An Evaluation of Western Australian Nurses’ Trauma Nursing Knowledge and Skills Following Participation in the Trauma Nursing Core Course (TNCC)

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Master of Clinical Nursing

This thesis is presented for the degree of Doctor of Philosophy of

The University of Western Australia

Faculty of Health and Medical Sciences

Discipline of Surgery

2017
Thesis Declaration

I, Min Ding, certify that:

This thesis has been substantially accomplished during enrolment in the degree.

This thesis does not contain material which has been accepted for the award of any other degree or diploma in my name, in any university or other tertiary institution.

No part of this work will, in the future, be used in a submission in my name, for any other degree or diploma in any university or other tertiary institution without the prior approval of The University of Western Australia and where applicable, any partner institution responsible for the joint-award of this degree.

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The research involving human data reported in this thesis was assessed and approved by The University of Western Australia Human Research Ethics Committee. Approval number: RA/4/1/5192.

The work described in this thesis was funded by a grant from the Chief Nursing and Midwifery Office, Department of Health, Western Australia. Grant number: F-AA-04364.

The thesis contains published work and/or work prepared for publication, all of which has been co-authored. Each co-author has agreed to the inclusion of the manuscript in this thesis. The bibliographical details of the work and where they appear in the thesis are outlined below.

Chapter 2 is an expanded version of this paper.

I confirm that permission has been obtained from all co-authors to include this manuscript in this thesis.

Date: 06/07/2017
Abstract

Trauma or injury is one of the leading causes of death in Australia (Curtis et al., 2012) and globally (World Health Organization [WHO], 2013), and leads to moderate to severe disability affecting over 45 million people in the world each year (Raja & Zane, 2012). According to the Australian Institute of Health and Welfare (AIHW) (2016a), nearly 7.6% of all deaths occurring in Australia over 2011–2012 and 5.3% of all hospitalisations in 2013–2014 resulted from injury; injuries cost $3.4 billion in Australia in 2004, totalling 7% of gross health expenditure (AIHW, 2010). Recognising the high health expenditure and significant impact caused by injury, the Australian Federal Government has designated injury prevention and control as a national health priority (AIHW, 2012b).

Trauma patients experience significantly lower mortality or morbidity when treated at a specialised trauma centre equipped with well-trained trauma health professionals (Raja & Zane, 2012). The WHO essential trauma care guidelines also emphasise the importance of trauma education for health care in optimising trauma patient outcomes (WHO, 2004). Trauma nursing is an emerging specialty distinct from emergency nursing (Beachley, 2005). While there are a number of emergency nursing courses available in higher education institutes (HEI), the development of trauma nursing education remains in its infancy.

The Trauma Nursing Core Course (TNCC) is an internationally renowned continuing professional development (CPD) course for nurses working in the area of trauma developed by the Emergency Nurses Association (ENA) in the US. The TNCC aims to offer nurses competency-based trauma nursing care knowledge and psychomotor skills. The two-day course provides lectures on trauma assessment, management and specific clinical care. A written and psychomotor assessment to successfully complete the course has set the standard for international trauma nursing assessment; however, there is no empirical research regarding evaluation of this course, the absence of which continues to be a challenge for health care providers and educational bodies when allocating resources.

The Western Australian Trauma Education Committee (WATEC) has procured a license to deliver the course in Western Australia (WA), and by the end of 2014, more than 960 nurses had attended the course since its implementation in 2009. This thesis presents an
outcome evaluation study to evaluate the perceived effectiveness of the TNCC in improving WA nurses’ knowledge and skills application in the practice of caring for trauma patients. Kirkpatrick’s training evaluation model is applied as the theoretical framework to guide this study. This descriptive study’s research design involved both quantitative and qualitative methods including surveys and interviews to collect data across three phases:

- **Phase I** – Preliminary evaluation of TNCC participants’ course evaluation data from 2009–2012
- **Phase II** – Retrospective evaluation of TNCC participants’ (2009–2013) course evaluation and perceived knowledge and skill outcomes
- **Phase III** – Prospective evaluation of TNCC participants’ (2014) course evaluation and perceived knowledge and skill outcomes, adopting a pre/post-course participation survey design.

Results showed overwhelmingly positive evaluation of the TNCC in relation to course content, delivery and relevance to practice. The study concludes that the TNCC was reported to have a positive impact on improving WA nurses’ trauma care knowledge, skills and practice, which could contribute to better patient outcomes. Recommendations to local government and educational bodies as well as recommendations for future research are described.
Acknowledgements

I would like to acknowledge the contributions and support of the following:

First of all, the Almighty God, my dear Father in Heaven, the source of wisdom, through those people who helped me, I saw His help. Without faith in His presence in my life, this work would not have been done.

I would like to thank my three supervisors: Professor Jeffrey M Hamdorf, Dr Helene Metcalfe and Dr Olivia Gallagher, without whose support, patience, encouragement, guidance and supervision, I would not have completed such an undertaking. I cannot imagine having any better supervisors and mentors for my doctoral study.

This study received funding from the Chief Nursing and Midwifery Office, the Western Australia Department of Health and I myself have benefited from the Australian Postgraduate Award (APA) and the UWA (University of Western Australia) Safety Net Top-Up scholarship. Special thanks to the School of Surgery, in particular the Clinical Training and Evaluation Centre (CTEC), UWA, for their ongoing support in many aspects of my study, including but not limited to finance, computer, administration, IT, statistical and staff support.

All staff in the CTEC have been so brilliant; they have provided me with more kinds of support and help than I could imagine, making me feel very blessed to have completed this research in what must truly be one of the best research venues in the world.

Special thanks to the WATEC, the administrator of the Trauma Nursing Core Course (TNCC) in Western Australia, and in particular Ms Julie Williamson, for providing expert review and distributing the research evaluation tools throughout the research process.

My thanks go to Royal Perth Hospital, in particular, to the nursing management team of the Coronary Care Unit, for giving me flexible working hours to help me maintain a work, study and life balance.

My thanks and gratitude go to Ms Carleen Ellis in the School of Surgery, UWA, and to Mrs Judy de Grauw, who each kindly donated their own time and expertise to proof read my thesis.
Many thanks go to Miss JiaLi Feng, who has kindly provided statistical help for the data analysis.

I owe tremendous thanks to my husband, Jack, for his endless love, patience, encouragement and perseverance, without which I could not have run so far.

Thanks to my late father who is unfortunately no longer able to see his beloved daughter’s achievement. His spirit of learning for life, striving for the best and being a person with good qualities first before doing any good work have always been the invisible big hands pushing me forward.

My mother and parents-in-law have kindly supported me with their love by always willingly taking care of my son while I was working hard on this project. I thank them wholeheartedly.

Thanks to my dearest son Paul, the most wonderful interlude to my doctoral study.

Thanks to my brothers and sisters who have been my spiritual support, helping, praying and encouraging me in these years to keep me sane.

My last thanks but not the least: to those TNCC participants who responded to my surveys and attended interviews. It was they who made this significant TNCC evaluation project possible.

This thesis benefited from the editorial advice of Elite Editing, in the matters of formatting and proof reading.

Lastly, I dedicate this thesis to my two fathers: my Heavenly Father, God in Heaven and to my earthly father, who gave me life and would be the most proud father if he was still here to see this achievement.
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Abbreviations

ACEN  Australian College of Emergency Nursing
AIHW  Australian Institute of Health and Welfare
APLS  Advanced Paediatric Life Support
ATCN  Advanced Trauma Care for Nurses
ATLS  Advanced Trauma Life Support Course
ATNC  Advanced Trauma Nursing Course
CENA  College of Emergency Nursing Australasia
CN    Clinical nurse
CPD   Continuing Professional Development
CPE   Continuing Professional Education
CTEC  Clinical Teaching and Evaluation Centre
DV    Domestic violence
ED    Emergency department
EMST  Early Management of Severe Trauma
ENA   Emergency Nurses Association
ENPC  Emergency Nurse Paediatric Course
GAS   Goal Attainment Scale
HEI   Higher education institutes
ICU   Intensive care unit
LCJR  Lasater Clinical Judgment Rubric
MIMMS Major Incident Medical Management and Support
PHTLS Prehospital trauma life support
RPH   Royal Perth Hospital
RFDS  Royal Flying Doctor Service
RN    Registered nurse
SRN   Senior registered nurse
TNCC  Trauma Nursing Core Course
TNP   Trauma Nursing Program
UWA   University of Western Australia
WA    Western Australia
WACHS Western Australian Country Health Service
<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
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<tr>
<td>WATEC</td>
<td>Western Australian Trauma Education Committee</td>
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<td>WHO</td>
<td>World Health Organization</td>
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Chapter 1: Introduction

Physical trauma presents as a wound resulting from sudden blunt or penetrating physical impact, violence or accident. Trauma severity may be minor, serious, life threatening or potentially life threatening, depending on injury type, number and location (Western Australian Department of Health, 2017b).

Road injury was in the top ten leading causes of death globally in 2015 (World Health Organization [WHO], 2017). Trauma or injury claimed 5.1 million lives in 2010 (Lozano et al., 2013). The Australian Institute of Health and Welfare (AIHW) reported that more than 11,000 deaths in Australia occurring over 2011–2012 resulted from injury (AIHW, 2016a). A single tertiary hospital in Western Australia (WA), designated the state Adult Major Trauma Service, reported more than 5,000 trauma admissions each year between 2010 and 2015 (Western Australian Department of Health, 2015). The high injury-related health care cost in Australia ($3.4 billion in 2004–2005, for example) has paved the way for injury prevention and control to become a national health priority area, designated by the Australian Federal Government (AIHW, 2012a).

The WHO has issued essential trauma care guidelines to address the importance of health care workers’ trauma education in optimising trauma patients’ outcomes (WHO, 2004). The current situation regarding traumatic injuries in Australia requires appropriately trained health professionals to follow standardised clinical trauma management principles with a multiple disciplinary approach to optimise trauma patient health outcomes (Curtis & Ramsden, 2011). In response, many hospitals and education bodies are offering a variety of continuing professional development (CPD) courses to prepare health professionals working in trauma areas to optimise trauma patient outcomes.

1.1 Background

Trauma or injury is an increasing cause of mortality and morbidity, both in Australia and globally (Curtis et al., 2012). In 2004, traumatic injury due to road traffic accidents was the ninth leading cause of death, taking 1.3 million lives globally (WHO, 2008). The AIHW (2017) reported a total of 11,192 deaths caused by injuries in Australia in 2011–2012, with unintentional falls and suicide the two main causes of injury-related deaths. Curtis et al. (2012) found that injury was the fourth most common cause of death in
Australia, with suicide, transport accidents, falls and assault the four main causes of injury. Among these, injuries caused by transport accidents declined after 1991 (Curtis, et al., 2012); however, suicide death rates have remained steady since 2004–2005 (AIHW, 2017).

There has been an increasing number of serious injuries, with 5,524 total trauma admissions to Royal Perth Hospital (RPH), the major trauma centre in WA, in 2015 (Western Australian Department of Health, 2011). Physical trauma cases resulting from domestic violence have increased from 68 in 2005 to 143 in 2015 (Western Australian Department of Health, 2015). Since 1994, the Trauma Registry at RPH has seen an overall increase of 109% in total annual trauma admissions (Western Australian Department of Health, 2015).

The impact of trauma is significant, not only in terms of economic expenditure, but quality of life. Injuries cost $3.4 billion in Australia in 2004, accounting for 7% of total health expenditure (AIHW, 2010). There was a total of 522,330 hospitalisations related to trauma over 2007–2008 in Australia, the second highest cause of hospital admissions after cardiovascular disease (Curtis et al., 2012). It is estimated that 185,050 years of healthy life are lost because of premature death or disability, 7% of the total burden of disease and injury in Australia in 2003 (Curtis et al., 2012).

Injury prevention and control has been designated a national health priority by the Australian Federal Government (AIHW, 2012b). Standardised trauma management contributes to preventable trauma mortality and morbidity (Curtis et al., 2012), and trauma centres with an organised multidisciplinary team approach to the care of trauma patients are essential to optimise health outcomes. Highly trained trauma health professionals are the core of an organised multidisciplinary team, as recognised in the WHO essential trauma care guidelines, which stress the importance of trauma education. The two most commonly attended CPD trauma courses in WA for nurses are the Western Trauma Course and the Trauma Nursing Core Course (TNCC) (Western Australian Trauma Education Committee [WATEC], 2012). The Advanced Trauma Life Support (ATLS), or the Early Management of Severe Trauma (EMST) in Australia, is a multidisciplinary trauma course that nurses can attend as observers. The TNCC, originally developed in the US, is regarded as a leading international course to educate nurses in the management of trauma patients. It is an internationally accredited and
recognised trauma course for nurses, developed by the Emergency Nursing Association (ENA) in the 1980s (Bryant, 1989). WATEC (2012) first offered the TNCC in January 2009, and by the end of 2014, a total of 967 WA nurses had participated in the course.

By the time of Massey’s (2007) review of the TNCC in 2007, it had been disseminated to 12 countries: Canada, Hong Kong, Australia, Mexico, the Netherlands, New Zealand, Norway, Portugal, South Africa, Sweden, United Arab Emirates and the UK. It has served as the international standard of nursing practice in trauma patients’ initial assessment and management, just as the Advanced Trauma Life Support (ATLS) has contributed to medical trauma education (Massey, 2007). The TNCC contains evidence-based trauma nursing knowledge, revised and updated every five years, with the current edition being the seventh. The course contents are designed to train participants in both cognitive knowledge and psychomotor skills in trauma care by combining lectures, workshops and skill stations and use of a low-fidelity simulation method. Participants must pass both a multiple-choice written test and a psychomotor skills station test to obtain the certificate.

Despite over 30 years of global dissemination, the TNCC has not been evaluated in any of the health services in which it is offered, according to the Director of the ENA (L. Wolf, personal communication, October 2, 2012). After searching diverse electronic databases including CINAHL Plus, Google Scholar, PubMed, Austhealth, Science Citation Index Expanded (Web of Science), Sciverse Science Direct (Elsevier) and OneFile (Gale), an in-depth literature review has found no empirical research regarding evaluation of this course. The absence of this evidence continues to be a challenge for health care providers and educational bodies when allocating resources not only locally in Australia but possibly in other countries. This TNCC evaluation study was conducted in response to this gap. The results and recommendations generated from the study not only provide valuable information for local government health resource allocation in the current complex health economics environment, but guide future implementation and evaluation of the TNCC in WA and around the world. Further description of the various trauma CPD courses provided in Australia are presented in the literature review.

1.2 Research Aim and Objectives

The aim of this research was to evaluate the perceived effectiveness of the TNCC in regard to WA nurses’ knowledge development and skills application in the practice of
caring for trauma patients. The specific objectives of the research were to 1) report the utilisation of the TNCC in WA, 2) evaluate participants’ experiences of the TNCC, 3) explore perceptions of knowledge and skills development following attendance at the TNCC and 4) develop and pilot a TNCC evaluation tool.

1.3 Research Questions

The following four research questions were determined to meet the aim and objectives of this study:

1. How do TNCC participants and their colleagues evaluate their trauma nursing knowledge development and skills application since participation in the TNCC?
2. How do TNCC participants and their colleagues evaluate the TNCC in terms of preparing and assisting participants to care for trauma patients?
3. How do TNCC participants and their colleagues evaluate the TNCC in terms of meeting participants’ learning needs?
4. How effective is the TNCC in improving participants’ trauma knowledge development and skills application?

1.4 Research Design

Outcome evaluation methodology was adopted as the methodology for this descriptive study, as it assesses the perceived effectiveness of the TNCC as a learning program. Kirkpatrick’s training evaluation model was used as the theoretical framework to guide the study (see Figure 1.1)—this model is a well-recognised and utilised four-level education evaluation framework, suitable to guide this descriptive study.

Both quantitative and qualitative methods were applied, using web-based retrospective surveys, interviews and prospective surveys. The study has been designed as a three-phase study. Phase I involves the preliminary assessment of TNCC participants’ course evaluation and analysed existing data from 2009–2012. Phase II is a retrospective evaluation of TNCC participants’ course evaluation and perceived knowledge and skill outcomes, analysing data from 2009–2013 collected through retrospective surveys and interviews involving both TNCC participants and senior nurse colleagues. Phase III is a prospective evaluation of TNCC participants’ course evaluation and perceived knowledge and skill outcomes, analysing data from 2014 collected by adopting a
pre/post-course participation survey design. This study commenced in 2012; hence, Cohort 1 participant group in Phase I was set as TNCC participants from 2009–2012. Phase II was completed by 2014; hence, the Cohort 2 participant group in Phase II included TNCC participants from 2009–2013. The Cohort 3 participant group comprises 2014 TNCC participants.

Figure 1.1: Kirkpatrick’s Training Evaluation Model

1.5 Significance

Trauma or injury is a significant health problem in Australia and around the world (WHO, 2017). It results in many lost lives and a significant health burden to society (Curtis et al., 2012). Evidence shows optimal first-line management of trauma patients is significant to optimise trauma patients’ outcomes, minimising deaths and disabilities caused by trauma (Curtis et al., 2012). Front-line health professionals, including nurses, require adequate specialised training in the management of trauma patients.

The TNCC provides such a CPD opportunity for nurses. However, the course has never been evaluated for effectiveness in meeting participants’ learning needs or contributing to the knowledge development and skills application of nurses. Such evaluation would provide valuable information on any potential improvement to be considered by the
international governing body, with the aim of optimising nursing trauma education globally. Results will also address gaps in the current body of evidence on the evaluation of trauma nursing courses and inform the local health authority considering trauma nursing education delivery in WA.

1.6 Thesis Overview

Chapter 2: Literature Review presents and discusses the literature on trauma nursing education globally, nationally and at the local WA level. The history and current state of trauma nursing is discussed. Trauma education, and specifically trauma nursing education, is explored, and the evaluation status of trauma nursing education assessed. An extensive search of international literature in English published over 1985–2017 is undertaken, including seminal works and those presenting an historical perspective.

Chapter 3: Methodology presents the history and evolution of outcome evaluation and explores its suitability to this study. The theoretical framework of evaluation used in this study, Kirkpatrick’s training evaluation model, is discussed and its application to this study is described. The three-phase research design is presented and the qualitative and quantitative data collection and analysis methods described. Ethical considerations are also reported.

Chapter 4: Results presents the results of the three-phase study.

Chapter 5: Discussion compares and contrasts these results against existing literature. Limitations of the study are also identified.

Chapter 6: Conclusion concludes the thesis by identifying how the four research questions are answered and the research aim and objectives achieved. Conclusions from this study are drawn and recommendations and opportunities for future research are presented.
Chapter 2: Literature Review

2.1 Introduction

The aim of the literature review is to describe the status of trauma nursing education from a historical perspective to the current day and to identify the evaluation status of trauma nursing education, especially evaluation of the TNCC. This chapter discusses the concept of trauma, the search strategy utilised, a historical overview of trauma nursing education, recent trends in trauma nursing education, and evaluation and evaluation tools for trauma nursing education. It concludes with a review of the literature, exploring the evaluation tools currently in use to evaluate the TNCC.

The concept of trauma can be defined as ‘a physical injury caused by violent or disruptive action or by the introduction into the body of a toxic substance’ or ‘a psychic injury resulting from a severe emotional shock’ (Mosby’s Medical Dictionary, 2012, p. 1798). In addition, the WHO (2008, p. 5) referred to injury as ‘the physical damage that results when a human body is suddenly subjected to energy in amounts that exceed the threshold of physiological tolerance or else the result of a lack of one or more vital elements, such as oxygen’. The term ‘trauma’ in this review only refers to physical injury.

Trauma to an individual whether causing death or disability is a global problem of significant proportions. Trauma or injury due to road traffic accidents is the ninth leading cause of death globally (WHO, 2013). According to the WHO, road traffic accidents claimed 1.24 million lives in 2010 (WHO, 2013). Also of note is that trauma results in moderate to severe disability, affecting over 45 million people in the world each year (Raja & Zane, 2012). The AIHW (2016a) reported that nearly 7.6% of all deaths occurring in Australia over 2011–2012 resulted from injury. The AIHW (2016b) further reported that 5.3% of all hospitalisations in 2013–2014 were the result of injury. This represents nearly 500,000 trauma-related hospitalisations. The financial cost of injuries was estimated at over $3.4 billion in Australia in 2004, accounting for 7% of total health expenditure (AIHW, 2010). Indeed, injury prevention and control has been designated as a national health priority by the AIHW (2012a).

It is unequivocally worthwhile to seek ways of minimising the impact of trauma. Raja and Zane (2012) showed that trauma patients have considerably lower mortality or
morbidity when treated at a specialised trauma centre equipped with well-trained trauma health professionals. This study supports the WHO essential trauma care guidelines, which emphasise the importance of health care workers’ trauma education in optimising trauma patients’ outcomes (WHO, 2004).

Trauma nursing has been defined as ‘a specialty area of nursing practice which encompasses all aspects of nursing care for the injured or those at risk of injury. The practice of trauma nursing is a holistic endeavour to provide a continuum of care beginning with prevention and encompassing prehospital, resuscitation, stabilisation, supportive care, rehabilitation, and reintegration into society’ (Trauma Nurse Network, 1988, p. 2). Trauma nursing was identified as a nursing specialty in the mid-1980s, distinct from that of emergency nursing (Beachley, 2005), thought both trauma nursing and emergency nursing can be traced to wartime experiences.

While there are a number of emergency nursing courses available in higher education institutes (HEI) globally, the development of trauma nursing education remains in its infancy. Walter and Curtis (2015) identified the development of advanced nursing programs such as master’s degrees, which may have the option to include trauma-specific subjects; however, they noted that many of these programs did not focus solely on the spectrum of specialist trauma nurse training. It seems that, currently, most of the available formal trauma nursing courses are designed for post-registered nurses. In view of this, in this literature review, the terms ‘trauma nursing education’ and ‘trauma nursing course’ refer only to the post-registration trauma courses. The term continuing professional development (CPD) is also used to identify post-registration trauma nursing education.

2.2 Search Strategy

When reviewing the current literature, the author of this study selected the following electronic databases: CINAHL Plus, Google Scholar, PubMed, Austhealth, Science Citation Index Expanded (Web of Science), Sciverse Science Direct (Elsevier) and OneFile (Gale). Key words used to focus the review included emergency nursing, trauma nursing education, history, continuing professional education and trauma nursing core course evaluation (see Table 2.1). As a historical perspective was required to explore the introduction and development of trauma nursing education, the author searched publications from as far back as 1985.
Table 2.1: Inclusion and Exclusion Criteria for Primary Studies

<table>
<thead>
<tr>
<th>Inclusion criteria</th>
<th>Exclusion criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Completed studies on trauma course evaluation, trauma nursing course evaluation</td>
<td>Studies on other CPD courses not directly addressing trauma course evaluation or uncompleted studies on trauma course evaluation</td>
</tr>
<tr>
<td>Peer reviewed journal articles and systematic reviews</td>
<td>Comments, editorials or media reports</td>
</tr>
<tr>
<td>Published in English</td>
<td>Published in non-English language</td>
</tr>
<tr>
<td>Published from 1985–2017</td>
<td>Published before 1985</td>
</tr>
</tbody>
</table>

2.3 Search Results

The search process and results are shown below (see Figure 2.1).

The initial search located 1,149 online articles and 57 publications not available online. The 1,149 online articles included 233 from CINAHL Plus, 784 from PubMed, 52 from Google Scholar, five from Austhealth, and 75 from One Search, which covered Science.
Citation Index Expanded (Web of Science), Sciverse Science Direct (Elsevier) and OneFile (Gale).

After removal of duplicates, 554 articles remained. These articles were screened by title and abstract. Papers on wound management, burns nursing care, advanced trauma nursing roles and mental health issues in trauma were excluded, leaving a total of 160 full text articles regarded as the most relevant articles to the search terms and review purpose. These 160 articles were assessed against the inclusion and exclusion criteria, with a total of 17 studies judged as meeting the inclusion criteria. This included nine quantitative studies, seven qualitative studies and one review. Among them, 14 discussed trauma course evaluation and three explored trauma nursing course evaluation. Analysis of the findings from these papers identified two themes: the historical evolution of trauma nursing education and the evaluation of trauma nursing education outcomes.

Although the history, evolution and development of trauma nursing education has been discussed extensively by Beachley (2005), few reports on trauma nursing education evaluation exist (Patient, 2007). In recent years, there has been considerable discussion on developing the role of advanced trauma nurses to include disaster nursing, domestic violence management, trauma systems, team training and simulation. The ATLS course for physicians has been widely reported, cited and evaluated since the 1980s (Ali et al., 1993).

In contrast, evaluation studies conducted on trauma courses are rare (Baird, Kernohan, & Coates, 2004; Gautam & Heyworth, 1994). Indeed, a very limited number of reports exist on the evaluation of trauma nursing education (Patient, 2007). The lack of strong evidence to prove the effectiveness of trauma education on patient outcomes is a widely held concern among many authors (Baird et al., 2004; Jordan, 2000). A summary of results from reviewing the limited number of trauma course or trauma nursing course evaluation studies appears in Appendix 1.
2.4 Trauma Nursing Education – Historical Overview

2.4.1 A global perspective

Trauma nursing education varies globally with country income levels. The literature suggests that the US has been leading the trauma specialty and education development since the 1950s (Boyd, 2010).

As early as 1989, Beachley (1989) identified trauma nursing as a developing specialty. Later, Beachley (2005) noted major American historical benchmarks that contributed to the evolution of trauma nursing as a specialty. From un-trained nurses during the Revolutionary War (1775–1783) to trained nurses during the Civil War (1861–1865), trauma nursing was not given recognition as a specific field of nursing (Beachley, 2005). This generalisation continued through subsequent stages of formal nurse training, including the establishment of nursing schools and military deployment of nurses during World Wars I and II, the Korean and Vietnam wars and Desert Storm (Beachley, 2005).

Although trauma nursing as a specialty developed from military nurses’ knowledge and experiences, there was also growing recognition that civilians needed trauma care and civilian nurses needed trauma education (Beachley, 2005). This fostered the establishment of the trauma system, whereby trauma centres and trauma associations were established, solidifying the formation of the new specialty (Beachley, 2005).

The foundation of the ENA in 1970 marked the official commencement of trauma nursing, further confirmed by the emergence of the first two international trauma nursing courses, TNCC and the Emergency Nurse Paediatric Course (ENPC) in the 1980s (Beachley, 2005). These trauma courses became the main sources of education for registered nurses seeking international standardised trauma knowledge and skills (Massey, 2007). Other indicators of trauma nursing as a specialty include the appearance of specific trauma nurse roles during the 1970s and 1980s and the creation of various trauma nurses’ organisations, such as the Trauma Nurses Network and the Society of Trauma Nurses in the US.

Canada took advantage of its proximity to the US to benefit from the development of trauma nursing education courses. Consequently, Canada now has a well-established trauma system, with trauma centres, trauma registries, clear trauma nurses’ roles and
various trauma associations (Evans, 2007). The ATLS and TNCC were introduced to Canada very early. The first evaluation study on the effectiveness of the ATLS with respect to improving patient outcomes was conducted in Canada by Ali et al. (1993).

The TNCC was introduced to the UK in 1991 (Castille, 1991). In addition, the Advanced Trauma Care for Nurses (ATCN) is available in the UK, educating a large number of UK registered nurses. Besides unstandardised or unrecorded trauma courses offered by HEIs, there are also a number of courses that include trauma care components for nurses available through staff development activities and CPD (Patient, 2007).

Nass and Kretschmer (2002) concluded that trauma nursing education in Germany is only partly comparable to the US models and that there is still a great deal of scope for progress. This literature search found only limited studies on trauma nursing education in Germany, confirming underdevelopment. However, ATLS, ATCN and ATLS refresher course are available in Germany (Munzberg et al., 2010). Thies and Nagele (2007) questioned the effectiveness of the ATLS in improving trauma care in Germany, on the grounds of its doubtful adaptability to regional needs and lack of multidisciplinary nature.

In Denmark, trauma nurse education requirements are slightly different from other countries (Soehus, 2006): nurses who wish to specialise in trauma nursing are required to undertake an additional two years’ training in anaesthesia and emergency nursing following their three-year general nursing course. The ATCN, introduced in 2001, is the main trauma course opportunity for Danish emergency nurses (Soehus, 2006).

In Africa, trauma nursing education is severely lacking because of the unstable political and socio-economic situation. Emergency nurses, with limited training, care for very complicated trauma cases in an underdeveloped trauma system (Brysiewicz & Bruce, 2008). Very few HEIs offer emergency and trauma training (Brysiewicz & Bruce, 2008).

Limited information was found on trauma education in Asia. The ATLS is available in Hong Kong (American College of Surgeons, 2012). The recent introduction of the TNCC in Hong Kong is the start of an attempt to improve trauma nursing education in Asia to match international standards (Massey, 2007).
2.4.2 Australasia

Because of the late development of specialised emergency departments in Australia and New Zealand, emergency nursing as a specialty has a duration of just over 35 years (Curtis & Ramsden, 2011; Fry, 2008). However, trauma nursing education in these two countries is now similar to that found in the US. Emergency nursing professional bodies such as the ENA Australia, now called the Australian College of Emergency Nursing (ACEN), the College of Emergency Nursing Australasia (CENA) and the Australasian Emergency Nursing Journal have been established (Curtis & Ramsden, 2011).

With the involvement of the ACEN, Australia has imported three main international trauma nursing courses: the TNCC, ENPC and Course in Advanced Trauma Nursing (CATN-II). The ATCN course, distributed by the Society of Trauma Nurses, is also in the process of being introduced into Australia. All four courses are of two days duration and are based around a prescribed course manual to provide trauma-related knowledge and skills for registered nurses (see Table 2.2).

The TNCC, first designed in 1986 (Rush, 2007), has been used in many countries other than Australia, including Canada, Hong Kong, Mexico, the Netherlands, New Zealand, Norway, Portugal, South Africa, Sweden, United Arab Emirates and the UK (Massey, 2007). Its global dissemination continues with the increasing need for nurse trauma education in light of the trends in global injuries (Mock & Owusu-Sekyere, 2007).

The TNCC was first introduced to Australia in the early 2000s after the ACEN obtained a licence to conduct the course (ACEN, 2012). The WATEC began delivering the TNCC in January 2009 and had trained 967 WA nurses through 66 TNCC deliveries by the end of 2014 (WATEC, 2016).

The TNCC is a two-day course including lectures and psychomotor skills stations. It is not mandatory but highly recommended for nurses working in emergency departments to attend; nurses earn 25 CPD points after attendance. The TNCC certificate remains valid for four years. After four years, reverification of the certificate is required by completion of a one-day reverification course. Apart from mechanisms of injury, initial assessment, shock, brain and thoracic trauma, spinal trauma and others as the main content of the TNCC, disaster management and domestic violence content is also included briefly in the lectures, since are also trauma situations (WATEC, 2016).
<table>
<thead>
<tr>
<th>Course</th>
<th>TNCC</th>
<th>ATCN</th>
<th>ENPC</th>
<th>CATN-II</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Course purpose</strong></td>
<td>To offer competency-based trauma nursing care knowledge and psychomotor skills.</td>
<td>To increase nurses’ knowledge in management of the multiple trauma patient.</td>
<td>To offer competency-based knowledge and psychomotor skills for the delivery of trauma nursing care to paediatric patients.</td>
<td>To teach physiologic concepts to strengthen trauma nurses’ critical decision-making skills.</td>
</tr>
<tr>
<td><strong>Main characteristics</strong></td>
<td>Set an international trauma nursing assessment standard</td>
<td>Taught concurrently with ATLS.</td>
<td>Has set an international paediatric trauma nursing care and assessment standard.</td>
<td>Advanced training on pathophysiology knowledge related to trauma.</td>
</tr>
<tr>
<td><strong>Content and delivery methods</strong></td>
<td>Lecture topics include trauma nursing, initial assessment, shock, trauma to brain and cranial-facial, thoracic, neck, abdominal, spinal cord and vertebral column, musculo-skeletal, burn trauma, special population: pregnant, paediatric and geriatric. Psychosocial aspects, transition of care.</td>
<td>Lecture content same as ATLS.</td>
<td>Lecture topics include care of the paediatric patient in emergency setting, epidemiology, the paediatric patient, triage and initial assessment, paediatric trauma, respiratory emergencies, respiratory failure and shock, child maltreatment, neonatal emergencies, medical emergencies, crisis intervention, environmental and toxicological emergencies, ethical and legal considerations, stabilisation and transport.</td>
<td>Lectures and case studies, interactive discussions in a flexible format include: collaboration/relationships, oxygen/ventilation pain, mobility/sensation, transport. perfusion/tissue integrity, consciousness. Critical decision making in trauma nursing, ethical decision making and application of science to practice.</td>
</tr>
<tr>
<td></td>
<td>Skill stations include trauma nursing process, airway and ventilation intervention, spinal protection, helmet removal and splinting skills stations.</td>
<td>Skill stations include initial assessment and management, airway and ventilator management, paediatric trauma, haemorrhage shock, musculoskeletal and spinal trauma and head trauma.</td>
<td>Skill stations include respiratory assessment and interventions, positioning and securing techniques, vascular access and medication administration, paediatric multiple trauma, paediatric resuscitation and triage priorities.</td>
<td>No skill stations.</td>
</tr>
</tbody>
</table>

2.4.3 Western Australia

The recognition of trauma nursing as a specialty in WA and the prioritisation of trauma education by health authorities started 10 years ago. Events contributing to WA trauma nursing education development include the establishment of the Trauma Working Group in 2005, the WATEC initiative to develop a WA Injury and Trauma Education and Training Framework in 2007, the establishment of a Level 1 major adult trauma centre in RPH in the late 2007 and the publication of the WA Trauma System and Services Implementation Plan in 2009 (WATEC, 2012).

