Mixed-methods study protocol for an evaluation of the mental health transition navigator model in child and adolescent mental health services: the Navigator Evaluation Advancing Transitions (NEAT) study

Kristin Cleverley, Kate Stevens, Julia Davies, Emma McCann, Tracy Ashley, Daneisha Brathwaite, Mana Gebreyohannes, Saba Nasir, Katelyn O’Reilly, Kathryn J Bennett, Sarah Brennenstuhl, Alice Charach, Joanna Henderson, Lianne Jeffs, Daphne J Korczak, Suneeta Monga, Claire de Oliveira, Peter Szatmari

ABSTRACT

Introduction Transition from child and adolescent mental health services (CAMHS) to community or adult mental health services (AMHS) is a highly problematic health systems hurdle, especially for transition-aged youth. A planned and purposeful transition process is often non-existent or experienced negatively by youth and their caregivers. Stakeholders, including youth and their caregivers, have demanded interventions to support more effective transitions, such as a transition navigator. The transition navigator model uses a navigator to facilitate complex transitions from acute care CAMHS to community or AMHS. However, despite the widespread implementation of this model, there has been no evaluation of the programme, hindering its scalability. This paper describes the study protocol of the Navigator Evaluation Advancing Transitions study that aims to collaborate with patients, caregivers and clinicians in the evaluation of the navigator model.

Methods and analysis A pre and post mixed-method study will be conducted, using the Triple Aim Framework, to evaluate the navigator model. We will recruit participants from one large tertiary and two community hospitals in Toronto, Canada. For the quantitative portion of the study, we will recruit a sample of 45 youth (15 at each site), aged 16–18, and their caregivers at baseline of the study, we will recruit a sample of 45 youth (15 at each site), aged 16–18, and their caregivers at baseline (referral to navigator) (T1) and 6 months (T2). Youth and caregiver participants will complete a set of standardised measures to assess mental health, service utilisation, and satisfaction outcomes. For the qualitative portion of the study, semi-structured interviews will be conducted at 6 months (T2) with youth, their caregivers and clinicians to better understand their experience and satisfaction with the model.

Ethics and dissemination Research Ethics Board (REB) approval has been obtained from the lead research sites, the University of Toronto and the Hospital for Sick Children. The results of the study will be reported in peer-reviewed publications, webinars and conferences and to all relevant stakeholders.

Strengths and limitations of this study

► We are using a mixed-methods design to conduct the first evaluation of the navigator model in child and adolescent mental health settings.
► There is strong engagement of youth with lived experience, and caregivers at all stages of the study.
► We will conduct longitudinal assessments of mental health, service utilisation and satisfaction with youth and their caregivers.
► This study is restricted to participants who can speak, read and write English, and within one large urban region in Canada.

INTRODUCTION

Poorly planned mental healthcare transitions can lead to avoidable exacerbations in youth mental health problems, unnecessary cost expenditures and increased use of social services. Youth and their caregivers often experience the transition from child and adolescent mental health services (CAMHS) to community or adult mental health services (AMHS) negatively, specifically having a lack of information about post-CAMHS transition mental healthcare, being left out of the transition discussions, and not feeling prepared for the transition. It is not surprising then that up to 60% of youth get disconnected from mental healthcare during this transition, leading to avoidable negative
mental health and social outcomes, wasted healthcare resources and unnecessary cost expenditures. These experiences have led policy-makers, administrators and other key stakeholders, including youth and their caregivers, to demand interventions to support more effective transitions.

Evidence shows that adults who transition out of psychiatric care benefit from discharge planning interventions, particularly multicomponent interventions that are co-designed with patients and focus on patient discharge needs, follow-up and clear communication, all of which have been shown to reduce readmission and long-term impairment. Few mental health transition support interventions, however, exist for children and youth. A systematic review of structured paediatric transition interventions reported lack of focus on mental health settings. Promising transition models exist however, such as the use of transition teams and/or specialised navigators.

Navigators are frequently recommended as a best practice in the mental health literature, given their expertise on transition practices, particularly working directly with youth to identify level of transition readiness and ongoing mental healthcare needs. Several quality improvement agencies, government health sectors and youth advocacy groups have documented recommendations for CAMHS to community/AMHS transitions, which include an emphasis on the need for a key worker who takes on a coordinating role in the transitions process.

The Shared Management Framework has emphasised the use of navigator models in youth mental healthcare. Youth have reported the need for continuity of a therapeutic relationship with a trusted person (service provider) throughout the transition process as key to their transition success. Hospital-based CAMHS have used navigators to facilitate the complex transition out of hospital based acute care CAMHS to community CAMHS or AMHS and ensure continuity of care for transition aged youth.

We summarised the core features of the navigator model in our recent review. Based on the clinical needs and goals of the youth and their caregivers, they are transitioned to a number of child or adult community programmes, for example, day treatment programmes, specialised supported school settings, family doctors and community-based counselling. Typically, navigators require a blend of qualifications (commonly a registered social worker), knowledge and clinical skills. They usually provide short-term (1–6 months) intensive support to bridge the youth using a combination of case management and system navigation. The navigator works with the youth to prioritise transition goals, assess and develop transition readiness, and collaborating with youth, their caregivers and clinicians to identify the level of need post-discharge and options for the receiving (transfer) agency. Data are captured at the programme level, with the navigator tracking: intervention components provided, rates of rehospitalisation, youth and caregiver’s satisfaction, length of time between discharge from hospital CAMHS and uptake in community or AMHS.

