

Setting Basic Standards in a Developing Ambulance Service:

A qualitative description of the impact of the
Intermediate Ambulance Care course on
prehospital care practice in Penang, Malaysia

Matthew Perry

Acknowledgement

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Thank you all, I have not done this alone.

Matt Perry.

Declaration

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Matthew J. Perry

Abstract

The Intermediate Ambulance Care (IAC) course is a thirty-week training program run in Penang Malaysia which was adapted from the South Australian Certificate IV in Ambulance Practice. The adaption of this program was designed and implemented to improve the clinical education of ambulance practitioners in Penang. However, the IAC is not the only course available within Penang or wider Malaysia, which seeks to improve the standard of care within the EMS. The question that remains unresolved is: what has been the impact upon the development of prehospital care as an occupation?

The prehospital care environment in Penang, Malaysia is a complex mix of government and non-government agencies, with variable training standards that lack consistency. Despite its central place in the public health system of many countries, there is little research or other literature available to inform the development of prehospital care education within developing countries. Even within developed systems, such as Australia, there is little evidence available to suggest how a program of education may assist prehospital care professional development.

This research considers the impact of the IAC on the development of prehospital care practice and how the course might have contributed to the development of an emerging profession. The questions in this research centre on what the IAC has achieved within the rapidly changing emergency medical system (EMS) in Penang as well as considering the perceptions of leading professions, such as the medical profession. The study examined the IAC in light of the attributes of a profession as suggested by Greenwood (1984).

A focused ethnography, triangulated with field notes and observational data, was conducted in order to describe the impact and subsequent professional development.

Focused ethnography was selected as the most appropriate methodology as the subject matter of this study was the constructed reality of professionalism and the subjective way in which a professional development course might contribute. As such semi-structured interviews were the most appropriate method for the collection of the primary data.

A total of eleven interviews were conducted and thematically analysed through the process described by Braun and Clarke (2006). The four themes that were identified were: Quality of training and quality of care go hand in hand; how standardisation is managed in Penang; the IAC one course that is assisting the development of a profession; and the management of change. The themes described the way in which the IAC contributed to the development of a distinct profession. Whilst pre-hospital care, as a profession, is yet to establish itself in Malaysia, in countries where it has there have been significant improvements in delivering public health outcomes.

This study sought to describe the impact of the IAC within the complex mix of service and education available, rather than in isolation. As such the study offers an insight into what can be achieved with a developing country's EMS by offering professional education and development.

Glossary of Terms & Abbreviations

Terms

Ambulance Practitioner This thesis uses the term Ambulance Practitioner to describe any person involved in ambulance practice. It encompasses all professional and non-professional groups involved in practice. For example Nurses, Doctors, Assistant Medical Officers can all be described as ambulance practitioners if their role at the time is to respond to emergencies in an ambulance. The term is used here to describe any person involved in ambulance practice and not to differentiate those with independent practice as in other parts of the world.

Ambulance Officer Refers to those who are employed or volunteer within an ambulance service. When a person is not part of another professional group, such as those listed above they are referred to as an Ambulance Officer.

Paramedic Paramedic refers to an ambulance practitioner who is involved in autonomous diagnosis and treatment of common, life threatening conditions. The title Paramedic is sometimes used without definition within literature. There is no internally accepted definition, however in this thesis the term Paramedic will only be used when describing professionals who operate as autonomous practitioners.

thesis prehospital care will always be differentiated from the more general term of EMS.

- HPP or GH Hospital Pulau Pinang or the Penang General Hospital is the main public hospital, located in Georgetown, Penang.
- IAC Intermediate Ambulance Care course. This course lies at the centre of this thesis and was developed from a Certificate IV in Health Care (Ambulance) course taught in South Australia. It is delivered in partnership with SJAM Penang and available for any ambulance practitioner from any service to attend.
- MCDD/JPAM Malaysian Civil Defense Department. Also referred to as Jabatan Pertahanan Awam (JPAM)
- MRC The Red Crescent Society of Malaysia. In the context of this thesis all references the 'MRC' refers to the Penang chapter of that organization.
- NGO Non government organisation.
- RC or MRC The Malaysian Red Crescent, or Bulan Sabit Merah Malaysia. Part of the International Red Cross and Red Crescent organisation.
- SA or S.A. The state of South Australia. It is worth noting that when used in titles of S.A. Ambulance or S.A. Health it is not actually an abbreviation. The official title of those government bodies is not, for example, South Australia Ambulance, it is S.A. Ambulance.
- SJAM St John Ambulance of Malaysia. For the purpose of this thesis, SJAM refers to the St John Ambulance of Malaysia, State of Penang. Where reference is made to the national body the suffix, 'national' will be used.

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Setting Basic Standards in a Developing Ambulance Service: A qualitative description of the impact of the Intermediate Ambulance Care course on prehospital care practice in Penang, Malaysia.

CHAPTER ONE

1.1 Introduction

This thesis describes the changing nature of an international prehospital care service provision within a developing public health system after the introduction of a professional development course. It intends to demonstrate how education has, or might have, impacted on that system. While isolating the exact changes that have resulted from a particular educational program is problematic, this research aims to develop useful insights from the introduction of a program that altered the delivery of a public health service (namely an Ambulance service). In doing so, this thesis provides an insight into the future directions that professional development might take within the developing prehospital care system such as that in Penang, Malaysia.

The introduction of the Intermediate Ambulance Care course (IAC) is the focus of this thesis. Paramedics from S.A. Ambulance Service (South Australia) (including the author) and local health and medical experts in Penang, Malaysia designed the course. The 300 hour course is conducted over thirty weeks and includes both online and face-to-face sessions. It is based on the curriculum contained in the existing Certificate IV program offered by S.A. Ambulance Service and many other Australian ambulance services. Material from the course, including description of the curriculum, is appended (Appendix 1). While the course is open to all participants, it is administered and primarily sponsored by St John Ambulance of Malaysia, State of

Penang (SJAM Penang). The majority of students are members of SJAM and the course is subsidised by SJAM and then offered to them at minimal cost.

The development of the IAC occurred over four years as a result of professional interactions between the researcher and Dr. Teo, Aik Howe (Emergency Consultant, Penang General Hospital), as well as other key figures in Penang's EMS system. The course was offered to other areas of Malaysia, including Kuala Lumpur, however Penang was chosen as the main site for this course and indeed this study, due to their willingness to participate, openness to change and new ideas exhibited by key individuals in the health system.

A team from Adelaide, South Australia, and Penang undertook the development of the IAC and the process culminated in this study. The Island of Penang also offers a relatively confined system, which relies on a single, large public hospital (Hospital Pulau Pinang or HPP) to co-ordinate and control EMS activities, therefore allowing the research process to capture the potential impact of changes in that system.

The research questions examined within this thesis are detailed at the end of this chapter.

1.2 Contextualising Prehospital Care within Public Health Framework

Ambulance services play a unique public health role in any healthcare system, given the dual roles of providing emergency and health care services. Traditionally the role has been limited to a transport medium to allow sick or injured people to get to a hospital for treatment. In the late 1960's ambulance practice began to transform into a profession in its own right in developed countries (O'Meara & Grbich, 2009). Prehospital care professional practice has developed at different rates in different countries and has adapted to suit the healthcare system in which it operates. Recognition as a profession remains a contentious issue with some commentators

agreeing that paramedics have yet to attain professional status, and therefore remain a semi-profession (Eburn & Bendall, 2014; Paramedics Australasia, 2014; Townsend & Eburn, 2014).

The process of achieving professional status has varied from country to country due to the different models of practice and education. However continuing research has assisted in recognizing an unique body of knowledge relating to prehospital care practice (Sheather, 2009).

Prehospital care is an inter-professional and inter-sectorial service that crosses many aspects of health care. What was often a forgotten phase of emergency health care provision has now developed into an integral part of primary, secondary and in some cases tertiary health care models (Raven, Tippet, Ferguson, & Smith, 2006). The nature of the multi-dimensional services offered is not well recognised in many developed health care systems.

In Australia, New Zealand and the United Kingdom paramedics practice as autonomous health care practitioners and often treat people in their own homes without the need to transport them to hospital. New and unique ways of managing public health concerns outside of traditional medical practices have been developed as a result of the ability of paramedic practitioners to determine and meet the health care needs of society (Raven et al., 2006). This move to evidence based independent practice means that prehospital care practitioners are now beginning to determine the scope of their own practice and develop unique solutions to public health issues. Paramedics Australasia (the peak professional body for Paramedics in Australasia and New Zealand) recognise this as one part of the advancement towards professional status (Paramedics Australasia, 2015).

Alongside the development towards professionalism have come changes in the way in which prehospital care services are delivered. Raven et al. (2006) discuss the nontraditional roles for paramedic practitioners throughout the U.K. and Australia

which have the ability to significantly contribute to public health outcomes. Community Paramedic and Extended Care Paramedic roles have transformed the profession into one that delivers wider public health outcomes (Mason, Wardrope, & Perrin, 2003; O'Meara, 2003; O'Meara & Grbich, 2009). Not only does prehospital care service delivery attend to urgent health care, the often neglected aspect of paramedic work is being able to respond to public health issues. Responding to major incidents such as pandemics is now seen as a key feature of a developed prehospital care system (Tippett et al., 2008).

There are also significant cost savings to be found in treating people in their own homes (Varney, Weiland, & Jelinek, 2014) by employing professional ambulance practitioners. By utilising Paramedics in a way traditionally reserved for Doctors, prehospital care practitioners can assist in reducing the overall costs of the public health care system in many countries.

While the expense of providing professional ambulance practitioners is relatively high, the overall savings to the healthcare system has led many countries to support further development of innovative non-traditional roles in this discipline (Raven et al., 2006). As developing nations have limited resources to devote to increasing healthcare demands, encouraging the creation of alternate, safe and less expensive means of meeting public health demands should be a priority.

1.2.1 The role of education in professional development

Professional development in Australia and other countries has, by and large, occurred through tertiary education. It is through the creation of a unique body of knowledge through evidenced based research (Raven et al., 2006), and then delivered in the tertiary setting that ambulance practice has moved closer to becoming a profession (Sheather, 2009). However, the role of ambulance personal in developing countries may be limited by the restricted access to quality ambulance specific education. This,

in turn, may limit the type of services provided and ultimately result in delayed progression in improving health outcomes during emergencies.

Education can assist in creating a distinct body of knowledge and the ability to critically reflect on current practices and norms in prehospital care. It is within this context that the IAC was established in order to assist the development of first world ambulance services within a developing system of prehospital care.

As an education course, the IAC sought to share an understanding of ambulance practice from Australia and alter that body of knowledge for the Penang context. In sharing knowledge in this way the principles and practice were not unique to Penang, but contextualised from the body of knowledge commonly accepted in Australia. In this way the IAC was not seeking to develop something unique to EMS, simply unique within ambulance practice in Penang and thus assisting in the sharing of a unique body of knowledge.

1.3 Background and Critique of the Literature

The literature available that contributes to this study is limited. Much of the literature drawn upon for this study would be classified as grey literature and has not had the benefit of peer review. Publications, such as government commissioned reports and annual reports have provided useful insights in the absence of peer-reviewed publications. Annual reports from St John Ambulance Malaysia, State of Penang, among others and publically available internal performance data from Hospital Pulau Pinang are utilised throughout this thesis.

There are various reasons for this limited pool of research, including the lack of consistent terminology for ambulance practitioners globally (as well as quite different roles as detailed in Table 1); the difficulty in defining ambulance practice in terms of the primary, secondary and tertiary healthcare models; the infancy of any experienced

and qualified researchers; and arguably the most important reason, the lack of a cohesive occupational identity in Malaysia.

The literature review and critique was an ongoing process throughout this study that started in September 2014 and was complete by the time of the writing of this thesis in September 2015. Drawing on a systematic review-like process, the author utilised Pubmed, Academic Search Complete, Ovid, Embase, and Eric databases, using the terms 'Ambulance' AND 'Malaysia'. The search was expanded, by replacing 'Malaysia' with 'developing country' as well as replacing 'Paramedic' with 'EMT', 'Technician' and 'Ambulance Officer' as well as other terms described in Table 1. Once duplicates were removed, there were 220 results across the five databases (see Appendix 8 for search results). The author assessed those articles for their relevance based on reference to ambulance practice and professional development within the developing world (particularly Malaysia), therefore leaving 33 articles. The articles deemed irrelevant had limited reference to ambulance practice as distinct from hospital practice, or were describing limited studies focused on clinical practice. There were no original research publications similar to the current research being undertaken in this study identified in this search.

The remaining 33 articles generally focused on system design and delivery by describing service provision rather than providing a theoretical basis for ambulance practice. This highlights the continued absence of original research and the paucity of high quality qualitative, mixed methods or quantitative research.

Due to the limited published studies available, a separate literature review would be of little value. Rather, a synthesis of the available literature regarding the various topics will be presented throughout this section whilst exploring the context of the study. It would be reasonable to postulate one possible reason for the lack of a professional identity for Ambulance practitioners throughout the region and the world, is because of the lack of common name for the role as well as limited involvement in original research.

1.4 Models of Practice and Terminology

The difficulty in literature searching is compounded by the inconsistency in practice standards, models of Emergency Medical Service (EMS) provision as well as inconsistency in terminology internationally. As is the case with this thesis, publications must choose the terminology used to describe those who practice in an ambulance setting. As models of practice differ around the world, so too do the terms used to describe ambulance practitioners. Within this thesis the term ‘paramedic’ has been reserved for those who can be described as professional or semi-professional and ‘ambulance practitioner’ has been used to describe the role generally. Other terms available and used elsewhere are ‘Emergency Medical Technician’; ‘Ambulance Officer’; and ‘Medic’. Tables 1 & 2 below briefly outline a comparison in terms and roles, job titles (name) and skills in different countries.

Table 1: Role Definitions of Prehospital Care Practitioners in Selected Countries

Country		Brief Course (up to 1 week)	Short Course (up to 6 months)	Higher Education Degree (Typically Undergraduate level)	Post Graduate or Internal Training post Degree/Diploma
Australia	Available as part of the state run EMS system	✓	✓	✓	✓
	Roles	Community 1 st Responder (Some states)	Patient Transfer	Emergency Ambulance	Emergency Ambulance Helicopter retrieval Primary Care roles and hospital avoidance.
	Name	Community Responder First Aider	Ambulance Officer	Paramedic (some states have differing	Intensive Care Paramedic, Rescue Paramedic, Retrieval

				levels)	Paramedic or Extended Care Paramedic
	Professionally registered	X	X	X	X
United Kingdom	Available as part of the state run EMS system	✓	✓	✓	✓
	Roles	Private first Aid only	Patient transfer, Assisting in Emergency Ambulance	Emergency Ambulance	Emergency Ambulance Home care, hospital avoidance and primary care roles
	Name	First Aider	Paramedic Assistant, Emergency Care Assistant, EMT-B (term not often used)	Paramedic	Paramedic Practitioner Advanced Care Paramedic
	Professionally registered	X	X	✓	✓
Singapore	Available as part of the state run EMS system	X	✓	✓	X
	Roles	Private First aid only	Patient Transfer	Emergency Ambulance Patient Transfer	
	Name	First Aider	EMT-B	EMT-I, EMT-Paramedic	
	Professionally registered	X	✓	✓	
Malaysia	Available as part of the state run EMS system	✓	✓	✓	X
	Roles	Emergency Ambulance, Patient Transfer	Emergency Ambulance, Patient Transfer	Emergency Ambulance, Patient Transfer	
	Name	EMT, Paramedic, Medic	EMT-B, Paramedic, Medic	EMT, Paramedic, Medic	
	Professionally registered	X	X	X	

Table 2: Brief Comparison of 'Paramedic Skills'

	South Australia	United Kingdom	Malaysia (general)	Malaysia (Penang)
Intubation	X	✓ (pre 2010)	X	X
Laryngeal Mask	✓	✓	X	✓ (Occasional use)
Manual Defibrillation	✓	✓	X	X
Automatic Defibrillation	✓	✓	✓ (not always available)	✓
Cannulation	✓	✓	X	✓ (some situations)
IV Saline administration	✓ (trauma only)	✓	X	✓ (trauma only)
Oxygen administration	✓	✓	✓	✓
Morphine Administration	✓	✓	X	X
Other pain relief medication	✓	✓	X	X

Source: S.A. Ambulance Service Paramedic Authority to Practice (Appendix 3)
 United Kingdom Paramedic Guidelines (JRCALC)
 & Author's experience

Note: This is not an exhaustive list of skills for each country / area. Only those skills that the practitioner is trained to perform autonomously are listed (i.e. without first obtaining permission from a Medical Practitioner or Director). Skills deemed higher than Paramedic eg Intensive Care Paramedic in Australia or Nursing Skills in Malaysia may be undertaken in the ambulance setting, however they are not listed here. Undergraduate degrees could be double or combined degrees or in some countries diploma/foundation level and range from 2 to 5 years.