According to the Western Australian Department of Health (2017), the WA State Trauma Service is made up of six streams: major trauma services, metropolitan trauma services, urban trauma services, regional trauma services, rural trauma services and remote Trauma services. The WA hospitals’ role delineation in the State Trauma Service are presented below in Figure 2.2.

![Western Australian Trauma System - role delineation](image)

Figure 2.2: Western Australia State Trauma Services (Western Australian Department of Health, 2017)

As a result of its extensive experience organising trauma educational activities and offering the TNCC, the WATEC is recognised as the leading trauma nursing education provider in WA. Further innovation occurred in 1997, when the WATEC designed the
Western Region Rural Trauma Course, now known as the Western Trauma Course (WATEC, 2012).

Trauma training opportunities for WA nurses currently include the TNCC as the only internationally adopted trauma course, trauma short courses run by local hospitals and Trauma Nursing across the Spectrum organised by Ausmed Education and Trauma Nursing Program (TNP), designed and organised by the CENA. After a review of two trauma nursing courses, the international TNCC and the Australian-designed TNP comparing their course structure, assessment process, CPD points, instructor process and costs, the WA Department of Health chose the TNCC, which it regarded as more suitable for WA trauma situations, as the trauma nursing course funded for WA nurses (CTEC, 2006).

2.5 Trauma Nursing Education – Recent Trends

The review of the literature also identified a shift into further specialised education areas, including disaster nursing, domestic violence management, team training and simulation. Since the TNCC contains information and training on disaster management and domestic violence, using a low-fidelity simulation delivery method, and disasters can involve trauma, the author of this study found it necessary and relevant to discuss these areas.

2.5.1 Disaster nursing

Disaster has been defined as ‘a serious disruption of the functioning of a society, causing widespread human, material or environmental losses which exceed the ability of the affected society to cope using its own resources’ (Ciottone, 2016, p.3). The need for health professionals to respond to frequent disasters worldwide has resulted in a call for disaster nursing to be added to trauma nursing education courses. According to Olchin and Krutz (2012), approximately one disaster occurs per week globally. The WHO strongly recommends disaster training for health care workers (Yin, He, Arbon, & Zhu, 2011).

However, evidence shows that nurses are unprepared for mass casualty incidences because of a lack of disaster training in both HEI curricula and CPD courses (Stanley, 2005; Veenema, 2006; Williams, Nocera, & Casteel, 2008). In response to this, Hsu et al. (2006) developed a list of disaster management competencies, which can be summarised
as recognition of disaster, application and understanding of disaster management principles, effective communication and essential knowledge and skills. Subbarao et al. (2008) conducted a systematic review providing a disaster education framework and core competencies based on lessons learned from the Hurricane Katrina experience. However, the literature review by Daily, Padjen and Birnbaum (2010) found a lack of universal standards, terminology, acceptance and applications for existing disaster competencies. Further, the surveys by Rassin et al. (2007) and Fox and Timm (2008) identified a need for paediatric disaster training. Jorgensen, Mendoza and Henderson (2010) responded to this need and provided a consensus-based core disaster competency set for perinatal and neonatal nurses. Recently, reviews by Stangeland (2010) and Smith (2007) pointed out a lack of research on nurses’ perspectives and experiences of participating in disasters. Considine and Mitchell (2009), however, revealed that the vast majority of emergency nurses were willing to participate in disaster events.

2.5.2 Domestic violence management

In recent years, there has been increasing recognition that domestic violence (DV) is a major cause of trauma, and moreover, that it is a significant public health problem across all cultures (D’Avolio et al., 2001; Saunders, 2000). The WHO has emphasised the profound effect of DV on victims’ health and ability to participate in the world (Olive, 2007).

Studies have shown significant under-reporting and lack of recognition of DV by health providers, mainly because of lack of training and confidence in dealing with DV cases (Garee, 2001; Reijnders, Giannakopoulos, & de Bruin, 2008). One US study reported 44% of women who died as a result of DV had a history of presenting to emergency departments with injuries within the two years prior to their deaths (Davis, Parks, Kaups, Bennink, & Bilello, 2003). Another US study revealed that more than one-third of female patient injuries were related to intimate partner violence (Birosckak, Smith, Roznowski, Tucker, & Carlson, 2006). In 2003, at least three children died in the US every day as a result of DV or neglect (Hornor, 2005). In Australia, it has been noted that there are increasing numbers of child abuse cases presenting to ED (Keane & Chapman, 2008).
2.5.3 Simulation

The use of simulation has been increasing in health training curricula, residency training, and medical and nursing CPD courses, such as the ATLS, TNCC, ATCN and ENPC (Berkenstadt, Erez, Munz, Simon, & Ziv, 2007). The effectiveness of simulation as a teaching tool in trauma training has been reported by several researchers. The systematic review by Harder (2010) supported the effectiveness of simulation as a health care teaching tool but pointed to the lack of evaluation in this area. Several randomised controlled trials, including studies by Steadman et al. (2006), Lee et al. (2003) and Knudson et al. (2008), supported the effective use of simulation in trauma training. Further, the multi-centre evaluation studies by Wisborg, Brattebø, Brattebø, & Brinchmann-Hansen (2006) and Falcone et al. (2008) concluded that simulation enhanced team performance in trauma training. The quasi-experimental study by Fero et al. (2010) recognised simulation’s benefits in improving nursing students’ critical thinking skills, and Cant and Cooper (2010) found simulation to be a useful teaching tool in nursing education.

2.5.4 Team training

Several studies have confirmed that team training of health care professionals, especially using simulation, can translate into more efficient patient care with fewer errors in trauma settings (Capella et al., 2010; Falcone et al., 2008; Georgiou & Lockey, 2010; Wisborg et al., 2006). Poor communication between team members in trauma resuscitation can be harmful to victims (Bergs, Rutten, Tadros, Krijnen, & Schipper, 2005). Wong and Petchell (2003) identified a lack of team training in trauma education, and proposed that team training, augmented by simulation, should be included in trauma courses such as the ATLS.

In an ethnographic study, Cole and Crichton (2006) echoed the findings of Wong and Petchell (2003), finding support for the suggestion of adding human factors, such as leadership skills, team management, inter-professional teamwork, conflict resolution and communication strategies into trauma team training. Cole and Crichton (2006) and Harkins (2009) further suggested the adoption of crew resource management training, which has been used successfully in the military and aviation area for trauma training. Harkins (2009) also recommended debriefing to be included in trauma team training.
Frakes, Neely and Tudoe (2009) pointed out that team training objectives should have clear role identification and a better organisational process. Wisborg et al. (2008) reasserted the importance of managerial support and strategic planning in implementing trauma team training.

2.6 Trauma Nursing Education – Evaluation

2.6.1 Continuing professional education

Continuing Professional Education (CPE), also called CPD, is defined as a discipline-specific educational opportunity; a finite program using adult learning principles containing profession, practice or issue-specific content and the focused, ongoing and advancing education in which professionals engage after having completed their formal pre-professional education (Apgar, 1999).

Despite CPD’s rapid proliferation and transformation into a mandatory requirement for health professionals in recent years, many researchers have pointed to a lack of solid evidence regarding the effectiveness of CPD in relation to patient health outcomes (Apgar, 2001; Attree, 2006; Eustace, 2001; Ferguson, 1994; Lee, 2011; Nolan, Owens, & Nolan, 1995; Penz et al., 2007).

Although the meta-analysis by Waddell (1991) provided convincing evidence to show CPD’s positive effect on nursing practice, the continuing lack of empirical research in this area represents a barrier to expenditure on CPD for nurses from the tight health budget. This was found to be the case eight years after the Waddell study (Furze & Pearcey, 1999), and again after 12 years (Lawton & Wimpenny, 2003). Few empirical and observational studies with limitations were available when Griscti and Jacono (2006) conducted their literature review. Ellis, Davies and Laker (2000), after a failed randomised controlled trial attempt, acknowledged the same research deficit, along with other researchers (Bell, Pestka, & Forsyth, 2007; Jordan, 2000).

Difficulties in CPD outcome evaluation noted in studies include methodological challenges such as hard-to-control variables, barriers inhibiting nurse CPD participation and the lack of valid evaluation tools (Apgar, 2001; Attree, 2006; Eustace, 2001; Ferguson, 1994; Lee, 2011; Nolan et al., 1995; Penz et al., 2007). Hence, a multi-dimensional approach with a multi-method design for CPD outcome evaluation has been
proposed to overcome these challenges (Clark, Draper, & Sparrow, 2008; Draper & Clark, 2007; Nolan, Owen, Curran, & Venables, 2000).

The lack of evidence to support the assertion that CPD can translate to safer patient care has led to significant budget cuts for CPD in the UK (Draper & Clark, 2007). All the above facts confirm the desperate need for CPD outcome evaluation studies.

2.6.2 Trauma course evaluation

In line with other reports, this review has found a lack of literature on trauma CPD course evaluation, excepting the evaluation studies on the ATLS by Ali and his colleagues (Driscoll, 2007; Hogan & Boone, 2008; Patient, 2007) and three other evaluation studies on trauma courses conducted by Driscoll (2007) on nursing retention of trauma resuscitation skills, Wisborg et al. (2008) on the effects of nationwide training of multiprofessional trauma teams in Norwegian hospitals, and Johansson et al. (2012) on the Prehospital Trauma Life Support (PHTLS) training of ambulance caregivers and impact on survival of trauma victims in Sweden.

The series of studies by Ali and colleagues, cited by numerous reviews, provided strong evidence on the effectiveness of the ATLS and PHTLS on participants’ knowledge and skills and patient outcomes (Ali et al., 1993; Ali, Adam, Gana, & Williams, 1997; Ali, Adam, Stedman, Howard, & Williams, 1994; Ali et al., 1996; Ali, Cohen, Gana, & Al-Bedah, 1998; Ali, Cohen, & Reznick, 1995). The development of the trauma severity scoring criteria has been a significant development (Boyd, Tolson, & Copes, 1987; Champion, 1990; Champion, Sacco, & Copes, 2002; Champion, Sacco, & Hunt, 1983; Copes et al., 1988; Radvinsky et al., 2012).

In contrast, the systematic review and retrospective evaluation study conducted by Sethi, Habibula and Kelly (2009), though limited by a small sample and inadequate information for resuscitation variables, arrived at a totally different conclusion, arguing that the ATLS instruction did not improve patient assessment and outcomes.

2.6.3 Trauma nursing course evaluation

There is very limited literature evaluating trauma nursing education. Patient (2007) was unable to identify any other evaluation studies apart from a study assessing the value of an abbreviated ATLS course on nurses’ knowledge by Gautam and Heyworth (1994,
1995), which shared similar limitations to other CPD evaluation studies, including a small sample, participants’ perception-based findings and a poor correlation between CPD and nursing practice.

Tippett (2004) conducted the first study evaluating nurses’ acquisition and retention of knowledge after the Advanced Trauma Nursing Course (ATNC) in the UK. The study found poor retention of knowledge three months post-course and recommended a refresher course (Tippett, 2004). However, as Patient (2007) commented, this study’s general applicability and validity are questionable because of the small sample size of only 14 nurses and inability to control some variables affecting nurses’ knowledge, such as nurses’ previous experiences. Both Tippett (2004) and Patient (2007) agreed that an increase in knowledge does not necessarily represent skills improvement or translate to improved patient outcomes, because of various factors influencing trauma patient outcomes.

Baird et al. (2004) conducted a study examining the role and impact of nurses as observers in the ATLS. Although they found a positive influence on nurses’ performance after full participation in the TNCC and the ATLS, the effect on nurses’ performance after an observer-only role was found to be minimal. Deterioration of knowledge and skills over time was also noted in this study; thus, a refresher course was recommended for both the ATLS and TNCC (Baird et al., 2004).

2.6.4 Evaluation tools

Consistent with other reviews or studies on health CPD evaluation (Attree, 2006; Nabulsi et al., 2007; Singh, 2004; Stavropoulou & Kelesi, 2012; Suhayda & Miller, 2006; Walker, 2011), there appears to be a lack of validated CPD evaluation tools. The Goal Attainment Scale (GAS) and the Lasater Clinical Judgment Rubric (LCJR) are the only two tools found to be in use in nursing education evaluation during the current review. The rationale of not using these two tools in this study was that one of the study’s research objectives was to develop a new TNCC evaluation tool.

The GAS is an outcome-focused evaluation tool developed by Kiresuk and Sherman (1968) and used by some health education evaluation studies (Cusick & Ottenbacher, 1994; Fleck & Fyffe, 1997; Tennant & Field, 2004). The tool uses a five-point rating scale to score expected behaviours in practice to measure whether the pre-established
patient goals have been achieved and whether the related treatment or CPD have been effective on actual practice (Kiresuk & Sherman, 1968). The five expected behaviours are categorised as communication, management, assessment, teaching and clinical skills (Kiresuk & Sherman, 1968).

The LCJR is a validated, evidence-based rubric (Lasater, 2007, 2011; Lasater & Nielsen, 2009), used to describe or evaluate nursing students’ clinical judgement development. It was created from Tanner’s clinical judgement model, which consists of four phases: noticing, interpreting, responding and reflecting (Lasater, 2007). The LCJR has been reviewed, evaluated and recommended by several nurse education evaluation researchers in recent years (Adamson, Gubrud, Sideras, & Lasater, 2012; Dillard et al., 2009; Isaacson & Stacy, 2009; Kardong-Edgren, Adamson, & Fitzgerald, 2010).

2.6.5 Trauma Nursing Core Course (TNCC) evaluation

There is no research or literature, national or international, evaluating the TNCC. The Director of the ENA, (L. Wolf, personal communication, 2 October 2012) confirmed that currently there is no study on TNCC evaluation worldwide. The only study mentioning the TNCC’s positive influence on nurses’ performance was the research previously discussed by Baird et al. (2004). The gap in TNCC evaluation has also been identified by other researchers (Danis, 2005; Tippett, 2004).

The TNCC Evaluation Project evolved from a request by the Chief Nurse and Midwifery Officer of WA (C. Stoddart, personal communication, 20 December 2010) to the University of Western Australia (UWA) in collaboration with the WATEC. The study was conceptualised in 2011 as the first study worldwide to evaluate the TNCC education outcome. The aim of the TNCC Evaluation Project is to conduct an outcome evaluation study using a survey questionnaire and interviews to assess the effectiveness of the TNCC in terms of WA nurses’ attitudes towards knowledge development and skills application in the practice of trauma patient nursing care post-TNCC.

2.7 Conclusion

In conclusion, the historical overview of trauma nursing education identified the development of trauma nursing as a recently recognised specialty evolving from emergency nursing. Post-registration trauma nursing courses have played, and continue
to play, an important role in the advancement and skills development of nurses in this specialty. It is envisaged that disaster nursing and DV management will be added to curricula in trauma nursing courses. When exploring the pedagogy used in these trauma nursing courses, there is strong evidence to suggest that team training augmented by simulation can be an effective training strategy, with significant benefits to patient outcomes.

Comparison of the four major international trauma nursing courses introduced to Australia showed that the TNCC has been the most widely distributed and significant course. Indeed, the TNCC sets the ‘gold standard’ of trauma nursing education worldwide. However, despite the dissemination and popularity of the TNCC for over 35 years, evaluation of course effectiveness has not been adequate. The current drought in the CPD evaluation field because of methodology difficulties and lack of validated evaluation tools may explain why the TNCC has not been widely evaluated. The extremely limited research on trauma course evaluation indicates the desperate need for strong evidence to prove the effectiveness of these courses on participants’ knowledge and skills in relation to patient care. This is of crucial importance in the context of the current complex, but cash-poor, health care environment.

It is therefore essential that courses such as the TNCC are evaluated to ensure that these courses remain contemporary and effective. An evaluation of the TNCC course undertaken in WA is the first of its kind. The significant contributions this evaluation makes can not only provide local health authorities with information on TNCC utilisation in WA, but add valuable evidence of trauma courses’ perceived effectiveness, providing important guidance for future trauma course implementation and evaluation studies both in WA and around the world.
Chapter 3: Methodology

3.1 Introduction

As the aim of this study is to evaluate the perceived effectiveness of the TNCC in relation to WA nurses' knowledge development and skills application in the practice of caring for trauma patients, it is appropriate to adopt outcome evaluation, which is designed to measure changes in clinical practice following a learning experience (Bell et al., 2007), as the methodology.

One of the common themes of outcome research is to measure the effectiveness of a program (Wennberg, 2010; WHO, 2000). The rationale explaining how the outcome evaluation methodology fits with this study is detailed in this chapter.

There are four research questions to be answered by this study:

1. How do TNCC participants and their colleagues evaluate their trauma nursing knowledge development and skills application since participation in the TNCC?
2. How do TNCC participants and their colleagues evaluate the TNCC in terms of preparing and assisting participants to care for trauma patients?
3. How do TNCC participants and their colleagues evaluate the TNCC in terms of meeting participants’ learning needs?
4. How effective is the TNCC in improving participants’ trauma knowledge development and skills application?

Kirkpatrick’s training evaluation model was chosen as the theoretical framework to guide this descriptive study, using both quantitative and qualitative methods in the research design. This chapter discusses outcome evaluation, explains Kirkpatrick’s training evaluation model and describes the quantitative and qualitative methods used to conduct the study. Rigour, reliability and validity, along with ethical considerations, are addressed. This chapter first examines evaluation and outcome evaluation in terms of the definitions, types of evaluation, theories of evaluation, and evaluation approaches to evaluation research designs. Second, this chapter describes Kirkpatrick’s training evaluation model and presents an application of the model to this study. Research design, including data collection methods such as surveys and interviews, follows. As this study
is designed as a three-phase study, the three-phase process is presented. Rigour and trustworthiness of the study and ethical considerations are presented in the final two sections.

3.2 Outcome Evaluation

3.2.1 Definitions

The term evaluation has many different definitions, focusing on a program’s worth, improvement, results or a combination of these (Kahan, 2008). One definition describes evaluation as ‘the use of the scientific method, and the rigorous and systematic collection of research data to assess the effectiveness of organisations, services and programmes in achieving predefined objectives’ (Bowling, 2014). Another widely accepted definition of evaluation, or program evaluation, is ‘a study designed and conducted to assist some audience to assess an object’s merit or worth’ (Stufflebeam, 2001, p.11).

Bowling (2014) defined outcome evaluation as the effectiveness of the activities in relation to the achievement of the intended goals. Outcome evaluation research has been described as public health research that studies the final results of the structure and processes of the health care system on the health of patients (Clancy & Eisenberg, 1998), requiring a systematic evaluation of the quality of care, and effectiveness of the health care system, targeting the areas of health technology assessment, decision making and policy analysis (Wennberg, 2010).

The origin of outcome evaluation research can be traced back to 1847, when Ignaz Semmelweis studied the aseptic procedures used to reduce risk of infection, followed by Florence Nightingale’s work in 1850 (Wennberg, 2010). After World Wars I and II, Avedis Donabedian’s (2005) paper ‘Evaluating the quality of medical care’ in 1966 and Paul Ellwood’s Shattuck Lecture in 1988, using the terms ‘outcome’ and ‘outcomes management’, are regarded as hallmarks in the evolution of outcomes research (Ellwood, 1988). The standard form of medical record development in the early 20th century contributed to the development of outcomes research by providing a reliable database (Wennberg, 2010). Outcome evaluation is normally carried out with the expectation from stakeholders that the results inform decision making related to programme funding, continuation, termination, expansion and reduction (O’Leary, 2013).
3.2.2 Types of evaluation

Types of evaluation have been summarised by Kahan (2008) in an evaluation framework review as comprising the following:

- preliminary evaluation
- formative evaluation (also known as process evaluation)
- summative evaluation (also known as outcome evaluation or impact evaluation)
- economic evaluation
- meta-evaluation
- ongoing review (also called performance measurement).

Preliminary evaluation refers to the needs and resource assessment that happens at the beginning stage of an evaluation, which sometimes forms part of formative evaluation (Van Marris & King, 2007).

Formative evaluation, or process evaluation, evaluates how the project is operating and if it has been implemented as planned. It is usually undertaken during the early stages of a project (Van Marris & King, 2007). It allows the assessment of the project development, to examine its activities and to identify areas for improvement (Scriven, 2007).

In contrast, summative evaluation, also known as outcome evaluation or impact evaluation, assesses the overall effectiveness and impact of a project, focusing on a completed or underway project (Van Marris & King, 2007). It aims to provide data and information related to the effectiveness of the change strategy in question (assessing whether goals, aims and objectives have been met) and its efficiency (that is, whether the effects justify the costs) (O’Leary, 2013).

There are differences between impact evaluation and outcome evaluation; therefore, these two concepts are not used interchangeably (Kahan, 2008). Impacts are more immediate effects, while outcomes are longer-term effects that relate to the endpoints of a program (Van Marris & King, 2007). Further, impact evaluation not only measures outcomes but the changes after the outcomes (Van Marris & King, 2007).
Economic evaluation assesses the project’s cost effectiveness, via cost-benefit and cost-utility analysis, while meta-evaluation refers to the accumulated findings from a series of evaluations (Kahan, 2008).

Ongoing review or performance measurement refers to ongoing monitoring rather than assessment of a program. Some authors do not regard it as a type of evaluation, however, they acknowledge its use in providing information to facilitate evaluation (Kahan, 2008).

This study is an outcome evaluation and quasi-experimental descriptive study. The reasons to describe this study as such become clearer after a consideration of theories of evaluation as well as of evaluation study design and evaluation approaches.

### 3.2.3 Theories of evaluation

Theories of evaluation have flourished with the popularity of program evaluation in the US by government and education sectors since the 1960s. To illustrate the development and summary of existing evaluation theories, Alkin and Christie (2004) drew an evaluation theory tree adding theorists’ names to the trunks and branches (see Figure 3.1).

![Evaluation Theory Tree](image-url)

**Figure 3.1: Evaluation Theory Tree (Alkin & Christie, 2004)**
Accountability and systematic social enquiry are the foundations of the evaluation theory tree (Alkin & Christie, 2004). Accountability has been defined as a process giving an account, or being answerable to, or being accounted for (Alkin & Christie, 2004). Alkin and Klein (1972) divided accountability into three concepts: goal accountability, which examines if reasonable and appropriate goals are determined; process accountability, which checks if reasonable and appropriate procedures are implemented to meet goals; and outcome accountability, which assesses the degree to which the established goals are met. Social enquiry, according to Alkin and Christie (2004), arises from a need to use a systematic and justifiable set of methods to demonstrate accountability.

Alkin and Christie (2004) grouped evaluation theorists into three main branches, also called methods and valuing, according to different emphases on evaluation by theorists.

When addressing the evaluation family tree, Stufflebeam’s (2001) CIPP (Context, Input, Process, Product) model has been classified as being on the use branch, which focuses on the use of evaluation information to facilitate decision making. Examples of theorists that have been classified as being on the methods branch, which emphasises research methods, include Tyler, Campbell and others. Tyler (1942), with his objectives-oriented evaluation, has been regarded as having a pioneering impact on educational evaluation. Indeed, Campbell and Stanley’s work on experimental and quasi-experimental research design has had significant influence on social science research (Cook & Campbell, 1976).

Scriven (1986) was assigned to the valuing branch, as a representative of valuing theorists because of his adamant definition of the evaluator’s role in making value judgements. By using comparison to identify critical competitors and producing consumer reports, the evaluator makes value judgements to serve the public interest (Scriven, 1986). Deciding a program’s worth or outcome is another responsibility of the evaluator (Scriven, 1972). Scriven advocates ‘goal-free evaluation’, which means that the evaluator can determine the program’s outcome measurement without including the program’s objective as a starting point. Scriven is described as a leading valuing theorist, providing guidance and direction to others in the field (Alkin & Christie, 2004).

3.2.4 Evaluation approaches

There are numerous evaluation approaches; Stufflebeam (2001) summarised 22 commonly used program evaluation approaches. However, Rogers and Fraser (2003)
noted that evaluations can combine elements of different approaches to fit local evaluation situations and serve the evaluation purposes. They also suggested criteria for selecting the best suitable evaluation approach, such as plausibility (which they defined as asking if the approach appears to be helpful), practicality (asking if it is possible to implement the approach) and finding evidence to show that the approach actually works (Rogers & Fraser, 2003). They set these criteria based on the concept of appreciative enquiry, described by Rogers and Fraser (2003) as developing a holistic understanding of its strengths and limitations from different perspectives and to increase its value for evaluators. They noted that program evaluation should not only describe the ‘good side’ of a program, but incorporate different techniques and approaches from other professions to form a sound and holistic understanding of its worth (Rogers & Fraser, 2003).

3.2.5 Evaluation research design

According to Kahan and Goodstadt (2005), evaluation studies can be designed as experimental, quasi-experimental or observational. Methods used in evaluation studies can be quantitative, qualitative or mixed. Randomised controlled studies are seen as a classic experimental design; however, Campbell (1969) noted the shortcomings of experimental design, which sometimes fails to achieve the desired objectives in social science contexts. This led to the introduction of quasi-experimental design, which lacks randomisation but provides comparison (Alkin & Christie, 2004). In contrast with an experimental study, which has randomisation where the researcher is able to control variables, an observational study draws inferences from a sample to a population where the independent variable is not under the control of the researcher because of ethical or logistical concerns (Della Porta, 2008).

This study is defined as an outcome evaluation study since it assesses the effectiveness of a learning program. It is classified as a quasi-experimental study since it sought to compare pre-TNCC and post-TNCC effectiveness without randomisation.

3.3 Kirkpatrick’s Training Evaluation Model

Kirkpatrick’s training evaluation model has been chosen as the main theoretical framework to guide this outcome evaluation descriptive study (see Figure 3.2). This model, introduced by Donald Kirkpatrick in 1959 and updated in 1975 and 1994, is a four-level model measuring reaction, learning, behaviour and results to evaluate a
Kirkpatrick’s training evaluation model has rapidly gained popularity since its original publication and is regarded as one of the most commonly used education evaluation approaches (Bates, 2004). Walker (2011) evaluated the ATLS in Obstetrics course currently being undertaken in Australia by referencing ideas from Kirkpatrick’s approach. Walker investigated the perceived changes in the knowledge and confidence of doctors and midwives to manage obstetric emergencies following completion of the course, using prospective pre- and post-participation survey questionnaires, and found significant overall improvement in perceived knowledge and confidence of course participants. However, very limited information was provided to explain how Kirkpatrick’s training evaluation model was adopted and applied in the design of the study’s data collection tools (Walker, 2011).

**Figure 3.2: Kirkpatrick’s Training Evaluation Model**

Level 1: Reaction measures customer satisfaction, to find out how the trainees felt and their personal reactions to the training, normally obtained through post-training survey.

Level 2: Learning measures the increase in knowledge or intellectual capability. Measurement should be closely aligned to the learning objectives and collected through interviews or an online questionnaire.
Level 3: Behaviour measures the extent to which trainees applied their learning and changed their behaviour, either immediately or some several months after the training, depending on the situation. Measurement can be collected through interviews, observation and online assessment. Observation from line managers to measure behaviour change is regarded as helpful for this evaluation.

Level 4: Results measures the effect on the organisation, business or environment resulting from the improved performance of the trainee. Individual measurement at this level is seen as easier than the entire organisation measurement because of the multiple factors affecting the organisation’s performance (Kirkpatrick, 2009).

Kirkpatrick and Kirkpatrick (2016) published an updated version of the Kirkpatrick model, naming it the New World Kirkpatrick Model. This model clarified the definitions in the original model and also added new elements to the evaluation. The elements of ‘engagement’ and ‘relevance’ were added to Level 1: Reaction, to ensure participants’ active involvement and participation in the learning (engagement), and the degree to which they can apply this learning to their roles (relevance) are evaluated. Level 2: Learning now includes how confident learners are in the knowledge and skills they have learnt (confidence) and their intent to apply the knowledge and skills on the job (commitment). Level 3: Behaviour goes beyond an individual’s application of knowledge and skills learned, to identify processes and systems that reinforce, encourage and reward performance of critical behaviours required on the job, termed required drivers. Level 4: Results adds short-term observations measuring whether critical behaviours are on target to create a positive outcome (leading indicators). While this study was conducted prior to the adaptation of the New World Kirkpatrick Model, the methods adopted have addressed some of these additions, and are detailed later in the chapter.

A critical analysis of the Kirkpatrick model questioned the model’s ability to address both the summative and formative questions for fulfilling core ethical duties such as beneficence (Bates, 2004). Bates (2004) pointed out that the model’s strengths, including a systematic evaluation approach, straightforward language and ability to simplify the complex training evaluation process, have contributed to its popularity in use. The Kirkpatrick model is regarded as a seed from which other evaluation models germinated (Alliger & Janak, 1989; Holton, 1996; Kaufman, Keller, & Watkins, 1996).
Limitations of the model identified by Bates (2004) include its oversimplified view of training effectiveness, the assumption of causal linkage and the incremental importance of information, which refers to the model’s assumption that each levels’ evaluation provides data that is more informative than the last.

3.3.1 Application of the Kirkpatrick model to this study

The Kirkpatrick model was applied to data collection tools and methods adopted throughout this study (see Table 3.1), over the three phases, consisting of (see Figure 3.3):

- Phase I: preliminary evaluation of existing course evaluation data
- Phase II: retrospective evaluation of the TNCC outcomes
- Phase III: prospective evaluation of the TNCC outcomes with a pre- and post-test of the TNCC knowledge and skills outcomes.

Level 1 (reaction) evaluation was demonstrated across all three phases, by seeking participant views on overall satisfaction with the course structure, delivery and content (customer satisfaction) in both survey and interview formats. The additional Level 1 elements of the revised 2016 version of the model were addressed by asking participants to what degree they were actively participating in the course (engagement) and the degree to which they felt they had used the TNCC knowledge and skills in their clinical practice (relevance).

Phases II and III of the research included Level 2 (learning) evaluation. Both survey and interview questions specifically sought to assess TNCC participants’ confidence levels in relation to trauma nursing knowledge and skills learned from the course.

Level 3 (behaviour) evaluation data were collected through Phase II and III survey data, asking TNCC participants about their ability to perform specific trauma nursing skills since they had received the TNCC training. Further, the Phase II interviews with the SRNs explored observations of how their TNCC participant colleagues were putting their newfound knowledge and skills into practice in the clinical setting.

Some Level 4 (results) evaluation data providing perceptions on patients’ improved outcomes linked to the nurses’ knowledge and skills gained from the TNCC training were
exposed by participants’ testimony in the survey and interview data of the TNCC participants and SRNs collected in Phases II and III.

