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QUANTITATIVE AND QUALITATIVE ANALYSES OF ADVANCED TRAUMA LIFE SUPPORT IMPACT

BY

© JAYNE SMITTEN

A thesis submitted to the Faculty of Graduate Studies and Research in partial fulfillment of the requirements for the degree of Master of Education.

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The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies and Research for acceptance, a thesis entitled QUANTITATIVE AND QUALITATIVE ANALYSES OF ADVANCED TRAUMA LIFE SUPPORT IMPACT submitted by JAYNE SMITTEN in partial fulfillment of the requirements for the degree of MASTER OF EDUCATION.

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Date: March 25, 1993

ABSTRACT

This study focused on the impact of the Advanced Trauma Life Support (ATLS) educational program for physicians and utilized both quantitative and qualitative methodologies. Its purpose was to explore specific areas of impact that were directly or indirectly interpreted to be the result of the internationally recognized ATLS program.

Quantitatively, there appeared to be a tendency for improved management of the blunt trauma patients by current status ATLS trained physicians. Positive impact was also evident in the ATLS summative course evaluations and in the comparison of the pre and post-test written scores.

The qualitative findings involved compiling themes perceived by nine randomly selected, current status ATLS trained physician respondents. Five main ATLS impact dimensions evolved from the interpretation of their perceptions. Evidence of dynamic interrelationships occurred among the combined group of these impact dimensions.

The five main impact dimensions, in order of their frequency of occurrence by the physician respondents, are as follows:

Dimension one: Standardized frame of reference.

Dimension two: Medical-technical patient care improvements.

Dimension three: Changes within the domains of learning.

Dimension four: Communication opportunities and improvements.

Dimension five: Reflective practice.

The main conclusion arising from the findings is that ATLS has had a positive impact. This impact has been favorable in terms of its effect on the lives of the current status ATLS physician respondents and suggests a trend towards improved management of blunt trauma victims. The most profound impact is on the perceived improvement in the outcomes of trauma victims.

A second conclusion is that the findings suggest that the ATLS program warrants continued endorsement within the realms of the medical-educational establishments and communities.

This study adds to the limited body of research on ATLS impact, supporting the general view that ATLS has value in contributing to trauma patient management and outcome. Further research is needed not only to corroborate these findings but to expand the investigation by examining the relationship of ATLS with the outcome of many types of trauma patients as well as probe into cost-effective health care benefits.

"The growth of the human mind is high adventure, perhaps the highest adventure on earth....."

Norman Cousins

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CHAPTER I

INTRODUCTION

Trauma reigns as the leading cause of death in individuals forty years of age or less in North America. Only cancer and heart disease rival trauma as the cause of death for all age categories, but it is trauma that is responsible for the loss of more years of expected life than cancer and heart disease combined.

Specific Canadian trauma demographic data are limited. Trauma is considered different in Canada as the risk to Canadian drivers, compared with Americans, is 50% greater per mile driven (Burns, 1985). In Alberta, it has been estimated that for every death, there are 45 injuries that require hospitalization. United States statistics report fifty million traumatic injuries annually, ten million of which are disabling. Two permanent disabilities occur for each traumatic death. More than 140,000 deaths occur annually from injuries, and the yearly trend of mortality from injuries, unlike the mortality trend in many other serious diseases, appears to be increasing. Generally, these are the death from injury ratios determined for the North American populations.

According to Statistics Canada (Adams, 1990), about one in five Canadians will be involved in an "accident" during the course of a year.

Motor vehicle collisions, which account for 33% of the total injuries, were considered the most common type of mishap in 1987. Moving vehicle accidents accounted for the majority of the deaths.

Astounding numbers of disabling injuries and trauma-related deaths create incalculable human suffering and life costs. Injuries are considered one of the most expensive health care problems, costing $ 75 billion to $ 100 billion in the United States annually, directly and indirectly. The National Academy of Sciences has reported that injury is the leading yet most under-recognized major public health problem facing the nation today.

Trauma is recognized as a surgical disease and can lethally strike anyone at anytime. The best cure, of course, is prevention. However, when prevention fails, a physician must be equipped with the knowledge and skills to ensure the acutely injured patient's needs are met.

The American College of Surgeons (ACS), Committee on Trauma (COT), as a leader in establishing and maintaining quality care of the surgical patient, developed the Advanced Trauma Life Support (ATLS) Course for physicians in an effort to establish a minimum standard of care for the trauma patient. Early assessment and management of the trauma patient, based on fundamental principles and a minimum standard of trauma care, is the aim of ATLS. The goal of the ACS COT is to significantly reduce the morbidity and subsequent mortality of trauma through the application of trauma principles and skills espoused in the ATLS program.

Birth of a concept. A small plane crash in the winter of 1976 resulted in tragedy for a Nebraskan surgeon and his family. The antecedents and consequences of the inadequate trauma care received in a small community hospital following the tragic accident caused the Nebraskan surgeon to prepare the original concept of a standardized approach to trauma care. In the Nebraskan surgeon's own words: "When I can provide better care in the field with limited resources than what my children and I received at the primary care facility - there is something wrong with the system and the system has to be changed." The Nebraskan surgeon approached Dr. Paul Collicott at the Lincoln Medical Education Foundation (LMEF) and the Southeast Nebraska Emergency Medical Services (SNEMS) and thus, the ATLS educational concept was born.

Prior to initiation of the ATLS educational concept, trauma management was considered inconsistent, even haphazard. Other Nebraskan physicians supported the ATLS concept, confirming the expressed need for a systematic, standard approach to trauma care. Concerned with the improvement in trauma hospital facilities and the physician's capability in managing trauma, LMEF responded in support by developing a prototype ATLS which was field-tested in 1978. ACS COT adopted the ATLS in 1979 and instituted ATLS as a national program in 1980. ATLS today has the distinction of being recognized internationally as a prolific trauma education program, teaching well-established, approaches and treatments in state-of-the art trauma care.

Alberta ATLS. The ATLS course was first introduced in Calgary in December, 1982, under the leadership of a general surgeon, Dr. William Dunlop. Edmonton's first ATLS course followed in May, 1983, under the direction of Dr. Robert Hallgren, who was also the first ACS Chairman, Alberta COT. Since that time, approximately 70 Edmonton ATLS courses have been held, primarily under the leadership of a general surgeon, Course Director Dr. Douglas Davey, to educate well over 1000 licensed physicians who practise in Alberta. It also has involved educating physicians from areas across Canada, United States and as far away as Australia.

ATLS focus. ATLS primarily emphasises the first hour of trauma management, referred to as the golden hour for the critically injured, when rapid assessment and resuscitation can be carried out to decrease the incidence of trauma mortality. This requires all physicians potentially exposed to trauma situations to possess a broad knowledge base of treatment principles and an appreciation for many types of injuries. It has been well documented that the final outcome for the trauma patient with multiple injuries, similar to patients with critical illnesses, is influenced by the quality of the initial assessment and management.

ATLS was originally targeted at the physician who dealt with trauma on an infrequent basis. However, ATLS has gained international recognition and acceptance as a standardized approach for many physician disciplines caring for the trauma patient. Trauma is recognized as an evolutionary disease - a disease that can embrace the

entire spectrum of medicine.

ATLS has gained widespread popularity internationally as a standardized method of teaching assessment and early management skills for trauma care. According to the proceedings of the 1992 Annual ACS COT meeting in Dallas, Texas, over 130,000 physicians had participated in an ATLS Course from 1980 to 1991. Continued commitment and dedication by the ACS COT and its organization involved in training physicians in ATLS must be based on an assumption that there would be an improvement in trauma patient management as a result of ATLS.

Informal evaluation methods communicated in post-course ATLS faculty and staff discussions (including casual observations, ATLS participants' verbalizations of fulfillment of their own personal objectives, subjective judgments by faculty who instruct ATLS) coupled with summative course evaluation results sent to the ACS COT upon completion of each ATLS program and the program's obvious popularity (demonstrated by escalating enrolments in the ACS COT annual statistical reports) indicates ATLS is providing some value. The general view is that physicians with ATLS training will lead to an improvement in the management and outcome in the trauma patient. Despite the continued popularity of ATLS, there is a limited body of research data on the impact of ATLS.

The intent of this study was to explore the impact of ATLS, perhaps providing further information for the justification and continued support of the ATLS program.

Purpose of the study

The purpose of this study was to investigate the impact of ATLS.

Specific Questions

To assist in achieving this purpose, five specific questions were formulated:

1. Are there significant differences between ATLS trained and non-ATLS trained physicians in the initial assessment and early management of the trauma patient? If so, in what specific areas is this evident?

2. In what ways does the impact of ATLS education become manifest?

3. Do current status ATLS physicians view the ATLS program as worthwhile and valuable and, if so, why do they view it this way?

4. Do physician participants who have completed the ATLS program have similar views regarding the impact of ATLS training?

5. What, if any, do current status ATLS physicians perceive as some of the significant changes in trauma care, associated directly or indirectly as a result of ATLS education?

Definition of terms

ABC's	Airway, breathing, circulation assessment.
ACS	American College of Surgeons, located in Chicago; organization founded in 1913 to improve the care of the surgical patient, which includes the trauma patient, as trauma is considered a surgical disease.
ATLS Course	Advanced Trauma Life Support Course of the American College of Surgeons
COT	Committee on Trauma, a standing professional committee of the American College of Surgeons, appointed by the Board of Regents.
C-spine	Cervical spine, referring to the first seven bones of the spinal column.
Current Status	Physician who has successfully completed the ATLS Student/Provider Level course; valid for four years from date of issue.
Golden Hour	The period of time, ranging from minutes to a few hours after injury, that is crucial to the outcome of the critically injured patient, referred to as the "second death peak" in the trimodal distribution of death from trauma.
ICU	Intensive Care Unit, or area where adult patients are admitted for diagnosis and treatment of acute medical-surgical illnesses causing multi-system failures.
Intern	Physician on a hospital staff, usually a recent graduate receiving a year of postgraduate training prior to being eligible to be licensed to practice medicine.
I.V.	Intravenous therapy, procedure to infuse fluids via catheters in to the veins of patients.
Major Trauma Patient	A patient with severe multisystem or major unisystem injury, the extent of which may be difficult to ascertain, but which has the potential of producing mortality or major disability.

Management of the Trauma Patient	Emergency care; transportation; and diagnostic, therapeutic, and rehabilitative techniques, both in and out of the hospital, which are necessary as part of comprehensive care of the injured patient.
PARR	Post Anaesthetic Recovery Room, or hospital area where patients are taken following surgery for monitoring of their condition, prior to returning to the hospital area they were originally admitted to.
Physician	A person who has successfully completed the prescribed course of studies in medicine in a medical school officially recognized by the country in which it is located and who has acquired the requisite qualifications for licensing in the practice of medicine.
Primary Survey	A - Airway maintenance with cervical spine control B - Breathing and ventilation C - Circulation with hemorrhage control D - Disability: Neurologic status E - Exposure: Completely undress the patient
Resident	A physician who continues to further his clinical training after his internship. Usually this is done as a member of the house staff of a hospital.
Stable	Firm and steady.
Triage	French word meaning sorting or sifting; implies priority.
Trimodal Distribution	Refers to specific time frames or "peaks" where death occurs from trauma: First Peak: Within seconds to minutes of injury Second Peak: Within minutes to hours of injury Third Peak: Occurs several days or weeks after initial injury.
Vital Signs	Term used to express temperature, respiration, and pulse and often includes the blood pressure asssessments of a patient.

Significance of the study

ATLS has been acclaimed as highly successful as measured by physician participation, summative course evaluation feedback, and the support of many provincial, regional, and national medical-educational institutions and organizations. While ATLS has become a compulsory aspect of licensure for physicians to practice in many emergency departments nationwide, it is neither federally funded or controlled by a medical licensing body, nor is it formally included in any recognized medical program in Canada.

There is a limited body of research data to support the subjective view that the program has value in contributing to trauma patient management and outcome. There is a definite need to further legitimize ATLS from a research base.

This lack of research highlights the theoretical and practical significance of this study. From a theoretical perspective, portions of the study may result in either a replicable or modifiable framework within which other trauma education programs may be studied. In practical terms, the study is intended to contribute to the limited body of research analyzing the direct or indirect impacts of trauma education programs. Further scientific studies are necessary to determine if the ATLS educational program is related to improved trauma patient management and outcome, thereby justifing the continued effort and participation in ATLS and warranting justification for the movement of mandatory ATLS physician training.

Trauma education has evolved as a dynamic process, and this study may provide further understanding and insights into the ATLS mininum standard of care for the trauma patient. It may also help educators and others in the community who have occasion to work and communicate within the field of trauma education.

The future direction of trauma care management may be enhanced with the identification of ATLS as a valuable program. With this information in hand, physicians can make sound judgements on whether to participate in the program, based on the quantitative and qualitative results. This documentation would also serve as a valuable resource for those regions provincially, nationally or internationally, where ATLS training is currently not endorsed, where it is being trialed or where it is in an evolving state.

ATLS has also served as a model for the development of sequel programs such as Basic Trauma Life Support (BTLS), Pediatric Advanced Life Support (PALS), Advanced Burn Life Support (ABLS), Pre-Hospital Trauma Life Support (PHTLS), to name a few. These sequel programs have been designed and adapted to meet the special educational needs of a variety of health professionals caring for the trauma patient. It would be useful to show that the ATLS program has been worthwhile in improving trauma care and, therefore, reinforce ATLS as a valued model in the evolution of trauma educational programs.

Delimitations

One component of the study involved the retrospective examination of blunt trauma patient documentation from the emergency department records of an urban hospital with large trauma volumes. ATLS trained and non-ATLS trained physicians were compared on their initial assessment and management of blunt trauma patients delimited to: airway management, cervical spine control and resuscitation. Outcome measures, if applicable, were delimited to: total number of days hospitalized; total number of days spent in the intensive care unit; total surgical time in minutes; and stability of post-anaesthetic vital signs.

The qualitative portion of the study was delimited to the perceptions of nine randomly selected physicians with current ATLS status, according to the guidelines set forth by the ACS COT.

Limitations

There are various limitations that are intrinsic to a study of this nature.

Quantifiable emergency documentation. In comparing the initial assessment and management of ATLS trained and non-ATLS trained physicians, it is necessary to consider other influences that may affect physician performance. It would be nonsensical to expect differences in

the performances to be due solely to the ATLS program. Various other factors have the potential to influence the outcome of the physician's management of the trauma patient. Medical training, experience and specialization represent a few of the profound variables that may account for varying responses in managing the trauma patient.

There were some limitations in ascertaining the following in the emergency record documentation:

1. Time of physician involvement relative to the initial assessment and consequent management of the blunt trauma patient.
2. Timeliness and appropriateness of airway management and fluid resuscitation.

These limitations were attributed to the variable nature of the emergency department's documentation of the trauma patient. Indeed, a standardized approach for documenting the initial assessment and primary management of the multiply injured patient, based on the ATLS principles of emergency medical care, was often unavailable. Frequently the emergency department records revealed sparse documentation as well as inconsistent record-keeping.

Recognizing the study involved a very small sample size of randomly selected blunt trauma patient records, it is apparent the suggestion that ATLS trained physicians manage blunt trauma better may not be representative of all ATLS trauma care providers. Given that the comparisons involved major differences in variables such as magnitudes of blunt trauma injury, age groups and emergency response times, it is

difficult to draw a cause-and-effect relationship or conclusion from this portion of the quantitative analyses without further intensive statistical testing.

Quantifiable secondary data. The ATLS format consists of didactic lectures coupled with unique practical skill stations and a surgical skill practicuum. Time is also allotted for general discussion, question and answer periods, and a self-assessment triage scenario exercise. On the final day of the program, ATLS students are provided with a unique opportunity to demonstrate synthesis and immediate self-evaluation on the concepts and principles of emergency medical care emphasized in ATLS. Specifically, ATLS students demonstrate their priorities in the initial assessment, management, and stabilization phases of trauma care on simulated multiply injured patients.

