

BMJ Open Adapting and enhancing PAX Good Behavior Game for First Nations communities: a mixed-methods study protocol developed with Swampy Cree Tribal Council communities in Manitoba

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ABSTRACT

Introduction High rates of mental health problems, such as suicidal behaviours, among First Nations youth in Canada are a major public health concern. The Good Behavior Game (GBG) is a school-based intervention that provides a nurturing environment for children and has been shown to promote positive outcomes. PAX Good Behavior Game (PAX GBG) is an adaptation and enhancement of the GBG. While PAX GBG has been implemented in Indigenous communities, little research exists examining the cultural and contextual appropriateness and effectiveness of the intervention in First Nations communities.

Methods and analysis The present paper describes a protocol of the mixed-methods approach guided by an Indigenous ethical engagement model adopted to implement, adapt and evaluate PAX GBG in First Nations communities in Manitoba, Canada. First, implementation outcomes (eg, acceptability, adoption) of PAX GBG will be evaluated using qualitative interviews with teachers, principals and community members from Swampy Cree Tribal Council (SCTC) communities. Second, by linking administrative databases to programme data from schools in 38 First Nations communities, we will compare PAX GBG and control groups to evaluate whether PAX GBG is associated with improved mental health and academic outcomes. Third, the qualitative results will help inform a cultural and contextual adaptation of PAX GBG called First Nations PAX (FN PAX). Fourth, FN PAX will be implemented in a few SCTC communities and evaluated using surveys and qualitative interviews followed by the remaining communities the subsequent year.

Ethics and dissemination Ethical approval was obtained from the University of Manitoba Health Research Ethics Board and will be obtained from the Health Information Privacy Committee and respective data providers for the administrative database linkages. Dissemination and knowledge translation will include community and stakeholder engagement throughout the research process, reports and presentations for policymakers and community

Strengths and limitations of this study

- This study will apply a mixed-methods approach guided by an Indigenous ethical engagement model rooted in a strong 11-year relationship with Swampy Cree Tribal Council communities, Indigenous organisations and collaborating with key government, private industry and research stakeholders; these strong partnerships will be crucial for the sustainability and success of the school-based PAX Good Behavior Game and First Nations PAX within these communities.
- Through linking de-identified, comprehensive, administrative mental health and education data, we can examine longer term outcomes of children exposed and unexposed to the PAX Good Behavior Game, which have yet to be studied.
- While First Nations PAX will be developed to better fit the contextual and cultural settings of the communities, differing opinions and beliefs within communities may act as barriers for the development and implementation of the intervention.

members, presentations at scientific conferences and journal publications.

The Indigenous view of health and well-being is holistic—highlighting the importance of balance in all life domains, including spiritual, mental, emotional, physical and social well-being.¹ However, given colonisation; oppressive laws and policies; the residential school system; marginalisation; intergenerational trauma; and current cultural, socioeconomic and geographical contexts, First Nations communities in Canada disproportionately experience poor mental health outcomes

such as psychological distress, mood and anxiety disorders, and substance use and misuse.²⁻⁶ Perhaps one of the strongest indicators of communities' languishing mental health are the alarmingly high rates of suicide and suicide attempts among First Nations youth in Canada, which have been identified internationally as a major public health concern.⁷⁻¹³ These findings show the strong need for effective mental health promotion strategies in First Nations communities, particularly for First Nations youth.

The Good Behavior Game (GBG), a school-based mental health promotion approach, has been associated with positive outcomes such as improved academic achievement¹⁴; decreased aggressive, violent and criminal behaviours¹⁵⁻¹⁷; reduced tobacco, alcohol and drug use¹⁸; and decreased use of services for problems with emotions, behaviours or drugs and alcohol.¹⁹ It is one of the few evidence-based approaches identified as reducing suicidal behaviours in youth.²⁰⁻²⁴ GBG is a prevention intervention developed by Barrish and colleagues²⁵ and is delivered by teachers within normal classroom instructional activities. The aim of GBG is to enhance students' self-regulation and behaviour self-management. This intervention promotes on-task behaviours by rewarding teams of students that do not exceed disruptive behaviour standards, as set by the teacher and students together. This intervention was shown to improve childhood peer relationships which appears to partially explain the relationship between GBG and improved child outcomes.

PAX Good Behavior Game (PAX GBG) is an enhancement of the first-generation GBG by adding evidence-based strategies to facilitate a comprehensive classroom approach and to provide a nurturing environment for students.²⁰⁻²⁶ In PAX GBG, students create a vision of a wonderful classroom, with detailed lists of what they would like to see, hear, do and feel more of, as well as less of, each day. Several times a day students play PAX GBG during a regular school activity on rotating, cooperative teams. Every team can win simple physically fun rewards by refraining from unwanted impulsive or off-task behaviours defined for the particular classroom activity. In Manitoba, the Healthy Child Manitoba Office (HCMO) reported that Grade 1 children who participated in PAX GBG showed a greater increase in prosocial behaviours and decrease in difficulties with conduct (eg, bullying other children), emotions, inattention and peer relationships, compared with children in schools not yet implementing PAX GBG.²⁷

Positive outcomes of GBG have also been demonstrated internationally and across diverse populations in the USA.¹⁶⁻²⁸⁻²⁹ PAX GBG has been implemented in Indigenous communities in the USA, New Zealand, Australia, Central and Latin America, and in 38 First Nations communities in Manitoba; however, there is little understanding of the cultural safety and effectiveness of PAX GBG in First Nations communities. Given the complex histories such as the colonisation of Canada's Indigenous people via legal and policy instruments such as the regressive residential school system and the differences

in cultural, socioeconomic and geographical contexts, including the various types of school systems (provincial school divisions vs First Nation governed system), we should not assume that PAX GBG will fundamentally fit or be culturally safe within First Nations communities. Nor should we assume that it has been or can be implemented and accepted in First Nations communities in the same way as it has in other schools. Evaluating PAX GBG and its cultural and contextual appropriateness in First Nations communities is crucial to ensure ethical practices and to strive for equity in communities that continue to experience physical, emotional and spiritual ill health because of historical traumas and current realities.³⁰⁻³⁵

