Dr Allyson Browne
2007 Churchill Fellow

To Investigate Models of Acute Mental Health Care for Severely Injured Trauma Survivors

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Signed: Dated: 31st March 2008
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1. Introduction

In 2006, Royal Perth Hospital (RPH) accepted over 5000 trauma admissions. Of these, over 500 were major trauma admissions (Injury Severity Score > 15). Among Australian trauma survivors, post traumatic stress disorder (PTSD) and depression occur 3 and 10 times more often respectively within 12 months of injury compared with community samples (O'Donnell, et al., 2004). PTSD and depression are associated with functional impairment and poorer quality of life above and beyond the contribution of comorbid physical injury and medical conditions (Holbrook, Anderson, Sieber, Browner, & Hoyt, 1998; Michaels, et al., 1998). Within the general population PTSD is associated with nearly the highest rate of medical and mental health service use, and is one of the costliest mental health disorders to treat (Deykin, et al., 2001; Greenberg, et al., 1999; Solomon & Davidson, 1997).

Despite compelling evidence of significant adverse mental health outcomes for trauma survivors, addressing the mental health needs of severely injured trauma survivors in the Australian public health sector has largely been neglected. Consistent evidence has demonstrated that early psychological intervention for post traumatic stress symptoms arising following traumatic injury is effective in reducing symptom severity and disability (e.g., Bisson et al., 2004; Bryant, Moulds, & Nixon, 2003; Ehlers, et al., 2003). Yet, there are no current staffing guidelines administered by professional bodies (e.g., Australasian College of Surgeons, Australian Psychological Society) for Clinical Psychologists within Australian trauma centres.

At the time of my departure for my Churchill Fellowship in November 2007 there were no published recommendations to guide the implementation of an evidence-based and clinically feasible mental health care model within an acute surgical setting in Australia. This fellowship enabled me to achieve three primary aims:

- Foster collaborative relationships with leaders in the fields of trauma, traumatic stress, and rehabilitation.
- Acquire an increased knowledge of the cultural, social, economic, and political factors that facilitate evidence based mental health care service development and provision.
- Attend international scientific meetings and clinical training events to gain a better understanding of the most recent developments in clinical and research models of mental health care following traumatic injury.

I am grateful to the Winston Churchill Memorial Trust for giving me with this tremendous opportunity to travel abroad to develop my skills and knowledge within the domain of traumatic injury and mental health. I would also like to express my sincere appreciation to my employers and managers, Professor Stephan Schug of the University of Western Australia and Dr Sudhakar Rao of Royal Perth Hospital, who supported me throughout my Churchill fellowship and continue to inspire me to strive for clinical and research excellence. I would like to extend my sincerest gratitude to the many people whom I visited in the United States, Northern Ireland, United Kingdom, and South Africa who willingly shared their time, knowledge, expertise, and culture with me. Finally, I would like to acknowledge the hundreds of Western Australian survivors of traumatic injury who have shared part of their journey with me and whose overwhelming experiences compel me to seek advances in the quality and accessibility of mental health care services following traumatic injury in Australia.
2. Executive Summary

2.1. Address For Correspondence

<table>
<thead>
<tr>
<th>Dr Allyson Browne</th>
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<tbody>
<tr>
<td>Specialist Clinical Psychologist</td>
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<tr>
<td>Trauma Services, Royal Perth Hospital</td>
</tr>
<tr>
<td>Tel: +61 8 9224 0271</td>
</tr>
<tr>
<td>Fax: +61 8 9224 0279</td>
</tr>
<tr>
<td>School of Medicine &amp; Pharmacology</td>
</tr>
<tr>
<td>University of Western Australia</td>
</tr>
<tr>
<td>Medical Research Foundation Building, Level 2</td>
</tr>
<tr>
<td>50 Murray St</td>
</tr>
<tr>
<td>GPO Box X2213</td>
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<tr>
<td>Perth WA 6847</td>
</tr>
<tr>
<td>Email: <a href="mailto:allyson.browne@uwa.edu.au">allyson.browne@uwa.edu.au</a></td>
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2.2. Project Description

To Investigate Models of Acute Mental Health Care for Severely Injured Trauma Survivors

2.3. Fellowship Highlights

Seattle, Washington, United States
Department of Psychiatry and Behavioral Sciences at Harborview Medical Centre. Discussions with Associate Professor Douglas Zatzick and Associate Professor Chris Dunn regarding the implementation of collaborative care interventions for traumatic injury survivors and motivational interviewing approaches to reduce alcohol related trauma recidivism. Presented lecture at the Harborview Injury Prevention and Research Centre on preliminary models and challenges to the implementation of mental health care for traumatic injury survivors in Western Australia (WA).

Ann Arbor, Michigan, United States
The Veterans Affairs (VA) Ann Arbor Healthcare System, and the University of Michigan Department of Emergency Medicine, Department of Psychiatry, Anxiety, Stress and Ambulatory Section, and Department of Emergency Medicine. Discussions with Dr Sam McLean, Professor Israel Liberzon, Assistant Professor Sheila Rauch, and Assistant Professor Nicholas Giardino regarding the establishment of clinical research models to investigate the evolution and prevention of persistent pain and post traumatic stress disorder (PTSD) following traumatic injury.

Baltimore, Maryland, United States
Attended the 23rd International Society of Traumatic Stress Studies Annual Meeting. Obtained advice and feedback from multiple international leaders in the field of trauma research and clinical practice regarding the design and implementation of feasible models of mental health care within public health system trauma settings. Attended presentations examining the prevalence of PTSD following injury, and the efficacy and effectiveness of psychological interventions for PTSD across different settings.

Boston, Massachusetts, United States
Visited the Behavioural Sciences Division of the National Centre for PTSD at the VA Boston Health Care System. Discussions with Professor Brett Litz regarding the evaluation of trauma focused brief cognitive behavioural mental health care interventions. Attended the Department of Psychiatry at Massachusetts General Hospital. Discussions with Professor Roger Pitman, Professor Scott Orr, and Assistant
Professor Natasha Lasko regarding the secondary prevention of PTSD, and physiological predictors of PTSD following traumatic injury.

**Omagh, Northern Ireland**
Visited the Northern Ireland Centre for Trauma and Transformation (NICTT). Was introduced by Dr Kate Gillespie, Dr Maria Kee, and Dr Michael Duffy to the model of mental health care service provision provided by the multidisciplinary mental health team at NICTT in response to the Omagh bombing. Reviewed socioeconomic and political factors underpinning the establishment of mental health systems with Mr Tom Frawley, Assembly Ombudsman and Northern Ireland Commissioner for Complaints.