Successful completion of the ATLS program is based on the results of the student's multiple choice written examination, performance proficiency evaluation of the practical skill stations including all surgical practicuum procedures, and the final critical evaluation of the initial assessment and management test stations.

Although each course follows the standardized format and lecture content, each session is independent of the other and the ATLS instructor faculty changes from course to course. Consequently each ATLS physician participant may not receive equivalent training in the program. This reality may have an impact on how some of the information is gathered by the student trained in ATLS.

Qualitative data. Accuracy of perceptions of the nine physician respondents is limited to their ability to remember their skills and views of the ATLS program before participating in the program.

Finally, this researcher has been involved to a great degree in the operation of the ATLS program in Edmonton since its inception. This involvement allowed access to information not ordinarily available to researchers and, thus, may cause some researcher bias. Efforts were made to design a study to minimize any bias.

Assumptions

A major assumption underlying this study is that the ATLS is an educational program that teaches valid trauma management skills and that through the application of the knowledge and skills learned, a significant reduction in morbidity and subsequent mortality of injury will be accomplished.

Another major assumption is that the nine physician respondents would truthfully and, to the best of their ability, accurately recollect their perceptions of impact resulting from the ATLS program.

A final assumption is that the researcher would strive to prevent personal biases to affect her reporting of the physician responses.

Organization of the thesis

The purpose of investigating the impact of ATLS, based on

examining differences in the initial assessment and early management of the blunt trauma patient as well as exploring perspectives and manifestations that resulted from ATLS training, is outlined in Chapter 1. Key terms included in the study were defined. Significance of the study was addressed, highlighting the theoretical and practical implications. Delimitations, limitations and assumptions were described.

The thesis is organized into five chapters. The following chapter provides an overview of the literature and research related to the research questions that have been delineated. The research design used for this study, including a description of the nature and sources of data, is described in Chapter III. Special attention is paid to the background of the researcher and to the matters of ethical consideration and trustworthiness. Data collection methods are scrutinized. A preliminary sketch of the quantitative and qualitative data analyses is included in the summary of this chapter..

The major findings, focusing on the specific research questions posed, are presented in Chapter IV. The results are organized encompassing both the quantitative and qualitative theoretical bases. The findings of the study based on the nine interviews are organized into themes and compiled into five impact dimensions.

The study is summarized in the final chapter, highlighting the major findings and providing a composite picture and conclusions. The final combination of propositions, fusing the qualitative and quantative data analyses, not only formulates the conclusions of this study, but

offers an examination of the resulting practical and methodological implications. Recommendations and ideas for further research are proposed. The bibliography lists the published and unpublished documents used for reference and cited in the study. The appendices provide copies of the trauma audit worksheet guides, ATLS summative course evaluation, correspondence, interview guide, questionnaire, and the systematic compilation of the final ATLS impact dimensions.

CHAPTER II

RELATED LITERATURE AND RESEARCH

This chapter summarizes the literature and research related to the impact of ATLS. It provides not only a foundation but also a springboard for the researcher before interpreting the quantitative findings. It also provides insight into some of the qualitative findings.

Background development leading to research study. In recent years, a great deal of interest has been demonstrated in the care of the patient with traumatic injuries. In accordance with the mission to improve the care of trauma patients, the ACS COT pursues excellence in trauma patient management by its continued endorsement and contribution to continued development of the ATLS Course for physicians.

ATLS training is assumed to lead to an improvement in trauma patient management, but surprisingly, there is little objective evidence to support the assumptions. To date, there is a scarcity of scientifically based research on the impact of ATLS. What follows are chronologically concise compendiums of what little related data there are.

Studies of ATLS before 1984 focused more on content issues, rather than those related to relationships of ATLS training to physician performance or trauma patient impacts or outcomes. Abrahamian et al.

(1984) focused on the relationship of level of training and area of medical specialization to the physician's performance in the ATLS program. The conclusion indicated ATLS was likely to benefit physicians, based on the improved post-test scores, but indicated the program required "curriculum customizing" to improve performance for the diverse physician speciality groups.

Thomas et al. (1985) surveyed hospital aeromedical evacuation services to determine who actually performed specific ATLS procedures, usually reserved for physicians, in the transport of trauma patients. Frequently, for this specialized service, the skills of physicians, nurses and paramedical personnel overlapped. The conclusion indicated there was a trend towards the expansion of the flight nurse's role to perform ATLS procedures on hospital aeromedical service operations that were traditionally done by physicians. Recommendations were made to further study the success and complication rates in the provision of care to the patient with multiple injuries transported by aeromedical transport personnel.

Although some reputed trauma physicians considered the role of ATLS in the prehospital management of the critically injured patient disputatious, Pon's study (1985) indicated otherwise. Patients sustaining critical penetrating thoracic and abdominal wounds were evaluated for the efficacy of ATLS prehospital treatment measures for a 2 1/2 year period. The prehospital interventions of ATLS were deemed significant, improving the hemodynamic status of the critically injured thoracic and

abdominal trauma patients, when administered by paramedics with advanced training. Pon further emphasized the critical importance of medical control in the ATLS system.

In the study by Ornata et al. (1985), further hints of ATLS impact appeared to emerge. The study suggested that improvement in statewide trauma emergency systems, including establishment of helicoptor transport services and trauma center designation, along with the impetus of trauma training to prehospital personnel and physician education in ATLS, caused a significant decline in the number of trauma related deaths in Nebraska from 1972 to 1982.

Ornata (1985, p.576) stated: "Care of the trauma victim is analogous to links in a chain, leading from field stabilization and transport, through hospital and to rehabilitative care." The impact of ATLS was considered an important link in the chain, suggesting that ATLS contributed to decreased mortality from trauma.

The systemized and prioritized approach sanctioned by ATLS was included in an article written for a primary care medical journal by Corballis and Nitowski (1986). The authors presupposed that adherence to the ATLS approach improved the chance of trauma patient survival with decreased morbidity.

The ATLS program was considered to be potentially advantageous to Third World countries such as Trinidad and Tobago, providing ATLS quality control criteria were assured and maintained by the ACS COT (Ali et al., 1987). Trauma was considered the leading cause of death in Third

World countries, as it was reported in North America. However, unlike the death resulting from injury ratios determined in North American populations, the comparison ratio for Trinidad and Tobago at least doubled. The authors appealed to the ACS COT and ATLS faculty for consideration of the ATLS program as a medical-educational foreign aid in an attempt to improve trauma patient survival for Third World countries.

A study by Walters et al. (1987) tested the appropriate assessment, technique, accuracy and complication rates of the peritoneal lavage performed by surgical residents trained in ATLS. The peritoneal lavage is a diagnostic skill used in blunt and penetrating abdominal trauma assessment and taught in ATLS. The conclusion was that the peritoneal lavage procedure could safely and accurately be performed with low complication rates by ATLS trained surgical resident staff. Although the data demonstrated that the peritoneal lavage was a useful skill in assessment of the victim of abdominal trauma, it did not address how the procedure affected the outcome of the patient.

In an East Carolina University evaluation study of senior medical students who were taught in both Advanced Cardiac Life Support (ACLS) and ATLS (Mehne et al., 1987), the medical-educational programs were shown to be useful in the integration of significant concepts and principles acquired in the previous 18 months of the student's clinical rotation. Since the inception of the combined programs in 1982, the anonymous, post-course summative evaluations by the medical students indicated

consistent praise for the combined ACLS/ATLS programs, with particular emphasis on application of the learned concepts in the component involving challenging simulated clinical scenarios. In addition, the evaluation comparison of pretest and post-test examinations indicated significant improvement in post-test performance ($p<0.001$).

Edwards et al. (1987) described a protocol for evaluation and treatment of airway injuries, based on ATLS guidelines. Although Edwards emphasized the necessity of using the traditional methods of resuscitation as outlined in ATLS, he did not directly relate how ATLS training affected the treatment of airway injuries.

Kilkenny's retrospective study (1988) emphasized ATLS as extremely beneficial to Alaskan physicians. The study sought to evaluate the effect of ATLS training on trauma care, determine if the various procedures and skills taught in ATLS were actually being utilized, and formulate some basic data on trauma care in Alaska.

Kilkenny suggested the introduction and establishment of ATLS in Alaska was invaluable for a variety of obvious reasons. Geography, climate, transportation and communication restrictions imposed extenuating challenges for the Alaskan physician in the management of trauma care. The development of the ATLS program was thought to address the specific difficulties the Alaskan physician encountered in their efforts to deliver quality trauma care. The study clearly indicated a variety of skills and treatments taught in the ATLS course were subsequently used by the Alaskan physicians. In addition, physician

respondents indicated that ATLS training influenced their attitudes on the management of the trauma patient. Kilkenny (1988, p. 131) concludes: "The ATLS course is I believe saving lives and substantially diminishing the morbidity from trauma."

Unfortunately, Kilkenny's study involved a small sample size. Further study involving a larger number of ATLS trained trauma care providers from various parts of the world would provide a more accurate representation.

The development of a prototype computerized support system, based on ATLS protocols, was designed to assist ATLS trained surgeons to initiate definitive decisions in the management of the stabilized penetrating abdominal trauma patient (Clarke et al., 1988). The preliminary results were encouraging, and the prospect of developing future prototype systems appeared certain.

Timberlake and McSwain (1988) provided overview data from a one-year retrospective study of trauma victims, evaluating appropriateness of transfer, treatment rendered and proper documentation of injuries incurred, based on the ATLS standards. They implied that major departures from the ATLS minimum standards of trauma care could result in inappropriate and uncompromised care of the trauma patient. They also stated that the primary goal of the physicians dealing with interhospital transfers of the trauma patient was proper, expedient care and to achieve this goal stressed by Timberlake and McSwain (1988, p. 127): "ATLS standards must be adhered to."

Vestrup et al. (1988) retrospectively examined the charts of trauma patients before and after a hospital institution mandated ATLS as a requirement to work in the emergency department. At that time, the author noted that the study was the first to attempt to address the issue as to whether the ATLS course made a difference on trauma care. Surprisingly to this researcher, the study concluded there was no quantifiable improvement in patient assessment or outcome with ATLS instruction. One weakness identified in the study was the limitation of assessing some of the parameters due to inadequacies in the emergency room record-keeping system.

Wesson et al. (1988) reinforced the importance of recognizing the need for objective measures of trauma care. The study evaluated a pediatric trauma program by developing an objective definition for preventable deaths and compared effectiveness, defined as the proportion of severely injured patients who were salvageable and survived, to the preventable death rate in a sample population. Realizing that previous methods of assessing quality of trauma care proved very difficult due to the lack of reproducible situations and objective criteria to define preventable deaths, the study based their definitions of injury and preventable deaths on the Abbreviated Injury Scores (AIS) because of its documented reliability. Dr. Wesson and his colleagues proposed that the development of the new term and methodology, effectiveness, be used to provide a more objective basis for measuring quality of trauma care.

In summary, the study provided a beginning assessment tool to basically evaluate how to measure the effectiveness of the care provided, whether pediatric or adult trauma programs. However, it further exemplified the complexities in evaluating the quality and impact of trauma care by trauma care providers.

The study by O'Gorman et al. (1989) called attention to the usefulness of initiating fluid replacement for the trauma victim in the prehospital phase, an important but controversial aspect of ATLS. Specific protocols for IV administration on the transfer of traumatized victims were addressed. However, the impact on morbidity and mortality outcomes as a result of fluid resuscitation were not measured.

The paper written by Walsh et al. (1989) presented the first reported adaption of ATLS as a standardized framework for primary care specialists caring for mass casualties, as in the invasion of Grenada in 1983. The ATLS standardized approach reportedly was effective in providing a comfortable framework for the non-trauma experienced physicians in the mass casualty situation.

Hammond and Eckes (1990) attempted to demonstrate how ATLS influenced management of the burn patient, utilizing nine principles stressed in the ATLS course as scoring criteria. The study concluded that ATLS certified physicians tended to do better in burn patient management, but that the difference was not statistically significant. The study did not compare whether there was a difference in the burn victims' outcome when the treatment was provided by ATLS versus the

non-ATLS trained physicians. The study did recommend further evaluations of ATLS and other trauma programs derived from ATLS, such as the Pediatric Advanced Trauma Life Support (PALS), Pre-hospital Trauma Life Support (PHTLS), and the Advanced Burn Life Support (ABLS), to determine clinically measurable improvements, especially in the pre-hospital transfer care of the trauma patient.

Esposito et al. (1991) reviewed state ATLS records to report on the demographics and skills utilized by those physicians who participated in an ATLS program. A survey questionnaire obtained information on whether ATLS was a requirement for hospital credentialing. A low rate of ATLS participation by rural surgeons was identified as one particular area of concern. Based on the results of the preliminary analyses, recommendations included a need to increase the data collection for demographic and professional characteristics of ATLS participants, further investigation on the frequency and appropriateness of the skills and procedures taught in ATLS, as well as increased information on the impact of ATLS on the morbidity and mortality of the trauma patient.

Summary

Limited amounts of literature and research available related to the impact of ATLS were provided in this chapter. Medical-educational establishments and communities as well as trauma care delivery centers require scientifically based research data to further legitimize ATLS. If

sufficient research suggests ATLS is of value to trauma patient improvement or survival, it could provide the ammunition to convince individual physicians and local, regional, national and international medical-educational institutions and establishments to commit to ATLS.

CHAPTER III

RESEARCH DESIGN

This chapter describes the design of the study. It is divided into three components. The first component discusses the nature and sources of the data in relation to the trustworthiness of the investigation. The second component deals with the collection of data, and the third component explains how data were analyzed.

Nature and sources of data

Hospital documentation, and secondary and interview data were used in this study. Hospital documentation generated more than 80 pages of preliminary data. Secondary data were obtained from 184 summative course evaluations and the comparison of148 pre and post-test results. The interview data generated over 65 pages of typed transcripts from the tape-recorded interviews as well as 20 pages of notes taken by the researcher during and after the interviews.

Hospital documentation

The Clinical Investigation Committee and the Medical Advisory Board of a large urban hospital approved the submission of the research

protocol, with the understanding that upon completion of the thesis, a final summary of the research results be submitted to the Chairpersons of both the Quality Control and the Clinical Investigation Committees. The hospital records for the most recent available period of January, 1989 to June 30, 1990 were accessed and reviewed. A total of 52 randomly selected blunt trauma emergency and related patient care microfiche records were reviewed to determine if there were quantifiable differences between the trauma care management areas of cervical-spine control, airway management, and fluid resuscitation, according to the ATLS standards. Total days of hospitalization, patient operating time and post-operative stability, if applicable, were also compared. In addition, transfer patient records were reviewed for availability of bloodwork and radiographic results, if obtaining these appeared practical. Emergent extenuating circumstances, such as the air-lifting of severely traumatized patients, were taken into consideration.

As expected (see limitations section of Chapter I), problems were encountered in assessing the precise time of the primary physician involvement relative to the initial assessment and consequent management of the blunt trauma patient. This limitation was highlighted in the findings and implications by the researcher.

Secondary data

Secondary data were obtained from 184 summative ATLS Course Evaluations from the period of March, 1990 to May, 1991. The evaluations

were filled in by ATLS course participants and collected on the final day of each ATLS Course, facilitating a high response rate.

In addition, secondary data were provided by comparison of 148 pre-and post-test examinations. Three sets of ATLS validated multiple choice examinations were used interchangeably for the purpose of this research study. Each course participant received two of the three examinations. The pre-tests were mailed out to each course participant at least two weeks before commencement of the ATLS course. Explicit instructions were provided with the pre-course ATLS materials, emphasizing the pre-test was to be completed before reading the ATLS course manual. Instructions explained that the pre-test results were being tabulated as part of an evaluation study for a thesis that would be submitted to the Faculty of Graduate Studies and Research at the University of Alberta. Pre-tests were returned personally by the participants to the researcher on the first day of the ATLS course.

Interview data

The primary participants interviewed for this study were randomly selected physicians who had successfully completed a Student ATLS Course and were classified as "active status", or otherwise referred to as current, according to the ACS COT guidelines.