Data collection tools and methods in this study were designed as a progressive training evaluation, elevating through the Kirkpatrick model as the phases progressed. Detail of how each specific tool addressed the four levels of the model is depicted in Table 3.1.
<table>
<thead>
<tr>
<th>Phase</th>
<th>Tool</th>
<th>Section / interview questions</th>
<th>Kirkpatrick model level</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>TNCC evaluation form</td>
<td>Q1 &amp; Q4–10, Q2 &amp; Q3</td>
<td>1, 2</td>
<td>Questions sought participants’ general course feedback (Level 1). Questions regarding participants’ perceptions of knowledge and skills correlation and met learning needs (Level 2).</td>
</tr>
<tr>
<td>II</td>
<td>Retrospective survey</td>
<td>General feedback section</td>
<td>1 &amp; 2</td>
<td>Questions about overall improvement in knowledge and skills resulting from attending the TNCC (Level 1) and probing questions about whether specific content area learning needs were met (Level 2).</td>
</tr>
<tr>
<td></td>
<td>Knowledge section</td>
<td></td>
<td>2</td>
<td>The knowledge section focused on the participants’ degree of confidence in the knowledge and skills they had learnt (Level 2).</td>
</tr>
<tr>
<td></td>
<td>Clinical practice section</td>
<td></td>
<td>3</td>
<td>The clinical practice section focused on participants’ ability to perform specific trauma nursing skills (Level 3).</td>
</tr>
<tr>
<td></td>
<td>TNCC participant interview schedule</td>
<td>Q1, Q2 &amp; Q10, Q3–7, Q8</td>
<td>1, 2, 3</td>
<td>Exploration of overall impressions of the TNCC, knowledge improvement and suggestions for TNCC improvement (Level 1). Exploration of specific trauma nursing content topics, the extent to which they were covered in the TNCC and how/if learning needs regarding these specific content areas were met (Level 2). Exploration of how participants felt the nursing care they provided had been affected by TNCC participation (Level 3).</td>
</tr>
<tr>
<td></td>
<td>SRN interview schedule</td>
<td>Q5–8, Q 2–4 &amp; 10</td>
<td>1, 3, 4</td>
<td>Questions relating to SRN perceptions of the benefits of specific trauma nursing topic areas (Level 1). Exploration of the SRN perceptions of the impact of the TNCC on participants’ confidence, knowledge and skills (Level 3), specifically in relation to the care they provide to their patients in clinical practice.</td>
</tr>
<tr>
<td>Phase</td>
<td>Tool</td>
<td>Section / interview questions</td>
<td>Kirkpatrick model level</td>
<td>Explanation</td>
</tr>
<tr>
<td>-------</td>
<td>------------------------------------------</td>
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<td>-------------------------</td>
<td>-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>III</td>
<td>Retrospective and prospective surveys</td>
<td>Knowledge and clinical practice sections</td>
<td>3 &amp; 4</td>
<td>The pre- and post-participation survey implementation sought to identify whether participants experienced any improvements in their confidence with trauma nursing knowledge and improvement in their ability to undertake trauma nursing skills when caring for trauma patients. To this end, this phase applied Levels 3 and 4 of the model providing an outcome-based evaluation of the impact of TNCC on nursing practice.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>General feedback section</td>
<td>1 &amp; 2</td>
<td>The general feedback questions asked participants about overall improvement in knowledge and skills resulting from attending the TNCC (Level 1) and probing questions about whether specific content area learning needs were met (Level 2).</td>
</tr>
</tbody>
</table>
3.4 Research Design

The research design of this study adopted both quantitative and qualitative methods, using a survey and various interviews for data collection (see Figure 3.3).

<table>
<thead>
<tr>
<th>Phase I</th>
<th>Phase II</th>
<th>Phase III</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preliminary evaluation</td>
<td>Retrospective evaluation</td>
<td>Prospective evaluation</td>
</tr>
<tr>
<td>Participant group</td>
<td>Cohort 1-2009-2012 TNCC participants</td>
<td>Cohort 2-2009-2013 TNCC participants (Cohort1 + 2013 TNCC participants)</td>
</tr>
<tr>
<td>Data collection methods</td>
<td>Demographic data</td>
<td>Retrospective survey TNCC participant and senior nurse interviews</td>
</tr>
<tr>
<td></td>
<td>TNCC evaluation</td>
<td></td>
</tr>
<tr>
<td>Data collection tools</td>
<td>TNCC application form</td>
<td>TNCC knowledge, skills and evaluation survey</td>
</tr>
<tr>
<td></td>
<td>TNCC evaluation form</td>
<td>Post-participation knowledge, skills and evaluation survey</td>
</tr>
</tbody>
</table>

**Figure 3.3: Study Phases and Data Collection Sequence**

The three phases were:

- **Phase I**: preliminary evaluation of existing course evaluation data
- **Phase II**: retrospective evaluation of the TNCC outcomes
- **Phase III**: prospective evaluation involving a pre- and post-test of the TNCC knowledge and skill outcomes.

In this study, quantitative data were collected in the form of survey data; qualitative data were collected subsequently using individual, focus group and telephone interviews.

The quantitative data collection informed the development of the interview schedules used for qualitative data collection. The qualitative data collection aimed to explain and elaborate on the quantitative results obtained from the initial surveys. The analysis of data in each phase informed the survey and interview schedule development of the next phase.
The rationale for this approach was that quantitative data analysis provides researchers with a meaningful understanding of the research problem being explored (i.e., the effectiveness of the TNCC towards WA nurses’ trauma knowledge and skills improvement), facilitating a rigorous qualitative approach to refine, explain and elaborate those quantitative results (Plano Clark & Creswell, 2011). Adopting this approach in each phase of the research ensured each phase built on the previous phase to best achieve the aim of, and answer, the research questions of the study.

The rationale for combining quantitative and qualitative methods in one study is that neither quantitative nor qualitative methods are sufficient, by themselves, to capture trends and explain the details of the situation (Ivankova, Creswell, & Stick, 2006). Curry, Nembhard and Bradley (2009) noted that although quantitative methods can count occurrences and statistically test hypotheses, they have limitations; in particular, the inability to measure complex factors in the health care system, such as people’s perceptions and attitudes.

Further, they pointed out that qualitative methods have the ability to describe a phenomenon’s complexity, breadth and depth. Curry et al. (2009), along with other writers, noted that by combining quantitative and qualitative methods, the research design has the advantages of each method’s strengths and minimises their shortcomings. Qualitative methods can also achieve various aims, collaborate findings, generate more complete data, allow for more robust analysis, use results from one method to enhance insights or confirm results of another, capture varied perspectives and allow for research protocol development in stages (Curry et al., 2009; Ivankova et al., 2006; O’Leary, 2013).

The limitations of mixed methods have been identified as the time and resources required to collect and analyse both types of data (Ivankova et al., 2006).

Based on the rationale above, this descriptive study used both quantitative and qualitative methods to capture perceptions of the WA TNCC participants to evaluate the perceived effectiveness of the TNCC by identifying improvements in their knowledge and skills post participation. The quantitative methods used included survey and analysis of preliminary demographic data. The qualitative method consisted of interviews—individual, focus group and telephone—to validate the quantitative findings and further explore improvements in trauma care knowledge and skills post-TNCC participation.
Quantitative data were collected and analysed in Phase I of the study. In Phases II and III, quantitative data were collected first, followed by qualitative data. By combining both quantitative and qualitative methods and giving priority to both, the results address the research questions with robust data analysis. Moreover, the results of the Phase I preliminary evaluation and the quantitative data collected from the retrospective survey in Phase II informed the design of the interview questions and the selection of interviewees. The results from interviews enhanced the insights gained from the retrospective survey and explained TNCC participants’ perceptions of the course in greater detail. The results of the Phase II retrospective evaluation assisted the production of an evaluation tool for the TNCC, in the form of a pre- and post-participation web-based survey used in Phase III and prospective evaluation for further validation of the Phase I and Phase II results.

3.4.1 Survey

A survey is defined as a quantitative method that can provide numeric description of trends, attitudes, or opinions of a population by studying a sample of that population (Creswell, 2009). There are two types of surveys: a retrospective/descriptive or cross-sectional survey, in which data are collected at one point in time and descriptive measures are usually calculated retrospectively, and an analytic/prospective or longitudinal survey, in which data collection and events analysis occur at more than one period of time, normally prospectively (Bowling, 2014). Two advantages of using a survey are that it is economical and that the data collection turnaround time is rapid (Bowling, 2014).

Common survey methods in use include postal or online web-based self-completion questionnaires and personal interviews or diaries (Bowling, 2014). Each method has its advantages and limitations. The online questionnaire has the advantages of being easy to administer, economical for distribution and having greater anonymity. It may have a lower response rate and has been reported to be less reliable than interviews (Bowling, 2014). Creswell (2009) suggested that it is important to consider the purpose, the population and sample, instrumentation, procedure, timeline, variables and response rates when designing and using a survey.

This study used both a cross-sectional retrospective survey and prospective pre- and post-participation surveys as quantitative data collection methods, by administering online
questionnaires to the TNCC participants. The rationale for using these surveys was the cost effectiveness, ease of participant access and anonymity provided by online surveys.

Phase I involved a demographic questionnaire completed by participants prior to TNCC participation and a course evaluation survey administered in person following the course. Phase II adopted a retrospective online survey of the TNCC participants of the preceding three-year period. Phase III used a prospective online pre- and post-TNCC participation survey of TNCC participants over a one-year period.

The retrospective and prospective survey design followed several important processes. The researcher co-opted the expertise of medical and nursing academic researchers experienced in critical care nurse training, survey development and evaluation research. In addition, a WATEC representative joined survey design meetings to facilitate alignment of survey questions with TNCC aims and objectives. Several drafts of the surveys and interview schedules were brought to survey design meetings, to seek feedback and refine survey questions.

This expert survey review ensured survey questions were aligned with the TNCC course objectives and addressed the four levels of evaluation of the Kirkpatrick training evaluation model. Survey questions were grouped into four sections—demographic information, knowledge, clinical practice and general feedback—for the purpose of encompassing the study’s aim of answering the four research questions. Further, survey questions were included seeking participants’ views on specific trauma nursing content based on findings of the literature review, to measure if the TNCC content met participants’ learning needs in these important aspects of trauma nursing education.

Open-ended questions were included in all surveys to enrich the quantitative data and identify areas for further exploration in the interviews.

3.4.2 Interviews

An interview can be described as a qualitative method that involves unstructured open-ended questions intending to elicit views and opinions from participants (Creswell, 2009). There are three types of commonly used interviews: face-to-face individual in-depth interview, telephone interview and focus group interview, typically comprising six-to-eight interviewees in each group (Curry et al., 2009).
Similar to other data collection methods, all types of interviews have advantages and limitations (Creswell, 2009). Advantages of interviews include usefulness for direct observation of participants, means of obtaining historical information from participants and ease of guiding interview questioning. Limitations include the researcher’s presence biasing responses, indirect information filtered through interviewees, information obtained in a designated setting rather than in the natural field and not all participants being equally perceptive (Creswell, 2009).

This study used three types of interviews—individual, telephone and focus group—to provide interviewees with flexibility in light of time and distance restrictions and to avoid compromised results arising from these factors.

Two sets of interview questions were designed, one for the TNCC participant interviews (10 questions) and one for the TNCC SRN interviews (12 questions). Questions at these two interviews were similar, with different wordings to suit different interviewees’ perspectives. Interview questions were generated following analysis of Phase I and Phase II quantitative data with the aim of exploring TNCC participants’ perspectives. The interview schedule development was supported by the experts co-opted for the survey development meetings, including experienced qualitative researchers. Once again, the Kirkpatrick model, research questions and TNCC objectives were considered during the development of interview questions.

Interviewee selection was based on several considerations. First, interviewees were selected from those who had consented to participate in an interview after completing the retrospective survey. Second, interview schedules were developed according to the quantitative data analysis results; for example, interview settings and timings were arranged in both metropolitan and rural WA health care facilities according to the results of TNCC distribution and number of participants in each area. The SRN interviewee selection, in particular, was based on Phase I and Phase II quantitative results of TNCC usage in WA, including SRNs from major north and south metropolitan and rural hospitals—those that sent the greatest number of nurses to attend the TNCC. Further, permission to conduct interviews with selected staff and the utilisation of settings were obtained from the relevant management team before interviews occurred.
3.5 Phase I: Preliminary Evaluation

Phase I (preliminary evaluation) involved initial analysis of existing evaluation data. The purpose of this phase was to report the utilisation of the TNCC in WA, as well as to report past participants’ evaluation of the TNCC. The results from the preliminary evaluation provided a demographic description of TNCC application across WA and informed the design of data collection tools for a more detailed evaluation of TNCC outcomes in Phase II (retrospective evaluation).

3.5.1 Participants

Participants of Phase I, Cohort 1, were recruited from a total of 556 registered nurses from WA who had attended the TNCC over 2009–2012.

3.5.2 Recruitment

On completing a TNCC application form, potential participants agreed that (de-identified) data collected by the WATEC could be used for evaluation purposes. The TNCC participants were recruited by the WATEC and application forms were submitted to the WATEC prior to the TNCC attendance.

3.5.3 Data collection

Demographic data and course evaluations were collected in this phase of the research. The TNCC application form (see Appendix 2) was completed by all TNCC participants before participation, and the TNCC evaluation forms (see Appendix 3) were completed immediately after course participation. The compiled TNCC application and evaluation data were provided to the researcher electronically by the WATEC.

Demographic data were collected from the initial TNCC application forms. The TNCC evaluation form consisted of five questions, five statements and a section for open-ended responses. Participants of the TNCC were asked to rate the questions and statements on a four-point Likert scale: excellent, good, fair, or poor. The open-ended response question at the end of the TNCC evaluation form asked participants to provide any further comments regarding their experience of the course.
3.5.4 Data analysis

Data cleaning and coding was undertaken prior to the demographic and evaluation data being entered into R software, a statistical computing and graphics program. Frequency distribution and some comparative analysis of demographic data were conducted.

The open-ended responses were retrieved from the TNCC evaluation forms and entered into QSR NVivo 10 software for coding and data management purposes. The frequency of comment topic areas was identified and reported. Content analysis of the qualitative data was checked by a second researcher to ensure accuracy. It was first analysed by one researcher then checked by the second. Content analysis of this group of qualitative data used an inductive approach determined by the aim of the study, because of the lack of knowledge on TNCC in the literature (Elo & Kyngas, 2008). The inductive content analysis followed the steps of open coding or creating nodes, creating categories and abstraction (Elo & Kyngas, 2008). According to Hsieh and Shannon (2005), there are three types of qualitative content analysis: conventional, directed and summative. Because of the limited literature on TNCC evaluation, the conventional content analysis approach, which involves deriving coding categories directly from the text data, was used to analyse the open-ended responses. The researcher read all transcripts from beginning to end, highlighting text that described different aspects of the TNCC, then attempted to limit these developing nodes as much as possible. After open coding of half of the transcripts, the researcher decided on the preliminary nodes, and coded the remaining transcripts using these nodes, adding new nodes when encountering data that did not fit an existing node. After all transcripts were coded, the researcher examined the data; some nodes were combined during this process, while others were split into sub-nodes. Finally, the researcher examined the final nodes to organise them into a hierarchical structure.

The results from the demographic and evaluation data analysis provided valuable information to guide the design of survey and interview questions for more detailed evaluation in Phase II.

3.6 Phase II: Retrospective Evaluation

Phase II (retrospective evaluation) involved the evaluation of past participants’ perception of knowledge and skills improvement in clinical practice. The purposes of this phase were to evaluate past participants’ satisfaction with the TNCC, whether it achieved
the aim of improving trauma nursing knowledge and skills, and to guide the development of a pre- and post-participation TNCC evaluation tool to be applied in Phase III.

3.6.1 Participants

Participants of Phase II, Cohort 2, included TNCC participants who had attended the course over 2009–2013 (Cohort 1 plus TNCC participants attending in 2013).

3.6.2 Recruitment

Recruitment took place in 2013. Those who had attended the TNCC prior to 2013 were contacted by the WATEC via email and informed of the opportunity to participate in the study. Participant Information Sheets (see Appendix 4) were distributed by the WATEC via email. Consent was implied by providing contact emails to researchers and responding to the survey. Participants of the TNCC run in 2013 were recruited by the WATEC at each course delivered at various metropolitan and rural health care settings in WA.

Through the preferred email address provided by consenting participants, researchers were able to send the electronic survey for completion. Included in the survey was a question asking whether the participant would be willing to participate in an interview. Those responding in the affirmative were contacted by the researcher via email or telephone and a suitable interview was arranged.

Senior nurse interviewees were purposively recruited by identifying the TNCC participants’ places of employment provided in the demographic data. The quantitative demographic results revealed the locations where most TNCC participants were practicing after course participation. Purposive sampling ensured a rural location was included to ensure the perspectives of those practicing in regional and remote areas of WA were captured. Participation in an interview implied consent, as stated in the Participation Information Sheet.

3.6.3 Data collection

Data collection methods used in this phase consisted of a retrospective survey and the TNCC participant and senior nurse interviews. The data collection tool used to collect the quantitative data was the TNCC skills, knowledge and evaluation survey (see Appendix 5). Data collection tools used to collect qualitative data in this phase were the
retrospective interview questions, including both the TNCC participant interview questions (see Appendix 6) and the SRN interview questions (see Appendix 7).

3.6.3.1 Quantitative data collection

The Cohort 2 TNCC participants received an email containing a link to the retrospective survey hosted by SurveyMonkey. This was distributed by WATEC staff to ensure confidentiality and avoid researcher bias. Follow-up emails were distributed by WATEC staff after the first initial email to maximise the response rate.

3.6.3.2 Qualitative data collection

The TNCC participant and SRN interviews occurred in three formats: individual face-to-face interview, telephone interview and focus group interview. The choice of interview format was made considering the interviewees’ location, availability of time and the possibility for sufficient numbers to form a focus group in a designated setting. For example, a telephone interview was used mainly for rural and remote interviewees using teleconference facilities connecting the researcher and interviewees.

The interviewer leading the interviews was supervised by an experienced interviewer for the first two interviews. The remaining interviews were conducted by the researcher independently. Data saturation was achieved after repeated comments on TNCC appeared in interviews, and the interview process was brought to a close.

At each interview, the interviewer gave a formal introduction along with the background to the study. The interviews lasted for 30-45 minutes, and were conducted using the pre-designed questions with prompts to illicit further information. Each interview was audio recorded and transcribed verbatim by a professional transcriber, cross-checked by the interviewer. Participant and SRN names were masked during transcribing and de-identified both in the analysis and reporting of results to ensure confidentiality.

SRN interviews were conducted after the participants’ interviews for the purpose of further assessment of the TNCC’s effectiveness on participants’ knowledge and skills improvement from the observers’ views. The TNCC SRN interview questions were designed based on the TNCC participant interview questions, with minor adjustments to suit the situations of senior nurses as both interviewees and observers.
Interview procedures such as setting, scheduling and permission obtaining, audio recording, transcribing and information verification were all conducted following the same interview protocol developed during the TNCC participant interview period.

3.6.4 Data analysis

The purpose of the quantitative data analysis was to identify TNCC participants’ perceptions of the course; in particular, whether the TNCC had helped improve their knowledge and skills in trauma settings. SurveyMonkey was used to analyse survey data because of its ease as an online survey tool and ability to clearly present descriptive statistics.

The purpose of the qualitative data analysis in this phase was to explain, refine and elaborate the quantitative results in greater detail and depth. Qualitative data were analysed with the QSR NVivo 10 software. The interview transcripts from the TNCC participants and SRNs, together with the open-ended responses from the retrospective survey, were stored using the QSR NVivo 10 software. Nodes were created using the interview question headings. Sub-nodes were created after the contents had been analysed from the interview answers.

Content analysis of this group of qualitative data used the same inductive method as the Phase I qualitative data analysis process (Elo & Kyngas, 2008). The inductive content analysis followed the same steps of open coding or creating nodes, creating categories and abstraction as Phase I (Elo & Kyngas, 2008). Because of the limited literature on TNCC evaluation, a conventional content analysis approach was used in analysing the interview transcripts (Hsieh & Shannon, 2005). The researcher followed the same steps and performed the same actions as in Phase I to analyse all interview transcripts.

Results of this stage were able to evaluate in further detail the TNCC participants and colleagues’ perceptions of how well the TNCC had prepared and assisted participants to care for trauma patients. It also assisted the researcher to develop surveys for the prospective evaluation of the TNCC undertaken in Phase III.
3.7 Phase III: Prospective Evaluation

Phase III (prospective evaluation) involved comparison of TNCC participants’ perceptions of knowledge and skills improvement in their clinical practice before and after TNCC participation. The results of this phase sought to provide more robust information on whether the TNCC meets learning needs and to what degree participants experience an improvement in their knowledge and skills in caring for trauma patients.

3.7.1 Participants

Participants in Phase III (prospective evaluation), Cohort 3, included the TNCC participants who completed the course in 2014.

3.7.2 Recruitment

Phase III participants were recruited by the WATEC before each TNCC delivered at the Clinical Teaching and Evaluation Centre (CTEC) in the Perth metropolitan area and various rural health care settings in WA. Participant Information Sheets (see Appendix 8) were circulated, and Consent Forms returned via email from those willing to participate prior to attendance at the TNCC. It was reiterated by the WATEC that there was no obligation to participate and this would in no way influence the delivery of the TNCC or their relationship with the WATEC staff delivering the course.

3.7.3 Data collection

Data collection of this phase commenced in April 2014 and finished in December 2014. Unfortunately, the first group of TNCC participants in March 2014 were not included in the data collection because of the lengthy process for the prospective survey design. Data collection tools used were the pre- and post-participation surveys (see Appendix 9).

The design of the data collection tools, focused on the main evaluation components of knowledge, skills, and course evaluation, were guided by the data analysis of previous phases. The prospective surveys of this phase were similar to the retrospective surveys, with minor adjustments to suit the prospective situation. Both the pre-participation and post-participation surveys contained similar items for the purpose of conducting comparative analysis between the time points that the WATEC distributed both surveys. The post-participation survey contained the same items as the previous retrospective
survey in Phase II. The SurveyMonkey web-link of the pre-participation knowledge, skills and evaluation survey was emailed to participants by WATEC staff two weeks prior to the course, with follow-up emails to maximise the response rate. The SurveyMonkey web-link of the post-participation knowledge, skills and evaluation survey was emailed to TNCC participants in 2014, some four weeks and three months after course participation. The timeframe was decided in the light of findings of the literature review that three to six months’ post-course attendance was the optimal time for knowledge retention (Ali et al., 1996). There was no sample size calculation in this phase, since the data collection aimed to capture as many 2014 TNCC participants as possible.

3.7.4 Data analysis

SurveyMonkey was used to manage and analyse basic descriptive statistics of the prospective survey results. Comparative analysis, including both collective comparison and matched respondent cross comparison between the pre- and post-participation survey results, were conducted using the SAS 9.4 software.

There was no unique identifier used for the purpose of de-identifying respondents’ names and matching the pre- versus post-participation respondents, because of confidentiality considerations. After careful consideration, the researchers decided that the use of the unique identifier to identify any individual pre- and post-participation survey respondent was not necessary. Apart from confidentiality considerations, the following two reasons contributed to this decision. First, some studies reported that the non-use of the unique identifier or anonymous survey may influence survey response rates (Murdoch et al., 2014). Second, although participants were not asked for names, other pieces of information such as IP address and detailed demographic answers (sex, age, employment organisation and department, education level and so on, especially in a small sample with low diversity such as the Cohort 3 TNCC participants group) provided sufficient information for researchers to identify individual TNCC participants who answered both the pre- and post-participation survey. To identify respondents who answered both pre- and post-participation surveys, manual matching of identical demographic information was performed. A total of 35 matched respondents who answered both pre- and post-participation surveys were identified. Comparative analysis of these 35 matched respondents was conducted using the SAS 9.4 software.
The open-ended responses retrieved from pre- and post-participation knowledge, skills and evaluation surveys were entered and coded, and content analysed by the QSR NVivo 10 software. Content analysis of this group of qualitative data used the same inductive method as the Phase I qualitative data analysis process (Elo & Kyngas, 2008). The inductive content analysis followed the same steps of open coding or creating nodes, creating categories and abstraction (Elo & Kyngas, 2008). Because of the limited literature on TNCC evaluation, a conventional content analysis approach was used in analysing the open-ended responses (Hsieh & Shannon, 2005). The researcher followed the same steps and performed the same actions as in Phase I to analyse all open-ended response transcripts.

### 3.8 Rigour

Rigour has been defined by Andrew and Halcomb (2009, p. xvi) as the ‘thoroughness, accuracy, confirmability and ethical soundness of all aspects of a study’s design’. It refers to the degree of an evaluation study’s theoretical and methodological robustness and the trustworthiness of its research process and publication (Cameron, 2011). The term trustworthiness is often used in qualitative research, proposed by Lincoln and Guba (1985) as a ‘goodness to fit’ criteria, equivalent to the term rigour in quantitative research. Andrew and Halcomb (2009, p. xvii) defined trustworthiness as the ‘degree of confidence that the researcher has that their qualitative data and findings are credible, transferable and dependable’. According to Lincoln and Guba (1985), there are four criteria to judge the trustworthiness of qualitative research (see Table 3.2).

#### Table 3.2: Criteria for Judging Qualitative Research

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Credibility (in preference to internal validity)</td>
<td>Is about determining how congruent the findings are with reality.</td>
</tr>
<tr>
<td>Transferability (in preference to external validity/generalisability)</td>
<td>Requires the researcher to provide sufficient data and context to enable the audience to judge whether the findings can be applied to other situations and contexts.</td>
</tr>
<tr>
<td>Dependability (in preference to reliability)</td>
<td>Having sufficient details and documentation of methods employed that the study can be scrutinised and replicated.</td>
</tr>
<tr>
<td>Confirmability (in preference to objectivity)</td>
<td>Refers to ensuring that the study’s findings are the result of the experiences of the informants rather than the preferences of the researcher(s) and can be achieved through an audit trail of the raw data, memos, notes, data reduction and analysis.</td>
</tr>
</tbody>
</table>
Similarly, Andrew and Halcomb (2009) identified four criteria for judging quantitative research (see Table 3.3).

### Table 3.3: Criteria for Judging Quantitative Research

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Validity</td>
<td>The degree to which a research tool measures what it is supposed to measure</td>
</tr>
<tr>
<td>Reliability</td>
<td>The degree of consistency with which a research tool measures what it is supposed to measure</td>
</tr>
<tr>
<td>Replicability</td>
<td>The same interpretation will be drawn if the study is repeated by different researchers with different respondents following the same methods</td>
</tr>
<tr>
<td>Generalisability</td>
<td>The degree to which we can infer the findings from the research sample to the population</td>
</tr>
</tbody>
</table>

In recent years, with the increasing use of mixed methods research, some pre-determined criteria to judge rigour or trustworthiness has been called for. Sale and Brazil (2004) introduced four criteria using different terms to judge mixed methods research, in parallel with the quantitative and qualitative criteria (see Table 3.4).

### Table 3.4: Criteria for Judging Mixed Methods Research

<table>
<thead>
<tr>
<th>Quantitative research</th>
<th>Qualitative research</th>
<th>Mixed methods research</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internal validity</td>
<td>Credibility</td>
<td>Truth value</td>
</tr>
<tr>
<td>External validity/</td>
<td>Transferability/</td>
<td>Applicability</td>
</tr>
<tr>
<td>Generalisability</td>
<td>Fittingness</td>
<td></td>
</tr>
<tr>
<td>Reliability</td>
<td>Dependability</td>
<td>Consistency</td>
</tr>
<tr>
<td>Objectivity</td>
<td>Confirmability</td>
<td>Neutrality</td>
</tr>
</tbody>
</table>

Through their literature review searching for quality appraisal criteria for mixed methods research, Sale and Brazil (2004) listed the above four criteria or goals to judge a mixed methods study’s rigour. However, they did not provide any further explanation or definition of the quality indicators, but only the parallel terms for quantitative and qualitative rigour indicators. Further development and explanation of these quality indicators are needed, as noted by Sale and Brazil (2004). The lack of consensus on criteria to judge the rigour of mixed methods studies is a widely held concern by researchers (Bryman, Becker, & Sempik, 2008).
Further, Cameron (2011) pointed out that the criteria to judge the rigour of mixed methods research is in the development stage, since mixed methods research is a recent and emerging movement.

To ensure the trustworthiness of qualitative research, Creswell (2009) made the following suggestions: check transcripts for accuracy, cross-check codes and documentation, triangulate different data, members check findings, utilise a rich description of the findings, undertake bias clarification, spend prolonged time, use peer debriefings or even external auditor review, utilise good documentation of research procedures and tools and develop protocol to aid generalisation.

Most of these suggestions have been followed in the qualitative data collection and analysis stage in this study. For instance, all interview transcripts were checked by researchers for accuracy prior to being entered into the NVivo software for analysis. Cross-check of nodes and findings were performed by the second researcher. A rich description of interview data is presented in the results chapter. To control bias, an interviewer was trained by another experienced interviewer, and the TNCC instructors among interviewees were identified and their transcripts excluded from data analysis. Good documentation of research procedures and the data collection tool design are presented throughout these chapters.

To ensure the rigour of this descriptive study combining both quantitative and qualitative methods, the following measures have been undertaken:

- The justification for using both quantitative and qualitative methods for this study and the choice of such a research design were clearly identified and stated.
- The purpose, priority and sequence of methods were clearly set and stated.
- Both quantitative and qualitative sampling, data collection and analysis were conducted with strategies and clearly identified in the three phases of the study.
- The development of survey and interview questions have passed through member checking, code cross-checking and experienced researcher’s review, as well as application of the four levels of the Kirkpatrick training evaluation model.
- Rich and thick descriptions of interviews are presented.
• There was triangulation of three sources of information (participants’ interviews, open-ended responses from the surveys and senior nurses’ interviews) analysed in phases.
• The design of data collection tools included input from the WATEC, the TNCC provider in WA.

3.9 Ethics

Ethics approval for Phases I, II and III of this study was granted and renewed annually by the UWA Human Research Ethics Office (see Appendix 10). Participants of the TNCC involved in the first two phases of the study gave written consent for their information and previously collected data to be utilised for research and evaluation purposes. All data provided to the university by WATEC had been de-identified. The Chair of the WATEC provided approval for the use of these data in this study. Participation in the study was voluntary and participants were able to withdraw at any time during the research process, with participation having no impact on the participants’ TNCC outcomes or their relationship with the TNCC providers, as identified in the Participant Information Sheet.

The researchers did not hold any information about the study participants other than that participants provided the researcher with their email address to participate in an interview. Consent was implied by the completion of the web-based surveys.

Data collected was stored securely following the university’s data management policy. The study processes complied with the National Health and Medical Research Council’s National Statement of Ethical Conduct in Human Research.

Ethics amendment was sought and approved in November 2013 because of the difficulty in accruing sufficient numbers of interviewees in any designated setting at certain times to form focus groups (see Appendix 11). Interview forms were reworded from focus group interview to multiple forms of interviews that were not limited to focus group interviews, individual and telephone interviews. The Participant Information Sheet was revised with approval (see Appendix 8).
3.10 Conclusion

The aim of this study is to assess the perceived effectiveness of the TNCC on WA nurses’ knowledge and skills in caring for trauma patients. This study has been defined as a descriptive study, adopting outcome evaluation as its methodology, with Kirkpatrick’s training evaluation model as its theoretical framework and using both quantitative and qualitative methods in its research design.

Methods used for data collection included the survey, both retrospective and prospective (pre and post participation), and interviews in multiple forms, of both participants and senior nurses as observers. Measures have been applied at multiple points of the research process to maximise the rigour of the quantitative component and trustworthiness of the qualitative component.

This outcome evaluation descriptive study was designed as a three-phase study, namely preliminary, retrospective and prospective evaluations for data collection and analysis. Data collection in these three phases was completed through three cohorts of participants, including Cohort 1, 2009–2012 TNCC participants, Cohort 2, 2009–2013 TNCC participants (Cohort 1 + 2013 TNCC participants) and Cohort 3, 2014 TNCC participants. Different data collection methods and tools were used in the three phases. Data collection tool design followed the four levels of Kirkpatrick’s training evaluation model progressively to achieve the study’s aim and answer the study’s research questions.

Ethics approval and ethics amendments were sought and abided by during the research process to protect the human research subjects. The next chapter, the results chapter, reports all findings after application of the above methodology and research design for the completion of this significant TNCC outcome evaluation study.
Chapter 4: Results

4.1 Introduction

This chapter presents the results of the study, which aimed to evaluate the perceived TNCC participants’ knowledge development and skills application after attending the TNCC. The results are presented in accordance with the sequence of data collection. First, Phase I findings of the preliminary evaluation of the TNCC by participants from 2009–2012. Second, Phase II findings of a retrospective survey of TNCC participants from 2009–2013 and interviews of both TNCC participants and senior nurses working alongside these nurses in clinical settings. Last, Phase III results from a prospective evaluation of pre- and post-TNCC attendance survey data collected from 2014 TNCC participants (see Figure 4.1).

<table>
<thead>
<tr>
<th>Participant group</th>
<th>Phase I Preliminary evaluation</th>
<th>Phase II Retrospective evaluation</th>
<th>Phase III Prospective evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cohort 1</td>
<td>2009–2012 TNCC participants</td>
<td>Cohort 2 2009–2013 TNCC participants (Cohort 1 + 2013 TNCC participants)</td>
<td>Cohort 3 2014 TNCC participants</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Data collection methods</th>
<th>Phase I Preliminary evaluation</th>
<th>Phase II Retrospective evaluation</th>
<th>Phase III Prospective evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demographic data</td>
<td>Retrospective survey</td>
<td>Prospective surveys</td>
<td></td>
</tr>
<tr>
<td>TNCC evaluation</td>
<td>TNCC participant and senior nurse interviews</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Data collection tools</th>
<th>Phase I Preliminary evaluation</th>
<th>Phase II Retrospective evaluation</th>
<th>Phase III Prospective evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td>TNCC application form</td>
<td>TNCC knowledge, skills and evaluation survey</td>
<td>Pre-participation knowledge and skills survey</td>
<td></td>
</tr>
<tr>
<td>TNCC evaluation form</td>
<td></td>
<td>Post-participation knowledge, skills and evaluation survey</td>
<td></td>
</tr>
</tbody>
</table>

Figure 4.1: TNCC Evaluation Process
4.2 Phase I: Preliminary Evaluation

The preliminary evaluation aimed to analyse existing data collected by the course administrators, the WATEC, to report on the utilisation and participant evaluation of the TNCC in WA. The analysis of this data was used to guide future, comprehensive evaluation of the application of the TNCC in WA (i.e., Phases II and III). Data had been collected by the WATEC from participants attending the TNCC between 2009 and 2012, using the TNCC application form (see Appendix 2) completed prior to participation, and the TNCC evaluation form (see Appendix 3) completed at the end of the two-day course. These tools provided demographic information on the TNCC participants and a Likert-scale evaluation of the TNCC with open-ended evaluation comments.