**London, England**
Met with Professor Chris Brewin and his research team at the Department of Health Psychology at University College London. Presented pilot results and obtained feedback regarding a trial conducted within the Trauma Service at RPH that examined the predictive utility of two brief psychological screening tools for accurately identifying individuals at risk of developing PTSD following traumatic injury.

**Johannesburg, South Africa**
Attended the Johannesburg General Hospital Trauma Unit and the Netcare Milpark Hospital. Met with Professor Ken Boffard and Sarah Maxwell to discuss the implementation of mental health care models embedded within medical systems. Discussed mental health service provision in an acute surgical setting, and integration of trauma staff resilience training as part of core business.

2.4. **Major Lessons & Conclusions**
- Stepped collaborative mental health care interventions could provide an economically viable and evidence based approach to providing quality mental health care to trauma patients – yet needs to be systematically evaluated to establish effectiveness, clinical utility, and feasibility in WA.
- Continued education of the impact of psychological well being on mental, physical, social, and economic outcomes is required for key stakeholders invested in providing health care services to traumatically injured patients.
- Greater integration of acute surgical care, rehabilitation, and community based health services is required for traumatic injury survivors in WA.
- Web based interventions and telemedicine approaches to mental health care may enable rural and remote populations in WA to be treated who have been underserviced previously compared to their metropolitan counterparts.
- The ongoing physical, social, and psychological needs of indigenous patients admitted to the WA trauma service should be investigated.
- Increased effort should be directed at fostering resilience among emergency workers and trauma health professionals in WA.
- Successful implementation of a gold standard statewide mental health service requires a plan for long term funding for staffing, specialist professional development and training, clinical assessment and treatment resources, clinically relevant research, physical infrastructure, and administrative support.

2.5. **Dissemination & Implementation**
- Applications for research funding investigating risk factors for post trauma syndromes and persistent pain outcomes following traumatic injury in collaboration with groups from US and UK has been planned.
- Planned collaborations with groups from US and South Africa to develop clinical and research programs designed to improve mental health outcomes and retention of staff exposed to high levels of trauma.
• Planned collaborations with South Australian, Netherlands, and Northern Ireland groups to establish community-based mental health interventions for trauma survivors discharged from hospital.
• Presentation of preliminary findings of mental health outcomes post trauma at the 2007 Australian Pain Society and Australian and New Zealand College of Anaesthetists Annual Scientific Meetings.
• Royal Perth Hospital Public Relations Officer to facilitate the dissemination of the key outcomes of the Churchill fellowship and mental health issues among traumatic injury survivors to Royal Perth Hospital Staff, the WA Health Department, and the broader West Australian community through local publications, newspaper, and television.
• Provision of lectures regarding psychological aspects of disasters for health professionals and emergency personnel attending the Disaster Medicine Courses coordinated by the WA Health Department Disaster Preparedness and Management Unit in 2007.
• Provision of training workshops in rural WA in 2007 to health professionals and emergency personnel supported by the Australian College of Ambulance Professionals.
### Programme Itinerary

<table>
<thead>
<tr>
<th>Date</th>
<th>Organization</th>
<th>People</th>
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<tr>
<td><strong>United States</strong></td>
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<tr>
<td>9 Nov 2007</td>
<td>Department of Psychiatry &amp; Behavioral Sciences, Harborview Medical Centre</td>
<td>Assoc Prof Douglas Zatzick</td>
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<td></td>
<td>Department of Rehabilitation Medicine, Harborview Medical Centre</td>
<td>Assoc Prof Chris Dunn</td>
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<td>Harborview Injury Prevention &amp; Research Centre</td>
<td>Clin Assist Prof Jeffery Sherman</td>
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<td>11-13 Nov 2007</td>
<td>University of Michigan, VA Ann Arbor Health Care System</td>
<td>Dr Sam McLean</td>
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<td>Erin Zalevski</td>
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<td>Prof Israel Liberzon</td>
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<td>Assist Prof Nick Giardino</td>
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<td>Leora Bowden</td>
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<td>14-18 Nov 2007</td>
<td>International Society of Traumatic Stress Studies Annual Meeting, Baltimore,</td>
<td>Prof Arieh Shalev, Israel</td>
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<td>Maryland, United States.</td>
<td>Prof Patricia Resick, US</td>
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<td>Prof Jonathan Bisson, Wales</td>
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<td>Dr Eve Carlson, US</td>
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<td>Dr Meaghan O'Donnell, Aust</td>
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<td>19-21 Nov 2007</td>
<td>Behavioural Sciences Division, National Centre for PTSD, VA Boston Health</td>
<td>Prof Brett Litz</td>
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<td>Care System</td>
<td>Assist Prof Barbara Niles</td>
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<td>PTSD Research Laboratory, Psychiatry-Massachusetts General Hospital</td>
<td>Assist Prof Steve Quinn</td>
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<td>Prof Roger Pitman</td>
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<td>Assist Prof Natasha Lasko</td>
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<td>Northern Ireland</td>
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<td>3-7 Dec 2007</td>
<td>The Edinburgh Traumatic Stress Centre, Royal Edinburgh Hospital, Scotland</td>
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<td>Dept of Orthopaedic Trauma, Royal Infirmary of Edinburgh, Scotland</td>
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<td>Sub-Department Clinical Health Psychology, University College London</td>
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<td>12 Dec 2007</td>
<td>Midlands Health Psychology Workshop: Applications of Acceptance, Cognitive Defusion, Mindfulness, and Values in Acceptance and Commitment Therapy</td>
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<td>13-14 Dec 2007</td>
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<td>South Africa</td>
<td>17-19 Jan 2008</td>
<td>Johannesburg General Hospital Trauma Unit</td>
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4. **Fellowship Objectives**

The Trauma Service of WA is establishing a clinical mental health service embedded within an acute surgical setting to service the needs of Western Australian traumatic injury survivors. In order to establish this service effectively, it is necessary to identify the most appropriate and viable mental health care model for WA trauma services, evaluate the services provided and outcomes achieved, and identify individuals at greatest risk of ongoing psychopathology following traumatic injury. In keeping with these broad professional objectives, the central aims of my fellowship were to:

(i) Determine best practice mental health care models and treatment interventions for injured patients in the acute phase and longer term.
(ii) Clarify the challenges to the provision of evidence based mental health care in medical settings.
(iii) Determine how other individuals, groups, and organizations have overcome these challenges.
(iv) Foster collaborative links with researchers and clinicians working within the field of traumatic stress, traumatic injury, and multidisciplinary rehabilitation following injury.