Another consideration is that there are multiple factors within First Nations communities that potentially enhance mental health and are protective against poor mental health outcomes. These include strong community connections, large family networks, a strong sense of identity, and traditional and spiritual ways.³⁶ Chandler and Lalonde³⁵ reported that First Nations communities with self-government (local control over health, education and police services) and community facilities for the preservation of culture were at lower risk of suicide. Further, a Manitoba sample of on-reserve First Nations adolescents perceived community caring as playing a protective role in reducing suicidal behaviour.³⁷ Spirituality and cultural connections have been previously linked with positive mental health outcomes in First Nations adults and youth³⁸⁻³⁹ and also associated with resilience among Swampy Cree Tribal Council (SCTC) community members who had experienced significant adversity in their lives.⁴⁰ It is important to take these factors into consideration when planning, developing and/or evaluating mental health promotion strategies in First Nations communities. At the Seventh Annual Conference with SCTC communities, many community members commented on the 'good fit' of PAX GBG with their Indigenous ways and voiced their support for programme implementation in their communities.

OBJECTIVES

The goal of this study is to evaluate whether PAX GBG in First Nations communities could contribute to '*mino pimatisiwin*' (the good life) by improving the mental health and well-being of First Nations children. This research is guided by two-eyed seeing, a principle that recognises both Indigenous and Western ways of knowing as equal contributors to an ever expanding and evolving knowledge base, where one worldview does not dominate the other.⁴¹⁻⁴³ The research objectives are as follows:

I(a) Through qualitative methods, examine how the current school-based PAX GBG is implemented in SCTC Grade 1 classrooms and evaluate its acceptability, adoption, appropriateness, feasibility, fidelity, coverage and sustainability.

I(b) Through linkages to administrative databases, evaluate if the current school-based PAX GBG is as

sociated with improved mental health and academic outcomes for children in First Nations communities in Manitoba.

2(a) Develop a culturally grounded toolkit for implementation of a culturally and contextually adapted version of PAX GBG, hereinafter referred to as First Nations PAX (FN PAX), as informed by objective 1a, across SCTC communities.

2(b) Implement and evaluate FN PAX in SCTC communities.

METHODS

Research team and partnerships

The genesis of this research project is rooted within a 11-year Canadian Institutes of Health Research-funded partnership between University of Manitoba researchers and SCTC communities known as Swampy Cree Suicide Prevention Team (SCSPT). Since 2007, SCTC communities and Cree Nation Tribal Health (CNTH) have partnered with University of Manitoba researchers to form the SCSPT and conduct a series of studies designed to both understand the risk and protective factors for suicide among Indigenous people and to develop culturally grounded suicide intervention strategies.⁴⁴ Through this established partnership, an environment of co-learning and mutual respect was fostered which led to this new project. SCTC community members are involved at various levels in this project, including co-principal investigator, knowledge users, community-based research assistants, community liaisons, members of the PAX Adaptation Working Group and PAX Advisory Committee, and project facilitators. For the purpose of the present research programme, the SCSPT has been expanded to form a large multidisciplinary team with the addition of policy and decision makers including HCMO (Manitoba government department); Manitoba First Nations Education Resource Centre (MFNERC); First Nations Inuit Health Branch (FNIHB, a federal health department); PAX GBG developers (PAXIS Institute); and researchers from the Manitoba Centre for Health Policy (MCHP), the University of Manitoba and Johns Hopkins University. Combined, the strong commitment from this group will be able to influence strategic planning and funding, which is crucial for longer-term success, sustainability and scalability.

Population

This project involves eight SCTC communities,ⁱ specifically for objectives 1a, 2a and 2b. The target populations are children, teachers, principals, parents and community members living in the SCTC communities (see [table 1](#) for demographic and school profiles). The descriptions of

ⁱIn preparing this proposal, we worked with eight Swampy Cree Tribal Council communities: Chemawawin Cree Nation, Opaskwayak Cree Nation, Sapotaweyak Cree Nation, Marcel Colomb First Nation, Mathias Colomb First Nation, Misipawistik First Nation, Moskahiken Cree Nation and Wuskwi Sipihk First Nation.

these eight communities (see [table 1](#) for demographic and school profiles) demonstrate that these communities differ in terms of being remote and rural, some communities are First Nations and some a mixture of First Nations and Métis (another Canadian Indigenous group) and lastly their previous exposure to PAX GBG. The HCMO has offered PAX GBG training to all eight communities over the last six years (2011/2012–2016/2017); however, only four schools have trained staff in PAX GBG and the other four are considering implementation in the current or future school years. The communities that have not yet implemented PAX GBG tend to be more remote and comprised mainly of First Nations people (as opposed to a mixture of First Nations and Métis people). For objective 1b, we will also include data from all other First Nations schools across Manitoba who have been exposed to the intervention. Engagement of these 38 communities will be through invitation to be part of an Advisory Committee that will review the objectives, methodology and results and inform the interpretation of the results.

Study design and data analysis plan

This research will be guided by two-eyed seeing, a principle that recognises both Indigenous and Western ways of knowing as contributors to an ever expanding and evolving knowledge base, where one worldview does not dominate the other.^{41 42} It allows for Indigenous ways of knowing, such as story-telling, community sharing circles, group participation and collective knowledge building to be used equitably with Western ways of knowing such as objective theories and numerical data. Our research is inherently compliant with ownership, control, access and possession (OCAP) principles that ensure self-determination of First Nations communities over all research involving their people. Examples of two-eyed seeing and OCAP-compliant practices in every step of our research programme include (a) having community members as co-principal investigator and research coordinator to design and implement the research project goals; (b) holding community gatherings to involve all members of the community wishing to participate; (c) training PAX GBG facilitators and community research assistants within the communities; (d) annual meetings; (e) community members forming the PAX Adaptation Working Group and in all steps of the research process from design to evaluation; and (f) partnering with Indigenous organisations.