A demographic questionnaire was prepared to gather some background information on the nine primary participants to assist the researcher in conducting the interviews. This is further elaborated upon

in the data collection section of this chapter. Five urban and four rural physicians were the primary participants for the interviews in this study. The physicians selected had a variety of educational backgrounds and specializations, with medical practice experience ranging from two to thirteen years.

The researcher acknowledged a previous healthcare working relationship with one of the primary physician participants in an effort to identify any potential sources of bias or conflict of interest that she might have in relation to the persons or issues under investigation. In addition, the researcher reported highlights of her background in the ATLS program to her advisor. This information was included in the thesis proposal.

Finally, a summary of the thesis results are reported here to provide the opportunity for public scrutiny.

The researcher

The researcher has been keenly involved in trauma management for the past twelve years as a nurse, health care consultant, and administrator of the Edmonton ATLS program. She continues to carry on her role as 'ATLS telecommuting administrator' on a casual basis while on an educational leave to attend the University of Alberta, Department of Educational Administration. Following completion of this leave, the researcher will resume her role as ATLS administrator and intends to pursue further study related to improvement of trauma education,

possibly investigating the relationships of ATLS training, knowledge retention and/or trauma patient outcome.

As administrator of the Edmonton ATLS program, the researcher's involvement allowed access to information not ordinarily available to researchers and thus, potentially influenced the researcher's own perception of the expectation effects. The potential of researcher prejudice on how data were gathered, analyzed, interpreted and reported was addressed and incorporated into the research design. Efforts were made to design a study to minimize the negative effects of perception interpretation.

Ethical considerations

The study was conducted in accordance with the ethical guidelines established by the University of Alberta.

Documentary information was accessed from the Medical Records Department of a large, acute care, urban hospital. Approval was first obtained from the hospital's Clinical Investigation Committee and Medical Advisory Board.

Secondary data sources were accessed from the Edmonton ATLS Course records approved by the ACS, Alberta Chairman, COT and the ATLS Course Director.

Interviews were conducted with both rural and urban physicians that were assured confidentiality, as stressed in the introductory letter

(Appendix 4) explaining the purpose and voluntary nature of the interview session. At no time were real names or places used in the final interpretation of the interview in order to protect the participants' and hospitals' anonymity. Special efforts were made to mask any details that would enable identification of the physician participants or their respective hospitals, including quotations used in the final report.

The researcher conducted all the interviews personally. The physician participants were advised of the name of the researcher's advisor whom they were asked to contact in the event of any concerns. A copy of a synopsis of the final study was offered to each participant, should they so request.

Trustworthiness

Data collection and the indepth analyses are described in the sections that follow. However, the interview component, involving physician perceptions, specifically warrants further exploration. Shaver's definition of perception as "the understanding of the world that you construct from data obtained through your senses" suggests to the researcher that perceptions are complex realities (Johnson, 1987, p.207). Johnson further emphasizes "perceptions gained from selected informants afford only partial views of the reality perceived by participants" (Johnson, 1987, p.220). Although the physicians were randomly selected, were their perceptions only a glimpse of the total reality that remains elusive? And are the researcher's perceptions whilst collecting the data accurate, devoid

of any preconceptions, or personal biases?

It is evident that a researcher must be aware of a host of strategies to facilitate an accurate, objective and critical picture resulting from interpretation of perceptual realities in the interview process. Johnson suggests these strategies include "introspection, frank appraisal, and disclosure of their own research orientations, methodological biases and inherent prejudices relating to persons, organizations, and issues associated with each research effort" (Johnson, 1987, p. 221).

Therefore, the researcher should attempt to be aware of inherent biases and influencing impressions, critically reflect, acknowledge, and, "as far as possible, accomodate opposing conceptions of reality, select and employ methodological techniques most suited to the research problems, and consciously and as 'objectively' as possible, subject to personal review all personal beliefs, prior conceptions, and other known biases that relate to the educational issues under investigation " (Johnson, 1987, p. 222).

The caution is relevant to this study because of the paucity of literature study has included a multifaceted methodological design in an effort to objectively address the trustworthiness issue and minimize the negative interpretation of perceptions.

Collection of data

This study encompasses both quantitative and qualitative analyses. Quantitative data were provided from hospital documentation,

summative course evaluations and pre and post-tests. Qualitative data were provided from the interviews conducted with each of nine randomly selected physicians.

Quantitative data analyses

Development of trauma audit worksheet. A trauma audit worksheet was developed by the researcher to obtain the relevant data from the hospital emergency record documentation. A pilot test of this worksheet was conducted on a small sample to determine the appropriateness and relevance of the selected items. Subsequently, a revision of the original trauma audit worksheet was developed (Appendix I).

Raw data were transcribed directly from the trauma audit worksheets to a computer worksheet (Appendix 2).

Secondary data. ATLS summative course evaluations, an example found in Appendix 3, and pre and post-test examinations provided the secondary data. These data were made available through the ATLS, Alberta COT organization.

Qualitative data analyses

Pre-interview activities. A random selection of physicians was obtained from the current ATLS master list for the northern Alberta

region. Physicians from this list successfully completed a provider level ATLS course and had maintained current ATLS status.

Preliminary formal contact was made by telephone to various current ATLS status physicians. The researcher explained the purpose of the research, solicited the participant's approval to include them in the study and asked for their participation in the interview process. Permission to use a tape-recorder for the interview was obtained in advance.

An introductory letter was prepared (Appendix 4) to reiterate the discussion during the initial telephone call with each of the prospective participants. This letter included the purpose of the study, emphasizing their participation was voluntary (Appendix 5), why the study was being conducted, assurance of confidentiality and compliance with ethical guidelines established by the University of Alberta. Furthermore, they were informed that the study was being conducted in order to add to the limited knowledge on the impact of ATLS. Emphasis was placed on investigating physicians' perceptions of ATLS impact, and that the study was not a program evaluation, nor was it intended in any way to harm them as individuals.

Telephone contact with physicians for agreement to participate did not always result in an affirmative response. Reasons cited were busy schedules, vacations, or inability to commit during the selected time frame. When the researcher explained that the study was being conducted as partial fulfilment of the requirements for a Master of Education degree

in the Department of Educational Administration at the University of Alberta, the researcher perceived initial reluctance by some of the potential participants. Were they reminded of the time consuming nature of research and, therefore, reluctant to commit? Once the researcher reassured the potential contacts that the interviews would take approximately one hour, a total of nine physicians confirmed their verbal agreement to participate and be tape-recorded for the study.

Two weeks before the scheduled interview, a confirmation letter (Appendix 6) indicating date, time and location of the proposed interview, along with a copy of an interview guide (Appendix 7), were mailed to the office addresses of each of the nine physicians. A follow-up telephone call was placed to each of the physicians one week before the scheduled interview as a reminder of the schedule date, time and location.

Interview guide. An interview guide (Appendix 7) was developed by the researcher for the purpose of providing a thought provoking tool during the evolving, flexible interview process. This guide was based on data collected in a preliminary interview for a core course called Research Methods in the Master of Education program, Department of Educational Administration. The guide addressed issues related to ATLS training, utilizing the semi-structured and open-ended style of questions. Information collected using this style of questions was used to verify the formal and informal casual descriptions of ATLS impact, as described by the participants. This 'freedom of expression' opportunity allowed for more ease in describing specific situations and experiences not defined in

the literature. Excerpts from the discussions provided valuable sources of information, enhancing the entire data collection process.

Interview. The interviews were conducted at a variety of locales, such as the office, lab and home setting, and involved both urban and rural locations. Thus, it was not feasible for the researcher to acquaint herself with the surroundings before the scheduled interviews. All sites, mutually agreed upon before the scheduled interviews, were chosen for their accessibility and relative comfort, from both the primary participants' and researcher perspective.

In order to gather some preliminary information on the primary participants, a short questionnaire was developed by the researcher (Appendix 8) to assist in conducting the interview. The researcher was personally acquainted with five of the participants; the remaining four were unfamiliar to her.

Because of personal acquaintance with five of the participants, the researcher initially felt that the interview process did not require relationship building, including trust and rapport building, to assist in increasing the credibility of the interview data (Measor, 1985). However, with the exception of one of the unfamiliar participants, more conservative and cautious responses were perceived, perhaps because of the lack of time to establish good rapport. The participant who was the exception was perceived to be particularly open and revealing, citing some controversial personal experiences and interpretations of ATLS impact.

The researcher, on occasion, detected some hesitation on the part

of some of the unfamiliar participants to fully elaborate on their personal experiences or perceptions to the extent that the familiar participants did. Review of the transcripts provided further evidence of these occurrences. Conversations by the unfamiliar participants were generally not as lengthy nor as revealing about their personal experiences in traumatic scenarios as those from the familiar primary participants.

Prior to the commencement of the scheduled interviews, each primary participant was reminded that their participation was voluntary and they could opt out of the study at any time.

The researcher personally interviewed nine physicians for approximately 1 to 1 1/2 hours. These interviews took place between September, 1990 to March, 1991. Each interview was tape-recorded.

A pilot interview was conducted in a Research Methods course (Educational Administration 512) during a preceding semester, and allowed for preliminary practice with the interview guide. Interview skills were also practised during a mock session with two graduate student colleagues, allowing for some critiquing of the researcher's interview skills.

Field and anecdotal notes were taken at each of the interviews. Anecdotal notes proved very useful for clarification of the participants' comments specific to the interview guide questions and to highlight issues addressed in the findings. Field notes also proved extremely useful. The researcher encountered what was perceived to be a particularly disasterous situation on the occasion of one interview,

wherein the recording equipment failed to record properly, despite both checking the operation of the equipment at the university's technical centre and before the actual interview. Indeed, researchers must be prepared for such extenuating circumstances in their attempts to secure the data!

With the exception of the one interview that resulted in an indiscernible tape-recording, no further technical problems, unnecessary interruptions, or related complications occurred.

Post-interview. All ATLS physician participants were offered the opportunity to review their transcribed conversations, allowing for personal critiques and comments on their submissions. None of the participants requested this opportunity. However, all participants indicated that they would be interested in receiving an abstract of the thesis findings.

A follow-up thank-you letter (Appendix 9) was sent to each participant, indicating that an abstract of the findings would be forwarded to them upon completion of the research study.

Analyses of data

The quantitative and qualitative data obtained were analyzed, with the focus on linkages to impact resulting from ATLS education.

Hospital documentation

Preliminary attempts were made to obtain emergency documentation with a built-in trauma scoring assignment such as the Abbreviated Injury Scale (AIS) and the Injury Severity Scale (ISS). These scoring methods were purported to be used by many hospitals in the literature and very useful in assigning the overall injury severity of the trauma patients. Unfortunately, although the determination of injury severity would definitely have allowed for a more detailed list of the trauma patients with greater specificity, such trauma scoring systems were not in routine use in the emergency documentation nor readily available by computer access in the large, acute care hospitals approached. Therefore, the AIS and ISS were not used for this study.

Blunt abdominal trauma patient records, regardless of age and magnitude of abdominal injury, were chosen for this research study in efforts to limit the focus to a specific area of injury. Care was taken to omit cases of multiple trauma involving other areas of the body injured in addition to abdominal trauma, that would obviously result in longer hospitalizations and skew the statistical findings.

Comparison of rural and urban trauma admissions, and physicians either trained or untrained in ATLS, were scrutinized. Specific patient initial assessment and treatment areas analyzed were: airway management, cervical spine control, and fluid resuscitation. ATLS protocols were used as the guide to determine the minimum standards for the specific treatment and management measures addressed in this

study. Length of hospital stay, including number of days spent on a critical care unit, if applicable, were also documented and compared. In addition, rural transfer patient records were reviewed for availability of bloodwork and radiographic results, if deemed appropriate and practical, from the initial admission site.

Content analyses involved determining the hospital record completeness and accuracy with respect to the documentation. Care was taken to reveal ownership of the initial patient assessment and the subsequent treatments administered. In essence, documentary materials were gleaned, combined with the other contextual data, and reported in the findings.

Secondary data

Both summative course evaluations and pre and post-tests were analyzed using the Statistical Package for the Social Sciences (SPSS). The summative course evaluations were also gleaned and combined with the contextual data from interviews and documentary data, and reported in the findings.

Interview data

The initial interview guide provided an organizing framework. The semi-structured, open-ended style of questions used in the interview process allowed for freedom in the development of identifiable areas or dimensions of impact. On comparative analyses of the physicians'

comments, common themes emerged. A more indepth analysis of the tape-recordings and the anecdotal notes taken during and following the interviews provided formulation of six emerging areas of perceived impact ATLS education had on early trauma patient management. The interview data were analyzed in terms of these six dimensions of impact: provided a universally accepted standardized frame of reference for trauma patient management; improved medical-technical trauma patient care; positive changes within the domains of learning; communication opportunities and improvements; and reflective practice. The results of the analyses appear in a composite description of the appear in a composite description of the impact of ATLS education of trauma patient management in Chapter IV.

Discussion. Intended to reduce researcher subjectivity, the multifaceted, research design, although somewhat complex, indeed served to strengthen the confidence one could place on the objectivity of the study. The interpretations of the intertwined analyses served to provide more credibility and validation, aiming for a reduction of perceptive selectivity on the part of the researcher.

Summary

The nature and sources of data used in the study were detailed in this chapter. Special attention was paid to the background of the researcher. Ethical considerations and trustworthiness were emphasized. The data collection processes were carefully scrutinized, identifying not

only the limitations, but the complexity of examining perceptions. The chapter ended with an explanation of how data were analyzed.

CHAPTER IV

FINDINGS

This chapter presents the major findings on the impact of ATLS education, directly or indirectly, on trauma patient management. The findings are based on data from the following sources: 1.) retrospective hospital documentation for the period of January 1989 to June 1990; 2.) summative course evaluations from ATLS courses conducted March 1990 to May 1991; 3.) pre and post-test results for ATLS courses during 1989 to 1991; and 4.) interviews conducted with nine physicians between September, 1990 and February, 1991.

The chapter is divided into two main sections. Specific quantitative methodological results are reported in the first section. The next section employs the qualitative methodolgy, whereby thematic dimensions developed from each physician respondents' view of ATLS educational impact are presented (Appendix 10). These thematic dimensions are synthesized into central themes (Appendix 11), and presented as a final composite (Appendix 12). The chapter closes with a conclusion, based on syntheses of the findings.

Hospital documentation

Raw data were transcribed directly from the trauma audit

worksheets to computer data cards. The Statistical Package for the Social Sciences (SPSS) was used for an analysis of the data as follows:

1. Frequency and percentage distributions were calculated for each variable obtained from the trauma audit worksheets.

2. Using the frequency distributions for independent demographic variables as a guide, data were grouped into two categories. The specific categories, ATLS trained physician and non-ATLS trained physician, provided the most useful comparison. (Preliminary statistical analyses comparing the categories of rural physician versus urban physician suggested little significance in the small sample.)

3. Chi-square analysis was used to determine significant differences in frequencies of demographic variables for ATLS and non-ATLS trained physicians. Chi-square analysis was also used to determine significant relationships between dependent variables and membership in the two patient treatment groups:

    1. by ATLS trained physicians, and,
    2. non-ATLS trained physicians.

4. Analyses using the t-test were performed to determine significant differences in the means of chosen dependent variables (age of the patient, ICU days, total hospital days, and total surgery time) by physician training categories. The t-test was also used to determine significant differences in the means between those trauma patients who underwent surgery, cared for by the specific physician training category, and the chosen dependent variables (age of the patient, ICU days, total hospital days, and total surgery time).

Chi-square analyses. ATLS trained and non-ATLS trained physicians were compared on specific trauma patient management skills stressed in the ATLS program. A Chi-square analyses was used to test the significance of the differences.

The Chi-square test was chosen as it is a nonparametric statistic used when variables are expressed in nominal or ordinal scales and when data

are expressed in the form of frequencies (Treece and Treece,1986, p.435). This non-parametric statistical approach, as it does not assume a normal distribution of scores about the population mean nor variance homogeneity of the comparison groups (Borg and Gall, 1983), produced values large enough to be interpreted as significant.

