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# **A service-level action research intervention study protocol to improve identification and treatment of cannabis and related mental health issues in young Indigenous Australians**

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## Abstract

**Background:** Regular cannabis use is associated with negative mental health impacts including psychosis, depression and anxiety. A young age of uptake, and high rates of cannabis use has increased in Aboriginal and Torres Strait Islander communities in northern Australia within the last two decades presenting a significant increased risk to young people's mental health in these regions. Improved screening, early detection and treatment for cannabis-related mental health issues are urgently required. This paper describes a service-level action research intervention and evaluation protocol for use in the few services where it is possible to engage young Aboriginal and Torres Strait Islander Australians.

**Methods/Design:** The protocol is being developed in two services where youth mental health is core business; a primary health care centre and a youth service in the Cairns and hinterland region, far north Queensland. The protocol calls firstly for baseline data to be collected using: staff and client surveys; network mapping; and analysis of screening, treatment and referral rates. The protocol's intervention phase is driven by service needs identified from baseline data. Intervention components focus on: implementing/enhancing cannabis screening instruments and processes in line with current best practice; enhancing networks with external drug and mental health services; developing culturally acceptable training programs and resources; developing targeted intervention programs for young Aboriginal and Torres Strait Islander cannabis users within the services. The protocol requires implementation of the intervention for one year with follow up data collected and compared to baseline. Process evaluation identifies the more effective intervention components and documents the challenges to be overcome for full implementation.

### **Ethics and Dissemination:**

Ethics approval was provided by The James Cook University, Human Research Ethics Committee. Ethics Approval Number H5322. Peer-reviewed publications will also be used to disseminate the findings. Results will also be discussed with stakeholder organisations.

**Keywords:** health service research, Indigenous, cannabis, treatment, detection

**Strengths and limitations of this study**

- This project utilises Participatory Action Research to develop Indigenous health interventions, as recommended in the NHMRC Road Map: A Strategic Framework for Improving Aboriginal and Torres Strait Islander Health through Research
- This study is unique: no published studies have addressed cannabis use or mental health in this hard to engage demographic, Indigenous young people.
- This study focuses on development of a much-needed culturally appropriate intervention for cannabis and mental health issues in Indigenous youth.
- This study is not a Randomised Control Trial (RCT), however the lack of rigorous evidence in this research area requires more exploratory and participatory research and intervention as proposed here.
- The organisations do not necessarily represent the diversity of youth services in Australia.

## BACKGROUND

Aboriginal and Torres Strait Islander youth are at significantly greater risk of developing substance use and mental health disorders compared to their non-Indigenous counterparts. They are around twice as likely to be hospitalised or die from injury; six times more likely to die from assault and four times more likely to die from suicide [1]. Up to 15% of the 10-year life expectancy gap between Indigenous and non-Indigenous Australians is attributed to mental health conditions [2], and Indigenous young people aged 12–24 years are hospitalised for mental and behavioural disorders three times more often than non-Indigenous young people [3].

Cannabis use can be a significant contributor to poor mental health, particularly when use begins at a young age [4-6]. The adverse mental health effects of cannabis use in the general population are increasingly recognised, including anxiety, depression [7-9], psychotic disorders [5, 10-13], dependence [7, 8, 14] withdrawal [15, 16], and cognitive impairment [17, 18]. Starting to use cannabis before age 15 is associated with an increased likelihood of developing later psychotic disorders, increased risk of dependence, other drug use and poor educational and psychosocial outcomes [6].

In Australia, little is known about the links between cannabis use and poor mental health in the young Aboriginal and Torres Strait Islander Australian population. Although this segment of the population has proven to be extremely difficult to engage for health promotion, prevention, service provision and research [19-22], recent surveys demonstrate that the prevalence of cannabis use in the Aboriginal and Torres Strait Islander Australian population in remote and very remote regions of northern Australia is very high in young people. In remote far north Queensland, 66% of men and 30% of women were currently using cannabis in a recent survey [23]. In remote communities in the Northern Territory, rates of use as high as 67% of Aboriginal and Torres Strait Islander men and 22% of Aboriginal and Torres Strait Islander women were earlier reported, half regular (daily) users [24] and around one-fifth meeting criteria for cannabis dependence or moderate-severe depression [25, 26]. This is in stark contrast with estimates from surveys of the general Australian population, in which 10.3% of adults surveyed in 2010 reported using cannabis within the past year, 13% of users reporting daily use [27]

and of those surveyed aged between 14 and 18, just 15.7% had reportedly used cannabis in the last 12 months [27].

In the only study to examine self-reported qualitative mental health impacts of cannabis published so far for Aboriginal and Torres Strait Islander populations, one in four current users may be suffering from negative mental health effects due to cannabis [23]. Reinforcing this limited data, Hunter et al. (2012) reported that the prevalence of psychosis in Aboriginal and Torres Strait Islander Australians in north Queensland was double that of the general Australian population, with cannabis playing a significant role in the onset of psychotic disorders in 50% to 59% of diagnoses [28]. There is no data available, at all, for the much larger populations of Aboriginal and Torres Strait young people who live in metropolitan and regional centres.

Addressing cannabis use issues and recognising the importance of reducing early onset use in preventing dependence, mental illness, and negative psychosocial outcomes in Aboriginal and Torres Strait Islander young people should be a high priority [24, 29-31]. Despite this, there are no published intervention strategies that have been shown to be effective in reducing cannabis use and mental health issues in any population of Aboriginal and Torres Strait Islander young people.

**Objectives**

The key objectives of this protocol are to:

1. Enhance the capacity of the few youth services and health services in regional centres in Queensland who have the capacity to engage with Aboriginal and Torres Strait Islander youth so that they can more routinely document cannabis use rates and effectively identify, refer, treat and respond to cannabis and related mental health issues in their clients, and;
2. Develop and implement intervention strategies to improve identification and treatment of cannabis and related mental health issues in young Indigenous clients within these services, using an action research approach;
3. Evaluate the effectiveness of the intervention strategies by comparing baseline data collected in item 1 with follow up data, and conducting process evaluation.

## METHODS/DESIGN

### Study design and setting

This intervention study will use an action research approach [32] within participating services to influence practice and effect sustainable change. A key feature of the study is collaboration with staff and stakeholders to identify needs and develop and implement practical strategies to improve identification and treatment of cannabis and related mental health issues in their young Indigenous clients. The action research framework encourages the services and staff to take ownership of the research and contribute to the development of sustainable changes in practice [32].

The research will be conducted across Queensland. The protocol is being developed and tested in far north Queensland, in two services in the Cairns and hinterland region. The participating services were chosen because they were keen to participate in the research, one is an Aboriginal community controlled primary health service and the other is a community-based service that works with vulnerable and hard-to-engage young people, the majority of whom are Aboriginal or Torres Strait Islanders. The primary health care service provides to a population of 764 Indigenous Australians aged 10-24 years, which represents 28.5% of a total of 2,677 Indigenous persons in the local population [33]. The community-based youth service serves a population of approximately 4,338 Indigenous young people aged 10-24 years, which represents 30.1% of a total of 14,391 Indigenous persons in the local population [33]. The client base of both services includes a significant number of young people who move between the regional centre and the remote and very remote communities of far north Queensland.

As shown in Figure 1, this protocol calls for the intervention and research to be conducted over two years; Objective 1 (6 months), Objective 2 (12 months), Objective 3 (6 months).

Figure 1: Timeline of research/concept diagram

### Data collection

Data collected at baseline and follow up is shown in Table 1. Data collection methods include staff and client surveys, process mapping, network mapping, and document scans. Participants in the research include both staff and clients at each service involved. All staff in the services are invited to participate, and to complete the same survey at baseline and follow up, addressing key issues in cannabis-related knowledge, attitudes and practice (Table 2).