Despite the widespread implementation of the navigator model, there have been no evaluations of the role’s effectiveness, which makes scaling up problematic. Moreover, a recent review revealed a general lack of robust evaluations of child and adolescent mental health transition interventions. Our recent review highlighted an urgent need for a formal evaluation of the model considering clinical, programme and economic outcomes.

Evaluative framework
This study follows the Triple Aim Framework (Triple Aim) developed by The Institute of Healthcare Improvement. Triple Aim provides an overview of the importance of selecting outcome measures that represent three central aspects of interventions: population health outcomes, experience of care outcomes and utilisation and cost outcomes. The Canadian Association of Paediatric Health Centres proposed the Triple Aim as an emerging evaluation framework in their recent transition guidelines. As well, two systematic reviews of paediatric transition interventions used the Triple Aim to summarise outcomes reported in studies and recommend practical, feasible and common outcome measures for future transition in care evaluations. These recommendations were considered when selecting measures for this study.

Study aims
The Navigator Evaluation Advancing Transitions (NEAT) study aims to collaborate with patients, caregivers, clinicians and navigators to evaluate the navigator model using the Triple Aim Framework. The aim is to address gaps identified in the literature by conducting a formal, patient-oriented, mixed-methods evaluation of the navigator model. As such, the study objective is to use patient-oriented research strategies in collaboration with youth, caregivers and clinicians to evaluate the navigator model.

Specifically, the NEAT study aims to answer the following research questions:
1. Does the navigator model improve transition readiness when used to support youth transitioning out of hospital-based CAMHS into the community or AMHS over a 6-month period?
2. Is the navigator model associated with preventing deterioration in: (1) functioning; (2) mental health symptoms, (3) health-related quality of life (QoL) and (4) preventing increased emergent service use, when used to support youth transitioning out of hospital-based CAMHS into community or AMHS over a 6-month period?
3. How do youth, caregivers and clinicians describe their experiences and satisfaction with using a navigator?
Study design
Using the Triple Aim framework, we will evaluate the navigator programme using a pre and post mixed-method study design. A mixed-method study design was selected as it is recommended for the evaluation of complex interventions.\(^1\) We will assess 45 youth and their caregivers (15 youth and 15 caregiver participants at each site) at baseline (referral to navigator) (T1) and 6 months (T2). Six months was selected as our review\(^3\) reported that youth were on average in the navigator programme for 1–6 months. At the 6-month follow-up (T2), all youth and caregiver participants who participated at baseline (T1) will be invited to participate in semi-structured qualitative interviews to better understand their experience with the navigator intervention. Clinicians will also be invited to participate in the qualitative interviews during this time. Our goal is to conduct a total of 24 interviews with youth, their caregivers, and clinicians (approximately eight participants from each group at each site).

Study setting
Participants will be recruited from the child and adolescent psychiatry programmes at the Hospital for Sick Children (SickKids), North York General Hospital (NYGH) and Humber River Hospital (HRH) in Toronto, Canada. SickKids is a large tertiary hospital and NYGH and HRH are community hospitals. All three hospitals provide a variety of inpatient and outpatient mental health services, serve youth aged 16–18 years, and currently employ at least one navigator to facilitate transitions as youth are discharged from inpatient and outpatient care.

Study population
For both quantitative and qualitative components, the inclusion criteria for research participants are: Youth (1) between the age range 16–18 years, (2) receiving navigation services from the navigator programme, (3) able to speak, read and write English and (4) able to provide informed consent. Caregivers: (1) who are the caregiver of the youth receiving navigator services, (2) able to speak, read and write English and (3) provide consent to participate in the study. Clinicians: any clinician who has had a patient access the navigator programme. Navigators: who are responsible for implementing the navigator intervention at recruiting hospital sites.

Sampling, recruitment and consent
We will simultaneously recruit youth, their caregivers, clinicians and navigators from three hospital sites over a 12-month period. All eligible youth who have a scheduled appointment with the navigator during the recruitment period will be invited to participate. During the first appointment, the navigator will inform the youth about a potential study opportunity. If the youth is agreeable, a research assistant (RA) will meet with the youth face-to-face and screen them based on the eligibility criteria. If found eligible, the RA will then provide further study information, answer any questions, and complete the informed consent procedure. Once written consent is obtained, the RA will set up a time to administer the baseline survey package. Baseline (T1) survey will be conducted after seeking consent and before the start of the navigator intervention.

Given that the study is recruiting youth with identified mental health problems, a clinical back-up will always be available to the RA and the youth will also be made aware of local service options should they need them.\(^4\) Based on our other ongoing research with similar populations, we will seek consent with youth, rather than assent, as youth aged 16–18 years have the capacity to consent to research even if a consenting caretaker is not available.\(^4\) Caregivers will be approached concurrently using the same process. Youth are permitted to participate in the study even if their caretaker is unable to or is not available.

Potential clinician participants will be identified by the navigator who will then inform the RA. Clinicians will be invited to participate in the study via email and, if willing, the RA will meet the clinicians in person to complete the informed consent process.

Navigators from all three hospital sites will be invited to participate in the NEAT study. The RA will directly contact the navigators and, if agreeable, the RA will explain about the study and complete the consent process. All participants will maintain their right to withdraw from the study at any time.

Data collection
Youth and caregiver participants will complete self-report study measures at baseline and at 6 months. At each time point, time required for data collection is expected to be 30 min. Youth and caregiver participants can complete the study measures either onsite (in person) using paper assessment packages, or online using a secured and encrypted web application called Research Electronic Data Capture (REDCap; http://project-redcap.org/)\(^5\) where study participants can log on and complete study measures. An RA will be available to answer any questions, either in person or via email, phone, or text (if using REDCap). The web forms will be developed, tested, operated, and maintained by the study team. Clinician participants will complete semistructured interviews either onsite (in person) or over the phone, while navigator participants will complete a checklist online at the 6-month follow-up (T2).