The tables above give an example of the complexities of international comparisons of ambulance systems and skills. Even in areas where similar terms are used, they may have different meanings. Terms such as Paramedic could mean a university educated professional with a year of practice in Australia, or in Malaysia simply someone who has had a few hours training. Likewise, models of ambulance practice can differ between physician led (such as the systems in the United States of America and Norwegian systems, or Paramedic led, such as New Zealand and Australia).

Just as the roles, skills and training of those who practice in the prehospital environment differs across international boundaries, so too do the standards against which they are measured. Each individual centre mentioned above has their own practice standards that they consider as 'best practice' (for example the ISO accreditation framework in Australia (SA Health, 2013) or the Health and Care Professionals Framework in the UK (HCPC, 2014)). Each understanding of best practice therefore depends on the training and background of the practitioners within the system under consideration.

Largely due to the vast differences between emergency medical systems worldwide, developing a comparison based on an understanding of best practice is problematic. Accounting for levels of training, the role of the ambulance services in primary as well as other areas of care would make the development of a common best practice model almost impossible. It is therefore unsurprising that there is a lack of literature that attempts to address or even describe this issue.

1.5 Development of Ambulance Education & Practice: The Malaysian Context

An accurate description of the Malaysian prehospital care system remains elusive even within the available literature. As evidenced by the literature

search, few have addressed ambulance care directly. Little is known about education standards in Malaysia generally as the research or even syllabus publication in this area remains sparse, other than what is documented in grey literature.

Inconsistencies within the literature may have arisen due to the changing and complex nature of EMS service provision. While Ong et al. (2013) and Hisamuddin, Hamzah, and Holliman (2007) have attempted to document the system, with the former describing ambulance services as being led by the Fire Service (or Bomba). Whilst this may be an accurate description for some parts of Malaysia, the EMS system in Penang is led by the major Government run hospitals.

Overall the literature details the complexity and lack of development, leading to potentially poor outcomes for those in need of services (Hisamuddin et al., 2007). The complexity, which appears to arise out of the breadth of agencies involved in service provision, may contribute to confusion within the available publications.

Malaysia is a developing nation (United Nations, 2014) which has achieved the World Health Organisation status of an upper middle income country (Jaafar, Mohd Nor, Abdul Muttalib, Othman, & Healey, 2013). In general, healthcare in Malaysia has made significant gains over recent years and is now comparable to upper middle income countries, with total expenditure of 4.6% of GDP in 2009 (Jaafar et al., 2013), which is below that of Australia's (9.4% of GDP for the same period) (Australian Government, 2011). The field of emergency medicine is a new discipline in Malaysia, having been created in 2009 under the Malaysian Ministry of Health. This has evolved from a systematic up skilling of Malaysian medical skills via education and sponsorship links with the United Kingdom and other countries, such as Australia throughout the 1990's (Jaafar et al., 2013).

The concentration on medical staff education may have a contributing factor to a lack of development of ambulance service provision as the health care system improved. This lack of development or even recognition in official documentation continues today. In a recent Health System Review, conducted by the World Health Organization, ambulance services are mentioned only briefly and Paramedics described as a branch of Nursing (Jaafar et al., 2013).

Just as the services themselves are developing, so too is the education base of those who work within them. Developing nations, such as Malaysia, struggle to find the available resources to allow for tertiary education for health professionals status and standards. Currently it is not a requirement for non-government ambulance practitioners to have tertiary education qualifications to practice as a paramedic. Unlike paramedics in Australia, NZ or UK, Malaysian ambulance practice remains a relatively low paid occupation with limited expectations of practitioners (Hisamuddin et al., 2007).

If the development of unique wider public health roles for ambulance practitioners in Malaysia is to be realised, attention needs to be paid to professional development. Traditional methods of developing the ambulance industry into a profession via tertiary education have met with limited success within Malaysia and may be linked to limited resources, limited role recognition for paramedics (other than medical assistants or drivers) and lack of registration authority. Therefore for professional development to occur, beyond the current status of being an occupation or semi-profession, the development or sharing of a unique body of knowledge is required. This study seeks to contribute to the understanding of how education can assist in the development of Ambulance practice in Penang Malaysia.

Unlike the simplistic picture presented by Ong et al (2013), Malaysian ambulance service provision is a complex mix of government, quasi-government and non-government agencies with individual training and competency standards (Hisamuddin et al., 2007). Similar to other South East Asian nations private

hospitals also provide ambulance services to their patients, which often do not integrate with Government services. Due to the absence of regulation (governmental or self –regulation) the number of services provided or staff involved, health or organisational data are not well reported (or possibly not even collected). Furthermore the lack of regulation has, in the authors' experience, led to having no common understanding of what an ambulance practitioner is and no common title (such as Paramedic).

Hisamuddin et al. (2007) comments that service provision in Malaysia lacks consistency and practice standards vary depending on the organisation providing the service. Penang appears to follow the national trend in that a number of service providers exist with little apparent co-ordination.

Unlike other ambulance provision in other countries such as in Australia or UK, where the Government (at state or national level) has jurisdiction over ambulance service delivery, the Malaysian Government has little direct control on what constitutes Ambulance practice. There is also a lack of minimum standards of competency for training or service provision.

Given the paucity of available literature regarding the development of Malaysian services this overview of services and education falls short of providing a comprehensive and accurate description. Moreover, there is little theoretical basis offered for the development of prehospital care in Malaysia. Similarly, the development of ambulance services in other developing countries has attracted little research attention.

1.5.1 Ambulance Education and Service Provision and Education in Penang

Despite the progress in other parts of the Malaysian health care system, generally ambulance services remain limited and are best described as

'developing' (Hisamuddin et al., 2007). There are a number of organisations, both Government and Non-Government, which have supplemented the Department of Health ambulance service provision to the general public of Penang. Red Crescent (RC), St John Ambulance of Malaysia (SJAM) and the quazi-Government Malaysian Civil Defense Department (MCCD) are the main providers. Ambulance Services are also provided by Government Hospitals and Clinics.

Recently some Malaysian Universities outside of Penang have offered Paramedic degree courses (for example the University Sans Malaysia). Published data on enrolments, graduates and post qualification employment remains sparse, however with limited employment opportunities in the industry and relatively low pay rates (Hisamuddin et al., 2007) the impact on the prehospital care industry's development may be minimal. Likewise the effect on the industry in Penang remains unknown.

Consistent with the lack of professional education for Malaysian paramedics, those Government hospitals which provide ambulance services are staffed by Assistant Medical Officers (AMOs), who are often taken from their ordinary duties in the Hospital when emergency calls come in. AMO training is completed in a tertiary setting and concentrates on in-hospital treatment (Ministry of Health Malaysia, 2010). Training in the prehospital environment for this group is generally less formal and in Penang is undertaken by observing a mentor for a period of approximately six months. In the author's experience this process is not well documented.

Not all AMO's in Penang GH undertake duties in the ambulance setting, rather a select group whom would otherwise work in the Emergency Department. This practice may differ in other hospitals.

There is little or no research around the use of the AMO professional group to undertake tasks seemingly outside of their training. The paucity of research in

this area may become more problematic as development of prehospital care services continue. Policy decisions on the development of prehospital care training may be impeded by the absence of a clear understanding of the appropriateness of the application of AMO professional training in the prehospital environment.

1.5.2 Organisation of Ambulance Services in Penang

Ambulance services in Penang are not immune to the issues described above. Whilst there is some co-ordination of Government and NGO based ambulance services, that co-ordination is limited by a lack of regulation and control at state and federal level. This co-ordination does not extend to the unknown number of private hospital based ambulance services. Whilst in-hospital emergency medical services fall under the authority of the Ministry of Health at both national and state level, the provision and co-ordination of emergency out of hospital response falls under the control of Malaysia Emergency Medical Response System (MRES999). The lack of regulation as described above may, in some circumstances, lead to a lack of clarity when it comes to Government responsibility for health outcomes associated with the non-government providers. Again, however there is little research available to support conclusions regarding health outcomes resulting from prehospital care in Penang or wider Malaysia.

Many different agencies, both Government and Non-Government run ambulance services in Penang and have no common, or agreed, training standards. Neither is there any external body, which regulates or controls the education provided, much less assesses the quality of that training. Most services in Penang rely on training that is often conducted over weekend courses by the various organisations that provide services.

This is contrasted in Australia, New Zealand, the UK and other developed health services where education of ambulance staff is overseen by educational standards bodies and health regulators. In Australia the Australian Qualifications Framework oversees the quality of the Certificate IV in Health Care (Ambulance Practice) on which the IAC was based. While there is a qualifications framework similar to this in Malaysia, the Ambulance training provided in Penang does not fall under this.

1.5.3 Ambulance Utilisation in Penang

A recently published study estimated that there were approximately 115 cases (or callouts) per month within Penang (Tan, 2014). However, this estimate is disputed by available statistics reported by HPP, which suggests 2,357 cases during the same period (Appendix 4). The difference in the workload statistics is difficult to reconcile, as the gap between the two figures is substantial.

Other than Tan (2014) and HPP, there is little in the way of published statistical information regarding Ambulance service provision in Penang. Only HPP were able to produce statistics that demonstrated the breakdown between service providers and while the veracity cannot be established, those statistics have been used here for the purpose of describing the prehospital care environment.

Statistics provided by HPP for use within this study (Appendix 4) indicate that the non-government providers and MCCD respond to approximately 14% of calls. MCCD accounts for approximately 10%, with the remaining 4% divided between SJAM, MRC and other non-government providers. According to its annual report, SJAM Penang handles approximately 100 emergency calls per month (St John Ambulance of Malaysia, 2014) and is almost certainly under reported in the available HPP statistics. These statistics reflect similarly to other like services such as Red Crescent and MCCD.

The statistics (Appendix 4) suggest that approximately 42% of ambulance calls made to HPP do not go through the emergency calling system (999) and are made direct to the hospital (GH). The calls are therefore only recorded by the hospital, bypassing the centralised system and reliable data collection. If NGO's and other providers have similar calling patterns, there is potential for the published statistics to be wildly inaccurate. Regardless, the NGO's and MCCD seem to share anywhere from 14% to 20% of the workload of approximately 2,400 to 2,900 cases per month.

When considering the IAC, the context in which it was created becomes important. Ambulance utilisation rates can provide some context, however given the complexities in comparing countries and systems this must be approached with caution.

Even with the most conservative estimate that equates to four calls for an ambulance per 1000 population. This is significantly fewer than the service utilisation in the developed system where the IAC course originated (being based on the Certificate IV in Ambulance Care). By comparison, S.A. Ambulance Service (the Government run Ambulance Service for South Australia) responds to nearly 157 cases per 1000 population (based on total incidents reported in 2014 and ABS population for S.A. in 2014) (S.A. Ambulance Service, 2014).

While the population of Penang and Adelaide are similar in size (approximately one million), it is important to note that statistics above are crude and have not been adjusted for population differences, differences in reporting or ambulance practice. The accuracy of the comparison may be lacking, however there is a prima facie case for more research into the difference in ambulance demand. It is important to note that demand for ambulance services are low in Penang, the factors which impact this appear broader than population demographics and health status of its citizens.

Clearly, aside from the difficulty in describing the service provision in Penang and wider Malaysia there are significant issues obtaining reliable data concerning utilisation. Regardless, it is apparent that utilisation of ambulances is significantly lower than that of developed countries. Despite ED demand being comparable (Ong et al., 2013) to developed countries, such as Australia, ambulance demand has not kept pace. The reasons or explanation for this are outside the scope of this research.

1.6 Professionalism and Education within Ambulance Practice

Education is interwoven with the concept of professionalism. There is no universally accepted definition of what makes a profession, nor what contributes the professionalisation of an industry. Definitions by Greenwood (1984); van Mook et al (2009) and Townsend and Luck (2009) provide a brief comparison of the attributes of a profession/al. Greenwood (1984) offers a succinct definition of a profession, which includes a systematic body of theory and authority. While van Mook et al. (2009) suggests that the expertise in a particular area contributes to professionalism. Townsend and Luck (2013) discuss the mastery of complex tasks and skills in a context of knowledge of some department of science or learning. Consistent with most definitions of professionalism is the understanding that a specific body of knowledge and authority exists, often in the form of recognition around that knowledge.

There is some evidence in developed ambulance services that education can lead to improvements in patient care (Giddens, Hrabe, Carlson-Sabelli, Fogg, & North, 2012; Spaite et al., 2000). Yet, advocates for the use of medically controlled treatment protocols rather than an educated professional workforce base remain (Halter et al., 2011). This increasingly divergent debate within the profession has been the subject of continuing research, however it is unclear from the literature if any one model of service provision has particular advantages for a developing ambulance service. Furthermore, few, if any, studies have considered the impact of non-tertiary training courses in terms of professional development.

The existence of a body of knowledge without the acceptance of this by associated professions (in particular the medical profession which currently control prehospital care practice in Malaysia and many other parts of the world) would be unlikely to lead to the same innovations as seen in a truly professional and independent prehospital care practice. Therefore, it is important to discuss other aspects of professionalism, such as recognition and authority when considering the impact of the IAC.

1.7 The Intermediate Ambulance Care Course within the Wider Context

The IAC was developed with the intention to advance the level of education of Penang based Ambulance practitioners. By considering if the IAC has advanced practitioners towards a level of professionalism this research will assist in the development of the worldwide body of knowledge in ambulance practice. This research may provide an insight into the development of a system, which is unique to Malaysia and suitable for other developing nations to consider.

Associated with improving education standards is the ability of ambulance practitioners to move from systematic treatment protocols, controlled by Medical staff (in the case of Penang, the Emergency Physicians). While the IAC was not designed to complete the move from a medically dominated protocol system to independent practice, it was designed as the first small step in that development.

The IAC is not the only course available and not the only factor that might advance professionalism. Whilst some University programs in prehospital care exist within Malaysia there has been no research conducted on how industry specific education may alter the development of a prehospital care profession. While other elements of tertiary-based education have been examined in

isolation (mostly in developed countries) (Fox et al., 2015; O'Meara, Williams, & Hickson, 2015; Ross & Williams, 2014; Williams, Boyle, & Earl, 2013; Williams, Sadasivan, Kadirvelu, & Olausson, 2014; Williams & Webb, 2013), it has not been attributed to holistic professional development. Until now the Medical profession has dominated the discussions on service provision in Malaysia and this seems to have continued in the tertiary programs developed in the country to date.

The evidence for non-medical professionals being involved in emergency care and expanded out of hospital medical care is mounting, but is not overwhelming. Some countries, such as Germany and the United States of America largely remain convinced that prehospital care should be physician led (Roudsari et al., 2007). Development of professional practice in Malaysia and Penang has significant limitations to overcome. The IAC is intended to assist practitioners to develop to a point whereby the EMS system can make an informed decision on which model they wish to follow and this research seeks to describe the progress made by the course towards this goal.

1.8 Research Questions

This research examines the way in which the IAC has contributed to the development of prehospital care in Penang, Malaysia and seeks to describe the ways in which professional development is taking place within Penang Ambulance practice. The place of the IAC within the general environment of professional development of ambulance practice will be explored.

The questions implicit in these issues are:

Has the I.A.C. contributed to the development or potential development of professional prehospital care practice within Penang, Malaysia?

Given this, what is the impact of the IAC on Ambulance practice within Penang?

What are the perceptions of the professionals who control the prehospital care practice in Malaysia (Emergency Physicians and Medical Assistants) with regard to the impact of the I.A.C.?

1.9 Aims/Objectives of the project

To describe the impact of the Intermediate Ambulance Care Course (a course of professional education) on the emerging profession of prehospital care practice in Penang, Malaysia.

To describe the perception of Ambulance practice development amongst the practitioners themselves and the hospital emergency department medical staff.

To offer insights into the perceived areas of development for the emerging profession of prehospital care practice within a developing public health system.

In the next Chapter the location and context of the study will be explored.