Table 1: Data collection

Method	Data collected	Data source
Service system data analysis	Client demographic information	Service data
	Client primary drug of concern	Service data
	Number of clients screened for cannabis in previous 12 months	Service data
Survey	Screening, referral, treatment practices for cannabis and mental health issues	Staff
	Cannabis knowledge, attitudes and practice	Staff
	Cannabis use information	Clients
Semi-structured interviews	Service needs, training, opportunities for intervention	Staff
	Process evaluation	Staff, stakeholders
Process mapping	Flow of patients through the service, screening and referral points	Staff
Network mapping	Referral pathways, opportunities to strengthen inter-service relationships	Staff
Document scan	Cannabis resources used	Staff

Table 2: Knowledge attitude and practices survey contents

Domain	Item content
Knowledge	Lifetime cannabis use rates (total Australian population, Indigenous Australian population, Cape York population)
	Current cannabis use rates (total Australian population, Indigenous Australian population, Cape York population)



	Daily cannabis use rates (total Australian population, Indigenous Australian population, Cape York population)
	Gender-related differences in use
	Quit intentions (derived from Cape York cannabis research)
	Impacts on physical health, mental health and cognitive function
	Cost per gram – national, local, Cape York
	Symptoms of dependence
	Age-related risk of dependence
	Effective treatments for cannabis dependence
	Recognition of presence of a cannabis screening policy within the service
	Recognition of presence of a mental health screening policy within the service
Attitudes	Legal status of cannabis use
	Medicinal use
	Harms related to cannabis (mental health, physical health, dependence)
	Psychosocial impacts (crime, education, other drug use)
	Perceptions of young cannabis users attitudes toward screening and treatment
	Utility and benefits of screening for cannabis use
	Satisfaction with level of knowledge
	Satisfaction with skills in screening and treating cannabis related issues
	Satisfaction with existing resources
	Satisfaction with training in cannabis-related issues
Practice	Number of clients screened, referred or treated for cannabis use in the previous month
	Number of clients screened, referred or treated for mental health issues in the previous month
	Barriers to screening and treatment for cannabis use issues
	Opportunities to improve confidence in screening and treating cannabis use

To determine the effectiveness of the intervention on cannabis use rates among the clients, client surveys are to be conducted at baseline and follow up (Table 3). Aboriginal and Torres Strait Islander clients aged between 12 and 24 years will be invited to participate in the surveys, which should be conducted in waiting rooms or another suitable situation during baseline and follow up.

Table 3: Client cannabis use survey

Cannabis and other drug use	Current drug use (cannabis and other drugs)
	Type, frequency and quantity of drug use
	Age of first use
	Financial expenditure on cannabis
	Method of use
Readiness to change	Intentions to quit or cut down
	Readiness to change
Mental Health	Current and past experience of symptoms of anxiety, depression, psychosis (GAD-7, PHQ-9, Strong Souls)
Demographic information	Gender, age, Aboriginal and/or Torres Strait Islander Highest level of education attained

Client surveys will be used to determine cannabis use patterns and mental health status, incorporating the following questionnaires: the Adolescent Cannabis Problems Questionnaire (CPQ-a) [34], Patient Health Questionnaire 9 (PHQ-9) [35], Generalised Anxiety Disorder 7 (GAD-7) [36] and Strong Souls [37].

Network and process mapping will be used to identify the relationships that exist with organisations surrounding both the services. Network mapping will be used in this study to show how each organization interacts with the service, including client referrals and resources [38]. Network mapping identifies influential organisations within the services network, and outlines the paths used by the services to seek support for clients. [39]

Process evaluation using realist evaluation techniques [40, 41] is included to determine if the intervention strategies were implemented as intended, and to fully describe any barriers to successful implementation. Realist evaluation in this study seeks to identify the mechanisms by which service practices work or not in both the health service and the youth service contexts. Using information collected in interviews with service staff and clients, using service records and documents as well as information from interviews with staff in other services in the network, these mechanisms will first be

identified and discussed with participating service staff to reach a consensus. In group discussions, the way these mechanisms are believed to operate will be mapped. At this theoretical level, the influence of the network of collaborating service providers, the context, will be considered in order to design practical and acceptable ways of making these mechanisms more effective. The intervention will be tested by implementing it. In a series of learning and information-sharing sessions with staff, the effectiveness of the intervention will be assessed and refined for further testing. The intervention design will include the design of suitable data collection tools for monitoring changes in service performance that can be attributed to the intervention. The realist evaluation approach uses participatory action research in this way to evaluate what works for whom and in what context. The process evaluation plan is shown in Table 4.

*Table 4: Process evaluation design with realist evaluation framework following realist evaluation principles outlined by Pawson et al [40, 41]*

Realist evaluation component	Process evaluation component	Data sources	Data collection timetable	Data analysis
Context	Process and service network mapping	Interviews with service staff	Baseline	Qualitative/thematic changes and network analysis
		Service document scan	Baseline and follow-up	Monitoring for key decision making moments
		Interviews with staff in collaborating services in the network	Baseline and follow-up	Qualitative/thematic changes and network analysis
Mechanism	Intervention development	Number of education workshops with service staff	Baseline and intervention phase	Numeric
		Workshop evaluations/rating	Baseline	Likert scale compilations and comparisons
		Number of distinct intervention components developed	Baseline	Numeric
	Intervention implementation	Number and proportion of distinct components put	Intervention	Numeric

		into practice		
Outcomes	Increased proportion of target group screened/referred	Service records	From baseline through follow-up	Repeated measures of proportions of client screened
	Increased staff knowledge and practices	Knowledge, attitudes and practices survey	Baseline and follow-up	Qualitative/thematic changes and change in network characteristics

Intervention

Following baseline data collection, the protocol calls for one workshop to be held at each service with staff and key stakeholders, to achieve Objective 1. Consistent with the action research approach, researchers work with staff to interpret the results of Objective 1, and to achieve Objective 2, develop interventions that are feasible, practical and readily implementable within the service. The workshop will be used to:

- 2.1 Identify/develop and implement valid and effective screening instruments and processes;
- 2.2 Develop and implement strategies to enhance screening of the target groups;
- 2.3 Develop and implement strategies to improve relationships with external services;
- 2.4 Identify/develop and implement cannabis and mental health training programs and resources for service staff to enhance knowledge and skills;
- 2.5 Identify/develop and implement cannabis and mental health intervention programs and resources for target clients.

Objective 2 intervention components will be designed to maximize incorporation into routine practice with little or no additional resources required. Staff working within the service are to be involved in and deliver the interventions while researchers facilitate the work and support staff through regular visits during implementation.

Recognising that the response from each service will be different, and consistent with an action research approach, the interventions will be developed with each service separately, however opportunities to work together and share expertise and experiences will be maximized.

### Data analysis

Descriptive statistics will be used to analyze the baseline staff surveys. A comparison of survey results before and after intervention will be undertaken using paired samples t-tests for continuous/ordinal variables, and McNemar's test for changes in categorical variables. For client surveys, no identification details are recorded, and surveys are treated as cross-sectional. Descriptive statistics summarise details of client demographic characteristics. Where appropriate, independent sample t-tests will be used to compare continuous/ordinal variables and chi-squared tests will be used for categorical variables. Thematic analysis will be used to analyse all qualitative data collected during baseline, mid-term process evaluation, and final evaluation.

### Limitations

Although randomized controlled trials generate the most reliable evidence of intervention efficacy, the project described here develops the intervention as well as procedures to monitor implementation fidelity of the intervention. The protocol described here is a necessary preliminary step in this challenging area of research where there are no credible interventions available. An action research approach is necessary. If successful, the action research model augmented by a realist evaluation approach for the process evaluation will assist to inform randomized controlled trials to be implemented in similar service networks in other Australian jurisdictions and possibly other similar settings.

