

# Implementing YouthCHAT – Evaluation and Development of An Implementation Framework

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## Research

**Keywords:** Health plan implementation, Implementation science, Programme evaluation, Bicultural research, Co-design, YouthCHAT, Community-based participatory research, Normalization Process Theory, New Zealand, Implementation framework

**Posted Date:** April 8th, 2021

**DOI:** <https://doi.org/10.21203/rs.3.rs-394425/v1>

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# Abstract

**Background** Northland, New Zealand has a generally socioeconomically deprived population with a high proportion of indigenous Māori. Māori youth suffer a high rate of mental ill-health, substance misuse, and other risky behaviours. While evidence demonstrates that early detection and management of these issues leads to long-term positive health outcomes, implementation of systematic screening and intervention is challenging. This study aimed to implement YouthCHAT, a self-administered digital tool screening young people for mental health concerns and risky health behaviours, into youth services in Northland using an iterative process of implementation, evaluation, and modification, and to create a framework for national-level rollout and implementation.

**Methods** Normalisation Process Theory and a Māori research approach informed the implementation and its evaluation. Data sources included end-user focus groups, staff surveys, field notes, and informal communications with key stakeholders. Number of YouthCHAT screens completed measured intervention uptake.

**Results.** Ongoing staff and youth feedback led to changes in YouthCHAT which increased acceptability. Facilitating two-way communication between providers and management, providing accessible training, and improved e-health record integration assisted uptake. Contextual factors, such as establishing a bicultural co-design approach and programming remote functionality during COVID-19 lockdown, were important factors in YouthCHAT's ultimate acceptability and implementation. Other impediments such as staff redeployed during meningococcal and measles epidemics merely required patience. An implementation framework for YouthCHAT was developed which addresses tool acceptance and uptake, requiring ongoing effective communication and coordination, and iterative evaluation.

**Conclusions** Failure to launch may be due to the interplay between the intervention, its users, contextual factors, and wider organisational aspects. Interventions may need to be tailored to a specific context to meet the needs of users, and address organisational and system barriers. Ultimately there will only be uptake where providers see this as worthwhile. Perception that its effective use will reduce their workload serves as a valuable incentive. The participatory research and bicultural Māori approaches employed in this project eventually led to YouthCHAT's successful implementation in Northland. Full ownership of the Northland YouthCHAT version was transferred to local stakeholders on project completion. An iterative and evaluative strategy is recommended for future implementation. While derived for a specific population, the principles are generic, and our framework should be generalisable to other settings.

**Trial registration** Australian and New Zealand Clinical Trials Registry ACTRN12618000299202p, 16-02-2018; <https://www.anzctr.org.au/Trial/Registration/TrialReview.aspx?id=374532>

## Contributions To The Literature

- Integrating a new intervention into routine care is an iterative process requiring awareness of the dynamic interplay between the intervention, characteristics of the intended users, contextual factors,

and wider organisational aspects.

- Participatory action research enables and empowers participants to modify an intervention so that it overcomes context-specific barriers and suits their needs.
- Interventions with the potential to reduce workload have increased likelihood to be successfully normalised into clinical practice.
- An implementation framework for YouthCHAT, which screens youth for mental health issues and risky health behaviours, addresses tool acceptance and uptake, requiring ongoing effective communication and coordination and iterative evaluation.

## Background

YouthCHAT is a self-administered digital screening tool that assesses young people for mental health concerns and risky health behaviour, providing clinicians with an immediate overview of the young person's psychosocial status [1]. The domains screened are tobacco, alcohol and recreational drug misuse, problematic gambling and gaming, depression, anxiety, stress, eating and conduct disorders, sexual issues, exposure to abuse, difficulty controlling anger, and physical inactivity. Recent research indicates that YouthCHAT is a valid, acceptable, and feasible tool that has the potential to offer benefit as both a time- and cost-effective alternative to the standard Home, Education/ Employment, Eating, Activities, Drugs, Sexuality, Suicide, Safety (HEEADSSS) youth assessment in New Zealand (NZ) [2]. However, research to date has focused on small and for the most part, single site implementations, such as a school or an individual youth clinic [2, 3, 4]. Rolling out a healthcare innovation to multiple sites across a larger area, such as a specific geographic region, is more complex.

Northland is a relatively large region in the upper north island of NZ, with a scattered and generally socioeconomically deprived population [5]. It has a high proportion of Māori, NZ's indigenous population, and its young people are particularly vulnerable to mental health and risky health behaviours [6] due, in part, to barriers to primary care [7]. Screening at-risk young people enables early intervention and the possibility of preventing development of problems into adulthood [8], and the implementation of a resource-efficient psychosocial screening tool would offer considerable benefit in this locality.