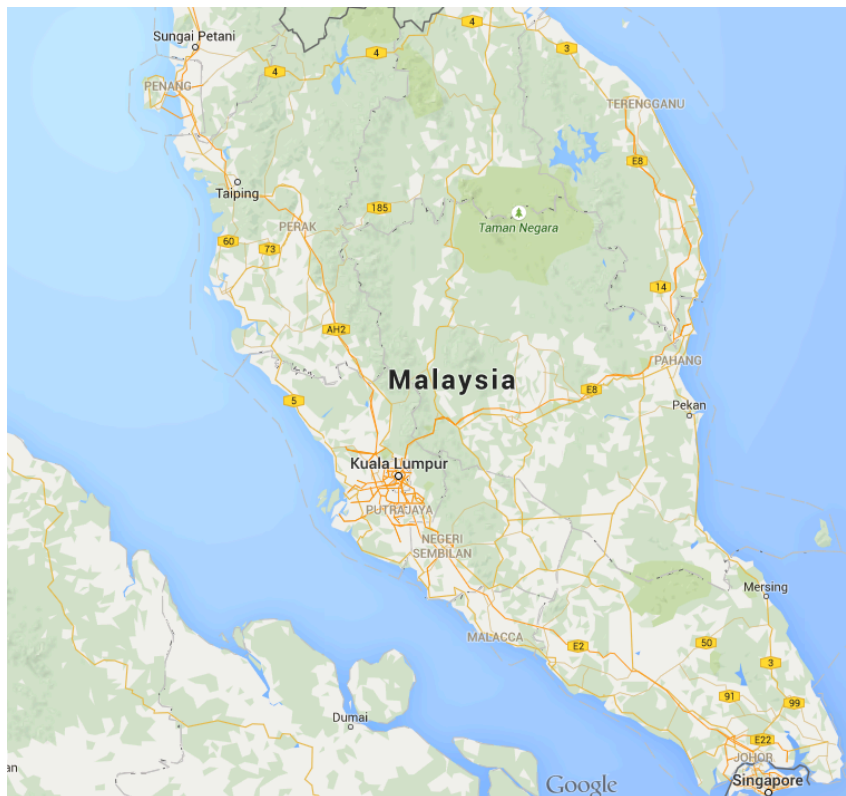
CHAPTER TWO

2.1 Locating the study

This study is based in the Malaysian state of Penang, which is one of 13 states and is situated in the north of the Malaya peninsular. Penang is a former British colony, with local government control being in place in the State of Penang since 1856 (Majlis Bandaraya Pulau Pinang, 2014).

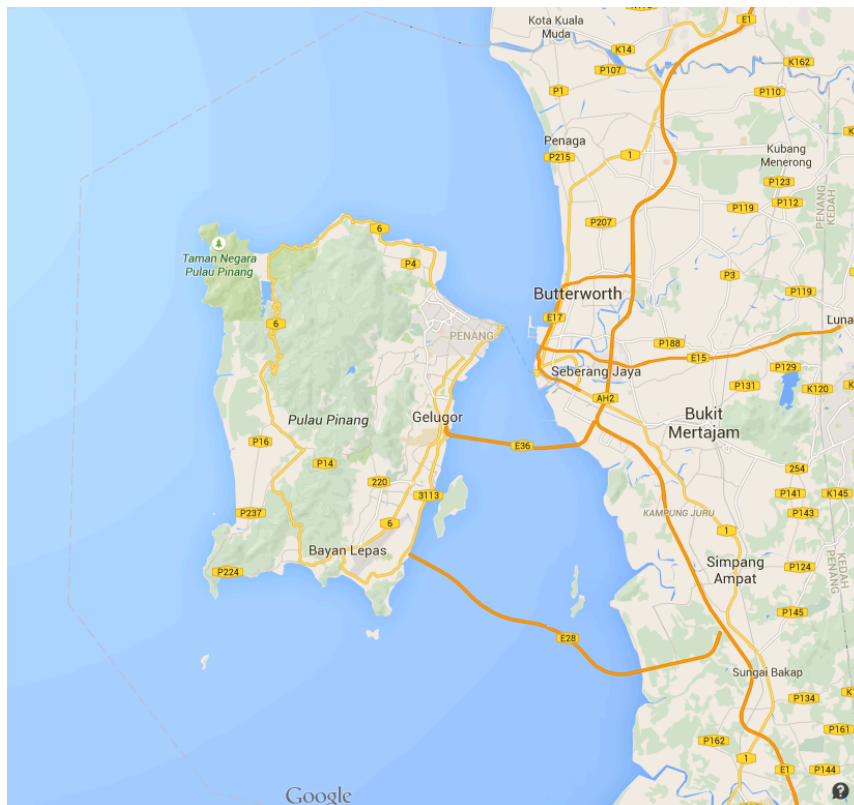
Figure 1, 2 and 3 (below) show the location of Penang in relation to the Malaysian Peninsular.

Figure 1: Malaysian Peninsular



Source: Google Maps

Figure 2: The State and Island of Penang



Source: Google Maps

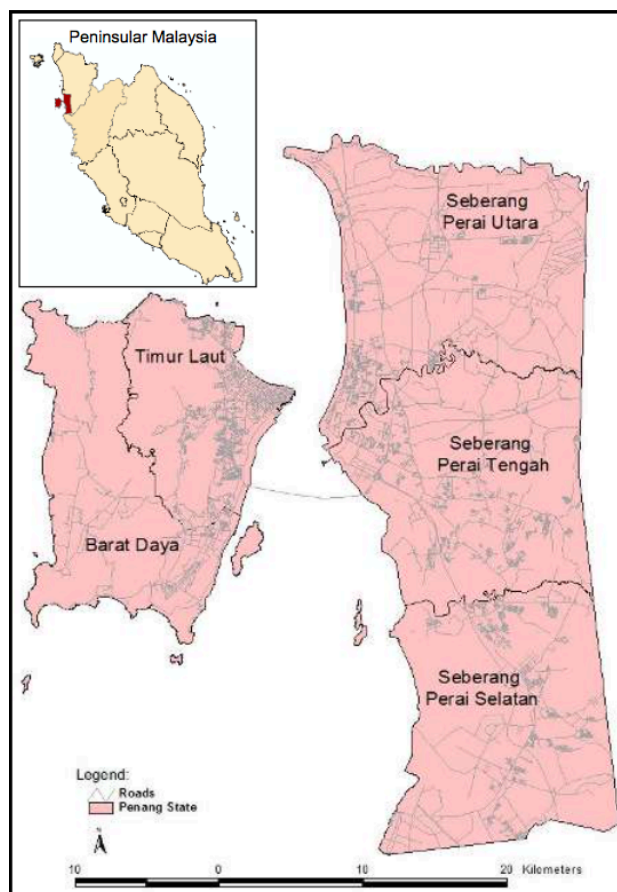
2.1.1 What's in a name?

The names used to refer to the state and the Island can be the source of confusion due to their interchangeable use in literature and colloquial conversation. Pulau (meaning island) Pinang is the Malay name for the State of Penang and is sometimes used to describe the island sections of that state. Penang is the Chinese name, adopted by the English, for both the state and the island.

Commonly however, when the name 'Penang' is used, it refers to the island parts of Pulau Penang. In official documents the name Pulau Pinang refers to the state, rather than just the island. For the purpose of clarity this thesis will refer to the state as Pulau Pinang and the island as Penang.

The island of Penang is home to the government and is comprised of two of the five areas of Pulau Pinang, Timur Laut and Barat Daya regions, with the main population centered around Georgetown in the northeastern section of the island (Timur Luat district). The island covers approximately 300 sq.km and is home to approximately 720,000 people (Majlis Bandaraya Pulau Pinang, 2014). Timur Luat population make up approximately 55% of the island's total population, living in approximately 40% of the land area. Population density in Timur Luat is approximately 3000 people per sq.km, making it one of the more densely populated areas of Malaysia (Department of Statistics Malaysia, 2013).

Figure 3: The Districts of Pulau Pinang



Source: Department of Town and Country Planning (2009)

The ethnic mix of Penang differs from other areas of Malaysia in that the Malaysian citizens that claim ethnic Chinese heritage make up approximately 53% of the population and ethnic Malay people, 32% (with the remainder being

mainly of Indian decent). Within the whole state of Pulau Pinang, the mix of the two most dominant ethnic groups, Chinese and Malay, moves more closely towards the pattern for the rest of Malaysia where ethnic Malay people are the majority. In Malaysia generally, ethnic or indigenous Malay people make up approximately 67% and the ethnic Chinese population, 25% (Majlis Bandaraya Pulau Pinang, 2014). Georgetown is home to the centre of the state Government and the largest Government hospital, Hospital Pulau Pinang (referred to as HPP or simply GH (General Hospital)).

While Malaysia has universal healthcare there are a number of private hospitals. Public health care is provided through Government run General Practitioner, clinics and hospitals. Whilst access to publicly funded medical care is low cost (often free), there is an increasing reliance on private hospitals to provide medical treatment and care and the private hospitals are often perceived as being able to offer a higher standard of care (Jaafar et al., 2013). Unlike the healthcare system in Australia, private medical services do not receive Government funding for any services and rely purely on a user pays or insurance system.

The cultural mix in Malaysia and Penang adds to the complexity of developing a comprehensive public health and emergency care system. In the author's experience, Western medicine is influenced by traditional Chinese and Malay beliefs regarding wellness and holistic care. The integration of different health care beliefs has received little research attention and little is known about how these beliefs guide policy or clinical decisions in Penang. This limits the ability of service providers to establish a culturally appropriate prehospital care system.

2.1.2 Ambulance Services in Penang

Ambulance services in Penang mirror Malaysia's generally complex mixture of Government, quazi-Government, N.G.O.'s and private services. Despite attempts

by some authors (Hisamuddin et al., 2007; Tan, 2014) to describe the Malaysian system, it seems that a lack of regulation and controls on what actually constitutes ambulance practice has led to a system that defies accurate description as well as development beyond basic services (Ong et al., 2013). This means that achieving improved public health outcomes remains difficult in a system which lacks early and emergency intervention capabilities.

The introduction of one emergency number for fire, police, ambulance and civil defense is a relatively new concept for the country (starting in 1999). Prior to this each provider had their own contact details published and most emergencies were either routed through HPP or the individual service's number.

Within Penang the individual services have taken this one step further with the introduction of a common radio frequency for improved communications. Each service provider has the ability to hear what the others are responding to and should they be in a better position to assist, offer their services. Recently however MCCD has ceased using this radio channel, preferring to use their own system.

Government run hospitals (of which there are two in Penang) operate ambulance services, with HPP having three dedicated ambulance crews available at all times (staffed with a driver, an assistant and an AMO). Any further need for ambulance attendance means removing additional medical staff from their general duties from the floor of the Emergency Department.

The Government Hospital in Balik Pulau operates its available ambulances with existing Emergency Department staff. The number of available ambulances at this hospital is variable, depending on the workload of the staff and nature of the emergency. As staff are taken from the emergency department there is no minimum or maximum number published, however being a smaller site it would be reasonable to assume that they would provide fewer resources than the larger HPP.

As a result of this utilisation of staff from the Emergency Department it is impossible to estimate the available Ambulance resources at any given time and often any statistics reported reflect the number of serviceable vehicles, rather than available staffed ambulances.

2.2 The Intermediate Ambulance Care Course: The Context of the Study

The implementation of the Intermediate Ambulance Care (I.A.C.) course has been a singular approach to address the underdevelopment of practice standards in prehospital care and professional development for ambulance practitioners in Penang. The I.A.C. has been developed over the last five years by an Emergency Consultant in Malaysia and a South Australian ambulance paramedic. While the course has been developed using resources provided by St. John Ambulance Malaysia, State of Penang, it was aimed at improving the knowledge base of ambulance staff in any service, worldwide.

The principal aims of the IAC are to improve the depth of training in the prehospital care environment and assist in developing a body of knowledge within the industry. Given that models of Emergency Medical Service (EMS) differ worldwide, the IAC has attempted to introduce a base level of education that has existed in Australia for many years. Despite Australia having a lengthy history of vocational level ambulance education, what remains unresolved is the impact of this model on Malaysian service provision and the development of ambulance specific knowledge.

The IAC is supported by St John Ambulance of Malaysia, State of Penang and designed around the content of the S.A. Ambulance Service Certificate IV in Health Care (Ambulance) course, currently delivered in Adelaide, South Australia. The content and curriculum was adapted and contextualised for

Malaysia and specifically Penang, however the overall course remains largely the same as that provided to S.A. Ambulance Service volunteers in rural and remote South Australia. The I.A.C. also aims to provide a basis on which to build a service model that relies more on the Ambulance Officer as an independent practitioner. In the current Malaysian model, Doctors provide direct oversight and approval of any medical intervention in the prehospital environment. Essentially, the goal was to move more toward a model of professional ambulance practice and away from a transport medium.

Approximately 20 people have been trained through the IAC program since it began in 2013 and a further 20 are expected to complete training by the end of 2015. The approximation of numbers is due the student cohort has been drawn from volunteer and paid staff from various organisations, including government hospitals. Predominantly those associated with St. John Ambulance Malaysia have attended, however some from other non-government Ambulance providers have participated.

The IAC exists within a prehospital care system that lacks consistency in practice and training standards. As described in Chapter one, there has been little focus on this area of public health in Malaysia and this study aims to contribute to the understanding of how the IAC has contributed to the development of prehospital care practice within Penang.

In the next chapter methodology and methods of collecting data are described. Ethical issues arising from working cross culturally will be explored.

CHAPTER THREE

In this chapter the aims, methodology, methods and ethical issues pertaining to the research are presented.

3.1 Introduction

This research seeks to describe the changing nature of prehospital care service provision in a developing public health system, namely that of Penang Malaysia. It aims to develop useful insights into how such a program might alter the course of a public health service (ambulance service) in a developing system of public health. While isolating the exact changes that result from a particular educational program is problematic, graduates' experiential and theoretical knowledge will provide some understanding of how education can effect change in perception and practice.

This research does not purport to be a definitive description of what the course has and has not achieved, but allows the reader to draw conclusions based on the experience of the participants who have made their data available. The participants are all involved and intimately familiar with the EMS system in Penang and have their own views on what has and has not been achieved to date.

The research described within this chapter offers a view of the impact of this single course in a way that can capture not only the current changes as a result of the course, but what it might mean for the future of an emerging profession. Using a qualitative methodology to collect and examine data is consistent with the issues the researcher is seeking to understand through this study.

Some consideration was initially given to conducting this research utilising a quantitative methodology, however isolating the causal factors of change in the

ever-changing EMS system under this methodology would have been problematic. Quantitative research in this case would generally seek to examine the effect of the alteration of one variable within a system (Liamputtong, 2013). The isolation of that variable is central to the success of experimental methodologies and where that variable cannot be isolated confounding variables make drawing conclusions difficult.

Ultimately the qualitative approach as explained throughout this chapter was selected as the most robust and reliable methodological approach for the examination of the research questions contained in this thesis.

3.2 Philosophical and Theoretical perspectives

3.2.1 Ontology

The ontological issues addressed in this research relate to the nature of reality as known and experienced by those working as ambulance officers or paramedics in Penang. The participants in this study *know* about their everyday work; that is 'real world' knowledge rather than just 'assumed' knowledge (Guba & Lincoln, 1989) and are able to articulate their knowledge as described in Chapter four.

Paradigms (or perspectives, or world views) shape the nature of any research. Commonly there have been two paradigms useful for research in social science: empirical-analytic science or quantitative research (sometimes called just 'science', logical positivism, or hard science) is underpinned by the assumption that the world is structured by law-like regularities that can be controlled, manipulated and analysed. These researchers value objectivity, measurement and generalisation. The methodology and methods used in this form of science may be, for example, controlled clinical trials, experimental designs, surveys, and using concepts like validity and reliability to test for 'truth' (Denzin, 1992; Guba & Lincoln, 2005).

Interpretive science or qualitative research (sometimes called soft science by its critics) focuses on interpreting and understanding the social world of people.

These researchers value human experiences and subjectivity. Data are collected through interview, field observations, focus groups, review of documents, and personal journals. The methodology used in this form of science may be, for example, phenomenology, oral history, critical theory, grounded theory and ethnography using concepts like trustworthiness, authenticity and transferability to test for 'truth' (Guba & Lincoln, 2005).

Morse, Barrett, Mayan, Olson, and Spiers (2008) argued for the use of the concepts of validity and reliability in qualitative research, an approach which this research adopts. Both validity and reliability in qualitative research have meanings that are intertwined and there is no universal agreement on how to define the concepts. Trustworthiness remains an important concept within both and the key question remains 'how well does this study present the phenomena under examination?' (Morse et al., 2008).

While debate regarding the way in which qualitative research can demonstrate quality continues, the process of ensuring rigor in this research can be described as one of incremental interaction between reliability and validity (Lincoln & Guba, 1985). Adding to the debate is the divergent research methodologies in qualitative research, which is often also lacking a clear distinction from quantitative research (Sandelowski, 1986).

Guba and Lincoln (2005, p. 6) ask this question of validity: "are these findings sufficiently authentic (isomorphic to some reality, trustworthy, related to the way others construct their social worlds) that I may trust myself in acting on their implications? Would I feel sufficiently secure about these findings to construct social policy or legislation based on them?" This study relies on the process of data saturation described below to provide evidence of authenticity.

Whilst establishing rigor in qualitative research has been problematic since development of the methodology (Sandelowski, 1986, 1993), Morse et al. suggests that "rigor does not rely on special procedures external to the research

process itself” (2008, p. 6). Rather the researcher, in examining what a situation means to those involved and what frames of reference they make sense of their situation, provides the context to demonstrate the validity of the knowledge generated.

Contributing to the question of rigor, Morse et al. (2008) outlined a number of verification criteria: methodological coherence (which is the coherence between the research question and method); appropriate sampling (as demonstrated by saturation and replication); collecting and analysing data concurrently; theoretical thinking; and theory development. Incorporating these verification criteria into the design and execution of the study assists with improving trustworthiness. The explicit application to this study of the verification criteria as described by Morse et al. (2008) is outlined in Appendix 5.