### DISCUSSION

Although the study of cannabis use in Indigenous populations worldwide is in its infancy, there is a growing collaborative effort to address cannabis and related mental health issues in young Aboriginal

and Torres Strait Islander people emanating from northern Australia. This work has documented sound evidence for high rates of cannabis use in remote Aboriginal and Torres Strait Islander populations [19, 23-25, 30, 31, 42]. But, it is increasingly recognised that the issues so far documented may also have appeared in peri-urban populations of Indigenous youth. In metropolitan and regional centres, Indigenous youth, are particularly hard to engage because they are embedded within populations which are many times greater than the small discrete communities which typify remote northern Australia where the only available evidence about Indigenous cannabis use has so far been compiled [43, 44]. To engage with such populations, it is critical that researchers work closely with relevant community-based services being used by these young people, to develop strategies that can improve their capacity to identify, refer, and treat cannabis and related mental health issues. If this is not done, then young people in regional and urban centres across Australia will continue to be overlooked, leading to further marginalisation.

Evidence-based interventions for mental health and illicit drug use are crucial to confer long-lasting, sustainable mental health benefits to young Indigenous Australians. Failure to develop these will result in further long-term negative impacts on young people’s workforce participation, productivity, family and community. Innovative strategies are needed to build the knowledge and capacity of practitioners, improve system-level processes and response, enhance the community and service provider network, and provide adequate support for young Indigenous people seeking help for cannabis and mental health issues.

It is anticipated that the research approach developed here can be used as a flexible intervention development model in future controlled trials in community and primary health care settings to improve identification and treatment of mental health and substance use in young Indigenous Australians. Implementation of this study protocol will also provide valuable data on current cannabis use rates and impacts in young Aboriginal and Torres Strait Islander Australians. It is highly likely that early detection and/or early intervention strategies developed as part of the project will be incorporated into other community health services and community organisations, and it is anticipated that this model of needs assessment, intervention and evaluation will be applicable to other settings.

## Ethics and dissemination

Ethics approval was provided by The James Cook University, Human Research Ethics Committee. Ethics Approval Number H5322. The protocol calls for results to be discussed with stakeholder organisations. Peer-reviewed publications will also be used to disseminate the findings. Findings will also be presented at national and international conferences with an Indigenous health focus and in collaboration with health service staff as opportunities to develop their research capacities emerge.

## Authors' information

Dr India Bohanna has an NHMRC Early Career Fellowship in Aboriginal and Torres Strait Islander Health, with a focus on mental health and substance misuse. She is also Associate Research Fellow in the APHCRI Centre for Research Excellence in the Prevention of Chronic Conditions in Rural and Remote High-Risk Populations.

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## Authors' contributions



1  
2  
3 IB and AC identified the research question, designed the study, and are primary investigators in this  
4 study. IB and KB drafted the manuscript. IB, KB and AC all revised the manuscript critically and  
5 contributed critical revisions. IB, KB and NR will acquire the data. IB, KB, NR and AC will be  
6 involved in the analysis and interpretation of the data. All authors read and approved the final  
7 manuscript.  
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22 **Competing interests**

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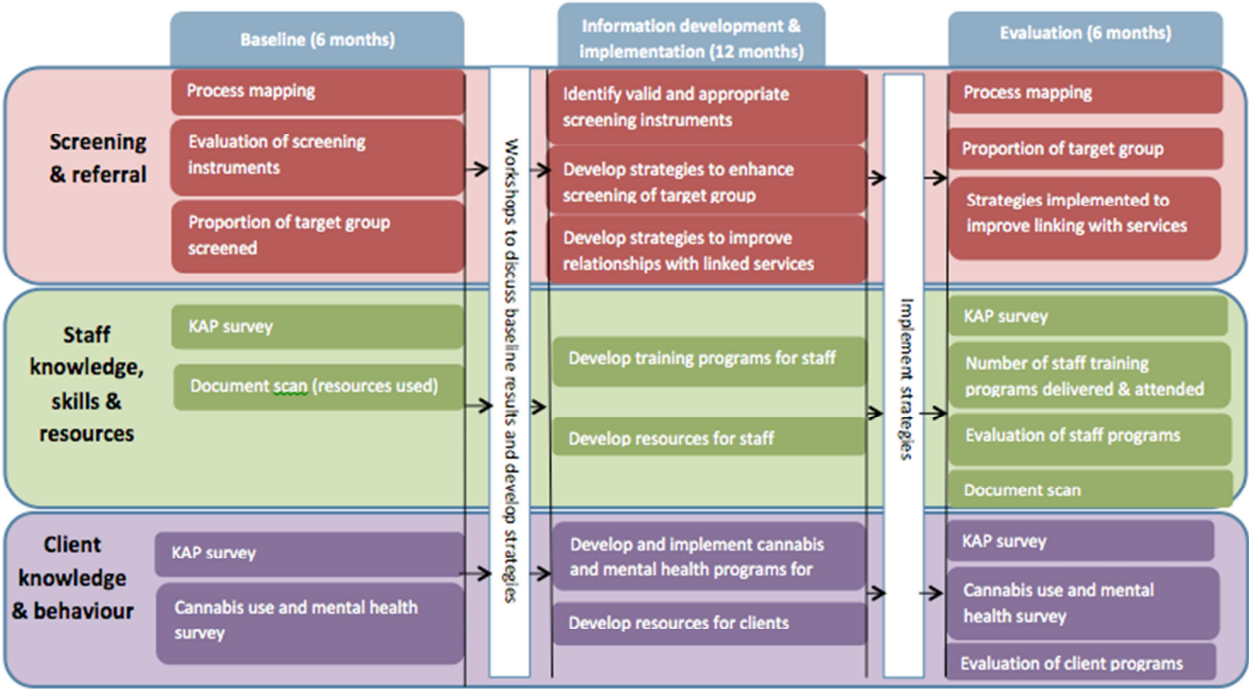
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# BMJ Open

## A service-level action research intervention to improve identification and treatment of cannabis and related mental health issues in young Indigenous Australians: study protocol

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**A service-level action research intervention to improve  
identification and treatment of cannabis and related  
mental health issues in young Indigenous Australians:  
study protocol**

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## Abstract

**Introduction:** Regular cannabis use is associated with negative mental health impacts including psychosis, depression and anxiety. Rates of cannabis use have increased in Aboriginal and Torres Strait Islander communities in northern Australia within the last two decades presenting a significant increased risk to young people's mental health in these regions. Improved screening, early detection and treatment for cannabis-related mental health issues are urgently required. This paper describes a service-level action research intervention and evaluation protocol for use in the few services where it is possible to engage young Aboriginal and Torres Strait Islander Australians.

**Methods/Design:** The protocol is being developed in two services where youth mental health is core business; a primary health care centre and a youth service in the Cairns and hinterland region, far north Queensland. The protocol calls firstly for baseline data to be collected using: staff and client surveys; network mapping; and analysis of screening, treatment and referral rates. The protocol's intervention phase is driven by service needs identified from baseline data. Intervention strategies focus on: implementing/enhancing cannabis screening instruments and processes in line with current best practice; enhancing networks with external drug and mental health services; developing culturally acceptable training and resources; developing activities aiming to reduce cannabis use in young Aboriginal and Torres Strait Islander clients using the services. The protocol requires implementation of the multi-level intervention within each service for one year, with follow up data then collected and compared to baseline. Process evaluation identifies the more effective intervention strategies and documents the challenges to be overcome for full implementation.

**Ethics and Dissemination:**

Ethics approval was provided by The James Cook University, Human Research Ethics Committee.

Ethics Approval Number H5322. Peer-reviewed publications will also be used to disseminate the finding Results will also be discussed with stakeholder organisations.