5. **Key Findings**

This section will provide an overview of the key issues associated with the design and implementation of evidence based mental health services embedded within medical trauma settings. It does not intend to be an exhaustive review of the key scientific findings, methodological issues, and psychological treatment components for PTSD. Traumatic injury survivors face an array of both physical and psychological challenges during the course of their recovery. Consequently, this review will provide an overview of some of the universal challenges and proposed solutions to the provision of mental health care for traumatic injury survivors. Reflecting the emphasis on post traumatic syndromes arising following traumatic injury in the scientific literature and clinical community, the findings presented here focus predominantly on the traumatic stress literature and discussions with professionals working within the field of traumatic stress. In view of the vast number of sites visited and people encountered as part of my fellowship, the key findings of my fellowship tour have been distilled into four broad domains that encompass both the most recent scientific evidence and the content of the discussions with researchers and practitioners visited:

i. **Mental Health Care Service Delivery Models**

ii. **Risk Factors for Adverse Psychosocial and Physical Outcomes**

iii. **Early Mental Health Interventions**

iv. **Challenges to Providing Mental Health Care Following Traumatic Injury**

5.1. **Mental Health Care Service Delivery Models**

There is no gold standard universally accepted public health system model to service the mental health needs of traumatic injury survivors at this stage. There have, however, been proposals put forward in recent years for the implementation of trauma focused cognitive behavioural therapy for traumatic injury survivors using community-based interventions (Gillespie, Duffy, Hackmann, & Clark, 2002), collaborative multidisciplinary care approaches (Zatzick, Roy-Byrne, Russo, Rivara, Droesch, & Wagner, 2004), stepped approaches (O'Donnell, Bryant, Creamer, & Carty, 2008), and web-based delivery of psychoeducation and intervention (Olff, Mouthaan, Kassam-
Adams, Kuhn, Winston, Sijbrandij, et al., 2007). The following section will review the key recommendations and findings for each of these modes of delivery in turn.

The effectiveness of cognitive-behavioural treatment for chronic PTSD has been well established in a series of randomized controlled trials (e.g., Foa, Hearst-Ikeda, & Perry, 1995; Resick & Schnicke, 1992). Cognitive behaviour therapy (CBT) has been shown to be superior to waiting list and relaxation training control groups. The gains achieved in CBT have been maintained in follow-ups of up to one year. There is also consistent evidence to suggest that trauma focused CBT is more effective for treating acute stress disorder than supportive counseling reducing the risk of PTSD following traumatic injury with results maintained for up to 4 years (Bryant, Moulds, & Nixon, 2003). There is less evidence, however, to suggest that trauma-focused interventions targeting PTSD will reduce anxiety or depression levels following traumatic injury. The converging evidence from randomized controlled trials has been recognized in the Practice Guidelines from the International Society of Traumatic Stress Studies (Foa, Keane, & Friedman, 2000) which state that “compelling and consistent evidence exists for demonstrating the efficacy of cognitive behaviour therapy for post traumatic stress disorder…” (p.102).

Despite widespread acknowledgement that CBT is an effective treatment for PTSD, there are significant challenges to the implementation of CBT approaches in routine clinical settings. Particularly, when embedded in medical systems where heterogenous patient characteristics, comorbid medical conditions and psychopathology, pain, medication side effects, rapidly shifting presentations associated with ongoing medical issues, and lack of therapists trained in trauma focused CBT approaches all serve to interfere with the structured approaches to intervention most commonly reported in the scientific literature.

Encouragingly, following the 1998 Omagh car bombing in Northern Ireland, significant and substantial improvements comparable to research trials were observed in PTSD symptoms among 91 patients who were treated by National Health Service (NHS) therapists given brief training in specialist cognitive therapy for PTSD following the event in line with the Ehlers and Clark (2000) model (Gillespie, Duffy, Hackmann, & Clark, 2002). Kate Gillespie identified during my visit to the NICTT that the positive findings achieved were indicative of the generalizability of cognitive therapy approaches to a frontline service staffed by clinicians with already heavy caseloads and previously no specialist training in trauma focused cognitive therapy. Patients who were physically injured, however, improved less than those who were not physically injured. Gillespie and colleagues (2002) hypothesized that this may have been because patients with continuing physical problems and medical interventions may have had clear reminders of the negative effect that the bombing had had.

It is also possible that these patients did not achieve as well as non-injured patients simply because of the lack of integration of medical and psychological treatments. In support of this view, there is growing evidence to suggest that collaborative care models that include multifaceted interventions (e.g., surgical intervention, case management, pharmacotherapy, and psychotherapy) within severe physical trauma populations yield more positive long-term mental health outcomes than usual care models (i.e., surgical interventions and pharmacotherapy; Zatzick, et al., 2004). Douglas Zatzick and colleagues suggested during my visit to Harbvorview Medical Centre that the stepped provision of mental health services commencing in the acute surgical phase of recovery reduce alcohol abuse and dependence during the year after injury, compared with usual care trauma patients receiving emergency, surgical, and primary care interventions (Zatzick, et al., 2004). Notably, Zatzick and colleagues (2004) demonstrated that the prevention of PTSD in collaborative care patients relative
to usual care patients coincided with the initiation of cognitive behavioural treatments three months post injury. Interestingly, these positive results were achieved when the mental health practitioner was not directly working with the inpatient trauma team on a daily basis suggesting that if trauma patients are referred for collaborative intervention at discharge they may receive benefit.