Implementation science is the translation of evidence-based complex interventions into routine clinical practice [9]. Such translation necessitates individual action and behaviour change which is not achieved in one single event, but influenced by the dynamic interplay between the intervention, characteristics of the intended users, contextual factors, and wider organisational aspects [10, 11]. The tailoring of existing validated interventions to suit the needs of different populations is considered to be the most cost and time efficient way to increase an intervention's acceptability and reach [12]. Thus, those with both a non-modifiable core (to maintain integrity and validity), and a softer outer layer (to allow tailoring to fit into the implementing organisation) are the most successful [13, 14]. Such innovations have the ability to adapt to meet context specific needs while at the same time maintaining the integrity and validity of the tool [15].

For an intervention to be successfully implemented, users must find it both acceptable and feasible, and for the implementation of an innovation to become sustained and normalised, the process must be ongoing, not linear [10]. Co-designed iterative processes allow reflection and action and ensure research is carried out with the end users, rather than on them [16, 17]. Participatory action research seeks to enable and empower participants to modify an intervention so that it overcomes context-specific barriers and suits their needs, thus being appropriate and responsive for the community it is supposed to serve [18]. A co-design approach facilitates a sense of ownership for the end-users.

## Methods

### *Aim*

The aims of this study were:

1. To progressively rollout YouthCHAT into Northland youth care services using an iterative process of implementation, evaluation, and modification using an implementation science approach.
2. To create a framework for wider scale rollout and implementation of YouthCHAT.

### *Design*

The evaluation of the implementation was undertaken based on Normalisation Process Theory (NPT), which looks at procedural translation of evidence into an intervention in the real world, until it becomes embedded and integrated into routine practice [19]. Implementation is collective action and collaborative work, which requires changes to behaviour, rules, resources, and organising logics and restructured relationships [20]. To understand implementation processes, the properties of the intervention (micro-level), the actions required by people to integrate it into practice (meso-level), and how they work together in context (macro-level) need to be examined [20]. NPT identifies four constructs for people to take up an intervention [10]:

1. Coherence: understanding and making sense of the intervention.
2. Cognitive participation: engaging with and committing to the implementation.
3. Collective action: integrating with existing practices
4. Reflexive monitoring: ongoing evaluation of the benefits of, and challenges to implementation, its effects on clinical outcomes, and where necessary inform changes in ways of working.

Implementation processes require iterative feedback loops to become sustained, and are impacted by organisational structures, the complexity of clinical practice, and the group dynamics within any given setting [20, 21]. This necessitates a participatory research co-design approach. These NPT principles informed the pragmatic implementation of YouthCHAT into clinical settings in Northland, with iterative cycles of implementation, evaluation, and modification of not only YouthCHAT, but the procedures around its use as well as the implementation process itself.

This study was undertaken in a predominantly Māori area of NZ and brought Māori and non-Māori researchers to work together sharing research principles, processes, and skills in bicultural research [22]. *Kaupapa* Māori research (by Māori, for Māori, of direct benefit to Māori) asserts the Māori worldview, cultural practices and language as the status quo [23]. Engaging and partnering with stakeholders and users involved participation in Māori customs and rituals and validation of Māori culture, values, and beliefs by the research team with the development of respectful relationships. Establishing these relationships took place prior to, and throughout this study, and were integral to its success [24]. Using the Māori metaphor of a braided river, a framework for bi-cultural research was developed by blending the principles of co-design research and those of *kaupapa* Māori [25].

### ***Setting***

The YouthCHAT Northland project took place in youth and school-based primary care clinics in Northland, NZ between October 2017 to October 2020.

### ***Study participants***

Following ethical and locality approval, consultation with key informants, local health providers and other cultural and community agencies took place through three co-design hui (meetings) in to introduce YouthCHAT and have conversations about the study in 2018. Consenting clinical and administrative staff who had used YouthCHAT participated in a focus group or face-to-face semi-structured interview and/or completed online surveys in 2019 and 2020. Informal communications with a number of stakeholders further informed understanding of the challenges to implementation in an ongoing process.

### ***Study measures***

- The number of YouthCHAT screens completed were recorded throughout the data collection period as an output measure of the degree of intervention uptake.
- Acceptability measures included staff perception and youth opinions of implementing YouthCHAT as a psychosocial screening tool for youth in Northland.
- Operational feedback data involved clinician opinion about the implementation of YouthCHAT into Northland youth health services, specifically perceptions of usefulness, likelihood of recommending using the tool to others clinicians, perceptions of the impact of using YouthCHAT on the subsequent consultation, and facilitators and barriers to using YouthCHAT.

### ***Evaluation processes***

YouthCHAT was implemented into one youth clinic in late 2018, operational feedback data were gathered and then used to modify and improve the YouthCHAT instrument and processes. After these changes were incorporated, and following further consultation, YouthCHAT 2.0 was implemented in October 2018. In collaboration with staff and students from the local Māori cultural immersion school, Māori co-investigators, and *iwi* (tribe) representatives from a local Māori health care trust, the screen was

translated into the Māori language. Further operational data were gathered, and YouthCHAT 3.0 launched in March 2019. After further consultations, the updated implementation processes were used to roll out the final iteration, YouthCHAT PRO, into Northland youth health services in February 2020. Final acceptability data were collected from staff focus group and surveys in July 2020.