For peer review only



## INTRODUCTION

Aboriginal and Torres Strait Islander youth are at significantly greater risk of developing substance use and mental health disorders compared to their non-Indigenous counterparts. They are around twice as likely to be hospitalised or die from injury; six times more likely to die from assault and four times more likely to die from suicide [1]. Up to 15% of the 10-year life expectancy gap between Indigenous and non-Indigenous Australians is attributed to mental health conditions [2], and Indigenous young people aged 12–24 years are hospitalised for mental and behavioural disorders three times more often than non-Indigenous young people [3].

Cannabis use can be a significant contributor to poor mental health, particularly when use begins at a young age [4 5]. The adverse mental health effects of cannabis use in the general population are increasingly recognised, including anxiety, depression [6-8], psychotic disorders [4 9-12], dependence [6 7 13] withdrawal [14 15], and cognitive impairment [16 17]. Starting to use cannabis before age 15 is associated with an increased likelihood of developing later psychotic disorders, increased risk of dependence, other drug use and poor educational and psychosocial outcomes [5].

In Australia, little is known about the links between cannabis use and poor mental health in the young Aboriginal and Torres Strait Islander Australian population. Although this segment of the population has proven to be extremely difficult to engage for health promotion, prevention, service provision and research [18-21], recent surveys demonstrate that the prevalence of cannabis use in the Aboriginal and Torres Strait Islander Australian population in remote and very remote regions of northern Australia is very high in young people. In remote far north Queensland, 66% of men and 30% of women were currently using cannabis in a recent survey [22]. In remote communities in the Northern Territory, rates of use as high as 67% of Aboriginal and Torres Strait Islander men and 22% of Aboriginal and Torres Strait Islander women were earlier reported, half regular (daily) users [23] and around one-fifth meeting criteria for cannabis dependence or moderate-severe depression [24 25]. This is in stark contrast with estimates from surveys of the general Australian population, in which 10.3% of adults surveyed in 2010 reported using cannabis within the past year, 13% of users reporting daily use [26]

and of those surveyed aged between 14 and 18; just 15.7% had reportedly used cannabis in the last 12 months [26].

In the only study to examine self-reported qualitative mental health impacts of cannabis published so far for Aboriginal and Torres Strait Islander populations, one in four current users may be suffering from negative mental health effects due to cannabis [22]. Reinforcing this limited data, Hunter et al. (2012) reported that the prevalence of psychosis in Aboriginal and Torres Strait Islander Australians in north Queensland was double that of the general Australian population, with cannabis playing a significant role in the onset of psychotic disorders in 50% to 59% of diagnoses [27]. There is no data available, at all, for the much larger populations of Aboriginal and Torres Strait young people who live in metropolitan and regional centres.

Addressing cannabis use issues and recognising the importance of reducing early onset use in preventing dependence, mental illness, and negative psychosocial outcomes in Aboriginal and Torres Strait Islander young people should be a high priority [25 28-30]. Despite this, there are no published intervention strategies that have been shown to be effective in reducing cannabis use and mental health issues in any population of Aboriginal and Torres Strait Islander young people.

**Objectives**

The key objectives of this protocol are to:

1. Enhance the capacity of the few youth services and health services in regional centres in Queensland who have the capacity to engage with Aboriginal and Torres Strait Islander youth so that they can more routinely document cannabis use rates and effectively identify, refer, treat and respond to cannabis and related mental health issues in their clients, and;
2. Develop and implement intervention strategies to improve identification and treatment of cannabis and related mental health issues in young Indigenous clients within these services, using an action research approach;
3. Evaluate the effectiveness of the intervention strategies by comparing baseline data collected in item 1 with follow up data, and conducting process evaluation.

## METHODS/DESIGN

### Study design and setting

This study will use a participatory action research approach [31] within services to influence practice and effect sustainable change at the service level. This approach is endorsed for Aboriginal and Torres Strait Islander research given that it emphasises participation by the people being studied, cultural respect, capacity building, and collaboration [32]. A key feature of the action research approach to be used in this study are “cyclical activities involving examination of existing processes, change monitoring the apparent effects if the change, and further change.” [33]. This will help the services develop and implement practical strategies to improve identification and treatment of cannabis and related mental health issues in their young Indigenous clients. The participatory approach encourages the services and staff to take ownership of the research and contribute to the development of sustainable changes in practice [31]. In this study the targets of the intervention are the services. The intervention is conducted at a service level and thus does not seek to reduce cannabis use rates in young Aboriginal and Torres Strait Islander clients directly through individual-level strategies. Nevertheless examination of changes in cross-sectional client cannabis use will be included.

The research will be conducted across Queensland. The protocol is being developed and tested in far north Queensland, in two services in the Cairns and hinterland region. The participating services were chosen because they were keen to participate in the research, one is an Aboriginal community controlled primary health service and the other is a community-based service that works with vulnerable and hard-to-engage young people, the majority of whom are Aboriginal or Torres Strait Islanders. The primary health care service provides to a population of 764 Indigenous Australians aged 10-24 years, which represents 28.5% of a total of 2,677 Indigenous persons in the local population [34]. The community-based youth service serves a population of approximately 4,338 Indigenous young people aged 10-24 years, which represents 30.1% of a total of 14,391 Indigenous persons in the local population [34]. The client base of both services includes a significant number of

young people who move between the regional centre and the remote and very remote communities of far north Queensland.

As shown in Figure 1, this protocol calls for the research to be conducted over two years; Objective 1 (6 months), Objective 2 (12 months), Objective 3 (6 months).

Figure 1: Timeline of research/concept diagram

Data collection

Data collected at baseline and follow up is shown in Table 1. Data collection methods include staff and client surveys, process mapping, network mapping, and document scans. Participants in the research include both staff and clients at each service involved. All staff in the services are invited to participate, and to complete the same survey at baseline and follow up, addressing key issues in cannabis-related knowledge, attitudes and practice (Table 2).

Table 1: Data collection

Method	Data collected	Data source
Service system data analysis	Client demographic information	Service data
	Client primary drug of concern	Service data
	Number of clients screened for cannabis in previous 12 months	Service data
Survey	Screening, referral, treatment practices for cannabis and mental health issues	Staff
	Cannabis knowledge, attitudes and practice	Staff
	Cannabis use information	Clients
Semi-structured interviews	Service needs, training, opportunities for intervention	Staff
	Process evaluation	Staff, stakeholders
Process mapping	Flow of patients through the service, screening and referral points	Staff

Network mapping	Referral pathways, opportunities to strengthen inter-service relationships	Staff
Document scan	Cannabis resources used	Staff

Table 2: Knowledge attitude and practices survey contents

Domain	Item content
Knowledge	Lifetime cannabis use rates (total Australian population, Indigenous Australian population, Cape York population)
	Current cannabis use rates (total Australian population, Indigenous Australian population, Cape York population)
	Daily cannabis use rates (total Australian population, Indigenous Australian population, Cape York population)
	Gender-related differences in use
	Quit intentions (derived from Cape York cannabis research)
	Impacts on physical health, mental health and cognitive function
	Cost per gram – national, local, Cape York
	Symptoms of dependence
	Age-related risk of dependence
	Effective treatments for cannabis dependence
	Recognition of presence of a cannabis screening policy within the service
	Recognition of presence of a mental health screening policy within the service
Attitudes	Legal status of cannabis use
	Medicinal use
	Harms related to cannabis (mental health, physical health, dependence)
	Psychosocial impacts (crime, education, other drug use)
	Perceptions of young cannabis users attitudes toward screening and treatment
	Utility and benefits of screening for cannabis use
	Satisfaction with level of knowledge
	Satisfaction with skills in screening and treating cannabis related issues

	Satisfaction with existing resources
	Satisfaction with training in cannabis-related issues
Practice	Number of clients screened, referred or treated for cannabis use in the previous month
	Number of clients screened, referred or treated for mental health issues in the previous month
	Barriers to screening and treatment for cannabis use issues
	Opportunities to improve confidence in screening and treating cannabis use

Client surveys are to be conducted at baseline and follow up to determine any changes in cannabis use rates (Table 3). Aboriginal and Torres Strait Islander clients aged between 12 and 24 years will be invited to participate in the surveys, which will be conducted in waiting rooms or another suitable situation during baseline and follow up.

