

Feasibility of a Screening Program for At-Risk Children Following Accidental Injury

Sonja March^{1,2} Justin A. Kenardy^{2,3} Vanessa E. Cobham^{2,4} Reginald D. V. Nixon⁵ Brett
McDermott⁴ Alexandra De Young³

¹School of Psychology, Counselling and Community, University of Southern Queensland,
Springfield, Queensland, Australia; ²School of Psychology, University of Queensland, St
Lucia, Queensland, Australia; ³Centre of National Research on Disease and Rehabilitation
Medicine (CONROD), School of Medicine, University of Queensland, Herston, Queensland,
Australia; ⁴Mater Child and Youth Mental Health Service, Mater Children's Hospital, South
Brisbane, Queensland, Australia; ⁵School of Psychology, Flinders University, Adelaide,
South Australia, Australia

Author Note

This research was supported by an NH&MRC grant 569660

We would like to acknowledge the contribution of Jason Ackworth and Andrew
Blanch in the conduct of this research.

Correspondence concerning this article should be addressed to Justin Kenardy,
CONROD, School of Medicine, University of Queensland, Herston, QLD 4006.

E-mail: j.kenardy@uq.edu.au

Abstract

Screening is recommended as a simple method for identifying those who should be monitored for risk following trauma. Effective methods for implementing large-scale screening programs are yet to be established. This study tested the feasibility and utility of a screening program with hospitalized youth exposed to injury in 3 Australian hospitals. A total of 1,134 eligible families were contacted and 546 children (48.0%) screened for posttraumatic stress disorder (PTSD) risk at 1-2 weeks postinjury. There were 95 (17.4%) children whose screen result was at-risk. A re-screening phase was introduced during the study, with 68 children completing the re-screen at 4-6 weeks postinjury, and 26 (38.2% of those re-screened) still at-risk. Of those initially screened, 29 (5.3%) completed diagnostic assessments, 21 (3.8%) were diagnosed with partial or full PTSD, and 17 (3.1%) commenced treatment. Screening was successful at identifying and reaching children with PTSD, but the response rate was lower than expected, which limited the utility of the program. The addition of a re-screening phase demonstrated that not all at-risk children required intervention. These findings replicate previous studies that have shown natural remission in PTSD symptoms and highlight the potential for re-screening as part of a watchful waiting approach.

Feasibility of a Screening Program for At-Risk Children Following Accidental Injury

Children hospitalized for injury can experience lifelong physical and psychological disabilities (Sminkey, 2008). Up to 46% experience PTSD within the first 6 months after injury with average prevalence rates for full PTSD approximately 9.7% for non-interpersonal trauma (Alisic et al., 2014). Although most children are resilient, 10%-15% are at-risk of a chronic course for at least 2 years after trauma (Le Brocque, Hendrikz, & Kenardy, 2010). PTSD in childhood is associated with frequent psychiatric comorbidity (De Young, Kenardy, Cobham, & Kimble, 2012), poorer treatment adherence (Shemesh et al., 2000), diminished health-related quality of life (Martin-Herz, Rivara, Wang, Russo, & Zatzick, 2012), and functional impairment at similar levels to those experiencing chronic illnesses. Therefore, undiagnosed or untreated PTSD following injury may increase health-care demands and costs across the lifespan.

Although posttraumatic stress symptoms remit over time for many children, watchful waiting or monitoring is suggested before provision of psychological intervention (NCCMH, 2005). Screening is recommended as a method for identifying those who should be monitored for risk or referred for treatment (NCCMH, 2005), however only few studies have examined the feasibility (ability to successfully implement) and utility (usefulness) of screening programs in pediatric settings (Charuvastra, Goldfarb, Petkova, & Cloitre, 2010; Kassam-Adams et al., 2011).

Charuvastra and colleagues demonstrated the feasibility of a screen-and-refer process in a contained school setting following a student suicide. Of the 95% eligible who were screened, 14% of children were identified as at-risk, with 45% of these at-risk children subsequently diagnosed with PTSD and referred to treatment (Charuvastra et al., 2010). Lower response rates were reported by Kassam-Adams and colleagues in their hospital-based screening program following medical injury, with 17% of eligible children refusing

participation and 48% unavailable (Kassam-Adams et al., 2011). Of those participants approached, 66% completed the screen and 29% of those screened were determined as at-risk and received a preventive intervention. The results of Kassam-Adams et al. (2011) indicate program feasibility may be limited when implemented in a less contained context by researchers external to the routine hospital system.