In this Chi-square analysis, associated with the crosstabulation procedure, the following represents the chosen variables for this study:

1. Independent variable - nominal measurement of physician training

2. Dependent variables
   i. Airway management
   ii. Cervical spine control
   iii. Fluid resuscitation

The dependent variables chosen were based on the ATLS protocols for primary survey and resuscitative measures emphasized during the f first hours of assessment and management of the trauma patient.

ATLS and non-trained ATLS rural physicians' trauma transfer patients were compared using the following dependent treatment measures performed, based on transfer protocol guidelines emphasized in ATLS:

1. Roentgenogram of c-spine (X-rays)
2. Hemotologic profile (Blood work)

Consideration was given to the expedient nature of the transfer and on the practicality of performing radiographic and laboratory examinations and/or procedures. In the event that radiographic or

laboratory examinations would not alter the immediate plan of care, the transfer to a facility best suited to the needs of the patient was given priority. Obviously, inappropriate delays were not in the best interest of the acutely injured patient.

In addition, ATLS and non-trained ATLS physician's patients who required surgery as a result of the blunt trauma were compared for the following dependent variable:

Stability of post anaesthetic vital signs

Findings. The examination of the Chi-square values for the comparison of ATLS trained and non-trained physicians revealed significant differences on the following variables (**Table 3.1**):

1. **C-spine control ($p<0.05$)**
2. **Fluid resuscitation ($p<0.001$)**

Comparison of Chi-square values for ATLS and non-trained ATLS rural physicians revealed significant differences ($p<0.01$) for the transport of both radiographic identification of the c-spine and blood work documentation to the receiving urban trauma centre (**Table 3.2**).

For the ATLS and non-trained ATLS physician's patients who underwent surgery resultant from the blunt trauma, Chi-square values were also significant ($p<0.01$) for stable vital signs in the post anaesthetic recovery room (PARR).

In each of the above cases, the null hypotheses were rejected, The null hypotheses were that there were no differences between the specific

TABLE 3.1

Frequency and Percentage Distribution of Patient Treatment Variables for ATLS Trained Physicians(a) and Non-ATLS Trained Physicians(b)

Training Category		Dependent Variable	
		Airway Management	
		YES	**NO**
ATLS Trained	F	33	4
	%	89.2	10.8
Non-ATLS Trained	F	11	4
	%	73.3	26.7
		C-spine Control*	
		YES	**NO**
ATLS Trained	F	30	7
	%	81.1	18.9
Non-ATLS Trained	F	8	7
	%	53.3	46.7
		Fluid Resuscitation***	
		YES	**NO**
ATLS Trained	F	37.0	0
	%	100.0	66.7
Non-ATLS Trained	F	10	5
	%	66.7	33.3

a N=37
b N=15

*** $p \leq 0.001$
** $p \leq 0.01$
* $p \leq 0.05$

TABLE 3.2

Frequency and Percentage Distribution of Transfer Protocol Information Received from ATLS Trained Rural Physicians(a) and Non-ATLS Trained(b) Rural Physicians

Training Category		Dependent Variable	
		C-spine X-rays**	
		YES	NO
ATLS Trained	F	8	2
	%	80.0	20.0
Non-ATLS Trained	F	3	10
	%	23.1	76.9
		Hematologic profile (Blood work)**	
		YES	NO
ATLS Trained	F	6	4
	%	60.0	40.0
Non-ATLS Trained	F	1	12
	%	92.3	40.0

a N= 10
b N= 13

** $p \leq 0.01$

dependent variables, directly or indirectly related to trauma patient management, and the care provided by ATLS and non-ATLS trained physicians. As the null hypotheses were rejected, alternative hypotheses were concluded.

The finding was that ATLS physician training appears to be of significance for each of the following dependent variables:

1. **Cervical spine control**
2. **Fluid resuscitation**
3. **Stable post anaesthetic vital signs (PARR)**

The findings also indicate that ATLS physician training appears to be of significance in reference to reporting the following important clinical documentation of findings or treatment, rendered in the transfer of blunt trauma patients:

1. **Roentgenogram of c-spine (X-rays)**
2. **Hematologic profile (Blood work)**

Discussion. The literature suggests that there is a need to evaluate specific measures of early trauma care, including the appropriate care and transfer of trauma victims (Timberbake and McSwain, 1988, p. 127; Hicks, Danzl, and Thomas, 1982, p.297). This portion of the study presents a glimpse into what quite possibly could imply unacceptable standards of trauma care by physicians in our province, based on the standards of the ACS ATLS program.

T-test analyses. The results of the t-test analyses are presented in

Tables 3.3 and 3.4, indicating the significant differences between the means of the dependent variables and the physician training category.

Findings. The differences between the mean ages of the blunt trauma patients for the total number of blunt trauma cases examined as well as those cases where the patients underwent surgery were not statistically significant. However, statistical significance was determined in favor of the ATLS trained versus the non-ATLS trained physician for those patients who spent time in ICU, regardless of whether or not they had surgery, as a result of the blunt trauma ($p<0.05$). The greatest differences examined between those blunt trauma patients managed by ATLS and non-ATLS trained physicians were in the total number of hospitalization days and in total surgery time in minutes ($p<0.01$). Once again, the null hypotheses were rejected and the alternate conclusion is drawn. ATLS physician training is significant for each of the following dependent variables (Table 3.3 and 3.4):

1. Total number of days spent in ICU.
2. Total number of hospitalization days.
3. Total surgery time in minutes.

Discussion. Although the hospital documentation demonstrated some quantifiable improvement in blunt trauma patient management, the sample size was very small. The time and cost factors were major limitations in providing a sufficient sample size for this complex analysis. The researcher is aware that sample size is a major factor in accuracy and confidence limits of the statistical results (Jackson, 1988).

TABLE 3.3

Analysis of 52 Blunt Trauma Patients' Dependent Variables with Category of Physician Training

Dependent Variable	Mean Scores: ATLS Trained	Mean Scores: Non-ATLS Trained	t-value
Age of Patient	31.35	34.93	-0.64
ICU Days	2.35	12.93	-2.50*
Total Hospital Days	13.73	34.28	-3.21**
Total Surgery Time (minutes)	90.81	152.00	-2.41**

** $p \leq 0.01$
* $p \leq 0.05$

TABLE 3.4

Analysis of 39 Surgical Blunt Trauma Patients' Dependent Variables with Category of Physician Training

Dependent Variable	Mean Scores: ATLS Trained	Mean Scores: Non-ATLS Trained	t-value
Age of Patient	34.63	35.6	-0.16
ICU Days	3.22	16.16	-2.65*
Total Hospital Days	16.55	41.45	-3.79**
Total Surgery Time (minutes)	124.44	190.00	-3.04**

** $p \leq 0.01$
* $p \leq 0.05$

Increasing the sample size would result in more confidence in the accuracy of estimations. Caution must, therefore, be exercised in making strong statements or inferences from the hospital documentation results.

Secondary data

Course evaluations. Data from 184 summative ATLS course evaluations (Appendix 3) were analyzed using the SPSS. Frequency and percentage distributions were calculated for each quantitative comment in the course evaluations. As the course evaluations primarily focused on the areas of program content, faculty, and facilities, frequency distributions were determined on selective evaluative statements that appeared to relate specifically to the impact of ATLS training.

Findings. The following highlights the results of the evaluation comments by 184 ATLS course participants, related to the immediate and short term impact of the ATLS program (Table 3.5):

1. 72% strongly agreed/26% agreed that the ATLS program content contributed to their continuing education.
2. 53% strongly agreed/44% agreed that the information obtained would be applicable to their practice.
3. 31% strongly agreed/62% agreed that their practical application of skills had increased regarding assessment and management of the trauma patient.
4. 23% strongly agreed/44% agreed that they would be able to initiate changes in emergency care in their own agency, institution, or region. 19% chose not to indicate a response or circled not applicable.
5. 75% strongly agreed/25% agreed that they would encourage others to attend the ATLS course.

TABLE 3.5

Percentage Distribution of Physicians' Perceptions of ATLS Impact

Evaluation Statement	Percentage Distribution* Agree Strongly	Agree	
The program content contributed to my continuing education.	72	26	
The information obtained will be applicable to my practice.	53	44	
Practical application of skills has increased regarding assessment and management of trauma patients.	31	62	
I feel able to initiate changes in emergency care in my agency, institution, or region.	23	44	**
I would encourage others to attend this course.	75	25	

* <100% due to no response from some participants

** 19% chose not to indicate a response or circled not applicable on this particular evaluative statement

The summative course evaluations implied that an immediate positive impact was perceived by the majority of physicians who completed the ATLS program.

The one-way analysis of variance and the Scheffé procedure were used to determine significant differences on the selected independent comments involving the variable ATLS courses. No two groups were significantly different at the 0.100 level.

Discussion. Demographic information obtained from post course reports revealed ATLS course participants were represented by a wide distribution of physician specialities and categories. These physicians were requested to rate their level of agreement or disagreement with each of the statements in the course summative evaluations. Space was also provided for additional comments on each of the evaluative statements.

Of particular concern were additional comments provided by some of the residents and/or interns. Comments related to initiating changes in emergency care in their respective agencies, institutions, or regions alluded to their lack of empowerment in the change process related to state-of-the-art trauma care practices. Resistent medical hierarchies, influential political forces, and lack of opportunity to initiate change were suggested as some of the reasons for stifling progressive changes in trauma patient care by residents/interns. Perhaps residents/interns are an untapped source for creative change that are not being encouraged, or worse, ignored, to positively effect trauma patient management and outcomes.

This finding raises the question as to how the current trauma agencies, institutions, or regional authorities - those that claim to aspire to excellence in trauma patient management - facilitate residents and interns to pursue improved trauma patient care initiatives. They are the future providers of care for injured patients.

Pre and post tests. Pre and post-test examinations were analyzed using the SPSS. Frequency and percentage distributions were calculated for the grade scores of each ATLS physician participant for a total of 146 examinations. T-tests were performed to examine to differences in the comparison of the means of pre and post-test score results for the variable courses.

Findings. The results of the t-test analyses are reported at the 0.01, 0.05 and 0.10 levels for the obtained t-value **(Table 3.6)**.

In Group 1, the only significant difference between the pre and post-test score was the October 1990 group ($p<0.05$). Here, however, the mean scores for the pre-tests were greater than the post-test scores. At the beginning of the October 1990 ATLS program, a large number of ATLS registrants admitted that the pre-test program instructions were not exclusively followed. Various reasons were given for their lack of compliance. Forgetfulness, unawareness of the explicit pre-course instructions, and claims that the instructions were not affixed to the pre-test and therefore misplaced with the remainder of the introductory course materials were the most common reasons provided.

The analysis of pre and post-test means showed significant differences for both Group 2 and Group 3. As expected, the statistical significance for the latter group was the highest ($p<0.01$).

The one-way analysis of variance and Scheffé procedures were used to determine if there was any difference between the means of the pre and post-test scores involving all three groups. No groups were significantly different at the 0.05 level.

Discussion. Beginning in 1990, modifications were established to provide clear-cut pre-course instructions and expectations for ATLS participants. A strategy involving three checkpoints specific to the pre-test were included in the pre-course package, resulting in satisfactory fulfilment of the pre-test conditions for ATLS participants. In addition, changes in administrative assistance resulted in more continuity in the 1991 pre-course packaging, monitoring, and follow-up for the purpose of this evaluation study.

Based on the changes in program preparation, administrative assistance, and strict compliance to the pre-course instructions, the pre and post-test means comparison for January to April, 1991 (Group 3) is considered the most accurate representation for this portion of the analysis.

Interview data

In the preliminary stages of investigation for this study, it was noted

TABLE 3.6

Analysis of Pre and Post-Test Means for ATLS Physician Participants

August, 1989 to April, 1991

Independent Variable	Means: Pre-Test	Means: Post Test	Number of Exams
Group 1:			
August , 1989	88.8125	90.6250	16
October, 1990**	90.9333	86.0667	15
November, 1990	89.3000	86.3000	20
Group 2:			
January, 1990*	78.8235	83.7059	17
March, 1990***	77.8750	86.4375	16
April, 1990*	81.8750	85.8125	16
Group 3:			
January, 1991***	80.0000	88.5000	16
March, 1991***	82.7500	90.9375	16
April, 1991***	79.5102	85.2857	16
			N= 148

*** $p \leq 0.01$
** $p \leq 0.05$
* $p < 0.10$

that there was a paucity of research information on the selected topic. There were some related quantitative data and virtually no information using the qualitative research approach.

Initially, the decision as to what style of research to employ was problematic. An exploratory approach was adopted; one that warranted an intensive look into not only the numerical interpretations, but also into the subjective descriptions by those physician respondents who experienced the ATLS program. The final choice was based on the need to accurately extract some quantitative data directly related to how ATLS affects outcomes, relative availability of secondary data demonstrating the immediate or short term effect and impact of the ATLS program, and an investigation on how the ATLS experience affected ATLS respondents' trauma management practices and personal lives.

To a certain degree it was possible to gain some information from the participants' perspectives on the immediate impact of ATLS using the course evaluation survey questions. A follow-up quantitative approach with survey questionnaires and highly structured interviews may also have proved useful. However, the challenge appeared to be on how to examine the physicians' perspectives, building on the development of themes based on their personal responses about how ATLS impact was manifest. The most desirable approach to investigate this form of inquiry appeared to be exploring the physicians' thoughts on ATLS impact through the "in-depth interview". This approach encompassed some of the descriptors originally cited by Bogdan and

Biklen (1982, p. 2):

> Sometimes termed "unstructured" (Maccoby and Maccoby, 1954), or open-ended" (Jahoda, Deutsch, and Cook, 1954), "non-directive" (Meltzer and Petras, 1970), or "flexibly structured" (Whyte, 1979).

The interview allowed the physician participants' freedom to describe their views on ATLS impact. The interview guide provided open-ended questions about the topic, allowing for answers from respondents' own frames of reference.

The respondents' perspectives were carefully scrutinized and the process of formulating thematic dimensions evolved. Terms for the thematic dimensions were derived by the researcher, based on their recurrent conceptual content. Finally, a composite was built from the grouped thematic dimensions.

The qualitative anproach enhanced the entire data package as it captured the essence of the physician participants' subjective reality. The "meaning" of the experience, an intrinsic feature of qualitative exploration, is perhaps best described by Bogdan and Biklen (1982, p.30): "By learning the perspectives of the participants, qualitative research illuminates the inner dynamics of situations-dynamics that are often invisible to the outsider."

The physicians' excerpts revealed their personal insights on how ATLS impact was manifest in their worlds of trauma care. Capturing the inner dynamics of these perspectives assisted in presenting an accurate interpretation of each respondents' experiences.

Evolution of ATLS impact dimensions. The development of the main dimensions that emerged from the qualitative data analysis involved three steps: 1.) the formation of emerging themes perceived by each individual respondent (Appendix 10); 2.) the synthesis of combined perceived dimensions from all respondents (Appendix 11); and 3.) compiling all combinations to produce the final main ATLS impact dimensions (Appendix 12).

The initial emerging themes were presented in no particular order. However, the final composite of ATLS impact dimensions were arranged in hierarchical order, based on the frequency of reference to the identified dimension in the respondents' statements.

The focus questions guiding the data collection produced information on personal perceptions of ATLS impact. Impact was manifest in terms of provision of a framework for the assessment and early trauma patient management, reference to specific significant changes related to the medical-technical aspects of trauma patient care, citing positive changes in the domains of learning, communication improvements, and opportunities for self-reflection. The dimensions did not appear to be mutually exclusive; more often than not, interrelationships were evident. Upon further intensive analysis of the "participants' perspectives", one could uncover many overlapping concepts and ideas.

Dimension 1: Standardized frame of reference for trauma patient management

The most recurring area of impact cited was that ATLS training provided a standardized, systemized and prioritized approach in trauma patient care. The following excerpts perhaps best illustrate the profound meaning this dimension had for the respondents:

> The benefit of ATLS is to give you a recipe, if you will, on how to look after a traumatized patient... I think my approach was really randomized... haphazard....prior to having ATLS.... And I think, that without that sequential thinking, you will not be a very efficient physician looking after a victim who has been traumatized. I think that our approach to the traumatized patient is much less of a bowl of stew today.....