This research has adopted the position that the concepts of trustworthiness and authenticity contribute to rigor. Through the use of validation of themes and triangulation of methods as outlined below, as well as the process of continuous data analysis, rigor has been demonstrated.

3.2.2 Epistemology

Epistemology, that is, the study of the origin, meaning and nature of knowledge, is central to this research. The epistemological issues relate to the ability of the researcher to objectively examine the relationship between paramedics and the knowledge they construct and use as they go about their daily work. In order to discover the subjective knowledge that ambulance practitioner’s use, the researcher, using thematic analyses, then interprets interaction between the researcher and the participants through in depth interviews. To describe the IAC in terms of its contribution to professionalism, the views of those who have undertaken the course and practice in prehospital care need to be examined.

Moreover, the perceptions of those in the medical profession, who are the current authorities on prehospital care within Malaysia, will be examined.

This research postulates that the contribution of the I.A.C. to prehospital care practice in Penang, Malaysia can and should be viewed in terms describing (as opposed to quantitatively measuring) its contribution to professionalism through the experience of participants in this study. The concept of professionalism is one that exists as a theoretical framework and is not one that lends itself to a universally accepted definition, as described in Chapter one.

3.3 Methodology

The research methodology needs to be congruent with the aims of the project (Liamputtong, 2013; Morse et al., 2008). Therefore, in order to determine the most appropriate methodology consideration needs to be given to how best to describe the impact of the IAC and the views of medical professionals associated with the course.

Ethnography in general allows the researcher to describe the practice of the participants by learning from them (Roper & Shapira, 2000). While ethnography has traditionally been utilised to explore a culture, through the observation of symbols and artefacts, along with participation in rituals, the methodology is useful in the examination of values and beliefs and has been successfully utilised in previous studies (Spiers et al., 2014). Focused Ethnography differs from that of traditional ethnography by allowing for a sharper focus on a particular aspect of their work practices of participants, the way in which they conduct themselves and how that is achieved.

Ethnographic enquiry is widely utilised in nursing research (Ho & Chiang, 2014; Mahon & McPherson, 2014; Sercu, Ayala, & Bracke, 2014). The methodology can provide a rich description and insights into social and professional interactions.

By developing the theory that social research is a reflexive process, ethnographic research has contributed to the understanding of the complexities of professional interactions in Nursing practice.

Ethnographic approaches have also been used in school based education to frame qualitative evaluations (Dinkel, Huberty, & Beets, 2014; Martin et al., 2014). Whilst these evaluations are often used to dissect what has failed in a course, the approach is used in this study because it allows a deep description of the perceptions of that course from a number of perspectives.

Focused ethnography has been described as a context specific, time-limited study focused on situations within groups (Knoblauch, 2005). As such the methodology is suited to the study of the constructed concept of professionalism in Ambulance practice. The benefit of using focused ethnography as opposed to traditional ethnography is the ability to explore the lived experience of selected individuals, rather than a community as a whole. In this study we are particularly interested in the professional experience of the Ambulance Practitioners themselves and the Emergency Physicians, who are the current authority in prehospital care practice in Malaysia are of particular interest.

While Ethnography is often considered synonymous with participant observation (Kluckhohn, 1953), focussed ethnography is arguably better suited to the examination of a particular group's understanding of the phenomena under study, such as nursing participants in an education program, (Spiers et al., 2014). The main benefit of focussed ethnography is the ability to examine interpretation and perceptions of meanings which can be reflected in memories (Mills, Bonner, & Francis, 2006). In this study, focussed ethnography provides a powerful tool, which enables participants to share their understanding of their experiences and knowledge of their everyday work including the impact of a professional educational program. Focused ethnography allows for the participants themselves to define what they consider to be the hallmarks of professional development within the Ambulance industry in Penang.

3.4 Methods

3.4.1 Research Design

In order to fulfil the project aims, there are a number of methods for data collection that need to be considered. To describe the impact of the introduction of the IAC, consideration needs to be given to being able to immerse the researcher into the subjectivity of those involved in the program. A variety of methods for data collection were utilised to ensure triangulation. Methods included semi-structured interviews, observation and field notes. The previous experience of the researcher as a trainer in the IAC also allowed for a deeper understanding of the issues addressed by this research.

Development of the themes was undertaken during the process of data analysis to assist in the identification of data saturation. Interpretation of the themes was considered in light of Greenwood's (1984) framework of a profession. This was not a linear process as theme development continued throughout the data collection and interpretation. The researcher continually referred to interview, observational and field note data to ensure the accurate reflection of the subjective reality of participants.

3.4.2 Semi-structured Interviews

Semi-structured interviews are interviews that follow a general guide, rather than a scripted question (structured) or conversational (unstructured) format. This was chosen as the main method of data collection as it allows the participants themselves to express views, rather than having their knowledge and behaviour interpreted by the interviewer or researcher.

Interviews in general allow a deep examination of the constructed reality of professionalism as it exists in the minds of participants. The views of interest to this study are from those who participate in prehospital care (Ambulance Practitioners) and those who are seen as the experts in emergency medicine, and therefore are the authority for prehospital care (EP's & MA's).

With any interviewing method the process of extracting the data can occur in a variety of different ways. In this study a thematic analysis was conducted following the guidelines set out by Braun and Clarke (2006) as described in detail later in this chapter. Consistent with this process, the researcher continually developed themes as the interviews were taking place aiding the process of identifying data saturation. The process of data collection is also discussed in detail below.

3.4.3 Triangulation of Methods

Methodological triangulation has been described as the use of more than one method being used in the data collection process (Liamputtong, 2013). For example, in one single study, interviews and observations may be utilised to collect data regarding the research questions and in doing so contribute to reliability and validity of the interpretation of the data (Carpenter & Suto, 2008; Padgett, 2008). In this study reliability and validity of the interview data is analysed in light of the observational data and field notes.

Interviews provided the main source of data in this study. Other data were sought through observation and field notes for the purpose of triangulation. To ensure trustworthiness and authenticity, the interview data were considered in the light of these observations and field notes, with approximately 40 hours spent observing ambulance practitioners' interactions with medical professionals (Table 5).

3.4.4 Observation

Gaining an understanding of professional development purely through observation would require a far deeper knowledge of culture and language than was available to the researcher. Likewise, the practicalities of gathering everyone involved in emergency care in focus groups whilst ensuring service providers can continue providing care would be too disruptive to essential services. Observations occurred alongside the thematic analysis as transcripts were being produced and themes identified. In addition, data and themes developed from the data were examined by an experienced researcher.

With its roots in anthropology, participant observation has been described as the most natural and the most challenging of qualitative data collection methods (Guest, 2013). Participant observation also can be described as the most appropriate method when the research question involves understanding a group of interacting people (Neuman, 1994). The benefit of participant observation, as Daly (2007) comments, is that it can generate a rich description of the way in which a culture operates.

Whilst being able to describe what is observed is advantageous, the researcher may also gain an intuitive understanding of the research and the ability to collect a wider range of data (Bernard, 2011). Observation is limited to the observable characteristics of professionalism and while it is not the primary source of data, it provides a means by which the primary data can be verified.

The author conducted observations in the Emergency Department at HPP, and on the emergency Ambulances of SJAM, RC and MCCD. The observations concentrated on developing evidence to confirm or refute the themes developed from the interviews and concentrated on observable evidence of professionalism (as described in Table 3).

The process of identifying the appropriate people, location and behaviours to observe was informed by Spradley's (1980) 12 step Developmental Research Sequence (DRS) method, which is commonly utilised in ethnographic studies (Berg, 1989; Bogdewic, 1999). DRS as a process aimed to lead the researcher into a deeper understanding of the cultural elements embedded in the group under observation (Spradley, 1980). The first four steps of the process concentrate on developing an understanding of the social interaction of the observed behaviour. Following this a domain analysis is conducted, identifying an overall context in which to view the observational data. This enables the researcher to develop and organise the data in a meaningful way (Phillips, 2014).

In the context of this study, utilising the principals of DRS, the author identified the Ambulance Officers interaction with Medical staff as the most appropriate place to consider the changing nature of the role of ambulance practitioners in Penang. This process, referred to as the 'handover' is the most obvious and observable point at which interaction between Ambulance Officers and Medical staff occurs.

Handover is described by the Australian Medical Association as the "transfer of professional responsibility and accountability for some or all aspects of care for a patient or group of patients, to another person or professional group in a temporary or permanent basis" (Australian Medical Association, 2006, p. 2). This definition is similar to one in use by the British Medical Association and is used by S.A. Health in South Australia (SA Health, 2015). Observation of this process as well as how Ambulance practitioners collect patient information for the purpose of clinical handovers, provided useful insights into the issues explored by this research.

By observing clinical interactions and in particular the handover process, the author proposes that the researcher was observing aspects of professionalism. Utilising the framework for the recognition of professionalism offered by Greenwood (1984) to also frame the observations, the researcher was able to

collect data for the purpose of triangulation. The table below gives examples of how Greenwood's (1984) attributes of a profession align with observable characteristics in this study.

Table 3: Observable Professional Attributes

Attribute (from Greenwood, 1984)	Demonstrated by	Application to this study
A systematic body of theory	Systematic and documented practice with standard procedures or guidelines	While evidence of this is difficult to observe in practice, a systematic approach to practice and handover can indicate that a systematic body of theory exists within an organisation.
Authority	Trust given and advice sought from members of the profession by other professions or members of the public	Authority in this setting is about the respect with which the emergency medical staff at the hospital gave to the ambulance crew. This can be evident in the handover and the extent to which it is given and received.
Community sanctions	Respect and recognition by the community	Community views were not canvassed during this research.
Ethical codes	Guidelines for the ethical conduct of the profession	Ethical codes were not observed during this research.
A Culture	A distinct way of interacting and an identity separate from other professional groups.	Ambulance culture in Malaysia is yet to be described. The complex nature of the cultural context within Penang, makes this aspect challenging to observe with any certainty.

Thus, observable characteristics of professional behavior were considered alongside data collected via interviews.

3.5 Ethical Considerations and Influence of the Researcher

3.5.1 Researcher Influence and Cultural Context

Penang is made up of a complex mix of ethnic groups, mainly Malay, Chinese and Indian. The cultural complexity of working in this mix has not yet been described in literature. The majority in Penang are ethnic Chinese with ethnic Malay, followed by ethnic Indian origins. Amongst the different communities there is little mixing of culture and there are some noticeable differences in occupation, English language proficiency and cultural norms. Navigating the cultural complexities offers ethical challenges, most notably the issue of influence. In the author's experience in Penang there is a cultural custom to place faith in the decisions of influential people with little question or comment publically. This custom is not well documented or studied; however reputation appears to be a very important aspect of public life.

As the researcher was also someone of influence within the community careful consideration was given to the effect of the power relationships. The researcher was a co-creator of the IAC and has taught on the program over the last five years, including some of the participants in this study. Furthermore, the researcher has the strong support of several very influential people in the Penang community. Due to cultural practices it would be unusual to be seen to publicly criticise anyone with high social status. There was a risk that participants would not feel free to refuse to participate and if they did so will simply respond with what they think are answers that the researcher wants to hear. Furthermore, if the participant thought that their responses would be identifiable, they may not have been candid.

This concern was addressed by ensuring that each participant had the opportunity to refuse to participate and it was made clear that in doing so, there would be no consequences. Furthermore, the researcher ensured that participation in the research did not carry advantages for those who chose to do

so. Data was not discussed with anyone outside of the study until such time as it was not identifiable and the participant was able to choose the interview location to minimise the possibility of being identified as a participant. Social meeting places frequented by colleagues and work sites were avoided as much as possible.

Inherent in these methods described above (interviews, observation and field notes) is the researcher becoming a reflexive instrument. Participation in activities associated with the study of ambulance practice also naturally include some clinical practice. It is noteworthy that the researcher had prior involvement with all of the respondents and in many ways was part of the system under study. This prior ethnography allowed for a deeper understanding of the complex nature of ambulance development in Penang, however it did come with the need to actively manage the risk of misinterpretation of findings due to acculturation within previous professional environments (Bell & Taylor, 2000; Benner, 2001; Kanuha, 2000).

The active management of researcher influence relies on the researcher themselves to critically reflect on how their own being interacts with the subjective reality of the participants. On this matter Guba and Lincoln (1989, p. 101) offer the following explanation:

“It is the conscious experiencing of the self as both inquirer and respondent, as teacher and learner, as the one coming to know the self within the process of research itself. These results in 3 selves: 1, research based selves; 2, brought selves; and 3, situationally created self: and each has a distinctive voice. Research is the process of discovering of the subject and of the self. This results in greater complexity via multiple, dynamic, problematic, open-ended, and complex forms of writing and representation however, this also creates more complexity via multiple selves to consider.”

The researcher has a professional background as both a Paramedic and a Social Worker. The ability to work whilst reflecting on one's own influence and interpretation of behaviours is a core part of both professions. Thus, the researcher in this study was able to maintain an awareness of the possible ways in which he influenced both data collection and the availability of the data to be collected. This, when combined with the researcher's intimate knowledge of prehospital care and practice in Penang allowed the researcher to minimise any misinterpretations of observable behaviour. By critically reflecting on observations and checking meaning where possible with the participants, the issue of researcher influence was actively managed throughout the research process.

Another factor countering the issue of influence is the fact that the IAC Course itself encourages students to develop their own ideas and to critically analyse information provided by the course. Students spend 30 weeks learning how to be critical thinkers and being encouraged to develop their own views on prehospital care. As the researcher has a professional relationship with nearly all the potential participants they are aware that a high importance is placed on their views. As such the likelihood that cultural considerations prevented participants from expressing their own view was low. Knowledge of the participant's background and in most cases a professional relationship outside of the research was, in this case essential to gaining trust and eliciting a candid response.

Working with the medical community holds similar advantages. Emergency Physicians are often asked for their opinions and in Penang have, on occasion, been a voice of dissent when it comes to public health issues.

Overcoming the issue of influence was considered when forming the interview guide and when conducting the interviews themselves. The interviewer has significant experience in interview skills, having had a background in Ambulance practice (where ascertaining medical histories via a patient interview is key), in

Social Work and in the Police. The interviewer has also benefited from formal and informal interview training in a number of different settings.

3.5.2 Anonymity of Participants

Each individual agreed to express their views in the knowledge that the population of this study was limited and true anonymity was not possible. Every participant was aware of this and chose to continue their involvement in the study. The participants' names were removed and the interview order randomised. They were given a pseudonym and the participant's position, the organization that they work for as well as their name, age and gender withheld. It is believed that this will afford some degree of anonymity without affecting the research findings.

3.5.4 Ethics Approval & Acceptance by Stakeholder Organisations

Ethics approval for this research was granted prior to participant recruitment and commencement of data collection (Appendix 6). The research was deemed low risk, as the study asked questions of workers regarding their work, rather than personal life and the potential for harm was minimal. Consent was gained from each individual prior to the interview and general consent to conduct the research was approved at an organisational level by SJAM Penang, HPP and MCCD (Appendix 9).

3.6 Process

3.6.1 Initial Contact and Information

Having gained ethics approval from Adelaide University (Appendix 6), existing email lists maintained by the IAC Course, SJAM Penang and HPP were used to send the participant information sheet to all people who may have been

interested in participating (EP's, AMO's, and Ambulance practitioners). Emails were sent by the respective organisations. Email addresses were not released to the researchers until such time as the participant responded and gave their permission for the researcher to hold this information.

Face to face information sessions were held with staff and volunteers from SJAM and HPP, RC and MCCD. Those who expressed initial interest attended and were free to give their details to the researcher. Again the researcher was not given access to contact details until such time as the potential participants gave their permission for this to occur. Several small group informal information sessions were held over January and February 2015 in Penang.

3.6.2 Recruitment for Interviews and Selection Criteria

Purposive sampling was used to enrol participants in the interviews conducted under this study. This sampling technique allowed for the recruitment of people who were able to comment on the IAC based on their position in the EMS or healthcare system. In this way the selection criteria for participants was not complicated. Simply put, they were in a position to form an educated view of either the healthcare system or the IAC and the role it plays (or both).

Those who were in a position to observe and form views were from the following groups:

- Ambulance practitioners (either employed or volunteer)
- Emergency Physicians within HPP (or current trainees)
- IAC Graduates
- Assistant Medical Officers within HPP

Participants approached the researcher directly, or by a return email. The researcher also spent time in the HPP Emergency Department observing

Ambulance practice. While there he was able to speak to various group and advertise the study.

Once recruited the researcher negotiated a suitable time and place for an interview with each participant. Interviews took place in a variety of settings, including public spaces, workplaces and coffee shops. At the beginning of the interview consent was obtained from each participant via the signing of the consent form (see Appendix 10 for the form template). Consent, and in particular the use of potentially identifiable data was discussed at length with each participant to ensure agreement before proceeding with the interview.