Similar problems are evident for adult populations. With their hospital emergency screening program, Bisson and colleagues found that only 17% agreed to complete the screening program, with 59% of those screened at-risk and only 2.6% of these (1.6% of the total screened) receiving treatment (Bisson, Weltch, Maddern, & Shepherd, 2010).

Recruitment was via telephone or letter, and the cost of the screening program was approximately £4,167 per person treated for PTSD, which limited the overall utility of the program. O'Donnell and colleagues implemented early screening within a stepped care approach, reporting high response rates (73.0%), with 54% identified as at-risk and only 12.6% of these (6.7% of the total screened) receiving treatment (O'Donnell et al., 2012). Importantly, this screening program utilized a broad screener for anxiety, stress or depressive disorders, and incorporated a re-screen of at-risk patients 4-weeks later.

These studies demonstrate the potential benefit of screen-and-refer programs for routine identification of PTSD. Similarly, Brewin and colleagues demonstrated that following the London bombings, despite awareness, a screen-and-refer program was far more effective in identifying and referring people with PTSD (255 survivors) than were primary health care providers, who only referred 14 survivors (Brewin et al., 2008). Inconsistencies reported in the outcomes of screening programs make it difficult to determine the effectiveness of early identification and intervention referral for PTSD in children, particularly following accidental injury.

This study aimed to examine the feasibility and utility of a screening program for hospitalized injured children. To examine feasibility, the ability of the screening program to successfully identify and direct at-risk patients into treatment consisted of the following steps: (a) screening children within 2 weeks of injury, (b) re-screening at-risk children at 4-6 weeks postinjury, (c) diagnostic assessment of children who continued to score at-risk at 4-6 weeks postinjury, and (d) referral to intervention of children diagnosed with PTSD or partial PTSD (the outcomes of which will not be discussed in this study). To examine utility of the program, the costs and overall usefulness of the program (numbers identified and treated), if delivered in a routine care model were explored.

Method

Participants and Procedure

Five hundred and forty-six children (187 female and 359 male) aged 7-16 years ($M = 11.19$, $SD = 2.83$) participated in the study. Participants were children who presented to the Royal Children's Hospital, Brisbane, Mater Children's Hospital, Brisbane, or Women's and Children's Hospital, Adelaide, following a non-intentional injury (e.g. sporting injury, burns, road traffic accident). Study inclusion criteria were these: (a) aged 7-16 years; (b) admission to hospital for a minimum of 6 hours for accidental injury (not required to be defined as traumatic); and (c) lived within 200km of the hospital. Exclusion criteria were: (a) English insufficient for questionnaire completion; (b) developmental delay in the child; (c) moderate-severe head injury or posttraumatic amnesia; (d) severe depression or suicide risk in the child; (e) alcohol, substance abuse, or psychosis in the caregiver; (f) child under the care of the Department of Child Safety; and (g) injury due to intentional abuse.

A summary of the numbers of children in each stage of the study is provided in Figure 1. Of the 3,550 children who sustained an accidental injury and met initial eligibility criteria,

1,134 (31.9%) were approached and 546 (15.4%) agreed to participate, with the majority being discharged before contact, or unable to be contacted. Reasons for exclusion are given in Figure 1.

Ethical approval was granted by all relevant ethics committees: University of Queensland, the Royal Children's Hospital (Brisbane), The Mater Health Services (Brisbane), and the Children Youth and Women's Health Services (Adelaide). This screening study is part of a larger project evaluating the efficacy of various interventions for childhood PTSD following injury.