Table 3: Client cannabis use survey

Cannabis and other drug use	Current drug use (cannabis and other drugs)
	Type, frequency and quantity of drug use
	Age of first use
	Financial expenditure on cannabis
	Method of use
Readiness to change	Intentions to quit or cut down
	Readiness to change
Mental Health	Current and past experience of symptoms of anxiety, depression, psychosis (GAD-7, PHQ-9, Strong Souls)
Demographic information	Gender, age, Aboriginal and/or Torres Strait Islander Highest level of education attained

Client surveys will be used to determine cannabis use patterns and mental health status, incorporating the following questionnaires: the Adolescent Cannabis Problems Questionnaire (CPQ-a) [35], Patient Health Questionnaire 9 (PHQ-9) [36], Generalised Anxiety Disorder 7 (GAD-7) [37] and Strong Souls [38].

Network and process mapping will be used to identify the relationships that exist with organisations surrounding both the services. Network mapping will be used in this study to show how each organization interacts with the service, including client referrals and resources [39]. Network

mapping identifies influential organisations within the services network, and outlines the paths used by the services to seek support for clients. [40]

Process evaluation using realist evaluation techniques [41 42] is included to determine if the intervention strategies were implemented as intended, and to fully describe any barriers to successful implementation. Realist evaluation in this study seeks to identify the mechanisms by which service practices work or not in both the health service and the youth service contexts. Using information collected in interviews with service staff, using service records and documents as well as information from interviews with staff in other services in the network, these mechanisms will first be identified and discussed with participating service staff to reach a consensus. In group discussions, the way these mechanisms are believed to operate will be mapped. At this theoretical level, the influence of the network of collaborating service providers, the context, will be considered in order to design practical and acceptable ways of making these mechanisms more effective. The intervention will be tested by implementing it. In a series of learning and information-sharing sessions with staff, the effectiveness of the intervention will be assessed. Using this method, any changes to the intervention strategies identified by staff or stakeholders as necessary will be implemented, thus refining the strategies. The intervention will include the design of suitable data collection tools for monitoring changes in service performance. The realist evaluation approach uses participatory action research in this way to evaluate what works for whom and in what context. The process evaluation plan is shown in Table 4.

*Table 4: Process evaluation design with realist evaluation framework following realist evaluation principles outlined by Pawson et al [41 42]*

Realist evaluation component	Process evaluation component	Data sources	Data collection timetable	Data analysis
Context	Process and service network mapping	Interviews with service staff	Baseline	Qualitative/thematic changes and network analysis
		Service document scan	Baseline and follow-up	Monitoring for key decision making moments
		Interviews with staff in collaborating	Baseline and follow-up	Qualitative/thematic changes and network analysis



		services in the network		
Mechanism	Intervention development	Number of education workshops with service staff	Baseline and intervention phase	Numeric
		Workshop evaluations/rating	Baseline	Likert scale compilations and comparisons
		Number of distinct intervention strategies developed	Baseline	Numeric
	Intervention implementation	Number and proportion of distinct strategies put into practice	Intervention	Numeric
Outcomes	Increased proportion of target group screened/referred	Service records	From baseline through follow-up	Repeated measures of proportions of client screened
	Increased staff knowledge and practices	Knowledge, attitudes and practices survey	Baseline and follow-up	Qualitative/thematic changes and change in network characteristics

Intervention

Following baseline data collection, the protocol calls for one workshop to be held at each service with staff and key stakeholders, to achieve Objective 1. Consistent with the action research approach, researchers work with staff to interpret the results of Objective 1, and to achieve Objective 2, develop interventions that are feasible, practical and readily implementable within the service. The workshop will be used to:

- 2.1 Identify/develop and implement valid and effective screening instruments and processes;
- 2.2 Develop and implement strategies to enhance screening of the target groups;
- 2.3 Develop and implement strategies to improve relationships with external services;
- 2.4 Identify/develop and implement cannabis and mental health training and resources for service staff to enhance knowledge and skills;



2.5 Identify/develop and implement activities to reduce cannabis and mental health issues in young Aboriginal and Torres Strait Islander clients.

Objective 2 intervention strategies will be designed to maximize incorporation into routine practice with little or no additional resources required. Staff working within the service are to be involved in and deliver the interventions. Researchers facilitate the work and support staff but will not implement any intervention strategies directly. The researchers will provide facilitation and support in the following ways; regular site visits (approximately one visit per month), analysis of peer-reviewed evidence to inform development of strategies, ongoing data analysis & feedback, report writing, organization of site visit by relevant experts.

Recognising that the response from each service will be different, and consistent with an action research approach, the interventions will be developed with each service separately, however opportunities to work together and share expertise and experiences will be maximized.

### Data analysis

Descriptive statistics will be used to analyze the baseline staff surveys. A comparison of survey results before and after intervention will be undertaken using paired samples t-tests for continuous/ordinal variables, and McNemar's test for changes in categorical variables. For client surveys, no identification details are recorded, and surveys are treated as cross-sectional. Descriptive statistics summarise details of client demographic characteristics. Where appropriate, independent sample t-tests will be used to compare continuous/ordinal variables and chi-squared tests will be used for categorical variables. Thematic analysis will be used to analyse all qualitative data collected during baseline, mid-term process evaluation, and final evaluation.

### Limitations

Although randomized controlled trials generate the most reliable evidence of intervention efficacy, the project described here develops the intervention as well as procedures to monitor implementation fidelity of the intervention. The protocol described here is a necessary preliminary step in this

challenging area of research where there are no credible interventions available. If successful, the action research model augmented by a realist evaluation approach for the process evaluation will assist to inform randomized controlled trials to be implemented in similar service networks in other Australian jurisdictions and possibly other similar settings.

**DISCUSSION**

Although the study of cannabis use in Indigenous populations worldwide is in its infancy, there is a growing collaborative effort to address cannabis and related mental health issues in young Aboriginal and Torres Strait Islander people emanating from northern Australia. This work has documented sound evidence for high rates of cannabis use in remote Aboriginal and Torres Strait Islander populations [18 22-25 30 43]. But, it is increasingly recognised that the issues so far documented may also have appeared in peri-urban populations of Indigenous youth. There is little data for Indigenous youth in metropolitan and regional centres. This population is hard to access because they are embedded within populations many times greater than the small discrete communities which typify remote northern Australia. To engage with such populations, it is critical that researchers work closely with relevant community-based services being used by these young people, to develop strategies that can improve their capacity to identify, refer, and treat cannabis and related mental health issues. If this is not done, then young people in regional and urban centres across Australia will continue to be overlooked, leading to further marginalisation.

Evidence-based interventions for mental health and illicit drug use are crucial to confer long-lasting, sustainable mental health benefits to young Indigenous Australians. Failure to develop these will result in further long-term negative impacts on young people’s workforce participation, productivity, family and community. Innovative strategies are needed to build the knowledge and capacity of practitioners, improve system-level processes and response, enhance the community and service provider network, and provide adequate support for young Indigenous people seeking help for cannabis and mental health issues.

It is anticipated that the research approach developed here can be used as a flexible intervention development model in future controlled trials in community and primary health care settings to improve identification and treatment of mental health and substance use in young Indigenous Australians. Implementation of this study protocol will also provide valuable data on current cannabis use rates and impacts in young Aboriginal and Torres Strait Islander Australians. It is highly likely that early detection and/or early intervention strategies developed as part of the project will be incorporated into other community health services and community organisations, and it is anticipated that this model of needs assessment, intervention and evaluation will be applicable to other settings.