To further our two-eyed seeing approach, we will use developmental evaluation which, in practice, means developing an evaluation plan with the SCTC communities, meeting frequently to initiate timely feedback, sharing data collection efforts and early results promptly, discussing interpretation of results and adapting the intervention based on results.⁴⁵ This type of evaluation is fluid and complex, encouraging trial and error and involving real-time feedback loops. Although the plan outlined below may be adopted, it is important to maintain a high degree of flexibility inherent in the developmental evaluation approach in order to produce a highly integrated

Table 1 Description and school characteristics of Swampy Cree Tribal Council (SCTC) communities

Swampy Cree Tribal Council community name	Geographical location	Population (April 2014)		Indigenous identity	Governance	School attended by community children/youth		Previous PAX GBG exposure
		On-reserve	Total			First Nations operated	Provincially operated	
Chemawawin/Easterville	Rural, 460 km northeast of Winnipeg, MB (provincial capital), by provincial highway, then 13 km gravel road.	1436	1783	First Nations/Métis	A chief and 3–12 council members (depending on community size) govern each community, with elections occurring every two years as per the Indian Act. Since the 1960s, SCTC communities have gradually gained greater autonomy in the management of their affairs.	Chemawawin School	–	January 2012 (one teacher, one admin)
Marcel Colomb/Lynn Lake	Remote, 322 km northwest of Thompson, MB (nearest urban centre-midsize), by gravel road.	26	401	First Nations		–	West Lynn Heights School (Frontier School Division)	–
Mathias Colomb/Pukatawagan	Remote, fly-in/winter road/train (irregular). 201 km north of The Pas (small urban centre).	2500	4034	First Nations		Sakastew School	–	–
Misipawistik/Grand Rapids	Rural, 435 km north of Winnipeg, MB (provincial capital), by provincial highway. Adjacent to hydro dam.	1132	1871	First Nations/Métis		Grand Rapids School (Frontier School Division)	–	March 2012 (one teacher, one admin); October 2012 (one teacher, one admin); March 2014 (one teacher); October 2014 (one teacher)
Mosakahiken/Moose Lake	Rural, 100 km from nearest small urban centre (The Pas, MB) (62 km of which is gravel road).	1530	2102	First Nations/Métis		Frontier Mosakahiken School (jointly operated)	–	October 2013 (two teachers), March 2014 (two teachers)
Opaskwayak Cree Nation	Rural/urban, on major provincial highway. Across the river from small urban centre (The Pas, MB) and 625 km northwest of Winnipeg, MB.	3126	5710	First Nations		Joe A. Ross School; Oscar Lathlin Collegiate (high school)	–	In Joe A Ross School: January 2012 (1 admin, four teachers); March 2014 (one teacher)
Sapotoweyak/Pelican Rapids	Rural, 114 km from small town (Swan River, MB) and 595 km northwest of Winnipeg, MB, by major highway and paved road.	898	2357	First Nations		Neil Dennis Kematch Memorial School	–	–
Wuskwiki Sipiik/Birch River	Rural, 75 km from small town (Swan River, MB), 12 km off of major provincial highway.	174	634	First Nations		Chief Charles Thomas Audy Memorial School	–	–

MB, Manitoba; PAX GBG, Pax Good Behaviour.

and appropriate intervention that provides utilisation-focused changes for the communities and stakeholders. This mixed-methods study will use qualitative methods and quantitative surveys as well as administrative database linkage to achieve the following objectives.

Objective 1a

Aspects of objective 1a have been completed or are currently under way and scheduled from September 2016 to April 2018. The methodology of interpretive description was used to inform the qualitative piece of this project. Interpretive description is an inductive, analytic approach that aims to take qualitative description and filter it through a disciplinary lens.^{46 47} It allows for the careful and systematic analysis of a phenomenon to then be put back in the context of practice where it can be used to inform and guide future practice decisions.⁴⁶

From September 2016 to January 2017, interviews and focus groups were conducted with principals, teachers, school staff, parents, elders and community members to understand how the current school-based PAX GBG is implemented and received in SCTC communities. Purposive sampling was used to recruit participants. The specific SCTC communities and the number of communities that were visited was based on available resources, multiple and diverse perspectives and contexts, and community interest. Whether individual interviews or focus groups were used depended on the community's preference. Informed consent was obtained for all participants. Topics covered consisted of implementation outcomes, including acceptability, adoption, appropriateness, feasibility, fidelity, coverage and sustainability of PAX GBG.⁴⁸ Supplementary appendix A provides an example of an interview guide used with teachers and principals who have implemented PAX GBG. Interview guides were also adapted for teachers and principals who have not implemented PAX GBG and for community members. These included an initial oral and video introduction to PAX GBG followed by questions focused on the participants' perspectives of whether and how the programme would be accepted, appropriate, and feasible within their school or community context. The goal was to obtain perspectives of 4 teachers, 4 principals, 16 parents and 8 elders. After interviewing 3 principals, 3 teachers, 2 school employees and 13 community members, including parents, grandparents and elders, no new themes emerged and categories were dense, thus theoretical saturation was deemed reached.

Community members felt strongly that the children's and youth's voices needed to be included in the adaptation process of PAX GBG. From September 2017 to April 2018, Grade 6–11 students from the eight communities will be invited to participate in an art-based qualitative study. Parental consent will be obtained. Through recorded focus groups, students will be asked about creating a healthy community, and what they would like to see, hear, feel and do more of and less of in their community. During the focus groups, students will also

be asked to create an art piece depicting the themes identified through the qualitative analyses of the data. The art piece will be of their choice, for example, a collage, collection of photos taken by the students or a sculpture. Qualitative analyses will be completed through line-by-line examination of the focus group transcripts, isolating patterns and uncovering emerging themes from the data. These findings will be communicated to the PAX Adaptation Working Group, the SCTC communities and the stakeholders to help inform the cultural and contextual adaptations of PAX GBG (FN PAX).