Recruitment procedures were identical across the three hospital sites and took place over an 18-month period (including all screening, diagnostic assessment and referral into treatment, but not receipt of treatment). Research nurses conducted recruitment separate to their normal clinical duties. Within each hospital's emergency, medical, and surgical wards, research nurses identified eligible participants and approached families while in hospital to obtain consent to contact. If families were unable to be contacted while in hospital (due to a parent not being present, inability to provide recruitment 24 hours per day, patients discharged before contact), research nurses attempted to contact the family via telephone. Recruitment times varied each week to maximize coverage over each 7-day period. Eligible families who gave permission to be contacted were phoned within 2 weeks of the injury. Parents and children were provided with further study information via the phone and informed verbal consent was obtained through audio recording. Only children 10 years of age and above were required to provide consent. Following consent, the child immediately completed the CTSQ with a trained research assistant and basic demographic data was collected. No demographic data was collected for participants who refused to provide consent to contact, or refused to participate in the study. Children who were not deemed at-risk using the CTSQ (below 5) took no further part in the current study. Parents of children

not at-risk were informed of the outcome and provided with information resources describing typical reactions to traumatic medical events and simple strategies for managing these reactions (www.som.uq.edu.au/childtrauma/accident-response).

Children scoring above the cut-off on the CTSQ (above 5) did not receive any psychoeducation and progressed to the next stage of this study. At-risk children completed the CTSQ again at approximately 4-6 weeks following the initial injury (re-screen phase). The re-screen phase was introduced after the study commenced (after the collection of 13 at-risk participants), when it became clear that a proportion of the children did not demonstrate PTSD at diagnostic assessment. At this re-screen stage, children who re-screened at-risk were invited to complete the CAPS-CA diagnostic interview, conducted in person by a trained research assistant. Participants meeting criteria for the intervention arm of the project were then allocated to treatment.

Measures

Data were obtained from three sources, the child, parent(s) and hospital records. Brief demographic information (age and gender) and information relating to the injury and hospital admission including: hospital site, accident circumstances, and injury type was obtained at baseline.

The Child Trauma Screening Questionnaire (CTSQ) is a 10-item self-report screen adapted from the adult Trauma Screening Questionnaire (TSQ; Brewin et al., 2002) and has been validated in children aged 7-16 years who have experienced accidental injury (Kenardy, Spence, & Macleod, 2006) and exposure to student suicide (Charuvastra et al., 2010). The CTSQ assesses for the presence of re-experiencing (5 items) and hyper-arousal symptoms (5 items) following a potentially traumatic event. Children indicate with yes (scored 1) or no (scored 0) whether they have experienced the symptom since the event with scores added to provide a total score. A cut off score of ≥ 5 has been shown in at least one study to offer

optimum prediction of PTSD diagnosis maximizing the balance between sensitivity and specificity (Kenardy et al., 2006). The CTSQ shows acceptable internal consistency and convergent validity with the Children's Revised Impact of Events Scale-8 (CRIES 8: Perrin, Meiser-Stedman, & Smith, 2005) and acceptable sensitivity and specificity for predicting the development of full and subsyndromal PTSD diagnosis at 1- and 6-months postinjury (correctly classifying 74–82% of cases) (Kenardy et al., 2006). The CTSQ was administered at baseline (within 1-2 weeks of the injury) and at the re-screening phase (4-6 weeks post-injury). The reliability of the CTSQ in the current sample was .63 at baseline and .67 at re-screen.

The Clinician Administered PTSD Scale for Children (CAPS-CA; Nader et al., 1996) is a developmentally modified, clinician-administered diagnostic interview that is conducted with children (8-15 years) to assess for PTSD diagnosis (Diagnostic Statistical Manual IV criteria) as well as impairment in functioning. The CAPS-CA has demonstrated sound psychometric properties (Carrion, Weems, Ray, & Reiss, 2002).

The ability of the DSM-IV criteria to adequately describe the presentation of PTSD in children has been questioned, with several alternative developmentally appropriate algorithms developed and supported, ultimately resulting in revised criteria in DSM-5 (Martin-Herz et al., 2012). Although this study employed the CAPS-CA, which assesses PTSD according to DSM-IV, an alternative diagnostic algorithm was utilized (the 2 of 3 method; see Carrion et al., 2002; Iselin, Le Brocque, Kenardy, Anderson, & McKinlay, 2010 for a review) to determine diagnosis (partial PTSD). The 2 of 3 method requires DSM IV-TR-defined symptom counts per cluster to be met, but for only two (or more) of the three symptom clusters (re-experiencing, avoidance and arousal). This algorithm has demonstrated improved ability to detect clinically meaningful PTSD symptoms and has demonstrated

significant associations with poorer psychosocial functioning in children postinjury (Carrion et al., 2002; Iselin et al., 2010).