An alternate stepped model of acute mental health intervention for traumatic injury survivors that is embedded within injury health service systems was presented at the International Society of Traumatic Stress Studies (ISTSS) meeting in Baltimore in 2007 by Meaghan O'Donnell's group. The stepped care health service model of early psychological intervention identifies and targets individuals who are in the early stages of their disorder with the aim of preventing a chronic course and escalation of symptom severity (O'Donnell, et al., 2008). Within the model, traumatic injury survivors are screened to identify those vulnerable to poor psychological adjustment, individuals deemed to be at risk are monitored, and then are offered early intervention if they remain symptomatic after four weeks. O'Donnell et al (2008) propose that initial psychological screening could occur prior to discharge by a care coordinator who would notify psychological/psychiatric services when a patient obtains results that go over an established threshold. Patients deemed to be 'at risk' would then be telephoned at one month post injury and screened using standardized self report measures for PTSD, anxiety, and depression. Individuals who score above diagnostic cut-off points, or those reporting significant distress that is contributing to impairment in social or occupational functioning would be offered a more in-depth clinical face-to-face assessment. Only those patients who attend the clinical assessment and deemed appropriate would then be offered CBT treatment. To cater for the complexity of issues that a traumatic injury survivor may present with such as pain, adjustment issues, ongoing medical problems and interventions, and financial strain a flexible approach to empirically supported manualised treatment would be offered.

The stepped collaborative care model proposed by O'Donnell and colleagues (2008) shows great promise for maximizing clinical outcomes within a resource limited environment such as WA. Although there are immediate challenges to the implementation of this model in WA at this point in time. Firstly, there is inadequate staffing to support the implementation of routine inpatient screening for all trauma admissions and telephone follow-ups of those at risk. Secondly, training for clinical psychology staff is required in the specialist assessment and intervention for ASD and PTSD. Thirdly, physical resources such as assessment materials and appropriate patient consulting areas are required for psychological therapy. Finally, nearly a third of trauma patients in WA are transferred by the Royal Flying Doctor Service from rural and remote areas. Hence, the accessibility of structured outpatient psychological interventions post discharge for patients from rural and remote areas is limited.

One possible aid to the provision of psychological treatment to patients discharged home to rural and remote areas would be the activation of a web-based approach to intervention or the use of telemedicine facilities. Using an innovative approach to the prevention and treatment of PTSD, Olff and colleagues reported promising pilot results at the 2007 ISTSS meeting from internet-based programmes that aim to reduce acute psychological distress and prevent long term PTSD symptoms in patients with traumatic injuries by providing online psychoeducation, self-directed exposure exercises, cognitive restructuring, and stress management between 2-8 days post trauma. Due to the geographical isolation of nearly a third of the trauma patients admitted to the WA Trauma Service, web-based approaches to service delivery could provide a useful alternative to structured outpatient services which are inaccessible to a third of patients discharged home in WA. In the event of limited internet access within rural home environments, internet facilities could be made available at the
nearest medical centre. The additional option of enabling patients to attend for remote outpatient psychological treatment linked to Royal Perth Hospital using telemedicine facilities could also be trialed in WA.

So far, the models of service delivery that have been presented have focused on the prevention and treatment of traumatic stress reactions to traumatic injury. Comparatively less research has reported on the other types of psychopathology, adverse social and financial outcomes, pain and physical disability, and adjustment to prolonged hospitalization and rehabilitation that severe traumatic injury is most often associated with. Discussions with Clinical Assistant Professor Jeff Sherman within the Department of Rehabilitation Medicine at Harborview Medical Centre highlighted the universal lack of clarity and consensus among mental health practitioners working in acute and rehabilitative medical settings in terms of role definition. As demonstrated during my visit, the role of the Clinical Psychologist in Trauma settings extends beyond screening for, and treating post traumatic stress reactions. Very often, the exacerbation of premorbid psychopathology, as well as grief, adjustment, and severe pain are correlates of traumatic injury. Despite considerable literature reporting longer term psychological outcomes following traumatic brain injury, spinal cord injury, back injury, and amputation together with strong evidence to suggest the role of acute psychological function in determining both psychological and physical outcomes (Pincus, Burton, Vogel, & Field, 2002), there is a dearth of research that has examined the potential role of clinical psychology within the acute surgical settings. This is an area of significant need which warrants further investigation, in view of the potentially powerful impact that early targeted psychological intervention could have on the development of persistent pain, physical disability, and psychopathology following traumatic injury.

5.2. Risk Factors for Adverse Psychosocial and Physical Outcomes.

A considerable body of research has attempted to identify risk factors for PTSD following traumatic injury. Relatively less research has attempted to examine psychological and physical risk factors for a range of post-traumatic outcomes, social, and physical health outcomes. As part of my Churchill fellowship I visited research centres in the United Kingdom and the United States that have examined psychological and physiological predictors of post traumatic psychopathology and pain following traumatic injury.

Two large meta-analyses of over 60 studies have identified factors that are most commonly associated with the development of PTSD (Brewin, Andrews, & Valentine, 2000; Ozer, Best, Lipsey, & Weiss, 2003). In general, more is known about the potential predictors of PTSD occurring during or after exposure to a variety of traumas (Brewin, et al., 2000). Peritraumatic and posttraumatic variables including trauma severity, traumatic stress symptoms, perceived life threat, dissociation, reported lack of social support after the event, and subsequent life events had the strongest association with PTSD (Brewin, et al., 2000; Ozer, et al., 2003). The most consistent predictors of PTSD following traumatic exposure have been found to be psychiatric history, childhood abuse, and family psychiatric history (Brewin, et al., 2000). Following a meta-analyses of 14 separate risk factors for PTSD in which the moderating effects of sample and study characteristics were investigated, Brewin and colleagues (2000) caution against building a general vulnerability model for PTSD because of the heterogeneity of the disorder in different settings. A model in which the impact of pretrauma factors interact with trauma severity or trauma responses increase the risk of PTSD is suggested with a recommendation that further research investigate the relationship between pretrauma risk factors and immediate trauma responses.
Within a hospitalized traumatically injured population, assessing both pretrauma risk factors and immediate trauma responses can be difficult to the potentially confounding effects of medication, pain, physical symptoms, and the ward-based assessment environment which can collectively distort symptom reporting. Upon discussion of these factors with Chris Brewin and his research team, it was suggested that initial psychological screening for vulnerability be conducted as late as possible during the inpatient admission just prior to discharge within the first month of trauma exposure to reduce the influence of these potential confounds. Home based assessments post discharge were also advocated to encourage compliance with follow-up data collection which has been observed to be particularly difficult in traumatic injury patient populations.