### **Ethics and dissemination**

Ethics approval was provided by The James Cook University, Human Research Ethics Committee. Ethics Approval Number H5322. The protocol calls for results to be discussed with stakeholder organisations. Peer-reviewed publications will also be used to disseminate the findings. Findings will also be presented at national and international conferences with an Indigenous health focus and in collaboration with health service staff as opportunities to develop their research capacities emerge.

### **Authors' information**

Dr India Bohanna has an NHMRC Early Career Fellowship in Aboriginal and Torres Strait Islander Health, with a focus on mental health and substance misuse. She is also Associate Research Fellow in the APHCRI Centre for Research Excellence in the Prevention of Chronic Conditions in Rural and Remote High-Risk Populations.

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**Authors’ contributions**

IB and AC identified the research question, designed the study, and are primary investigators in this study. IB and KB drafted the manuscript. IB, KB and AC all revised the manuscript critically and contributed critical revisions. IB, KB and NR will acquire the data. IB, KB, NR and AC will be involved in the analysis and interpretation of the data. All authors read and approved the final manuscript.

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**Competing interests**

None of the authors have financial or professional conflicts of interest that would influence the conduct or reporting of this study.

All authors declare that they have no competing interests.

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**A service-level action research intervention study protocol  
to improve identification and treatment of cannabis and  
related mental health issues in young Indigenous  
Australians: study protocol**

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## Abstract

**Background/Introduction:** Regular cannabis use is associated with negative mental health impacts including psychosis, depression and anxiety. ~~A young age of uptake, and high rates of~~ Rates of cannabis use ~~have~~ increased in Aboriginal and Torres Strait Islander communities in northern Australia within the last two decades presenting a significant increased risk to young people's mental health in these regions. Improved screening, early detection and treatment for cannabis-related mental health issues are urgently required. This paper describes a service-level action research intervention and evaluation protocol for use in the few services where it is possible to engage young Aboriginal and Torres Strait Islander Australians.

**Methods/Design:** The protocol is being developed in two services where youth mental health is core business; a primary health care centre and a youth service in the Cairns and hinterland region, far north Queensland. The protocol calls firstly for baseline data to be collected using: staff and client surveys; network mapping; and analysis of screening, treatment and referral rates. The protocol's intervention phase is driven by service needs identified from baseline data. Intervention components focus on: implementing/enhancing cannabis screening instruments and processes in line with current best practice; enhancing networks with external drug and mental health services; developing culturally acceptable training programs and resources; developing targeted intervention programs for young Aboriginal and Torres Strait Islander cannabis users within the services. The protocol requires implementation of the multi-level intervention for one year, with follow up data collected and compared to baseline. Process evaluation identifies the more effective intervention components and documents the challenges to be overcome for full implementation.

**Ethics and Dissemination:**

Ethics approval was provided by The James Cook University, Human Research Ethics Committee. Ethics Approval Number H5322. Peer-reviewed publications will also be used to disseminate the finding Results will also be discussed with stakeholder organisations.

**Keywords:** health service research, Indigenous, cannabis, treatment, detection

**Strengths and limitations of this study**

- This project utilises Participatory Action Research to develop Indigenous health interventions, as recommended in the NHMRC Road Map: A Strategic Framework for Improving Aboriginal and Torres Strait Islander Health through Research
- This study is unique: no published studies have addressed cannabis use or mental health in this hard to engage demographic, Indigenous young people.
- This study focuses on development of a much-needed culturally appropriate intervention for cannabis and mental health issues in Indigenous youth.
- This study is not a Randomised Control Trial (RCT), however the lack of rigorous evidence in this research area requires more exploratory and participatory research and intervention as proposed here.
- The organisations do not necessarily represent the diversity of youth services in Australia.

## **BACKGROUNDINTRODUCTION**

Aboriginal and Torres Strait Islander youth are at significantly greater risk of developing substance use and mental health disorders compared to their non-Indigenous counterparts. They are around twice as likely to be hospitalised or die from injury; six times more likely to die from assault and four times more likely to die from suicide [1]. Up to 15% of the 10-year life expectancy gap between Indigenous and non-Indigenous Australians is attributed to mental health conditions [2], and Indigenous young people aged 12–24 years are hospitalised for mental and behavioural disorders three times more often than non-Indigenous young people [3].

Cannabis use can be a significant contributor to poor mental health, particularly when use begins at a young age [4-6]. The adverse mental health effects of cannabis use in the general population are increasingly recognised, including anxiety, depression [7-9], psychotic disorders [5, 10-13], dependence [7, 8, 14] withdrawal [15, 16], and cognitive impairment [17, 18]. Starting to use cannabis before age 15 is associated with an increased likelihood of developing later psychotic disorders, increased risk of dependence, other drug use and poor educational and psychosocial outcomes [6].

In Australia, little is known about the links between cannabis use and poor mental health in the young Aboriginal and Torres Strait Islander Australian population. Although this segment of the population has proven to be extremely difficult to engage for health promotion, prevention, service provision and research [19-22], recent surveys demonstrate that the prevalence of cannabis use in the Aboriginal and Torres Strait Islander Australian population in remote and very remote regions of northern Australia is very high in young people. In remote far north Queensland, 66% of men and 30% of women were currently using cannabis in a recent survey [23]. In remote communities in the Northern Territory, rates of use as high as 67% of Aboriginal and Torres Strait Islander men and 22% of Aboriginal and Torres Strait Islander women were earlier reported, half regular (daily) users [24] and around one-fifth meeting criteria for cannabis dependence or moderate-severe depression[25, 26]. This is in stark contrast with estimates from surveys of the general Australian population, in which 10.3% of adults surveyed in 2010 reported using cannabis within the past year, 13% of users reporting daily use [27]

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and of those surveyed aged between 14 and 18, just 15.7% had reportedly used cannabis in the last 12 months [27].

In the only study to examine self-reported qualitative mental health impacts of cannabis published so far for Aboriginal and Torres Strait Islander populations, one in four current users may be suffering from negative mental health effects due to cannabis [23]. Reinforcing this limited data, Hunter et al. (2012) reported that the prevalence of psychosis in Aboriginal and Torres Strait Islander Australians in north Queensland was double that of the general Australian population, with cannabis playing a significant role in the onset of psychotic disorders in 50% to 59% of diagnoses [28]. There is no data available, at all, for the much larger populations of Aboriginal and Torres Strait young people who live in metropolitan and regional centres.

Addressing cannabis use issues and recognising the importance of reducing early onset use in preventing dependence, mental illness, and negative psychosocial outcomes in Aboriginal and Torres Strait Islander young people should be a high priority [24, 29-31]. Despite this, there are no published intervention strategies that have been shown to be effective in reducing cannabis use and mental health issues in any population of Aboriginal and Torres Strait Islander young people.

**Objectives**

The key objectives of this protocol are to:

1. Enhance the capacity of the few youth services and health services in regional centres in Queensland who have the capacity to engage with Aboriginal and Torres Strait Islander youth so that they can more routinely document cannabis use rates and effectively identify, refer, treat and respond to cannabis and related mental health issues in their clients, and;
2. Develop and implement intervention strategies to improve identification and treatment of cannabis and related mental health issues in young Indigenous clients within these services, using an action research approach;
3. Evaluate the effectiveness of the intervention strategies by comparing baseline data collected in item 1 with follow up data, and conducting process evaluation.