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> Because ATLS is a universally accepted approach to trauma, it gives the patient a better chance of being treated properly. In a proper sequence...within a certain period of time... and it gives anybody else that might be involved in that patient's subsequent care, at that hospital or a receiving hospital elsewhere, a better chance of dealing with the consequences of the patient's injuries. Be they life threatening or not.

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> I see it more as a case of teaching people that never knew the proper sequence of treating trauma patients, or never were made familiar with the various techniques of treating trauma patients. And ATLS is now teaching those techniques and bringing that information to them. That is the biggest difference that I see.. going from someone who has no real concept of what is involved in treating trauma patients, and how one should assess, treat, do the secondary survey, etc, To me the biggest change that ATLS has had is that we now are getting patients that are having the basics taken care of. There are basic principles to fall back on...

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> Without the kind of background ATLS provides, doctors do not perform very well surprisingly with trauma. They are pretty hopeless sometimes. They get off the track, things out of sequence, and would probably contribute to the demise of the patient. So, I think it is a critical piece of training.... I have seen various provinces

and organizations that have not adopted the ATLS approach and they do not fare very well. And their mismanagement is often not known by the public or the patient's families.

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I've seen the before and after of ATLS training... and I'appalled...by people who should know this stuff....and that is what their job is...a medical system that is supposed to go into a combat zone and give assistance to casualties and get them out. And their approach, and I mean some of these people have been in the service 18 years, is very haphazard, disorganized.... So what they are doing is what they have picked up. And it is totally inadequate. They have all the basic skills..it's just that the organizational skills are not there. That is what ATLS does. It gives you a systematic approach.

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Some patients who are transferred in from out of town; from some places you'll know the attending physician has or hasn't taken the ATLS course....I think their trauma technical skills may be there, but it's their approach that, sort of, makes them stand out....some places are still pretty unsafe for trauma... which is really too bad....

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There are certain things you can take from the ATLS course that you can apply to any ailing patient. There are principles that can be applied to anyone who is sick.

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My perception is those trauma patients treated in areas where everybody is ATLS trained ..well, they're handled very well... Now is that because of the ATLS training or is it also because of the local environment that is progressive and is willing to adopt new ideas and is willing to somewhat standardize, etc.....ATLS gives you that "flow chart" approach to the management of the trauma patient. It gives you almost that rote way of doing things. I'm a believer... so I believe it is going to have an impact on physician's ability to think through their approach to the trauma patient. It basically gives you an algorithm, essentially, something to hang your hat on.

Dimension 2: Medical-technical trauma patient care improvements

This dimension refers to several specific medical management or technological skill improvements. It is interesting to note that there was concurrence among a majority of the respondents on the following medical-technical trauma care areas: cervical-spine control, intravenous fluid resuscitation, and airway management. These three areas are presented in hierarchical order, reflecting the frequency in which they were identified in the respondents' excerpts. The remaining medical-technical trauma care areas of impact are not presented in any meaningful order; these were simply identified on several occasions in the respondents' transcripts and as they are important issues identified in the trauma literature, they deserved mention.

Cervical-spine management. The problem of inappropriate care and transfer of the trauma victim related to the cervical spine (C-spine) radiographical assessment with subsequent immobilization has often been addressed in the trauma literature. This area of concern was repeatedly expressed by the respondents in this study.

> C-spine protection was like a lottery.... it was there sometimes.... sometimes it wasn't...To me the biggest change that the ATLS course has impacted is that we now are getting patients that are having the basics taken care of. They are coming in with adequate C-spine protection, or the C-spine is cleared prior to coming in. And quite often, right down to C-7. There are still some centers, and they stand out like sore thumbs, you know.....that... where the management is terrible.
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> There are occasions when a patient has already been sent and we get a call afterwards. Then we find out they (the patient) are

unconscious and have not had an x-ray, have not had either a neck or skull x-ray, they don't have C-spine control, and they don't have an airway to protect them. Now, that is a rare combination, but one of these types of things, we still get every once in a while. Because of the perceived urgency on the part of the physician who is sending the trauma patient.....

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It seems you can tell very quickly, even by looking at the chart, if a person has done the ATLS course. Not only is it thorough, but it is laid out in an organized fashion. It gives you how the patient has been taken of.... it talks about querying the C-spine.. and the breathing... it goes through it step by step very clearly..... Now there are some people who are... inbetween. They have had experience- you can tell from their documentation and communication, but they have missed some things.....Like they send in the patient with a compound....., and sort of takes C-spine precautions, but forgets to do the C-spine x-ray. But compared to what we were seeing here 5 or 6 years ago, we are light years ahead of that. So we are going in the right direction.

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What we didn't manage well was the C-spine. Now we are more cognizant of C-spine difficulties and potential problems.

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And then there's C-spine control, which the course has had a definite impact on the management of trauma patients.... to a point where people are saying ' if the C-spine is okay, then we almost abandon spinal precautions.' And that is wrong. There is data that shows that that's definitely wrong. You can have more than one lesion in the cord, and because your C-spine is clear, it doesn't mean at all that your L-spine, T-spine are clear. And the emphasis should be more on the whole spine - the C-spine is very important for the neck..... but the deemphasis should be really on the whole spine.

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There are still, on occasion, x-rays that have been done on the transfer patient and have either been misplaced or the hospital forgot to send them, thinking that 'Well, they're going to a big hospital- they're going to be redone anyways' but for the patient who has got C-spine immobilization, you don't want to move them unnecessarily anyway... Yeah, if you can have that pre-hospital information, you certainly don't have to put the patient through

any big problems, and even, not have to go through the trials or tribulations yourself....as the attending physician, of what you are doing to your patient.

Fluid resuscitation. Providing adequate and appropriate volume replacement for the treatment of shock in the trauma patient also appeared to be an area of major concern.

I think most physicians have a preconceived notion that anybody that does go into an emergency room, with an altered level of consciousness, probably does require an intravenous line. But again, it is how you are going to run the line and how big the line is going to be that is important. For instance, if you are going to have somebody come in who is hypotensive from an M.I. and comes in fainted, you probably put a big line in and run a lot of saline, well, obviously that's not the route. Whereas, if you have somebody else who has an obvious reason for an altered level of consciousness from a motor vehicle accident, you don't put a 22 gauge I.V. in these people. I think that is the important message.....ATLS is to be able to educate what is now the standard of I.V. care in dealing with the traumatized patient. That is what ATLS does. And the patients will benefit.

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I.V. therapy is better, because a lot of people were without I.V.'s, flatter than pancakes, and it's hard to resuscitate somebody who has been like that for hours as opposed to someone that's just dropped his pressure as they hit emergency. And, of course, it's taken a while for ones that were starting I.V's to switch over to crystalloid instead of D5W for resuscitating shock patients. And we're more aware of the potential for patients to go down the tubes very quickly. So that we may get two large bore I.V.'s in right away and maybe type and cross for blood before there is a problem, rather than having to do a crash I.V. and starting when you've got no veins to stick a catheter into..... and that sort of thing.

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Victims were sometimes with large bore I.V.'s; sometimes they wouldn't have any I.V.'s; depends an awful lot on who was there and what their mood was, quite frankly. So there was no pattern... no consistency whatsoever on how transfer patients arrived....ATLS has been an impact. They are now coming in with large bore I.V.'s, in most cases.

Airway management. The traditional ABC's of resuscitation, as outlined in the ACS ATLS guidelines, lists the number one trauma care priority as the establishment and maintenance of an adequate airway. Improper management of the airway continues to remain a particular area of concern for some of the respondents.

> The ABC's have been taken care of. The patients are intubated, or at least they have an oropharyngeal airway in there, whereas before, the patient might have been sent down supine or in a left lateral position with nothing protecting the airway. Or the idea now that ambu bags and other resuscitating equipment have to accompany the patient. Whereas before there wasn't maybe even a thought about it....The philosophy of "scoop and run" has changed considerably. Before they didn't have a choice, I think now the sending physicians are making sure; if they don't have paramedics, E.M.T.'s, or nurses to attend to an I.V. or to intubate on route they send somebody that can.

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> Anyone who looks at the records should know, particularly if they have done an ATLS course. I think that everybody should write down that the fellow is breathing properly. And if the fellow is unconscious, whether or not he has protected the airway with a PA and whether he is breathing, and if he is not breathing properly, but his airway is patent....are his lungs clear?.....does he have good air entry?...is there any sign of pneumothorax?...has he done a chest x-ray??.....I mean these things will be written down then. Maybe not in chronological order, but that sort of thing is written down.

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> Our disasterous transfers..... well, you think that they are not ATLS trained... but I have never checked... well, their patient airways have been badly handled. They've got no I.V.'s. It's load and go from about 6 hours out or something stupid like that..

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> I think the emphasis on the airway in ATLS is outstanding, but I am not sure ... I think that still is the area where the course instructions, let's say, are not followed as much as they should be. People are

afraid to put in an airway, because they don't do it often, and they feel they aren't good at it. There is a tendency, a natural tendency I think for people who aren't skilled in the airway, to always see that... well, the patient will make it.. it's okay... A reason is found not to make an airway... He ('the patient') may do this..He may do that.. I wouldn't be able to without heavily sedating him or paralyzing him and that would be wrong for him....that kind of thing.. so I still think the airway, even if it is stressed, I think that it is still one area that is a particular problem in the management of the trauma patient.

Stabilization and transport. Some respondents claimed a significant impact in the pre-packaging of transfer patients. A prearranged transfer protocol of the stabilized trauma patient was considered the ideal arrangement, in accordance with the standards adopted by ACS ATLS.

Well, a great change I have noticed personally is the effect it has had on patient transfers from rural areas, realizing that ATLS was originally targeting a lot of rural physicians. It is still a problem on occasion. The transport... the actual "packaging", the treatment - the packaging and actual transportation of the patient was abysmal before a lot of these docs were getting the ATLS courses.

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Because it used to be scoop and run. Even before 1984, or somewhere around there when we used to have the other ambulance services...prior to the Edmonton Ambulance Authority... there is a lot more thinking now about sending a nurse or doctor rather than just E.M.T.s...Before they would never have thought about it. Or if they thought about it, they kept it to themselves, and if they couldn't do it, they would have thought 'Well, I can't do it, so what difference does it make?' I am sure the impact of losing the air ambulance helicopters is definitely being felt by some of the areas that were utilizing it before, now having just to depend on road transportation.

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How would I rate prehospital care today? Well, good... today. Six years ago...terrible! And that's the crux to the whole thing....the

difference seen today. There will be those physicians who may not see ATLS as a deficiency, because they do not know anything about it.

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There is no question that ATLS has made a big difference. And it seems to me that the emphasis should be in rural medicine, on this type of course. Because this is a course that saves lives. So I think that it has had a major impact on trauma management. The quality is better, the quality of the arrival of patients is better.....The longer the patient is in shock, the worse the end organ problems are. So, my feeling is that the patients that all come in benefit from good initial care. Unfortunately, we have to go to the records and see whether ATLS really has made a difference or not. My perception.... Definitely.

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I think in a lifetime you are going to come across something from time to time where ATLS would be of assistance. I've come across road accidents where I've stopped. In Alberta, it's usually not an issue, because the paramedics are so well trained. They basically do the initial assessment as well or better than anybody trained in trauma care would do it. But there's been other places... it's not universal in Canada, and the standard of pre-hospital training is not universal either. A lot of provinces don't have paramedics, and there are just attendants... I've seen some terrible things done at accidents by people who are not trained... not trained in any standards.....mismanagements like moving people out of vehicles with possible broken necks with no stabilization. Not managing the airways. Improper positioning..not stabilizing the fractures before they were moved. And there was no reason to move them. There was no fire or hazard that required them to be moved quickly..... No taking into consideration - the real problems... and all they really needed.....Just the ABCs... the basics again... even first aid in some circumstances.

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Another one I recall... nothing like telling horror stories... where a chap was crushed by a couple of tons of steel plating on a ship and was lifted off by helicoptor...Got ourselves organized at the staging base and I got the bigger aircraft set up for the aerovac. Got O-negative blood organized. And when the chopper arrived, I jumped onto that. I had to get I.V's started, started transfusing him, got MAST trousers, got the surgeons organized at the receiving

hospital, and the thing just went click, click, click.....Again, it was using the ATLS approach. And this guy did fine. He would have probably died otherwise. You know, he had no way of being rescued any other way. There was probably another day out at sea. So, you know... the ATLS training, and obviously I sound like I'm converted, and I am. I think that it's the best thing that's come along in quite awhile. So I certainly sing praises to it.

Mechanism of injury. More attention seems to be paid to the less obvious injuries as a result of ATLS training. There also appears to be evidence of better identification of specific types of injuries as a result of emphasis on the injury-producing mechanisms. Determining the direction and degree of impact force is useful in identifying specific injury patterns.

I think there has been more attention paid to the life-threatening, potentially life-threatening injuries such as closed chests, closed abdomens, and penetrating wounds than before. Before a lot of them just put a little dressing on the wounds, cover them up and because if they were covered, it was forgotten and because, you couldn't see it, you didn't worry about it until the receiving hospital got it. Whereas now, physicians seem more attentive to wondering whether there is a ruptured viscous or whether something else is still in the wound, like a foreign body and whether or not an x-ray is appropriate to do before they leave or whether it is even appropriate or a team to come up. As far as the mechanism of injury, I think that is something a lot of people never really thought about before. And even though some of the patients may walk up to the emergency desk and not appear to be in extreme pain on arrival, we are more aware of what the potential is.....

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And this victim had an obvious fracture of the leg.... and they were all spending their time dealing with this and hadn't assessed any of the other areas.. that you normally would assess. They just went to the obvious. ATLS has resulted in more thorough examinations...they're not just focused in on the obvious injuries... they're asking more questions about what happened exactly at the accident... like restraining devices, appearance of the car... any clues....

Prophylactic chest management. Prompt clinical identification of a life-threatening chest injury, followed by the appropriate surgical management, can save a trauma patient's life.

> The idea of prophylactic single or bilateral chest tubes was something that I think was thought of more after some of these guys had seen it or taken it at an ATLS course. Which was especially useful for air transports, when the potential for a simple pneumo-thorax becoming a tension pneumothorax....or even developing a simple pneumothorax was greater.

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> I've actually done a needle thoracotomy in an aircraft, on an airvac which I wouldn't have thought of doing had I not had some skill in this area, as what I have been exposed to in the ATLS, because I felt confident about putting a needle into a chest. This was a multiply traumatized victim. We were moving her as an airvac. The initial doctors caused a pneumothorax when they put in a central line, which wasn't noticed until we got to the airport, and she started to go down... well, I couldn't auscaltate the chest anymore. It was in a helicoptor. I thought there was some tracheal deviation, and I couldn't see any movement on the affected side, so I put a needle in, and low and behold, it was there... a tension pneumo! This really stabilized her enough to get her to a bigger hospital. Now I wasn't planning to put a chest tube in her in the air... it was too rough. But, I guess, there was a case where ATLS training had a direct benefit.

Emergency room changes. Some respondents from the rural centers viewed ATLS as an opportunity to update emergency practices or equipment in their hospitals.

> Now we have specific trays that we can set up properly to insert lines, cutdowns, for instance. We have gotten rid of our trocar tipped chest tubes which were a hazard and so in that perspective it's quite easy now, whereas before you had to go around and look for specific equipment to perform a specific emergency surgical procedure. Everything is sort of cut and dry. But we worked on it. Our staff here, there are 5 of us who have ATLS and therefore

> we have a majority of people who do trauma work here again who are thinking exactly the same thing based on that situation. So, if you need a cutdown tray... you don't ask for the old I.V. tray.. you get a cutdown tray. Whereas some of the other physicians who have not had the benefit of ATLS may not know that... or how to do that....

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> It's like everything... there is a certain norm of treatment or care in any work, at any institution, and if the junior guy on the totem goes away and learns something from ATLS, it is not necessarily going to impact that much except when that individual is looking after a particular patient by himself. You get the head honcho to go away and he learns something, and he happens to be a strong head of a hospital or something... and he learns his stuff and he feels it is important and comes back and insists that everybody in the group go away and take the ATLS course. Then I think it will probably have a significant impact.