Other researchers have identified biological markers that are linked with PTSD following traumatic injury. Elevated heart rate shortly after traumatic injury has been associated with PTSD in many studies (Bryant, Marosszeky, Crooks, & Gurka, 2004; Shalev & Freedman, 2005). However, the accuracy with which heart rate predicts PTSD is only modest and therefore, should not be used to screen for PTSD in public health settings (Bryant, 2006). There is considerable interest in neuroendocrine (e.g., cortisol, catecholamines) markers of PTSD risk following traumatic injury within Israel Liberzon and Sam McLean’s research group in Ann Arbor as well as Roger Pitman’s PTSD laboratory in Boston. Interestingly, the consensus at both sites was that research findings to date regarding the potential role of neuroendocrine function in the evolution of PTSD were largely inconsistent and difficult to interpret within the context of traumatic injury due to the significant confounds associated with physiological changes resulting from physical trauma, medication, and surgery. Promising new directions, however, were discussed within the area of identifying genetic markers of vulnerability and the secondary prevention of PTSD at admission using pharmacological approaches. This research is continuing and results are inconclusive at this stage.

A further significant risk following traumatic injury is persistent pain. Little is known about the aetiology of chronic pain. While there is evidence to suggest that more intense post surgical pain is linked with the evolution of chronic pain (Perkins & Kehlet, 2000), the mechanisms underlying the transition from acute to chronic pain are unclear. The progression of acute to chronic pain among major trauma patients could be explained, in part, by psychological factors. There is evidence to indicate that psychological factors such as maladaptive attitudes and beliefs, premorbid psychiatric history, lack of social support, increased emotional distress, substance abuse, and compensation status may be among the best predictors of the transition from acute injury to chronic disability (Pincus, Burton, Vogel, & Field, 2002). Whereas physical factors such as severity of injury do not appear to contribute much to the prediction of pain and pain disability chronicity (Turk & Okifuji, 2002). Sam McLean and Israel Liberzon in Ann Arbor highlighted the potential role of the central nervous system in mediating the relationship between acute psychological distress and subsequent pain experiences. In their recent literature review of whiplash-associated disorders, fibromyalgia, and PTSD among motor vehicle survivors they identified consistent evidence pointing to the important potential role of the physiological stress response system, that is highly sensitive to cognitive and emotional modulatory input, in the evolution of chronic pain syndromes (McLean, Clauw, Abelson, & Liberzon, 2005).

However, results obtained from most studies conducted to date must be interpreted cautiously due to methodological shortcomings including the predominance of retrospective designs, small and unrepresentative samples, use of univariate models, and inadequate descriptions of predictors and outcomes. Further research is required to examine prospectively using a longitudinal design the interaction between acute
psychological stress, central nervous system responses, and chronic pain development.

5.3. Early Mental Health Interventions

Relatively less research has examined the efficacy and effectiveness of early psychological intervention following traumatic injury compared with the considerable body of literature that has reported on the effects of psychological treatment for chronic PTSD and depression following traumatic injury. Considering the mental health model of service delivery in WA is embedded within the trauma service and the first point of contact will likely occur within the inpatient setting, it is important to review the evidence pertaining to the most commonly employed early interventions in trauma settings. Early mental health interventions administered in the immediate aftermath of trauma exposure have typically focused on psychological debriefing, and in more recent times, psychological first aid approaches. Trauma focused cognitive behavioural interventions are recommended as the gold standard intervention within the first six months post injury to reduce PTSD symptoms. Moving beyond PTSD, routine early psychological intervention targeting alcohol intake reduction in traumatic injury populations has also been recommended. A brief overview of the key findings pertaining to debriefing, psychological first aid, early trauma focused CBT, and alcohol reduction interventions in the context of traumatic injury will be outlined.

During the 1980s there were calls for critical incident stress debriefing to be routinely provided following adult trauma (Mitchell, 1983). However, systematic reviews of randomized controlled trials have revealed neutral clinical effects for any brief single session intervention within 1 month of a traumatic event, and also highlighted the possibility that single session debriefing could cause harm (Rose, et al., 2005; van Emmerick, Kamphuis, Hulsbosch, & Emmelkamp, 2002). A recent study of psychological debriefing found psychoeducational debriefing to have a neutral effect but emotional debriefing to be associated with poorer outcome in individuals with significant hyperarousal symptoms (Sijbrandij, Olff, Ratsma, Carlier, & Gersons, 2006).

Although psychological debriefing is the most common form of early intervention for recently traumatized people, there is little evidence supporting its continued use with individuals who experience severe trauma. Rose and colleagues (2001) concluded following their Cochrane review that there is no evidence for the efficacy of single session psychological debriefing provided soon after exposure to trauma and recommended that compulsory debriefing of individuals following traumatic events should cease. It has subsequently been argued that the provision of trauma intervention to all trauma survivors is “impractical, inefficient, and arguably unethical” (Gray & Litz, 2005, p191). Rather, intervention should target those who develop post trauma psychopathology.

Based on the most current evidence presented at the 2007 ISTSS annual meeting in Baltimore, there is general consensus that psychological first aid is an appropriate initial intervention but that it may not serve a preventative function in reducing the incidence of PTSD. Individuals should be provided with information about possible reactions that they might have, what they can do to help themselves, how they can access support from those around them, and how to access further help if necessary (Bisson, Brayne, Ochberg, & Everly, 2007). It is also recognized that individuals can access and benefit from early psychological intervention if they are experiencing continued symptoms a month or more after a traumatic event, though individuals with extreme reactions can benefit when psychological treatment is provided earlier. Bisson and colleagues (2007, p.1018) state that “people cope with stress in differing ways, and no formal intervention should be mandated for all exposed to trauma.”
Notably, the findings presented at the 2007 ISTSS meeting and in Bisson’s work are far removed from routine clinical practice in many trauma settings.

Within many medical trauma settings it is often assumed that patients with severe injuries, injured as a result of interpersonal violence, exposed to grotesque events, or exposed to the death of friend or relative should receive counseling as soon as practical once medical stability is achieved. For example, discussions with Ken Boffard revealed that trauma counselors are employed 24 hours a day at Johannesburg General Hospital in South Africa to provide support to families and trauma victims within the immediate aftermath of traumatic injury, particularly when the injury is severe enough to warrant resuscitation. Similarly, patients are often referred to chaplaincy, social work, or nurse counselors in order to access debriefing and counseling during the acute aftermath of trauma exposure at many Australian trauma centres. While the content of the counseling provided to Australian and South African patients during the acute aftermath of trauma exposure is unclear, it would appear that the dissemination of most recent findings advocating for the provision of psychological first aid rather than debriefing during the acute phase post injury is required. Moreover, the central management of mental health care within WA for traumatic injury survivors, and training of local mental health care providers is also imperative to ensure consistent and transparent evidence-based approaches to service provision.