Objective 1b

In 2011, the HCMO invested in a randomised controlled trial of PAX GBG. Across all Manitoba schools, 200 Grade 1 classrooms were enrolled in the trial. Half of the schools were randomly allocated to PAX GBG in 2011/2012 with the other half in 2012/2013, thereby effectively becoming wait list 'control' schools. Close to one quarter of the schools were from 38 First Nations communities, where about half of these schools were exposed to PAX in 2011/2012 and the other half in 2012/2013. The precise numbers will be confirmed once analyses begin. The HCMO collected data on training, a self-reported teacher implementation and fidelity survey, and a measure of emotional and behavioural child outcomes called the Strengths and Difficulties Questionnaire (SDQ).⁴⁹ Using administrative databases housed at the MCHP, this study will compare children who were randomly exposed (estimated $n=825$) and unexposed (estimated $n=865$) to evaluate whether school-based PAX GBG is associated with improved mental health and academic outcomes (ie, objective 1b).

The Manitoba Population Research Data Repository at the MCHP houses a collection of deidentified population-based, administrative database, capturing virtually all contacts by Manitoba residents involving the health, education and social services administered by these systems. A numeric identifier unique to each resident is encrypted prior to the data being deposited in the Repository which allows individual-level linkage of data sets across files and over time. Capabilities, validity and reliability of the data repository have been published elsewhere.^{50–54} Administrative databases for this research programme will include the Manitoba Population Health Registry; the Drug Program Information Network; Canadian Census Files; Medical Claims (physician billings); Vital Statistics; Hospital Abstracts; Social Assistance Management Information Network; Child and Family Services Application and Intake; Education Enrollment, Marks, and Assessments; the HCMO's Early Development Instrument data; and the HCMO's PAX GBG data (see [table 2](#) for a description of each data set). From these data, the outcomes include grade repetition, receipt of special education services, Grade 3 reading and numeracy assessments, hospitalisations due to injury, diagnosis of attention-deficit hyperactivity disorder (ADHD), mood and anxiety disorders, conduct disorders and diagnosis

Table 2 Manitoba Centre for Health Policy data files

Data	Data range*	Data fields	Rationale
Manitoba Health Registry	1984/1985– latest available	Birth, coverage status, sex, location of residence, marital and family status	For linkage between all sources of data, and to examine the sociodemographic characteristics, and coverage benefits of the Manitoba children and their families.
Drug Program Information Network	1995/1996–latest available	Prescriptions, drugs, characteristics (type, dose, quantity, class), carriers, prescribers	To examine the use of pharmaceutical drugs and define chronic diseases (eg, ADHD, family history of mental health disorders).
Canadian Census File (public use)	2001, 2004, 2011	Area data on income/ socioeconomic status	To obtain relevant community-level data on socioeconomic characteristics (eg, income quintile).
Medical Claims (physician billings)	1984/1985–latest available	Services, diagnoses, provider characteristics, dates of visits and reasons for visits	To define chronic diseases (eg, ADHD, family history of mental health disorders).
Vital Statistics	2004–latest available	Date and cause of death	To identify children who died during the study period.
Hospital Abstracts	1984/1985–latest available	Hospitalisations, diagnoses, procedures, services and providers, length of stay	To define chronic diseases (eg, ADHD, family history of mental health disorders), injuries, comorbidities and healthcare use.
Social Assistance Management Information Network	1995/1996–latest available	Fields relating to income and employment assistance	To examine family receipt of income assistance.
Child and Family Services Application and Intake	1992/1993–latest available	Information on children in care and families receiving protection or support services	To identify children in care or receiving protection or support services and their circumstances. Also to identify parental history of CFS involvement.
Education— Enrollment, Marks and Assessments	1995/1996–latest available	Fields describing school enrolment, high school completion, and Special Needs Categorical Funding, assessments	To study and compare educational outcomes for PAX GBG versus no PAX GBG groups and assess children who have special needs funding. Also to determine parental education.
Early Development Instrument (HCMO)	2006–latest available	EDI performance on all five domains	Assess the child's readiness for school and identify risk factors.
PAX GBG data (HCMO)	2011/2012–latest available	Student and school enrolment, treatment data, SDQ and spleem data, other child and programme descriptives	Identify the treatment and control cohorts, use of the programme, characteristics of the programme across sites, etc.

*Fiscal years XXXX/YY: 1 April XXXX through 31 March YYYY.

ADHD, attention-deficit hyperactivity disorder; CFS, child and family services; EDI, Early Development Instrument; PAX GBG, PAX Good Behaviour Game; HCMO, Healthy Child Manitoba Office; SDQ, Strengths and Difficulties Questionnaire.

of any type of mental disorder. Consent for these analyses based on administrative data has been waived by the Health Research Ethics Board because the analyses will be conducted under very secure conditions to protect confidentiality of the children and because this is secondary de-identified data where obtaining consent is not possible.

Community engagement for this portion of the research will include consulting the Health Information and Research Governance Committee (as suggested by the Assembly of Manitoba Chiefs) and representatives from all First Nations communities involved in this analysis to discuss the research plan, the goals and the outcomes.

In summer 2018, analyses will be conducted using the 2011/2012 cohort of Grade 1 children with follow-up data to the end of the 2016/2017 school year. This will provide knowledge of the longer-term outcomes listed above among children who were exposed to PAX-GBG compared with those who were not. Multilevel modelling will be used to account for the study design's nested structure (the intervention was randomised at a school level and PAX GBG was implemented at a classroom level). Differences between classrooms are anticipated due to classroom, school and community characteristics such as the teacher's level of experience, levels of programme fidelity and geographic location of the community

(ie, remote or close to a major centre). The analyses will first be nested by participant characteristics including age, sex, Early Development Instrument^{55–57} scores, mother's age at first birth, family receipt of income assistance and parental mental health. The second level of nesting will be at the classroom level and includes programme assignment, programme fidelity, classroom disruption, teacher training and whether the classroom is in an urban or rural area.