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Acknowledging that change and improvements are a constant in the medical-technical trauma care practices, some respondents reported outstanding areas of concern that continue, despite ATLS.

> Even though ATLS is out there, and not knowing exactly whether these guys sending in the patients from distances have ATLS, there are still problems and insufficiencies. There are times when somebody sends a patient and they'll do all the ABC's and we will talk to them before the patient is sent and ask that certain things be done.....and by the time the patient comes down, some of them have not been, even though we've been assured they will be done. We then phone back and find out it was because the guy didn't know how to intubate, for example. Well, he could have said so on the telephone. A lot of times now, I'll just say, "Can you intubate? Are you able to?"

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> Burn victims are still a real concern. Burn victims who came in any distance at all, the wait of two to three hours on the road, were grossly underhydrated when they got here. They were so far behind because they were received with small bore I.V.'s. Often times, not

> even catheterized. Often these patients will arrive in cold, damp clothing and are hypothermic. So not only are they hypovolemic, they are also hypothermic unnecessarily.....So I think the burn management needs to be looked at very carefully.
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> Prehospital transport still requires some looking into. A lot of docs don't know anything about that... packaging people. In small centers, the physician may be an integral part of the prehospital transport. We need more hands on packaging and splinting the trauma patients... attention to all areas of stabilization and the immobilization procedures.
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> Pediatric trauma is another area... it is always very **emotional.** There is a tremendous amount of emotion drawn on behalf of the paramedics, physicians, nurses in our area. Sometimes the approach breaks down because of the emotion. I don't think there's enough emphasis on the emotional impact, and that's where people break down with pediatric trauma...it's so **emotional.**

Dimension 3: Changes within the domains of learning

The definition of learning for the purpose of this study is defined as a relatively permanent change in behavior that comes about as a result of a planned experience (cited in ATLS, 1988).

Three domains of learning were referenced from the adult learning literature to demonstrate the respondents' changes in learning (Knowles, 1984): 1.) cognitive, referring to acquiring content or knowledge; 2.) affective or emotional, which results in attitude change or value shifts; and 3.) physical skill development. Following are some excerpts illustrating the respondents' view of changes in their domains of learning.

Cognitive.

Ten years ago, when I first moved to the States, my level of trauma care, if one (1) being the worst and ten (10) being the best, I was at the best of two (2). And given my knowledge and skills now in that situation, I would be a nine (9) or ten (10), in the way I approach and treat trauma patients. They have a better chance of survival with me now than they did then. I would say a full 50% would be attributed to ATLS...So it has boosted me from a 2 to a 6 or 7 and again the rest is basically, postgraduate training in intensive care and anesthesia.

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There is a short term gaining of concrete knowledge. The problem is how long does that stay with you beyond your course... how well do you remember it in the heat of the moment and does that have an impact on outcome? I think that that is going to be very physician and local medical environment dependent.

Affective.

It certainly helps me, as a clinical person in the emergency area, knowing if the colleague working with me has done ATLS, as far as when a trauma victim comes in. I can work well with them, or if they happen to see the patient first, I can feel fairly comfortable that they have an idea of what they are doing. Particularly in the hospital I am in...sole physician for a good part of the time, in emerg, with double coverage only on certain days and hours. If I am the only physician on, when I have an intern working with me and a trauma victim comes in and I'm tied up and can't see them right away.... if I know that he's done ATLS, I have an idea he will at least be evaluating the ABC's. Then maybe even going beyond that...before I even lay eyes on the patient.

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You feel more comfortable talking about trauma. That is the big thing for me and I think most of the other doctors. It really gives you a feeling of confidence.

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I think for the general practitioner, ATLS has had a significant impact. Especially in those stressful situations where the patients are badly traumatized and you wonder if you've done all you can. You keep asking yourself 'Have I done everything? Is there

something I've forgotten?' In any situation like this, with the great frustration...the anxiety you feel, you know the provoking thought is that... is there something I've forgotten that would've changed the situation? And if you understand the ATLS guidelines, and you've worked with them, then you feel it, you know you've done everything you could have.....that's it... there's nothing more anyone could've done in that situation.

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I think there is more confidence in what to do if the patient is traumatized. Whereas, if you have a physician who does not have ATLS behind him, despite how much more experience he may have seeing patients, there is a level of fear and lack of confidence in dealing with the trauma patient. I think they'd benefit from ATLS. I now have a sense of control... because of the regimented thinking of ATLS and understanding why specific interventions are done.

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I now have a sense of control...because of the regimented thinking of ATLS and understanding why specific interventions are done.

Physical skill development.

I know of a doc who just started working in the a rural emerg. department of a small city, and on his very first night he had to put in a chest tube, for the very first time in his life. He didn't even do it in internship... he'd only done it on a dog in ATLS. But this person came in, a motorcycle accident, with a collapsed lung, and he put the tube in successfully. There is no way somebody would have tampered with that without having at least some background like ATLS.

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You don't get enough time for the surgical skills in ATLS... like a cutdown, or whatever. I must admit, even after my second ATLS course, I didn't feel terribly comfortable and I'm still not comfortable with the actual cutdown... So ATLS provides the chance to practice surgical skills that I'd never had the chance to do in my basic training. Most G.P.'s don't do much surgery. They watch, but they rarely get much to do unless they go to a small hospital and work directly with a surgeon. But there are lots of physicians that are more confident to try a surgical skill, as long as they have seen it or at least tried it a few times. I think in an

> emergency situation.....I know I wouldn't have unless I'd tried it. I've actually done a needle thoracotomy which I wouldn't have thought of doing had I not had some skill in this area, like what I had been exposed to in ATLS.

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> There's improvement in technical skills, from my point of view... in the insertion of an airway...chest tubes... doing abdominal taps.....for someone fresh and who hasn't had a lot exposure to trauma, you may not have the expertise to do a tap on your first night of emergency call...And if you're doing emergency every day, then your skills stay up. One of the comments that is invarably made, though, whenever a discussion of ATLS comes up at the medical staff meetings is, well, it' s either use it or lose it.

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> Even though you use dummies and stuff in some sections of ATLS, it does give you first hand hands-on experience in the skill stations. For someone who did not have that background, working in a rural hospital, it would be very beneficial.

Dimension 4: Communication opportunities and improvements

Effective communications within any health care system are of utmost importance for ensuring the quality of care for the trauma patient. Unfortunately, some respondents stated documentation was an example of an inherent, continual communication problem. However, it is common knowledge that adherence to adequate and accurate communications can only enhance the experiences of patients and physicians alike.

> There is more communication now where there wasn't before. And there are records now which specifically document what has been done for the trauma patient, whereas before, there might not be any records.

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I can pick up the phone and phone any casualty officer in any emergency room in the city, introduce myself and explain the trauma situation... and they will almost automatically accept the patient. It is simply because they know that, because of the regimented thinking that ATLS provides - the type of accident, type of injury, history of patient, adequate resuscitation, so on and so forth - all this information will have been obtained. And they have a very good idea of what they will be receiving on the other end. For instance...two weeks ago a 12 year old with a second degree burn to perhaps 1/3 of his body came in..... I bypassed the tertiary hospital and just sent him to the burn unit. Then the kid has a good shot. A lot of guys wouldn't do that, I don't think. I got that from ATLS...you shouldn't just refer to the closest hospital but to the closest appropriate hospital. Well, I wanted to know whether the initial triage of this kid was adequate. I think it was.....but, well, you just don't know. Unfortunately, when you send them to the largest burn unit in the city, well, we never find out. They just become a number. Unless you pursue it..... But, I mean, sure, if there was an inadequate resuscitation, and I sent a patient who may have been inadequately resuscitated, I'd get a phone call. And I prefer to.

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I liked the opportunity for collaboration...there were a lot of G.P.'s in my group and, as we were on somewhat of a common ground, it was a very supportive interaction. Some of our trauma experiences and concerns were so similar.....

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We still have the people, I think, who suffer from lack of trauma ATLS exposure. Their charting is terrible. You may be able to read it, but it is all over the place. There's no organization to it. People who come in with the background are well organized. You can see, through their charting. They work through things in an appropriate fashion, and when you are receiving a patient, it is all pretty well worked out. My feeling is that it should be 100%. We've improved, but we're probably hitting around 60%. So we have a ways to go....

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I'm in a bit of a unique position, I guess, in most respects, because of my involvement in ATLS, ACLS, PALS... and I tend to have, I suppose, a broader view.... and I see there is more networking

amongst the groups. And what I've noticed is over a particular period of time...there are more expanding views, as you go along. And much more understanding of what are the hows and whys of what you are doing for the trauma patient.

* * * * *

I think there are three main groups ATLS impacts - the general practitioners, the para-emergency personnel, and the surgeons. With such different groups.....if everyone understands the goals and importance of their contribution to the outcome of the patient...you don't have one saying 'Well, we have to fix the broken bones' and another saying 'We really should drain the subdural hematoma first'.... there is no arguing anymore, because there's a standard and everyone understands it. I think.... I hope everyone believes in it...because, I think the results speak for themselves. The patients benefit.

Dimension 5: Reflective practice

Reflective practice obtained through reflection of our own actions is being increasingly recognized as an essential part of personal and professional development.

Looking back on a certain case.... I was able to phone up a guy with an anaesthesiology background and say 'Hey, what should I have done?' I just didn't know whether or not to administer a general anaesthetic to this guy to intubate him, or whether to give him a whole bunch of narcotics and bring him down deep. This one was a real dilemma... And I follow-up now... I have no qualms about phoning and finding out and following up on a trauma patient that really concerned me.

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In the ideal world, I'd hope that for ATLS type cases of blunt trauma, or any trauma for that matter, that some form of conversation, by phone or letter.... some system of feedback occurs. We, at this end, are often so damn busy that we don't have time to give feedback to the transfering hospital on how the patient arrived....And maybe with the inception of a 'trauma team', that may be one of our mandates. When it is over and done, the

prehospital is evaluated and the evaluation is sent back to the referring doc. So they then get some positives and negatives..... constructive negatives. There's no doubt in my mind that the ATLS course will be a part of that... a major part of that, and already has been.

* * * * *

I feel fortunate to be here... the standard of care here seems so much superior than to a lot of places....the only places that seem to have their act together... P.E.I. definitely don't..I don't remember Newbrunswick as much better. Nova Scotia might be a little better... physicians there seem to be a little more organized. Ontario seems to be getting much better. I think they also have a bonafide paramedic program now. It's the smaller provinces that just don't have the money to organize these types of programs and it is pretty scary.....when the economics play such an important role...it's pretty scary.....what you are going to end up with. I've seen a real improvement in my own personal experiences... it's my own personal requirement. And those working for me better perform to a reasonable standard....especially since I've seen what the civilian standard is in Alberta. We had an operations evaluation and failed on the first one due to medical mismanagement. So our team worked very hard for 6 months on a systematic approach and aced the second one.

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There are times when you face a trauma problem and you don't know what to do and you look back and refresh your memory about it...looking it up in your course manual or just talking to someone about it. I know how worried a lot of physicians have been at times, and talking to some of them at the ATLS courses. They say they just didn't know what to do. And that's a scary feeling. They are happy to discuss it with you and are more receptive on discussing how they could have approached the problem instead of knowing that they didn't do a good job and sort of dumped the patient, or not even coming in with the patient when they should have. It's a very human reaction. If you know you haven't done a good job, you don't want to be, sort of, be identified as the person who did it... and then it just worsens the division between you and the specialties that are taking care of that patient. Whereas if you're confident that you've done everything you can for the patient, or within reason, you're naturally happier to come in and be identified as the person that took care of that patient, and then pick up where you could've

possibly done better. It just puts you in a much more receptive frame of mind. I know. And I get that really distinct impression that the physician is much happier to talk to you on the phone, or phone you up... instead of falling into the worse case scenario, which is that the patient arrives unannounced at a tertiary care center, without appropriate resuscitation and without a physician in attendance. I remember this being all too common before, and I think it's becoming distinctly less common now, and I think the understanding... the talking about ATLS, has made the difference.

Summary

The major findings of the study, based on the interplay of the quantitative and qualitative research approaches, were presented in this chapter. Quantitatively, the data findings involved the examination of retrospective hospital documentation as well as secondary data sources, including summative course evaluations and the comparison of pre and post-test score results. Qualitatively, the findings were based on interviews conducted with nine randomly selected physicians with current ATLS status.

The findings imply ATLS had far-reaching impact. There appeared to be an association between ATLS training and specific primary survey and resuscitative measures emphasized during the first critical hours of assessment and management of the trauma patient. A linkage was also implied between ATLS training and specific patient outcome measures. Immediate impact, based on the quantifiable information extracted from the course evaluations as well as pre and post-test comparisons showed positive results. The qualitative data findings, based on compiling the emerging themes of the nine current status ATLS physician respondents,

were organized into five ATLS impact dimensions.

The results of these findings form the basis of the conclusions of the study in Chapter V.

CHAPTER V

SUMMARY, CONCLUSIONS AND IMPLICATIONS

The intent of this research was to explore areas of impact implied either indirectly or directly as a result of the ATLS program. The first section of this chapter presents an abridgment of the study, noting the purpose. The research design is then outlined.

According to the Webster Dictionary (1984), a composition can be defined as the quantitative and qualitative makeup of a chemical compound or a written piece of music especially of considerable size and complexity. The definition was adapted to describe this research study. The combination of the quantitative data, built from disparate pieces of numerical interpretations, with the qualitative data, built from the grouped thematic dimensions, forms the final research composition.

Based on the fusion of the multifaceted methodological research approaches, the second section presents the conclusions of the study. Finally, the chapter ends with an examination of the practical and methodological implications of the study, resulting in suggestions for further research and recommendations to various stakeholders within the medical-educational establishments and communities linked to trauma patient care.

Summary

This section summarizes the study in terms of its purpose, incorporating the qualitative and quantitative research perspectives. This leads to the findings derived from the data.

Purpose of the study

The study investigated the impact of ATLS, focusing on five specific questions:

1. Are there significant differences between ATLS trained and non-ATLS trained physicians in the initial assessment and early management of the trauma patient? If so, in what specific areas is this evident?

2. In what ways does the impact of ATLS education become manifest?

3. Do current status ATLS physicians view the ATLS program as worthwhile and valuable and, if so, why do they view it this way?

4. Do physician participants who have completed the ATLS program have similar views regarding the impact of ATLS training?

5. What, if any, do current status ATLS physicians perceive as some of the significant changes in trauma care as a direct or indirect result of ATLS training?

Research design

A detailed description of the nature and sources of the multifaceted

research methodology were presented in Chapter III. Emphasis was placed on researcher objectivity, ethical considerations and trustworthiness. The study was conducted in accordance with the ethical guidelines established by the University of Alberta, Department of Educational Administration. The process of data collection and analyses were also detailed.

Rigorous inquiry involving the incorporation of the qualitative and quantitative research approaches facilitated an interesting and effective investigation on the impact of ATLS education. The entire process created a vista that allowed for a wide-angle definition of scientific research for the study.

Nature and sources of data

The major findings of the study were disclosed in Chapter IV. Hospital documentation as well as secondary and interview data were used for the final analyses of this study. Hospital documentation generated more than 80 pages of preliminary data. Secondary data were obtained from 184 summative course evaluations as well as comparison of 148 pre and post-test examinations. Interview data were received from nine current status ATLS physicians with diverse educational and work experiences. The interview source generated over 80 pages of typed transcripts and over 20 pages of notes taken by the researcher during and after the interviews.

Approval for access to the emergency record documentation of a large, acute care, urban hospital was obtained from the hospital's research

regulating bodies, including a Clinical Investigation Committee and a Medical Advisory Board. Secondary data were accessed from the Alberta COT ATLS Course records, approved by the ACS, Alberta Chairman COT and Alberta ATLS Director.

Interviews were conducted in both urban and rural locations. Care was taken to protect the physician participants' and hospitals' anonymity. Efforts were made to design a study to reduce the possibility of biases and minimize the adverse interpretations of perception.