### ***Analyses***

Analysis of quantitative data were descriptive, using Microsoft Excel. Qualitative data were analysed using a general inductive approach with collated text categorised and thematically analysed. Data were independently coded by two researchers with consensus reached by adjudication. These findings, along with informal data sources including local knowledge from Northland colleagues, identified factors contributing to lack of YouthCHAT uptake in accordance with NPT principles, and hence informed modifications to develop YouthCHAT 2.0 in 2017, YouthCHAT 3.0 in 2018 then YouthCHAT PRO to address these perceived barriers.

## **Results**

### **Characteristics of participants**

Hui attendees ranged from adolescents to older adults from a diversity of genders and ethnicity (n = 27). Eight clinical staff participated in a focus group in July 2020 and completed the anonymous survey. Another nine underwent a semi-structured interview. The staff focus group comprised clinicians and administrative staff from youth health clinics across Northland, all of whom were female, and three were Māori.

Throughout the project, many other stakeholders plus the local research team, who were also clinicians, provided informal feedback on many factors at micro, meso, and macro levels impeding or facilitating YouthCHAT use which also informed the many iterative changes made. Field notes taken by researchers were another form of data. Students at the local Māori immersion school (*kura*) provided the YouthCHAT translation into local dialect, produced the video, and created the logo for their YouthCHAT version.

### **Qualities of the intervention (micro-level)**

On the micro-level, ongoing feedback from staff and young people led to changes in YouthCHAT 1.0 to the 2.0, 3.0 and PRO versions, which increased acceptability by both youth and clinical staff (Fig. 1). Changes included adding more youth-friendly language, providing an animated video introduction, and the option to hear rather than read the questions for youth with literacy issues (Table 1). The lack of integration with the e-health record was a major issue with staff, who were cutting and pasting text from YouthCHAT answers into the HEEDSSS form. Providing an IT solution to this made using YouthCHAT much more efficient.

Table 1

Changing the nature of the intervention in response to feedback from youth and staff (micro-level)

<b>YouthCHAT 2.0 feedback</b>	<b>Modifications (YouthCHAT 3)</b>	<b>YouthCHAT 3.0 feedback</b>	<b>Modifications (YouthCHAT PRO)</b>
Many youth have literacy issues	Google™ text to speech audio option added (English only)	Youth did not like automated voice of Google™ app	Real voice over recordings made in both English & Māori by fluent speakers
Youth found introductory video boring	Female & animated infographic options added	Youth prefer animated version	No change
Youth wanted to know how they were progressing through the screen	Progress bar added	Youth liked this addition	No change
Clinicians found adding YouthCHAT data to HEEADSSS form in e-records prohibitively time-consuming	YouthCHAT software programmer collaborated with developer of HEEADSSS	Some issues with integration continue	YouthCHAT now integrated with HEEADSSS form
Youth did not recognise names of drug classifications	None	Assess correct names & most recognisable NZ wide	Colloquial terms added as examples in brackets to maintain wording of validated questionnaire
Youth & clinicians reported gaming is significant issue in Northland	Gaming added to gambling module	Providers found young people confused between the two issues	No change – allows discussion about addiction
Include “Gender Diverse” as option	Added to gender question	Preferred	No further change
Youth had issues understanding sexual health questions meaning	Wording updated	No further issues	No further change

## **Actions of participants (meso-level)**

On the meso-level, staff feedback from interviews and online surveys revealed that they had not received clear communication from management as to how and why they should use YouthCHAT, and hence were unmotivated to do so (Table 2). Facilitating the communication from management about YouthCHAT use, providing accessible training and responding to their request for IT integration assisted engagement and uptake.

Table 2

Responses to staff feedback on reasons for their failure to engage with YouthCHAT

Construct	Questions to consider	Evaluation 2018	Evaluation 2020
Coherence	Is YouthCHAT different to existing way of screening?	As a web-based tool clinic staff clearly saw differences between YouthCHAT & interview-based HEEADSSS assessment	Staff understood how YouthCHAT could replace or lead to a targeted HEEADSSS assessment
	Is YouthCHAT relevant to current setting?	Participants thought many of their clients could not use the tool due to literacy issues	The updated version of YouthCHAT had audio options for both English and Māori versions
	Did the participants see the benefits of using YouthCHAT?	No, participants felt they were already skilled in undertaking psychosocial assessments with youth, and saw no benefit in using YouthCHAT	Yes, with clarity from governance that results of YouthCHAT could be used alongside HEEADSSS assessment. This meant that clinicians could use the results of a YouthCHAT screen to conduct a targeted HEEADSSS assessment.
Cognitive Participation	How did participants think using YouthCHAT would impact their workload?	The clinicians thought YouthCHAT added to their workload as data did not integrate with e-record, requiring a copy and paste of information from YouthCHAT that was prohibitively time consuming	A technological update to enable the pre-population of the e-health record was created, saving participants a significant amount of documentation time
	What was the effect using YouthCHAT consultations with youth?	Participants thought that if many concerns identified, consultation times could increase to address them all. With busy & often understaffed clinics they did not have time for this	The pre-consultation completion of YouthCHAT meant that the consultation was a discussion-based rather than an information-gathering exercise
	Could participants easily see the rationale behind using YouthCHAT?	Directives from management & governance to use YouthCHAT as part of routine practice did not reach service providers. Providers saw YouthCHAT as an extra that would increase their workload	Yes, once they started using YouthCHAT more, the point of using became clear to participants