The qualitative and quantitative findings from objective 1 will be shared with First Nations community partners and government departments. Qualitative findings from focus groups and youth artwork descriptions will be used to evaluate the current PAX GBG and help to inform areas for the FN PAX adaptation. Quantitative findings will provide evidence for longer-term child outcomes associated with PAX GBG and serve as a baseline for future work to determine whether the adapted version, FN PAX, has increased effectiveness compared with the original PAX GBG. A shared understanding of factors, as measured by the covariates in the quantitative study and as identified in the qualitative interviews, that contribute to PAX GBG's effectiveness may inform areas for programme improvement.

Objective 2a

Objective 2a will be completed in two iterations: spring/summer 2017 and spring/summer 2018. The literature points to a series of steps to ensure that enhancements and adaptations are successful in improving the reach and effectiveness of communities including meaningful community engagement.⁵⁸ This includes reviewing the current evidence and perspectives and designing a pilot model for evaluating FN PAX in a few communities. To this end, representatives from each SCTC community will form a PAX Adaptation Working Group together with a researcher and stakeholders to determine what adaptation or enhancement is required (eg, for language, cultural, socioeconomic, geographical or historical reasons). The exact adaptations and enhancement of PAX GBG will be determined through a co-designing approach based on the results of the qualitative research (ie, objective 1a), results of the quantitative research (ie, objective 1b), community members' experience and perspectives, sociopolitical realities and contexts, available resources and the developer's expertise, balancing the fit to the communities' cultural contexts and the need for fidelity of the intervention. Revisions will be made to the toolkit and materials. Knowledge generated from one iteration will be used to refine the adaptation further and to create a final version of FN PAX.

Objective 2b

First, a pilot of FN PAX will be implemented in three schools during the 2017/2018 and 2018/2019 academic years, and then evaluated and revised before it is offered to all eight SCTC schools in the following school year. To implement and evaluate the culturally grounded FN PAX,

a number of evaluation measures are being proposed to assess how FN PAX is working in practice and to determine whether early impacts of the intervention can be detected. These are described below. As in objective 1a, after obtaining informed written consent, we will collect qualitative data about the pilot version of FN PAX by interviewing teachers, principals, community facilitators and by conducting focus groups for parents and community members. We will ask the groups for their perspective on the training and using FN PAX within schools, their homes and their communities. Field notes will be taken by the research assistants to document implementation of FN PAX in the classroom or elsewhere and any adaptations that are naturally occurring. Similarly, the following year after broader implementation to the eight communities, we will collect qualitative data on the revised version of FN PAX by interviewing students, school personnel and community members. The goal is to obtain the perspective of at least one teacher, the principal and one focus group for each participating community.

After obtaining informed consent from the parents and assent from the children, we will collect measures of disruptive behaviours in schools (classroom observations, number of visits to the principal office and children's school attendance), and emotional and behavioural outcomes of students using the SDQ,^{49 59 60} well-being and health behaviours of students using the Manitoba Youth Health Survey⁶¹ and the well-being of school personnel before and after FN PAX implementation using the Mental Health Continuum-Short form.^{62–64} In 2017/2018, these measures will be collected in schools piloting FN PAX and those not yet implementing FN PAX, providing an opportunity to compare exposed and unexposed as well as before and after implementation. Those implementing FN PAX (ie, teachers and/or others) will track the components of the intervention they are using.

Ethics and dissemination

Ethical approval was obtained from the University of Manitoba Health Research Ethics Board. The full partnership with the CNTH and the active participation of the SCTC community members will ensure that they remain informed and involved throughout the research process. Approvals from the Health Information Privacy Committee of the Health, Seniors and Active Living (Manitoba government branch) and the respective data providers will be sought for use of administrative databases prior to conducting objective 1b.

Community engagement will be promoted using multiple strategies including community visits in each community; meetings with education administrators and school staff; health directors and personnel; presentation at Band Council meetings; communicating through Facebook, local radio and local newspapers; presenting at other community events; providing door prizes and food; regular meetings with the PAX Adaptation Working Group; annual SCSPT meetings; and SCSPT newsletters, among other knowledge exchange strategies (see

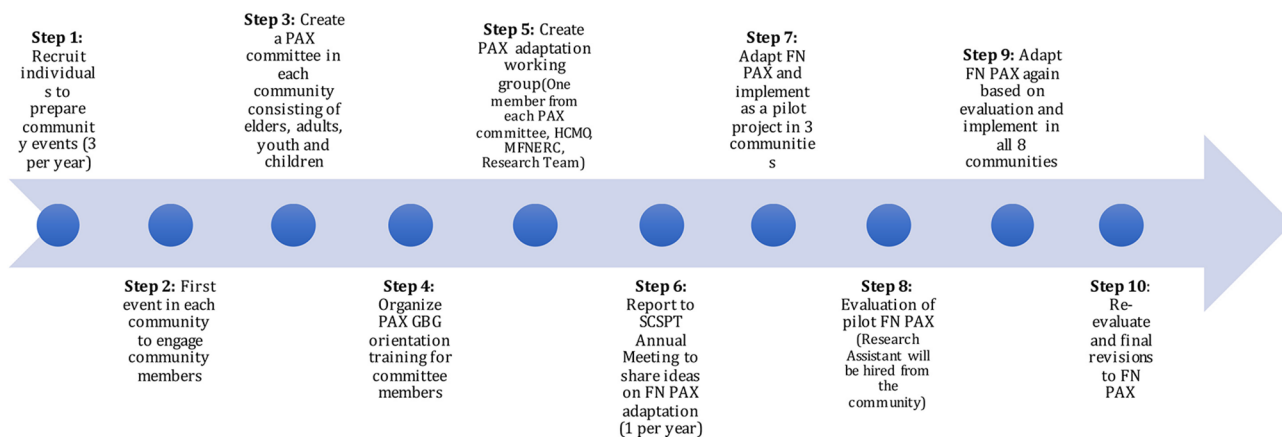


Figure 1 PAX Good Behavior Game (GBG) community engagement plan and strategies. FN PAX, First Nations PAX; HCMO, Healthy Child Manitoba Office; MFNERC, Manitoba First Nations Education Resource Centre; SCSPT, Swampy Cree Suicide Prevention Team.

figure 1). Findings will be summarised in two-page user-friendly reports and posted on the SCSPT website using accessible language and pictures to describe the findings.