Quantitative measures
In accordance with the Triple Aim framework, three outcomes will be studied—(1) population health outcomes, (2) experience of care outcomes and (3) utilisation and cost outcomes. The primary outcome is transition readiness measured by Transition Readiness Assessment Questionnaire (TRAQ\(^6\)) at baseline and 6 months. The secondary outcomes include mental health trajectories, transition experience and service utilisation assessed at baseline and 6 months.
Transition readiness is selected as the primary outcome measure as it has been recommended in a recent Cochrane Review and has been used as the primary outcome in several child and youth health transition interventions. Further, in keeping with the principles of participatory action research, youth, caregivers and clinicians were involved in the selection of these measures and endorse their relevance to this study. Table 1 summarises the outcome domains and corresponding data collection tools and timelines for each participant group.

**Sample characteristics**

Demographic data will be collected from youth, caregivers and clinicians to describe key characteristics of the sample. The demographic form used in the Longitudinal Youth in Transition Study will be used, as it was co-created with a youth and caregiver advisory team. For youth and caregiver participants, demographic data will be collected at baseline and 6 months.

For youth participants, we will collect their age (in years), sex at birth, current gender identity, total length of service (years/months) in CAMHS, primary self-reported mental health diagnosis, cultural group, current living situation, if anyone attends appointments with them, and current school and/or work hours. For caregiver participants, we will collect their relationship to the youth participant, age of their youth who is receiving mental health and addiction services (in years), and current school and/or work hours. Lastly, for clinician participants, we will collect their current gender identity, occupational role/clinical background, years of clinical experience, relationship to the youth participant (ie, primary clinician) and length of time treating the youth participant.

**Health outcomes**

Four measures will be used to assess health outcomes. Youth and caregivers will report their readiness (related to skills, knowledge and self-efficacy) to transition out of services using the 20-item TRAQ. The instrument is scored on a 5-point Likert scale; total scores (/100) will be generated, with higher scores indicating greater readiness and ability to negotiate transitions in care. The TRAQ was found to be the best transition-readiness tool with the strongest reliability (Cronbach’s α .82–.93) for use with youth and caregivers and recommended as a standardized assessment of transition programmes.

To assess functioning, youth and caregivers will complete the Columbia Impairment Scale (CIS), a 13-item scale which provides a global measure of impairment in four major areas of functioning: interpersonal relations with family and friends, broad psychopathological domains, functioning in job or schoolwork, and use of leisure time. Both the youth (Cronbach’s α .78) and caregivers (Cronbach’s α .89) version of the CIS has been shown to have good internal consistency and test–retest reliability.

To measure mental health symptoms, youth will complete the Youth Self-Report (YSR), a 119-item scale, which measures psychiatric symptoms and adaptive functioning. Caregivers will complete the Child Behaviour Checklist/ 6–18 (CBCL/6–18), a 113-item scale that assesses behavioural and emotional problems in children and adolescents. Both the YSR and CBCL/6–18 yield scores on an eight-syndrome scale. Youth will be assessed for their alcohol and substance use using an adapted version of the Adolescent Alcohol and Drug Involvement Scale (AADIS). This 13-item checklist assesses youth’s alcohol and substance use pattern on a continuum.

---

**Table 1** Study domains and sources of data collection

| Domain                        | Source of data collection                  | T1 Youth | T1 Caregiver | T2 Youth | T2 Caregiver | Clinician | Navigator |
|-------------------------------|-------------------------------------------|----------|-------------|----------|-------------|-----------|-----------|
| Sample description            | Demographic questionnaire                 | ✓        | ✓           | ✓        | ✓           | ✓         | ✓         |
| Health outcomes               | Transition Readiness Assessment Questionnaire | ✓        | ✓           | ✓        | ✓           | ✓         | ✓         |
|                               | Columbia Impairment Scale                 | ✓        | ✓           | ✓        | ✓           | ✓         | ✓         |
|                               | Youth Self-Report                         | ✓        | ✓           | ✓        | ✓           | ✓         | ✓         |
|                               | Child Behaviour Checklist                  | ✓        | ✓           | ✓        | ✓           | ✓         | ✓         |
|                               | Adolescent Alcohol and Drug Involvement Scale |         |             |          |             |           |           |
| Experience of care            | Core Components of Effective Youth Transitions |         |             | ✓        | ✓           | ✓         | ✓         |
|                               | Satisfaction with Mental Health Navigator Tool |         |             | ✓        | ✓           | ✓         | ✓         |
|                               | Qualitative Interviews                    | ✓        | ✓           | ✓        | ✓           | ✓         | ✓         |
| Utilisation and cost          | Assessment of Quality of Life-6D          | ✓        | ✓           | ✓        | ✓           | ✓         | ✓         |
|                               | Health and Social Services Utilisation    | ✓        | ✓           | ✓        | ✓           | ✓         | ✓         |

on September 14, 2023 by guest. Protected by copyright.http://bmjopen.bmj.com/ BMJ Open: first published as 10.1136/bmjopen-2021-051190 on 29 June 2021. Downloaded from http://bmjopen.bmj.com/ on September 14, 2023 by guest. Protected by copyright.
ranging from no use to severe dependence. The AADIS is a revised tool based on Adolescent Alcohol Involvement Scale (AAIS) and the adolescent drug involvement scale ADIS. Internal consistency is satisfactory for ADIS for youth (Cronbach’s α=0.85) and that of AAIS was (Cronbach’s α=0.84).  