The study's total population was estimated at twenty due to the transient nature of the workforce in both Emergency Medicine and Ambulance practice in Penang. Of the graduates of the IAC course, less than ten have remained with an active involvement in prehospital care within Penang. It is unclear where the remainder are working and there are no methods of tracking graduates within the EMS system.

3.6.3 Non-Respondents

Those people in the population of the study that did not respond at all were discussed above. There were three people who expressed an initial interest in being interviewed, but did not respond to follow-up correspondence. All three had requested contact via electronic means and two attempts were made to follow-up the non-response. Following this no further attempts were made to contact them and their contact information was deleted. It is not known why these people did not wish to take part in the study after initially agreeing to. Non-respondents were all volunteers with SJAM Penang.

3.6.4 Interviews

The semi-structured interviews were framed by an interview guide (Appendix 7). They were audio recorded and a verbatim transcript created from that recording. That transcript was offered back to the participant for addition or correction (out of the eleven transcripts, none were altered). During the transcription process the author reviewed and authenticated the data. Data analysis was undertaken as a continuous process, thus allowing for the researcher to form a logical point of completion of this process, or data saturation.

3.6.5 Identification of Data Saturation

Data saturation refers to the point at which themes continually re-emerge from the data (Liamputtong, 2013). Following saturation there is little new data produced and further interviews would be redundant. This can create a dilemma as to how to identify the most appropriate sample size for the study (Francis et al., 2010). Samples are determined by the quality of data, rather than the number and representativeness of the participants (Liamputtong, 2013). The point at which data saturation is achieved is often unclear (Francis et al., 2010). This dilemma was addressed in this study by maintaining the process of identifying themes as a continual process whilst interviews were being conducted. This led to data saturation being easily identified by the 11th interview. That process is described in detail below.

3.6.6 Data Analysis

Following collection, a thematic analysis of the data collected from the interviews was conducted following the guidelines set out by Braun and Clarke (2006), as described in detail later in this chapter. Consistent with this process, the researcher continually developing themes as the interviews were taking

place aided the process of identifying data saturation. The process of data collection is also discussed in detail below.

A thematic analysis was then carried out by first coding the verbatim transcripts in a process described by Braun and Clarke (2006). They describe a six-stage process for identifying themes. The themes identified through this process are discussed in the next chapter. The process is outlined below for reference:

Phase one – Familiarisation

The primary researcher in this study conducted the interview and transcribed them into text. This constituted the familiarisation phase as described by Braun and Clarke (2006).

Phase two – Generating Initial Codes

Preliminary codes were generated which were placed into a table. This table can be seen during the results section of this thesis (Table 6)

Phase three – Searching for Themes

Themes were collated from the initial generation of codes and placed into the aforementioned table.

Phase four – Reviewing Themes

The themes were reviewed and mapped to ensure that the generated themes worked in relation to the coded data. Examples of each theme were then identified in the transcribed data. These were extracted and added to the table.

Phase five – Defining and Naming Themes.

Themes, along with explanations and examples were extracted from the transcripts to enable clear definitions and descriptions of each theme.

Phase Six – Producing the Report.

Themes were then used to provide descriptors for the analysis in the outcome and discussion section of this thesis (Chapters four and five).

As discussed by Braun & Clarke (Braun and Clarke (2006), the process outlined above did not happen in a simple linear progression. Constant attention was paid to re-visiting the code and theme creation throughout the process. The themes were validated by an experienced researcher, familiar with the six-stage process as described.

3.6.7 Validation of Thematic Analysis

Validation of the thematic analysis occurred in March and April 2015. Another qualified researcher repeated the process described above using the de-identified transcripts in order to verify the themes. Both the validating researcher and the author agreed on the themes reflected in Table 6. Both the researcher and the second validating researcher coded all transcripts to establish validity.

3.6.8 Process of Data collection by Observation

Interactions between professional medical staff and ambulance practitioners (both paid and unpaid) were observed. Field notes were recorded (an example of observation notes is presented in (Appendix 8) and the results reported alongside the thematic analysis presented in chapter four. Permission to conduct research in HPP, SJAM, MCCD and MRC was obtained, with the first three

organisations issuing letters of approval (Appendix 9). An observation schedule (Table 5) and the themes are presented in Chapter four.

In the next chapter the themes derived from the data will be discussed.

CHAPTER FOUR

In this chapter the collection of data and the themes derived from that data are described.

4.1 Introduction

Observations and field note recording were made and interviews were conducted by the author in Penang during January and February 2015. In total eleven interviews were conducted and forty hours of observation were undertaken, with subsequent field notes being recorded. The thematic analysis of the interview data, combined with the results of the observations and field notes, identified four themes, described below. These themes paint a picture of the Ambulance service provision within Penang, how it might develop and how the IAC contributes within the milieu of prehospital care development. Further discussion regarding the relevance of the themes within the context of this study will be detailed in Chapter five.

As discussed in the previous chapter, a gender neutral, random pseudonym was assigned to participants to assist in de-identification of data. Where excerpts are used in the following pages, associated tables or appendices those pseudonyms will be used. The age or exact role of each individual is not reported here, as doing so would lead to easy identification of participants. Broad descriptions are given (Table 4) for the purpose of contextualising the comments made by the participant.

4.2 Respondents and Response Rates

The participants who were invited to share their views were from medical and ambulance services backgrounds, as discussed in chapter three. Those who responded to invitations to be interviewed were a mixture of age and experience. Participants included Ambulance Officers from SJAM, MCCD and HPP (AMO's). Ambulance staff from Red Crescent and Bomba (including the volunteer arms) did not respond to requests for interviews and were consequently not interviewed. Red Crescent agreed to allow the researcher access to services for the purpose of observation, along with HPP, SJAM and MCCD. Bomba was the only organisation to have no representation within this study. Those who did not participate were not followed up to ascertain why. As previously discussed the estimated population for this study was twenty. With eleven participants in the study, the views of over half of the estimated population were ascertained via interviews.

Those who chose to participate were from a mixture of professional and other backgrounds, ages and gender. There were five females and six males, aged between 21 and 43. All participants had firsthand knowledge of the EMS system in Penang, although not all (n=4) had direct knowledge of the IAC. All participants currently work or volunteer within the EMS system in Penang.

4.3 Participants Roles

A description of the participants' exact role within Penang's EMS system is difficult. Many people hold dual roles and more than one type of qualification. For example, it is not uncommon for someone who has a passion for prehospital care to be a Doctor within HPP and a volunteer with an NGO ambulance service. Likewise, the IAC course has 'trained' a number of people who have previously

completed Medical or Nursing Degrees. Categorising these people into a professional group or grouping by education is therefore likely to be inaccurate.

The table below outlines participants' pseudonyms alongside non-identifiable bibliographical data.

Table 4: Description of participants

Name	Age Range	Role				
		HPP	NGO	Medical Prof.	Ambulance Role	IAC
Leigh	30-39		√		√	√
Nicky	30-39		√		√	√
Reilley	20-29		√		√	√
Joyce	30-39	√		√	√	
Greer	20-29	√		√		
Dell	20-29	√		√		
Reegan	40-49	√	√	√	√	√
Shannon	40-49	√		√		√
Kelsey	30-39	√		√		
Devin	20-29		√			
Val	30-39		√			√

Notes: HPP – Those who have a role within Hospital Pulau Pinang Emergency Department.
 NGO – Those who have a role with an NGO (e.g. SJAM, RC or MCCD).
 Medical Professional – Those who are members of medical professions (e.g. Doctors, AMO's).
 Ambulance Role – Those who have a role (including administration & management) within Government or Non-Government Ambulance services.
 IAC – Those who have a role within or have attended the IAC.

4.4 Observations

As discussed in the previous chapter, observations were conducted as a means of triangulation, rather than a primary source of data. Sites for observational data collection included Ambulance bases, Ambulances and the Emergency Department of HPP. No particular group (e.g. IAC graduates or participants of interviews) was targeted for observation and various people were observed. Observations involved all of the various ambulance providers within Penang described in this thesis. A table outlining the observation schedule and the interactions observed is below.

Table 5: Observation Schedule

Location	Time Spent	Interactions Observed
Hospital Palau Pinang	15 hours	Handovers from various Ambulance crews from M CCD, Red Crescent, SJAM and HPP. Interactions between staff and volunteers from all services. Interactions between AMO and Medical staff as well as AMO and Ambulance practitioners.
SJAM	10 hours with paid staff.	Interactions between IAC trained and non IAC trained staff. Handovers between practitioners as well as handovers at hospital.
SJAM	Five hours with volunteers	Interactions between IAC trained and non-IAC trained staff. Handovers between practitioners as well as handovers at hospital. Clinical interactions with patients.
Red Crescent	Five hours with paid and volunteer staff	Interactions between IAC trained and non-IAC trained staff. Handovers between practitioners as well as handovers at hospital. Clinical interactions with patients.

Civil Defense	Five hours	Interactions between IAC trained and non-IAC trained staff. Handovers between practitioners as well as handovers at hospital. Clinical interactions with patients.
Bomba	Two hours	Handovers from non-IAC trained ambulance staff (note: no Bomba member has attended the IAC training to date).

4.5 Outcomes

The Thematic analysis, combined with the results of the observations and field notes, identified four themes, described in Table 6 below. These themes describe of the Ambulance service provision within Penang, how it might develop and how the IAC contributes within the milieu of prehospital care development. Further discussion regarding the relevance of the themes within the context of this study will be detailed in Chapter five.

Table 6: Themes Derived from Interviews.

Theme (Phase 3)	Sub-Theme (Phase 2)	Concepts (Phase 1)
Quality of Training and Quality of Care Go Hand in Hand	When higher quality of care is seen, it is perceived to relate to higher quality of training	Training standards vary and are set by each provider. There is no central control of training content or standards. Those organisations that are perceived as providing a comparatively higher level of care are also those with a comparatively higher standard of training.
	Quality of training varies depending on the service provider.	Quality of care is not necessarily associated with resources, however those with mainly volunteer resources may have lower training available. Some of the NGO's that have greater financial resources

		<p>are regarded as having lower standards of care. Having Government funding does not always result in higher perceived practice standards.</p> <p>A rank order may exist in terms of quality of training.</p>
<p>How Standardisation is Being Managed in Penang.</p>	<p>Penang lacks standardisation in both service delivery and training. This is seen as a key way to improve patient care.</p>	<p>The IAC is seen as one way of achieving standard training, however it would need the co-operation of the NGO's.</p> <p>Similar to how change might be managed, the NGO's need to display leadership in this area.</p> <p>Prehospital care in Penang is under developed. The current system is outdated and not as effective as it could be. Even given the limitations of a developing nation, Penang can and should do better. Change can occur from the top (government) down or from the practitioners up. In both instances there needs to be specific people with both the authority and the knowledge to effect change.</p>
	<p>Training is one of the keys ways that standardisation may be achieved.</p>	<p>The IAC is seen as one way of achieving standard training, however it would need the co-operation of the NGO's.</p>
<p>The IAC is one Course that is Assisting the Development of a Profession</p>	<p>The course assists in improving practice through education</p>	<p>Education standards are variable amongst the NGO's and there is no specific prehospital care program for AMO's. The IAC provided a course that fills a gap in the education market. It is not the only course, but is accessible.</p>
	<p>Perception of quality of care and professional development have been improved as a result of the course.</p>	<p>Those who have completed the course are now perceived as being more professional in their approach to prehospital care.</p>
<p>The Management of Change</p>	<p>Change is required for the system to improve.</p>	<p>The NGO's and the practitioners within them are well placed to achieve change. If practitioners wait</p>

	Change can happen if people are willing	for 'top down' change, they may be waiting a long time.
	NGO's are able to set their own agenda.	NGO's are seen as not being as restricted by Government policy and bureaucracy. The lack of regulation means that NGO's are free to set their own directions in training and service provision.
	The prehospital care system currently relies on NGO's and now cannot exist without them.	A move to a single Government run system would be unlikely due to the system which currently exists being an integral part of the prehospital care response. The Government Service does not have the funding to change practice.

4.6 Detailed Analysis of Themes.

4.6.1 Quality of Training and Quality of Care Go Hand in Hand

Amongst the participants there was a consensus that service provision differed between the service providers. Each service has its own method of operating and own training systems. While there are attempts to standardise some aspects of the patient experience, practice largely depends on each individual agency.

Clinical care and education were seen as linked. Dell, a Doctor, summed up the current state of clinical care within Penang's EMS system by saying:

"I don't think it's very [well] organised yet ... most [ambulance practitioners] are Medical Assistants [AMOs] and the other main NGO will be St John. The rest of the NGO's are not very well trained. So in terms of attending the patient, how they are going to manage the patient, it's very much primitive still. I don't think care is very well managed here" (Dell, p.1, turn 12).

Participants identified that the quality of care given to individual patients often equates to the quality of the training provided. Quality of care is difficult to empirically assess in prehospital care.

As discussed in previous chapters the differing standards and accreditation frameworks lack international cohesion. In developed systems each area of operation has their own set of standards that lack international cohesion. Quality of care is defined against each individual standard, for example the ISO accreditation framework in Australia or the Health and Care Professionals Framework in the UK. In parts of the United States of America and increasing in Asia there are also private companies (for example the Commission for Accreditation of Ambulance Services), which offer accreditation according to standards they set. In Malaysia there is a lack of published standards relating to prehospital care generally.

Some areas of Malaysia (such as Kuala Lumpur) have a cohesive understanding of what constitutes quality care, however in the authors experience there is little documented evidence of this. Where there are no universally accepted local guidelines (such as Penang), there is nothing to compare service providers against. Where there are local (such as parts of Kuala Lumpur) standards, they often relate only to availability and response times, not clinical outcomes.

A more reliable measure of quality in this circumstance may be opinions of the medical professionals who receive those patients as well as other practitioners working within the industry. That professional opinion consistently positioned the AMO's and SJAM Penang staff at the top two, followed by Red Crescent and MCCD.

While some participants were eager to point out that there are factors at play (such as the volunteer nature of people in the poorer performing organisations) they agree that most of the difference lies in training standards. This was evidenced mainly in the responses given by participants who have a role within

the emergency Department at HPP. As described in the previous chapter, these participants were a mixture of trainee Doctors, EP's and Consultants and were in a position to make observations and form professional opinions on presentation of the patients.

Once such participant, Greer, stated that the AMO's and SJAM are adequately trained and "the rest of the NGO's are not very well trained" (Greer, p.1, turn 12). Greer commented that the training given to the AMO's and SJAM enabled them to distinguish between a critically ill patient and one who was not. When asked about the other organisations (JPAM and RC), Greer commented that the training was insufficient to allow members of those organisations to perform at this level (Greer, pp. 2-3, turn 22-34).

The level of training is reflected in the way in which patients are treated and handed over to the emergency department at HPP. While other differences between the NGO's may affect patient care, such as the availability of equipment, it was the level of training that seems to be most relevant to the standards of service provided in the minds of participants (Appendix 8).

Joyce, who has a role in HPP, was able to further expand on the differences between service provision:

" ... you asked me between the NGO there's any discrepancy between pre-hospital care, I think there is, personally, I noticed, there are certain NGO's who actually can work better in pre-hospital care. They can bring a patient and present to you the problem. They can give a short diagnosis. Whereas some of them, some NGO's, they are not capable at this moment ... All they do is uhh, they go and attend the patient. And then they bring the patient to hospital and know the patient needs emergency care but they do not have any idea what is the problem" (Joyce, turn 43).

Whilst reluctant to openly criticise, Joyce was able to state which NGO's were perceived to be of a higher standard. Joyce stated:

"For the NGO's, I think St John's Ambulance provide the highest care for the time being. Their crew can present the short history of the patient's medical history and they can give us a summary of their examinations. And they can, some of them who are good, they can actually tell us what treatment has been given, and what, they can give us some suggestions, what needs to be done. Where else so far I notice the JPAM [MCCD] team is a bit lacking in this sense ... Sometimes they don't even know why the patient has to be in the ambulance and has to come to hospital" (Joyce, turn 44 to 51).

Leigh (who has involvement in ambulance work via an NGO service) commented in regards to the service they practice with, "... not everyone is from [an] ambulance background ... they are trained first aiders ... not at BAC level. They are probably first responder level" (p. 2, turn 20). Leigh went on to comment that while they are first responder level, most times the first response is the only ambulance response.

Reilly, another NGO based practitioner, commented that there are different standards for the different providers and that Penang lacks standardisation in regard to training (Reilly, p.8, turn 86). It is the lack of standardisation which contributes to the difference in training and therefore practice standards.

