a frequently reported negative consequence for current users (36, 53). The crude estimate of the local cannabis trade at ∼$AUD39,000/week in this small population of around 2,187

Appendix 2 Quantitative data

people is similar to estimates a decade ago for NT communities ($AUD19,000–$AUD32,000/week for 2,649 people) (33). The gross annual income of the Indigenous members of the three communities in this study is approximately $25.1 million (43), of which, the local cannabis market may constitute around 9%. This parallels the widely voiced concern about broader adverse impacts on families and community and concerns about financial impacts reported during earlier consultation (35). Since similar impacts have been documented for similar remote NT communities (33) this information could be incorporated into motivational strategies and general social marketing to encourage support for those seeking to quit.

## Cannabis Dependence, "Heavy Use" and Weekly Expenditure

The association between cannabis dependence [probably reinforced by nicotine (54)] and weekly expenditure on cannabis by current users ($P = 0.023$) confirms concerns about adverse financial impacts of trafficking and addiction in users. The expected association between cannabis dependence and "heavy use" was not apparent, perhaps because of the narrow range of levels of use found. Notwithstanding the challenges of measuring "heavy use," the precise nature of the experience of cannabis dependence in these settings, where resources such as cannabis and money to purchase it are shared, requires further research into the social underpinnings of addiction in this population.

## Study Limitations

This sample was not randomly selected, but included more than one-third of males and females aged 15–49 years in the study communities, and nearly half of the 15–24 year-olds at each site. While there was bias in the overall sample toward younger and hard-to-reach males, the proportions of males and females in these age groups were broadly consistent across the communities (**Tables 1A,B**). Therefore, gross differences between communities in prevalence of cannabis use are less likely to be distorted by this sampling bias although the overall sample results may not be generalizable.

## CONCLUSIONS

The high rate of heavy and problematic cannabis use in remote Indigenous Australian communities is clearly not isolated to one part of northern Australia as reported in the limited available literature on the topic (32, 33). Substantial numbers of users in our sample were seeking to quit, which may be encouraging for people living in the participant communities. We can no longer overlook the opportunities revealed in this modest study to assist similar community populations to reduce cannabis use and address its local harms.

Indigenous populations living in similarly isolated communities elsewhere in the world, where fundamental asymmetries of social and economic power are most stark, may be especially vulnerable to experiencing cannabis harms (29, 37). Indigenous vulnerability to heavy episodic substance use reflects socioeconomic disadvantage relative to the wider economic situation (55) in a population along with a range of social (56), family (20, 39), and systemic factors (57–59). The influences of these factors on regional and ethnic variations in rates of cannabis use within nations like Australia are poorly understood and should be further investigated (21).

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Appendix 2 Quantitative data

**Appendix 3** Qualitative analysis of data from interviews conducted for the CYCP, published in the *Journal of Substance Use and Misuse.*
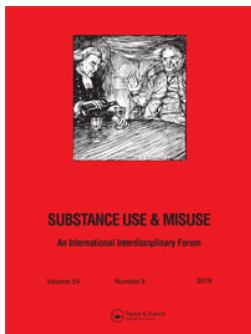
# "Need Everyone Helping to Keep Off Because Everyone Helping to Keep On" – Reducing Harms from Cannabis use in Remote Indigenous Australian Communities Involves More Than Just Users

Veronica E. Graham & Alan R. Clough

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Appendix 3 Qualitative data

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ORIGINAL ARTICLE

# "Need Everyone Helping to Keep Off Because Everyone Helping to Keep On" – Reducing Harms from Cannabis use in Remote Indigenous Australian Communities Involves More Than Just Users

Veronica E. Graham [iD] and Alan R. Clough [iD]

James Cook University , Australian Institute of Tropical Health and Medicine, Cairns, Australia