Experience of care  
This outcome will be measured using two measures. Youth and caregivers will report the Satisfaction with Mental Health Navigator Tool, a 11-item scale, adapted from the Navigation Satisfaction Tool. This tool measures youth and caregiver satisfaction with the navigator model. Youth, caregivers, and navigators will complete a 27-item Core Components of Effective Youth Transitions (CCEYT) checklist at the 6-month follow-up (T2), with each item scored as ‘yes’ (the youth was satisfied that component occurred), ‘no’ (they were not satisfied, or the component did not occur), and ‘unsure’. This checklist aims to capture core components of stages of effective transitions identified in the literature and is validated via a National Delphi consensus study. Given the core features of the navigator model aligns with the 27 CCEYT components, this checklist will permit the evaluation of the degree to which each youth perceived they received the navigator intervention components. The navigators will be asked to complete the CCEYT checklist to understand their perspectives on the extent to which the core components of the navigator intervention are being implemented for each youth participant.

Utilisation and cost  
In order to capture health service utilisation, youth and caregivers will report on the Health and Social Service Utilisation (HSSU) measure. A structured interview that assesses use of health programmes and services in the past 6 months with emphasis on both physical and mental health services (ie, psychiatrist, general practitioner, private therapist, community drop-in agencies, online/telephone counselling, school counsellor, etc), lab services (ie, blood work) and current (prescribed and non-prescribed) medications. This instrument of ambulatory care utilisation has been empirically validated. To assess, QoL, youth will complete the Assessment of Quality of Life-6D (AQoL-6D), a 20-item assessment of six domains of QoL: independent living, relationships, mental health, coping, pain and senses. The six domains can be combined to form a single global QoL factor with strong internal consistency (Cronbach’s α=0.81) across hospital and community samples. The AQoL-6D will be used to calculate quality adjusted life years (QALYs). In addition, we will collect comprehensive information on the costs of setting up and delivering this information. Taken together, this information (ie, interventions costs, health services utilisation and costs, and QoL) will be used to explore the possibility of undertaking a cost utility analysis of the navigator model in accordance with the Canadian Agency for Drugs and Technologies in Health guidelines.

Qualitative interviews  
Semistructured, in-depth interviews will be conducted with youth, caregivers and clinicians to obtain narrative descriptions of the navigator intervention. For all three participant groups, the interviews will focus on the participants’ experiences and satisfaction with the navigator intervention (see online supplemental file 1). Example questions for youth include: ‘What has been your experience receiving care from the navigator?’ and ‘What aspects of the navigator care/intervention did you find most, and least, helpful?’ Qualitative interviews will be conducted at 6 months and will take place in person, or via videoconferencing as needed (COVID-19 has limited on-site research capabilities in some hospital settings). Interviews will be conducted by a research team member with at least a master’s education who has both clinical expertise and experience in conducting and facilitating qualitative interviews with youth and caregivers in mental health settings. It is expected each interview will take 30–45 min and will be audio recorded and transcribed verbatim by an RA.

Data analysis  
Quantitative data  
All analyses will be undertaken using 9.4 SAS. Effect size and 95% CI will be reported for each outcome. A two-sided p<0.05 will be defined as statistically significant.

Descriptive statistics will be used to summarise the characteristics of study sample at baseline. Continuous variables (eg, age) will be summarised using a mean and SD, while ordinal and categorical variables (eg, gender identity) will be expressed using frequency counts and percentages.

Primary research question: Change in TRAQ scores from baseline to 6 months will be analysed using a paired sample t-test. Based on previous research, it is assumed TRAQ scores will be normally distributed; however, if skewed, non-parametric testing will be used (ie, Wilcoxon-signed rank test). Mean difference will be calculated along with 95% CI. Cohen’s D will be calculated as a measure of effect size. Secondary research question: A similar analysis strategy as above will be used to assess change over time for the CIS and YSR/CBCL. AADIS checklist will be assessed using descriptive statistics only. The three HSSU composite measures will be analysed using: (1) time in weeks between discharge and first community visits using t-test (if normally distributed); (2) total number of unscheduled emergent visits and (3) total number of rehospitalisations using descriptive statistics. The AQoL-6D will be analysed both for a simple total score (by adding the response of each item) and QALYs will be analysed following the developers analytical recommendations, in short, by multiplying life years by an index of utility measured on a 0–1 scale. Last, measures of intervention satisfaction, will be completed
at 6 months. Total scores (continuous) for the CCYET Core Components checklist will be analysed for the entire sample using descriptive statistics.

Qualitative data
We will use Braun and Clarke’s thematic analysis methodology to analyse qualitative data. NVivo software will be used for data management, and more than one researcher will analyse the qualitative data in order to enhance the credibility of the findings. The first author (KC) and a research team member will independently read and reread interview transcripts to become familiar with the content and to look for meaning and patterns. They will establish initial codes by identifying concepts and ideas present in the text. They will then independently examine the data at a broader level, by reviewing initial codes and grouping them into themes. Themes will be reviewed to ensure that they meaningfully represent connected codes and are distinguishable from one another. Finally, themes will be defined and refined within the context of the data set as a whole for presentation of analysis. After completing this process independently, the two researchers will come together and share themes to ensure agreement and consistency. Levels of agreement of themes will be tracked, and where disagreements exist, the researchers will review the codes and corresponding transcript text and come to a consensus. In line with the patient-oriented research framework, youth and caregivers will be presented the initial coding framework and corresponding transcript text for feedback and interpretation. Adjustments to the coding framework will be made in collaboration with the youth and caregivers.