Shannon, another participant with a role in HPP supports the other participants by stating:

"In the experienced ones you would expect the standard should be higher. In our experienced prehospital care providers [AMO's]. But of course saying that, there are also, in other organisations like St. Johns, who, those who we know we've been training them on these courses, they've been bringing in patients ... so they have also been trained to a fairly good standard, so we

also trust the sort of information that they bring ... and if you talk about Civil Defense of course, they are more volunteers. They have not really been trained very well in the medical field, so you would expect them to have a lesser medical competency” (Shannon, p.12, turn 112).

The roles were evident when participating and observing in the HPP Emergency Department. In the case of AMO's it was clear that they occupied a particular place within the Emergency staff. Given that they are part of the Emergency Department workforce, Medical staff are familiar with their practices, strengths and weaknesses. Medical handovers were given and appeared to be structured, with consideration to the content given by medical staff (Appendix 8). SJAM staff and volunteers are not part of the emergency department workforce but were afforded a similar level of respect when it came to handing over the patient (Appendix 8). Although individual levels of competency did differ, it appeared that SJAM personnel were able to express their handover in a consistent manner.

Red Crescent staff often either did not attempt a handover or were not asked for one. A number of handovers and little medical information was passed to ED staff by RC staff as was the same for MCCD staff.

Most participants saw that improving patient care within the EMS system in Penang as a reasonable and attainable goal. Joyce expressed her desire to see that significant improvements are made within the system and linked this to the knowledge base from which practitioners operate:

“I hope we move towards the direction actually where paramedics are trained enough to give more extensive first aid help at the scene. Actually to me they can assess the situation and should be able to give emergency treatment, drugs.” (Joyce, p.8, turn 91).

“At this moment, what I feel lacking is better knowledge itself in some of the paramedics. I mean from what I see some of them are not really familiar

with the certain guidelines or protocol, even for cardiac arrest protocol.”
(Joyce, p.10, turn 113).

Amongst participants, the desire to improve education within prehospital care in Penang appears to be driven by a desire to improve patient care. Where other more developed EMS systems, such as the one in Australia, may be looking to provide improvements through the use of technology or inter-discipline co-operation, the common view amongst participants in this study is that improved training will have a large impact on patient care.

4.6.2 How Standardisation Is Being Managed in Penang

Participants in this study described an EMS system that lacked a standardisation of practice. This theme is interlinked with the descriptions participants gave of the lack of common training standards when discussing the link between training and patient care above.

According to all of the participants in this study, the standard of care given depends on the organization delivering the care. While there have been attempts made to at least co-ordinate the providers, little if any has been done to ensure standardisation of practice within the system as a whole.

The current standards within all services should be at least BAC level, according to descriptions given by participants of this study (See Appendix 11 for a description of the scope of practice). This was the suggested standard as a means of ensuring minimal basic care was given, however Reegan commented it is not well enforced with some crews only able to deliver “basic first aid” (p.3, turn 34).

Reilley described the impact of variable training service provision:

“It depends on your luck where you have your medical emergency at... so, if you happen to be in a central part in Penang, if you call 999, 999 would

have dispatch nearest ambulance which is Penang General Hospital. Let's say if you are in the southern part of Penang, if you are unlucky, you might get not so well trained ambulance to respond to you ... Pre-hospital care in Penang is not standardised. It varies from organisation to organisation, from person to person" (Reilly, p.4, turn 40).

Improvements to the EMS system in Penang are seen by participants as necessary and desirable. Nicky, who has a role in an NGO, commented that improving the EMS system is the key issue: "That's the most important words that I want to mention. [We need] to try and close the gap with other country who have been doing well compared to us" (p.11, turn 98).

When each participant in this study asked about their 'ideal' system of prehospital care, they commented on the need to standardise training and service provision. Participants who have a role in HPP (Joyce, Greer, Dell, Shannon & Kelsey) all commented that a single ambulance service co-ordinated by HPP would be their preferred 'best practice' model. Participants who have roles within NGO's were split on this issue, with Leigh, Greer, Val and Tracy preferring standardised education across existing services and Reilly preferring one service. Interestingly, Reegan (a participant with multiple roles) commented that:

"If funding is not a problem I would think definitely a single emergency [system] would be better in controlling their management and all that. But the model we are using now in Penang with multiple agencies working together seems to be working as well" (Reegan, p.6, turn 68).

Both Reegan and Shannon discussed the current efforts to standardise services with a council dedicated to provide oversight and co-ordination of the whole EMS system. The function and co-ordination of this council is not well known or advertised and the author understands that it mainly discusses hospital-based services and administrative issues currently. Minutes of the meetings are not

published and few practitioners involved in this study had knowledge of its existence. Participants view the system as lacking in the type of co-ordination that such a council was originally designed to provide.

Just as improved training will lead to improved patient care as described above, participants viewed that the standardisation of training will standardise practice. The IAC is seen as by participants as possible way of achieving standardisation and therefore improving service provision within Penang. Naturally this is dependent on the course being accepted as an appropriate standard by all services.

4.6.3 The IAC is One Course That is Assisting the Development of a Profession

Greenwood (1984) describes the existence of a distinct body of knowledge as one of the attributes of a profession. This study seeks, in part, to ascertain if the IAC has contributed to the creating a distinct identity for ambulance practitioners through sharing ambulance specific knowledge.

The IAC was perceived by all participants with knowledge of the course as being a positive driving factor in professional development. For those without direct knowledge of the IAC, the idea of having a course with specific prehospital care knowledge is seen as essential to improved ambulance practice. Evidence of this theme is provided from two distinct perspectives: Those participants who have knowledge or have attended the course (n=6) and those who have knowledge for the EMS environment in Penang, but no direct knowledge of the course (n=4). Out of the six participants with knowledge of the course, five had previously attended.

Participants reported that ambulance practice requires knowledge that cannot be found in other disciplines and simply being medically trained is not sufficient. In particular, Greer, a Doctor in HPP, found that being involved in an ambulance response without any specific training is a harrowing experience. Greer states that on one ambulance run she was treating an elderly lady for a gastrointestinal bleed outside of the hospital:

“She was like bleeding frank blood on my shoes, I was like, ‘Aunty please survive’ and I couldn’t get a line in” (Greer, p.8, turn 144).

“... So it’s tough for me. I would say because I’m not fully trained to go out on calls. I mean if it’s in the Hospital, it’s easier for me because there’s help around” (Greer, p.2, turn 34).

Greer typifies the views of the Doctors involved in this study. Whilst medical knowledge is important, prehospital care knowledge is perceived as broader than just medical knowledge. A number of authors have described how Paramedic practice has separated itself from other medical practice in developed systems (Mason et al., 2003; O’Meara & Grbich, 2009; Tippett et al., 2008). This is something that has yet to occur in Penang, participants in this study recognise this as the next logical step.

Val, an Ambulance Officer for an NGO and former participant in the IAC, stated that the IAC allowed them to work in a “more systematic way” and better cooperate with other Ambulance practitioners for the benefit of the patient (p.5, turn 70). This systematic way of working is indicative of professional development as a systematic body of knowledge emerges.

Observations within the NGO’s support the assertion that the IAC has had a wider impact than simple medical training for the participants. The IAC has provided an avenue to improve leadership in EMS organisations. Colleagues of those who participated in the course tended to view them as clinical leaders

within their respective organisations. Whilst some were already in formal leadership positions prior to the course others, such as Nicky, they have taken on additional roles with new staff and were observed providing guidance during Ambulance responses. Nicky stated that there was ‘a world of difference’ between practice pre and post IAC (p.3, turn 28).

Professional development has been assisted by the IAC. This is evidenced by the comments of IAC participants, and those familiar with it, who describe it as providing “more advanced knowledge” (Nicky, p.4, turn 34); “set to shape [the] ambulance crew to be more professional” (Regan, p.2, turn 22); and “trying to bring us to the professional level but [has not achieved] that yet” (Devin p.3, turn 62).

Whilst the IAC is perceived as being an agent of change, it is also seen as limited in its ability to effect change due to the limited number of participants. Reegan, a participant with multiple roles within Penang EMS, including working as a Doctor stated that the IAC assists in making Ambulance practitioners more professional (p.2, turn 22) and assists in teaching people skills to help care for patients (p.4, turn 52). However, this is tempered by the views expressed by Reilly, that the impact of the course is limited by the number of people that have attended the course (p. 9, turn 100). Joyce, Greer, Dell and Kelsey were participants with a role in HPP and had not heard of the IAC program.

4.6.4 The Management of Change

Service providers within Penang can be separated into two broad groups: NGO’s and Government. While this delineation initially seems clear the service provided by Bomba (Fire Service) and MCCD, while technically Government services, rely mainly on a volunteer workforce. Thus, these services are often considered alongside NGO’s as additional to those provided by HPP. In general,

when participants referred to Government Ambulances in Penang, they were talking about those services provided by HPP. When referring to those services provided by NGO's this included Bomba and MCCD.

When raising the issue of NGO's leading change, participants first discussed the current context of limited resources as a primary reason for a lack of progression. Resourcing appears to be a complex issue with differing opinions amongst those interviewed as to the solutions available in the developing Malaysian economy. In this theme, participants examined the role of AMO's and their limitations as prehospital care practitioners as well as some of the driving factors of the current limited resources.

The AMO role within the HPP Emergency Department encompasses work within and outside of the emergency department. This role has the Diploma qualified AMO's undertaking duties that in Australia, New Zealand and the UK would have been undertaken by Nursing staff and Paramedics separately. Leigh describes the duties undertaken by people in this role:

"In Malaysia they are trying to split the [AMO's], currently today in hospital, [AMO's] are doing two functions ... any patient walk in to the emergency room after the doctor give any prescriptions, they did any IM injections the doctor will pass the prescription card to the [AMO] ... They are the same guy that need to respond to any ambulance call. In KL, today they are starting to split them. So, today you are on ambulance run, so you only standby for ambulance run. That already able to shorten the respond time" (Leigh p.5, turn 28).

The recent split in the AMO role to give a dedicated ambulance response may have been the beginning of an acceptance of the unique nature of Ambulance practice. Despite this, the AMO role largely remains split between ED duties and Ambulance responses. Kelsey describes the difficulties in maintaining an ambulance response when staff are required in the ED for other duties:

“For the first second and third call we already have dedicated person to go for calls and also the ambulance as well as the drivers. But after that it might be a bit difficult because we have to call a person that is working inside of our department, that also [is a] busy area, to go out and respond to the ambulance call ... Sometimes they might be doing procedures and they can’t leave the thing, just like that or they might be working in other places where they really needed there, because there’s also a resuscitation going on there. That is a few things that we can’t avoid” (Kelsey p.3, turn 44-46).

The limited availability of Hospital staff to attend to ambulance calls as well as increasing demand seems to have driven the reliance on NGO’s to provide additional services within Penang. Shannon comments on the ability of the Government systems to cope and the place of NGO’s within the prehospital care system.

“In Penang, as in the rest of Malaysia, actually we are very scarce on the number of ambulances that we have, which are belonging to what we call the Ministry of Health. So, we have tried to expand the number of ambulance[s] we have by actually incorporating them into multiple non-governmental agencies into this prehospital care system” (Shannon, p.2, turn 12).

Reilly supports the idea that NGO’s are not only integral to the prehospital care system in Penang, but the system would likely fail without them:

“If we were to do it all on our own, we wouldn’t have the resources. It still needs to have the community ... to be able to cover the numbers of cases that we see. For example ... I think we see about 14,000 Ambulance calls a year, so compared to maybe 6 years ago, it was probably 6000 calls. So the number of calls have been increasing, so the demand is also been increasing. So although [HPP] still manage the majority of all the ambulance calls, if we

do not have extra help from the other organisations, we are also not going to be able to cope” (Reilly, p.6, turn 58).

Similarly, Reegan views the involvement of NGO's in prehospital care as an inevitable consequence of a lack of resources. However Regan makes the additional comment that resourcing is linked with the values of the community:

“In this part of the world people don't see health as something that they need to actually invest a lot. For example, someone can go to a barber shop have their hair cut for RM50, wait there for two or three hours and they are very happy with the hair do. But if people go to a private [General Practitioner] practice, they pay the RM20 consultation fees, Doctor say ‘Oh ok, you don't need any medications, consultation fee is RM20’ they will be screaming. That's how it is, so money probably is there, but it's not channeled to the needs.” (Reegan p.5, turn 58).

In this way Greer makes it clear that economic affordability is linked with community acceptance of what is an essential service. Without the community accepting ambulance practice as an essential part of health, development is unlikely to be well resourced. HPP, and indeed all healthcare in Malaysia, is provided at minimal cost to the public and the system itself. This universal healthcare system is something, in the author's experience, that Malaysian society is accustomed to and protective of. However, as Greer points out, this may have led to an unconscious undervaluing of health care.

The perceived lack of value placed on health care (and by association prehospital care) can be translated into a lack of recognition of those who provide that care as professionals. In regards to community awareness and acceptance of improved prehospital care practice Regan further states that:

“Some more aware person might [be aware of IAC level prehospital care practice]. They will see the difference of these particular crews, teams, do

things differently and they will be happy to see that going on. But basically the majority of them still think ambulance is a form of emergency taxi, just come and pick up the patient and go” (Reegan p.5 turn 60).

As NGO's are organisations supported and run by the community they may well have an integral role in developing community perceptions as prehospital care develops into a profession. In this way, participants in this study reflected the importance of community acceptance which assists in defining a profession. The views of the community are an important aspect of the development of any profession (Greenwood, 1984).

The integral role of NGO's was seen as a strength of the current EMS system in Penang and while some participants (Joyce, Greer, Dell, Shannon & Kelsey) discussed the need for co-ordination involving a Government agency, all except one participant, voiced the opinion that NGO's would still need to maintain a leading presence in development of the EMS system. Reilly, who expressed a view that there should be one Government run ambulance service made no comment in relation to the funding or feasibility of this idea. The nature of how this change could occur was also a topic raised by participants.

Change was seen as something that can happen from the government or from society. Reegan commented that individual providers in Penang are currently working towards improving the EMS system in Penang by building public awareness for the need to improve and the alternative is to “wait for miracles” from a policy maker that is passionate about prehospital care (pp.6-7, turn 82-84). Overall, NGO led change was seen as difficult to achieve but the only realistic method of achieving improvements to the system.

In the next chapter the themes are discussed in relation to the research question along with limitation of this study and areas of future research.

CHAPTER FIVE

5.1 Introduction

This study sought to describe the IAC course in terms of the development of a distinct identity for ambulance practitioners within Penang. What was being examined was how improved education may have contributed to a change in the values and beliefs within a developing profession. Greenwood (1984) describes the existence of a distinct body of knowledge as one of the attributes of a profession therefore, this study sought to ascertain if the IAC has contributed to the development of this body of knowledge in Penang. While it is not feasible that one course in isolation could achieve the creation of a distinct body of knowledge throughout ambulance practice, examination of how the IAC has contributed to this remains a key aspect of professional development.

The preceding chapters demonstrated a consistent lack of research and literature regarding ambulance practice in Malaysia and other developing countries. However, the published literature presents conflicting views of the current state of services and a number of questions that remain unanswered.

The IAC is not the only course available to ambulance practitioners in Penang Malaysia and not the only factor that might advance professionalism. There are other prehospital education programs available, which are offered at university level in Malaysia (such as the Bachelor of Science (Hons.) Paramedic Science at Asia Metropolitan University). However, to date there has been no research conducted to establish how this level of education impacts upon the development of a prehospital care profession in Malaysia.

This is contrasted by an increasing body of literature from Australia and the UK describing components of professional education and the impact on improving quality of care (Boyle, Williams, & Burgess, 2007; Williams, Boyle, & O'Meara,

2009; Williams, Onsman, & Brown, 2012; Williams, Onsman, & Brown, 2009). Whilst the link between professional development and practice and ambulance demand is yet to be researched, an intuitive link between the quality of practice and training and demand for those services may seem clear.

5.2 Discussion

By examining the way in which the participants of the IAC course and professions associated with the provision of prehospital care, it is possible to build a picture of a developing profession. Essentially, the goal was to demonstrate that it was possible to move more toward a model of professional ambulance practice and away from a transport medium.

The IAC was built on a foundation of well-developed education within South Australia, however it was not known what the impact of this course would be when delivered in a very different ambulance environment, that of Penang, Malaysia. Understanding this impact is an important step to developing the prehospital care industry within Penang. Significantly, these study participants chose to identify the service provider for whom the IAC has become a central part of training (SJAM Penang). They were able to identify a link between improved education via the IAC and professional development. The existence of the program as a specific prehospital care program appears to have assisted in contributing to a specific body of knowledge, which is relevant and accepted within Penang's EMS system. The perception of the IAC as being an agent of change within the EMS system may assist in establishing the course at the core of future training and education developments.

The IAC as a foundational EMS program is particularly relevant when considering the theme presented above of the direct causal relationship linking training and competence in practice. The perception of improved training leading to improved competence is noted, however what may be of greater

interest to policy makers is the association of the IAC as leading to improved quality of care. Whilst this study did not set out to describe the impact of the IAC on quality of care, this finding of the perceived improved level of competence does suggest that participants consider the course as one advancing the quality of care available in Penang's EMS system.