Construct	Questions to consider	Evaluation 2018	Evaluation 2020
Collective Action	Were participants willing to commit time and effort to using the tool?	Since they could see no reason to use it & their workload was already heavy, staff were not prepared to invest time into using it	Yes, encouraged by colleagues and champions, participants reported that with increased use the benefits of YouthCHAT became evident and the time spent learning how to use it and integrating into workflow was time well spent
	How much training was needed to use the tool?	The tool is simple to use, but some training is needed. Long distances between clinics in Northland & staff viewing YouthCHAT as low priority made coordinating training challenging.	Two-stage training was found to be successful especially once participants had access to resources so they could immediately start familiarising themselves with YouthCHAT. The use of Zoom to run training sessions was also found to be beneficial.
	How did YouthCHAT fit into the participants' current workflow?	Participants found it challenging to integrate YouthCHAT into their workflow & were unable to envisage processes for doing so, meaning that YouthCHAT was not used	Using the comprehensive user guide provided, participants found it easy to fit YouthCHAT into their workflow  Provision of the stepped care management resource package tailored to local contexts facilitated uptake
Reflexive Monitoring	Did the participants think it was worth using YouthCHAT?	Inability to integrate the tool into workflow meant participants thought it was not worth using YouthCHAT	The change to YouthCHAT saved participants' time. They found the screening process less demanding for them & more relaxed for youth.
	Are the participants likely to use YouthCHAT?	With no clear directive from management & governance to use YouthCHAT & believing that its use would increase their workload; youth health service staff were unlikely to use the tool	Yes, data from screens are used to evaluate screening, detection, intervention delivery, and referral rates by the Primary Health Entity. Data also used to track health outcomes for Northland youth

Co-design approaches are aimed at working with and for local partners, not conducting research on them, which will facilitate engagement and uptake. In the final evaluation one staff member clearly identified that the goal of the project was to find out how best YouthCHAT might help them in their work to improve youth health, when she said “*The actual research process and data gathering aspect of it, I mean is this about us and youth? or is like getting data and more data from our youth? and so I mean it is actually going to benefit us*”.

## Working in context (macro-level)

On the macro-level, a number of contextual factors that impacted on implementation, which were mostly external in origin (Fig. 2). Because YouthCHAT screens were predominantly delivered within a school-

based context, little YouthCHAT activity was expected during school holidays, especially during the summer break from December through February.

Some macro-level factors, such as appropriate cultural engagement, had modifiable components. The project used a bicultural co-design model. This required extensive engagement with Māori before releasing YouthCHAT, with community-based meetings (*hui*) observing Māori protocols in July, August and September 2018. Over time the local team were able to facilitate effective and clear two-way communication between managers and service providers around YouthCHAT use.

Many factors were beyond the control of the research team, who needed to work within these constraints. These included youth nurses redeployed to deliver vaccinations in response to a Northland meningococcal epidemic in October 2018 to March 2019, and then again with a measles epidemic from May 2019. Although implementation of YouthCHAT had been at the invitation of the Northland Youth Governance Group, the intention for YouthCHAT to be routinely used had not been communicated to staff on the ground. Local services were fragmented with inequitable funding. In December 2018 the service underwent a restructure and the Northland Youth Health Service (NYHS) was launched. In June 2019 YouthCHAT was formally approved as part of the HEEADSSS assessment and this was communicated to youth services. In February 2020 guardianship of Northland YouthCHAT formally passed to the NYHS.

Another major restructure was the two Northland Primary Health Organisations with which the research team worked closely, underwent a merger to form a single Primary Health Entity in July 2019. During this process many staff left or changed roles and others had uncertainty around their new roles and responsibilities. This included loss of the YouthCHAT champion from a key clinic, and redeployment of our local research team staff into new roles within the health system. By the end of the project, staff were settling into their new roles. A new manager supported training, resource provision such as e-tablets for nurses to deliver YouthCHAT in remote locations, and new champions were encouraged and emerged.