Process of data collection and analyses

Hospital emergency record documentation, summative ATLS course evaluations, ATLS pre and post-tests and interviews conducted with nine current status ATLS physicians formulated the interfusion of data findings.

Nine interviews, ranging from approximately 1 to 1 1/2 hours, were conducted personally by the researcher. In addition to tape-recording and transcribing the interviews, anecdotal notes proved invaluable.

The data analyses focused on the linkages to impact resulting from ATLS education. The explorative and inductive approaches were followed in examination of all the data.

The composition

The findings implied a variety of possibilities linking ATLS education to specific areas of impact. Quantitatively, linkages were

determined between ATLS training and specific primary survey and resuscitative measures used in the assessment and management of trauma patients, as well as trauma patient outcome measures such as stable post-anaesthetic vital signs, total number of days spent in ICU and/or hospital, and total surgery time in minutes, when applicable. A trend was evident in the relationship between ATLS training and trauma patient transfer protocol. Positive immediate and short term results were confirmed in the analyses of summative course evaluations and the pre and post-test comparisons.

A variety of pervasive perceptions of ATLS impact by the nine physician respondents were compiled, producing five main impact dimensions. These impact dimensions did not appear to be mutually exclusive; more often than not, interrelationships were prevalent.

Trauma patient care is considered to be inherently interrelated. Management of the trauma injured patient often involves the interrelated care of a whole - the patient, the phases of the trauma care system, the continuum care delineated.

Interestingly, in the area of medical-technical improvements, the quantitative data results concurred somewhat with the qualitative findings. The ATLS primary survey and resuscitative measures emphasized during the first critical hours of assessment and management of the trauma patient, were considered significant in the findings of both research approaches, although the hierarchical order was determined to be different.

Qualitatively, the final composite derived the following five ATLS impact dimensions that were arranged in hierarchical order, based on the frequency of reference to the identified dimension in the physician respondents' statements: provision of a standardized frame of reference for trauma patient management, reference to specific improvements in medical management or technological skills in trauma patient care, positive changes within the domains of learning, communication opportunities and improvements, and self-reflection. The following sub-sections summarize the substantive nature of each of the identified impact dimensions.

Dimension 1: Standardized frame of reference for trauma patient management.

The most repetitive and profound impact dimension cited was that ATLS provided a systemized and prioritized approach to trauma patient care.

> Because ATLS is a **universally accepted approach** to trauma, it gives the patient a better chance of being treated properly. In a proper sequence... within a certain period of time... and it gives anybody else that might be involved in that patient's subsequent care, at that hospital or a receiving hospital elsewhere, a better chance of dealing with the consequences of the patient's injuries. Be they life threatening or not.

* * * * *

> The benefit of ATLS is to give you a **recipe**, if you will, on how to look after a traumatized patient... I think my approach was really randomized...haphazard... prior to having ATLS... And I think, that without that sequential thinking, you will not be a very efficient physician looking after a victim who has been traumatized.

> I think that our approach to the traumatized patient is much less of a bowl of stew today...

Dimension 2: Medical-technical trauma patient care improvements

Specific medical management and technological skill improvements were mentioned. The following highlights the three most recurrent concerns, listed in hierarchical order, cited by the nine physician respondents.

Cervical spine management. The most frequent concern cited was the inappropriate care and transfer of the trauma patient related to cervical spine management. The following comment, expressed by one of the physician respondents, captured the magnitude of this problem:

> C-spine protection was like a lottery..... it was there sometimes.... sometimes it wasn't.....To me the biggest change that the ATLS course has impacted is that we now are getting patients that are having the basics taken care of. They are coming in with adequate C-spine protection, or the C-spine is cleared prior to coming in. And quite often, right down to C-7. There are still some centers, and they stick out like sore thumbs, you know.....that...where the C-spine management is terrible.

Fluid resuscitation. Providing adequate and appropriate volume replacement for the treatment of shock in the trauma patient also appeared as a major concern. The following responses captured the essence of the intravenous fluid resuscitation concern:

> I think most physicians have a preconceived notion that anybody that does go into an emergency room, with an altered level of consciousness, probably does require an intravenous line. But again, it is how you are going to run the line and how big the line is going to be that is important... I think that is the important

> message.....ATLS is able to educate what is now the standard of I.V. care in dealing with the traumatized patient. That is what ATLS does. And the patients will benefit.
>
> * * * * *
>
> Victims were sometimes with large bore I.V.'s; sometimes they wouldn't have any I.V.'s; depends an awful lot on who was there and what their mood was, quite frankly. So there was no pattern.... **no consistency** whatsoever on how transfer patients arrived.... ATLS has been an impact. They are now coming in with large bore I.V.'s, in most cases.

Airway management. The traditional ABC's of resuscitation, as outlined in the ATLS guidelines, lists the number one trauma care priority as the establishment and maintenance of an adequate airway. Improper management of the airway continues to remain a particular area of concern.

> The ABC's have been taken of. The patients are intubated, or at least they have an oropharyngeal airway in there, whereas before, the patient might have been sent down supine or in a left lateral position with nothing protecting the airway. Or the idea now that ambu bags and other resuscitating equipment have to accompany the patient. Whereas before there wasn't maybe even a thought about it.... The philosophy of "scoop and run" has changed considerably. Before they didn't have a choice. I think now the sending physicians are making sure; if they don't have paramedics, E.M.T.'s, or nurses to attend to an I.V. or to intubate on route, they send somebody that can.
>
> * * * * *
>
> I think that emphasis on the airway in ATLS is outstanding, but I'm not sure, I think that still is an area where the course instructions, let's say, are not followed as much as they should be. People are afraid to put in an airway, because they don't do it often, and they feel they aren't good at it. There is a tendency, a natural tendency I think, for people who aren't skilled in the airway, to always see that... well, the patient will make it... it's okay... A reason is found not to make an airway... He ('the patient') may do this... He may do that..I wouldn't be able to without heavily sedating him or

> paralyzing him and that would be wrong for him... that kind of thing.. so I still think the airway, even if it is stressed, I think that is still one area that is a particular problem in the management of the trauma patient.

Other. The remaining medical-technical trauma care impact areas are presented in no particular order. They were identified on several occasions in the respondents' transcripts and as they are important issues identified in the trauma literature, they warranted mention.

Stabilization and transport. Some respondents claimed a significant impact in transfer patient pre-packaging. A prearranged transfer protocol was considered the ideal arrangement for the trauma patient, based on the standards adopted by ATLS.

Mechanism of injury. More attention to less obvious trauma injuries and better identification of specific types of injuries as a result of emphasis on the injury-producing mechanisms were cited as examples of ATLS impact. This inevitably would lead to a more thorough initial assessment and ,therefore, improved management of the trauma patient.

Prophylactic chest management. ATLS training was mentioned in some cases as having a direct benefit to the life-threatening chest injury patient. Cited examples of prompt clinical identification of potential chest complications, followed by the appropriate surgical management, saved trauma patients' lives.

Emergency room changes. Respondents from the rural centers

viewed ATLS as an opportunity to update their current emergency practices or equipment used in their hospitals.

Acknowledging that change is a constant and that practices in trauma patient management will continue to improve based on sound scientific research, several physicians reported areas of concern that remained outstanding, despite ATLS. The most prevalent ones mentioned were management of the burn patient, prehospital transport, dealing with the emotionality of pediatric trauma, and communication issues.

Dimension 3: Changes within the domains of learning

The definition of learning for the purpose of this study is defined as a relatively permanent change in behavior that comes about as a result of a planned experience (cited in ATLS, 1988).

Three domains of learning, namely cognitive, affective and physicial skill development, were adopted from the adult learning literature (Knowles, 1984) and used to organize the respondents' views of changes in their learning. ATLS was considered responsible for positive changes within each of these domains of learning.

Cognitive

> There is a short term gaining of concrete knowledge. The problem is how long does that stay with you beyond your course... how well do you remember it in the heat of the moment and does that have an impact on outcome? I think that that is going to be very physician and local medical environment dependent.

Affective

I now have a sense of control...because of the regimented thinking of ATLS and understanding why specific interventions are done.

Physical skill development

There's improvement in technical skills, from my point of view.... in the insertion of an airway...chest tubes... doing abdominal taps.....for someone fresh and who hasn't had a lot of exposure to trauma, you may not have the expertise to do a tap on your first night of emergency call... And if you're doing emergency every day, then your skills stay up. One of the comments that is invariably made, though , whenever a discussion of ATLS come up at the medical staff meetings is, well, it's either use it or lose it.

Dimension 4: Communication opportunities and improvements

Exposure to the ATLS program was perceived to result in opportunities for discussion and debate on trauma issues, improved communications, demonstrated by more thorough documentation of the trauma patient, and the development of rapport and liasons within the trauma management communities, both urban and rural.

I see there is more networking amongst the groups. And what I've especially noticed is, over a particular period of time, there more expanding views, as you go along. And much more understanding of what are the hows and whys of what you are doing for the trauma patient.

* * * * *

We still have the people, I think, who suffer from lack of trauma ATLS exposure. Their charting is terrible. You may be able to read it, but it is all over the place. There's no organization to it. People who come in with the background are well organized. You can see, through their charting. They work through things in an appropriate fashion, and when you are receiving a patient, it is all pretty well worked out. My feeling is that it should 100%. We've improved, but we're propably hitting around 60%. So we have a ways to go....

Dimension 5: Reflective Practice

The effect on the respondents seemed to indicate an overall increase in their personal and professional development. Respondents acknowledged that their ATLS experience seemed to contribute to positive changes on trauma patient management, but also reinforced existing beliefs and behavoirs.

> Looking back on a certain case... this one was a real dilemma..... And I follow up now... I have no qualms about phoning and finding out and following up on a trauma patient that really concerned me.

* * * * *

> There are times when you face a trauma problem and you don't know what to do and you look back and refresh your memory about it...looking it up in your course manual or just talking to someone about it. I know how worried a lot of physicians have been at times, and talking to some of them at the ATLS courses. They say they just didn't know what to do. And that's a scary feeling. They are happy to discuss it with you and are more receptive on discussing how they could have approached the problem instead of knowing that they didn't do a good job and sort of dumped the patient, or not even coming in with the patient when they should have. It's a very human reaction. If you know you haven't done a good job, you don't want to be, sort of, be identified as the person who did it... and then it just worsens the division between you and the specialties that are taking care of that patient. Whereas if you're confident that you've done everything you can for the patient, or within reason, you're naturally happier to come in and be identified as the person that took care of that patient, and then pick up where you could've possibly done better. It just puts you in a much more receptive frame of mind. I know. And I get that really distinct impression that the physician is much happier to talk to you on the phone, or phone you up... instead of falling into the worse case scenario, which is that the patient arrives unannounced at a tertiary care center, without appropriate resuscitation and without a physician in attendance. I remember this being all too common before, and I think it's becoming distinctly less common now, and I think the understanding... the talking about ATLS, has made the difference.

Conclusions

Two main conclusions arise from this study. First, ATLS education has had positive, far-reaching impact. The impact has been favorable in terms of its effect on the lives of the physician respondents and also suggests a trend of improved management of trauma patients by physicians who have current ATLS status. The most profound impact is on the perceived improvements in the outcomes of trauma patients.

Second, the findings suggest that the ATLS program warrants continued endorsement within the realms of the medical-educational establishments and communities.

Implications

This chapter ends with an examination of the practical and methodological implications of the study and offers some suggestions for further research.

Practical implications

In practical terms, the study has contributed to the limited body of research data supporting the general view that ATLS had value in contributing to trauma patient management and outcome. This was achieved by analyses of the various impacts directly or indirectly implied as attributable to the ATLS educational program.

Secondly, the study provided further insights and understanding on the importance of the ATLS program. The perceived effect on the

physicians' management of the trauma patient coupled with the potential improvement in the outcome of the trauma patient was remarkable.

Thirdly, the identification of the ATLS as a valuable program may influence other physicians to participate, based on the quantifiable and qualitative results. Favorable evaluative results of the ATLS program may assist in providing ammunition for knowledgeable decisions on the allocation of medical-educational funds from political and educational authorities. The future direction of trauma care management may be improved with more participation in the program.

Fourthly, as ATLS has resulted in various sequel programs, legitimizing the ATLS program as a worthwhile model may also contribute to its intended aim, that is, the pursuit of excellence in trauma patient management resulting in improved patient outcomes.

Methodological implications

The research design used for this study has its limitations. However, the design may serve as a replicable or modifiable framework within which other trauma education programs may be studied. The usefulness of this design inevitably lies with others who apply it for their own purposes.

Research suggestions and recommendations

This study could be extended to other areas, regionally, nationally or internationally, where the ATLS educational program is currently

practiced. There is a definite need to expand the research base on the impact of the ATLS educational program related to outcomes of the trauma patient. The use of scientific research-based knowledge in clinical practice, education and management will inevitably lead to superior trauma patient care.

An obvious gap in this study was the failure to examine the perceptions of physicians, urban and rural, who have not participated in an ATLS program. This category of physician may not see having ATLS as a deficiency, because they may not know anything about it. Studies directed towards determining the impetus for physician participation in ATLS may also prove useful. Strategies to increase participation in ATLS should be formulated and implemented and include emphasis on the decision-makers in the trauma care facilities.

Inadequate documentation standards for a large majority of the emergency records examined in this study suggests an urgent need for thorough, standardized documentation of the injured patient including prehospital, rural transfer and hospital centers. The medical-legal implications could prove devastating. In this age of rapid technology, advancements in software to ensure faster, shorter, consistent and timelier improvements in communications are essential to quality improvements in trauma care.

Incorporation of an automatic injury data base system, such as a scaling system to determine overall injury severity, is recommended for rural and urban trauma admissions. This type of scoring, used primarily

to quantify injury as well as compare the outcomes of trauma patients with multi-system involvement, would assist in evaluating clinically measurable improvements with much less difficulty.

Further research examining the relationship of cost-effectiveness and patient outcome as a result of ATLS training should be explored.

In conclusion, the care of the trauma patient is a complex undertaking involving many health care disciplines. Perhaps there is no greater opportunity to positively impact a trauma patients' outcome than in the golden hour, the critical period that occurs within minutes to a few hours after injury. The primary focus of the Advanced Trauma Life Support Course is on the first few hours of trauma management, when rapid assessment and resuscitation can be carried out to reduce death from trauma. More research is needed in this area of trauma management either to support or augment these research findings.

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APPENDIX 1

ADVANCED TRAUMA LIFE SUPPORT TRAUMA AUDIT WORKSHEET

PATIENT NUMBER
NAME
AGE/SEX

ADMISSION URBAN/RURAL ATLS NON-ATLS

SUPPLEMENTAL O2 C-SPINE CONTROL IV MANAGEMENT

IF RURAL TRANSFER, AVAILABILITY OF C-spine Xrays____
BLOOD WORK_____

DAY OF ADMISSION: DAY OF DISCHARGE:

OR TIME ___IN ___OUT (TOTAL:_____)

PARR VITAL SIGNS STABLE: ____Yes ___No

DAYS OF HOSPITALIZATION:

ICU DAYS_____
TOTAL HOSPITALIZATION DAYS____

APPENDIX 2

Guide for Quantitative Research Results (Source: Emergency Documentation)

I.D. Case Number	Age of Patient
Gender of Patient	1=female 2=male
	Admission 1=urban 2=rural
Physician Training	1=ATLS trained 2=non-ATLS trained
Mechanism of Injury	1=MVA 2=MBA 3=PED 4=FALL 5=BICYCLE 6=OTHER
MVA/MBA/BICYCLE	1=Driver 2=Passenger
MVA Passenger	1=Front 2=Rear
Oxygen Management	1=Yes 2=No
C-spine Control	1=Yes 2=No
IV Therapy	1=Yes 2=No
X-ray	1=Yes 2=No
Blood work	1=Yes 2=No
Surgery Time	Hours Minutes (to the closest 1/4 hour)
PARR V.S.	1=Stable 2=Non-stable
ICU Days	
Total Hospital Days	
Expired	1=Yes 2=No

APPENDIX 3

American College of Surgeons Committee on Trauma (1988) Advanced Trauma Life Support Course Instructor Manual, 519-521. Appendix E: Course Evaluation

Course Evaluation

Course Dates:_____ Course Site:_____

Your suggestions and criticisms are invaluable to us in preparing for future courses. Please assist us by taking the time to complete your evaluation of this course. Please rate each of the following statements by checking the box under the number which best indicates your level of agreement or disagreement with the statements. Feel free to make additional comments in the spaces provided. Thank you.