Mixed methods
The use of the parallel mixed-methods design in this study means that the quantitative and qualitative data are collected and analysed separately, with each providing a unique lens and understanding of the experiences and satisfaction with the navigator model. The results of the two sets of analysis will then be linked, combined and integrated into meta-inferences, with the goal being a more comprehensive understanding of the intervention using analytical strategies describe by Teddlie and Tashakkori.

Sample size justification
Quantitative sample
The sample size calculation was based on the primary outcome—change in TRAQ scores from T1 to T2 assessed using a paired t-test. We anticipate a mean TRAQ score of 3.54 (SD 0.71) (out of a possible 5) at baseline, as reported by a similar population in our other ongoing studies (ages 16–18 years) and an anticipated mean score of 4.04 post-intervention resulting in a mean difference of 0.5 (as reported in a recent Cochrane review of transition interventions among youth). Using G*Power with α=0.05, it was determined that a sample size of 34 youth would provide 80% power to detect such a difference. Assuming a 20% attrition at the 6-month follow-up, we will enrol at least 41 youth in three sites, that is, 15 at each of the three sites.

Qualitative sample
The sample size will be approximately 15–20 for each participant group. We aim to have representation of at least eight youth, eight caregivers and eight clinicians from each of the three participating sites. KC and a research staff will conduct preliminary thematic analysis after approximately 15 interviews from each group to determine whether thematic saturation has been reached and add additional interviews, as necessary. This is in line with recommended guidelines for qualitative interview sample size determination during data collection.

Data management and confidentiality
All study data will be managed in accordance with the Tri-Agency principles of digital data management (Governement of Canada) and according to Personal Health Information Protection Act (PHIPA) guidelines.

Study period
The study started enrolling participants in March 2021. The estimated completion date for study enrolment is March 2022.

Patient and public involvement
With specific focus on participatory action research, the NEAT study is engaging youth, caregivers and a core team of researchers and knowledge users (KUs) in every stage of the evaluation as part of the Expert Advisory Committee (EAC). To date, this has included engagement on the recruitment strategies and methodologies, the selection of outcome measures and developing interview guides. Additionally, one youth with lived experience and two caregivers are collaborators on the funding application. Youth and caregivers will also be involved in interpretation of findings and knowledge dissemination activities. Further, using integrated knowledge translation methods, we would ensure that the study goals and outputs are relevant to the needs of patients and KUs, feasible and reach a wide audience.

ETHICS AND DISSEMINATION
This study protocol has been approved at the lead research sites: the University of Toronto (UofT; REB#: 39046), and the Hospital for Sick Children (SickKids; REB#: 1000066139). REB approval has been received by North Youth General Hospital (NYGH; REB#: 20–0023) and is currently being sought at the third recruitment site (Humber River Hospital). The EAC and coinvestigators will continue to meet regularly throughout the project to develop and then implement an end-of-project
knowledge mobilisation plan. Provisional components are as follows: (1) A webinar will be developed in collaboration with the EAC to identify organisations, teams and regions that may be used for future implementation and research; (2) Peer-reviewed open-access publications and (3) workshops and/or presentations will be held at key KU meetings (eg, academic and community conferences, mental health agencies). Members of the EAC, coinvestigators and site collaborators will be invited to copresent and coauthor the project findings. The results will be published using the Criteria for Reporting the Development and Evaluation of Complex Interventions (CReDECI)-2 criteria for reporting of interventions in healthcare.85

Supplemental material This content has been supplied by the author(s), it has not been vetted by BMJ Publishing Group Limited (BMJ) and may not have been peer-reviewed. Any opinions or recommendations discussed are solely those of the author(s) and are not endorsed by BMJ. BMJ disclaims all liability and responsibility arising from any reliance placed on the content. Where the content includes any translated material, BMJ does not warrant the accuracy and reliability of the translations (including but not limited to local regulations, clinical guidelines, terminology, drug names and drug dosages), and is not responsible for any error and/or omissions arising from translation and adaptation or otherwise.

Open access This is an open access article distributed in accordance with the Creative Commons Attribution Non Commercial (CC BY-NC 4.0) license, which permits others to distribute, remix, adapt, build upon this work non-commercially, and license their derivative works on different terms, provided the original work is properly cited, appropriate credit is given, any changes made indicated, and the use is non-commercial. See: http://creativecommons.org/licenses/by-nc/4.0/.

ORCID IDs Kristin Cleverley http://orcid.org/0000-0002-2822-2129 Joanna Henderson http://orcid.org/0000-0002-9387-5193 Lianne Jeffs http://orcid.org/0000-0002-3522-2549 Daphne J Koczak http://orcid.org/0000-0002-0611-7495