5.2.1 Education and a body of knowledge

At the core of the professional development has been the education base provided to Paramedics. Having a distinct body of knowledge alone, as Greenwood (1984) described, does not solely create a profession. It is, however, one of the attributes and an important step. This study sought, in part, to ascertain if such a body of knowledge was being or had been created by the IAC. Evidence of this finding is provided from two distinct perspectives: those participants who have knowledge or have attended the course and those who have knowledge of the EMS environment in Penang, but no direct knowledge of the course. Out of the six participants with knowledge of the course, five had previously attended.

The sharing of ambulance theory that has been well established in Australia for many years may in fact be something new for Malaysia. In that way the IAC may contribute to the development of a distinct body of knowledge despite using principles and practice that are well-established in Australia.

The finding that graduates of the IAC program are perceived to possess a distinct body of knowledge regarding prehospital care practice is significant. Having a distinct body of knowledge, and recognition that it is this body of knowledge that contributes to the wellbeing of patients, has meant that the graduates of the IAC have begun the process of being recognised as a distinct group. This adds support to the notion that the IAC is contributing to professional development of ambulance practice in Penang.

Participants of the study generally commented that SJAM was ranked higher than all of the other NGO's due to their training being of a higher standard. The training at SJAM consists of the BAC, followed by the IAC. As the majority of IAC attendees have been drawn from SJAM, it is reasonable to conclude that the IAC at least contributes to the view that SJAM provides a higher standard of care amongst the NGO's. The ranking of service providers by participants in this study is noted in so far as it highlights the differences in training and service delivery standards between the various providers of emergency services.

Noting these differences brings to light the inconsistency and differences between service provision and the general agreement that the SJAM service is placed ahead of other NGO providers is significant. SJAM's primary difference has been their uptake and support in providing the IAC and while this fact alone cannot be said to have been solely responsible for their perceived comparative success, it is likely to be a contributing factor.

5.2.2 Outcomes in Relation To Ambulance Service Provision

Participants in this study expressed ideas regarding the development of prehospital care. They tended to frame this discussion in terms of quality of care and training, however participants generally expressed a clear understanding of developmental needs and an idea of how that could be achieved. Quality and common standards were seen as an integral part of development.

The empirical assessment of the quality of prehospital of care is difficult and inconsistent across jurisdictions. . As discussed earlier, the differences in service provision internationally and in Malaysia mean that direct comparison in terms of quality of care is problematic. It is unclear the exact standard that participants individually chose to use as a guide to their ranking of service providers and this was not the focus of interview questions.

Until now, the medical profession has dominated the discussions on EMS service provision in Malaysia and this seems to have continued within the tertiary programs developed to date. Yet, Paramedic practice has separated itself from other medical practice in some developed systems (Mason et al., 2003; Raven et al., 2006). This developmental milestone is something that has yet to occur in Penang; participants in this study recognised this as the next logical step.

It appears that a lack of regulatory control on what actually constitutes ambulance practice in Penang has led to a system that defies accurate description as well as development beyond basic services. Those participants who described their ideal ambulance system commented that the NGO's would likely maintain their roles within it. Despite having little knowledge of systems outside of Asia, most participants described an EMS system similar to that of Norway. The Norwegian system, while Government funded, is a hybrid system which makes use of private companies and NGO's to provide services and retains co-ordination and control within public hospitals (Langhelle et al., 2004).

Given that Penang lies within a country that struggles with economic development generally (Hauswald & Yeoh, 1997a; Jaafar et al., 2013; United Nations, 2014), the affordability state run services remains questionable. Ambulance services based on the current models within developed countries tend to be unaffordable within developing healthcare systems (Altintas, Bilir, & Tuleylioglu, 1999; Hauswald & Yeoh, 1997b).

While the exact nature of the development of the EMS system in Penang is debatable the point of greatest interest for this study is that the ambulance practitioners themselves appear to be involved in the debate. Previously this debate was restricted to the medical profession. Participants who were not from that profession were able to express a clear vision of their 'ideal' system, all of which are possible to implement in Penang. This means that participants from the ambulance background are beginning to contribute to the debate regarding

development of practice, giving further evidence to the development of a profession.

5.2.3 Community involvement

The views of the community are an important aspect of the development of any profession. Community acceptance and recognition forms part of Greenwood's (1984) definition of a profession. As NGO's are organisations supported and run by the community they may well have an integral role in developing community perceptions as prehospital care develops into a profession.

Participants in this study saw community involvement via NGO participation in the EMS system in Penang as important. This may well contribute to community acceptance of an ambulance profession, however this aspect of professionalism was not considered by this study.

5.2.4 Areas of development for the emerging profession of prehospital care practice

The IAC has impacted on the emerging profession with the increased educational opportunities. As seen in Chapter Four the participants in this study have come from a wide group of professional and non-professional backgrounds, yet hold similar beliefs on the future directions for the ambulance services in Penang and wider Malaysia.

The impact of this research for the participants and their discussion has renewed focus on what constitutes good ambulance education and practice within Penang. Participants did not comment on the content of the IAC as much as the fact that the course exists and therefore allows them to express what they need in terms of prehospital care education.

While research along similar lines to this study is sparse, some support can be found in the understanding of the way in which education professionals change their practice. Building on the work of Lewin (1935), Fullan (1999) and Fullan and Hargreaves (1996), Guskey (2002) developed a model which leads sequentially from professional development through changes in the practice of teaching to a change in student outcomes. Ultimately the model ends with a change in the teachers' values and beliefs.

Applied to the context of this study, the impact of the IAC is more about effecting a change in the values and beliefs that are guiding the occupation towards professionalism, than the clinical base of the education packages themselves. Where Guskey (2002) talked of student outcomes and teacher development being driven by improved student outcomes, patients and patient outcomes could easily be substituted. In Penang this means that further developing prehospital along the path to becoming a profession could be driven through a desire to improve patient outcomes.

The sequence of events which leads to a changes in professional behavior is of particular importance (Guskey, 2002). Leading with professional development focused on improved outcomes can prove more effective than other approaches. Programs of professional development seldom have the desired outcome unless the positive change can be seen in action (Bolster, 1983). The relationship between perceived competence and training seen in the outcomes of this research is a tangible example of the evidence of the potential for professional development provided by a specialist training program, such as the IAC.

While the IAC has trained a very small proportion of ambulance practitioners in Penang it is clear that the perception of those involved in the study that the course is providing a much-needed boost to clinical knowledge and their professional development. Participants in this study explained that the creation of the IAC has not only extended the knowledge base of those who have attended, it has also shown others what can be achieved by improved education

in a field that, until now has seen only minimal development in Penang. Thus it is not simply the participants of the course that have benefited, but the EMS system as a whole.

The IAC and similar courses are seen as by participants as possible ways of achieving standardisation and therefore improving service provision. This is dependent on the courses being accepted as achieving appropriate standards and supported by all services. Political and financial support for such change is essential.

This study considered the impact of IAC in terms of some aspects of professional development, as presented by Greenwood (1984). The outcomes presented focus mainly on the development of a specific body of knowledge and an identity for prehospital care practitioners in Penang. Professional development is a process that may well take considerable time and cannot be achieved by a single educational program, however it is important to consider the contribution the IAC has made to that journey. The table below outlines how this study aligns with parts of Greenwood’s understanding of the attributes of a profession, as well those areas that may require further research.

Table 6: Observable Professional Attributes and the Findings From This Study

Attribute (from Greenwood, 1984)	Demonstrated by	Application to this study	Findings from this study
A systematic body of theory	Systematic and documented practice with standard procedures or guidelines	While evidence of this is difficult to observe in practice, a systematic approach to practice and handover can indicate that a systematic body of theory exists within an organisation.	Practice from the IAC graduates is viewed as systematic . The IAC is seen as providing improved patient care.
Authority	Trust given and advice sought	Authority in this setting is about the respect with which	Patient handover is more consistently given by IAC graduates

	from members of the profession by other professions or members of the public	the emergency medical staff at the hospital gave to the ambulance crew. This can be evident in the handover and the extent to which it is given and received.	and Medical staff (Doctors) expressed a view that the IAC improves medical care. The IAC trained providers we seen by other medical professionals as providing a higher quality of care.
Community sanctions	Respect and recognition by the community	Community views were not canvassed during this research.	This is an area for possible future research.
Ethical codes	Guidelines for the ethical conduct of the profession	Ethical codes were not observed during this research.	This is an area for possible future research.
A Culture	A distinct way of interacting and an identity separate from other professional groups.	Ambulance culture in Malaysia is yet to be described. The complex nature of the cultural context within Penang, makes this aspect challenging to observe with any certainty.	This is an area for possible future research.

5.2.4 Appropriate methodology and methods

This study describes the impact of an education program that is attributed to current changes within the Penang EMS system and what it might mean for the future of an emerging profession. Using a qualitative methodology to collect and examine data, the methodology enabled the researcher to understand various issues at hand. Focused Ethnography has been described as a context specific, time-limited study focused on situations within groups (Knoblauch, 2005). As such this methodology is suited to the study of the constructed concept of professionalism within Ambulance practice.

This study sought, in part, to describe the ways in which the IAC has contributed to professional development through the perceptions of participants gained by in depth interviewing and observation. The findings described in Chapter four, give a clear indication that the IAC is beginning to change the values and beliefs of

those who have attended and those who work within the EMS system in Penang. This provides evidence of an emerging prehospital care profession in Penang.

5.3 Limitations

There are several issues that need to be addressed when considering the limitations of this study. The two main limitations arise from the nature of the research question and therefore the methodology and the fact that the researcher was one of the key people to design and implement the IAC program, which is the focus of this study.

It is difficult to estimate the numbers of people involved in Ambulance practice within Penang (due to the volunteer nature of the NGO's and the transient nature of the Government medical staff). However it is clear that the number of IAC trained Ambulance practitioners is only a small proportion of all Ambulance practitioners. An expansion of the IAC program and acceptance by agencies other than SJAM is required for the program to have a wider impact on professional development at a systemic level.

5.3.1 Limitations within the Methodology, Method and Ethics

From some perspectives (such as a logical positivist perspective) a limitation of the research design may be found in the influence the researcher had on the outcomes. The researcher was one of the leading people in the creation and design of the IAC program and remains involved in teaching and curriculum development. It is, in fact, through his interest in developing and improving the program that this research was conceived and undertaken. While care was taken within the design of this study, the influence of the researcher must be mentioned as a possible limitation to this research.

Researcher influence remains a contentious issue within research in general (Liamputtong, 2013). Reflexivity has been discussed earlier in relation to observations, however in accepting (or rejecting) the findings of this research, attention must be paid to the ways in which the researcher has consciously or unconsciously allowed his values and beliefs to influence the work.

Guba and Lincoln (2005) comment that values cannot be extracted from any research process:

“Some ways that values feed into the inquiry process: choice of the problem; choice of the paradigm to guide the problem; choice of the theoretical framework; choice of the major data gathering and data-analytic methods; choice of context; treatment of values already resident within the context; and choice of format/s for presenting findings.” (p.215).

The researcher being part of the system within which they are researching is not uncommon within ethnographic and indeed qualitative enquiry (Liamputtong, 2013; Maxwell, 2013; Minichiello, 2004). However, through the use of reflexivity and critical subjectivity (Guba & Lincoln, 1989; Guba & Lincoln, 2005) as well as processes within the research to ensure rigor, this limitation is minimised. The concepts of trustworthiness and authenticity contribute to rigor. Through the use of validation of themes and triangulation of methods, as well as the process of continuous data analysis, rigor has been demonstrated.

This research utilised triangulation through interviews, observations and validation of the themes as a means of identifying and reducing the influence of the researcher (Minichiello, 2004). While it would not be accurate to describe the researcher as independent, it was not the intention of this research to seek such independence. The researcher simply remained critically aware of his possible influences as the research developed. Critically reflecting on observations, and checking meaning where possible with the participants,

actively managed the issue of researcher influence managed throughout the research process.

5.3.2 Temporal Limitations

This research set out to describe the ways in which the IAC, being a specific educational program, may have influenced the development of professional ambulance practice in Penang, Malaysia. Whilst there may well be wider implications for other, similar settings, it is important to note that in much the same way as the impact of the course cannot be completely described within these pages, the same is true to the variations in practice and policy in settings outside of that described in this study. The prehospital care system within Penang is developing and constantly changing, just as any system will constantly change. The views gathered over the course of this investigation relate to a specific time within the lived experiences of the participants.

5.4 Further research

This study has provided evidence that an ongoing program of research is needed to develop a model for change within the prehospital care system in Penang.

Possible research issues and questions could include:

- Which factors contribute to the high attrition rate of Ambulance staff in Penang?
- Why those completing the IAC did not stay in the Penang Ambulance service?
- What are the political and financial issues affecting prehospital training in Penang?

- A population survey would also shed some light on the levels of education, training and career planning of prehospital staff.
- Is there a move towards attaining the attributes of a profession as described by Greenwood (1984) which were not considered in this research.

Appendices

Appendix 1: IAC Course Description

The Intermediate Ambulance Care Course

Introduction and Course Overview

The Intermediate Ambulance Care (IAC) Course has been developed over the last five years by a small team of Doctors and ambulance staff in Penang with assistance from experienced Paramedics based in Australia. The course is based around the Certificate IV in Ambulance Practice, in use throughout Australia, and incorporate best practice recommendations from ARC, ILCOR and other leading prehospital care bodies throughout the world. The course is run over 30 weeks and incorporates 20 days of face to face, practical based sessions.

What is expected of me as a student?

This course will be different to most others that you have done. We are interested in helping you develop your skills in critical thinking as well as practical ambulance skills. Basically we want to know why you are doing things as well as what you are doing.

You will need to have had some experience or previous training in prehospital care. For those lucky enough to have done the Basic Ambulance Care course, that is enough. If you do not practice in Penang, you may not have had access to this course, so we will consider your training or experience on a case by case basis.

There will be weekly online discussion forums to participate in. The majority of the learning will take place in these forums and you will be expected to spend approximately 5 hours per week completing this. The forums are easy to use and you don't need to be a computer genius to use them.

You will need internet access and while some people have used their smart phones to complete this it is a lot easier on a computer or tablet.

The face to face sessions, or intensives, are run throughout the course and the dates will be given to you well in advance. They will be held in Penang at either the HPP Skills Lab or St. John HQ building. You will be expected to attend each and every day of these as it is difficult to catch up if you miss a day.

You will be expected to pass each section of the course before proceeding to the next.

Topics covered in the course:

- Module 1: Introduction to Paramedic Practice
- Module 2: Respiratory Emergencies
- Module 3: Cardiovascular Emergencies (including basic ECG diagnosis)
- Module 4: Medical & Behavioural Emergencies
- Module 5: Traumatic Emergencies
- Module 6: Special Populations

2015 Course dates and venues

For 2015 the course will start on 10th January 2015. The intensives have been scheduled over weekends plus one weekday to minimise time off work for students. Intensive 3 & 4 dates may change slightly due to the availability of instructors. The dates for the intensives are:

Intensive 1 Jan 10, 11, 12 & 17,18
Intensive 2 March 14, 15, 16 & 21, 22
Intensive 3 May 16, 17, 18, & 23, 24
Intensive 4 July 18, 19, 20 & 25, 26

Please note that each week from 10th January until July 26th you will need to put in about 5 hours work in order to complete the course.

The course will be taught at either the skills lab of Penang General Hospital or the headquarters building of St John Ambulance, Malaysia, State of Penang. Directions will be given to students well in advance of the start of the intensives.

So why should I do the IAC - I've been trained by my service already and I don't even work for St John Ambulance Malaysia, State of Penang?

There are some very good courses run by various agencies throughout Malaysia. The IAC seeks to build on the good work already done and extend that knowledge even further. The course represents an attempt to improve the standard of education in prehospital care service provision in Malaysia. There are a few courses around, including some very expensive internet based ones. We believe that we have developed a course that is appropriate for Malaysia and does not seek to impose a foreign system of EMS.

Unfortunately, there are also very few courses that have had significant input from currently practicing, experienced Paramedics. A number of available courses seem to teach hospital based medicine in the mistaken belief that it can be easily translated to the prehospital environment.

This course is not specific to one service. It has been developed by a team of people from Malaysia, Thailand and Australia who all work for different service providers and bring different perspectives.

Will I get a 'recognised' qualification

The IAC is recognised by Flinders University as equivalent to an Australian Certificate IV and allows equal credit towards the Bachelor of Paramedic as that qualification. The IAC also meets the education requirements for associate membership to Paramedics Australasia (the peak professional body for Paramedics in Australia and New Zealand).

There is currently no global standard as to what makes a Paramedic. For example, in Australia, the UK and New Zealand the general standard is a university degree, followed by approximately one year of internship with an experienced Paramedic. In some countries a weekend course is all it takes (and the ability to write 'Paramedic' on your shirt).