Sharing our process and our findings with a broader group of stakeholders is also important to sustain the culturally grounded FN PAX. This is facilitated by having key representatives from the MFNERC and the HCMO on our research team and having the support of the FNIHB. Presentations are planned for the First Nations Health Directors, First Nations Education Directors, Assembly of Manitoba Chiefs, Manitoba First Nations Centre for Aboriginal Research, Healthy Child Committee of Cabinet (consisting of six ministers in Manitoba), school divisions, health organisations, policymakers, conferences and sites implementing PAX GBG in Alberta. We have engaged with *Nanaandawewigamig* (First Nations Health and Social Secretariat of Manitoba), a Partners for Engagement and Knowledge Exchange, to collaborate with us in translating our research findings into practices and policies at a national level. Finally, we will present at scientific conferences and submit our findings to peer-reviewed journals.

DISCUSSION

Mental health promotion for First Nations communities and, particularly, for First Nations youth is a key priority for Canada, and yet there is limited evidence regarding what population-level programmes or interventions are effective and culturally and contextually appropriate. It is not known what school and community factors might facilitate or impede implementation in rural and remote First Nations communities and what enhancements and adaptations are required for mental health promotion. The current research programme will provide evidence that will help address these gaps. First, using a collaborative mixed-methods approach, our study will assess the cultural and contextual appropriateness of PAX GBG, a school-based mental health promotion strategy that has been associated with positive mental health outcomes

and currently implemented in schools in 38 First Nations communities across the province of Manitoba. If the programme is considered to fundamentally fit in the context of the communities and contextual and cultural changes are suggested, necessary adaptations will be made. Second, using administrative databases housed at the MCHP, our study will use comprehensive population data relating to demographic, social, educational and behavioural factors to evaluate whether the school-based PAX GBG is associated with improved mental health and academic outcomes. Third, a mechanism will be developed to track students' longer-term outcomes through the MCHP Data Repository.

This study has many strengths, particularly the strong relationships between the research community, SCTC communities, First Nations organisations, programme developers and the provincial government are crucial for the sustainability and success of the intervention as well as further exploring the effectiveness of school-based PAX GBG and FN PAX. Furthermore, the mixed-methods two-eyed seeing approach which incorporates indigenous and Western ways of knowing is essential to ensure ethical practices and the cultural safety of the intervention. In addition, the comprehensiveness of the data repository housed at the MCHP permits long-term and extensive evaluation of the intervention via health, education, social and justice data, which has been used extensively to study children's long-term outcomes.⁵⁰ This study will lay the groundwork to follow the cohort of children initially exposed to PAX GBG and FN PAX until they reach adolescence when the risk of suicide is increased.

While this research programme has many strengths, it is also important to note its limitations. The first limitation of this study is the long-standing commitment required from the communities and, particularly, the schools to continue to implement and support FN PAX. Many northern, rural and remote First Nations communities experience a high degree of turnover among all levels of school personnel. This may result in the need for

consistently reoccurring training and also temporary or permanent disruption of the progress of the programme. Second, the integration and expansion of FN PAX hinges on the engagement and commitment of the majority of community members, which may be difficult due to competing priorities or differing opinions of what will work in the community. While we will be adapting FN PAX to better fit the contextual and cultural contexts of the communities, there may still be differing or opposing opinions and beliefs (eg, the degree of cultural or spiritual adaptations) within communities themselves that may act as barriers for the complete implementation of FN PAX. Such tensions will take time, guidance from elders and a high level of collaboration to navigate. Third, in evaluating FN PAX, we will not be able to randomly assign those who will implement the new approach. The choice of which communities implement FN PAX will depend on the SCTC communities' readiness to try a new approach. While we are planning on collecting data from SCTC communities that are not implementing FN PAX as a comparison group, these communities may vary on community characteristics. We will collect information on community characteristics to mitigate this limitation. Fourth, data on school attendance are not currently collected in the administrative databases. Consequently, there is no measure of individual dosage to PAX GBG, and thus, we are unable to account for variations in exposure to the intervention. With our partners, we will explore the possibility and feasibility of collecting attendance data in the implementation of the adapted FN PAX. Fifth, implementation and fidelity data collected as part of PAX GBG is self-reported which may be subject to bias. Sixth, while administrative databases have many strengths, they also have limitations such as restricted measures according to what is currently and readily collected and missing data.

PAX GBG and the first-generation GBG have been associated with positive mental health outcomes.^{15 17–24 27–29 65} PAX GBG creates a nurturing environment for students by rewarding positive behaviour and promotes group cohesion, and has the potential to make a positive difference in the lives of students and their families. At the end of this study, the team will have achieved (a) a good understanding of how PAX GBG is implemented in First Nations communities in Manitoba, particularly in SCTC communities; (b) created, implemented and evaluated a culturally and contextually grounded version, namely, FN PAX; (c) documented our process to engage the community and (d) created a set of interview guides, measures and administrative data-tracking mechanisms to evaluate the implementation of PAX GBG in First Nations communities and the students' longer-term outcomes. This study will contribute to identifying and developing an ethical, culturally grounded and effective health promotion intervention for communities to promote *mino pimatisiwin*: the good life for children and youth in First Nations communities.

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REFERENCES

1. Health Council of Canada. *The Health Status of Canada's First Nations, Métis and Inuit Peoples: a Background Paper to Accompany Health Care Renewal in Canada: Accelerating Change*. Toronto, 2005. http://publications.gc.ca/collections/collection_2012/ccs-hcc/H174-37-2005-1-eng.pdf (accessed 6 Oct 2017).
2. Firestone M, Smylie J, Maracle S, et al. Mental health and substance use in an urban First Nations population in Hamilton, Ontario. *Can J Public Health* 2015;106:e375–81.
3. Elton-Marshall T, Leatherdale ST, Burkhalter R. Tobacco, alcohol and illicit drug use among Aboriginal youth living off-reserve: results from the Youth Smoking Survey. *CMAJ* 2011;183:E480–6.
4. Currie CL, Wild TC. Adolescent use of prescription drugs to get high in Canada. *Can J Psychiatry* 2012;57:745–51.