REFERENCES

1. Singh SP, Paul M, Ford T, et al. Process, outcome and experience of transition from child to adult mental healthcare: multiperspective study. Br J Psychiatry 2010;197:305–12.
2. Davis M. Addressing the needs of youth in transition to adulthood. Adm Policy Ment Health 2003;30:495–508.
3. Health Canada. Reaching for the top: a report by the advisor on healthy children and youth, 2007. Available: https://www.canada.ca/ content/dam/hc-sc/migration/hc-sc/hc-sc-va/english/alt_formats/hb-dgps/pdf/child-enfant/2007-advisor-consultation/eng.pdf
4. McGorry P. Transition to adulthood: the critical period for mental, depressive, disease-modifying care for schizophrenia and related disorders. Schizophren Bull 2011;37:524–30.
5. Viner R. Transition from paediatric to adult care. Bridging the gaps or passing the buck? Arch Dis Child 1999;81:271–5.
6. Singh SP, Tuomainen H, Girolamo Gd, et al. Protocol for a cohort study of adolescent mental health services users with a nested cluster randomised controlled trial to assess the clinical and cost-effectiveness of managed transition in improving transitions from child to adult mental health services (the milestone study). BMJ Open 2017;7:e016055.
7. Mental Health Commission of Canada. Making the case for investing in mental health in Canada, 2016. Available: https://www.mentalhealthcommission.ca/sites/default/files/2016-06/Investing_in_Mental_Health_FINAL_Version_ENG.pdf [Accessed 3 Feb 2019].
8. Vaks Y, Bensen R, Steidtmann D, et al. Better health, less spending: redesigning the transition from pediatric to adult healthcare for youth with chronic illness. Healthc 2014;6:47–58.
9. Hovish K, Weaver T, Islam Z, et al. Transition experiences of mental health service users, parents, and professionals in the United Kingdom: a qualitative study. Psychiatr Rehabil J 2012;35:251–7.
10. Riosa PB, Preyde M, Porto ML. Transitioning to adult mental health services: perceptions of adolescents with emotional and behavioral problems. J Adolescent Health 2015;56:446–76.
11. Cleverley K, Lanters L, McCann E. ‘Objectively terrifying’: a qualitative study of youth’s experiences of transitions out of child and adolescent mental health services at age 18. BMC Psychiatry 2020;20:147.
12. Singh SP, Paul M, Ford T, et al. Process, outcome and experience of transition from child to adult mental healthcare: multiperspective study. Br J Psychiatry 2010;197:305–12.
13. CMHO Youth Action Committee. From crisis to quality: bridging gaps in child and youth mental health services, 2018. Available: http://www.thenewmentality.ca/crisistooyouickal.
14. Mental Health Commission of Canada. Taking the next step forward: building a responsive mental health and addictions systems for emerging adults. mental health Commission of Canada, 2015. Available: https://www.mentalhealthcommission.ca/sites/default/files/Taking%252220the%252220Next%252220Step%252220Forward_0.pdf [Accessed 3 Feb 2019].
15. Okrainec K, Lau D, Abrams HB, et al. Impact of patient-centered discharge tools: a systematic review. J Hosp Med 2017;12:110–7.
16. Vigod SN, Kurydkay PA, Dennis C-L, et al. Transitional interventions to reduce early psychiatric readmissions in adults: systematic review. Br J Psychiatry 2013;202:187–94.

Cleverley K, et al. BMJ Open 2021;11:e051190. doi:10.1136/bmjopen-2021-051190

Acknowledgements The authors would like to thank the Expert Advisory Committee members and collaborators (Christina Bartha, Crystal Edwards, Tania Fiasco, Barbara Hansmann, Jennifer Holmes-Haronitis, Alexa Jaouich, Kristin Lenters, Kimberly Moran, Michele Sparling, Vicky Stergiopoulos). We would like to thank the Youth Engagement Facilitator and Youth Advisor Members of the Youth Engagement Initiative team at CAMH who provided feedback on the study design, study measures and process. We also extend our thanks to the CAMHIS services, clinicians and community mental health agencies who are collaborating in this study. Lastly, the authors would like to acknowledge the study research assistant, Soha Salman, for her assistance with the operationalisation of the study.

Contributors KC is the principal investigator who conceived the original study design and obtained funding. All authors (KC, KS, JD, EM, TA, DB, MG, SN, KO, KJB, SB, AC, JH, LJ, DJK, SM, CdO and PS) participated in revisions to the study design for important intellectual content. KC and KS collaborated with the NEAT study Committee (TA, DB, MG, SN and KO) on reviewing all aspects of the study design and incorporating feedback. KC drafted the protocol, and all other authors (KS, JD, EM, TA, DB, MG, SN, KO, KJB, SB, AC, JH, LJ, DJK, SM, CdO and PS) read, revised and approved the final version of the manuscript. SB is the statistician who led the calculation of the sample size, developed the analytical plan and will undertake the statistical analysis.

Funding The NEAT study is funded by the Canadian Institutes of Health Research (CIHR) under grant agreement TEG-16558.

Competing interests None declared.

Patient consent for publication Not required.

Provenance and peer review Not commissioned; peer reviewed for ethical and funding approval prior to submission.
Open access

17 Steffen S, Kösters M, Becker T, et al. Discharge planning in mental health care: a systematic review of the recent literature. *Acta Psychiatr Scand* 2009;120:1–9.

18 Embrett MG, Randall GE, Longo CJ, et al. Effectiveness of health system services for youth to adult transition in mental health care: a systematic review of academic literature. *Adm Policy Ment Health* 2016;43:259–69.

19 Paul M, Street C, Wheeler N, et al. Transition to adult services for young people with mental health needs: a systematic review. *Clin Child Psychol Psychiatry* 2015;20:436–57.

20 Signorini G, Singh SP, Marsanic VB, et al. The interface between child/adolescent and adult mental health services: results from a European 28-country survey. *Eur Child Adolesc Psychiatry* 2018;27:501–11.

21 Gabriel P, McManus M, Rogers K, et al. Outcome evidence for structured pediatric to adult health care transition interventions: a systematic review. *J Pediatr* 2017;188:263–9.