## METHODS/DESIGN

### Study design and setting

This intervention study will use ~~an~~ a participatory action research approach [32] within participating services to influence practice and effect sustainable change. This approach is endorsed for Aboriginal and Torres Strait Islander research given that it emphasises participation by the people being studied, cultural respect, capacity building, and collaboration. A key feature of the action research approach to be used in this study are “cyclical activities involving examination of existing processes, change monitoring the apparent effects if the change, and further change.” This will help the services develop and implement practical strategies to improve identification and treatment of cannabis and related mental health issues in their young Indigenous clients. The participatory approach encourages the services and staff to take ownership of the research and contribute to the development of sustainable changes in practice [31]. In this study the targets of the intervention are the services. The intervention is conducted at a service level and thus does not seek to reduce cannabis use rates in young Aboriginal and Torres Strait Islander clients directly through individual-level strategies. Nevertheless examination of changes in cross-sectional client cannabis use will be included. A key feature of the study is collaboration with staff and stakeholders to identify needs and develop and implement practical strategies to improve identification and treatment of cannabis and related mental health issues in their young Indigenous clients. The action research framework encourages the services and staff to take ownership of the research and contribute to the development of sustainable changes in practice [32].

The research will be conducted across Queensland. The protocol is being developed and tested in far north Queensland, in two services in the Cairns and hinterland region. The participating services were chosen because they were keen to participate in the research, one is an Aboriginal community controlled primary health service and the other is a community-based service that works with vulnerable and hard-to-engage young people, the majority of whom are Aboriginal or Torres Strait Islanders. The primary health care service provides to a population of 764 Indigenous Australians

aged 10-24 years, which represents 28.5% of a total of 2,677 Indigenous persons in the local population [33]. The community-based youth service serves a population of approximately 4,338 Indigenous young people aged 10-24 years, which represents 30.1% of a total of 14,391 Indigenous persons in the local population [33]. The client base of both services includes a significant number of young people who move between the regional centre and the remote and very remote communities of far north Queensland.

As shown in Figure 1, this protocol calls for the ~~intervention and~~ research to be conducted over two years; Objective 1 (6 months), Objective 2 (12 months), Objective 3 (6 months).

Figure 1: Timeline of research/concept diagram

**Data collection**

Data collected at baseline and follow up is shown in Table 1. Data collection methods include staff and client surveys, process mapping, network mapping, and document scans. Participants in the research include both staff and clients at each service involved. All staff in the services are invited to participate, and to complete the same survey at baseline and follow up, addressing key issues in cannabis-related knowledge, attitudes and practice (Table 2).

Table 1: Data collection

Method	Data collected	Data source
Service system data analysis	Client demographic information	Service data
	Client primary drug of concern	Service data
	Number of clients screened for cannabis in previous 12 months	Service data
Survey	Screening, referral, treatment practices for cannabis and mental health issues	Staff
	Cannabis knowledge, attitudes and practice	Staff
	Cannabis use information	Clients
Semi-structured	Service needs, training, opportunities for intervention	Staff

interviews		
	Process evaluation	Staff, stakeholders
Process mapping	Flow of patients through the service, screening and referral points	Staff
Network mapping	Referral pathways, opportunities to strengthen inter-service relationships	Staff
Document scan	Cannabis resources used	Staff

Table 2: Knowledge attitude and practices survey contents

Domain	Item content
Knowledge	Lifetime cannabis use rates (total Australian population, Indigenous Australian population, Cape York population)
	Current cannabis use rates (total Australian population, Indigenous Australian population, Cape York population)
	Daily cannabis use rates (total Australian population, Indigenous Australian population, Cape York population)
	Gender-related differences in use
	Quit intentions (derived from Cape York cannabis research)
	Impacts on physical health, mental health and cognitive function
	Cost per gram – national, local, Cape York
	Symptoms of dependence
	Age-related risk of dependence
	Effective treatments for cannabis dependence
Attitudes	Recognition of presence of a cannabis screening policy within the service
	Recognition of presence of a mental health screening policy within the service
	Legal status of cannabis use
	Medicinal use
	Harms related to cannabis (mental health, physical health, dependence)
	Psychosocial impacts (crime, education, other drug use)
	Perceptions of young cannabis users attitudes toward screening and treatment



	Utility and benefits of screening for cannabis use
	Satisfaction with level of knowledge
	Satisfaction with skills in screening and treating cannabis related issues
	Satisfaction with existing resources
	Satisfaction with training in cannabis-related issues
Practice	Number of clients screened, referred or treated for cannabis use in the previous month
	Number of clients screened, referred or treated for mental health issues in the previous month
	Barriers to screening and treatment for cannabis use issues
	Opportunities to improve confidence in screening and treating cannabis use

Client surveys are to be conducted at baseline and follow up to determine any changes in cannabis use rates ~~To determine the effectiveness of the intervention on cannabis use rates among the clients, client surveys are to be conducted at baseline and follow up~~ (Table 3). Aboriginal and Torres Strait Islander clients aged between 12 and 24 years will be invited to participate in the surveys, which should be conducted in waiting rooms or another suitable situation during baseline and follow up.

Table 3: Client cannabis use survey

Cannabis and other drug use	Current drug use (cannabis and other drugs)
	Type, frequency and quantity of drug use
	Age of first use
	Financial expenditure on cannabis
	Method of use
Readiness to change	Intentions to quit or cut down
	Readiness to change
Mental Health	Current and past experience of symptoms of anxiety, depression, psychosis (GAD-7, PHQ-9, Strong Souls)
Demographic information	Gender, age, Aboriginal and/or Torres Strait Islander Highest level of education attained

Client surveys will be used to determine cannabis use patterns and mental health status, incorporating the following questionnaires: the Adolescent Cannabis Problems Questionnaire (CPQ-a) [34], Patient

Health Questionnaire 9 (PHQ-9) [35], Generalised Anxiety Disorder 7 (GAD-7) [36] and Strong Souls [37].

Network and process mapping will be used to identify the relationships that exist with organisations surrounding both the services. Network mapping- will be used in this study to show how each organization interacts with the service, including client referrals and resources [38]. Network mapping identifies influential organisations within the services network, and outlines the paths used by the services to seek support for clients. [39]

Process evaluation using realist evaluation techniques [40, 41] is included to determine if the intervention strategies were implemented as intended, and to fully describe any barriers to successful implementation. Realist evaluation in this study seeks to identify the mechanisms by which service practices work or not in both the health service and the youth service contexts. Using information collected in interviews with service staff and clients, using service records and documents as well as information from interviews with staff in other services in the network, these mechanisms will first be identified and discussed with participating service staff to reach a consensus. In group discussions, the way these mechanisms are believed to operate will be mapped. At this theoretical level, the influence of the network of collaborating service providers, the context, will be considered in order to design practical and acceptable ways of making these mechanisms more effective. The intervention will be tested by implementing it. In a series of learning and information-sharing sessions with staff, the effectiveness of the intervention will be assessed. Using this method, any changes to the intervention strategies identified by staff or stakeholders as necessary will be implemented, thus refining the strategies. The intervention will include the design of suitable data collection tools for monitoring changes in service performance. In a series of learning and information sharing sessions with staff, the effectiveness of the intervention will be assessed and refined for further testing. The intervention design will include the design of suitable data collection tools for monitoring changes in service performance that can be attributed to the intervention. The realist evaluation approach uses participatory action research in this way to evaluate what works for whom and in what context. The process evaluation plan is shown in Table 4.