## ABSTRACT

*Background*: Heavy cannabis use in remote Indigenous Australian communities potentially contributes to existing health disparities. Community members' perceptions of cannabis harms will support harm-minimization in these settings. *Objective*: To describe perceived cannabis harms reported by a cohort of Indigenous Australians living in small, isolated communities as an indication of their existing resources for change. *Method:* Inductive thematic analysis of 407 semi-structured interviews with participants in a cohort study in three remote communities in Cape York in far north Queensland (Australia) revealed major areas of concern about cannabis. Three attitudinal categories were defined according to reported cannabis impacts and urgency for change: 1- "LOW CONCERN" said cannabis was a low priority community issue; 2- "SOME CONCERN" tolerated cannabis use but identified personal or community-level concerns; and 3- "HIGH CONCERN" expressed strong aversion to cannabis and identified serious personal or community-level harms. The characteristics and the patterns of concerns were summarized across the groups. *Results*: "Category 1- LOW CONCERN" (n = 107), mostly current users, emphasized personal "financial impacts" and "stress." "Category 2 – SOME CONCERN" (n = 141) perceived community level impacts warranting systematic action, particularly on "employment"; and "Category 3 – HIGH CONCERN" (n = 159), most of the never users, emphasized concerns for families and youth. Irrespective of use history, the cohort reported financial and abstinence-related stress, overlapping alcohol issues and generally endorsed alleviating impacts on children and youth. *Conclusion*: Nearly ubiquitous experience with cannabis harms and impacts in this cohort suggests resources for harm reduction including family and cultural obligation, stress relief, financial management, and engagement are available across all community members, not just users.

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Appendix 3 Qualitative data

**Appendix 4** Project information and Consent form used in the Cape York Cannabis Project

# JAMES COOK UNIVERSITY
**MARIJUANA (CANNABIS) STUDY**
**INFORMATION TO ACCOMPANY**
**CONSENT STATEMENTS**
**THIS IS FOR YOU TO KEEP**

Smoking marijuana causes a lot of mental health problems in Australia.
James Cook University is trying to support remote communities in Cape York and
Torres Strait to encourage community people to avoid taking up marijuana, to stop
smoking marijuana or cut down. This should help a lot to relieve some mental health
problems in these communities. The project will run for four years.

Trying to quit smoking marijuana is not easy, especially when many people smoke
and marijuana is easy to get. People who want to try to quit will need help,
especially if they have been a heavy user for a long time. Our project will train
clinic workers and others who work with us in your community to help people to quit
marijuana or to cut down. We will also work with local people to develop
information for people about marijuana and mental health problems that they can
easily understand. We will work with the Council and other community agencies to
come up with ideas for the community to encourage people to avoid using marijuana.

We will ask people aged 16 to 34 in the communities whether they smoke marijuana
or not and some questions about problems with their marijuana use. We will do this
at the start of the project. It will take about 15 minutes. Then after about one year,
we will come back and ask the same people if they are still smoking. To prove that
someone has given up or cut down when we try to interview them in a year or so, we
will ask their permission to ask our local research assistants about whether they are
still using. We will interview heads of households or senior family members in the
community and key people who provide services to the community to ask
them what they think the problems are and how to address the problems in the
community. This may take up to half an hour depending on the ideas people have.
We will interview them at the start of the project and again in about a year's time to
find out what changes they may have seen in marijuana use and marijuana problems
in the community.

You can say 'no' or you can pull out of this study any time. Call Alan Clough (
    ) and your information will be removed from the study. For any concerns and
complaints about the ethical conduct of the study contact the Chairperson, Professor
Michael Humphrey, Human Research Ethics Committee of the Cairns and
Hinterland Health Service District.
Phone 07 4050 8012, e-mail cairns_ethics@health.qld.gov.au.

IV

**There are some legal risks you should know about:**

There are some risks of participating in this study that you should know about before giving your consent to participate. The risks come about because there is no law to guarantee that any information you give to the researcher about illegal behaviour, your own or that of others, can be kept confidential if the information is requested by the Police or a court.

**We are NOT trying to find out about:**

- Who is selling marijuana and who is buying it, i.e. about trafficking in marijuana.
- Who may have been buying or selling marijuana in the past.
- Crimes that have not come before the court or which are still being investigated.

**We ARE trying to find out about:**

- How much marijuana people have been smoking and whether the amount they have been smoking has caused harm to their health
- Behaviour that is harmful to the rest of the community, the person's family and to the person themselves.
- How and why the person started smoking marijuana and for those who don't smoke marijuana, what stopped them from taking it up or what helped them give up.
- Any past trouble with Police and the courts and any trouble with family, arguments in the community or people wanting to hurt themselves and others.