5. Bombay A, Matheson K, Anisman H. The impact of stressors on second generation indian residential school survivors. *Transcult Psychiatry* 2011;48:367–91.
6. First Nations Information Governance Centre. *First nations regional health survey (rhs) 2008/10: national report on adults, youth and children living in first nations communities*. Ottawa, 2012. http://fnigc.ca/sites/default/files/docs/first_nations_regional_health_survey_rhs_2008-10_-_national_report.pdf (accessed 23 Mar 2017).
7. Katz LY, Elias B, O'Neil J, et al. Aboriginal suicidal behaviour research: from risk factors to culturally-sensitive interventions. *J Can Acad Child Adolesc Psychiatry* 2006;15:159–67.
8. Kirmayer LJ, Boothroyd LJ, Hodgins S. Attempted suicide among Inuit youth: psychosocial correlates and implications for prevention. *Can J Psychiatry* 1998;43:816–22.
9. Kirmayer LJ. Suicide among Canadian aboriginal peoples. *Trans Psy* 1994;31:3–58.
10. Unicef. *Aboriginal children's health: leaving no child behind*. *Can Suppl to State World's Child* 2009 http://www.nccah-ccnsa.ca/docs/nccah_partner_documents/UNICEFReport_English.pdf
11. Statistics Canada. 2006 Census of Canada: aboriginal identify population by age groups, median age and sex, percentage distribution for both sexes, for canada, provinces and territories - 20% sample data. <http://www12.statcan.ca/census-recensement/2006/dp-pd/hlt/97558/pages/page.cfm?Lang=E&Geo=PR&Code=01&Table=1&Data=Dist&Sex=1&Age=1&StartRec=1&Sort=2&Display=Page> (accessed 23 March 2017).
12. Elias B, Hall M, Hart L, et al. The health of manitoba tribal nations: adults 18 years and older, 2002. 2011;2003. <http://www.umanitoba.ca/centres/cahr> (accessed 23 Mar 2017).
13. , Elias B, Laplante JAMC Health Information Research and Governance Committee. *Manitoba first nations regional longitudinal health survey report (2002/03)*. Winnipeg, 2006. <http://www.fnhssm.com/images/PDF/manitoba-first-nations-regional-health-survey-report-2002-03.pdf> (accessed 23 Mar 2017).
14. Bradshaw CP, Zmuda JH, Kellam SG, et al. Longitudinal impact of two universal preventive interventions in first grade on educational outcomes in high school. *J Educ Psychol* 2009;101:926–37.
15. Kellam SG, Rebok GW, Ialongo N, et al. The course and malleability of aggressive behavior from early first grade into middle school: results of a developmental epidemiologically-based preventive trial. *J Child Psychol Psychiatry* 1994;35:259–81.
16. Petras H, Kellam SG, Brown CH, et al. Developmental epidemiological courses leading to antisocial personality disorder and violent and criminal behavior: effects by young adulthood of a universal preventive intervention in first- and second-grade classrooms. *Drug Alcohol Depend* 2008;95(Suppl 1):S45–59.
17. Dolan LJ, Kellam SG, Brown CH, et al. The short-term impact of two classroom-based preventive interventions on aggressive and shy behaviors and poor achievement. *J Appl Dev Psychol* 1993;14:317–45.
18. Kellam SG, Brown CH, Poduska JM, et al. Effects of a universal classroom behavior management program in first and second grades on young adult behavioral, psychiatric, and social outcomes. *Drug Alcohol Depend* 2008;95(Suppl 1):S5–28.
19. Poduska JM, Kellam SG, Wang W, et al. Impact of the good behavior game, a universal classroom-based behavior intervention, on young adult service use for problems with emotions, behavior, or drugs or alcohol. *Drug Alcohol Depend* 2008;95(Suppl 1):S29–44.
20. Flannery DJ, Vazsonyi AT, Liau AK, et al. Initial behavior outcomes for the peacebuilders universal school-based violence prevention program. *Dev Psychol* 2003;39:292–308.
21. Embry DD. The good behavior game: a best practice candidate as a universal behavioral vaccine. *Clin Child Fam Psychol Rev* 2002;5:273–97.
22. Hagermoser Sanetti LM, Fallon LM. Treatment integrity assessment: how estimates of adherence, quality, and exposure influence interpretation of implementation. *Journal of Edu and Psych Con* 2011;21:209–32.
23. Wilcox HC, Kellam SG, Brown CH, et al. The impact of two universal randomized first- and second-grade classroom interventions on young adult suicide ideation and attempts. *Drug Alcohol Depend* 2008;95(Suppl 1):S60–73.
24. Katz C, Bolton SL, Katz LY, et al. A systematic review of school-based suicide prevention programs. *Depress Anxiety* 2013;30:1030–45.
25. Barrish HH, Saunders M, Wolf MM. Good behavior game: effects of individual contingencies for group consequences on disruptive behavior in a classroom. *J Appl Behav Anal* 1969;2:119–24.
26. Embry DD, Biglan A. Evidence-based kernels: fundamental units of behavioral influence. *Clin Child Fam Psychol Rev* 2008;11:75–113.
27. Healthy Child Manitoba. *Improving the early mental health and well-being of manitoba's children: first findings from the province wide pilot and evaluation of PA*, 2014.
28. Leffot G, van Lier PA, Onghena P, et al. The role of children's on-task behavior in the prevention of aggressive behavior development and peer rejection: a randomized controlled study of the Good Behavior Game in Belgian elementary classrooms. *J Sch Psychol* 2013;51:187–99.
29. Nolan JD, Houlihan D, Wanzek M, et al. The Good Behavior Game: a classroom-behavior intervention effective across cultures. *Sch Psychol Int* 2014;35:191–205.
30. Elias B, Mignone J, Hall M, et al. Trauma and suicide behaviour histories among a Canadian Indigenous population: an empirical exploration of the potential role of Canada's residential school system. *Soc Sci Med* 2012;74:1560–9.
31. Kirmayer LJ, Gone JP, Moses J. Rethinking historical trauma. *Transcult Psychiatry* 2014;51:299–319.
32. Truth and Reconciliation Commission of Canada. *Honouring the Truth, Reconciling for the Future. Summary of the Final Report for the Truth and Reconciliation Commission of Canada*, 2015.
33. Larcombe L, Nickerson P, Singer M, et al. Housing conditions in 2 Canadian First Nations communities. *Int J Circumpolar Health* 2011;70:141–53.
34. Richmond CA, Ross NA. The determinants of First Nation and Inuit health: a critical population health approach. *Health Place* 2009;15:403–11.
35. Chandler MJ, Lalonde C. Cultural continuity as a hedge against suicide in Canada's First Nations. *Trans Psychiatry* 1998.
36. McCormick RM. Healing through interdependence: the role of connecting in first nations healing practices. *Can J Couns* 1997;31:172–84.
37. Mota N, Elias B, Tefft B, et al. Correlates of suicidality: investigation of a representative sample of Manitoba First Nations adolescents. *Am J Public Health* 2012;102:1353–61.
38. Snowshoe A, Crooks CV, Tremblay PF, et al. Cultural connectedness and its relation to mental wellness for first nations youth. *J Prim Prev* 2017;38:67–86.
39. Graham H, Martin S. Narrative descriptions of miyo-mahcihoiyan (physical, emotional, mental, and spiritual well-being) from a contemporary néhiyawak (Plains Cree) perspective. *Int J Ment Health Syst* 2016;10:58.
40. Isaak CA, Stewart DE, Mota NP, et al. Surviving, healing and moving forward: journeys towards resilience among Canadian cree adults. *Int J Soc Psychiatry* 2015;61:788–95.
41. Bartlett C, Marshall M, Marshall A. Two-Eyed Seeing and other lessons learned within a co-learning journey of bringing together Indigenous and mainstream knowledges and ways of knowing. *J Environ Stud Sci* 2012;2:331–40.
42. Martin D. Two-eyed seeing: a framework for understanding Indigenous and non-Indigenous approaches to Indigenous health research. *Can J Nurs Res* 2012;44:20–42.
43. Vukic A, Gregory D, Martin-Misener R, et al. Indigenous health research: Theoretical and methodological perspectives. *Can J Nurs Res* 2012;44:146–61.
44. Isaak CA, Campeau M, Katz LY, et al. Community-based Suicide Prevention Research in Remote On-Reserve First Nations Communities. *Int J Ment Health Addict* 2010;8:258–70.
45. Patton MQ. *Developmental evaluation: applying complexity concepts to enhance innovation and use*. New York, NY: Guilford Press, 2011.
46. Thorne S. *Interpretive Description*. Walnut Creek, CA: Left Coast Press, 2008.
47. Thorne S, Kirkham SR, O'Flynn-Magee K. The analytic challenge in interpretive description. *Int J Qual Methods* 2004;3:1–11.
48. Peters DH, Adam T, Alonge O, et al. Implementation research: what it is and how to do it. *BMJ* 2013;347:6753.
49. Goodman R. Psychometric properties of the strengths and difficulties questionnaire. *J Am Acad Child Adolesc Psychiatry* 2001;40:1337–45.
50. Jutte DP, Roos LL, Brownell MD. Administrative record linkage as a tool for public health research. *Annu Rev Public Health* 2011;32:91–108.
51. Roos LL, Brownell M, Lix L, et al. From health research to social research: privacy, methods, approaches. *Soc Sci Med* 2008;66:117–29.
52. Roos LL, Gupta S, Soodeen R-A, et al. Data Quality in an Information-Rich Environment: Canada as an Example. *Can J Aging* 2005;24:153–70.
53. Roos LL, Nicol JP. A research registry: uses, development, and accuracy. *J Clin Epidemiol* 1999;52:39–47.