4.2.1 Demographic data

A total of 566 WA nurses participated in the 37 TNCC delivered between January 2009 and December 2012. Of the 566 participants, demographic data were analysed through the original TNCC application form completed by the 556 consenting participants, achieving a response rate of 98.2%.

The number of participants in each TNCC ranged from 10–17 (mean = 14.6). The 37 TNCC were delivered at various locations throughout metropolitan and rural locations of WA (see Figure 4.2 and Table 4.1), with the majority convened in the metropolitan area. Of the 556 participants, 303 (54.5%) resided in metropolitan areas, while 248 (44.6%) resided in rural areas. Several participants travelled from rural locations to attend a TNCC held in the metropolitan area. Five (0.9%) participants had travelled from locations outside of WA to participate in the course. Of the 556 participants, 548 TNCC evaluation forms were received. A total of 399 (72.8%) of these participants attended the TNCC in a metropolitan location and the remaining 149 (27.2%) participants attended the TNCC at a rural location. The TNCC delivery locations are circled in red on the WA government regions map (see Figure 4.2)
The standard application form, as provided by the ENA, did not ask participants to specify their age. Similarly, information on gender was not specifically requested. Gender could
not be gauged from the title used by the participant, since some participants used non-gender-specific professional position titles. Therefore, this field was removed.

On the TNCC application form, only six (1.1%) of 556 participants provided their highest level of education as degree level; one (0.1%) participant answered graduate diploma/certificate and one (0.1%) masters’ levels. All other 548 (98%) participants did not provide additional information on this since it was not asked on the application form.

At the time of participating in the TNCC, 296 of the 556 participants were employed in the WA metropolitan health services, with the greatest proportions of participants employed at Sir Charles Gairdner Hospital (9.4%, N = 52), RPH (9.2%, N = 51) and Fremantle Hospital (7%, N = 39) (see Table 4.2).

<table>
<thead>
<tr>
<th>Health Service</th>
<th>N (556)</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>WA Metropolitan Health Services</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sir Charles Gairdner Hospital</td>
<td>52</td>
<td>9.4</td>
</tr>
<tr>
<td>Royal Perth Hospital</td>
<td>51</td>
<td>9.2</td>
</tr>
<tr>
<td>Fremantle Hospital</td>
<td>39</td>
<td>7.0</td>
</tr>
<tr>
<td>Armadale Kelmscott Memorial Hospital</td>
<td>32</td>
<td>5.8</td>
</tr>
<tr>
<td>Rockingham General Hospital</td>
<td>29</td>
<td>5.2</td>
</tr>
<tr>
<td>Princess Margaret Hospital</td>
<td>24</td>
<td>4.3</td>
</tr>
<tr>
<td>Swan Kalamunda Health Service</td>
<td>24</td>
<td>4.3</td>
</tr>
<tr>
<td>Joondalup Health Campus</td>
<td>22</td>
<td>4.0</td>
</tr>
<tr>
<td>Peel Health Campus</td>
<td>13</td>
<td>2.3</td>
</tr>
<tr>
<td>St John of God Murdoch</td>
<td>10</td>
<td>1.8</td>
</tr>
<tr>
<td><strong>WA Country Health Services</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>South West</td>
<td>45</td>
<td>8.1</td>
</tr>
<tr>
<td>Midwest</td>
<td>35</td>
<td>6.3</td>
</tr>
<tr>
<td>Pilbara</td>
<td>35</td>
<td>6.3</td>
</tr>
<tr>
<td>Goldfields</td>
<td>30</td>
<td>5.4</td>
</tr>
<tr>
<td>Wheatbelt</td>
<td>27</td>
<td>4.9</td>
</tr>
<tr>
<td>Great Southern</td>
<td>21</td>
<td>3.8</td>
</tr>
<tr>
<td>Kimberley</td>
<td>16</td>
<td>2.9</td>
</tr>
<tr>
<td>Other agencies</td>
<td>51</td>
<td>9.2</td>
</tr>
</tbody>
</table>

Note: Percentages rounded to one decimal place.
A total of 299 (37.6%) of the 556 TNCC participants were employed in the WA Country Health Service (WACHS), which includes at least 54 health care settings across rural WA. The greatest proportion of rural participants were employed in the south west region of WA (8.1%, N = 45), followed by the Midwest and Pilbara regions (6.3% each). A further 51 (9.2%) were employed by other agencies, including the Royal Flying Doctor Service (RFDS), mine sites or nursing agencies (see Figure 4.3 and Table 4.2).

The vast majority of participants reported their current area of employment to be in a hospital emergency department (ED) (77.9%), with other options including ICU (2.9%), community areas (2.5%), trauma units (1.6%), general wards (1.1%), nurse education (1.1%), nurse management (1.1%), flight nurses (4.3%) and other areas, such as mining, offshore oil and gas or for a nursing agency (0.7%) (see Figure 4.4).
Participants were asked to identify their current position titles on the TNCC application form. These responses were coded according to the Department of Health WA career structure (Western Australia Department of Health, 2016) and definitions from the AIHW (2016c). It should be noted all hospitals except one (St John of God Murdoch) were public health facilities. Several respondents did not provide sufficient detail to classify their positions—these included responses such as trauma coordinator or trauma case manager (usually Level 3 or 4) and community nurse (may be employed at varying levels depending on experience or role requirements).

Those employed as paramedics (N = 2) did not hold a nursing position at the time of the TNCC participation. Most of the TNCC participants either held a registered nurse (RN) position (57.4%) or a clinical nurse (CN) position (23.9%). Staff development nurses comprised 4.7% of the total TNCC participants, with 2.5% classified as clinical nurse specialists, 0.9% area managers, 0.9% staff development educators, 0.7% clinical nurse managers, 0.5% nurse practitioners, 0.4% nurse directors and 0.2% clinical nurse consultants (see Table 4.3).
Table 4.3: Position Held at Time of TNCC Participation

<table>
<thead>
<tr>
<th>Level</th>
<th>Position</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level 1</td>
<td>Registered nurse</td>
<td>319</td>
<td>57.4</td>
</tr>
<tr>
<td>Level 2</td>
<td>Clinical nurse</td>
<td>133</td>
<td>23.9</td>
</tr>
<tr>
<td></td>
<td>Staff development nurse</td>
<td>26</td>
<td>4.7</td>
</tr>
<tr>
<td></td>
<td>Area manager</td>
<td>5</td>
<td>0.9</td>
</tr>
<tr>
<td>Level 3</td>
<td>Clinical nurse manager</td>
<td>4</td>
<td>0.7</td>
</tr>
<tr>
<td></td>
<td>Clinical nurse specialist</td>
<td>14</td>
<td>2.5</td>
</tr>
<tr>
<td></td>
<td>Clinical nurse consultant</td>
<td>1</td>
<td>0.2</td>
</tr>
<tr>
<td></td>
<td>Trauma coordinator/case manager</td>
<td>5</td>
<td>0.9</td>
</tr>
<tr>
<td>Level 3 or 4</td>
<td>Staff development educator</td>
<td>5</td>
<td>0.9</td>
</tr>
<tr>
<td>Level 5</td>
<td>Nursing director</td>
<td>2</td>
<td>0.4</td>
</tr>
<tr>
<td>Non-determinant</td>
<td>Nurse practitioner</td>
<td>3</td>
<td>0.5</td>
</tr>
<tr>
<td>Non-nursing</td>
<td>Paramedic</td>
<td>2</td>
<td>0.4</td>
</tr>
<tr>
<td></td>
<td>Unknown</td>
<td>37</td>
<td>6.7</td>
</tr>
</tbody>
</table>

Notes: percentages rounded to one decimal place; sourced from WA health department career structure.

A total of 30% of participants reported 0–2 years of emergency nursing experience, 29% reported 2–7 years of emergency nursing experience and 24% reported greater than 7 years of emergency nursing experience. A total of 95 (17%) participants did not respond to this question.

A total of 39 participants (7%) identified that they had previously attended a TNCC. Repeated attendance may be a result of verification lapsing or a desire to undertake the TNCC over again to refresh trauma nursing skills. Six participants (1.1%) reported having completed another trauma course other than the TNCC; however, details of the specific trauma courses attended were not collected.

### 4.2.2 Trauma Nursing Core Course evaluation

There were 10 questions contained in the TNCC evaluation form, with a Likert rating scale response set of excellent, good, fair and poor (see Appendix 3). A total of 548 TNCC evaluation forms were received and analysed from the 556 consenting participants. Participant responses (response rate 98.5%) to the TNCC evaluation data are presented in Table 4.4 below.
<table>
<thead>
<tr>
<th>TNCC Evaluation Question</th>
<th>Number of responses / 548</th>
<th>Evaluation Response</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Q1: How well did this program achieve its goals?</td>
<td>N = 527</td>
<td>Excellent</td>
<td>390</td>
<td>74</td>
<td>130</td>
<td>24.7</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Good</td>
<td>120</td>
<td>23.7</td>
<td>4</td>
<td>0.8</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Fair</td>
<td>109</td>
<td>20.6</td>
<td>5</td>
<td>0.9</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Poor</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Q2: How relevant were the program goals to learner needs?</td>
<td>N = 531</td>
<td>Excellent</td>
<td>401</td>
<td>75.5</td>
<td>126</td>
<td>23.7</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Good</td>
<td>118</td>
<td>22.4</td>
<td>4</td>
<td>0.8</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Fair</td>
<td>109</td>
<td>20.6</td>
<td>5</td>
<td>0.9</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Poor</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Q3: The skills taught correlate with the core knowledge needed to care for the trauma/paediatric patient</td>
<td>N = 530</td>
<td>Excellent</td>
<td>416</td>
<td>78.5</td>
<td>109</td>
<td>20.6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Good</td>
<td>109</td>
<td>20.6</td>
<td>5</td>
<td>0.9</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Fair</td>
<td>109</td>
<td>20.6</td>
<td>5</td>
<td>0.9</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Poor</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Q4: The course was pertinent to the current or perspective practice</td>
<td>N = 531</td>
<td>Excellent</td>
<td>379</td>
<td>71.4</td>
<td>140</td>
<td>26.4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Good</td>
<td>134</td>
<td>25.4</td>
<td>44</td>
<td>8.3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Fair</td>
<td>109</td>
<td>20.6</td>
<td>5</td>
<td>0.9</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Poor</td>
<td>2</td>
<td>0.4</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Q5: The audiovisuals contributed to the presentation</td>
<td>N = 531</td>
<td>Excellent</td>
<td>294</td>
<td>55.4</td>
<td>209</td>
<td>39.4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Good</td>
<td>142</td>
<td>27.1</td>
<td>59</td>
<td>11.2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Fair</td>
<td>109</td>
<td>20.6</td>
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<td>0.9</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Poor</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Q6: The multiple-choice exam reflected course content</td>
<td>N = 531</td>
<td>Excellent</td>
<td>205</td>
<td>38.6</td>
<td>266</td>
<td>50.1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Good</td>
<td>103</td>
<td>19.6</td>
<td>97</td>
<td>18.4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Fair</td>
<td>109</td>
<td>20.6</td>
<td>5</td>
<td>0.9</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Poor</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Q7: Please rate the physical facilities</td>
<td>N = 530</td>
<td>Excellent</td>
<td>302</td>
<td>57</td>
<td>188</td>
<td>35.5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Good</td>
<td>138</td>
<td>26.2</td>
<td>59</td>
<td>11.2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Fair</td>
<td>109</td>
<td>20.6</td>
<td>5</td>
<td>0.9</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Poor</td>
<td>2</td>
<td>0.4</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Q8: Please rate the overall quality of the program</td>
<td>N = 531</td>
<td>Excellent</td>
<td>401</td>
<td>75.5</td>
<td>124</td>
<td>23.4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Good</td>
<td>149</td>
<td>28.2</td>
<td>42</td>
<td>8.3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Fair</td>
<td>109</td>
<td>20.6</td>
<td>5</td>
<td>0.9</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Poor</td>
<td>2</td>
<td>0.4</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Q9: Please rate the effectiveness of the teaching methods (lecture, psychomotor skills station format)</td>
<td>N = 532</td>
<td>Excellent</td>
<td>373</td>
<td>70.1</td>
<td>146</td>
<td>27.4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Good</td>
<td>130</td>
<td>24.7</td>
<td>4</td>
<td>0.8</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Fair</td>
<td>109</td>
<td>20.6</td>
<td>5</td>
<td>0.9</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Poor</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Q10: Please rate the relevance of content to the educational session objective</td>
<td>N = 532</td>
<td>Excellent</td>
<td>387</td>
<td>72.7</td>
<td>141</td>
<td>26.5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Good</td>
<td>127</td>
<td>24.2</td>
<td>35</td>
<td>6.6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Fair</td>
<td>109</td>
<td>20.6</td>
<td>5</td>
<td>0.9</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Poor</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Note: Percentages rounded to one decimal place
The majority of participants positively rated all items on the TNCC evaluation form, with good and excellent ratings making up between 88.7–99.2% of item responses. In summary, course participants reported the TNCC achieved its intended goals (98.7%, N = 520), was relevant to learners’ needs (99.3%, N = 527) and course content reflected current trauma nursing practice (97.8%, N = 519). Participants were also positive in their evaluation of the various physical facilities (92.5%, N = 490) and teaching methods used (97.5%, N = 519). The only item not rated as either excellent or good by at least 90% of participants was the multiple-choice aspect of course content, with 10.9% (N = 58) rating this item fair and 0.4% (N = 2) rating it as poor. Overall, 75.5% of participants rated the quality of the course as excellent, and 23.4% rated it as good.

Each evaluation item response was compared between metropolitan and rural participants. Two items showed a statistically significant difference in responses, namely rating of the physical facilities (p = 0.017) and the effectiveness of teaching methods used (p = 0.045). Rural participants (N = 146) rated the physical facilities less positively than the metropolitan participants (N = 383). An excellent rating score for the physical facilities was received by 60.7% of metropolitan participants compared with 47.3% of rural participants. While there was a greater percentage of rural participants responding with the rating of fair, the actual number of participants providing this response was higher for the metropolitan group (rural 10.3%, N = 15; metropolitan 5.7%, N = 22) (see Table 4.5).

It should be noted the majority of metropolitan courses (17 out of 24) were undertaken at the UWA’s CTEC, which houses a dedicated simulation and training facility. The rural TNCC locations included a variety of venues including hospital rooms with or without dedicated simulation facilities.

There was also a statistically significant difference in the ratings of teaching methods and effectiveness between the metropolitan and rural participant groups (p = 0.045). There was a higher percentage of rural participants rating this item excellent (74.8%) than metropolitan participants (68.3%) (see Table 4.6). The TNCC has maintained a consistent team of facilitators over the period of TNCC implementation 2009–2012.
Table 4.5: Comparative Rating of Physical Facilities between Metropolitan and Rural Participants

<table>
<thead>
<tr>
<th>TNCC evaluation question</th>
<th>Location</th>
<th>N</th>
<th>Excellent N</th>
<th>Excellent %</th>
<th>Good N</th>
<th>Good %</th>
<th>Fair N</th>
<th>Fair %</th>
<th>Poor N</th>
<th>Poor %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q7: Please rate the physical facilities</td>
<td>Metropolitan</td>
<td>384</td>
<td>233</td>
<td>60.7</td>
<td>128</td>
<td>33.3</td>
<td>22</td>
<td>5.7</td>
<td>1</td>
<td>0.3</td>
</tr>
<tr>
<td></td>
<td>Rural</td>
<td>146</td>
<td>69</td>
<td>47.3</td>
<td>60</td>
<td>41.1</td>
<td>15</td>
<td>10.3</td>
<td>2</td>
<td>1.4</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>530</td>
<td>302</td>
<td>57</td>
<td>188</td>
<td>35.5</td>
<td>37</td>
<td>7</td>
<td>3</td>
<td>0.6</td>
</tr>
</tbody>
</table>

Note: percentages rounded to one decimal place.

Table 4.6: Comparative Rating of the Effectiveness of Teaching Methods between Metropolitan and Rural Participants

<table>
<thead>
<tr>
<th>TNCC evaluation question</th>
<th>Location</th>
<th>N</th>
<th>Excellent N</th>
<th>Excellent %</th>
<th>Good N</th>
<th>Good %</th>
<th>Fair N</th>
<th>Fair %</th>
<th>Poor N</th>
<th>Poor %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q9: Please rate the effectiveness of the teaching methods (lecture, psychomotor skills station format)</td>
<td>Metropolitan</td>
<td>385</td>
<td>263</td>
<td>68.3</td>
<td>115</td>
<td>29.9</td>
<td>7</td>
<td>1.8</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Rural</td>
<td>147</td>
<td>110</td>
<td>74.8</td>
<td>31</td>
<td>21.1</td>
<td>5</td>
<td>3.4</td>
<td>1</td>
<td>0.7</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>532</td>
<td>373</td>
<td>70.1</td>
<td>146</td>
<td>27.4</td>
<td>12</td>
<td>2.3</td>
<td>1</td>
<td>0.2</td>
</tr>
</tbody>
</table>

Note: percentages rounded to one decimal place.
A total of 898 written comments were received, 877 from the TNCC evaluation form and 21 from emails sent to the TNCC Coordinator providing feedback on the TNCC. NVivo software was used to manage, order and categorise the data. Five main topic areas of feedback were identified, each with multiple sub-categories (see Table 4.7).

Table 4.7: Phase I Open-Ended Response Analysis

<table>
<thead>
<tr>
<th>Topic</th>
<th>References/comments</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assessment</td>
<td>Multiple-choice examination</td>
<td>19</td>
</tr>
<tr>
<td></td>
<td>Skills stations</td>
<td>59</td>
</tr>
<tr>
<td>Content</td>
<td>Australian content</td>
<td>31</td>
</tr>
<tr>
<td></td>
<td>Pre-reading</td>
<td>23</td>
</tr>
<tr>
<td>Delivery</td>
<td>Instructors:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Positive</td>
<td>202</td>
</tr>
<tr>
<td></td>
<td>• Negative</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>Timing</td>
<td>112</td>
</tr>
<tr>
<td>General feedback</td>
<td>Positive</td>
<td>112</td>
</tr>
<tr>
<td></td>
<td>Negative</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>Suggestions for improvement:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Practical</td>
<td>53</td>
</tr>
<tr>
<td></td>
<td>• Theory</td>
<td>29</td>
</tr>
<tr>
<td>Participant outcomes</td>
<td>Knowledge outcomes</td>
<td>31</td>
</tr>
<tr>
<td></td>
<td>Practice outcomes</td>
<td>14</td>
</tr>
</tbody>
</table>

Most comments received related to positive instructor feedback (N = 202), timing of TNCC delivery (N = 112) and general feedback of a positive nature (N = 112). Other topics discussed by the TNCC participants included the TNCC assessment, localisation of TNCC content to Australia and participants’ knowledge and practice outcomes.

Of the 19 participant comments, eight reported that the multiple-choice examination was difficult, with five participants attributing this to vaguely worded questions. Few participants felt not all content tested in the multiple-choice examination was included in the course content delivered.
As one participant stated:

*Some of the questions on the exam are worded in such a way that it is very difficult to decide what they are asking.*

While several participants praised the set up and instructions of the psychomotor skills sessions (N = 25), the overwhelming majority of feedback regarding the skills station identified a need for more time practicing skills over the two-day course. Participants commented that smaller group numbers, more one-on-one time with instructors and more time for practice would improve their skills station experience:

*I would have liked more time on skill stations as I felt this was sometimes rushed, especially on the second day.*

*Felt a bit rushed with time limits on skill stations ... as never/rarely touched on final quarter of assessment/intervention processes.*

*Skill stations frustrating when you’re stopped at primary assessment as other participants require further instructor assistance, therefore my experience was hindered. The skill stations set up was appropriate for objectives.*

A total of 31 comments were made expressing that some modification of the TNCC content was desirable to make the course content more applicable and relevant to the Australian and WA trauma care context. Participants commented that some of the scenario and lecture content was ‘Americanised’:

*Would love to see more of this relevant to Australian situations but the examples provided were great and understand that (TNCC is an) international course.*

*Some of the course content was very ‘American’ and not exactly the practices we use here in WA.*

Several participants thanked staff for their efforts in developing and improving their knowledge base and nursing practice, with most stating they had learnt a lot from attending the TNCC, which would enhance their nursing practice of trauma patients (N = 21):

*Very challenging at times, but in a positive way.*
Learnt lots and feel more confident now to manage a trauma.

The content and skills learnt will assist me in my current role and development.

I feel I have grown from this course and am looking forward to sharing my knowledge.

Very useful to reinforce systematic assessment of patient(s) and to remind ourselves what we are looking for and why we do things.

While exhausting – invaluable and will change my practice and my patient care.

One of the most commented on topics was the timing of course delivery. Participants felt the lectures and skills stations were often rushed because of time constraints, providing limited time for questions, discussion or sharing of experiences. Also, many participants commented the days were long, sometimes running overtime. Several participants suggested the course would be better delivered in shorter days, over two-and-a-half or three days:

Needs to be run over three days to allow more practical sessions and learner input during lectures. Not enough time given to practical applications.

I feel this course would benefit from an extra ½ day as I felt that presenters of lectures rushed on the second day and you didn’t feel that you could discuss anything because that was eating into more time.

I think the course was cramped into two long days and would benefit from being a three-day course. This would allow greater concentration and more information/education to be retained.

The course compacted into two days is very tiring.

Despite the issues identified with the duration of the course and timing of content delivery, participants provided overwhelmingly positive feedback in relation to the instructors: 202 positive comments as opposed to 20 negative comments.

The negative instructor comments related to instructors being too softly spoken or speaking too fast, non-stimulating lectures where presenters read directly from their notes, and lecturers not being as knowledgeable about the subject they were presenting
as participants had expected. The positive instructor comments focused on the knowledgeable, interesting, enthusiastic and supportive instructors:

*Great staff with an obvious commitment to course content.*

*Even though the time restraints were obvious all presenters made time to address questions and concerns.*

*All instructors were extremely knowledgeable and obviously passionate about this course and the content they taught, which made the lectures interesting.*

*Great diversity of instructor experience, including work locations, to cover all bases.*

*All four instructors were fantastic, interested, motivated, with loads of experience and knowledge.*

The final topic commented on most by participants was positive feedback on the TNCC in general. The 112 comments praised the quality of the course and its organisation, identifying how much participants enjoyed their learning experience:

*I thoroughly enjoyed all aspects of the course.*

*Fantastic programme. Very informative and pertinent to my workplace.*

*Totally loved it, can’t wait to get back to work and deal with a trauma!*

*Fantastic course and will recommend to others.*

*A highly organised, informative course. Valuable for all RNs in ED/remote positions. Thanks, thoroughly enjoyable and worthwhile.*

*I cannot tell you enough what a difference those lectures and the different methods of teaching used made to me ... it finally all came together and I understood what the text had been trying to explain! Thank you again to each of you for sharing your knowledge and taking the time to teach such a great course! I have been and will continue to rave on about this course to fellow nurses.*

The 53 suggestions for improvement in relation to the practical skills station component of the TNCC reflect previous feedback suggesting more time to practice the skills stations and less time spent waiting for testing. The 29 suggestions for improving the theory
component of the TNCC included variable PowerPoint designs and more interaction during lectures.

4.3 Phase II: Retrospective Evaluation

The retrospective evaluation comprises both quantitative and qualitative evaluation methods. Quantitative data include the retrospective survey results providing demographic information, knowledge and skills development evaluation, course evaluation and the open-ended evaluation responses collected from Cohort 2 of the TNCC participant group 2009–2013 (Cohort 1 + 2013 TNCC participants) (see Figure 4.1). The survey (see Appendix 5) sought to comprehensively evaluate knowledge and skills of the TNCC participants retrospectively; development was informed by the Phase I preliminary evaluation results. Therefore, data collected from the original TNCC evaluation forms completed at the time of course participation in 2013 were not been used for this phase data analysis. Qualitative results of this phase consist of findings from the TNCC participant interviews and senior nurse colleague interviews using the retrospective interview schedule (see Appendix 12).

Data were collected at two time points: the beginning of 2013, from participants who attended the TNCC between 2009–2012, and the end of 2013, from participants attending the TNCC during that year. A total of 200 of the 2009–2012 participants responded to the retrospective survey, achieving a response rate of 36% (200/556). Only 29 of the 2013 participants responded to the retrospective survey, achieving a response rate of 15.4% (29/188). Therefore, a total response rate of 30.8% (229/744) was achieved. The combined analysis of retrospective survey results, 2009–2013, is presented below.

4.3.1 Demographic data

Information supplied by the WATEC shows that a total of 744 participants attended one of 49 TNCC delivered between January 2009 and December 2013. Course locations in 2009–2012 were presented in the Phase I preliminary evaluation (see Table 4.1). Course locations in 2013 include the CTEC in the Perth metropolitan area, which hosted 10 TNCC, as well as Geraldton and Broome in the WACHS, which hosted one TNCC each.

At the time of participating in the TNCC, 52% of respondents (N = 119) indicated their employment organisations were metropolitan health services and 32.8% (N = 75)
identified rural health services. The remaining 15.3% of respondents (N = 35) answered ‘other’, which included a variety of employers and employment avenues such as the RFDS, nursing agencies, paramedics, private practice, not-for-profit organisations, mining, offshore oil and gas companies, nurse education and nurse management.

The majority of retrospective survey respondents (68.1%, N = 156) reported their current employment as ED; ‘other’ was indicated by 27.9% of respondents (N = 64), to indicate RFDS flight nurse, community, offshore site medical service, agency, primary care, nurse education and paramedics. There were four (1.7%) respondents from an ICU. Only one (0.4%) respondent reported working in a Trauma Unit.

Participants were also asked to identify their position titles in the retrospective survey. These responses were coded according to the WA Department of Health career structure (Government of Western Australia, 2016) and definitions from the AIHW (2016c) (see Table 4.8). The majority of respondents were RNs (42.8%, N = 98) or CNs (28.8%, N = 66).

<table>
<thead>
<tr>
<th>Level</th>
<th>Position</th>
<th>Retrospective survey responses</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>N</td>
</tr>
<tr>
<td>Level 1</td>
<td>Registered nurse</td>
<td>98</td>
</tr>
<tr>
<td>Level 2</td>
<td>Clinical nurse</td>
<td>66</td>
</tr>
<tr>
<td></td>
<td>Staff development nurse</td>
<td>10</td>
</tr>
<tr>
<td>Level 3</td>
<td>Clinical nurse manager</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>Clinical nurse specialist</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>Clinical nurse consultant</td>
<td>1</td>
</tr>
<tr>
<td>Level 3 or 4</td>
<td>Staff development educator</td>
<td>5</td>
</tr>
<tr>
<td>Level 5</td>
<td>Nursing director</td>
<td>1</td>
</tr>
<tr>
<td>Non-determinant</td>
<td>Nurse practitioner</td>
<td>1</td>
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<tr>
<td>Non-nursing</td>
<td>Paramedic</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Unknown</td>
<td>23</td>
</tr>
</tbody>
</table>

Notes: Percentages rounded to one decimal place; sourced from WA health department nursing career structure.

Participants were asked to provide their highest level of education. Some 95 (41.5%) respondents had attained graduate certificates or diplomas and 85 (37.1%) a bachelor’s
degree. Diploma holders accounted for 35 (15.3%), 13 (5.7%) identified their highest education level as masters’ level and one (0.4%) as doctoral level (see Table 4.9).

Table 4.9: Highest Education Level of Retrospective Survey Respondents

<table>
<thead>
<tr>
<th>Highest education level</th>
<th>Retrospective survey responses</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
</tr>
<tr>
<td>Diploma</td>
<td>35</td>
</tr>
<tr>
<td>Bachelors</td>
<td>85</td>
</tr>
<tr>
<td>Graduate certificate/diploma</td>
<td>95</td>
</tr>
<tr>
<td>Masters</td>
<td>13</td>
</tr>
<tr>
<td>Doctorate</td>
<td>1</td>
</tr>
</tbody>
</table>

Note: Percentages rounded to one decimal place.

Table 4.10 presents other demographic information collected from the TNCC participants in the retrospective survey.
Table 4.10: Demographics of Retrospective Survey Respondents

<table>
<thead>
<tr>
<th>Demographics</th>
<th>Retrospective survey responses</th>
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<td></td>
<td>N</td>
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<td>Gender</td>
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<tr>
<td>Male</td>
<td>23</td>
</tr>
<tr>
<td>Female</td>
<td>206</td>
</tr>
<tr>
<td>Age (years)</td>
<td></td>
</tr>
<tr>
<td>Min = 22</td>
<td></td>
</tr>
<tr>
<td>Max = 57</td>
<td></td>
</tr>
<tr>
<td>Mean = 41</td>
<td></td>
</tr>
<tr>
<td>Median = 40</td>
<td></td>
</tr>
<tr>
<td>Experience</td>
<td></td>
</tr>
<tr>
<td>Years of nursing experience</td>
<td>Min = 3</td>
</tr>
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<td></td>
<td>Max = 50</td>
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<td></td>
<td>Mean = 17</td>
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<tr>
<td></td>
<td>Median = 13</td>
</tr>
<tr>
<td>Years of ED/trauma nursing experience</td>
<td>Min = 1</td>
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<td></td>
<td>Max = 30</td>
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<td></td>
<td>Mean = 9.2</td>
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<td>Median = 7.5</td>
</tr>
<tr>
<td>Location TNCC attended</td>
<td></td>
</tr>
<tr>
<td>Metropolitan</td>
<td>177</td>
</tr>
<tr>
<td>Rural</td>
<td>52</td>
</tr>
<tr>
<td>Other trauma course attendance prior to TNCC</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>202</td>
</tr>
<tr>
<td>No</td>
<td>27</td>
</tr>
<tr>
<td>Other trauma course attendance post-TNCC</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>43</td>
</tr>
<tr>
<td>No</td>
<td>186</td>
</tr>
</tbody>
</table>

Note: percentages rounded to one decimal place.