Table 4: Process evaluation design with realist evaluation framework following realist evaluation principles outlined by Pawson et al [40, 41]

Realist evaluation component	Process evaluation component	Data sources	Data collection timetable	Data analysis
Context	Process and service network mapping	Interviews with service staff	Baseline	Qualitative/thematic changes and network analysis
		Service document scan	Baseline and follow-up	Monitoring for key decision making moments
		Interviews with staff in collaborating services in the network	Baseline and follow-up	Qualitative/thematic changes and network analysis
Mechanism	Intervention development	Number of education workshops with service staff	Baseline and intervention phase	Numeric
		Workshop evaluations/rating	Baseline	Likert scale compilations and comparisons
		Number of distinct intervention components strategies developed	Baseline	Numeric
	Intervention implementation	Number and proportion of distinct components strategies put into practice	Intervention	Numeric
Outcomes	Increased proportion of target group screened/referred	Service records	From baseline through follow-up	Repeated measures of proportions of client screened
	Increased staff knowledge and practices	Knowledge, attitudes and practices survey	Baseline and follow-up	Qualitative/thematic changes and change in network characteristics

Intervention

Following baseline data collection, the protocol calls for one workshop to be held at each service with staff and key stakeholders, to achieve Objective 1. Consistent with the action research approach, researchers work with staff to interpret the results of Objective 1, and to achieve Objective 2, develop

~~interventions strategies~~ that are feasible, practical and readily implementable within the service. The workshop will be used to:

- 2.1 Identify/develop and implement valid and effective screening instruments and processes;
- 2.2 Develop and implement strategies to enhance screening of the target groups;
- 2.3 Develop and implement strategies to improve relationships with external services;
- 2.4 Identify/develop and implement cannabis and mental health training ~~programs~~ and resources for service staff to enhance knowledge and skills;
- 2.5 Identify/develop and implement activities to reduce cannabis and mental health issues in young Aboriginal and Torres Strait Islander clients. ~~cannabis and mental health intervention programs and resources for target clients.~~

Objective 2 intervention ~~components strategies~~ will be designed to maximize incorporation into ~~to~~ routine practice with little or no additional resources required. Staff working within the service are to be involved in and deliver the interventions. Researchers facilitate the work and support staff but will not implement any intervention strategies directly. The researchers will provide facilitation and support in the following ways: regular site visits (approximately one visit per month), analysis of peer-reviewed evidence to inform development of strategies, ongoing data analysis & feedback, report writing, organization of site visit by relevant experts. ~~while researchers facilitate the work and support staff through regular visits during implementation.~~

Recognising that the response from each service will be different, and consistent with an action research approach, the interventions will be developed with each service separately, however opportunities to work together and share expertise and experiences will be maximized.

#### Data analysis

Descriptive statistics will be used to analyze the baseline staff surveys. A comparison of survey results before and after intervention will be undertaken using paired samples t-tests for continuous/ordinal variables, and McNemar’s test for changes in categorical variables. For client surveys, no identification details are recorded, and surveys are treated as cross-sectional. Descriptive statistics summarise details of client demographic characteristics. Where appropriate, independent sample t-tests will be used to compare continuous/ordinal variables and chi-squared tests will be used for categorical variables. Thematic analysis will be used to analyse all qualitative data collected during baseline, mid-term process evaluation, and final evaluation.

**Limitations**

Although randomized controlled trials generate the most reliable evidence of intervention efficacy, the project described here develops the intervention as well as procedures to monitor implementation fidelity of the intervention. The protocol described here is a necessary preliminary step in this challenging area of research where there are no credible interventions available. ~~An action research approach is necessary.~~ If successful, the action research model augmented by a realist evaluation approach for the process evaluation will assist to inform randomized controlled trials to be implemented in similar service networks in other Australian jurisdictions and possibly other similar settings.

**DISCUSSION**

Although the study of cannabis use in Indigenous populations worldwide is in its infancy, there is a growing collaborative effort to address cannabis and related mental health issues in young Aboriginal and Torres Strait Islander people emanating from northern Australia. This work has documented sound evidence for high rates of cannabis use in remote Aboriginal and Torres Strait Islander populations [19, 23-25, 30, 31, 42]. But, it is increasingly recognised that the issues so far documented may also have appeared in peri-urban populations of Indigenous youth. There is little data for Indigenous youth in metropolitan and regional centres. This population is hard to access

because they are embedded within populations many times greater than the small discrete communities which typify remote northern Australia. In metropolitan and regional centres, Indigenous youth, are particularly hard to engage because they are embedded within populations which are many times greater than the small discrete communities which typify remote northern Australia where the only available evidence about Indigenous cannabis use has so far been compiled [43, 44]. To engage with such populations, it is critical that researchers work closely with relevant community-based services being used by these young people, to develop strategies that can improve their capacity to identify, refer, and treat cannabis and related mental health issues. If this is not done, then young people in regional and urban centres across Australia will continue to be overlooked, leading to further marginalisation.

Evidence-based interventions for mental health and illicit drug use are crucial to confer long-lasting, sustainable mental health benefits to young Indigenous Australians. Failure to develop these will result in further long-term negative impacts on young people's workforce participation, productivity, family and community. Innovative strategies are needed to build the knowledge and capacity of practitioners, improve system-level processes and response, enhance the community and service provider network, and provide adequate support for young Indigenous people seeking help for cannabis and mental health issues.

It is anticipated that the research approach developed here can be used as a flexible intervention development model in future controlled trials in community and primary health care settings to improve identification and treatment of mental health and substance use in young Indigenous Australians. Implementation of this study protocol will also provide valuable data on current cannabis use rates and impacts in young Aboriginal and Torres Strait Islander Australians. It is highly likely that early detection and/or early intervention strategies developed as part of the project will be incorporated into other community health services and community organisations, and it is anticipated that this model of needs assessment, intervention and evaluation will be applicable to other settings.

## Ethics and dissemination

Ethics approval was provided by The James Cook University, Human Research Ethics Committee. Ethics Approval Number H5322. The protocol calls for results to be discussed with stakeholder organisations. Peer-reviewed publications will also be used to disseminate the findings. Findings will also be presented at national and international conferences with an Indigenous health focus and in collaboration with health service staff as opportunities to develop their research capacities emerge.

**Authors’ information**

Dr India Bohanna has an NHMRC Early Career Fellowship in Aboriginal and Torres Strait Islander Health, with a focus on mental health and substance misuse. She is also Associate Research Fellow in the APHCRI Centre for Research Excellence in the Prevention of Chronic Conditions in Rural and Remote High-Risk Populations.

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**Authors’ contributions**

IB and AC identified the research question, designed the study, and are primary investigators in this study. IB and KB drafted the manuscript. IB, KB and AC all revised the manuscript critically and contributed critical revisions. IB, KB and NR will acquire the data. IB, KB, NR and AC will be



involved in the analysis and interpretation of the data. All authors read and approved the final manuscript.

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### Competing interests

None of the authors have financial or professional conflicts of interest that would influence the conduct or reporting of this study.

All authors declare that they have no competing interests.

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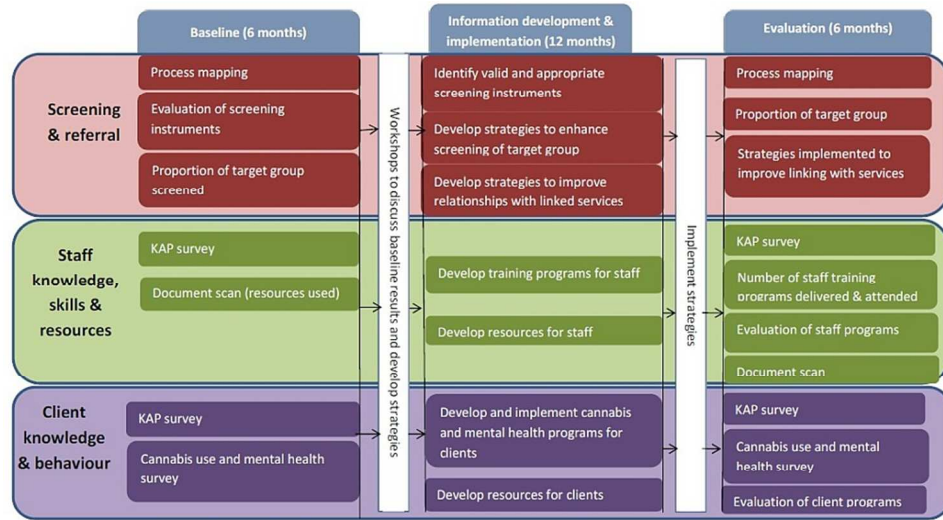
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