We are working closely with Queensland Police Service and your community Council to make sure that the chances of Police needing the detail of confidential interviews with participants is very small. But we cannot guarantee you absolutely that they will not ask for this information.

v

**JAMES COOK UNIVERSITY**

**CANNABIS STUDY**
**KEY INFORMANT**
**CONSENT STATEMENT**

I, _____agree to be in this study.

I understand the information provided to me about the risks of the researcher being
obliged to provide this information to Police or a court if they request it.
This has been explained to me by

_____

I understand that I do not have to be in the study if I don't want. I can contact Alan
Clough (              ) to remove me from the study at any time. Information
already provided can be removed from the study if I request.

I understand that the results of my interview will only be used for the purposes for
which this research is carried out.

Signed _____(key informant)

Witness _____ Date _____

**Appendix 5** Visual depiction of the Severity of Dependence Scale

**Generic questions in the Severity of Dependence Scale used with local words for cannabis (e.g. gunja)**

1. Did you ever think your cannabis (local term) use was out of control?

2. Did the prospect of missing a smoke make you very anxious or worried?

3. How much did you worry about your use of cannabis?

4. Did you wish you could stop using cannabis?

5. How difficult would you find it to stop or go without cannabis?

**Responses question 1-3:** Not at all 0; A little 1; Often 2; Always or nearly always 3.
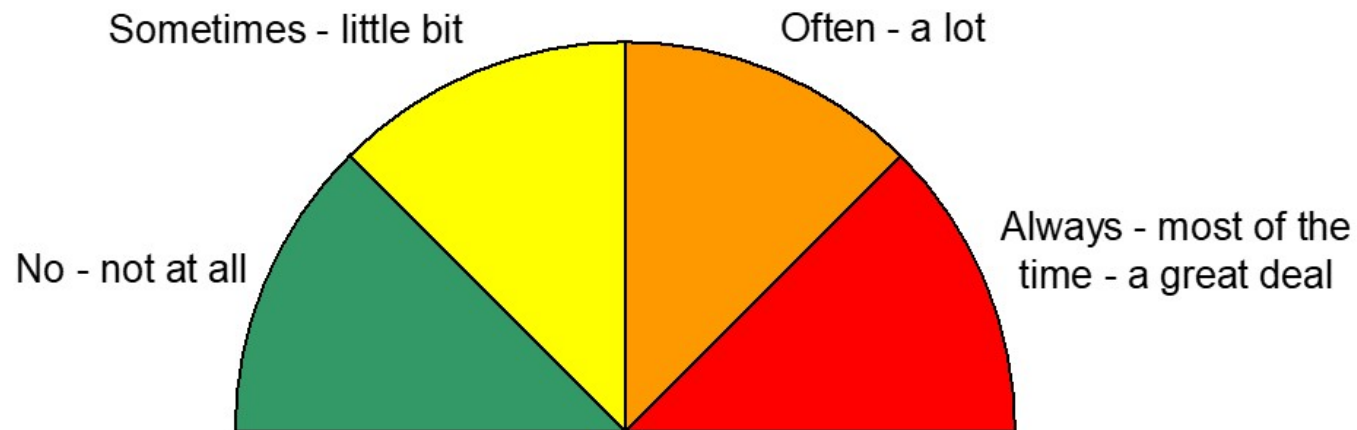