An example of how one traumatic stress service centralized the provision of mental health services following trauma exposure was acquired during my visit to the Rivers Centre at the Royal Edinburgh Hospital. In addition to accepting referrals from the public health system in Scotland, the Rivers Centre has secured private contracts with all local emergency services (e.g., police, fire). Personnel working within these services who are exposed to trauma are screened by the Rivers Centre using a stepped care approach to enable only those who are symptomatic to access evidence based psychological intervention in a timely fashion that is tailored to individual needs. Within WA, the implementation of such a model could have important implications for the improvement of psychological and work-related outcomes. Currently, many patients who have sustained injuries within the workplace report being seen within the first few days post injury, and then frequently during the first month by counselors and psychologists acting for the employer. Monitoring the content and frequency of these interventions is difficult within the WA Trauma Service because of the high patient admission rates and correspondingly low mental health staffing, the ‘invisibility’ of services purportedly provided during the inpatient recovery phase due to the prohibition of intervention from non-hospital employees, and lack of communication between non-hospital employees and the RPH treating team. Based on best practice evidence, frequent psychological intervention during the acute phase post injury is not aligned with the most recent expert consensus at the 2007 ISTSS, nor does it comply with the Australian, British, and United States national guidelines for the management of psychological responses to trauma exposure. Clearly, dissemination of the most recent evidence based guidelines for managing acute trauma exposure associated with traumatic injury is required.

There is well established efficacy for psychotherapeutic interventions for treating PTSD within three months of the traumatic event (e.g., Bryant, Harvey, Dang, Sackville, & Basten, 1998; Ehlers et al., 2003). Guidelines derived from these studies have been developed correspondingly (e.g., Australian Centre for Posttraumatic Mental Health, 2007; Foa, Keane, & Friedman, 2000). Individual trauma-focused cognitive behavioural therapy, eye movement desensitization and reprocessing (EMDR), stress management and group trauma-focused cognitive behavioural therapy are effective in the treatment of PTSD (Bisson & Andrew, 2007). In their 2007 Cochrane review, Bisson and Andrew reported that other non-trauma focused psychological treatments
did not reduce PTSD symptoms significantly. Despite this consensus, many individuals with PTSD go untreated or do not receive intervention that is consistent with evidence based guidelines for care (Katon, Zatzick, Bond, & Williams, 2006).

One of the primary difficulties with implementing evidence based treatments such as trauma focused cognitive behavioural therapy in medical trauma settings, is the myriad of social and medical factors that preclude successful engagement in the treatment process. This was aptly identified by Douglas Zatzick at Harborview Medical Centre who reported experiencing significant problems with recruitment and retention of participants for randomised controlled trials of manualised treatments for PTSD following traumatic injury. In his previous work he has identified that treatments derived from efficacy trials developed in mental health specialty settings may require adaptation to be delivered in real-world early intervention settings (Zatzick & Galea, 2007). He went on to identify the need for treatment programs and systems to be developed within the context of trauma settings to maximize external validity, and treatment to be provided as required, and when required. Unlike controlled efficacy trials, the recruitment of trauma patients takes place in an opportunistic fashion once the medical and social issues have stabilized. In support of this argument his research has demonstrated that patients are mainly concerned with physical health and bodily pain in the days and weeks after injury, and psychological concerns including depression and anxiety are less prevalent within the days after the injury but steadily increase over the following months (Zatzick, et al., 2002; Zatzick, et al., 2007).

Beyond the risk of developing psychopathology, there is also significant risk of trauma recidivism among traumatic injury survivors. Among the traumatic injury population, alcohol abuse and dependence is one of the leading risk factors for traumatic injury (Gentilello, Donovan, Dunn, & Rivara, 1995; Soderstrom, Smith, Dischinger, et al., 1997). I was introduced to an innovative and powerful brief alcohol intervention for patients at risk of ongoing alcohol-related injury by Chris Dunn at Harborview Medical Centre. In a randomized controlled trial at a Level 1 trauma centre in which 46 per cent of 2524 patients screened were deemed to be at risk of chronic alcohol abuse, Gentilello and colleagues (1999) demonstrated that an inpatient one-session motivational interview with a psychologist was superior to a usual care control condition in reducing alcohol intake and frequency of injuries requiring hospital admission at 12 months post injury. The results of this study formed the basis of a submission to the American College of Surgeons (ACS), which resulted in ACS now requiring all Level 1 trauma centres in the US to employ routine alcohol screening and intervention for accreditation purposes. This development has significant implications for Australian trauma centres where routine blood alcohol screening, formal assessment of alcohol disorders using screening questionnaires, and the provision of alcohol counseling is not routinely conducted. Further examination of the clinical utility and social and economic outcomes of implementing routine alcohol screening and intervention with Australian trauma settings is required.

5.4. Challenges to Providing Mental Health Care Following Traumatic Injury

There are significant challenges to the provision of gold standard mental health services for traumatic injury patient groups in Australia. Firstly, widespread dissemination of best practice models of early intervention is still yet to translate to feasible models of mental health care embedded within the public health care system. Secondly, the provision of mental health care services to rural and remote Australians who have been traumatically injured is yet to be tackled in a systematic way. Thirdly, the mental health outcomes and needs of minority groups such as indigenous Australians, who constitute a significant proportion of trauma admissions, has not been
examined. Finally, there is a lack of recognition of the impact of frequent trauma exposure on staff working in medical settings and emergency personnel (e.g., ambulance staff, fire, police) and correspondingly, no statewide specialist mental health service to cater for the needs of staff exposed to traumatic injury on a daily basis. The recommendations provided by trauma experts visited during the course of my fellowship will be outlined in turn as they pertain to these four significant challenges.

Dissemination to increase awareness of traumatic stress reactions, as well as improve knowledge of the fact that routine interventions for everybody is not appropriate, that some individuals will require specialist input, and that there are effective treatments available is vital to the success of implementing a best practice mental health plan for WA trauma services. Bisson and Cohen (2006) recommend a multilevel dissemination strategy that involves traumatic stress experts involved in nongovernmental organizations and government planning, developing contracts at various levels, and trying to raise the profile of the traumatic stress field through publications, presentations, and involvement with the media. Without awareness of the mental health issues arising following trauma exposure, health and social care decision makers are unlikely to fund improved services in the future. Bisson and Cohen (2006) advocate a whole systems approach in which partnerships are forged with providers of other health services such as emergency services, primary care workers, and trauma specialists who in turn exert influence on the groups responsible for funding decisions.