Key:	
Agree strongly	5
Agree	4
Undecided	3
Disagree	2
Disagree strongly	1
Not applicable	0

Program Content	5	4	3	2	1	0
1. Too much emphasis on diagnostic and therapeutic services available only at large medical centers.	☐	☐	☐	☐	☐	☐
Comments:						
2. There was a useful blend of both theory and practical application.	☐	☐	☐	☐	☐	☐
Comments:						
3. The program content contributed to my continuing education.	☐	☐	☐	☐	☐	☐
Comments:						
4. The objectives of this course were clearly defined.	☐	☐	☐	☐	☐	☐
Comments:						
5. The objectives of this course were realistic.	☐	☐	☐	☐	☐	☐
Comments:						

Program Content	5	4	3	2	1	0
6. The subject matter was well prepared and appropriately emphasized.	❑	❑	❑	❑	❑	❑
Comments:						
7. The course organization, pace, and flow were satisfactory.	❑	❑	❑	❑	❑	❑
Comments:						
8. The course content was at an appropriate level (not too basic or complex).	❑	❑	❑	❑	❑	❑
Comments:						
9. The information obtained will be applicable to my practice.	❑	❑	❑	❑	❑	❑
Comments:						
10. The pre- and posttests were consistent with the subject matter.	❑	❑	❑	❑	❑	❑
Comments:						
11. My practical application of skills has increased regarding assessment and management of trauma patients.	❑	❑	❑	❑	❑	❑
Comments:						
12. I feel able to initiate changes in emergency care in my agency, institution, or region.	❑	❑	❑	❑	❑	❑
Comments:						

Faculty	5	4	3	2	1	0
1. The faculty were well-informed.	❑	❑	❑	❑	❑	❑
Comments:						
2. The faculty made the content relevant to my needs.	❑	❑	❑	❑	❑	❑
Comments:						
3. Opportunities were provided for discussion and questions.	❑	❑	❑	❑	❑	❑
Comments:						
4. The media aids were effective.	❑	❑	❑	❑	❑	❑
Comments:						

Facilities	5	4	3	2	1	0
1. The physical facilities were conducive to learning.	❑	❑	❑	❑	❑	❑
Comments:						
2. Lodging arrangements were satisfactory.	❑	❑	❑	❑	❑	❑
Comments:						
3. Meals were satisfactory.	❑	❑	❑	❑	❑	❑
Comments:						

Other	5	4	3	2	1	0
1. I will encourage others to attend this course.	❑	❑	❑	❑	❑	❑
Comments:						

Please use the back of this sheet for additional comments.

APPENDIX 4

Dear Participant:

I am conducting a study to explore physicians' perceptions of the Advanced Trauma Life Support Program. The objectives of this study are:

1. to investigate specific areas of ATLS impact, and if so, how is it manifest;
2. to obtain information to determine if ATLs education contributes to trauma patient management.

Your input is important in providing information about these issues. This study is NOT a program evaluation; it is a more broadly based examination of experiences and perceptions of those physicians who have either experience in the ATLS program or are affiliated as ATLS faculty in the program. Findings from this study will contribute to the limited body of knowledge known on the impact of ATLS.

This research project has been approved by the Faculty of Education, Department of Educational Administration at the University of Alberta as well as a research regulating body of a large, urban active treatment hospital.

YOUR INVOLVEMENT IS ENTIRELY VOLUNTARY. Neither you nor your position or hospital you are affiliated with will be identified in any reports of this study. Information will be reported in aggregate form only, or by use of pseudonyms. To ensure confidentiality, all interview materials will be secured in a safe location. Original data will be available only to the project researcher, statistician and thesis advisor.

It would be greatly appreciated if you would complete the attached Interview Volunteer Form at your earliest convenience and return it to me in the self-addressed envelope. If you have any questions about the study, please feel free to contact me at

466-7546.

Thanking you in advance for your interest and cooperation.

Sincerely,

Jayne Smitten, Graduate Student
Project Researcher
10911-50 Street
Edmonton T6A 2E7

APPENDIX 5

Interview Volunteer Form

I,_____voluntarily consent to participate in an interview with Jayne Smitten, a Master of Education candidate in the department of educational administration at the Unversity of Alberta.

The purpose of the study has been explained to me and I have had the opportunity to ask questions. I also understand that I have the right to opt out of this study at any time.

The information given by me will used solely for this research project and all measures will be taken to ensure confidentiality. I also agree to this interview being recorded on tape with the understandidng that the tapes will be erased upon the research project completion.

Name: _____

Date: _____

APPENDIX 6

Dear Dr.

Thank you for agreeing to participate in my study on the impact of Advanced Trauma Life Support, in partial fulfillment of the requirements for the degree of Master of Education in the department of educational administration at the University of Alberta.

Further to our conversation, I am writing to confirm the following:

Date/Time: _____
Location: _____

The objective of the interview is to acquire information on your perceptions having experienced the Advanced Trauma Life Support program. I have enclosed an interview guide for your perusal.

As previously indicated, this study is being conducted in accordance with the ethical guidelines established by the University of Alberta. My thesis advisor is Dr. Al MacKay, Department of Educational Administration.

Your involvement is entirely voluntary. As previously discussed, I will be taping our conversation. You will not be identified in the report as I will be using pseudonyms. To ensure further confidentiality, all interview data will be secured in a safe location.

Following completion of all the interviews, I will provide you with a transcript of our conversation for your review, should you so request, and would appreciate any feedback for final preparation of the thesis.

Please call me at 466-7546 should you have any further questions.

Thank you again for your interest and support in this endeavor.

Sincerely,

Jayne Smitten
Graduate Student

APPENDIX 7

INTERVIEW GUIDE

1. What are your perceptions of the impact of the ATLS program?

2. How do you view the ATLS program? Why do you view it in this way? (i.e.mandatory or not, worthwhile or not, etc.)

3. What, if any, are the significant changes in trauma care you may contribute to ATLS education?

4. Are there any specific experiences you can recall that may have been influence by ATLS? How did ATLS affect you?

Again, thank you for your input.
Your assistance is sincerely appreciated.

APPENDIX 8

What is the impact of Advanced Trauma Life Support?

Participation in the study and/or responses to individual questions is voluntary. The return of the completed questionnaire will be interpreted as further consent to participate. To ensure anonymity, please do not identify yourself on the questionnaire. Involvement in this project is sincerely appreciated.

Thank-you.

BACKGROUND INFORMATION

Please respond by circling the number of the appropriate response or filling in the blanks where indicated.

1. I am a:
    1. Current ATLS Instructor
    2. Current ATLS Provider Partipant

2. I practise in:
    1. An Urban Hospital
    2. A Rural Hospital

3. My Specialty (type of practice) is:
    1. Family Practice
    2. General Practice
    3. Emergency Medicine
    4. General Surgery
    5. Pediatrics
    6. Internal Medicine
    7. Orthopaedics
    8. Other_____

4. The frequency I treat multiple trauma patients is:
    1. Regularly
    2. Occassionally
    3. Rarely
    4. Never

APPENDIX 8 (Continued)

5. What would you rate the pre-hospital trauma care you generally experience today?

    1. Good
    2. Adequate
    3. Poor
    4. Varies

6. Can you cite any specific trauma treatment or management problem areas that concern you? Has ATLS training had any impact on these areas? If so, please elaborate.

    _____

    _____

7. The hospital bed capacity I currently work in is:

    1. 1-20
    2. 20-100
    3. 100-200
    4. 200+

8. I have been employed in my Speciality for _____years. (Speciality as identified in Question #3).

Thank-you.

APPENDIX 9

Dear Dr.

Thank you for giving so freely of your time and expertise for the interview on the impact of the Advanced Trauma Life Support (ATLS) Course. Your perceptions were greatly appreciated and contributed to enhancing the content of my thesis.

I trust you also found value in the experience of sharing your expertise beyond a professional commitment Reflective practice obtained through reflection on our own actions is being increasingly recognized as an essential part of personal and professional development.

As we discussed, I am forwarding an abstract of my thesis findings for your perusal.

Again, thank you for your assistance. I trust we will meet again, perhaps within the realms of pursuing improvement in trauma patient management.

Yours sincerely,

Jayne Smitten, Graduate Student
Department of EducationalAdministration
University of Alberta

Enclosure

APPENDIX 10

Phase One: Initial Analysis of ATLS Impact Dimensions as Perceived By Each Respondent.

RESPONDENT #1: (Rural)

1. Gives you a recipe. (Sequential thinking).

2. Provides more than basic technical skills - the how and whys of what you are doing are questioned (reflection of practices).

3. Improvement in both knowledge and skills - rating now a 9-10 from 2. A full 50% would be attributed to ATLS (a 2 to a 6 or 7 and the rest from postgraduate training and ICU and anesthesia experience.

4. Maintain a standard of care - skill delivery.

5. Procedural and equipment changes in department.

6. Rapport developed with urban centre emergency staff. Ability to follow-up.

7. Overall better communication/ feedback.

8. Resolved dilemmas for how a case was handled. Reassurance that they did was o.k.; reflection time - areas to focus on.

RESPONDENT #2: (Urban)

1. Change on effect of patient transfers - ATLS target on rural physicians helped - still is a problem on occassion.

   SPECIFIC CHANGES:
   a. "packaging" the patient
   b. communication (phone-calls)
   c. I.V. initiation
   d. X-rays done and sent
   e. C-spine immobiization

   SHOULD BE MORE EMPHASIS ON BASIC BODY STABILIZATION

2. Improvement in communication - previously non-existent or almost non-existence.

3. Appears to be more attention to potentially life-threatening injuries whereas they used to be covered up and forgotten.

4. Definite feeling about the patients received from ATLS trained rural physicians. i.e.)airway protection/ accompanying equipment/ sending along help in transfer.

5. More attention paid to mechanism of injury.

6. Increase in competence of interns/residents related to emergency trauma-related injuries. Didactic teaching of medical school termed inadequate.

7. Comfortable feeling knowing that the person who is assisting you in emergency setting has ATLS background- they can deal effectively with the ABC's before senior assistance arrives.

8. Universally accepted, simple approach to trauma.

9. Transfer patient care inadequate because of perceived urgency on the part of the sending physician - this still happens.

10. More accurate and thorough documentation.

11. Increased networking of healthcare delivery services.

RESPONDENT #3:(Urban)

1. Systematic approach to management of ABC's.

2. More networking of people in all areas of trauma management (ATLS, BTLS, PALS).

3. Better in certain areas of technical skills.

4. Rapport development of urban and rural centers.

RESPONDENT #4: (Urban)

1. Prehospital Care much better today than 6 years ago. Quality improved.

2. Technical skills - C-spine a lottery!
   I.V. care improved.
   BASICS now being taken of.

3. More consistency on how trauma patients handled.

4. Recognize need to increase/ improve communication to rural centers.

5. Basic principles to fall back on.

6. Burn Victim management still a major problem.

7. Pediatric management still a concern- deal with the emotional.

8. Need to improve mobilization time to O.R. - based on ATLS statistics.

9. Documentation improved. Non-ATLS coincides with terrible charting.

10. Lightyears ahead today - but always room for improvement i.e. C-spine precautions done, but no C-spine x-ray sent.

RESPONDENT #5: (Rural)

1. More attention paid to the less obvious injuries.

2. Keeping on track, in sequence; otherwise contribute to the demise of the patient. CRITICAL - to have organization in the application of medical intervention

3. Setting priorities - adopting the ATLS approach.
e.g.: combat zones - evidence of haphazard, disorganized approach when ATLS is not a standard part of the training program.

4. Systematic approach/ reasonable standard.

5. Confidence. More comfortable talking about trauma.

6. Chance to practise surgical skills that are used infrequently.
Situation: whereby used specific emergency surgical skill used because of exposure in ATLS.

7. Prophylactic chest tube insertions.

8. Witness of horror stories/disasters in standard of trauma care from other provinces.

RESPONDENT #6: (Rural)

1. Standardized fashion in delivery of trauma care.

2. No real change in behavior; helps to understand why specific interventions are done.

3. Provoking thought of something forgotten in trauma patient transfer ATLS guidelines provide assurance that you know you have done everything you can.

4. A more complete history and examination.

5. Specific medical interventions improved: i.e.) C-spine assessment and I.V. Therapy.

6. Confidence about management.

RESPONDENT #7: (Urban)

1. No matter how much the G.P. has seen patients, seems without ATLS, - sense of fear and lack of confidence in dealing with trauma patients.

2. Technical skill improvement: 1. Airway skills - increase of intubated trauma patients received in transport today compared to 5 years ago 2. Chest tube insertion 3. Abdominal taps

3. You just know when a patient is transferred in from out of town; you the places where the attending physician has no standard approach.

4. Communication on the phone: improvement - a systematic conversation specifying primary survey, second survey, etc.

5. Documentation- a continual problem, inherent in traumatic situations.

RESPONDENT #8: (Urban)

1. Definite short term gain of trauma management knowledge.

2. Significant changes within departments dealing with trauma on specific new interventions if support instituted from the top down.

3. Standardized methods that can apply to any ailing patient. Recipe. Flow chart approach to the management of the trauma patient. Rote way of doing things.

4. Hunch that ATLS training corresponds with trauma patients who are handled extremely well. However, scientific validation unavailable.

5. Airway and C-spine control - greatest area of impact. However, airway still remains a particular problem area.

RESPONDENT #9: (Rural)

1. Regimented thinking (ATLS) provided sense of control/confidence.
2. Develops systematic versus randomi.. .d trauma patient care.
3. Specific medical intervention changes: Crystalloid I.V.'s for Shock Rx.
4. Realize the minimum standard of care for treatment; confirms good practices and shows where improvement can be made.
5. You don't use it, you lose it concept. Allows those of us who have been away from current trauma management to update.

APPENDIX 11

Phase Two: Synthesized Combination of ATLS Impact Dimensions as Perceived by All Respondents

1. Systematic, regimented, standardized, universally accepted approach to trauma patient management; priorities set.

2. Specific medical-technical patient care improvements:
   - Basic ABC's now being taken of
   - Airway skills increase - still problems here (fear?)
   - Cervical-Spine Control (C-spine)
   - Emergency procedural changes
   - Update in hospital emergency equipment.
   - "Pre-packaging" hospital transfer patient improved.
     - Blood work/ x-rays included.
   - Fluid resuscitation improvements i.e.)crystalloid
   - More attentiveness to potentially life-threatening injuries.
   - More focus on mechanism of injury.
   - Enhances intern/residency programs with practical application complementing didactic trauma lectures
   - Prophylactic chest tube insertion

3. Increased self confidence; comfortable feelings dealing with personnel who have ATLS background in emergency setting.

4. Increase in knowledge (at least short term), increase interest in trauma care.

5. Improved communication; feedback requested and received; development of rapport between rural and urban centres.

6. Opportunity for reflection; reassurance that past practices were appropriate and areas to focus and improve on; opportunity to resolve personal trauma care dilemmas.

7. Increased networking with other healthcare facilities.

8. Opportunity for rural physicians to practise those infrequent interventions directly related to traumatic injuries.

APPENDIX 12

Phase Three: Final Main ATLS Impact Dimensions Perceive By Respondents Compiling All Previous Combinations

1. **Standardized Frame of Reference for Trauma Patient Management.**

2. **Medical-Technical Trauma Patient Care Improvements.**

3. **Positive Changes Within the Domains of Learning.**
   - i. **Cognitive - acquiring knowledge.**
   - ii. **Affective - attitude change.**
   - iii. **Motor - physical skill development.**

4. **Communication Opportunities and Improvements.**

5. **Reflective Practice.**