Data Analysis

As the CTSQ was either administered in-person, or via telephone, there were no missing data. Participants who refused participation at the re-screen stage were considered dropouts of the screening program and excluded from analysis beyond the initial screen. There were no significant differences between dropouts and screening completers on key demographic or clinical indicators. Data were analyzed for the number and percentages of children progressing through different stages of the screening program.

Results

Participants completing the initial screen ($N = 546$) were on average 11.19 years of age ($SD = 2.83$) and predominantly males (65.8%). Within the subsample of participants who screened at-risk at baseline and went on to complete the re-screen ($n = 68$), the mean age was 10.6 years ($SD = 2.79$), and 60.3% were male. The most common injury type was a fracture (61.5% in baseline sample, and 52.9% in re-screen subsample) and the most common accident circumstances were falls (36.4% in baseline sample and 44.1% in re-screen subsample). Further accident and injury details can be found in Table 1. The mean CTSQ score was 2.61 ($SD = 2.11$, Range = 0-10) for those screened at baseline, and 4.0 ($SD = 2.40$, Range = 0-10) for those screened at the re-screen stage.

Children were referred into treatment if they received a minimum diagnosis of partial PTSD (met the 2 of 3 criteria). Out of the 29 children completing the diagnostic assessment, 21 received a diagnosis, with only 9 (31.0%) meeting DSM-IV criteria for PTSD, but 21 (72.4%) meeting criteria for partial PTSD. The mean Total CAPS-CA severity score for children completing the diagnostic assessment was 44.97 ($SD = 25.66$) and for the subsample of participants demonstrating at least partial PTSD ($n = 21$) was 56.24 ($SD = 20.50$). Of those

initially screened, the proportion of children with partial or full PTSD ($n = 21$) was 3.8%. Seventeen children (1.5% of approached, 3.1% of screened) went on to treatment.

In terms of utility, the translation of this screening program into routine clinical services of tertiary care settings would require administering (by a nurse) and scoring the short, 10-item CTSQ. Removing time and costs associated with selection of instruments and training of staff (establishment costs), and allowing enough time to explain the purpose of screening to the young person, the total time required to administer and score the CTSQ in this study was 15 minutes. Implementation of screening by a nurse already involved in the child's medical care would therefore cost approximately AUD\$12.50 per participant, per screening occasion (working on a salary of AUD\$50 per hour). Though there might be additional, minimal costs with printing hard copies of the screening measure, electronic administration would eliminate such costs and allow for automatic scoring. Depending on the service, there may be additional costs in following up and providing referrals for high-risk cases, but this too could be minimized through electronic scoring and data records, and are not included in these calculations. Therefore, the operational costs of delivering this screening program are minimal per patient, if integrated into routine care.

It is also possible to estimate the cost per patient referred into treatment, if all children in need of referral following hospital admission were identified during screening. In the current study, 3.8% ($n = 21$) of participants screened went on to receive a diagnosis of partial or full PTSD by 6-weeks post-hospital admission. If these incidence rates were representative of this population generally, and if all 3,550 children presenting at hospital during the 18-month recruitment period were screened, we would expect approximately 134 children to receive a referral for intervention. This would represent a cost of AUD\$388 per client referred into treatment (total operational costs of screening and rescreening program (AUD\$52,087) divided by number of children (134) requiring intervention).

Discussion

This study evaluated the feasibility and utility of a large-scale screening program for the identification of full or partial PTSD in hospitalized injured children. Children were identified using the CTSQ and at-risk participants were followed up to a re-screening phase and subsequent diagnostic interview.

Overall, the screening program was able to identify those children at-risk of PTSD following injury and refer those children in need into treatment. Of participants completing the screening process, the number of youth identified as at-risk (17.4%) was consistent with previous research, however, our study diagnosed only 3.8% of children, which is lower than what might be expected based on prevalence rates (although 3 children refused treatment despite PTSD being evident). This was less than the number of participants treated in some screening programs (e.g. Kassam-Adams et al., 2011; O'Donnell et al., 2012), but higher than that reported by Bisson et al. (2010). Across screening programs, percentages of participants referred into intervention are higher when broad, rather than PTSD-specific screeners, and preventive, rather than treatment programs are utilized.