4.3.2 Retrospective survey

Table 4.11 shows the data evaluating the TNCC participants’ skills, knowledge and general feedback collected from the retrospective surveys. Participants were asked to rate the answers of each evaluation question using a four-point rating scale (strongly agree, agree, disagree or strongly disagree).
## Table 4.11: Retrospective Survey Responses 2009–2013

<table>
<thead>
<tr>
<th>Evaluation question</th>
<th>N</th>
<th>Strongly agree</th>
<th>Agree</th>
<th>Disagree</th>
<th>Strongly disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Knowledge</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I am more confident in identifying the common mechanisms of injury associated with trauma</td>
<td>225</td>
<td>126</td>
<td>95</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>I recognise the importance of conducting an initial assessment on the trauma patient utilising a systematic process</td>
<td>225</td>
<td>178</td>
<td>46</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>I am more confident in identifying the pathophysiological changes associated with the trauma patient</td>
<td>225</td>
<td>115</td>
<td>101</td>
<td>7</td>
<td>2</td>
</tr>
<tr>
<td>I am more confident in identifying the signs and symptoms of a raised intracranial pressure in the head-injured patient</td>
<td>225</td>
<td>89</td>
<td>124</td>
<td>11</td>
<td>1</td>
</tr>
<tr>
<td>I am more confident in communicating with other trauma team members regarding the management of trauma patient</td>
<td>225</td>
<td>108</td>
<td>111</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>I am more confident in evaluating the effectiveness of nursing interventions for trauma patients</td>
<td>225</td>
<td>115</td>
<td>107</td>
<td>2</td>
<td>1</td>
</tr>
</tbody>
</table>

Note: percentages rounded to one decimal place.
<table>
<thead>
<tr>
<th>Evaluation question</th>
<th>N</th>
<th>Strongly agree</th>
<th>Agree</th>
<th>Disagree</th>
<th>Strongly disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
<td>N</td>
</tr>
<tr>
<td><strong>Skills</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I am able to perform a standardised primary and secondary assessment on a trauma</td>
<td>221</td>
<td>141</td>
<td>76</td>
<td>34.4</td>
<td>2</td>
</tr>
<tr>
<td>patient utilising the A-I process correctly</td>
<td></td>
<td>63.8</td>
<td></td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>I am able to recognise a compromised airway and intervene appropriately</td>
<td>221</td>
<td>160</td>
<td>60</td>
<td>27.1</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>72.4</td>
<td></td>
<td></td>
<td>0</td>
</tr>
<tr>
<td>I am able to correctly measure and insert an appropriate airway adjunct for a</td>
<td>221</td>
<td>154</td>
<td>66</td>
<td>29.9</td>
<td>1</td>
</tr>
<tr>
<td>trauma patient</td>
<td></td>
<td>69.7</td>
<td></td>
<td></td>
<td>0</td>
</tr>
<tr>
<td>I am able to correctly identify patients who require spinal immobilisation and</td>
<td>221</td>
<td>155</td>
<td>63</td>
<td>28.5</td>
<td>1</td>
</tr>
<tr>
<td>correctly measure and apply a cervical collar</td>
<td></td>
<td>70.1</td>
<td></td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>I am now confident in performing a log roll maintaining spinal immobilisation</td>
<td>221</td>
<td>165</td>
<td>55</td>
<td>24.9</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>74.7</td>
<td></td>
<td></td>
<td>0</td>
</tr>
</tbody>
</table>

Note: percentages rounded to one decimal place.
<table>
<thead>
<tr>
<th>Evaluation question</th>
<th>N</th>
<th>Strongly agree</th>
<th>Agree</th>
<th>Disagree</th>
<th>Strongly disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
<td>N</td>
</tr>
<tr>
<td>General feedback</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TNCC training has improved my knowledge of trauma care</td>
<td>218</td>
<td>138 63.3</td>
<td>76</td>
<td>34.9</td>
<td>3</td>
</tr>
<tr>
<td>TNCC training has improved my trauma nursing skills</td>
<td>218</td>
<td>136 62.4</td>
<td>77</td>
<td>35.3</td>
<td>4</td>
</tr>
<tr>
<td>I have utilised the knowledge and skills learned from TNCC in my care of non-trauma patients</td>
<td>218</td>
<td>112 51.4</td>
<td>99</td>
<td>45.4</td>
<td>5</td>
</tr>
<tr>
<td>Team training with other health professionals in trauma care would help to further enhance my trauma care knowledge and skills application in clinical situations</td>
<td>218</td>
<td>120 55</td>
<td>91</td>
<td>41.7</td>
<td>6</td>
</tr>
<tr>
<td>The disaster management contents in TNCC have been sufficient to equip me to provide care to people in disaster situations</td>
<td>198</td>
<td>27 12.4</td>
<td>113</td>
<td>51.8</td>
<td>54</td>
</tr>
<tr>
<td>The domestic violence contents in TNCC have been sufficient to equip me to provide care to people injured as a result of DV</td>
<td>196</td>
<td>15 6.9</td>
<td>132</td>
<td>60.6</td>
<td>46</td>
</tr>
<tr>
<td>I would recommend TNCC to other nurses</td>
<td>218</td>
<td>168 77.1</td>
<td>42</td>
<td>19.3</td>
<td>6</td>
</tr>
<tr>
<td>If a refresher course is developed, I would be interested in attending</td>
<td>218</td>
<td>128 58.7</td>
<td>75</td>
<td>34.4</td>
<td>13</td>
</tr>
</tbody>
</table>

Note: percentages rounded to one decimal place.
Most respondents agreed their trauma nursing knowledge had improved since attending the TNCC, with 93.7–99.5% of respondents agreeing or strongly agreeing with the knowledge survey questions. Participants most strongly agreed that they recognised the importance of conducting an initial assessment on a patient using a systematic process (79.1%, N = 178).

The lowest number of participants reported being more confident in identifying signs of raised intracranial pressure (38.6%, N = 89), with 5.3% of participants (N = 12) disagreeing with this statement. Confidence in communicating with other trauma team members received the second lowest strongly agree rating at 48% (N = 108); however, overall 93.7% of participants (N = 219) reported being more confident to some degree. Only 4% of participants did not agree they were more confident identifying pathological changes associated with trauma (N = 9).

Participant agreement on confidence and ability pertinent to psychomotor skills-based items was generally higher than the knowledge survey questions (98.2–99.6%), with only one-to-four participants strongly disagreeing or disagreeing with these items. The overwhelming majority agreed they were more confident in performing a log roll to maintain spinal immobilisation and able to correctly measure and insert an adjunct airway (99.6% for both).

The general feedback questions showed participants felt TNCC participation had improved their knowledge of trauma care (98.2%, N = 214) and their trauma nursing skills (97.7%, N = 213). In addition, 96.8% of participants (N = 211) reported using these knowledge and skills in the care of their non-trauma patients. Respondents most frequently disagreed that the TNCC had sufficiently equipped them to deal with situations of disaster management (26.6%, N = 58) and DV (22.5%, N = 47). All but eight participants would recommend the TNCC to their colleagues (96.4%, N = 210).

4.3.2.1 Open-ended retrospective survey responses

Open-ended responses were sought to the last question of the TNCC retrospective survey. A total of 87 written comments were received. The NVivo software was utilised to manage, order and categorise the data. Seven main topic areas of feedback were identified, each with multiple sub-categories of feedback (see Table 4.12).
Table 4.12: Phase II Open-Ended Response Analysis

<table>
<thead>
<tr>
<th>Topic</th>
<th>References/comments</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Assessment</strong></td>
<td>Multiple-choice examination</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Skills stations</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Confidence level</td>
<td>10</td>
</tr>
<tr>
<td><strong>Content</strong></td>
<td>Australian content</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Disaster management</td>
<td>2</td>
</tr>
<tr>
<td><strong>Delivery</strong></td>
<td>Instructors:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Positive</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>• Negative</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Timing</td>
<td>8</td>
</tr>
<tr>
<td><strong>General feedback</strong></td>
<td>Positive</td>
<td>40</td>
</tr>
<tr>
<td></td>
<td>Negative</td>
<td>13</td>
</tr>
<tr>
<td><strong>Suggestions for improvement:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Practical</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>• Theory</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>• Refresher</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>• Rural access</td>
<td>1</td>
</tr>
<tr>
<td><strong>Participant outcomes</strong></td>
<td>Knowledge outcomes</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>Practice outcomes</td>
<td>12</td>
</tr>
<tr>
<td><strong>Recommend to others</strong></td>
<td></td>
<td>14</td>
</tr>
</tbody>
</table>

Most comments received related to positive general feedback (N = 40), promotion of the TNCC to others (N = 14), negative general feedback (N = 13) and participant practice outcomes of a positive nature (N = 12). Other topics discussed by the TNCC retrospective survey respondents included the TNCC assessment, ‘Australianising’ of the TNCC content, participants’ knowledge outcomes and confidence levels.

Two comments were made about the American context of the TNCC content, suggesting modification to make the TNCC more applicable and relevant to the Australian and WA trauma care context.
Two participants commented on the disaster management content in the TNCC, and suggested the Major Incident Medical Management and Support (MIMMS) course was better than the TNCC to prepare nurses for this situation:

*It is good as an overview but does not cover nearly enough information required for someone to be ready for disaster work.*

*I have attended MIMMS course so cannot say whether TNCC provided me with knowledge but together feel confident.*

Several participants thanked staff for their work, stating that the TNCC increased their confidence in looking after trauma patients (N = 10):

*I frequently lead teams in the Resus/Trauma area in my ED and feel very confident in this role directly due to having done the TNCC course.*

*I feel it gave me greater confidence in dealing with trauma patients and it was hugely beneficial.*

*The course verified my prior skills and knowledge and has given me confidence in overseeing and supervising the multidisciplinary team.*

One of the most commented on topics was the timing of course delivery. Respondents reported there was too much information packed into too short a time. Some suggested the course would be better delivered over three days.

Despite the issues identified with the content and the timing of delivery, participants provided overwhelmingly positive general feedback, comprising 40 positive comments as opposed to 20 negative comments. The positive comments generally praised the quality of the TNCC and stated how much participants enjoyed their learning experience:

*TNCC is the best, most applicable course I have ever done in my career.*

*TNCC is an excellent course applicable to all nurses in every field.*

*The quality of teaching was the best that I have ever experienced. Really good course that I have recommended to many others.*

*Thank you for a wonderful course; it was informative, interactive and simply brilliant.*
TNCC instructors were praised through positive comments \((N = 9)\) for their enthusiasm, knowledge and experience:

*Presenters were prepared and knowledgeable.*

*The quality of teaching was the best that I have ever experienced.*

*Extremely satisfied with the level of support of teachers of TNCC and the methods of teaching used.*

*Lecturers were fantastic and the active participation allowed great development and room for questioning.*

Respondents reported that they gained improvement in knowledge and skills from the TNCC and would strongly recommend the TNCC to others \((N = 14)\):

*My knowledge content and application is theoretical only. However, the course has improved my understanding of trauma management principles and enabled me to evaluate the service in terms of compliance with current practice.*

*My nursing assessments for trauma are better which means better outcomes for patients.*

*Improves assessment, intervention and documentation in the trauma patient, thus improving outcomes.*

The negative general feedback mainly identified the intensive nature of the course and the application of content to the rural environment:

*TNCC doesn’t take into consideration rural staff working environments.*

The eight suggestions for improvement were made in relation to calling for a TNCC refresher course \((N = 5)\), insufficient skills practice time in rural areas \((N = 1)\), exam questions requiring greater clarity \((N = 1)\) and greater access for rural participants \((N = 1)\).

### 4.3.3 Retrospective interviews

Among the total 229 respondents to the retrospective survey covering 2009–2013, 50 (response rate of 21.8%) expressed their willingness to participate in a retrospective
interview. However, because of various difficulties in contacting the respondents, only 20 actually participated. One interviewee was found to be an instructor of the TNCC at the time of the interview and therefore this interviewee’s responses were excluded from the analysis, leaving 19 sets of interview data for analysis. Fourteen participants attended one of five focus group interviews held in the metropolitan area, three participated in telephone interviews and two were individually interviewed.

SRNs who work alongside nurses who have completed the TNCC were invited to participate in interviews to share their views on the application of the TNCC knowledge and skills by nurses practicing in their clinical areas. SRNs were either CN specialists, staff development nurses or staff development educators, who may or may not have been TNCC participants themselves. The SRN sampling was based on TNCC participant demographic information identifying employment locations of participants. The majority of the TNCC participants were employed at three metropolitan hospitals, while one rural hospital was identified to provide the rural trauma nursing perspective of these SRNs. Of the five interviewees, two attended focus group interviews, one participated in a telephone interview and two attended individual interviews conducted at their workplace. Results of both the TNCC participant and SRN interviews are presented collectively below, in order of interview question.

**Question 1: Overall impression of the TNCC**

The TNCC participants were asked about their overall impression of the TNCC at the beginning of the interview. Both positive (N = 51) and negative comments (N = 28) were received. Most of the negative comments were made by one interviewee, who reported attending the TNCC to assess how the course was running. The participant found that the TNCC did help to refresh existing knowledge, and as a result, this participant encouraged other staff to attend the course. This participant’s negative comments were mainly related to the volume of information delivered during long and intensive days.

Participants commented that the most valuable part of the TNCC was the systematic assessment process:

*I say the systematic assessment tool was exceptionally valuable in teaching the correct, or at least the easy way to assess that trauma presentation.*
The most helpful aspect of the TNCC was considered the enthusiasm of the instructors:

_Enthusiastic educators, who know their subject very well, which makes it very easy to listen to._

The SRNs were asked about their overall impressions of the TNCC at the beginning of the interview. They agreed that the TNCC had helped staff nurses to standardise and structure their approach to trauma patient care and assisted critical thinking and problem solving. The SRNs stated that they saw a difference in practice after the TNCC. They described the TNCC as a fantastic, encouraging, transferrable course applying best practice:

_One of our girls just did her TNCC and she came back and she felt ... felt excited, empowered._

_I think it’s very beneficial what they learn ... and they can bring that back to their work._

**Question 2: Impact of the TNCC on participants’ knowledge, skills and confidence in the management of trauma patients**

The TNCC participants were asked if the TNCC had improved their confidence in the management of trauma patients. Mostly positive comments (N = 40) and few negative comments (N = 3) were received. The three negative comments were from a single interviewee. All other interviewees agreed that the TNCC had improved their confidence in trauma patient management, reporting the course has helped them perform in their teaching roles and improved their communication with other trauma team members. The interviewees praised the systematic standardised assessment process as the most useful part of the TNCC to apply in their clinical practice.

In terms of specific skills of identifying and managing raised intracranial pressure in a head-injured patient, recognising and managing a compromised airway and log roll of spinal injury patients, the interviewees from two major teaching hospitals with trauma centres all agreed that the TNCC has improved their confidence. However, interviewees from both rural areas and the smaller metropolitan hospitals without major trauma centres replied that these skills were not employed often in their clinical practice:
Well, literally since the day I walked away from that course, I believe it’s quite possibly the best course that I’ve ever taken part in. And, yeah, nothing I’d done … had really, you know, really boosted my confidence in the way that the TNCC did.

The SRNs were asked how they thought the TNCC had influenced nurses’ confidence in management of trauma patients; 13 positive comments were made. The SRNs reported that TNCC-trained staff tended to question leaders more in trauma care situations, completed structured documentation, often imparted to junior staff the knowledge and skills they had learnt from the TNCC, were more proactive in patient care through enhanced recognition and identification, and showed a greater knowledge base in trauma-related teaching sessions than non-TNCC-trained staff. However, one SRN pointed out that TNCC was compulsory for students enrolled in the Master of Clinical Nursing course, a postgraduate nursing course provided by one of the universities, so it made it hard to assess if it was the TNCC alone that had increased participants’ confidence:

I think TNCC gives us a trauma algorithm and it’s a tool that gives them skill, knowledge and confidence that they can challenge or they can promote a certain standard because they’ve got a reputable tool or algorithm to go well (with) the TNCC.

**Question 3: Comparison of the TNCC with other trauma courses**

The TNCC participants were asked to compare other trauma courses with the TNCC and to describe the major differences between them. The following trauma courses were commented on by the interviewees: ATLS, Advanced Paediatric Life Support Trauma (APLS), EMST, the Western Rural Trauma Course and the Prehospital Trauma Course. Participants reported that the TNCC emphasised a systematic approach in a more comprehensive and clear way compared with the other courses, which were more scenario oriented. They also commented that the TNCC was more nurse-centred in its content and had more of a focus on ‘forced learning’ in its delivery. Most participants who had completed the MIMMS course agreed that the MIMMS course was more in-depth and structured, and more targeted than the TNCC with respect to disaster management. Comments included:

I think the TNCC was much clearer to me.
With the MIMMS course that I did, really you were involved and you had to set up scenarios but it was more in depth, so it was good to get an understanding, but no I felt the MIMMS course was a lot better.

The SRNs were asked to compare other trauma courses they were aware of with the TNCC and to identify the major differences between the courses in terms of helping their nurses’ knowledge and skills improvement. They commented on the similarity of the standardised assessment process of the TNCC compared with other trauma courses such as the ATLS or EMST. They also supported sending nurses to the MIMMS course for disaster management training. As one SRN noted:

 Actually, those who’ve done ALS or APLS in the past find the TNCC easy to attend to and it’s not much of a leap for them to follow that systematic process. I think MIMS reinforced it more to be honest.

**Question 4: Perceived benefits of team training in enhancing participants’ clinical skills**

The TNCC participants were asked about the benefits they perceived with regard to team training in enhancing their clinical knowledge and skills. Poor perceptions were elicited from two participants, with one rural participant expressing that the TNCC should not focus too much on team training for rural participants because of the difficulty in forming a team in rural scenarios.

All other interviewees strongly advocated the team training content in the TNCC. They listed the benefits of team training as including improving patient outcomes, facilitating communication, increasing mutual understanding, team members following the same principles or providing clear roles with distinction, reducing patient waiting times, less stress and minimising individual mistakes:

Better communication, less stress and hopefully a better outcome for the patient if we’re all thinking on the same pathways. I definitely think the more training that is multidisciplinary you know this day and age would be really beneficial.

The SRNs were asked about the perceived benefits of team training with regard to enhancing their staff nurses’ clinical skills. One SRN commented this may be intimidating for nurses:
Scary, as it is, but I think it should be nerve wracking and some people don’t do well under pressure.

Other SRNs not only agreed with the participants’ perceptions on the team training benefits, but also pointed out that team training can empower novice nurses:

The benefits of the team training – its inter-professional respect, working well as a team, communication.

It improves the communication, less likely to make mistakes and working together, different people think of different things so you’re going to cover everything.

**Question 5: Impression of the domestic violence content within the TNCC**

The TNCC participants were asked for their impression of the DV content in the TNCC. Interviewees reported seeing DV cases in their clinical areas and agreed that it was relevant and applicable to trauma training. However, they also admitted that there was no clear policy or guidelines to be followed in their clinical settings, whether in WA metropolitan hospitals or rural health care settings. They stated they found it hard to recall this part of the content and expressed the desire to have more training in this aspect. However, they suggested that it may not be applicable to add more information into the current TNCC since the course was already overloaded with information.

The SRNs agreed with the importance and applicability of DV training for nurses, but acknowledged that the TNCC course has just touched on it. As one SRN noted:

We do have that sort of patient but they may not present as a trauma. It’s an education issue all on its own and I don’t think it necessarily needs to be with TNCC. It is still a very important thing.

**Question 6: Impression of the disaster management content within the TNCC**

The TNCC participants were also asked for their impressions of the disaster management content. Interviewees agreed that disaster management was applicable and relevant to ED nurses but the TNCC only covered the basics. They recommended the MIMMS as a more appropriate course to prepare nurses in this aspect:

Because we live in an uncertain world where anything can happen and sometimes does. And people will look to us as first responders and I want to have the confidence to go
in and do it and I must say MIMMS has given me that although I need to keep it up. It (TNCC) did briefly cover everything. So, I think I got more out of MIMMS than I would have out of TNCC.

The SRNs also recommended the MIMMS as a more appropriate course to prepare their nurses in disaster situations:

*I think they all need to know about disaster management, you never know when something’s going to happen.*

*We would say to them you need to do MIMMS course and we offer that to all our staff and purely for disaster management.*

**Question 7: Perception of knowledge retention following the TNCC participation**

The TNCC participants were asked about their perception of knowledge retention following participation in the TNCC. Both retention length of time (N = 29) and the need for a refresher course (N = 21) were discussed by interviewees. Interviewees from major metropolitan hospitals reported that they either had been practicing the TNCC knowledge and skills at all times or teaching others TNCC principles, promoting knowledge retention. Other interviewees expressed concern that the TNCC knowledge and skills might decay with time. They reported that the most memorable part of the TNCC was the systematic process. They suggested a TNCC refresher course might be necessary in two to four years of the TNCC participation:

*Because it’s easy to forget things. When you’re fresh and had that course you remember everything and then it slowly, gradually wears off, especially if you didn’t get that much frequent trauma patients.*

*So, my retention of knowledge the first few months obviously, it’s fantastic and every time you do something, you apply the knowledge you’ve learnt.*

*So, I’ve gone about 18 months out, probably starting to forget.*

The SRNs were asked about their perception of nurses’ retention of knowledge following participation in the TNCC. They admitted to having noticed staff knowledge decay six months following the TNCC, but the standardised assessment process seemed to be retained for longer. They strongly recommended a refresher course within one-to-four years following the TNCC.
Question 8: Impact of the TNCC participation on participants’ nursing care of patients who have a ‘non-trauma’ presentation

The TNCC participants were asked how the TNCC had affected their nursing care of patients who had a ‘non-trauma’ presentation. Comments (N = 17) made by all interviewees showed that they had applied the TNCC knowledge and skills, especially the standardised systematic A-I assessment process, to the care of non-trauma patients:

So, there is nothing in that (TNCC) you couldn’t use and apply to your everyday practice.

Yeah, and I am still consciously looking for that. Like say a person has a seizure, I know they’re not trauma but you’re still looking in their airway.

I worked through the trauma process with them whether they were trauma patients or not. So, I definitely think it’s completely applicable across the board.

The SRNs were asked how TNCC attendance had affected the nursing care of patients of ‘non-trauma’ presentation. They gave universally positive responses (N = 12), stating that the standardised assessment process in the TNCC was most beneficial, for both the staff and patients:

I actually advocate for them to use the TNCC format particularly. Septic shock, we even get a few cardiogenic shocks, distributive shocks and if they follow a TNCC format they won’t miss a thing.

Question 9: Effect of the TNCC participation on participants’ professional development

The TNCC participants were asked how TNCC certification had helped them with respect to professional development. Some interviewees reported that the TNCC had helped them in either getting promoted or performing in trauma nurse roles. As one comment stated:

I think that it definitely helped as far as being a team leader in resus. It definitely helped me get my most recent job.

Two interviewees reported that the TNCC had not helped them gain a promotion:
I don’t think I’ve got any promotional positions or gone further on because of the TNCC.

Well for me it made pretty much no difference whatsoever.

Some SRNs commented that even though the TNCC was not a compulsory course for nurses to obtain a promotion, it improved their resume. They acknowledged that the TNCC had allowed nurses to achieve a higher level of competence in performing resuscitation and acting in trauma nurse roles in their clinical areas:

For their own personal development, absolutely and it definitely makes them stronger nurses on the floor.

**Question 10: Other suggestions or comments relating to the TNCC**

The TNCC participants were invited to provide other suggestions or comments relating to the TNCC towards the end of the interview. Comments made pertained to accessibility of the TNCC to rural nurses (N = 3), the idea of a more advanced trauma nursing course than the TNCC (N = 12), recommendation of the TNCC to others (N = 12) and trauma nursing education in universities (N = 16). Rural interviewees commented on the difficulty in accessing the TNCC. Interviewees stated they would strongly recommend the TNCC to all other nurses. They also expressed strongly their appetite for an advanced trauma course or ‘TNCC 2’ after the TNCC. They supported the idea of a tertiary trauma nursing course covering all aspects of trauma in the future. Comments included:

It’s really quite hard to get onto a TNCC course, I applied and waited 2 years.

And I think that’s what the TNCC did for me is it got a hunger in me that went searching for a more advanced course.

The SRNs were also asked to provide further suggestions or comments relating to the TNCC at the end of the interview. They expressed concern about funding support for the TNCC, stating their staff were keen to attend the TNCC but faced budget constraints as it was only partially funded and required study leave:

I’ve had a lot of people come in wanting to attend the TNCC they just can’t afford the time or they can’t afford doing it in their own time.

Some people have pulled out of TNCC because they didn’t get funding.
4.4 Phase III: Prospective Evaluation

Data were collected in the prospective evaluation from Cohort 3 participants, who completed the TNCC in 2014. The prospective evaluation phase used two surveys: pre- and post-participation surveys evaluating TNCC knowledge, skills and course evaluation (see Appendix 9). The pre- and post-participation surveys were developed from the findings of the previous two phases: the preliminary evaluation and the retrospective evaluation.

A total of 224 TNCC participants attended the 15 TNCC convened between March and November 2014. After excluding 30 reverification TNCC participants, 194 participants consented to receive emails from WATEC staff for both pre- and post-participation surveys. After multiple attempts by WATEC staff, 172 emails were successfully sent distributing the pre-participation survey and 185 distributing the post-participation survey. Total responses to the pre-participation survey numbered 96, a response rate of 55.8%. Total responses received from the post-participation survey numbered 84, a response rate of 45.4%.Because of a delay in the prospective survey design and distribution, participant data for March and April 2014 were not captured. Incomplete data from the March and April TNCC participants were discarded before analysis.

Further, after examination of the data collected from May to November 2014, the researchers identified only 35 participants who completed both pre- and post-participation surveys. This identification was conducted by matching the demographic information obtained through the pre- and post-participation surveys. The 35 complete datasets collected were entered into and analysed using the SAS 9.4, a quantitative software program for crosstab comparison using McNemar’s chi-square test, which may demonstrate differences where the same subjects are measured twice, that is, before and after an intervention; in this case, the training episode. The examination was kappa weighted to demonstrate inter-rater agreement. Results are shown in Table 4.20. The demographic data and pre-participation and post-participation survey results from all participants are presented first, followed by comparison of the 35 matched data sets.

4.4.1 Demographic data

In 2014, the CTEC in the Perth metropolitan area hosted 12 TNCC and Northam, Pilbara and Bunbury in the WACHS each hosted one TNCC. Most participants attended a
metropolitan TNCC, with 72.6% (post) and 82.4% (pre) participants attending a TNCC in Perth and 15.6 (pre) and 27.4% (post) attending the course in a rural delivery location.

The majority of respondents were female (92.7% pre, 92.9% post) and ranged in age from 24–60 years (mean 37–38). Years of nursing experience ranged from 2–40 years (mean 12–14.2), and experience in trauma/ED settings ranged from 1–30 years (mean 6.9–7.3).

Respondents were primarily employed in metropolitan health services, while 22% (pre) and 32% (post) were employed in rural health services. Other areas of employment were listed as mine sites, agencies, private practice and RFDS (see Table 4.13).

Table 4.13: Current Employment Organisation

<table>
<thead>
<tr>
<th>Current employment organisation</th>
<th>Survey responses</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pre-participation</td>
<td>Post-participation</td>
<td></td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
</tr>
<tr>
<td>Metropolitan health services</td>
<td>61</td>
<td>63.5</td>
<td>46</td>
</tr>
<tr>
<td>Rural health services</td>
<td>22</td>
<td>22.9</td>
<td>27</td>
</tr>
<tr>
<td>Other</td>
<td>13</td>
<td>13.5</td>
<td>11</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>96</strong></td>
<td><strong>100</strong></td>
<td><strong>84</strong></td>
</tr>
</tbody>
</table>

Note: percentages rounded to one decimal place.

The majority of respondents were employed in the ED (78.6% post to 81.3% pre), with few working in Intensive Care Units (ICU) (N = 3–5). ‘Other’ areas of employment were identified as RFDS, clinics, mine sites, mixed wards and casual pool (see Table 4.14).

Table 4.14: Current Employment Department

<table>
<thead>
<tr>
<th>Current employment department</th>
<th>Survey responses</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pre-participation</td>
<td>Post-participation</td>
<td></td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
</tr>
<tr>
<td>ED</td>
<td>78</td>
<td>81.3</td>
<td>66</td>
</tr>
<tr>
<td>ICU</td>
<td>5</td>
<td>5.2</td>
<td>3</td>
</tr>
<tr>
<td>Other</td>
<td>13</td>
<td>13.5</td>
<td>15</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>96</strong></td>
<td><strong>100</strong></td>
<td><strong>84</strong></td>
</tr>
</tbody>
</table>

Note: percentages rounded to one decimal place.

Participants were also asked to identify their position titles. These responses were again coded according to the WA Department of Health career structure (Western Australia
Department of Health, 2016) and definitions from the AIHW (2016c) (see Table 4.15). The majority of both pre- and post-participation survey respondents were RNs (pre: 61.5%, N = 59; post: 58.3%, N = 49) and CNs (pre: 25%, N = 24; post: 25%, N = 21).

**Table 4.15: Current Position of Survey Respondents**

<table>
<thead>
<tr>
<th>Level</th>
<th>Position</th>
<th>Survey responses</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Pre-participation</td>
<td>Post-participation</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
</tr>
<tr>
<td>&lt; Level 1</td>
<td>Enrolled nurse</td>
<td>0</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Level 1</td>
<td>Registered nurse</td>
<td>59</td>
<td>61.5</td>
<td>49</td>
</tr>
<tr>
<td>Level 2</td>
<td>Clinical nurse</td>
<td>24</td>
<td>25</td>
<td>21</td>
</tr>
<tr>
<td></td>
<td>Staff development nurse</td>
<td>4</td>
<td>4.2</td>
<td>2</td>
</tr>
<tr>
<td>Level 3</td>
<td>Clinical nurse manager</td>
<td>3</td>
<td>3.1</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Clinical nurse specialist</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Level 3 or 4</td>
<td>Staff development educator</td>
<td>1</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Other</td>
<td>RFDS, flight nurse, mine site</td>
<td>4</td>
<td>4.2</td>
<td>3</td>
</tr>
</tbody>
</table>

Notes: percentages rounded to one decimal place; sourced from WA health department nursing career structure.

Most respondents identified their highest level of education as a bachelor’s degree, followed by graduate certificate/diploma holders (see Table 4.16).

**Table 4.16: Highest Level of Education**

<table>
<thead>
<tr>
<th>Highest education level</th>
<th>Survey responses</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pre-participation</td>
<td></td>
<td>Post-participation</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
</tr>
<tr>
<td>Diploma</td>
<td>10</td>
<td>10.4</td>
<td>12</td>
</tr>
<tr>
<td>Bachelors</td>
<td>47</td>
<td>49</td>
<td>33</td>
</tr>
<tr>
<td>Graduate certificate/diploma</td>
<td>34</td>
<td>35.4</td>
<td>33</td>
</tr>
<tr>
<td>Masters</td>
<td>5</td>
<td>5.2</td>
<td>6</td>
</tr>
</tbody>
</table>

Note: percentages rounded to one decimal place.

A total of 21 respondents (of 96 pre-participation survey respondents) reported having attended a trauma course prior to attending the TNCC. None of the post-participation survey respondents reported attending a trauma course since completing the TNCC.
4.4.2 Pre-participation survey

A total of 96 responses were received from the pre-participation survey. Participants were asked to answer the TNCC knowledge, skills and evaluation survey questions using the four rating scales: strongly agree, agree, disagree and strongly disagree. The following table shows the quantitative results of those survey responses (see Table 4.17).
Table 4.17: Pre-Participation Survey Results

<table>
<thead>
<tr>
<th>Survey question</th>
<th>Strongly agree</th>
<th>Pre-participation survey responses</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
</tr>
<tr>
<td>Knowledge</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I am confident in identifying the common mechanisms of injury associated</td>
<td>13</td>
<td>13.7</td>
<td>72</td>
<td>75.8</td>
<td>10</td>
<td>10.5</td>
</tr>
<tr>
<td>with trauma</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I recognise the importance of conducting an initial assessment on the trauma</td>
<td>71</td>
<td>74.7</td>
<td>23</td>
<td>24.2</td>
<td>1</td>
<td>1.1</td>
</tr>
<tr>
<td>patient utilising a systematic process</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I am confident in identifying the pathophysiological changes associated with</td>
<td>9</td>
<td>9.5</td>
<td>67</td>
<td>70.5</td>
<td>18</td>
<td>18.9</td>
</tr>
<tr>
<td>the trauma patient</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I am confident in identifying the signs and symptoms of a raised intracranial</td>
<td>12</td>
<td>12.6</td>
<td>63</td>
<td>66.3</td>
<td>20</td>
<td>21.1</td>
</tr>
<tr>
<td>pressure in the head-injured patient</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I am confident in communicating with other trauma team members regarding the</td>
<td>23</td>
<td>24.2</td>
<td>57</td>
<td>60</td>
<td>14</td>
<td>14.7</td>
</tr>
<tr>
<td>management of trauma patient</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I am confident in evaluating the effectiveness of nursing interventions for</td>
<td>15</td>
<td>15.8</td>
<td>68</td>
<td>71.6</td>
<td>11</td>
<td>11.6</td>
</tr>
<tr>
<td>trauma patients</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: percentages rounded to one decimal place.
<table>
<thead>
<tr>
<th>Survey question</th>
<th>Strongly agree</th>
<th>Pre-participation survey responses</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
</tr>
<tr>
<td><strong>Skills</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I am able to perform a standardised primary and secondary</td>
<td>16</td>
<td>17</td>
</tr>
<tr>
<td>assessment on a trauma patient utilising the A-I process correctly</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I am able to recognise a compromised airway and intervene appropriately</td>
<td>32</td>
<td>34</td>
</tr>
<tr>
<td>I am able to correctly measure and insert an appropriate airway adjunct for a</td>
<td>28</td>
<td>29.8</td>
</tr>
<tr>
<td>trauma patient</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I am able to correctly identify patients who require spinal</td>
<td>22</td>
<td>23.4</td>
</tr>
<tr>
<td>immobilisation and correctly measure and apply a cervical collar</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I am confident in performing a log roll maintaining spinal</td>
<td>49</td>
<td>52.1</td>
</tr>
<tr>
<td>immobilisation</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: percentages rounded to one decimal place.
The majority of respondents were confident in their trauma knowledge and skills prior to their participation in the TNCC, responding with agree and strongly agree ratings between 78.9% and 98.9%. Respondents were most confident in their knowledge of the initial assessment of a trauma patient (98.9% agree or strongly agree). Least confidence was evident in survey items related to signs and symptoms of raised intracranial pressure (78.9% agree or strongly agree), identifying pathophysiological changes in the trauma patients (80% agree or strongly agree) and correctly identifying patients requiring spinal immobilisation and fitting a cervical collar (84% agree or strongly agree). Further, 10.5% were not confident in recognising common mechanisms of injury in trauma patients, 15.8% were not confident communicating with the trauma team, 12.7% were not confident in evaluating the effectiveness of their nursing interventions, 17% felt they could not correctly perform a primary and secondary assessment using the A-I process, and 10.6% reported they were not able to correctly measure and insert an appropriate airway for a trauma patient.