My visit to the Northern Ireland Centre for Trauma and Transformation (NICTT) highlighted the importance and value of integrating trauma focused mental health services with community based support services. Under the direction of Kate Gillespie, the NICTT responded to the Omagh bombing by facilitating the establishment of mental health guidelines for the community, leading the early intervention planning and dissemination efforts, and ensuring continued government funding. Immediately following the Omagh bombing, it was recognized that natural support systems (e.g., families, chaplains) were already stretched and affected by the bombing, so the primary aim of NICTT was to integrate other community support services. The NICTT achieved this through the development of collaborative partnerships with government organizations, media, churches, community groups, youth services, employers, schools, and with individual patients following the 1998 Omagh bombing. These partnerships were achieved through the provision of support, education, and training from the NICTT.

Within WA there is a paucity of traumatic stress specialists trained in evidence based treatments such as trauma focused cognitive behavioural therapy. Bisson and Cohen (2006) highlight the importance of training less experienced therapists in trauma focused cognitive behavioural therapy. One such model which has yielded positive results has been used in Cardiff, Wales. A cognitive behavioural therapist employed by the traumatic stress service provides trauma counselor training. Groups of six or eight health professionals from different backgrounds with limited previous training in CBT are given 1.5 hours training in trauma-focused CBT per week for 6 weeks with the assistance of a prolonged exposure manual (Foa, Dancu, & Hembree, 2002), and a video-training package (Creamer, Forbes, Phelps, & Humphreys, 2004). Trainees are also given background reading material, which is discussed during the sessions and role-playing of cognitive behavioural techniques within the group is conducted to enhance skill development. Following the 6 week training course the individuals continue to attend weekly supervision for their treatment of an individual with PTSD of mild severity. Due to this training initiative, the traumatic stress service in Cardiff is able to treat more individuals and maintains a group of trained trauma counselors should a disaster occur. This initiative could also be trialed in WA, where there are few
community based practitioners trained in evidence based trauma focused mental health approaches. Support for ongoing training of mental health staff is imperative to the development of a statewide mental health service.

The paucity of research that has investigated the long term physical, social, and psychological outcomes of traumatic injury among the rural and remote populations, including indigenous patients, was highlighted as part of my presentation at the Harborview Injury Research and Prevention Centre. It was suggested by the team attending this forum that data from the WA Trauma Registry be accessed to enable statistics regarding type of injury, physical outcome, and discharge destination to be generated for the indigenous patient group admitted to RPH. Moreover, funding to support research investigating the provision of improved health care to rural and remote indigenous communities should be sought from state and federal government bodies who until now, have not targeted the impact of physical trauma on indigenous communities. Significant needs also exist for non-indigenous Australians in rural and remote areas who are not routinely screened, monitored, or treated due to their inability to access mental health care. In line with the more promising results reported by Olff and colleagues at the 2007 ISTSS meeting, investigation of the efficacy and effectiveness of web based interventions in Australian rural samples of traumatic injury survivors is required to determine the future value of such approaches in reaching these patients.

There is very little published literature that has examined the impact of high trauma exposure among staff working in trauma centres, and in prehospital roles (e.g., paramedics, emergency services). While at Johannesburg General Hospital I discussed the impact of chronic trauma exposure among staff with Ken Boffard (Head of Trauma Service, Milpark Hospital; Director Surgical Division, Johannesburg General Hospital) and Sarah Maxwell (Clinical Psychologist). In a clinical audit of 38 staff members working at a trauma unit in South Africa, staff reported a significant level of post traumatic symptoms as a result of critical incidents that they had been exposed to within the last six months, and at least half of the respondents also reported a high degree of professional burnout. Yet interestingly, discussions with medical and nursing staff working at these hospitals revealed that most staff did not report experiencing symptoms of trauma or burnout. Discussions with psychologists, senior nurses and medical practitioners in Johannesburg regarding the discrepancy between research findings and actual reporting led to hypotheses that due to the high prevalence of interpersonal trauma (e.g., gun shot, assault) and history of political violence within South Africa, “trauma” is normalized. Johannesburg General Hospital admits approximately 1000 trauma patients per month mostly as a result of interpersonal violence. Consequently, in order to maintain a view of self that fosters resilience and enables active problem-based coping strategies to be employed following trauma exposure, the psychological reactions to traumatic exposure are minimized, and strong and available social support networks within families and the work environment bolster active coping efforts.

The impact of cultural factors on the development of PTSD following traumatic injury is only just starting to be formally recognized. Ulrich Schnyder presented a paper at the 2007 ISTSS meeting in Baltimore reporting that the incidence of PTSD among traumatic injury survivors in Switzerland was lower than that reported in the scientific literature. At six months post injury only 3.1% of 255 patients who had been admitted to hospital following accidental injury reported PTSD symptoms. Similarly to the views of the South African trauma specialists, it may be that the dense social networks in Switzerland act as protective factors by enhancing patients’ sense of control, and there may be differences in the likelihood of patient’s disclosing psychological symptoms and
6. Conclusions

- Stepped collaborative mental health care interventions appear to be the most economically viable evidence based approach to providing trauma focused mental health care to trauma patients.
- Continued education is required for key stakeholders invested in providing health care services to traumatically injured patients in regards to the impact of psychological well being on mental and physical, social, and economic outcomes.
- The implementation of state-wide mental health services for traumatic injury survivors requires greater integration of acute surgical care, rehabilitation, and community based health services.
- Web based interventions and telemedicine approaches may provide a useful vehicle for reaching rural and remote populations who to date, have been underserviced compared to their metropolitan counterparts.
- Relative to other Australian states and the international community, very little clinical research has been conducted in Western Australia (WA) examining the efficacy and effectiveness of mental health interventions for traumatic injury populations. Yet, many interventions supported by controlled efficacy trials are not clinically viable or feasible in WA due to the unique challenges presented by the heterogenous trauma population serviced in WA (e.g., 30% of trauma patients from rural and remote areas). Consequently, WA trauma survivors must frequently contend with suboptimal mental health care treatment alternatives due to the limited availability and accessibility of best practice mental health care. The development and evaluation of innovative approaches to mental health care provision for trauma survivors in WA is required urgently.
- Further investigation of the factors that place individuals at risk of clinically significant post trauma and pain symptoms following traumatic injury is required to enable the optimization of currently available clinical resources.
- Little is known about the ongoing physical, social, and psychological needs of indigenous patients admitted to the trauma service and should be investigated.
- The prevalence of vicarious trauma and burn-out among staff with high levels of trauma exposure (e.g., rural ambulance workers, trauma staff) should be systematically investigated within WA where the strain of stretched resources across vast geography are likely to compound the effects of trauma exposure.
- Successful implementation of a best practice mental health service for the state-wide trauma service requires the development of a plan for long term funding for staffing, specialist professional development and training, clinical assessment and treatment resources, clinically relevant research, physical infrastructure, and administrative support.