54. Roos NP, Roos LL, Brownell M, *et al.* Enhancing policymakers' understanding of disparities: relevant data from an information-rich environment. *Milbank Q* 2010;88:382–403.
55. Janus M, Offord D. Readiness to learn at school. *Can J Policy Res* 2000;1:71–5.
56. Janus M, Offord DR. Development and psychometric properties of the Early Development Instrument (EDI): A measure of children's school readiness. *Can J Behav Sci* 2007;39:1–22.
57. Healthy Child Manitoba. *Provincial Report: Starting Early, Starting Strong: the Early Development Instrument (EDI) 2012-2013*. Winnipeg, MB 2012;13. http://www.gov.mb.ca/healthychild/edi_1213/edireport_mb_2012_13.pdf%0D
58. Fletcher C. Community-based participatory research relationships with aboriginal communities in canada: an overview of context and process. *A J Aborig Indig Community Heal* 2003;1. <http://www.pimatisiwin.com/uploads/694984954.pdf>
59. Bourdon KH, Goodman R, Rae DS, *et al.* The strengths and difficulties questionnaire: U.S. normative data and psychometric properties. *J Am Acad Child Adolesc Psychiatry* 2005;44:557–64.
60. Goodman A, Goodman R. Strengths and difficulties questionnaire as a dimensional measure of child mental health. *J Am Acad Child Adolesc Psychiatry* 2009;48:400–3.
61. Partners in Planning for Healthy Living. Youth health survey. 2012. http://partners.healthincommon.ca/wp-content/uploads/2013/01/YHS_A.pdf
62. Keyes CL. The mental health continuum: from languishing to flourishing in life. *J Health Soc Behav* 2002;43:207.
63. Keyes CLM. Atlanta: Brief description of the mental health continuum short form (MHC-SF).
64. Lamers SM, Westerhof GJ, Bohlmeijer ET, *et al.* Evaluating the psychometric properties of the Mental Health Continuum-Short Form (MHC-SF). *J Clin Psychol* 2011;67:99–110.
65. Newcomer AR, Roth KB, Kellam SG, *et al.* Higher childhood peer reports of social preference mediates the impact of the good behavior game on suicide attempt. *Prev Sci* 2016;17:145–56.