**Open-ended pre-participation survey responses**

Six comments were received in response to the pre-participation survey open-ended questions asking participants to provide other comments about the TNCC.

Generally, participants reported poor confidence in trauma patient management and identified some uncertainty about the course content and volume:

* I feel that a pre-course MCQ test would be very helpful for people get an idea about the theory test and would give us more confidence.

* I don’t feel confident at all at this point. I have information over load from the huge manual and lack of experience making for lack of confidence!!

* I have read the text once, but my only ED experience is about one or two shifts per week for one year in a country hospital. I have never treated a trauma patient.

**4.4.3 Post-participation survey**

Table 4.18 presents the quantitative results of the 84 post-participation survey responses. The same TNCC knowledge, skills and evaluation survey questions using the four-point
Likert scale were asked, along with some additional questions seeking general feedback about the TNCC.

Most post-participation survey respondents (86.3%–100%, N = 69–83) responded positively to the survey questions by choosing strongly agree or agree. In fact, all respondents agreed they were more confident in identifying mechanisms of injury, undertaking an initial assessment of a trauma patient, identifying signs and symptoms of raised intracranial pressure, communicating with the trauma team and evaluating the effectiveness of their trauma nursing interventions. A single respondent disagreed that he/she was more confident in identifying pathophysiological changes of a trauma patient.

With regard to trauma nursing skills, all respondents reported being able to conduct a primary and secondary assessment of a trauma patient, and identify and appropriately manage a compromised airway. A single participant did not agree that he/she was able to correctly identify a trauma patient requiring spinal immobilisation and apply a cervical collar.

Some 100% of respondents agreed the TNCC had improved their trauma knowledge and skills and would recommend the TNCC to other nurses. One participant reported to have not applied the trauma nursing knowledge and skills learned in the TNCC to a non-trauma patient, and one participant disagreed that team training would further improve his/her trauma knowledge and skills. The most poorly rated items related to the DV and disaster management content of the TNCC. Several participants reported the content was insufficient to equip them to care for patients following DV (8.8%, N = 7) or a disaster situation (13.8%, N = 11).
Table 4.18: Post-Participation Survey Results

<table>
<thead>
<tr>
<th>Survey question</th>
<th>Post-participation survey responses</th>
<th>N</th>
<th>%</th>
<th>N</th>
<th>%</th>
<th>N</th>
<th>%</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Knowledge</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I am more confident in identifying the common mechanisms of injury associated</td>
<td></td>
<td>51</td>
<td>61.4</td>
<td>32</td>
<td>38.6</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>with trauma</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I recognise the importance of conducting an initial assessment on the trauma</td>
<td></td>
<td>77</td>
<td>92.8</td>
<td>6</td>
<td>7.2</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>patient utilising a systematic process</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I am more confident in identifying the pathophysiological changes associated</td>
<td></td>
<td>56</td>
<td>67.5</td>
<td>26</td>
<td>31.3</td>
<td>1</td>
<td>1.2</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>with the trauma patient</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I am more confident in identifying the signs and symptoms of a raised</td>
<td></td>
<td>48</td>
<td>57.8</td>
<td>35</td>
<td>42.2</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>intracranial pressure in the head-injured patient</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I am more confident in communicating with other trauma team members regarding</td>
<td></td>
<td>55</td>
<td>66.3</td>
<td>28</td>
<td>33.7</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>the management of trauma patient</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I am more confident in evaluating the effectiveness of nursing interventions</td>
<td></td>
<td>57</td>
<td>68.7</td>
<td>26</td>
<td>31.3</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>for trauma patients</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: percentages rounded to one decimal place.
<table>
<thead>
<tr>
<th>Survey question</th>
<th>Strongly agree</th>
<th>Agree</th>
<th>Disagree</th>
<th>Strongly disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
</tr>
<tr>
<td><strong>Skills</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I am able to perform a standardised primary and secondary assessment on a trauma patient utilising the A-I process correctly</td>
<td>71</td>
<td>86.6</td>
<td>11</td>
<td>13.4</td>
</tr>
<tr>
<td>I am able to recognise a compromised airway and intervene appropriately</td>
<td>68</td>
<td>82.9</td>
<td>14</td>
<td>17.1</td>
</tr>
<tr>
<td>I am able to correctly measure and insert an appropriate airway adjunct for a trauma patient</td>
<td>66</td>
<td>80.5</td>
<td>16</td>
<td>19.5</td>
</tr>
<tr>
<td>I am able to correctly identify patients who require spinal immobilisation and correctly measure and apply a cervical collar</td>
<td>63</td>
<td>76.8</td>
<td>18</td>
<td>22</td>
</tr>
<tr>
<td>I am now confident in performing a log roll maintaining spinal immobilisation</td>
<td>72</td>
<td>87.8</td>
<td>9</td>
<td>11</td>
</tr>
</tbody>
</table>

Note: percentages rounded to one decimal place.
<table>
<thead>
<tr>
<th>Survey question</th>
<th>Strongly agree</th>
<th>Agree</th>
<th>Disagree</th>
<th>Strongly disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
</tr>
<tr>
<td>General feedback</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TNCC training has improved my knowledge of trauma care</td>
<td>68</td>
<td>84</td>
<td>13</td>
<td>16</td>
</tr>
<tr>
<td>TNCC training has improved my trauma nursing skills</td>
<td>65</td>
<td>80.2</td>
<td>16</td>
<td>19.8</td>
</tr>
<tr>
<td>I have utilised the knowledge and skills learned from TNCC in my care of non-trauma patients</td>
<td>45</td>
<td>55.6</td>
<td>35</td>
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<tr>
<td>Team training with other health professionals in trauma care would help to further enhance my trauma care knowledge and skills application in clinical situations</td>
<td>56</td>
<td>69.1</td>
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<td>29.6</td>
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<tr>
<td>The disaster management contents in TNCC have been sufficient to equip me to provide care to people in disaster situations</td>
<td>19</td>
<td>23.8</td>
<td>50</td>
<td>62.5</td>
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<tr>
<td>The domestic violence contents in TNCC have been sufficient to equip me to provide care to people injured as a result of DV</td>
<td>20</td>
<td>25</td>
<td>53</td>
<td>66.3</td>
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<tr>
<td>I would recommend TNCC to other nurses</td>
<td>72</td>
<td>88.9</td>
<td>9</td>
<td>11.1</td>
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<tr>
<td>If a refresher course is developed, I would be interested in attending</td>
<td>56</td>
<td>69.1</td>
<td>24</td>
<td>29.6</td>
</tr>
</tbody>
</table>

Note: percentages rounded to one decimal place.
Open-ended post-participation survey responses

In contrast to the responses from the pre-participation survey, respondents provided many more comments on the TNCC post-participation survey, frequently using words such as ‘great’, ‘excellent’, ‘fabulous’ and ‘enjoyable’. Improvement of trauma management knowledge and skills were also reported. Some participants stated they would recommend the TNCC to other nurses. The positive feedback of the TNCC from the 2014 participants is represented by the following quotes:

Fabulous course, enjoyed every minute, completely hooked, the presenters were brilliant, thanks guys!

Such a good course. I learnt so much, but it also opened my mind to how much I didn’t know!

It is a very useful and excellent course that I would recommend to my colleagues.

I have adopted this approach towards all of my patients. Lots of things I learnt on this course have stuck in my memory. Best course I’ve done by far.

Excellent course. Not only clinically really well presented but also thoughtfully presented. Presenters were prepared, and knowledgeable. Have recommended this course to others.

However, the intensity of the course was noted by some, similarly to the previous retrospective survey respondents in 2009–2013, with several suggesting to extend the length of the course. A refresher course was also recommended:

The TNCC course is brilliant but I do feel a refresher course maybe every 12 months or maybe more would be of great benefit for nurses who don’t see trauma regularly.

Course too intensive, too much packed into too little time. Need to read through course material at least twice before attending. I learnt heaps but these changes would have help me learn more and retain more.

One comment provided by a participant was testimony to how the knowledge and skills gained from the TNCC had helped this participant in dealing with trauma cases in clinical practice and ultimately achieve better health outcome for patients:
I was not prepared for just how much difference this course would make for me in clinical practice. In the last week I identified, assessed and managed two trauma patients who went on to require transport and surgical intervention for potential life-threatening injuries. In one of these cases the patient with nil obvious injuries had been allocated to a non-complex bay and not been seen. I happened to be nearby and something just didn’t feel right to me. I went over and commenced the TNCC assessment. I correctly identified that this patient had internal haemorrhage and initiated immediate care, complex care and got assistance. I strongly believe that had I not attended TNCC the outcome for this patient would have been significantly worse due to delay in critical care. Thanks TNCC teachers, my confidence has increased, my nursing assessments for trauma are better, which means better outcomes for patients.

4.4.4 Pre- and post-participation survey comparison

The pre- and post-participation survey results were initially compared collectively using the 96 responses from the pre-participation survey and 84 responses from the post-participation survey (see Table 4.19). Post-participation survey results showed an increase in those responding ‘agree’ or ‘strongly agree’ of between 1.05–19.83% on all TNCC knowledge, skills and evaluation questions when compared with the pre-participation survey results. There were significant differences between the pre- and post-participation survey results (P < 0.05) with respect to answers for each TNCC knowledge, skills and evaluation question.

However, there was no significant results or differences between the pre- and post-participation survey results of the matched 35 respondents (see Table 4.20). The results also showed poor inter-rater (pre- and post-participation) agreement (kappa weighted < 0.20).
### Table 4.19: Pre- and Post-Participation Survey Response Comparison

<table>
<thead>
<tr>
<th>Survey question</th>
<th>Pre-Pt</th>
<th>Pre- and post-participation survey responses: comparison</th>
<th>Chi-square</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
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<td>N  %</td>
<td>N  %</td>
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<tr>
<td><strong>Knowledge</strong></td>
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<tr>
<td>I am (more) confident in identifying the common mechanisms of injury associated with trauma</td>
<td>Pre 13 13.68 72 75.79 10 10.53 0 0 47.4 &lt;0.0001</td>
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<td></td>
<td>Post 51 61.45 32 38.55 0 0 0 0</td>
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<td>I recognise the importance of conducting an initial assessment on the trauma patient utilising a systematic process</td>
<td>Pre 71 74.74 23 24.21 1 1.05 0 0 10.5 0.0151</td>
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<td>Post 77 92.77 6 7.23 0 0 0 0</td>
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<td>I am (more) confident in identifying the pathophysiological changes associated with the trauma patient</td>
<td>Pre 9 9.47 67 70.53 18 18.95 1 1.05 67.8 &lt;0.0001</td>
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<td>Post 56 67.47 26 31.33 1 1.2 0 0</td>
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<tr>
<td>I am (more) confident in identifying the signs and symptoms of a raised intracranial pressure in the head-injured patient</td>
<td>Pre 12 12.63 63 66.32 20 21.05 0 0 49.0 &lt;0.0001</td>
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<td>Post 48 57.83 35 42.17 0 0 0 0</td>
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Correlation coefficients (and p-values) for the agreement with the statements:

- 0.353 (0.0433 for Strongly agree vs. Agree)
- 0.265 (0.0697 for Strongly agree vs. Agree)
- 0.252 (0.0062 for Strongly agree vs. Agree)
4.5 Conclusion

In conclusion, the Phase I preliminary evaluation results not only demonstrated the utilisation and distribution of the TNCC in the WA region, but provided positive feedback collected from the TNCC participants attending the course from 2009–2012. The Phase II retrospective evaluation results reported a strong improvement in participants’ trauma knowledge and skills improvement since attending the TNCC, as reported by both the TNCC participants and the SRNs who have been working with them. Phase III prospective evaluation collective results clearly demonstrated a knowledge and skill improvement, as reported in Phase I and Phase II, although the 35 matched respondents’ pre- and post-participation survey results did not show significant differences in their knowledge and skills improvement. The open-ended responses collected from both surveys in this phase gave the same positive feedback on the effectiveness of the TNCC as the previous two phases. Discussions on these results are presented in greater detail in Chapter 5.
Chapter 5: Discussion

5.1 Introduction

In this chapter, the results of this study presented in Chapter 4 are explained and discussed, comparing with and contrasting against existing literature. The specific results of each phase are discussed, followed by a discourse on the integration of the three phases’ quantitative and qualitative findings. Limitations are presented. The discussion concludes by summarising how the four research questions have been answered, namely:

1. How do TNCC participants and their colleagues evaluate their trauma nursing knowledge development and skills application since participation in the TNCC?
2. How do TNCC participants and their colleagues evaluate the TNCC in terms of preparing and assisting participants to care for trauma patients?
3. How do TNCC participants and their colleagues evaluate the TNCC in terms of meeting participants’ learning needs?
4. How effective is the TNCC in improving participants’ trauma knowledge development and skills application?

5.2 Phase I: Preliminary Evaluation

In the preliminary evaluation, the researcher accessed existing data, collected by the TNCC administrators for the purposes of reporting on the utilisation of the TNCC in WA since its implementation, on participants’ overall evaluation of the TNCC. This phase of the research sought to provide some preliminary evaluation of the TNCC. This preliminary evaluation was used to develop more robust evaluation of how the TNCC has influenced participants’ knowledge, skills and clinical practice. The evaluation tool consisted of 10 Likert-scale and two open-ended response questions. These questions applied levels one and two of Kirkpatrick’s training evaluation model, exploring both the participants’ reaction to the learning event offered and the extent to which participants perceived they had gained the intended knowledge, skills and attitudes of the learning event. The course evaluation form was an existing tool into which the research team had no input. As such, it represents an evaluation of the feedback that course administrators
were seeking to use, aiming to monitor course evaluation against the aim and objectives of the course.

5.2.1 Demographic data

In the first three years of the TNCC implementation in WA, 566 nurses completed the course. From those participants, 556 evaluation forms were analysed. This high response rate (98.2%) is because of consent being provided at the time of application for the course, permitting application data to be used for research and evaluation purposes.

While the majority of the TNCC training courses were held in the Perth metropolitan area (27 of 37), a significant proportion of rural participants attended the course (44.6%), many travelling to Perth to participate. This may be because of the limited trauma-related courses on offer to WA nurses and to the internationally renowned reputation of the TNCC. While age and gender of participants was not captured on the tools, it is known the majority of participants were RNs (57.4%) or CNs (23.9%), mostly practicing in either the metropolitan (53%) or rural health services (37.6%). The ratio of nurses per capita is significantly lower in rural areas compared with metropolitan areas (AIHW, 2005), yet rates of hospitalised injury rise steeply with distance from a major city (AIHW, 2013), identifying a clear need for rural nurse training in trauma presentation management. The significant proportion of rural nurses attending the TNCC demonstrates that these rural nurses identified the need to further their knowledge and skills by seeking trauma training.

The highest proportion of TNCC participants was employed at Sir Charles Gairdner Hospital (9.4%) and RPH (9.2%) at the time of attendance. There were small differences in participant numbers across these two hospitals. These were, then, the two main adult trauma centres in the state, located in the metropolitan area. Sir Charles Gairdner Hospital is also the base of the WATEC, which convenes the TNCC. There were three other major trauma centres in WA at the time this phase of the study was conducted: Fremantle Hospital (accounting for 7% of the participant group), Princess Margaret Hospital for Children (4.3% of participants) and Joondalup Health Campus (4% of participants) (Department of Health Australia, 2011). The other highly represented hospitals, Armadale Kelmscott Memorial Hospital (5.8%), Rockingham General Hospital (5.3%) and Swan Kalamunda Health Service (4.3%), are located in inner regional areas of WA, from which major trauma patients are generally transferred to the metropolitan major
trauma centres. Nurses in inner and outer regional and remote areas of WA must be adequately prepared to manage trauma presentations outside of the resources of a major trauma centre.

Logically, most participants were employed in EDs (77.9%), where trauma first presents in the hospital setting. Flight nurses transporting trauma patients to acute care settings represented 4.3% of participants. Intensive care and trauma units, where acute ongoing management of trauma patients is undertaken, represented 2.9% and 1.6% of participants respectively. Interestingly, 2.5% of participants identified employment in community settings. This may indicate nurses’ desire to improve knowledge and skills as potential first responders to trauma cases in the community, or may refer to specific nursing roles in rural settings. Further detail of specific employment roles was not captured in this data set. It may also demonstrate the TNCC’s renowned reputation in setting a trauma care standard in the community, as Mock and Owusu-Sekyere (2007) claimed.

All but one participant were employed in the public health sector. Being a government-funded program, the focus of the TNCC implementation was to develop knowledge and skills of nurses employed by the government in public health settings. The fact that nurses from non-trauma-specific settings (community, general medicine, nursing education, agency nursing and management) have sought TNCC training may indicate such assessment and management skills are useful in varied health care specialty areas.

Participants were asked how many years of emergency nursing experience they had. The results showed those interested in gaining further trauma nursing skills had variable years of experience ranging from zero to two (30%), two to seven (29%), up to more than seven years of emergency nursing experience (24%). This question was not answered by 95 participants; they may not have deemed it applicable to them if they did not or had not worked in ED settings specifically. This result demonstrates that regardless of years of experience caring for trauma patients, these nurses all identified that their trauma knowledge and skills could be improved and sought further professional development in this area in the form of the TNCC.

5.2.2 Trauma Nursing Core Course evaluation

Participants overwhelmingly evaluated the TNCC positively, providing good and excellent item response ratings in 88.7–99.2% of instances. The results confirmed the
course content was relevant to nursing practice and the outcomes of the course were aligned with its goals. The only item not rated as either excellent or good by at least 90% of participants was the multiple-choice examination’s reflection of course content, with 10.9% (N = 58) rating this item fair and 0.4% (N = 2) rating it poor. This point of view was also reflected in half of the open-ended responses where participants commented that the multiple-choice questions were too difficult, vaguely worded or tested content that was not delivered in the course. Some of the difficulty encountered could be linked to other comments about the Americanisation of course content. While participants felt the course content delivered by instructors was relevant to their practice, perhaps the content of some of the multiple-choice examination questions did not relate to common trauma presentations or practices in Australia. The TNCC is administered under license of the ENA in the US, and as such, Australian administrators of the course are not permitted to change content or examination components, and thus unable to make them more applicable to the Australian context.

Responses of metropolitan participants and rural participants were compared to elicit any variable learning experience of these two groups. Two evaluation items showed a statistically significant difference. The first was the rating of the physical facilities in which the TNCC was delivered, with rural participants rating physical facilities less positively. While the metropolitan courses were delivered at a single location with state-of-the-art simulation facilities, the rural courses were delivered in varying rural settings with basic simulation equipment provided for participant skill practice because of venue and transportation restrictions. The second statistically significant difference was the rating of the effectiveness of the teaching methods used. There was a higher percentage of rural participants rating this item as excellent (74.8%) compared with metropolitan participants (68.3%). There are possible reasons for this. It may be that not all facilitators or indeed perhaps different facilitators travelled to deliver the rural courses, leading to different perceptions of facilitators’ delivery. Alternatively, the difference in perception could be related to participants’ variable frequency and breadth of exposure to CPD opportunities between rural and metropolitan settings.

The open-ended responses overwhelmingly praised the TNCC facilitators, in particular for their knowledge and enthusiasm. Critical comments related to the multiple-choice examination and the Americanisation of content (as previously discussed), as well as a
desire for more time to be spent practicing clinical skills on the skills stations. The desire for more practice time may have emerged from the anticipated pressure of skills assessment and the short time frame (two days) in which to demonstrate competence in specific skills, despite the majority of nurses’ working in trauma-related areas and likely undertaking these skills in their practice already. Further comments strongly suggested the TNCC delivery time be lengthened to three days because of the sometimes ‘rushed’ delivery of such a large volume of content.

In summary, the TNCC was evaluated by WA participants very positively as a relevant, informative and quality trauma education course. The statistically significant differences between metropolitan and rural participants may require review of how greater consistency of delivery and resources between settings can be achieved, while acknowledging the challenges and costs of vast distances to be travelled to deliver the TNCC in rural areas. Suggestions for improvement relating to making the content more geographically relevant and modifying the delivery time and structure of the TNCC require consultation with, and approval of, the licencing body in the US.

This study filled a gap in TNCC evaluation. As the literature review found a paucity of literature on trauma CPD course evaluation, apart from the serial evaluation studies on the ATLS done by Ali and his colleagues (Driscoll, 2007; Hogan & Boone, 2008; Patient, 2007) and three other evaluation studies on trauma courses conducted by Driscoll (2007), Wisborg et al. (2008) and Johansson et al. (2012). These were all trauma medical course evaluation studies. However, their existence provided the researchers of this study with information to assess the current status of trauma course evaluation and the merit or worth of conducting this TNCC evaluation study.

There is also very limited literature evaluating trauma nursing education to compare this study with. Therefore, there is very limited integration of literature to support the findings of this study. As Patient (2007) mentioned, there were hardly any other evaluation studies identified in this area, apart from a study by Gautam and Heyworth (1994, 1995) assessing the value of an abbreviated ATLS course on nurses’ knowledge, which shared similar limitations with other CPD evaluation studies: a small sample, participants’ perception-based findings and a poor correlation between CPD and nursing practice.
This study’s Phase I preliminary evaluation comprises a significant data set providing valuable information on how participants value the course in developing their professional knowledge and skills application. The overwhelming majority of participants reacted favourably to the learning event, acknowledging that their knowledge and skill learning needs were met. The results of this phase enabled the research team to expand the evaluation to target higher levels of Kirkpatrick’s training evaluation model and probe specific areas to inform future course development and implementation. This was achieved by adopting a mix of both quantitative and qualitative methods to conduct the TNCC evaluation in Phase II. This approach was applied to the same participant group as Phase I, as well as to an additional cohort who had attended the TNCC during the actual year that the preliminary evaluation was being planned and conducted (2013).

5.3 Phase II: Retrospective Evaluation

The retrospective evaluation analysed two sets of data applying the descriptive research design comprising both quantitative and qualitative methods: first, quantitative data collected through a retrospective survey, and second, qualitative data collected through interviews. This phase of the research was conducted with the aim of conducting further robust and detailed evaluation on the effectiveness of the TNCC in improving participants’ knowledge and skills as applied in clinical practice. Further, this Phase II evaluation was intended to pilot the design of a TNCC evaluation tool to be used in Phase III, a prospective evaluation.

The evaluation tool used in this phase was a TNCC skills, knowledge and evaluation survey, consisting of 33 questions using a 4-point rating scale and one open-ended question collecting participants’ overall perceptions of the TNCC. These questions applied levels one, two and three of Kirkpatrick’s training evaluation model, not only exploring participants’ reaction to the learning event offered and the extent to which participants perceived they had gained the intended knowledge, skills and attitudes of the learning event, but the extent to which participants applied their learning and changed their behaviour in clinical practice. The development of the retrospective survey was informed by the Phase I preliminary evaluation results. An expert review was undertaken that ensured survey questions were aligned to the TNCC course objectives and addressed at least three levels of evaluation of Kirkpatrick’s training evaluation model. The inclusion of the open-ended question in the retrospective survey not only provided rich
data for this phase evaluation, but helped researchers to identify areas for exploration in interviews conducted after the survey.

5.3.1 Demographic data

According to the information supplied by the WATEC, a total of 744 participants attended one of the 49 TNCCs in the first four years (2009–2013) of the TNCC implementation in WA. From those participants, 229 retrospective survey questionnaires were received and analysed. This survey response rate (30.8%) was facilitated by regular follow-up emails over the recruitment period to maximise the response rate. This was a strong response rate, given that it is unclear how many participants had changed their email addresses since providing contact details over the preceding four-year period.

Similar results were found in this phase to Phase I preliminary evaluation in the following demographics: the highest level of education (37.1% bachelor’s and 41.5% graduate certificate/diploma), the current position (42.8% RNs and 28.8% CNs), the current employment department (68.1% ED) and current employment organisation (52% metropolitan and 32.8% rural health services). These similarities reflect the representativeness of this retrospective survey sample in relation to the TNCC population from 2009 to 2013, given the majority of participants are the same in Phase I (2009–2012) and II (2009–2013).

Apart from the majority of respondents working in metropolitan and rural health services in WA, 15.3% of respondents provided a variety of answers in relation to their employers and employment avenues such as the RFDS, nursing agencies, paramedics, private practice, not-for-profit organisations, mining, offshore oil and gas companies, nurse education and nurse management. This breadth of employment reiterates the desire of a wide range of health care workers to improve their trauma knowledge and skills.

A total of 13.1% respondents stated that their current positions were above Level 2 (Levels 3–5) in the WA health department nursing career structure. This result demonstrated the interest of nursing management and education staff in the TNCC as the gold standard of trauma nursing education. Further, it shows the impact of the TNCC on the professional development of the nursing management staff themselves, and their interest in supporting their nurses to seek such a trauma education opportunity in the workplace. According to Kirkpatrick (2009), observations from managers on trainees’
performance can provide valuable data to measure level three of the Kirkpatrick model (behaviour), and support of the management team of an organisation may be indirectly related to the improved performance of trainees or perceived effectiveness of the TNCC. Altogether, multiple factors including the renowned reputation of the TNCC may have contributed to the high attendance rate of nursing management and education staff.

A total of 88.2% of the retrospective survey respondents stated they had attended a trauma course other than the TNCC prior to the TNCC attendance. Interestingly, 81.2% of respondents said they had not attended another trauma course following the TNCC. These results showed nurses’ interest in, and perceived need to attend, further trauma education. It may also indicate their satisfaction with the TNCC in meeting their trauma training needs so that they did not need to participate in further trauma education. In contrast, it may indicate further the difficulty in attending more trauma CPD courses for nurses, associated with barriers and organisational factors such as culture, leadership or workload issues that are reported to affect their ability to attend CPD courses, as Coventry, Maslin-Prothero and Smith (2015) pointed out.

5.3.2 Quantitative results from retrospective survey

Participants reported improvement in their perception of trauma knowledge (93.7%–99.5%) and skills and confidence (98.2%–99.6%) after participation in the TNCC. Participants most strongly rated their ability to perform a log roll and manage a compromised airway, perhaps because these two skills would likely be the primary life-preserving tasks undertaken on trauma patients and performed most frequently. The participants suggested they were least confident in recognising signs of raised intracranial pressure. This may be because of the insidious but critical nature of such a presentation, leading to higher levels of anxiety associated with this aspect of trauma care, or could represent a lack of coverage of this topic in the TNCC.

A total of 96.8% of participants reported using the knowledge and skills gained in the course in the care of their non-trauma patients, demonstrating the value of the TNCC in varied healthcare areas (not just ED nursing), as indicated by the variable specialty areas of nurses participating in the TNCC, as previously discussed.

The results of this phase confirmed the course was perceived as being beneficial in improving nurses’ trauma knowledge and skills in practice, further evidenced by 96.4%
of participants being willing to recommend the TNCC to their colleagues. The only two topic areas where participants most frequently disagreed they were sufficiently equipped were disaster management (26.6% disagree or strongly disagree) and DV (22.5% disagree or strongly disagree). This result indicated the need for these two areas of education for nurses, as reported in the literature (Garee, 2001; Reijnders et al., 2008; Stanley, 2005). Integrative findings of specific learning aspects showed that the disaster management and DV content in the TNCC were insufficient to equip participants to deal with these situations. A more comprehensive course, such as the MIMMS, a scenario-based simulated multidisciplinary disaster course, was recommended by both the TNCC participants and SRNs working with them for disaster training.

It seems that no formal comprehensive course for nurse DV training was available at the time of interviews. Further, there was no clear policy or protocol on DV handling for staff to follow in the interviewees’ working areas. However, most participants admitted that both disaster and DV training were very applicable to their practice. The reported shortcomings were consistent with the following findings of the literature review: there is a willingness and a need for nurses to be trained in disaster management and in DV handling, since nurses feel unprepared in these two areas; there is a need for a well-developed universally accepted set of disaster competencies; and there is a need for a developed clear-cut policy or protocol for nurses to follow when they face DV cases in clinical areas (Daily et al., 2010; Garee, 2001; Pabis, Wronska, Slusarska, & Cuber, 2011; Sanders & Coblly, 2005; Stanley, 2005; Yin et al., 2011).

The inclusion of team training combined with a simulation component in the TNCC was advocated by 96.7% of participants. This finding adds further evidence to support results from studies indicating that team training, with multidisciplinary health care workers combined with simulation, can translate into more efficient patient care and better patient outcomes (Falcone et al., 2008; Murphy, Curtis & McCloughen, 2016; Wisborg et al., 2008; Wong & Petchell, 2003).

The open-ended responses were mainly positive comments on the TNCC (52), promotion of the TNCC to others (14) and praise of the staff (10). Similar to the Phase I open-ended responses result, critical comments related to the Americanisation of content, as previously discussed, and the intensity of information delivered in a short time frame.
Disaster management content was also criticised, indicating again the need for education in this area.

5.3.3 Qualitative results from the interviews

Qualitative results of this phase refer to the findings from the TNCC participant interviews and the TNCC SRN interviews. The purpose of conducting these interviews was to provide more robust, in-depth and detailed information to verify the quantitative findings gained in Phase I and Phase II. The SRN group added another level of perceived effectiveness of the TNCC on nurses’ clinical practice.

The senior nurse interviews were designed to serve as observers’ point of view to increase the rigour of the quantitative results. According to Lincoln and Guba (1985), confirmability is one of four criteria to increase or judge a qualitative study’s rigour. It ensures a study’s findings are the result of the experiences of the informants rather than the result of the preferences of the researcher(s), and equates to the objectivity of a quantitative study (Lincoln & Guba, 1985). The carefully selected SRNs were senior staff working with the TNCC participants and observing their practice at all times. Their direct observations provided more objective data on the assessment of TNCC participants’ performance related to the course’s effect.

The design of the interview questions (10 for participants, 12 for SRNs) applied not only levels one to three, but level four of the Kirkpatrick model. They were designed in an attempt to measure the effect of the TNCC on the organisation, business or environment resulting from the improved performance of the TNCC participants. The interview questions were developed based on the results of the previous Phase I study and the quantitative component of the Phase II study. The SRN selection was based on the demographic information provided by Phase I. Content analysis of these qualitative data comprised summarised participant perceptions. These perceptions not only provided answers for research question one, but formed the basis for more in-depth perceptions for research questions two, three and four.

The first notable perception was the positive overall impression expressed by a high percentage of participants at different phases from 2009 to 2013. The positivity of the praise for the TNCC by respondents was not limited to any of the TNCC’s teaching qualities or enthusiasm, nor the administrator’s organisation, nor even to the effectiveness
in improving nurses’ critical thinking and problem-solving abilities. The most noticeable praise focused on the standardised assessment A-I process content, which was reported by participants to be the most valuable and applicable aspect of the TNCC. Mock and Owusu-Sekyere (2007) stated that the TNCC has set a ‘gold’ assessment standard in trauma nursing care. This study’s finding supported such a statement.

The second significant perception found was the resultant confidence, knowledge and skills improvement reported by participants after attending the TNCC. This result not only clearly answered research question one (how do TNCC participants and their colleagues evaluate their trauma nursing knowledge development and skills application since their participation in the TNCC), and research question four (how effective is the TNCC in improving participants’ trauma knowledge development and skills application), but confirmed the results of the quantitative data.

The third key perception noted was the participants’ utilisation of TNCC knowledge and skills in caring for non-trauma patients in their clinical practice, particularly using the standardised assessment process. This finding adds further weight to the demonstrable effectiveness of the TNCC in improving nursing practice not specific to trauma care settings, indicating perhaps that the participant group targeted to attend this course should be expanded to non-trauma-specific settings.

The similarities between the SRNs’ perceptions of the TNCC’s effect and perceptions of the TNCC participants added further evidence on the effectiveness of TNCC training in improving participants’ knowledge development and skills application.

In summary, the TNCC was evaluated by Phase II participants positively and was reported to have contributed to improving their knowledge, skills and confidence in clinical practice. DV and disaster management have been identified as the areas of unmet learning needs in the TNCC. Team training with simulation was reported as a favourable combination in trauma training. The same suggestions for improvement proposed in the evaluation of Phases I and II were to make the content more geographically relevant and to extend the delivery time of the TNCC.

This retrospective evaluation provided rich evidence to show that participants perceived the course as very effective in improving their trauma knowledge, skills and confidence in clinical practice. However, as some interviewees pointed out, it was ‘hard to assess’
whether the improvements in both knowledge and skills were the result of the TNCC alone or the combination of work experience and some participants’ postgraduate learning experience. This reflects hard-to-control variables as a methodological difficulty faced by outcome evaluation for CPE, as noted by researchers in the field (Apgar, 2001; Attree, 2006; Eustace, 2001; Ferguson, 1994; Lee, 2011; Nolan et al., 1995; Penz et al., 2007). A multi-dimensional approach with multi-method design in CPD outcome evaluation studies has been proposed to overcome these challenges (Clark, Draper, & Sparrow, 2008; Draper & Clark, 2007; Nolan et al., 2000). In response to this suggestion, this study applied the descriptive quantitative and qualitative methods design, by adopting Kirkpatrick’s training evaluation model to guide the outcome evaluation methodology.