**CAPE YORK CANNABIS PROJECT**

**Responses question 4:** Not difficult at all 0; Quite difficult 1; Very difficult 2; Impossible 3.



**CAPE YORK CANNABIS PROJECT**

JAMES COOK
UNIVERSITY
AUSTRALIA
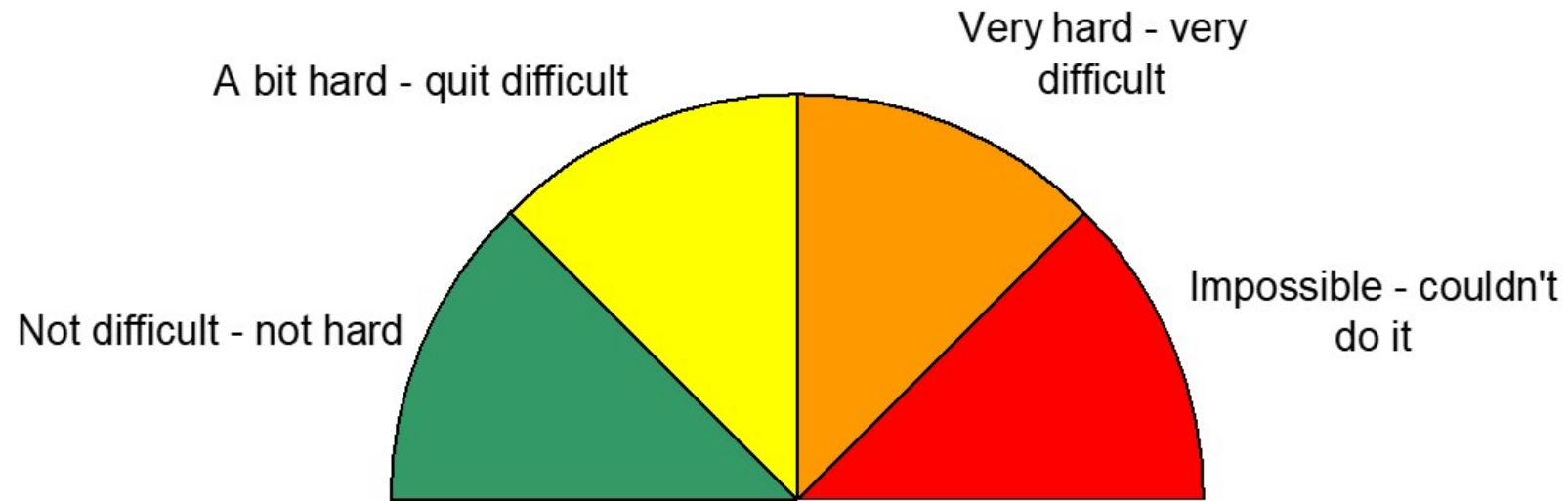
## Appendix 6 Calendar of field trips to three communities 2001-12 [Return to section 2.8.1]

| Cape York Cannabis Project / 2007-2012 | 2007/2008 Months? | 2010 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 2011 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 2012 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Consultation Phase (list communities) | ■yellow | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Capacity building: NCPIC Cannabis Information worshops | | | | ■ | ■ | | | | | | | ■ | | | | | | | | | | | | | | | | ■ | | ■ | ■ | | | | | | |
| Lotus Glen Workshops & Interviews Prison | | | | | ■ | ■ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Townsville Women's Prison Interviews | | | | | | | | | | | | | | | | | ■ | | | | | | | | | | | | | | | | | | | | |
| Awareness raising - Community A | | | | | | | | | | | | | | | | | ■ | | ■ | | ■ | | | | | ■ | ■ | ■ | ■ | ■ | | | | | | | |
| Awareness raising - Community B | | | | | | | | | | | | | | | | | | | ■ | | | | | | | | ■ | ■ | ■ | ■ | | | | | | | |
| Awareness raising - Community C | | | | | | | | | | | | | | | | | | | | | | | | | | | ■ | ■ | ■ | ■ | ■ | | | | | | |
| Community Engagement - Community A | | | | | | | | | | | | | | ■ | ■ | ■ | | | | | | | | | | | | ■ | ■ | ■ | ■ | | | | | | |
| Community Engagement - Community B | | | | | | | | | | | | | | | | | | ■ | ■ | ■ | ■ | | | | | | | | ■ | ■ | ■ | | | | | | |
| Community Engagement - Community C | | | | | | | | | | | | | | | | | | | | ■ | ■ | | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | | | | | | |
| Baseline Interviews - Community A | | | | | | | | | | | | | | ■ | ■ | ■ | | | | | | | | | | | | | | | | | | | | | |
| Baseline Interviews - Community B | | | | | | | | | | | | | | | | | | ■ | ■ | ■ | | ■ | ■ | | | | | | | | | | | | | |
| Basline Interviews - Community C | | | | | | | | | | | | | | | | | | | ■ | ■ | ■ | ■ | | | | | | | | | | | | | | |
| Feedback - Community A | | | | | | | | | | | | | | | ■ | | ■ | | | ■ | ■ | | | | ■ | | | | | | | | | | | | |
| Feedback - Community B | | | | | | | | | | | | | | | | | | | | ■ | ■ | | | | ■ | | | | | | | | | | | | |
| Feedback - Community C | | | | | | | | | | | | | | | | | | | | | | | | ■ | | | | | | | | | | | | | |
| Capacity building: Cannabis Motivational Interviewing | | | | | | | | | | | | | | | | | | | | | | | | ■light green | | | | | | | | | | | | | |
| Intervention - Community A | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ■cyan | | | | | | |
| Intervention - Community B | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ■cyan | | | | | | |
| Intervention - Community C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ■cyan | | | | | |
| Follow up - Community A | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ■magenta | | | | | | |
| Follow up - Community B | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ■magenta | ■ | | | ■ | | |
| Follow up -Community C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | ■magenta | ■ | | | ■ | | |