The advent of the COVID-19 pandemic was another unexpected macro-level factor that impacted the project. In March 2020 NZ went into lockdown. Youth providers expressed concern about rising mental health issues in isolated youth. In response, remote functionality was programmed, allowing youth to be emailed or texted invites to complete YouthCHAT from their phone or other device at home. The provider could then access the summary report and contact a consultation with the young person by phone or video.

The first lockdown ended in April 2020. By May 2020 most barriers had been overcome and YouthCHAT started to be routinely implemented as can be seen in Fig. 1.

Full ownership of their version of YouthCHAT by the NYHS, including the passing over of computer code and local hosting, took place at the end of 2020. YouthCHAT is now viewed as a precious gift and treasure (*toanga*).

## **Development of the implementation framework**

Findings from this, as well as other studies, indicate that successful YouthCHAT implementation has two key aspects: tool acceptance, and tool uptake, but it also relies on communication, coordination, and evaluation activities as outlined next.

The first step in the successful rollout of YouthCHAT is to create a tool that is acceptable to its stakeholders. There are four key activities involved:

1. Establish cultural partnerships: Cultural partnerships need to be established to ensure that YouthCHAT itself, as well as the way it is used, are appropriate for the communities it serves.
2. Endorsement from leaders: Clear endorsement of YouthCHAT by leaders, managers, and governance is an important part of acceptance.
3. End user and community acceptance: There are several modifiable aspects of YouthCHAT which can be adjusted according to user requirements. Consult with end users and the community to ensure their needs are met.
4. Encourage emerging champions: Champions are people who promote, encourage, and support YouthCHAT use, who understand its need and believe it offers real benefit. Ideally, they will also be experienced enough to train other users and help with basic troubleshooting. The identification of real YouthCHAT champions is an important part of gaining acceptance, but also contributes directly to tool uptake.

Successful uptake of YouthCHAT requires an iterative implementation and review process:

1. Assess the current screening or assessment procedures (standard workflow) and set YouthCHAT screening criteria and targets.
2. Appoint a YouthCHAT organisational administrator (ideally a champion) and identify potential barriers to uptake (eg shortage in staff, infrastructure, technology, or resistance to change) with the aim of resolving them.
3. Assist end-users with determining the best way to integrate YouthCHAT into their daily workflow and establish a set screening protocol.
4. Adapt procedures as necessary to overcome barriers as well as update goals, targets, criteria and procedures of use.

A vital part of implementation is the communication and coordination of key messages and activities:

1. Communicate (two-way). Top-down expectations and goals must be clearly communicated and bottom-up information flow is also needed, with end users able to communicate their needs.
2. Clarify roles and responsibilities of all involved so that users are not confused about their role in both the implementation and the ongoing use of YouthCHAT.
3. Check resources are sufficient, such as the availability of devices (eg e-tablets) and Wi-Fi networks. As a web-based tool, YouthCHAT requires internet access and a device on which to complete the questionnaire.

4. Coordinate training and support. This includes practical hands-on YouthCHAT training, as well as ensuring the necessary support materials are in place (such as the YouthCHAT manual and stepped care resource guide).

Ideally evaluation of an implementation takes place in parallel to the actual implementation. Tasks and metrics might include:

1. Review goals, targets, criteria, and procedures (process evaluation).
2. Record barriers and facilitators to uptake (process evaluation).
3. Record outputs such as number of screens conducted or the number of users/clinics set up over a set time (outcome evaluation).
4. Review outcomes such as changes in mental health and/or risky health behaviours over time (outcome evaluation).

These four-by-four factors are represented in our implementation framework (Figure 3). This is accompanied by a practical ten-step implementation guide (Supplementary material).

## Discussion

We learned that for YouthCHAT to become part of routine care, change was needed at all levels, from the individual practitioner to the service team through to the over-arching health system. Similarly, a study looking at embedding effective depression management in primary care requires a team approach and organisational and system-level change as well as practitioner education [26].

Our findings are consistent with the Consolidated Framework for Implementation Research, which identifies that the constructs required to implement an intervention, relate to the intervention, to the outer setting such as patient needs and resources, to the inner setting such as culture and leadership engagement, to individual characteristics, and to processes such as planning, evaluating, and reflecting [14].

Murray et al advise abandoning a trial if it becomes apparent that there is little likelihood that the intervention will become normalised into routine care [15]. It took nearly three years to successfully embed YouthCHAT and implement it into usual practice. We persevered because we knew that YouthCHAT had the potential to reduce workload if properly integrated, rather than add an extra burden [20]. We also were able to take make changes in response to the views of actual users in the real world, which led to their engagement and eventual intervention uptake.

## Limitations

Limitations include the small sample of formally recruited young people and service providers contributing data from focus groups and online surveys. Initial miscommunications meant that services were not informed by management that YouthCHAT should form part of usual care, and

misunderstanding that youth needed to formally consent to using YouthCHAT, whereas this is built into the introductory video.