The results of Phase II guided the research team to build further evaluation at a higher level of the Kirkpatrick model, by designing a prospective TNCC evaluation tool to provide more robust evidence of the effectiveness of the TNCC by mitigating some of the confounding variables that may affect a retrospective evaluation.

5.4 Phase III: Prospective Evaluation

Prospective evaluation was conducted to identify changes in TNCC participants’ perceptions of knowledge and skills improvement in their clinical practice related to TNCC participation. This phase evaluation sought to find more robust and definitive answers on whether the TNCC meets learning needs and to what degree participants actually experience an improvement in their knowledge development and skills application in caring for trauma patients.

The two surveys (pre-participation and post participation) address the TNCC skills, knowledge and course evaluation and were administered to the 2014 TNCC participants. The pre-participation survey consisted of 21 questions and the post-participation survey consisted of 30 questions, using a four-point rating scale and one open-ended question collecting participants’ perceptions of the TNCC. These surveys applied level one of the Kirkpatrick model (exploring participants’ reactions to the learning event offered), level two (identifying the extent to which participants perceived they had gained the intended knowledge, skills and attitudes of the learning event), level three (determining to what degree participants’ knowledge and skill development translated into behaviour in
practice) and level four (evaluating whether the targeted outcomes of the TNCC had occurred).

The distribution timeframe for the surveys, especially the post-participation survey, respected the findings from the literature that three to six months’ post-course attendance was the peak knowledge retention (Ali et al., 1996). It was noted that interviews to collect qualitative data were not conducted in this phase because of the lengthy research process of the study. This reflected the same limitation pointed out by some researchers, such as Ivankova et al. (2006), who conducted research combining both quantitative and qualitative methods and also identified limitations including lengthy time and feasibility of resources required to collect and analyse both types of data.

5.4.1 Demographic data

According to the information supplied by the WATEC, a total of 224 participants attended one of the 15 TNCC convened between March and November 2014. Of those, 96 pre-participation and 84 post-participation survey questionnaires were received and analysed. This high survey response rate (pre = 55.8%, post = 45.4%) may be reflective of the shorter distribution timeframe since participation compared with the other two phases of the research.

Similar demographics were reported from the Phase III participant group as previous phase participants: highest level of education a bachelor’s degree (pre = 49%, post = 39.3%), a further graduate certificate/diploma (pre = 35.4%, post = 39.3%), current position (RNs: pre = 61.5%, post = 58.3%; and 25% CNs), current employment department (ED: pre = 81.3%, post = 78.6%), current employment organisation (metropolitan: pre = 63.5%, post = 54.8%; rural health services: pre = 22.9%, post = 32.1%), representing a similar participant demographic between the pre-participation group and the post-participation group.

Apart from three TNCCs hosted by rural health care settings in Northam, Pilbara and Bunbury in the WACHS, the CTEC in the Perth metropolitan area hosted 12 TNCCs in 2014. It was noted that the CTEC has become the major hosting organisation in WA for the TNCC in recent years. These results indicated the contributions that the CTEC has been making to this significant trauma nursing education programme and the development of the trauma nursing education. Located at UWA, the CTEC is a
simulation-based specialist skills training centre opened by Queen Elizabeth II in 2000. It has been playing a major role in streamlining medical and nursing education with a combination of high-fidelity equipment and state-of-the-art facilities. It has also been providing high-quality medical and nursing training to enhance risk management and clinical safety in WA hospitals.

5.4.2 Comparison between pre-and post-participation survey responses

Analysing the collective 84 responses from the post-participation survey, it was found that the results in Phase III were consistent with findings from Phase I and Phase II. Participants overwhelmingly reported improvement in their knowledge and skills since attending the TNCC. This finding is further supported by the collective analysis comparing all pre-participation and post-participation responses. This comparison identified a statistically significant improvement in each of the knowledge and skills components evaluated, clearly demonstrating that the TNCC improved the knowledge and skills of these participants.

However, the 35 sets of data matching pre- and post-participation responses demonstrated no statistically significant difference in knowledge and skills. The possible reasons for this include but are not limited to the small sample of data for comparison (only 35) and greater clarity or understanding of survey items at second completion (post participation). Supporting the theory of small sample size affecting statistical power is the positive nature of the open-ended feedback provided by the 35 participants, reporting they had experienced knowledge and skills improvement since attending the TNCC.

In summary, the TNCC participants in 2014 noted that the TNCC had helped them to improve their knowledge and skills in trauma care to achieve better patient outcomes in their clinical practice. Development of an online pre- and post-participation knowledge, skill and evaluation questionnaire as an evaluation tool for the TNCC was also achieved as an objective of this study. Validation of a survey questionnaire requires assessing its face validity, content validity, concurrent validity, predictive validity and construct validity (Litwin, 1995). In this study, face validation and content validation were achieved through the following methods: researchers’ cross examination of survey items and experts’ review of contents. However, more advanced validity and reliability checks, including internal reliability, require further research in the future. Unfortunately, the
literature review for this study has not found any other similar TNCC evaluation questionnaires available for researchers to conduct a concurrent validity check.

5.5 Overall Results

As Creswell (cited in Fetters, Curry, & Creswell, 2013) pointed out, the integration of quantitative and qualitative results is essential in any study mixing quantitative and qualitative methods. Integrative results of both the quantitative findings and qualitative findings showed a possible positive association between TNCC training and participants’ reported knowledge and skills improvement.

The four research questions of this study were:

1. How do TNCC participants and their colleagues evaluate their trauma nursing knowledge development and skills application since participation in the TNCC?
2. How do TNCC participants and their colleagues evaluate the TNCC in terms of preparing and assisting participants to care for trauma patients?
3. How do TNCC participants and their colleagues evaluate the TNCC in terms of meeting participants’ learning needs?
4. How effective is the TNCC in improving participants’ trauma knowledge development and skills application?

Research question one was designed with more of a quantitative nature, to assess the effectiveness of the TNCC on WA nurses’ trauma knowledge development and skills application post participation. Research question two was designed with more of a qualitative nature, aiming to explore in-depth perceptions from the TNCC participants and SRNs working with the participants on the effectiveness of the course. Research question three was designed to seek both quantitative and qualitative answers, targeting specific areas, reflecting potential unmet needs that the TNCC participants and SRNs reported in the previous qualitative and quantitative components of the research. Research question four was also designed to seek both quantitative and qualitative answers, on the positive effect of the TNCC on the participants’ knowledge development and skills application. A historical overview of trauma nursing education from the literature review found that disaster nursing, DV management, simulation and team training may tend to be new content in the education of this specialty (Knudson et al., 2008; Reijnders et al., 2008; Williams et al., 2008; Wong & Petchell, 2003). Therefore, questions in both Phase
II and Phase III surveys and the Phase II interviews asked TNCC participants and SRNs about these learning needs.

The three phases—preliminary evaluation, retrospective evaluation and prospective evaluation—were designed to progressively build evidence, step by step, on the effectiveness of the TNCC participation in participants’ knowledge development and skills application. Figure 5.1 illustrates this study’s design in phases.

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**Figure 5.1: Study Design in Phases**

In this descriptive study, the quantitative findings were linked to qualitative sampling. For instance, the selection of the TNCC SRN interviewees from major metropolitan and rural health care settings was based on the demographic results from Phase I and the retrospective survey results in Phase II (Fetters et al., 2013). Similarly, the quantitative numeric data and the qualitative textual data from different phases were brought together for analysis (Fetters et al., 2013). Multiple similarities were found between the quantitative and qualitative findings.
Existing literature showed that there were some hard-to-control variables in CPD outcome evaluation studies that might affect the knowledge and skills levels of participants (Apgar, 2001; Ferguson, 1994; Nolan et al., 2000). Some variables in the demographic data indeed proved hard to control, including years of nursing experience, years of emergency nursing experience and attendance at other trauma courses. All these may have affected the TNCC participants’ knowledge and skills levels. Further, as previously discussed, some interviewees admitted that it was ‘hard to assess’ whether the improvements in both knowledge and skills were the results of the TNCC alone or a combination of work experience and postgraduate learning experience.

An overview of the course evaluation and interview results in three phases found that high percentages of respondents provided positive and in-depth answers relating to their knowledge and skills improvement by attending the TNCC. They showed support for team training in the trauma course and the application of the TNCC generated knowledge and skills to the non-trauma patients in clinical practice. A strong willingness to recommend the TNCC to others has been shown in both quantitative and qualitative results. A strong desire to participate in a TNCC refresher course and other more comprehensive training in both DV and disaster management has also been shown through the quantitative and qualitative results. The standardised assessment process questions in both knowledge and skill sections received higher percentages of ‘strongly agree’ and ‘agree’ than other questions gathering quantitative data and were spoken of highly in the qualitative data sections. This overall finding demonstrated the effectiveness of the TNCC in establishing a trauma nursing assessment standard and in improving participants’ trauma care performances.

Both Bowling (2014) and O’Leary (2013) suggested that interview data quality needed to be ensured at all times using certain measures. The researchers of this study applied the following measures to increase the quality of interviews: training of interviewers by experienced researchers prior to independent interviews, taking care in designing interview questions, persistence in contacting the interviewees to maximise attendance rates and the development of interview protocol.

Consistent reports of knowledge and skills improvement were found not only from survey results, but from interview transcripts and open-ended responses collected in different phases of the study. Consistency of results was also found after analysis of data collected
from different TNCC cohorts using various data collection tools. Further, agreement on
the improvement existed between TNCC participants and senior nurses working with
them as observers. This multi-dimensional agreement and consistency strengthened the
positive association between the TNCC training and participants’ knowledge and skills
improvement in trauma care (Creswell & Plano Clark, 2007).

5.6 Limitations

This study has some limitations, despite using a descriptive research design combining
quantitative and qualitative methods in an attempt to overcome the methodology
difficulties facing CPE outcome evaluation (Draper & Clark, 2007; Nolan et al., 2000).

First, there was difficulty in controlling some variables that may have influenced the
TNCC participants’ knowledge and skills improvement pre- and post-participation, such
as nurses’ professional experience, experience of emergency or trauma nursing, prior and
post-attendance of other trauma courses and participation in postgraduate courses.

Second, because of ethical and other considerations such as maximising survey responses,
there was not a unique identifier used during the prospective evaluation phase to help
researchers precisely identify respondents from pre- to post-participation knowledge,
skill and evaluation surveys for comparison. Only a small sample of 35 respondents was
identified by matching the pre- and post-participation demographic information for
comparison: this may be associated with the insignificant comparison results. As Bowling
(2014) pointed out, cross-sectional survey results alone cannot establish causality, but
merely point to statistical associations between variables.

Further, no follow-up interviews were arranged to verify the findings in the prospective
evaluation phase. The prospective evaluation results relied mainly on the post-
participation knowledge, skill and evaluation survey results, which contained limited
qualitative data, from the open-ended responses. Also in this phase, the missing data that
were not successfully collected from the first two months in 2014 resulted in a reduction
of the sample size, which may have influenced representation of the study population.

Third, no direct-observation data were obtained by researchers from clinical areas, since
senior nurses working with the TNCC participants were interviewed retrospectively as
indirect observers. The reliability of interview data might be limited by interviewees’
recall. Also, there was no documentation of the TNCC participants’ performance in clinical areas. Such documentation would have permitted the researcher’s review to access more objective information for this evaluation. Data obtained might have been limited by participants’ and indirect observers’ personal perceptions.

Fourth, there were insufficient interviewees recruited during the retrospective evaluation phase, leading to insufficient interviewees to form a proper focus group to foster discussion to gain richer qualitative data.

There was no similar study and survey questionnaire for comparison for the purpose of validation of the study and the newly developed evaluation tool since this was the first TNCC evaluation study to be conducted.

5.7 Conclusion

The overall results answered the four research questions set for this study. This study evaluated participants’ trauma nursing knowledge development and skills application retrospectively and prospectively, seeking perceptions of both TNCC participants and senior nurses working with them. Overwhelmingly positive evaluation of the TNCC was provided, acknowledging quality content, delivery and learning resources.

Participants consistently perceived that the TNCC improved their knowledge, confidence and capability to perform trauma nursing skills across all three phases of the study. Both TNCC participants and their colleagues perceived that the TNCC had prepared participants to care for trauma patients, with specific mention of the value of knowledge development on the systematic A-I assessment process. Participants reported the TNCC met their learning needs, however, on further questioning, stated DV and disaster management components of trauma management were lacking.

In summary, despite limitations, this descriptive study has made significant findings via the integration of quantitative and qualitative results. It found a reported positive association between TNCC training and WA participants’ knowledge and skills improvement in trauma care. Multiple dimensions of consistency have been found in findings from different phases, from different cohorts and from both participants’ and observers’ points of view. The consistency of the findings reflects the study’s merit and
status in the field of trauma nursing education. The findings indicated areas for future education and research, summarised in Chapter 6.
Chapter 6: Conclusion

6.1 Introduction

Trauma or injury is one of the leading causes of death in Australia (Curtis et al., 2012) and globally (WHO, 2013). Trauma nursing is an evolving specialty in Australian nursing practice. Training is predominantly provided for post-registration nurses, in a variety of tertiary and hospital settings in the form of CPD courses.

The TNCC was first developed in the 1980s in the US and is one of the most sought after, internationally renowned trauma nursing courses offered in Australia. The WATEC obtained a licence from the ENA in the US to deliver the TNCC in WA, and has trained over 900 WA nurses since 2009. A review of the literature undertaken for this study demonstrated an absence of any formal evaluation of the TNCC globally.

The aim of this research, therefore, was to evaluate the perceived effectiveness of the TNCC in terms of WA nurses’ knowledge development and skills application in the practice of caring for trauma patients. The specific objectives of the research were to 1) report the utilisation of the TNCC in WA, 2) evaluate participants’ experiences of the TNCC, 3) explore perceptions on knowledge and skills development following attendance at the TNCC, and 4) develop and pilot a TNCC evaluation tool.

These objectives were achieved by answering four research questions:

1. How do TNCC participants and their colleagues evaluate their trauma nursing knowledge development and skills application since participation in the TNCC?
2. How do TNCC participants and their colleagues evaluate the TNCC in terms of preparing and assisting participants to care for trauma patients?
3. How do TNCC participants and their colleagues evaluate the TNCC in terms of meeting participants’ learning needs?
4. How effective is the TNCC in improving participants’ trauma knowledge development and skills application?

This study adopted the outcome evaluation methodology, guided by Kirkpatrick’s training evaluation model. A descriptive research design combining quantitative and
qualitative methods was applied, using web-based retrospective surveys, interviews and prospective surveys. The study addressed the objectives and demonstrated a strong positive association between attendance at the TNCC and improvement in WA nurses’ trauma care knowledge development and skills application.

Utilisation of the TNCC in WA has been reported to the local health department and the WATEC. Further, an evaluation tool in the form of web-based pre- and post-TNCC participation surveys has been developed and utilised for the first time. This chapter summarises the conclusions of the study, offering recommendations for the local health department and TNCC’s licencing bodies and governing body (ENA), and suggests opportunities for future research.

6.2 Conclusions

This study reached a number of conclusions that may become a significant reference for future education and research in the area of trauma nursing.

It is clear from the literature that there is a lack of formal evaluation to demonstrate the effectiveness of trauma nursing courses. In particular, there is a lack of outcome evaluation of the many CPD courses currently available. While this study has a number of limitations, as discussed in Chapter 5, it may be seen as an empirical study exploring the evaluation of the TNCC internationally.

The findings of this outcome evaluation study demonstrate the positive effect that participation at the TNCC has on WA nurses’ trauma care knowledge, skills and confidence, especially in relation to clinical practice.

It must be noted that this study did not aim to assess the effectiveness of the TNCC on clinical patients’ outcomes. However, both the TNCC participants and the senior nurses who acted as observers of participants’ practice, reported that the TNCC had a positive impact on patient outcomes. Further, the knowledge and skills gained in the TNCC have been reported by participants as transferable and applicable to a diverse range of patients, and not limited to trauma care settings.

Participants reported that participation in the TNCC met their learning needs. The exception to this was in the areas of disaster management and DV, which were identified
as applicable in clinical practice and in need of more comprehensive coverage in the TNCC to prepare nurses. Most TNCC participants were advocates of team training with the use of simulation in trauma courses. It does appear that there is a need for further development of trauma courses, particularly incorporating team training and simulation. The expansion of these areas may translate into positive patient outcomes.

Course participants gave high praise to the TNCC. They reported benefits of attending the course and indicated that they highly recommended the TNCC to other nurses. These results correspond with reports from course administrators of a high demand to attend the TNCC in WA. Available funding and ongoing support for the TNCC is required to ensure this educational opportunity is offered to more WA nurses.

Participants’ main feedback regarding suggested improvements to the TNCC related to increasing the length of time for the large volume of content delivered (including providing greater time for skills practice prior to assessment) and to ensuring the content of the TNCC is consistently relevant to the Australian context of trauma nursing.

6.3 Significance

The significance of this study can be summarised in the following contributions:

- The demographic analysis provided the Department of Health and the Chief Nursing and Midwifery Officer in WA with information on TNCC utilisation in WA from its introduction in 2009 until 2014.
- The evaluation results informed the Department of Health and the Chief Nursing and Midwifery Officer in WA and education bodies, such as the WATEC, of the impact of the TNCC on WA nurses’ professional development.
- The study results provided possibly the first evaluation in the world of the TNCC, and valuable information on potential areas for improvement to be considered by the international governing body of the TNCC.
- The results of this study filled a gap in the evidence on the effectiveness of trauma nursing courses, especially the TNCC. This may help the Department of Health and the Chief Nursing and Midwifery Office in WA justify resource allocation in the current complex economic environment.
• The results of this study verified findings from the literature review and provided information on the development status of trauma nursing education and possible trends. These findings may be used as a reference to assist trauma nursing education development locally and even internationally, for trauma professionals’ training in response to a demonstrated need.
• The development of a new TNCC evaluation tool should inform the development of guidelines for future trauma course evaluation locally, nationally and internationally.

6.4 Recommendations

Recommendations generated from this study will be made available to local health authorities, licencing bodies and the governing body (ENA) for the TNCC.

Recommendation 1: Substantial funding and resources should be allocated to provide trauma nursing education in WA and throughout Australia. This will ensure sufficient opportunity for nurses to develop their knowledge and skills in trauma care.

Recommendation 2: The TNCC content, including the use of trauma statistics and scenarios, should be contextualised to the country in which it is delivered. Specifically, this requires liaison and collaboration between the WATEC and the ENA to ensure the course content is relevant to trauma nursing practice in Australia.

Recommendation 3: A refresher course following attendance at a TNCC is recommended to continually update nurses’ knowledge and skills. It is suggested that a TNCC refresher course, with updated trauma care information, delivered over a shorter time, be designed and implemented within one-to-three years of the TNCC, instead of the current reverification course.

Recommendation 4: Further to trauma nurse training through either undergraduate courses, postgraduate courses or the current available trauma nursing CPD courses such as the TNCC, further advanced trauma nursing courses could produce well-trained advanced trauma nursing health workers, potentially leading to improved patient outcomes.
6.5 Future Research

Limitations were identified in the discussion chapter. For example, the study findings are based mainly on the participants’ and observers’ perceptions. It is recommended that, to add solid evidence to this area and validate the results of this study, a more robust methodological design be adopted to objectively measure the effectiveness of the TNCC and its impact on patient outcomes.

It is also recommended that a future comparative study collecting pre- and post-course participation data should use a unique identifier with a larger sample or conduct interviews to verify the quantitative findings.

A further recommendation for future research is that to ensure the accuracy of measurement, better methodologies should be explored to control variables. For instance, nurses’ experience may affect their knowledge and skill levels at assessment. Direct observation of nurses’ practice and the relevant accompanying documentation as objective data are recommended to be used in future studies to add reliable direct evidence.

This newly developed and piloted evaluation tool is possibly the first TNCC evaluation tool. As such, the online pre- and post-participation TNCC survey, though subjected to face and content validation, requires further research prior to use or incorporation into an evaluation framework.

Overall, further research is needed on the effectiveness of not only the TNCC, but of other trauma nursing courses and trauma courses designed for health professional knowledge and skills improvement. It is recommended that these are conducted locally and internationally, as they are very much needed in the current complex political, economic and social context of global healthcare.
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among rural and remote nurses. *The Journal of Continuing Education in Nursing, 38*(2), 58.


Appendix 1: Summary of Trauma Education Evaluation Studies

<table>
<thead>
<tr>
<th>Study</th>
<th>Design/sample</th>
<th>Objective/intervention</th>
<th>Results/conclusion</th>
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<tbody>
<tr>
<td><strong>TRAUMA COURSE EVALUATION</strong></td>
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<tr>
<td>Ali et al. 1993</td>
<td>Outcome evaluation quantitative comparative study (pre/post ATLS) N = 199 physicians.</td>
<td>To assess trauma outcome improvement following the ATLS in the developing country of Trinidad and Tobago by comparing trauma outcome variables such as mortality and morbidity using Injury Scale Scoring System (ISS) before &amp; after program.</td>
<td>The ATLS program significantly improved trauma patient outcomes. Trauma mortality decreased post ATLS (134/400 vs 279/413), as did major disability (1.9% vs 6.7%).</td>
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<tr>
<td>Ali et al. 1994</td>
<td>Outcome evaluation – quantitative comparative study (pre/post ATLS intervention frequency comparison) N = 813 trauma patient charts.</td>
<td>To assess the impact of the ATLS by comparing the pre &amp; post ATLS life-saving intervention frequency for a 9-year period.</td>
<td>The frequency of life-saving interventions, particularly in the ER, increased post ATLS. Pre vs post ATLS: endotracheal intubation: 26.1% vs 36.4%; Foley catheterisation of the bladder: 11% vs 97.7%; nasogastric tube insertion: 3.2% vs 95.9%; chest tube insertion: 3.9% vs 95.2% (P &lt; 0.05). These differences were associated with significant improvement in trauma.</td>
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<tr>
<td>Ali et al. 1994</td>
<td>Qualitative study pre/post ATLS multiple-choice questions (MCQ) &amp; questionnaires N = 212 physicians MCQ N = 87 questionnaires (50 physician, 37 nurses).</td>
<td>To assess the cognitive and attitudinal impact of the ATLS in Trinidad and Tobago.</td>
<td>Positive cognitive and attitudinal effects contributed to improved post ATLS trauma patient outcomes. Reported physicians’ improvement in MCQ performance and better resuscitation, timelier and appropriate consultation and greater confidence in trauma management post ATLS.</td>
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<tr>
<td>Study</td>
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<td>Objective/intervention</td>
<td>Results/conclusion</td>
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<tr>
<td>Ali et al. 1996a</td>
<td>Randomised controlled trial pre/post ATLS MCQ &amp; Objective Structured Clinical Examinations (OSCE) N = 32 physicians.</td>
<td>To assess the teaching effectiveness of the ATLS.</td>
<td>Results support the teaching effectiveness of the ATLS among practicing physicians by improvement in OSCE scores and cognitive performance in MCQ.</td>
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<tr>
<td>Ali et al. 1997</td>
<td>Outcome evaluation – longitudinal, experimental design All trauma patient data in a major trauma hospital over two years.</td>
<td>To assess the effectiveness of the Prehospital Trauma Life Support (PHTLS) course on trauma patient outcome.</td>
<td>Post-PHTLS course mortality (pre 15.7% vs post 10.6%) and morbidity (length of stay pre 14.6+/−12.5 days vs post 8.9 +/−6.7 days; major disability pre 40% vs post 8.6%) were significantly decreased, suggesting a positive impact of the PHTLS program on trauma patient outcomes.</td>
</tr>
<tr>
<td>Ali et al. 1998</td>
<td>Controlled experimental outcome evaluation study N = 88 medical students.</td>
<td>To assess the effect of the ATLS on medical students’ performance in simulated trauma patient management. 32 students (group I) completed a standard ATLS course, 12 students (group II) audited the ATLS course, and their performance in trauma simulations was compared with 44 matched control students (group III) from the same class. Performance in the non-trauma patient simulation stations was also analysed. The score on each station was standardised to a maximum of 20.</td>
<td>The ATLS course, both complete and audit status, prepares students more appropriately for managing trauma patients as judged by trauma simulation scenarios. The ATLS-trained and ATLS-audit students had higher scores in the trauma stations than the control group, with the highest scores being in the ATLS-trained group. All ATLS-trained students passed with 62.5% honours and 37.5% passing grades. The ATLS-audit group had 33.3% honours and 66.6% passing grades, compared with the control group who had 84.09% pass, 9.09% borderline, and 6.82% failure in the trauma stations.</td>
</tr>
<tr>
<td>Ali et al. 1996b</td>
<td>Controlled experimental design (pre/post MCQ &amp; OSCE) at 6 months, 2, 4 &amp; 6 years post ATLS. N = 60 physicians.</td>
<td>To test the attrition of cognitive and trauma management skills among practicing physicians after the ATLS.</td>
<td>Cognitive and trauma management skills decline after the ATLS, major principles of trauma care maintained for at least 6 years post ATLS.</td>
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<tr>
<td>Study</td>
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<tr>
<td>Ali et al. 1995</td>
<td>Controlled experimental (Pre/post MCQ &amp;OSCE)</td>
<td>To assess the teaching effectiveness of the ATLS among senior medical students.</td>
<td>Demonstrated trauma management skills acquisition by senior medical students using highly reliable trauma OSCE stations after the ATLS.</td>
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<td>N = 40 medical students.</td>
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<tr>
<td>Gautam &amp; Heyworth 1995</td>
<td>Controlled prospective study (pre/postquestionnaire)</td>
<td>To examine the change of knowledge in trauma management post two different course: ATLS &amp; local junior doctors’ induction course.</td>
<td>Demonstrated benefits of both courses and the ATLS course participants achieved better scores.</td>
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<td>N = 74 doctors.</td>
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<tr>
<td>Johansson et al. 2012</td>
<td>Population-based observational study</td>
<td>To investigate the association between PHTLS training of ambulance crew members and the mortality in trauma patients.</td>
<td>PHTLS training of ambulance crew members may be associated with reduced mortality in trauma patients. But the precision in this estimate was low because of overall low mortality. While there may be a relative risk reduction, the predicted absolute risk reduction in this population was low. Adjusting for multiple potential confounders, PHTLS training appeared to be associated with a reduction in mortality, but the precision of this estimate was poor (odds ratio, 0.71; 95% confidence interval, 0.42–1.19). The mortality risk was 4.7% (36/763) without PHTLS training and 4.5% (94/2067) with PHTLS training. The predicted absolute risk reduction is estimated to correspond to 0.5 lives saved annually per 100,000 population with PHTLS fully implemented.</td>
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<tr>
<td>N = 2,830 injured patients.</td>
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<tr>
<td>Wisborg &amp; Brattebø 2008</td>
<td>Qualitative study</td>
<td>To better understand why only some hospitals achieved implementation of regular trauma team training, despite the intentions of all hospitals to do so.</td>
<td>The main determinant to implement lasting training activities seems to be the maintenance of momentum for improvement and dedicated, enthusiastic health professionals.</td>
</tr>
<tr>
<td>Focus group interviews with multiprofessional respondents in seven hospitals in Norway.</td>
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<tr>
<td>Study</td>
<td>Design/sample</td>
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<tr>
<td>Wisborg, Brattebø &amp; Brinchmann-Hansen 2006</td>
<td>Qualitative study Pre/post-course questionnaire N = 2,860 trauma team members in 28 Norwegian hospitals.</td>
<td>To assess the feasibility of a locally developed trauma training course.</td>
<td>Local team training is a feasible approach and simulation benefits trauma team training.</td>
</tr>
<tr>
<td>Wisborg, Brattebø &amp; Brinchmann-Hansen 2008</td>
<td>Qualitative study – outcome evaluation (pre/post-course questionnaire) N = 4,203 participants in 44 hospitals.</td>
<td>To evaluate the effects of nationwide training of multiprofessional trauma teams in Norwegian hospitals.</td>
<td>Practical trauma team training improved the participants’ perceived knowledge and confidence, which continued to increase for 6 months after training independent of participants’ experience level, suggesting that small hospitals may reach levels comparable to major hospitals.</td>
</tr>
<tr>
<td>Sethi, Habibula &amp; Kelly 2009</td>
<td>Review.</td>
<td>To quantify the effectiveness of hospitals with an ATLS-trained trauma response system versus hospitals without such a response system in reducing mortality and morbidity following trauma.</td>
<td>Found limited literature on this topic. No studies met the inclusion criteria for the review.</td>
</tr>
</tbody>
</table>

**TRAUMA NURSING COURSE EVALUATION**

<table>
<thead>
<tr>
<th>Study</th>
<th>Design/sample</th>
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<tr>
<td>Baird, Kernohan &amp; Coates 2004</td>
<td>Cross-sectional correlational design Questionnaire survey &amp; MCQ N = 275 A&amp;E nurses in Northern Ireland.</td>
<td>To investigate the influence of ATLS training on the performance of nurses in A&amp;E, taking account of experience and intuition.</td>
<td>Results suggested that ATLS training in the form of the TNCC &amp; the ATNC have a positive influence on nurses’ performance. There is little difference between the effectiveness of the TNCC ($r = \text{correlation coefficient 0:31}$) and the ATNC ($r = 0:29$). The ACLS ($r = 0:15$) and the PHTLS ($r = 0:17$) appear to be approximately 50% less effective.</td>
</tr>
<tr>
<td>Study</td>
<td>Design/sample</td>
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<tr>
<td>Gautam &amp; Heyworth 1994</td>
<td>Cross-sectional correlational study (pre/post questionnaire) N = 27 A&amp;E nurses.</td>
<td>To measure change in nurses’ knowledge post an ATLS abbreviated course and to detect any correlation between the length of their experience with the trauma management knowledge.</td>
<td>Statistically significant improvement in the score achieved on priorities and procedures after the course. The change in triage skills after the course was less marked and not statistically significant. Poor correlation was observed between the length of experience of individual nurses and their skills, both before and after the course.</td>
</tr>
<tr>
<td>Tippett 2004</td>
<td>Quantitative study – outcome evaluation (pre/post short answer questions) N = 14 A&amp;E nurses.</td>
<td>To evaluate the effectiveness of ATNC by measuring knowledge change and retention.</td>
<td>Demonstrated significant knowledge improvement as a result of ATNC attendance and declined knowledge retention 3 months post course.</td>
</tr>
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</table>
Appendix 2: TNCC Application Form 2009-2012

THE TRAUMA NURSING CORE COURSE (TNCC)
WESTERN AUSTRALIA
Proudly presented by
The Western Australian Trauma Education Committee

APPLICATION FORM

Full Name: Mr / Mrs / Ms ________________________________
Preferred Name on Name Badge __________________________________________
Mailing Address: _______________________________________________________
Email Address: _________________________________________________________
Telephone numbers: Business: ( ) ___________________________
Fax: ( ) ___________________________
Private: ( ) ___________________________

Eligibility
This course is highly recommended for all registered nurses working in emergency settings, intensive care and other trauma care facilities. It is advised that course participants have at least six months of clinical nursing experience in an emergency care setting or trauma care related setting.

Nursing Classification: [ ] RN [ ] CH [ ] EN [ ] SRIN3 [ ] SRIN4 [ ] N.P.
Years since qualified ____________________________ Current Organisation ____________________________
Current Department ____________________________ Position Title ____________________________
Emergency Nursing Experience ______________________________________________________________

What Type of TNCC Course are you applying for?
[ ] Provider [ ] Instructor [ ] Reverification [ ] Course Observer

Have you ever completed a TNCC Course? [ ] Yes [ ] No

If "Yes" Where? State ________ Country ________ Year ________ Provider Number ________________

Preferred Course Date 1 _______________________ Preferred Course Date 2 _____________________

Please note that whilst all efforts will be made to honour one of these selections we are unable to guarantee placement. Applicants' names will be placed on a waiting list and positions will be filled from that list. Offers will be made approximately two to three months before the course date, as positions become available. All offers are valid for 14 days. Once offers have been accepted, late withdrawal penalties apply.

1. Cancellations advised in writing (3 weeks prior to the course) will be refunded with $50.00 deducted for administrative costs and the pre-reading material must be retained or a further $150.00 will be deducted.
2. A refund will not be granted if a registrant fails to attend or cancels up to six (6) weeks before the course.
3. We will assist where we can to substitute the registrant to another course.
4. WATEC reserves the right to cancel planned courses, even at short notice, in particular if:
   - the minimum number of participants has not been reached, or
   - other essential conditions for course change.

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# Appendix 3: TNCC Evaluation Form

## INSTRUCTOR EVALUATION FORM

**Key for Instructor Evaluation:**

- **Excellent = 4**
- **Good = 3**
- **Fair = 2**
- **Poor = 1**
- **Not Applicable = Leave Blank**

### Instructor Evaluation Form

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<th>Inst. No.</th>
<th>Evaluation</th>
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<td>10</td>
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<td>14</td>
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<td>15</td>
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</tbody>
</table>

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Obtain an instructor number from your course director for each instructor.