22 Davidson S, Cappelli M. We’ve got growing up to do: Policy and practice in youth mental health transitions. Ottawa, Ontario, Canada, 2011. http://www.excellencewithchildandadoleyouth.ca/sites/default/files/resource/policy_growing_up_to_do.pdf

23 Vloet MA, Davidson S, Cappelli M. We ‘suffer from being lost’: formulating policies to reclaim youth in mental health transitions. *Healthc Q* 2011;14:Spec No 2:32–8.

24 Singh SP, Paul M, Islam Z. Transition from CAMHS to adult mental health services (track): a study of service organisation, policies, process and user and carer perspectives. Available: http://www.netssc.ac.uk/nhrd/files/project/SDO_FR_08-1613-117_V01.pdf [Accessed 7 Jan 2019].

25 Care Quality Commission. From the pond into the sea: children’s transition to adult health services, 2014. Available: https://www.cqc.org.uk/sites/default/files/CQC_Transition%20Report.pdf [Accessed 7 Jan 2019].

26 Queensland Government Department of Health. *Guideline for the transition of care for young people receiving mental health services*. Queensland AU: Queensland Government, 2015. https://www.health.qld.gov.au/_/data/assets/pdf_file/0020/151085/qh-gdi-365-5.pdf

27 Health and Social Care Advisory Service. Great Britain, CAMHS to adult transition, HASCOS tools for transition. A literature review for informed practice, 2006. Available: https://www.scie-socialcareonline.org.uk/camhs-to-adult-transition-hascos-tools-for-transition—a-literature-review-for-informed-practice/1a1G00000017rrZIAQ [Accessed 7 Jan 2019].

28 Brodie I, Goldman R, Clapton J. Mental health service transitions for young people. London: Social Care Institute for Excellence, 2011. https://www.scie.org.uk/publications/briefings/briefing37/

29 National Institute for Health and Care Excellence. Transition from children’s to adults’ services for young people using health or social care services: NICE guideline NG343, 2016. Available: https://www.nice.org.uk/guidance/ng343/resources/transition-from-childrens-to-adults-services-for-young-people-using-health-or-social-care-services-pdf-1837451149765 [Accessed 3 Feb 2019].

30 Royal College of Nursing. *Lost in Transition - Moving Young People Between Child and Adult Health Services*. London, England: Royal College of Nursing, 2013. https://my.rcn.org.uk/_/data/assets/pdf_file/0010/157857/003227_WEB.pdf

31 Rethink. Joint working at the interface - Early Intervention in Psychosis and Specialist Child and Adolescent Mental Health Services. London, Rethink, 2011. http://www.iris-initiative.org.uk/silo/files/eip-camhs-interface-report.pdf

32 Office of the Auditor General of Ontario. Children and youth mental health. *in: 2016 annual report. Ontario: Queen’s Printer for Ontario, 2016: 111–47*. http://www.auditor.on.ca/en/content/annual/reports/area-reports/en16/2016en16.pdf

33 Lamb C, Hall D, Kelvin R. Working at the CAMHS/Adult interface: good practice guidance for the provision of psychiatric services to adolescents/young adults. Royal College of psychiatrists, 2008. Available: https://rcpsych.ac.uk/pdf/Transition_2008.pdf [Accessed 7 Jan 2019].

34 Cleverley K, Gore D, Nasir S, et al. Facilitating effective transitions from hospital to community for children and adolescent mental health services: overview of the transition support worker role and function. *J Can Acad Child Adolesc Psychiatry* 2018;27:228–35.

35 Schoe B, Battams S, Platania-Phung G. Transitioning from adolescent to adult mental health services: an integrative literature review. *Issues Ment Health Nurs* 2018;1:1–15.

36 Berwick DM, Nolan TW, Whittington J. The triple AIM: care, health, and cost. *Health Aff* 2008;27:759–69.

37 Merry G, Majumder S, Brown A, et al. What do we mean when we talk about the triple AIM? A systematic review of evolving definitions and adaptations of the framework at the health system level. *Health Policy* 2017;121:629–36.

38 Prior M, McManus M, White P, et al. Measuring the ‘triple aim’ in transition care: a systematic review. *Pediatrics* 2014;134:e1648–61.

39 Canadian Institutes of Health Research. *Health Care for Canada’s Health System: 2015 Report*. Ottawa, Canada: Canadian Institutes of Health Research, 2015. http://www.cihr-irsc.gc.ca/e/46903.html

40 Canadian Institutes of Health Research. Strategy for patient-oriented research putting patients first patient Engagement framework, 2014. Available: https://cihr-irsc.gc.ca/e/documents/spor_framework-en.pdf [Accessed 1 Feb 2019].

41 Craig P, Dieppe P, Macintyre S. Developing and evaluating complex interventions: new guidance, 2008. Available: https://mrc.ukri.org/documents/pdf/complex-interventions-guidance/ [Accessed 3 Feb 2019].

42 Rambberger M. Introduction to mixed methods in impact evaluation, 2012. Available: https://www.interaction.org/sites/default/files/Mixed%20Methods%20in%20Impact%20Evaluation%20%5BEng%5D.pdf [Accessed 3 Feb 2019].

43 Stevens K, Thambisanathan V, Hollenberg E, et al. Core components and strategies for suicide and risk management protocols in mental health research: a scoping review. *BMC Psychiatry* 2021:21:13.

44 Government of Canada. TCPS 2 interpretations: consent. panel on research ethics, 2018. Available: https://www.pre.ethics.gc.ca/eng/policy-politique/interpretations/consent-consentement/ [Accessed 3 Feb 2019].