There were several findings that should be considered in the future implementation of such screening programs. The feasibility of the screening program was primarily impacted by uptake rates, with only 31.9% of eligible children approached. Constraints of research meant that recruitment and screening occurred external to routine medical care, was not funded 24 hours per day or 7 days per week, and for many was conducted via telephone, with significant numbers unable to be contacted. Unfortunately, the proportion of patients approached compared to the total eligible number is only reported by Kassam-Adams et al. (2011) who contacted 52% of eligible patients, noting requirements to first contact parents rather than children as contributing factors. It is likely such problems are specific to recruitment of child versus adult participants into screening programs.

In terms of consent and screening, only half (48.1%) of participants approached agreed to complete the screening questionnaire, which is less than in programs utilizing only face-to-face screening (Charuvastra et al., 2010; Kassam-Adams et al., 2011; O'Donnell et al., 2012), but higher than some others employing telephone recruitment (Bisson et al., 2010). Given the short hospital admission stays in our study, telephone contact was utilized to reach those families who were discharged before in-hospital contact could be made and it is possible that project staff were unable to as clearly explain the benefits of screening to these families. Of those providing consent, the majority did so face-to-face, which may suggest it is a more efficient means of engaging families into screening. Additionally, the consent process employed in this study related to the entire study (screening, monitoring, diagnostic assessment, potential randomization, treatment and follow-up) and may have acted as a deterrent. It is also possible that screening for a significant illness such as PTSD following, in many cases relatively minor physical injuries, may have seemed unnecessary for many families. We were unable to collect demographic or injury data for those children not approached or refusing participation, and it is possible that some children who were potentially in-need may have been missed.

The current study was unique in that it introduced a re-screening process 4-6 weeks following the injury. Of those who were re-screened, 38.2% continued to present as at-risk, indicating remission in symptoms for over half of the children. This process reduced the numbers of participants progressing to diagnostic assessment, although led to higher proportions of children entering treatment (3.1% of those screened) than screening programs without re-screening (e.g. Bisson et al., 2010: 1.6% of those screened). This is a particularly important finding as it highlights the substantial reduction in the number of participants who require full diagnostic evaluation by 4-6 weeks postinjury. The introduction of a brief, re-

screen may save significant time and costs and should be considered in any future attempts to implement effective screening or watchful waiting programs.

Although it is possible that the screening measure employed (CTSQ) lacked sufficient specificity in identifying those children who would go on to develop PTSD, an alternative explanation is that screening within the first 4 weeks postinjury may not be appropriate. Current guidelines and our results suggest that for many, symptoms may diminish naturally over time. However, by delaying screening, opportunities to engage with families face-to-face in routine medical care are lost, particularly where hospitalization is only brief. Contacting families 4-6 weeks postinjury via telephone or other means may substantially impair the ability to convey the benefits of screening meaningfully, is likely to reduce numbers agreeing to screening and subsequently will impact on the successful identification of those in need. Thus, there are compelling reasons to perform screening as a method of watchful waiting in the first month, particularly when there is opportunity to integrate screening with routine care.

In terms of utility, it would seem that the more such a program is embedded in routine medical care rather than existing within a research study, the lower the costs will be. The integration of the screening into clinical service delivery would not pose significant burden during medical care, would allow face-to-face administration and scoring of the short CTSQ, at a cost of approximately AUD\$12.50 per administration, which may be further reduced through self-completion and automatic scoring using electronic devices. For this study, this would equate to approximately AUD\$379 per client entering treatment. Although the observed incidence rate is lower than expected, if 9% of eligible children admitted were to demonstrate PTSD and be referred into treatment, this would reduce the costs to approximately AUD\$163 per client entering treatment.

These costs need to be considered in comparison to the high incremental costs that are evident for PTSD and comorbid conditions if left untreated, the documented short and long-term functional and health related impairment in children following injury, and the low rate of help-seeking among young people (Sawyer et al., 2001). The inability of health providers to identify PTSD outside such targeted screening programs, even following events clearly associated with PTSD (e.g. bombings; Brewin et al., 2008) further highlights the potential utility of such screening programs.