- **Objectives** - Stated objectives met.
- **Instructor** - Instructor's teaching effectiveness (i.e., presentation, delivery of content, lecture style).
- **Content** - Instructor's knowledge of course content (i.e., ability to answer questions, provide examples).
- **Skill Stations** - Demonstrated correctly and appropriate feedback was provided.

---

Name:          | Inst. No. | Evaluation |
---------------|-----------|------------|
Name:          | Inst. No. | Evaluation |
Name:          | Inst. No. | Evaluation |
Name:          | Inst. No. | Evaluation |
Name:          | Inst. No. | Evaluation |
Name:          | Inst. No. | Evaluation |
Name:          | Inst. No. | Evaluation |
Name:          | Inst. No. | Evaluation |
Name:          | Inst. No. | Evaluation |
<table>
<thead>
<tr>
<th>Question</th>
<th>EXCELLENT</th>
<th>GOOD</th>
<th>FAIR</th>
<th>POOR</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. How well did this program achieve its goals?</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>2. How relevant were the program goals to learner’s needs?</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>3. The skills taught correlate with the core knowledge needed to care</td>
<td>1</td>
<td>2</td>
<td>3</td>
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<tr>
<td>for the trauma/pediatric patient.</td>
<td></td>
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<tr>
<td>4. The course was pertinent to the current or prospective practice.</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>2</td>
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<tr>
<td>5. The audiovisuals contributed to the presentation.</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>6. The multiple choice exam reflected course content.</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>7. Please rate the physical facilities.</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>2</td>
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<tr>
<td>8. Please rate the overall quality of the program.</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>2</td>
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<tr>
<td>9. Please rate the effectiveness of the teaching methods (lecture,</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>psychomotor skill station format).</td>
<td></td>
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</tr>
<tr>
<td>10. Please rate the relevance of content to the educational session</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>objectives.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Please provide comments or feedback regarding instructor’s performance, individual lectures or skill stations, as specific as possible.

Thank you for your input.

Additional comments:

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________
Appendix 4: Participation Information Sheet

PARTICIPANT INFORMATION SHEET A

Title: Trauma Nursing Core Course (TNCC) evaluation project

Researchers: Min Ding (PhD student), Assistant Professor Olivia Gallagher, Winthrop Professor Jeff Hamdorf, Associate Professor Rosemary Saunders, Ms Julie Williamson, Associate Professor Helene Metcalfe.

Who is carrying out the study?
The University of Western Australia is carrying out an evaluation of the Trauma Nursing Core Course on behalf of the Western Australian Trauma Education Committee.

What is the study about?
The TNCC objective is to provide nurse participants with the cognitive knowledge and psychomotor skills necessary for the care and management of trauma patients. This study aims to evaluate the utilisation and application of TNCC knowledge in Western Australia by speaking with people who have attended the TNCC.

What does the study involve?
If you agree to participate, your participation would involve completing an online survey and attending a focus group. Several questions will be asked of the group of up to 10 participants to explore your experiences of attending the TNCC & how you have applied this knowledge in your clinical setting. You are under no obligation to complete both the online survey & the focus group. You may participate in either or both.

How much time will the study take?
The online survey should take approximately 15 minutes. The focus group will take between 1 - 1.5 hours. Light refreshment will be provided.

Will anyone else know the results?
The focus groups will be audio recorded and transcribed verbatim. Any personal details or identifying information will be removed from the data. The survey & focus group data collected will be secured in a locked filing cabinet, and stored at the University premises for a period of 7 years after completion of the research study, at which time they will be destroyed. The information gathered about you by the researchers will be held in strict confidence. The only people having access to the data will be the researchers. All the people who handle your information will adhere to traditional standards of confidentiality. If the results of the study are published in a medical journal, as is intended, the publication will not identify individual participants.

Will the study benefit me?
The perceived benefits to you in participating may include your valued contribution to understanding the value of the TNCC delivery in Western Australia. Further studies plan to modify and validate a comprehensive evaluation tool.
Can I withdraw from the study?
Being in this study is completely voluntary and you are not under any obligation to consent to participate. Completing the online survey & attending the focus group is an indication of your consent to participate in the study. In the event that participating in the focus group causes emotional distress at any time, you have the option to withdraw from the study by notifying the researcher. You may choose to withdraw your participation from this study at any time and this will have no impact on your relationship with any organisation or health care provider connected to this study.

What if I have a complaint or concerns?
Approval to conduct this research has been provided by The University of Western Australia, in accordance with its ethics review and approval procedures. Any person considering participation in this research project, or agreeing to participate, may raise any questions or issues with the researchers at any time.

In addition, any person not satisfied with the response of researchers may raise ethics issues or concerns, and may make any complaints about this research project by contacting the Human Research Ethics Office at the University of Western Australia on (08) 6488 1610, or (08) 6488 3793, or by emailing to hreo-research@uwa.edu.au.

What if I require further information?
Your participation would be greatly appreciated. If something is unclear or you have any queries, please do not hesitate to contact me;
Phone: 6488 8044
E-mail: jeffrey.hamdorf@uwa.edu.au
Postal address: MB05, 35 Stirling Hwy, Nedlands 6009

How do I register my interest in participating in this study?
To complete the online survey please click on the link below:

https://www.surveymonkey.com/s/D86F5K

Kind Regards,

Winthrop Professor Jeffrey Hamdorf
University of Western Australia
Appendix 5: Retrospective Survey 2009–2013
* 6. Current Position
   - Enrolled Nurse
   - Graduate Nurse
   - Registered Nurse
   - Clinical Nurse
   - Staff Development Nurse
   - Staff Development Educator
   - Clinical Nurse Specialist
   - Clinical Nurse Manager
   - Clinical Nurse Consultant
   - Nurse Practitioner
   - Other (please specify)

* 7. Current employment organisation
   - Metropolitan hospital
   - Rural hospital
   - Other (please specify)

* 8. Current employment department
   - Emergency Department
   - Trauma Unit
   - Intensive Care Unit
   - High Dependency Area
   - Coronary Care Unit
   - Surgical Ward
   - Medical Ward
   - Other (please specify)
9. At which location did you attend your TNCC?
   - Metropolitan venue
   - Rural venue

10. What year did you attend TNCC?
   - 2009
   - 2010
   - 2011
   - 2012

11. Which type of TNCC did you attend? (select all that apply)
   - [ ] Provider Course
   - [ ] Re-verification course

12. Did you attend any other trauma courses prior to attending the TNCC?
   - [ ] No
   - [ ] Yes (please specify the course name)

13. Since attending the TNCC, have you attended any other trauma courses?
   - [ ] No
   - [ ] Yes (please specify the course name)
<table>
<thead>
<tr>
<th>Knowledge</th>
</tr>
</thead>
</table>

The following survey items ask you to report on your knowledge following attendance at the TNCC. Please indicate the extent to which you agree with the following statements:

**14. I am more confident in identifying the common mechanisms of injury associated with trauma.**
- [ ] Strongly agree
- [ ] Agree
- [ ] Disagree
- [ ] Strongly disagree

**15. I recognise the importance of conducting an initial assessment on the trauma patient utilising a systematic process.**
- [ ] Strongly agree
- [ ] Agree
- [ ] Disagree
- [ ] Strongly disagree

**16. I am more confident in identifying the pathophysiological changes associated with the trauma patient.**
- [ ] Strongly agree
- [ ] Agree
- [ ] Disagree
- [ ] Strongly disagree

**17. I am more confident in identifying the signs and symptoms of a raised intracranial pressure in the head injured patient.**
- [ ] Strongly agree
- [ ] Agree
- [ ] Disagree
- [ ] Strongly disagree

**18. I am more confident in communicating with other trauma team members regarding the management of a trauma patient.**
- [ ] Strongly agree
- [ ] Agree
- [ ] Disagree
- [ ] Strongly disagree
* 19. I am more confident in evaluating the effectiveness of nursing interventions for trauma patients.
   - Strongly agree
   - Agree
   - Disagree
   - Strongly disagree

Trauma Nursing Core Course Evaluation Survey

Clinical practice

The following survey items ask you to report on your clinical practice following attendance at the TNCC. Please indicate the extent to which you agree with the following statements:

* 20. I am able to perform a standardised primary and secondary assessment on a trauma patient utilising the A-I process correctly.
   - Strongly agree
   - Agree
   - Disagree
   - Strongly disagree

* 21. I am able to recognise a compromised airway and intervene appropriately.
   - Strongly agree
   - Agree
   - Disagree
   - Strongly disagree

* 22. I am able to correctly measure and insert an appropriate airway adjunct for a trauma patient.
   - Strongly agree
   - Agree
   - Disagree
   - Strongly disagree
* 23. I am able to correctly identify patients who require spinal immobilisation and correctly measure and apply a cervical collar.
   - Strongly agree
   - Agree
   - Disagree
   - Strongly disagree

* 24. I am now confident in performing a log roll maintaining spinal immobilisation.
   - Strongly agree
   - Agree
   - Disagree
   - Strongly disagree

Trauma Nursing Core Course Evaluation Survey

General TNCC feedback

Please indicate the extent to which you agree with the following statements:

* 25. TNCC training has improved my knowledge of trauma care.
   - Strongly agree
   - Agree
   - Disagree
   - Strongly disagree

* 26. TNCC training has improved my trauma nursing skills.
   - Strongly agree
   - Agree
   - Disagree
   - Strongly disagree
* 27. I have utilised the knowledge and skills learned from TNCC in my care of non-trauma patients.
   - Strongly agree
   - Agree
   - Disagree
   - Strongly disagree

* 28. Team training with other health professionals in trauma care would help to further enhance my trauma care knowledge and skills application in clinical situations.
   - Strongly agree
   - Agree
   - Disagree
   - Strongly disagree

* 29. The disaster management contents in TNCC have been sufficient to equip me to provide care to people in disaster situations.
   - Strongly agree
   - Agree
   - Disagree
   - Strongly disagree
   - Not Applicable

* 30. The domestic violence contents in TNCC have been sufficient to equip me to provide care to people injured as a result of domestic violence.
   - Strongly agree
   - Agree
   - Disagree
   - Strongly disagree
   - Not applicable
* 31. I would recommend TNCC to other nurses.
   - Strongly agree
   - Agree
   - Disagree
   - Strongly disagree

* 32. If a TNCC refresher course (not a re-verification course) is developed, I would be interested in attending.
   - Strongly agree
   - Agree
   - Disagree
   - Strongly disagree

* 33. I would be willing to participate in a focus group interview discussing the TNCC and my application of the knowledge and skills learnt.
   - No
   - Yes. (please enter your email address here to be contacted with further information)

34. Any other comments:
Appendix 6: TNCC Participant Interview Questions

1. What is your overall impression of TNCC? (Prompts: in terms of improving your knowledge, skills and confidence, give examples, good/bad in which aspect …)

2. Do you feel that TNCC has improved your confidence in the management of trauma patients? (Prompts: especially to recognise trauma pathophysiology changes, to identify and manage raised intracranial pressure in head injury patient, compromised airway recognition and intervention, log roll …)

3. Comparing other trauma courses with TNCC, what are the major differences between them? (Prompts: in terms of helping your knowledge and skills improvement, give examples, is trauma nursing course going to be needed?)

4. What do you perceive as the benefits of team training in regards to enhancing your clinical skills? (Prompts: benefits of the team training)

5. What was your impression of the domestic violence content in the TNCC? (Prompts: sufficient time, length, applicability, more training needed, any examples …)

6. What was your impression of the disaster management content in the TNCC? (Prompts: sufficient time, length, applicability, more training needed, any examples …)

7. How would you perceive your retention of knowledge following participation in the TNCC? (Prompts: length of time, applicability, need for refresher course?)

8. How has TNCC affected your nursing care of patients who have a ‘non-trauma’ presentation? (Prompts: benefits, applicability, give examples …)

9. How has the TNCC certificate helped with your own professional development? (Prompts: promotion, playing more trauma nurse roles, self-actualisation, need for reverification)

10. Do you have any other suggestions or comments relating to the TNCC?
Appendix 7: Senior Registered Nurse Interview Questions

1. What do you know about the TNCC? (Prompts: What is your overall impression? Content of the course. Usefulness of the course. Staff attendance at the course.)

2. How do you think TNCC has impacted your nurses’ confidence in the management of trauma patients? (Prompts: especially to recognise trauma pathophysiology changes, to identify and manage high risk trauma patients.)

3. How do you think TNCC has impacted your nurses’ knowledge in the management of trauma patients? (Prompts: especially to recognise trauma pathophysiology changes, to identify and manage high risk trauma patients.)

4. How do you think TNCC has impacted your nurses’ skill in the management of trauma patients? (Prompts: especially to recognise trauma pathophysiology changes, to identify and manage high risk trauma patients.)

5. Comparing other trauma courses you are aware of with TNCC, what are the major differences between them? (Prompts: in terms of helping your nurses’ knowledge and skills improvement, please give examples.)

6. What do you perceive as the benefits of team training in regards to enhancing your nurses’ clinical skills?

7. What are your thoughts about the inclusion of domestic violence content within TNCC (Prompts: applicability, length of time, more training needed …)

8. What are your thoughts about the inclusion of the disaster management content within the TNCC? (Prompts: applicability, length of time, more training needed …)

9. How would you perceive your nurses’ retention of knowledge following participation in the TNCC? (Prompts: length of time, need for refresher course?)

10. How do you think TNCC attendance has affected your nurses’ care of patients who have a ‘non-trauma’ presentation? (Prompts: benefit, applicability, give examples.)

11. How has the TNCC certification helped your staff nurses’ professional development? (Prompts: promotion, playing more trauma nurse roles.)

12. Do you have any other suggestions or comments relating to the TNCC?
Appendix 8: Participation Information Sheet Revised

ATTACHMENT B
PARTICIPANT INFORMATION SHEET

Title: Trauma Nursing Core Course (TNCC) evaluation project

Researchers: Winthrop Professor Jeff Hamdorf, Assistant Professor Olivia Gallagher, Associate Professor Helene Netsole, Associate Professor Rosemary Saunders, Ms Julie Williamson, Ms Hannah Solomon, Ms Min Ding (PhD candidate).

Who is carrying out the study?
The University of Western Australia is carrying out an evaluation of the Trauma Nursing Core Course on behalf of the Western Australian Trauma Education Committee.

What is the study about?
The TNCC objective is to provide registered nurse participants with the cognitive knowledge and psychomotor skills necessary for the care and management of trauma patients. This study aims to evaluate the utilisation and application of TNCC knowledge in Western Australia by speaking with people who work in clinical areas where staff have attended the TNCC.

What does the study involve?
If you agree to participate, your participation would involve participating in an interview, either in person or on the telephone at a time convenient to you. Several questions will be asked of you to explore your experiences of working with nurses who have attended the TNCC & how they have applied this knowledge in your clinical setting.

How much time will the study take?
The online survey should take approximately 15 minutes. The interview will take between 1 - 1.5 hours.

Will anyone else know the results?
The interviews will be audio recorded and transcribed verbatim. Any personal details or identifying information will be removed from the data. The information collected will be secured in a locked filing cabinet, and stored at the University premises for a period of 7 years after completion of the research study, at which time they will be destroyed. The information gathered about you by the researchers will be held in strict confidence. The only people having access to the data will be the researchers. All the people who handle your information will adhere to traditional standards of confidentiality. If the results of the study are published in a medical journal, as is intended, the publication will not identify individual participants.

Will the study benefit me?
The perceived benefits to you in participating may include your valued contribution to understanding the value of the TNCC delivery in Western Australia. Further studies plan to modify and validate a comprehensive evaluation tool.

Can I withdraw from the study?
Being in this study is completely voluntary and you are not under any obligation to consent to participate. Attending the interview is an indication of your consent to participate in the study.
the event that participating in the interview causes emotional distress at any time, you have the option to withdraw from the study by notifying the researcher. You may choose to withdraw your participation from this study at any time and this will have no impact on your relationship with any organisation or health care provider connected to this study.

What if I have a complaint or concerns?
Approval to conduct this research has been provided by The University of Western Australia in accordance with its ethics review and approval procedures. Any person considering participation in this research project or agreeing to participate, may raise any questions or issues with the researchers at any time.

In addition, any person not satisfied with the response of researchers may raise ethics issues or concerns, and may make any complaints about this research project by contacting the Human Research Ethics Office at the University of Western Australia on (08) 6488 1610, or (08) 6488 3703, or by emailing to hreo-research@uwa.edu.au.

What if I require further information?
Your participation would be greatly appreciated. If something is unclear or you have any queries, please do not hesitate to contact me;
Phone: 6488 8044
E-mail: jefl.hamdorf@uwa.edu.au
Postal address: M308, 35 Stirling Hwy, Nedlands 6009

Kind Regards,

Winthrop Professor Jeff Hamdorf
University of Western Australia
Appendix 9: TNCC Pre-and Post-Participation Survey 2014

Trauma Nursing Core Course Evaluation Pre-participation Survey

The purpose of the survey is to collect information from nurses who are scheduled to attend the Trauma Nursing Core Course (TNCC). This survey forms part of a research project evaluating the TNCC.
<table>
<thead>
<tr>
<th><strong>Trauma Nursing Core Course Evaluation Pre-participation Survey</strong></th>
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</thead>
<tbody>
<tr>
<td><strong>Demographic Information</strong></td>
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<tr>
<td></td>
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<tr>
<td>* 1. Gender</td>
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<tr>
<td>☐ Male</td>
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<td>☐ Female</td>
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<td>* 2. Age (years)</td>
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<tr>
<td>* 3. The highest level of education you have completed.</td>
</tr>
<tr>
<td>☐ Diploma</td>
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<tr>
<td>☐ Bachelor's Degree</td>
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<tr>
<td>☐ Graduate Certificate / Graduate Diploma</td>
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<td>☐ Masters</td>
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<td>☐ Doctorate</td>
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<td>* 4. Years of practice as a nurse</td>
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<tr>
<td>* 5. Years of trauma and/or emergency nursing experience</td>
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</tbody>
</table>
* 6. Current Position
- Enrolled Nurse
- Graduate Nurse
- Registered Nurse
- Clinical Nurse
- Staff Development Nurse
- Staff Development Educator
- Clinical Nurse Specialist
- Clinical Nurse Manager
- Clinical Nurse Consultant
- Nurse Practitioner
- Other (please specify)

* 7. Current Employment Organisation
- Metropolitan hospital
- Rural hospital
- Other (please specify)

* 8. Current Employment Department
- Emergency Department
- Trauma Unit
- Intensive Care Unit
- High Dependency Area
- Coronary Care Unit
- Surgical ward
- Medical ward
- Other (please specify)
9. At which location are you going to attend your TNCC?
- Metropolitan venue
- Rural venue

10. In which month are you going to attend TNCC in 2014?
- April
- May
- June
- July
- August
- September
- October
- November

11. Have you attended any other trauma courses prior to this TNCC?
- No
- Yes (please specify the course name)
<table>
<thead>
<tr>
<th>Knowledge</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>The following survey items ask you to report on your current knowledge. Please indicate the extent to which you agree with the following statements:</strong></td>
<td></td>
</tr>
<tr>
<td><strong>12.</strong> I am confident in identifying the common mechanisms of injury associated with trauma.</td>
<td></td>
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<tr>
<td>○ Strongly agree</td>
<td></td>
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<tr>
<td>○ Agree</td>
<td></td>
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<tr>
<td>○ Disagree</td>
<td></td>
</tr>
<tr>
<td>○ Strongly disagree</td>
<td></td>
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<tr>
<td><strong>13.</strong> I recognise the importance of conducting an initial assessment on the trauma patient utilising a systematic process (A-I process).</td>
<td></td>
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<tr>
<td>○ Strongly agree</td>
<td></td>
</tr>
<tr>
<td>○ Agree</td>
<td></td>
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<tr>
<td>○ Disagree</td>
<td></td>
</tr>
<tr>
<td>○ Strongly disagree</td>
<td></td>
</tr>
<tr>
<td><strong>14.</strong> I am confident in identifying the pathophysiological changes associated with the trauma patient.</td>
<td></td>
</tr>
<tr>
<td>○ Strongly agree</td>
<td></td>
</tr>
<tr>
<td>○ Agree</td>
<td></td>
</tr>
<tr>
<td>○ Disagree</td>
<td></td>
</tr>
<tr>
<td>○ Strongly disagree</td>
<td></td>
</tr>
<tr>
<td><strong>15.</strong> I am confident in identifying the signs and symptoms of a raised intracranial pressure in the head injured patient.</td>
<td></td>
</tr>
<tr>
<td>○ Strongly agree</td>
<td></td>
</tr>
<tr>
<td>○ Agree</td>
<td></td>
</tr>
<tr>
<td>○ Disagree</td>
<td></td>
</tr>
<tr>
<td>○ Strongly disagree</td>
<td></td>
</tr>
</tbody>
</table>
16. I am confident in communicating with other trauma team members regarding the management of a trauma patient.
- __Strongly agree__
- __Agree__
- __Disagree__
- __Strongly disagree__

17. I am confident in evaluating the effectiveness of nursing interventions for trauma patients.
- __Strongly agree__
- __Agree__
- __Disagree__
- __Strongly disagree__
### Clinical practice

The following survey items ask you to report on your current clinical practice. Please indicate the extent to which you agree with the following statements:

* 18. I am able to perform a standardised primary and secondary assessment on a trauma patient utilising the A-I process correctly.
   - [ ] Strongly agree
   - [ ] Agree
   - [ ] Disagree
   - [ ] Strongly disagree

* 19. I am able to recognise a compromised airway and intervene appropriately.
   - [ ] Strongly agree
   - [ ] Agree
   - [ ] Disagree
   - [ ] Strongly disagree

* 20. I am able to correctly measure and insert an appropriate airway adjunct for a trauma patient.
   - [ ] Strongly agree
   - [ ] Agree
   - [ ] Disagree
   - [ ] Strongly disagree

* 21. I am able to correctly identify patients who require spinal immobilisation and correctly measure and apply a cervical collar.
   - [ ] Strongly agree
   - [ ] Agree
   - [ ] Disagree
   - [ ] Strongly disagree
* 22. I am confident in performing a log roll maintaining spinal immobilisation.
   - [ ] Strongly agree
   - [ ] Agree
   - [ ] Disagree
   - [ ] Strongly disagree

23. Other comments
The purpose of the survey is to collect information about knowledge and skills from nurses who have attended the Trauma Nursing Core Course (TNCC) and also to seek your feedback about the TNCC.
**Trauma Nursing Core Course Evaluation Post-participation Survey**

**Demographic information**

**1. Gender**
- Male
- Female

**2. Age (years)**

**3. The highest level of education you have completed.**
- Diploma
- Bachelor's Degree
- Graduate Certificate / Graduate Diploma
- Masters
- Doctorate

**4. Years of practice as a nurse**

**5. Years of trauma/emergency nursing experience**
6. Current Position
- Enrolled Nurse
- Graduate Nurse
- Registered Nurse
- Clinical Nurse
- Staff Development Nurse
- Staff Development Educator
- Clinical Nurse Specialist
- Clinical Nurse Manager
- Clinical Nurse Consultant
- Nurse Practitioner
- Other (please specify)

7. Current employment organisation
- Metropolitan hospital
- Rural hospital
- Other (please specify)

8. Current employment department
- Emergency Department
- Trauma Unit
- Intensive Care Unit
- High Dependency Area
- Coronary Care Unit
- Surgical ward
- Medical ward
- Other (please specify)
* 5. At which location did you attend your TNCC?
   - Metropolitan venue
   - Rural venue

* 10. In which month did you attend TNCC in 2014?
   - April
   - May
   - June
   - July
   - August
   - September
   - October
   - November

* 11. Since attending the TNCC, have you attended any other trauma courses?
   - No
   - Yes (please specify the course name)
Knowledge

The following survey items ask you to report on your knowledge following attendance at the TNCC. Please indicate the extent to which you agree with the following statements:

* 12. I am more confident in identifying the common mechanisms of injury associated with trauma.
   - Strongly agree
   - Agree
   - Disagree
   - Strongly disagree

* 13. I recognise the importance of conducting an initial assessment on the trauma patient utilising a systematic process.
   - Strongly agree
   - Agree
   - Disagree
   - Strongly disagree

* 14. I am more confident in identifying the pathophysiological changes associated with the trauma patient.
   - Strongly agree
   - Agree
   - Disagree
   - Strongly disagree

* 15. I am more confident in identifying the signs and symptoms of a raised intracranial pressure in the head injured patient.
   - Strongly agree
   - Agree
   - Disagree
   - Strongly disagree
* 16. I am more confident in communicating with other trauma team members regarding the management of a trauma patient.
   - Strongly agree
   - Agree
   - Disagree
   - Strongly disagree

* 17. I am more confident in evaluating the effectiveness of nursing interventions for trauma patients.
   - Strongly agree
   - Agree
   - Disagree
   - Strongly disagree
Trauma Nursing Core Course Evaluation Post-participation Survey

Clinical practice

The following survey items ask you to report on your clinical practice following attendance at the TNCC. Please indicate the extent to which you agree with the following statements:

* 19. I am able to perform a standardised primary and secondary assessment on a trauma patient utilising the A-I process correctly.
   - Strongly agree
   - Agree
   - Disagree
   - Strongly disagree

* 19. I am able to recognise a compromised airway and intervene appropriately.
   - Strongly agree
   - Agree
   - Disagree
   - Strongly disagree

* 20. I am able to correctly measure and insert an appropriate airway adjunct for a trauma patient.
   - Strongly agree
   - Agree
   - Disagree
   - Strongly disagree

* 21. I am able to correctly identify patients who require spinal immobilisation and correctly measure and apply a cervical collar.
   - Strongly agree
   - Agree
   - Disagree
   - Strongly disagree
22. I am now confident in performing a log roll maintaining spinal immobilisation.

- [ ] Strongly agree
- [ ] Agree
- [ ] Disagree
- [ ] Strongly disagree
<table>
<thead>
<tr>
<th><strong>23. TNCC training has improved my knowledge of trauma care.</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>- Strongly agree</td>
</tr>
<tr>
<td>- Agree</td>
</tr>
<tr>
<td>- Disagree</td>
</tr>
<tr>
<td>- Strongly disagree</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>24. TNCC training has improved my trauma nursing skills.</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>- Strongly agree</td>
</tr>
<tr>
<td>- Agree</td>
</tr>
<tr>
<td>- Disagree</td>
</tr>
<tr>
<td>- Strongly disagree</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>25. I have utilised the knowledge and skills learned from TNCC in my care of non-trauma patients.</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>- Strongly agree</td>
</tr>
<tr>
<td>- Agree</td>
</tr>
<tr>
<td>- Disagree</td>
</tr>
<tr>
<td>- Strongly disagree</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>26. Team training with other health professionals in trauma care would help to further enhance my trauma care knowledge and skills application in clinical situations.</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>- Strongly agree</td>
</tr>
<tr>
<td>- Agree</td>
</tr>
<tr>
<td>- Disagree</td>
</tr>
<tr>
<td>- Strongly disagree</td>
</tr>
</tbody>
</table>

<table>
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<tr>
<th><strong>27. The disaster management contents in TNCC have been sufficient to equip me to provide care to people in disaster situations.</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>- Strongly agree</td>
</tr>
<tr>
<td>- Agree</td>
</tr>
<tr>
<td>- Disagree</td>
</tr>
<tr>
<td>- Strongly disagree</td>
</tr>
<tr>
<td>- Not Applicable</td>
</tr>
</tbody>
</table>
*28. The domestic violence contents in TNCC have been sufficient to equip me to provide care to people injured as a result of domestic violence.
   - Strongly agree
   - Agree
   - Disagree
   - Strongly disagree
   - Not applicable

*29. I would recommend TNCC to other nurses.
   - Strongly agree
   - Agree
   - Disagree
   - Strongly disagree

*30. If a TNCC refresher course [not a re-verification course] is developed, I would be interested in attending.
   - Strongly agree
   - Agree
   - Disagree
   - Strongly disagree

31. Any other comments:
Appendix 10: Ethics Approval

The University of Western Australia
Achieving International Excellence

Research Ethics and Biosecurity Office
Research Services
Phone: +61 8 6488 1633
Fax: +61 8 6488 8775
e-mail: hum-research@uwa.edu.au
MDDP: M469

Our Ref: RA/4/4/5102 21 February 2012

Assistant Professor Olivia Hill
Population Health (School of)
MOPP: M41

Dear Professor Hill

HUMAN RESEARCH ETHICS APPROVAL - THE UNIVERSITY OF WESTERN AUSTRALIA

Transect survey course evaluation project.

Students:

Ethics approval for the above project has been granted in accordance with the requirements of the National Statement on Ethical Conduct in Human Research (National Statement) and the policies and procedures of The University of Western Australia. Please note that the period of ethics approval for this project is five (5) years from the date of this notification. However, ethics approval is conditional upon the submission of satisfactory progress reports by the designated renewal date. Therefore, initial approval has been granted from 21 February 2012 to 01 March 2013.

You are reminded of the following requirements:

1. The application and all supporting documentation must be submitted to the ethics approval process.
2. The Human Research Ethics Office must be informed of any changes or amendments to the approved protocol.
3. The Chief Investigator is required to report any adverse or unexpected events to the Human Research Ethics Office.
4. The Human Research Ethics Office must inform the Human Research Ethics Office as soon as practicable if a research project is discontinued before the expected date of completion, providing the reasons.

Any conditions of ethics approval that have been imposed are listed below:

Special Conditions

None specified

The University of Western Australia is bound by the National Statement to monitor the progress of all approved projects until completion to ensure continued compliance with ethical standards and requirements.

The Human Research Ethics Office will forward a request for a Progress Report approximately 60 days before the due date. A further reminder will be forwarded approximately 30 days before the due date.

If your progress report is not received by the due date, your ethics approval will expire, requiring that all research activities involving human participants cease immediately.

If you have any queries please do not hesitate to contact the Human Research Ethics Office (HREO) at hum-research@uwa.edu.au or on (08) 6488 3703.

Please ensure that you quote the file reference – RA/4/4/5102 – and the associated project title in all future correspondence.

193
Yours sincerely

Peter Johnston
Manager
Human Research Ethics Committee
Appendix 11: Ethics Amendment

Our Ref: RA/4/1/5192

15 November 2013

Professor Jeffery Handorf
School of Surgery
MBIEP: M606

Dear Professor Handorf

HUMAN RESEARCH ETHICS OFFICE - AMENDMENT REQUEST APPROVED
Trauma nursing core course evaluation project
Student(s): Min Leong

I confirm receipt of your correspondence requesting an amendment to the protocol for the above project.
Approval has been granted for the amendment as outlined in your correspondence and attachments (if any) subject to the conditions listed below.
The following is a brief description of the amendment and any conditions that apply:
1. Replacing focus group interview with individual interviews due to small participant number.
2. Revised Participant Information Sheet (please clearly indicate the time commitment) and interview questionnaire.

If you have any queries, please contact the HRO at hro-research@uwa.edu.au

Please ensure that you quote the file reference RA/4/1/5192 and the associated project title in all future correspondence.

Yours sincerely

[Signature]

Tea Mark Dixon
Associate Director, Research Ethics and Biometry
Appendix 12: TNCC Participant Interview Schedule

Dear TNCC participant

Thank you again for your willingness to participate in the TNCC evaluation focus group interview. Your feedback and participation in the interview component of this project is very valuable and we would love to hear more about your experience of the TNCC course. If you are still interested in participating in the interviews, please indicate your availability to join one of the sessions scheduled below:

<table>
<thead>
<tr>
<th>Date</th>
<th>Time</th>
<th>Location</th>
<th>Venue</th>
</tr>
</thead>
<tbody>
<tr>
<td>17,09,2013</td>
<td>10am-11am</td>
<td>Sir Charles Gardiner Hospital</td>
<td>ED seminar room</td>
</tr>
<tr>
<td>19, 09, 2013</td>
<td>2-3pm</td>
<td>Royal Perth Hospital</td>
<td>ED seminar room</td>
</tr>
<tr>
<td>24, 09, 2013</td>
<td>11am-12 N</td>
<td>Swan Districts Hospital</td>
<td>ED meeting room</td>
</tr>
<tr>
<td>26,09,2013</td>
<td>11am-12 N &amp; 2-3pm</td>
<td>Rockingham General Hospital</td>
<td>ED seminar room</td>
</tr>
<tr>
<td>01,10,2013</td>
<td>3-4pm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>01,10,2013</td>
<td>11am-12N</td>
<td>Joondalup Health Campus</td>
<td>ED interview room 1</td>
</tr>
</tbody>
</table>

If you work in rural areas, please click the link below so I can arrange either a telephone or on-site interview for you.

Please contact me directly or click the link below for interview registration.

Link:

Many thanks again

Best regards