## Conclusion

Not all evidence-based interventions will become normalised into routine primary care. Failure to launch may be due to the interplay of between the intervention, its users, contextual factors, and wider organisational aspects. The intervention may need to be tailored to a specific context to meet the needs of users, and organisational and system barriers addressed. Ultimately there will only be uptake where providers see this as worthwhile. The perception that its effective use will reduce their workload serves as a valuable incentive. The strengths of this project rest in its co-design participatory research and bicultural *kaupapa* Māori approaches, which eventually led to successful implementation of YouthCHAT in Northland, where YouthCHAT is now viewed as a treasured gift (*toanga*).

There is a large body of evidence that early detection and management of mental health issues, substance misuse and other risky behaviours leads to many long-term positive health and social outcomes, but the challenge is how to implement a systematic process of screening and intervention. While our study focuses on a particular population, the principles are generic, and our framework should be generalisable to other settings.

## Abbreviations

HEEADSSS	Home, Education/ Employment, Eating, Activities, Drugs, Sexuality, Suicide, Safety
NPT	Normalisation Process Theory
NYHS	Northland Youth Health Service
NZ	New Zealand
YouthCHAT	Youth Case-finding and Help Assessment Tool

## Declarations

### *Ethics approval and consent to participate*

This study received approval from the New Zealand Health and Disability Ethics Committee (reference. 18/CEN/31) on May 05 2018

The study is registered with the Australian and New Zealand Clinical Trials Registry - registration number ACTRN12618000299202p.

Locality assessment approval was obtained from the local kura (Māori culture and language immersion school on 02/26/2017 and from the Manaia PHO on 26/10/2017.

### ***Consent for publication***

Not applicable

### ***Availability of data and materials***

Not applicable

### ***Competing interests***

No author has any conflict of interest to declare

### ***Funding***

This study is funded by the 2017 Global Alliance for Chronic Diseases-Health Research Council Funding, HRC Reference: 17/705. RM also received the University of Auckland HABITS Digital Mental Health Doctoral Scholarship in Psychological Medicine, the University of Auckland Scholarship in General Practice, and a New Zealand Nursing Education and Research Foundation McCutchan Trust Scholarship.

### ***Authors' contributions***

All three authors contributed to the study design. RM conducted the research for her doctoral thesis, MD managed the overall project, and FG provided doctoral supervision. FG wrote the first draft of the paper. All three contributed to the writing and approved the final version.

### ***Acknowledgements***

This study would not have been possible without the support of Mahitahi Hauora Primary Health Entity (formerly Manaia and Te Tai Tokerau PHOs) and Northland District Health Board who run the youth and school-based clinics in Northland. The authors would like to acknowledge the support of the Youth Health Governance Group, which has general practice and iwi representation as equal partners. Thank you to the staff and students of Te Kura Kaupapa Māori o Te Rawhitiroa for their work translating YouthCHAT into Te reo; the Northland-based research team, Tracey Wihongi, Tuiata Smith and Aniva Lawrence; and the software development team, especially Prof Jim Warren and Dr Chester Quick-Holt. RM would also like to acknowledge her doctoral co-supervisor, Dr Matthew Shepherd.