45 Harris PA, Taylor R, Thielke R, et al. Research electronic data capture (REDCap)–a metadata-driven methodology and workflow process for providing translational research informatics support. *J Biomed Inform* 2009;42:377–81.

46 Wood DL, Sawicki GS, Miller MD, et al. The transition readiness assessment questionnaire (TRAQ): its factor structure, reliability, and validity. *Acad Pediatr* 2014;14:415–22.

47 Campbell F, Biggs K, Adiss GK, et al. Transition of care for adolescents from paediatric to adult health services. *Cochrane Database Syst Rev* 2016;CD009794.

48 Huang JS, Terrones L, Tompane T, et al. Preparing adolescents with chronic disease for transition to adult care: a technology program. *Pediatrics* 2014;133:e1639–46.

49 Mackie AS, Islam S, Mannelli-Evans J, et al. Healthcare transition for youth with heart disease: a clinical trial. *Heart* 2014;100:1113.

50 Heffernan OS, Herzog TM, Schiralli JE, et al. Implementation of a youth-adult partnership model in youth mental health systems research: challenges and successes. *Health Expect* 2014;17:486–99.

51 Rodriguez LF, Brown TM. From voice to agency: guiding principles for participatory action research with youth. *New Dir Youth Dev* 2009;2009:19–34.

52 Cleverley K, Bennett KJ, Brennenstuhl S, et al. Longitudinal youth in transition (LYiTS): protocol for a multicentre prospective cohort study of youth transitioning out of child and adolescent mental health services at age 18. *BMJ Open* 2020;10:e035744.

53 Zhang LF, Ho JSW, Kennedy SE. A systematic review of the psychometric properties of transition readiness assessment tools in adolescents with chronic disease. *BMC Pediatr* 2014;14:4.

54 Schwartz LA, Daniel LC, Brumley LD, et al. Measures of readiness to transition to adult health care for youth with chronic physical health conditions: a systematic review and recommendations for measurement testing and development. *J Pediatr Psychol* 2014;39:588–601.

55 Sawicki GS, Lukens-Bull K, Yin X, et al. Measuring the transition readiness of youth with special healthcare needs: validation of the TRAQ—Transition Readiness Assessment Questionnaire. *J Pediatr Psychol* 2011;36:160–70.

56 Le Roux E, Mellerio H, Guilmin-épon S, et al. Methodology used in comparative studies assessing programmes of transition from paediatrics to adult care programmes: a systematic review. *BMJ Open* 2017;7:e012338.

57 Honrado B, Shatte O, Fisher P. The Columbia-Impairment-Scale (cjs): pilot findings on a measure of global impairment for children and adolescents. *Int J Methods Psychiatr Res* 1993:3:167–76.

58 Cleverley K, Brennenstuhl S, Henderson J. Measuring functional impairment: preliminary psychometric properties of the Columbia Impairment Scale—Youth version with youth accessing services at an outpatient substance use programme. *Early Interv Psychiatry* 2020;14:535–43.
59 Achenbach TM, Rescorla LA. Manual for the ASEBA school-age forms & profiles. Burlington, VT: University of Vermont, Research Center for Children, Youth, & Families, 2001.
60 Mobberg DP, Hahn L. The adolescent drug involvement scale. Journal of Adolescent Chemical Dependency 1991;2:75–88.
61 McKay MT, Dempster M. The reliability and factorial validity of the adolescent alcohol involvement scale in a large sample in the United Kingdom. Journal of Substance Use 2016;21:177–8.
62 Fishman KN, Levitt AJ, Markoulakis R, et al. Satisfaction with mental health navigation services: Piloting an evaluation with a new scale. Community Ment Health J 2018;54:521–32.
63 Cleverley K, Rowland E, Bennett K, et al. Identifying core components and indicators of successful transitions from child to adult mental health services: a scoping review. Eur Child Adolesc Psychiatry 2020;29:107–21.
64 Cleverley K, McCann E, O’Brien D, et al. Prioritizing core components of successful transitions from child to adult mental health care: a national Delphi survey with youth, caregivers, and health professionals. Eur Child Adolesc Psychiatry 2021. doi:10.1007/s00787-021-01806-6. [Epub ahead of print: 05 Jun 2021].
65 Browne GB, Arpin K, Corey P, et al. Individual correlates of health service utilization and the cost of poor adjustment to chronic illness. Med Care 1990;28:43–58.
66 Browne G, Roberts J, Weir R, et al. The cost of poor adjustment to chronic illness: lessons from three studies. Health Soc Care Community 1994;2:85–93.
67 Richardson JRJ, Peacock SJ, Hawthorne G, et al. Construction of the descriptive system for the assessment of quality of life AQoL-6D utility instrument. Health Qual Life Outcomes 2012;10:38.
68 Allen J, Inder KJ, Lewin TJ, et al. Construct validity of the Assessment of Quality of Life - 6D (AQoL-6D) in community samples. Health Qual Life Outcomes 2013;11:61.
69 Hawthorne G, Richardson J, Osborne R. The assessment of quality of life (AQoL) instrument: a psychometric measure of health-related quality of life. Qual Life Res 1999;8:209–24.
70 Canadian Agency for Drugs and Technologies in Health. Guidelines for the economic evaluation of health technologies: Canada. 4th ed. Ottawa, ON: Canadian Agency for Drugs and Technologies in Health, 2017.
71 SAS Institute. SAS Software, North Carolina, 2020. Available: https://www.sas.com/en_ca/home.html#