The study was limited in that it utilized a PTSD specific screening instrument, and did not screen for other psychological outcomes. Further, the re-screen phase was introduced partway through the study as it became apparent that not all children required full diagnostic assessment following the initial screen. The lack of information about families unable to be contacted or those refusing to participate in the study does not allow us to determine representativeness of the sample. Finally, the reliance on telephone screening in addition to face-to-face approaches is a limitation of this study.

Given the necessity to include parents in the consent process, future research should evaluate the effectiveness of such screening programs when integrated into routine medical care pathways. There is also a need to comprehensively examine cost-effectiveness of such screening programs as well as test the reliability, validity and appropriateness of screening at initial and re-screen stages. There are clear opportunities to trial new approaches, such as computerized delivery of screening, as well more broad screening instruments assessing for other trauma-related distress, in an attempt to improve program utility.

The present study evaluated the feasibility of integrating a screening program into three busy pediatric tertiary care settings. Although the response rate was lower than expected, the process was accepted by families and significant numbers of at-risk children were identified, assessed, and entered intervention. The results of this study suggest that a

PTSD screening program may be feasible for children experiencing accidental injury, and that re-screening may be especially important.

References

- Alisic, E., Zalta, A. K., van Wesel, F., Larsen, S. E., Hafstad, G. S., Hassanpour, K., & Smid, G. E. (2014). Rates of post-traumatic stress disorder in trauma-exposed children and adolescents: meta-analysis. *The British Journal of Psychiatry*, *204*, 335-340. doi: 10.1192/bjp.bp.113.131227
- Bisson, J. I., Weltch, R., Maddern, S., & Shepherd, J. P. (2010). Implementing a screening programme for post-traumatic stress disorder following violent crime. *European Journal of Psychotraumatology*, *1*, 5541. doi: 10.3402/ejpt.v1i0.5541
- Brewin, C. R., Rose, S., Andrews, B., Green, J., Tata, P., McEvedy, C., . . . Foa, E. B. (2002). Brief screening instrument for post-traumatic stress disorder. *British Journal of Psychiatry*, *181*, 158-162.
- Brewin, C. R., Scragg, P., Robertson, M., Thompson, M., d'Ardenne, P., & Ehlers, A. (2008). Promoting mental health following the London bombings: A screen and treat approach. *Journal of Traumatic Stress*, *21*, 3-8. doi: 10.1002/jts.20310
- Carrion, V. G., Weems, C. F., Ray, R., & Reiss, A. L. (2002). Toward an empirical definition of pediatric PTSD: The phenomenology of PTSD symptoms in youth. *Journal of the American Academy of Child and Adolescent Psychiatry*, *41*, 166-173. doi: 10.1097/00004583-200202000-00010
- Charuvastra, A., Goldfarb, E., Petkova, E., & Cloitre, M. (2010). Implementation of a screen and treat program for child posttraumatic stress disorder in a school setting after a school suicide. *Journal of Traumatic Stress*, *23*, 500-503. doi: 10.1002/jts.20546
- De Young, A. C., Kenardy, J. A., Cobham, V. E., & Kimble, R. (2012). Prevalence, comorbidity and course of trauma reactions in young burn-injured children. *Journal of Child Psychology and Psychiatry*, *53*, 56-63. doi: 10.1111/j.1469-7610.2011.02431.x