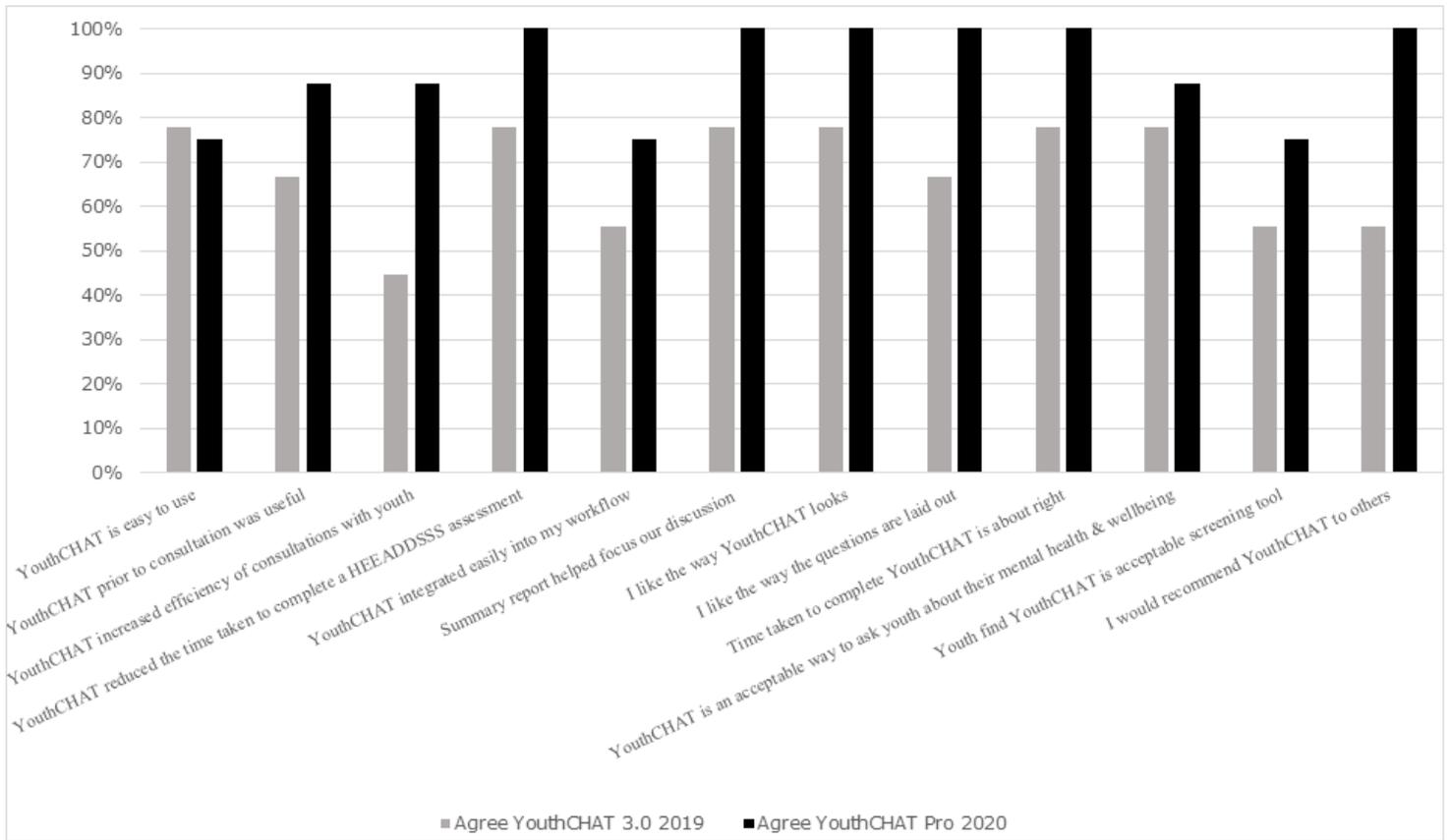
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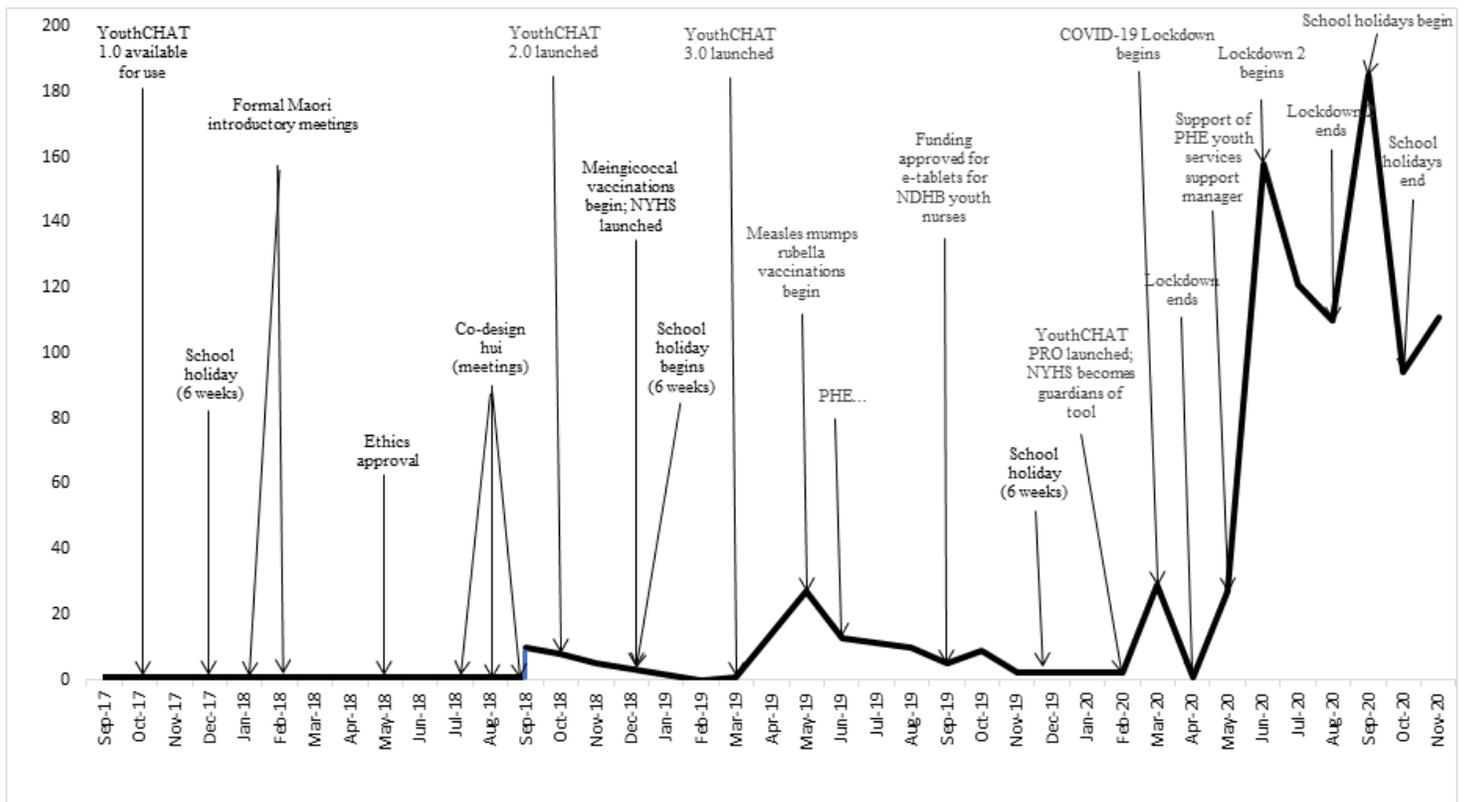
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## Figures