7. Dissemination of Information

- Presentation of preliminary findings from a pilot study of mental health outcomes post trauma at the 2007 Australian Pain Society and Australian and New Zealand College of Anaesthetists Annual Scientific Meetings.
- Presentation of findings and recommendations following the Churchill fellowship at professional development seminars to all staff within the WA Trauma Service, and at a Trauma Grand Round for the wider RPH community.
- Royal Perth Hospital Public Relations Officer to facilitate the dissemination of the key outcomes of the Churchill fellowship and mental health issues among traumatic injury survivors to Royal Perth Hospital Staff, the WA Health
Department, and the broader West Australian community through local publications, newspaper, and television.

- Submission of two papers in 2007 to scientific peer reviewed journals that focus respectively on the implementation of psychological risk screening procedures for trauma patients and mental health outcomes in the acute phase following traumatic injury.
- Provision of lectures regarding psychological aspects of disasters and mental health initiatives for health professionals and emergency personnel attending the Disaster Medicine Courses coordinated by the WA Health Department Disaster Preparedness and Management Unit in 2007.
- Provision of training workshops in rural WA in April 2007 to health professionals and emergency personnel supported by the Australian College of Ambulance Professionals.

8. **Recommendations**

- Stepped collaborative mental health care models of service delivery should be assessed by the Western Australian State Wide Trauma Service to establish effectiveness, clinical utility, and feasibility.
- Psychological first aid is an appropriate initial intervention within trauma settings. Dissemination of most recent findings advocating for the provision of psychological first aid rather than debriefing during the acute phase post injury is urgently required at a statewide level.
- The central management of mental health care within WA for traumatic injury survivors, and training of local mental health care providers is also imperative to ensure consistent evidence-based approaches to service provision.
- Psychological screening of risk should occur routinely in trauma settings to identify individuals at most risk of longer term psychopathology, persistent pain, and social and occupational dysfunction.
- Collaboration with local and international experts within the field of traumatic stress and multidisciplinary rehabilitation following traumatic injury should be fostered and encouraged in view of Perth’s relative isolation and relatively limited opportunities for professional development in these specialist fields. Towards this end, this fellowship has enabled the establishment of multiple collaborations to enable advances in clinical practice and research:
  - Working with groups from US and South Africa to develop clinical and research programs designed to improve mental health outcomes and retention of staff exposed to high levels of trauma.
  - Further collaborations with South Australian, Netherlands, and Northern Ireland groups to establish community-based mental health interventions for trauma survivors with ongoing psychological distress post discharge from hospital.
  - Collaborative application for research grant funding for a multi-site trial examining predictors of adverse psychological and functional outcomes following accidental traumatic injury with Scottish group.
  - Collaboration with US groups to examine the impact of traumatic injury and management of healthcare among indigenous populations.
- Improved communication between acute surgical settings, rehabilitation medicine, and community-based health care providers (e.g., GPs) should occur to enable the provision of a coordinated approach to health care following traumatic injury.
- Delivery of psychological interventions to rural and remote populations using telemedicine technology should be implemented and evaluated.
• Prospective evaluation of the prevalence of mental health issues among indigenous trauma patients should be conducted to establish the need for services.

• Web based psychoeducation and psychological interventions for trauma patients should be developed and evaluated for WA trauma patients as an accessible treatment alternative.

• Routine blood alcohol screening for all patients admitted to RPH with traumatic injuries should commence. On this basis, patients with blood alcohol levels exceeding 0.05 should be identified and screened for alcohol abuse and dependence using standardized questionnaires, and provided with single-session inpatient motivational interviewing by a Clinical Psychologist if deemed to be at risk of alcohol abuse or dependence.

• Active collaboration with the Trauma Verification Sub Committee, a sub-committee of the Trauma Committee of the Royal Australasian College of Surgeons, should be established to have the impact of alcohol abuse and dependence on trauma recidivism addressed by the College, with a view to introducing trauma centre accreditation standards for alcohol screening and intervention within Australian trauma centres.

• Clinical Psychologists working within Trauma settings should be trained in line with current evidence based guidelines for managing PTSD, at a minimum, in the management of acute trauma reactions using psychological first aid approaches and chronic PTSD using trauma focused cognitive behavioural therapy. In view of the high prevalence of substance abuse issues in trauma populations training in motivational interviewing for alcohol abuse and dependence for Clinical Psychologists working in trauma settings should be supported. Training in evidence based cognitive behavioural interventions for acute and chronic pain management should also be provided routinely in view of the significant issues associated with pain-related disability within traumatic injury populations.

• The development and evaluation of psychological group interventions designed to foster resilience among staff exposed to high levels of trauma should be a matter of priority.

• Funding should be sought urgently for physical infrastructure within the hospital environment (e.g., suitably furnished private consulting rooms that enable the standards of the Australian Psychological Society Code of Conduct to be met; private office space for administrative tasks; clinical teaching and supervision, assessment, and training materials), specialist training (e.g., trauma focused cognitive behavioural therapies, motivational interviewing for substance abuse), and clerical support for mental health practitioners working in trauma settings.

• Post graduate research within the state wide trauma service of WA should be encouraged to further advance current knowledge regarding the implementation of evidence based mental health approaches in “real world” settings.

• Informal and formal education opportunities should be sought to educate staff about the psychological impacts of traumatic injury, and first-line treatment approaches.
9. References

Australian Centre for Posttraumatic Mental Health (ACPMH). Australian guidelines for the treatment of adults with acute stress disorder and posttraumatic stress disorder 2007. Melbourne, Australia; ACPMH.