- Iselin, G., Le Brocque, R., Kenardy, J. A., Anderson, V., & McKinlay, L. (2010). Which method of posttraumatic stress disorder classification best predicts psychosocial function in children with traumatic brain injury? *Journal of Anxiety Disorders, 24*, 774-779. doi: 10.1016/j.janxdis.2010.05.011
- Kassam-Adams, N., Felipe García-España, J., Marsac, M. L., Kohser, K. L., Baxt, C., Nance, M., & Winston, F. (2011). A pilot randomized controlled trial assessing secondary prevention of traumatic stress integrated into pediatric trauma care. *Journal of Traumatic Stress, 24*, 252-259. doi: 10.1002/jts.20640
- Kenardy, J. A., Spence, S. H., & Macleod, A. C. (2006). Screening for posttraumatic stress disorder in children after accidental injury. *Pediatrics, 118*(3), 1002-1009. doi: 10.1542/peds.2006-0406
- Le Brocque, R. M., Hendrikz, J., & Kenardy, J. A. (2010). The course of posttraumatic stress in children: Examination of recovery trajectories following traumatic injury. *Journal of Pediatric Psychology, 35*, 637-645. doi: 10.1093/jpepsy/jsp050
- Martin-Herz, S. P., Rivara, F. P., Wang, J., Russo, J., & Zatzick, D. F. (2012). Predictors of parental posttraumatic stress disorder symptoms in the year after adolescent traumatic injury. *Academic Pediatrics, 12*, 198-204. doi: 10.1016/j.acap.2012.02.008
- Nader, K., Kriegler, J. A., Blake, D. D., Pynoos, R. S., Newman, E., & Weathers, F. W. (1996). *Clinician Administered PTSD Scale, Child and Adolescent Version*. White River Junction, VT: National Center for PTSD.
- NCCMH. (2005). *Post-traumatic stress disorder (PTSD): the management of PTSD in adults and children in primary and secondary care*. Leicester and London: The British Psychological Society and the Royal College of Psychiatrists.
- O'Donnell, M. L., Lau, W., Tipping, S., Holmes, A. C. N., Ellen, S., Judson, R., . . . Forbes, D. (2012). Stepped early psychological intervention for posttraumatic stress disorder,

other anxiety disorders, and depression following serious injury. *Journal of Traumatic Stress, 25*, 125-133. doi: 10.1002/jts.21677

Perrin, S., Meiser-Stedman, R., & Smith, P. (2005). The Children's Revised Impact of Event Scale (CRIES): Validity as a Screening Instrument for PTSD. *Behavioural and Cognitive Psychotherapy, 33*, 487-498. doi: 10.1017/s1352465805002419

Sawyer, M. G., Arney, F. M., Baghurst, P. A., Clark, J. J., Graetz, B. W., Kosky, R. J., . . . Zubrick, S. R. (2001). The mental health of young people in Australia: Key findings from the child and adolescent component of the national survey of mental health and well-being. *Australian and New Zealand Journal of Psychiatry, 35*, 806-814. doi: 10.1046/j.1440-1614.2001.00964.x

Shemesh, E., Lurie, S., Stuber, M. L., Emre, S., Patel, Y., Vohra, P., . . . Shneider, B. L. (2000). A pilot study of posttraumatic stress and nonadherence in pediatric liver transplant recipients. *Pediatrics, 105*, e29. doi: 10.1542/peds.105.2.e29

Sminkey, L. (2008). World report on child injury prevention. *Injury Prevention, 14*, 69. doi: 10.1136/ip.2007.018143

Table 1

*Percentage of Children identified as 'At-Risk' on the Baseline and Re-Screen CTSQ**According to Gender, Accident Circumstances and Injury Type*

Variable	T1: Baseline (N=546)				T2: Re-Screen (N=68)			
	'Low-risk'		'At-risk'		'Low-risk'		'At-risk'	
	<i>N</i>	%	<i>N</i>	%	<i>N</i>	%	<i>N</i>	%
Gender								
Male	305	85.0	54	15.0	25	61.0	16	39.0
Female	146	78.1	41	21.9	17	63.0	10	37.0
Circumstances of accident								
Traffic accident	21	75.0	7	25.0	2	100.0	0	0.0
Fall	157	78.9	42	21.1	18	60.0	12	40.0
Organised sports accident	72	90.0	8	10.0	3	42.9	4	57.1
Other recreational activity	138	89.0	17	11.0	5	38.5	8	61.5
Injury from animal	11	78.6	3	21.4	2	66.7	1	33.3
Fire, burn or scald	14	70.0	6	30.0	4	100.0	0	0.0
Other	38	76.0	12	24.0	8	89.0	1	11.0

Type of injury									
Fracture	285	84.8	51	15.2	21	58.3	15	41.7	
Laceration	63	81.8	14	18.2	5	50.0	5	50.0	
Amputation	5	55.6	4	44.4	2	66.7	1	33.3	
Burn	16	72.7	6	27.3	4	100.0	0	0.0	
Internal injuries	33	84.6	6	15.4	3	60.0	2	40.0	
Bite/sting	8	88.9	1	11.1	0	0.0	1	100.0	
Crush	7	87.5	1	12.5	1	100.0	0	0.0	
Other	34	73.9	12	26.1	6	75.0	2	25.0	