## Appendix 7 NHMRC project grants included in the review published in 2017

a) Project grants included in the 2017 Review article (Appendix 1 and Chapter 3)

| Year | Grant# | CIA | State | Title | Search terms | life of project | k$ |
|------|--------|-----|-------|-------|--------------|-----------------|-----|
| 2003 | 253511 | Dr Robyn McDermott | QLD | The impact of a multi-intervention anti-tobacco strategy in 8 Indigenous communities | Smoking, intervention, RCT, evaluation | 3 | 555 |
| 2005 | 320851 | Dr Sandra Eades, | NT | Helping Indigenous women to stop smoking during pregnancy | Intervention RCT | 3 | 686 |
| 2007 | 436012 | Dr Alan Clough | NT | Community action for smoking cessation in remote Aboriginal communities | Community-level intervention to reduce tobacco | 4 | 1.1 m |
| 2008 | 510771 | Dr Sandra Eades | QLD | Yrs 4 & 5 RCT smoking reduction among pregnant women | Smoking, intervention, RCT, evaluation | 2 | 314 |
| 2008 | 513818 | Dr Ggaeme Macguire | WA | Randomised Controlled Trial of an intensive smoking cessation intervention in Kimberley Aboriginal PHC setting | Smoking, intervention, RCT, evaluation | | 778* |
| 2009 | 545203 | Dr David Thomas, | NT, NZ | A study of a family-centred smoking control program to reduce respiratory illness in Indigenous infants | Family-centred, tobacco | | 864 |
| 2010 | 641002 | A/ Prof Alan Clough | QLD | Indigenous action to reduce harms associated with heavy cannabis use in Cape York | Cape York Cannabis Project | 3 | 785 |
| 2013 | 1048069 | A/ Professor Anthony Shakeshaft | QLD | Intervention trial to reduce alcohol related harms among high risk young Indigenous Australians | Alcohol, Binge drinking | 2 | 380 |

* Department of Health and Ageing - General Practice Clinical Research Grant, or strategic grant

x

b) Project grants included in the 2021 review update (Chapter 3)

| Year | Grant# | CIA | State | Title | Search terms | life of project | k$ |
|------|--------|-----|-------|-------|--------------|-----------------|-----|
| 2015 | 1098308 | A/Pr David Thomas | NT | Social media to enhance Indigenous tobacco control | | 3 | 923 |
| 2015 | 1105339 | Prof Katherine Conigrave | National | Increasing uptake of evidence-based management of unhealthy alcohol use in Aboriginal primary health care services | - | 4 | 2.3 m |
| 2015 | 1105000 | Dr James Fitzpatrick | WA | Making Fetal Alcohol Spectrum Disorders History in the Pilbara:  An evidence-based prevention intervention | Hedland FASD Project | 4 | 1.7 m |
| 2015 | 1108309 | Prof Brian Smith | SA | Training health professionals in tobacco cessation and evidence translation for Aboriginal Australians | - | 4 | $832 |
| 2016 | 1116084 | Prof Billie Bonevski | SA | Title: 'Indigenous Counselling and Nicotine (ICAN) QUIT in Pregnancy' - a cluster randomised trial to implement culturally competent evidence-based smoking cessation for pregnant Aboriginal and Torres Strait Islander smokers | International collaborations | 4 | 2.3 m* |
| 2017 | 1132367 | Dr Michael Wright | WA | Looking Forward - Moving Forward Project: Transforming systems to improve mental health and drug and alcohol outcomes for Aboriginal peoples | Looking Forward - Moving Forward | 3 | 1.3 m** |

* International collaboration grant

** Partnership project grant