**Figure 1**

Acceptability and usefulness of YouthCHAT to clinical staff



Key: NYHS = Northland Youth Health Service; PHE = Primary Health Entity

Figure 2

Numbers of YouthCHAT assessments completed in relationship to events

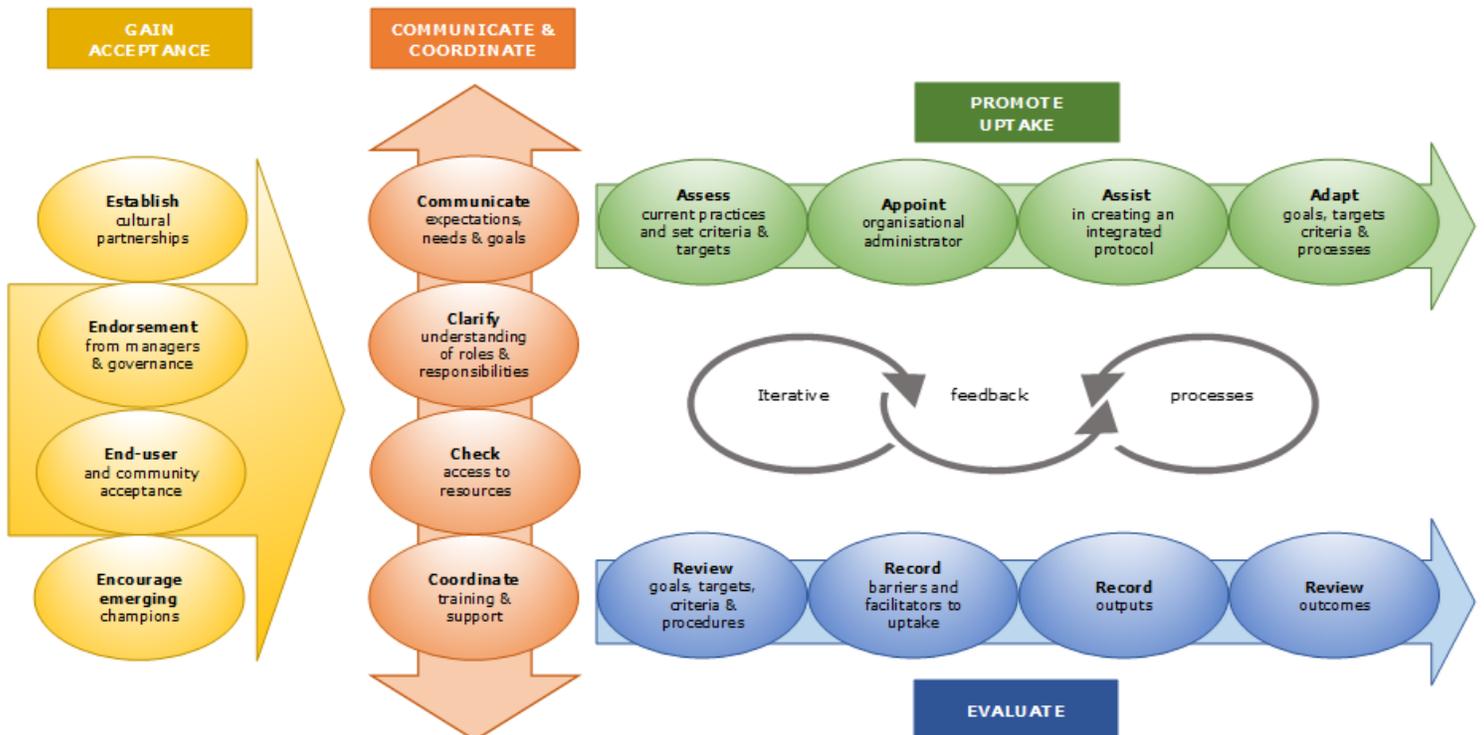


Figure 3

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