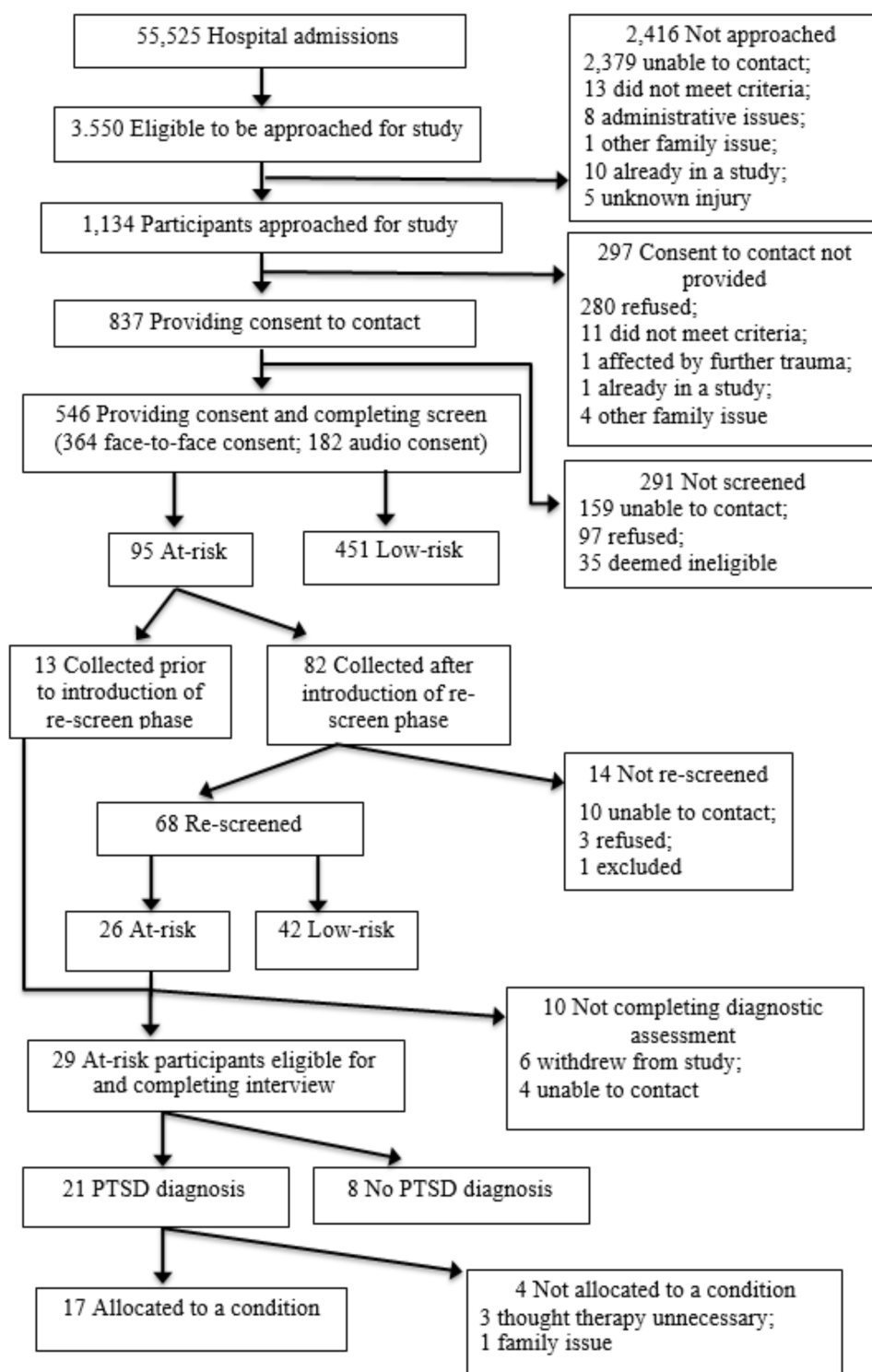


Figure 1. Flow of participants through screening program