In Australia there is no national registration and vast differences in the practice standards between states. In the UK there is registration, however a Paramedic from Australia cannot simply go and work there as the practice is quite different.

So, basically there is no single body to recognise any qualification. We could have provided something that was recognised in Australia or the UK, however that would not hold much meaning in Malaysia.

What we have done is to ensure that we have included an understanding of best practice and explained where that has come from. In some cases we will even discuss why 'best practice' differs between different parts of the world. To ensure we had some external verification of the quality of the material we had the Paramedic School at Flinders University in Adelaide take a look and they were satisfied with what we had produced.

OK, I'm interested. Where do I sign up?

Firstly, if you have any questions or need clarification on any aspects of the course I would strongly encourage you to talk with us before deciding to sign up. If you wish to sign up, please email one of the people below with your contact details.

Your primary contact people are:

Matt Perry	matperry@me.com
Mike Rushby	mrushby000@gmail.com
Grant Gallagher	grant.Gallagher@sahealth.sa.gov.au

COURSE COSTS:

While the course is taught by volunteers from Australia and other parts of the world, there are still significant costs to bring this expertise to Malaysia. We have limited the expense to students as much as we can and currently the course costs a total of RM1000.00 (similar online courses can cost up to US\$5000.00!).

You will need to pay a deposit of RM500.00 by December 20th 2014 to secure your place. The remainder will be due by the end of the first intensive. You can withdraw at any point during the first intensive if you decide the course is not for you and you will only pay the costs associated with that intensive.

Thank you for reading this introduction. If you have questions or would just like to chat, feel free to email one of the instructors above. If you would prefer to talk to someone in person, we can put you in touch with someone to talk to in Penang or Ipoh.

Regards,

Matt Perry
BSW, BHSc (Paramedic)

Co-ordinator Project Novo
Co-ordinator Intermediate Ambulance Care Course.

Appendix 2: Literature Search Results

Article	Remarks
The problem of migration of physicians and para-medical auxilliary to the advanced countries from Taiwan. (1974). <i>Med J Malaysia</i> , 29(2), 149-150.	Excluded – little relevance to this study.
Hilots make the family planning scene. (1974). <i>Philipp Popul Newsl</i> , 2(10), 4.	Excluded – little relevance to this study.
Thai midwives brought into family planning. (1974). <i>IDRC Rep</i> , 3(1), 17-20.	Excluded – little relevance to this study.
Granny midwives can help with family planning in developing lands; in Iran they insert, remove IUDs. (1975). <i>Int Fam Plann Dig</i> , 1(4), 1-3.	Excluded – little relevance to this study.
Tribute to ten years' pioneering effort. (1977). <i>IPPF News</i> , 2(6), 2.	Excluded – little relevance to this study.
A sensitive approach to family planning motivation in Malaysia. (1978). <i>Asian Pac Popul Programme News</i> , 7(4), 30-32.	Excluded – little relevance to this study.
Family development: a classic example. (1979). <i>Bul Keluarga</i> , 97, 4-5, 8.	Excluded – little relevance to this study.
Abstracts of Theses Approved for the M.Sc., M.Med. and Phd. Degrees at the School of Medical Sciences, University Sains Malaysia, Health Campus, Kubang Kerian, Kelantan, Malaysia. (2009). <i>Malaysian Journal of Medical Sciences</i> , 16(3), 55-69.	Excluded – little relevance to this study. Abstracts only, with no links to peer reviewed publications.
Abrams, H. K. (1984). Occupational safety and health in developing countries. <i>P N G Med J</i> , 27(1), 24-31.	Excluded – little relevance to this study.
Ahmad, N., & Oranye, N. O. (2010). Empowerment, job satisfaction and organizational commitment: a comparative analysis of nurses working in Malaysia and England. <i>J Nurs Manag</i> , 18(5), 582-591. doi: 10.1111/j.1365-2834.2010.01093.x	Excluded – little relevance to this study.
Ali, A., & Howden-Chapman, P. (2007). Maternity services and the role of the traditional birth attendant, bidan kampung, in rural Malaysia. <i>J Public Health Manag Pract</i> , 13(3), 278-286. doi: 10.1097/01.PHH.0000267686.08282.3c	Excluded – little relevance to this study.
Ali, M., Miyoshi, C., & Ushijima, H. (2006). Emergency medical services in Islamabad, Pakistan: A public-private partnership. <i>Public Health</i> , 120(1), 50-57.	Excluded – little relevance to this study.
Altintas, K. H., Bilir, N., & Tuleylioglu, M. (1999). Costing of an ambulance system in a developing country, Turkey: costs of Ankara Emergency Aid	Some elements of this publication considered

and Rescue Services' (EARS) ambulance system. <i>Eur J Emerg Med</i> , 6(4), 355-362.	
Altıntaş, K. H., Bilir, N., & Tüleylioglu, M. (1999). Costing of an ambulance system in a developing country, Turkey: costs of Ankara Emergency Aid and Rescue Services' (EARS) ambulance system. <i>Eur J Emerg Med</i> , 6(4), 355-362.	Some elements of this publication considered
Ambigga, D., Suthahar, A., Ramli, A., Ng, K., Radziah, A., & Marymol, K. (2011). Diagnosis and Management of Mild Cognitive Impairment in the Community: What is the Role of Primary Care Physician? <i>Malays Fam Physician</i> , 6(2-3), 74-78.	Some elements of this publication considered
Anantharaman, V. (2011). Developing resuscitation programmes in the community: The tasks ahead for the National Resuscitation Council. <i>Singapore Med J</i> , 52(8), 634-641.	Excluded – little relevance to this study.
Anisah, A., Chew, K. S., Mohd Shaharuddin Shah, C. H., & Nik Hisamuddin, N. A. R. (2008). Patients' perception of the ambulance services at Hospital Universiti Sains Malaysia. <i>Singapore Med J</i> , 49(8), 631-635.	Some elements of this publication considered Reports on original research. Quantitative research with sample size, may be low quality.
Ariffin, F., Ramli, A. S., Naim, N., Selamat, M. I., & Syed-Jamal, S. J. (2014). Recognizing Life-threatening Features of Dengue in Children and Health Seeking Behavior in Dengue Emergency Amongst Parents and Carers: A Cross-sectional study in Gombak District, Malaysia. <i>Med J Malaysia</i> , 69(5), 210-215.	Excluded – little relevance to this study.
Arreola-Risa, C., Mock, C., Herrera-Escamilla, A. J., Contreras, I., & Vargas, J. (2004). Cost-effectiveness and benefit of alternatives to improve training for prehospital trauma care in Mexico. <i>Prehospital and disaster medicine : the official journal of the National Association of EMS Physicians and the World Association for Emergency and Disaster Medicine in association with the Acute Care Foundation</i> , 19(4), 318-325.	Some elements of this publication considered However, deals mainly with the economic considerations and has limited relevance to this study.
Arreola-Risa, C., Mock, C. N., Lojero-Wheatly, L., De La Cruz, O., Garcia, C., Canavati-Ayub, F., & Jurkovich, G. J. (2000). Low-cost improvements in prehospital trauma care in a Latin American city. <i>Journal of Trauma - Injury, Infection and Critical Care</i> , 48(1), 119-124.	Excluded – little relevance to this study.
Arreola-Risa, C., Vargas, J., Contreras, I., & Mock, C. (2007). Effect of emergency medical technician certification for all prehospital personnel in a Latin American city. <i>Journal of Trauma - Injury, Infection and Critical Care</i> , 63(4), 914-919.	Excluded – little relevance to this study. Based on a U.S. protocol system and assessed this

	using qualitative research, basing measures on patient outcomes.
Atique, S., Zarour, A., Siddiqui, T., El-Menyar, A., Maull, K., Al Thani, H., & Latifi, R. (2012). Trauma caused by falling objects at construction sites. <i>Journal of Trauma and Acute Care Surgery</i> , 73(3), 704-708.	Excluded – little relevance to this study.
Austin, S., Murthy, S., Wunsch, H., Adhikari, N. K. J., Karir, V., Rowan, K., . . . Angus, D. C. (2014). Access to urban acute care services in high- vs. middle-income countries: An analysis of seven cities. <i>Intensive Care Medicine</i> , 40(3), 342-352.	Excluded – little relevance to this study.
Aygençel, G., Karamercan, M., Ergin, M., & Telatar, G. (2008). Review of traffic accident cases presenting to an adult emergency service in Turkey. <i>Journal of Forensic and Legal Medicine</i> , 15(1), 1-6.	Excluded – little relevance to this study.
Báez, A. A., & Lane, P. (2002). Emergency medical services workforce in the city of Santo Domingo. <i>Prehospital Emergency Care</i> , 6(3), 336-339.	Excluded – little relevance to this study.
Bahadori, M., Ravangard, R., & Nejati, M. (2012). Development of emergency medical services (EMS) in Iran: Component of transportation. <i>HealthMED</i> , 6(3), 826-831.	Excluded – little relevance to this study.
Balakrishna Rao, B. N. (1975). Organization and management of emergency service. <i>Hospital Administration</i> , 12(1-2), 23-34.	Excluded – little relevance to this study.
Barton, H. E. (1970). Dental auxiliary utilization University of North Carolina School of Dentistry. <i>Dent J Malaysia Singapore</i> , 10(2), 32-38.	Excluded – little relevance to this study.
Bateman, C. (2006). New triage system halves mortalities. <i>South African Medical Journal</i> , 96(9), 770-772.	Excluded – little relevance to this study.
Bazuaye, N., & Nwogoh, B. D. A. (2012). Challenges of setting up stem cell transplant centre in a resource-poor and developing country. <i>Bone Marrow Transplantation</i> , 47, S278-S279.	Excluded – little relevance to this study.
Belousova, O. B., & Okishev, D. N. (2009). About the problem of opportune admission of patients with cerebral aneurysms to specialized neurosurgical department of N.N. Burdenko Neurosurgical Institute. <i>Zhurnal voprosy neirokhirurgii imeni N. N. Burdenko</i> (1), 29-32; discussion 32-33.	Excluded – little relevance to this study.
Berman, D. S. (1969). Utilization of the dental auxiliary--school dental nurse. <i>Int Dent J</i> , 19(1), 24-40.	Excluded – little relevance to this study.
Bernhard, M., Mohr, S., Weigand, M. A., Martin, E., & Walther, A. (2012). Developing the skill of endotracheal intubation: implication for emergency medicine. <i>Acta Anaesthesiol Scand</i> , 56(2), 164-171. doi: 10.1111/j.1399-	Excluded – little relevance to this study.. Quantitative research

6576.2011.02547.x	focused on a single skill.
Best, Gill, Hajzler, Darko, Ivanov, Tina, & Limon, Jodie. (2008). Peer Mentoring as a Strategy to Improve Paramedic Students' Clinical Skills. <i>Australasian Journal of Peer Learning, 1</i> , 14.	Some elements of this publication considered.
Bevington, J., Halligan, A., & Cullen, R. (2004). Emergency care. From zero to hero. <i>The Health service journal, 114</i> (5916), 26-27.	Excluded – little relevance to this study.
Bhattacharjee, M., Vairale, J., & Dalal, P. (2009). Mumbai stroke registry quality of life in stroke survivors. <i>Journal of Neurology, 256</i> , S65-S66.	Excluded – little relevance to this study.
Bhattacharjee, M., Vairale, J., & Dalal, P. M. (2009). Who Global stroke initiative -mumbai stroke registry (msr). prospective population based study - Quality of life (qol) in stroke survivors. <i>Cerebrovascular Diseases, 27</i> , 12.	Excluded – little relevance to this study.
Bin Abdul Rahman, S., Tan Boon, Ann, Subbiah, M., Loh Sow, Khin, & Baker, Y. (1974). East Asia Review, 1973. 5. Malaysia. <i>Stud Fam Plann, 5</i> (5), 158-159.	Excluded – little relevance to this study.
Bolton, J. M. (1973). A training-orientated medical programme in West Malaysian aboriginals. <i>Med J Aust, 2</i> (25), 1122-1125.	Some elements of this publication considered. Descriptive publication utilised as general background.
Boros, M. J. (2003). Emergency Medical Services in St. Vincent and the Grenadines. <i>Prehospital Emergency Care, 7</i> (4), 477-481.	Excluded – little relevance to this study.
Boyle, D. K., Forsyth, A., Bagg, J., Stroubou, K., Griffiths, C. E., & Burke, F. J. (2002). An investigation of the effect of prolonged glove wearing on the hand skin health of dental healthcare workers. <i>J Dent, 30</i> (5-6), 233-241.	Excluded – little relevance to this study.
Burgess, S. (2010). Evidence on trial: Has it made an impact on health?: Auckland, New Zealand 22 March 2010. <i>Journal of Emergency Primary Health Care, 8</i> (1), 9.	Excluded – little relevance to this study.
Camrass, R. (1973). A periodontal programme for a developing country (Western Samoa). <i>Dent J Malaysia Singapore, 13</i> (1), 45-50.	Excluded – little relevance to this study.
Chang, A. S., Yeong, B. Y., & Koh, W. P. (2010). Symposium on Plant	Excluded – little relevance to

Polyphenols: Nutrition, Health and Innovations, June 2009. <i>Nutr Rev</i> , 68(4), 246-252. doi: 10.1111/j.1753-4887.2010.00283.x	this study.
Chen, P. C. (1973). The medical auxiliary in rural Malaysia. <i>Lancet</i> , 1(7810), 983-985.	Excluded – little relevance to this study. Publication is old.
Chen, P. C. (1982). The role of the community and medical auxiliaries in the prevention of diarrhoeal diseases of children in Sarawak, Malaysia. <i>Southeast Asian J Trop Med Public Health</i> , 13(3), 441-445.	Excluded – little relevance to this study.
Chen, P. C. (1984). Providing primary health care with non-physicians. <i>Ann Acad Med Singapore</i> , 13(2), 264-271.	Excluded – little relevance to this study. Publication is old.
Chen, P. C. (1987). Developing primary health care for a nomad tribe: the Penans of the Baram. <i>Asia Pac J Public Health</i> , 1(1), 34-37.	Excluded – little relevance to this study.
Chen, P. C. (1989). Health care in Sarawak's jungles. <i>World Health Forum</i> , 10(2), 190-192.	Excluded – little relevance to this study.
Chen, P. C., & Tan, Y. K. (1981). Primary health care among the Iban of Sarawak. <i>Trop Geogr Med</i> , 33(4), 403-409.	Excluded – little relevance to this study.
Chen, P. C., & Tan, Y. K. (1982). A primary health care project in Sarawak. <i>Med J Malaysia</i> , 37(1), 25-34.	Excluded – little relevance to this study.
Chew, K. S., Wan Masliza, W. M., Nik Hisamuddin, N. A., Mohd Hashairi, F., Shaik Farid, A. W., Tuan Hairulnizam, T. K., . . . Zurkurnai, Y. (2015). A Survey on the Choice of Transportation to come to Emergency Department among Patients with Acute Coronary Syndrome of A Community in Malaysia. <i>Med J Malaysia</i> , 70(1), 6-11.	Some elements of this publication considered. Quantitative study with small sample size (therefore may be unreliable).
Chew, K. S., Yazid, M. N., Kamarul, B. A., & Rashidi, A. (2009). Translating knowledge to attitude: a survey on the perception of bystander cardiopulmonary resuscitation among dental students in Universiti Sains Malaysia and school teachers in Kota Bharu, Kelantan. <i>Med J Malaysia</i> , 64(3), 205-209.	Excluded – little relevance to this study.
Chitran, M. (2012). Assistant medical officers and pre-hospital experience. <i>Malaysian Orthopaedic Journal</i> , 6, 27.	Some elements of this publication considered.
Chotani, H. A., Razzak, J. A., & Luby, S. P. (2002). Patterns of violence in Karachi, Pakistan. <i>Injury prevention : journal of the International Society for Child and Adolescent Injury Prevention</i> , 8(1), 57-59.	Excluded – little relevance to this study.
Cooper Poole, J. H. (1974). A new teaching and referral hospital for Tanzania. <i>World Hospitals</i> , 10(4), 199-201.	Excluded – little relevance to this study.

Coulibaly, D., Bassong, Y., Mbonda, P., Touré, K., Diop, A. G., & Ndiaye, M. M. (2013). Is thrombolysis realizable at the Department of Neurology, Fann Teaching Hospital, Dakar-Senegal? <i>Journal of the Neurological Sciences</i> , 333, e235.	Excluded – little relevance to this study.
Crouse, H. L., Macias, C. G., Cruz, A. T., Wilson, K. A., & Torrey, S. B. (2010). Utilization of a mobile medical van for delivering pediatric care in the bateys of the Dominican Republic. <i>International Journal of Emergency Medicine</i> , 3(4), 227-232.	Excluded – little relevance to this study.
Daud, M. K., Noh, N. F., Sidek, D. S., Abd Rahman, N., Abd Rani, N., & Zakaria, M. N. (2011). Screening of dental staff nurses for noise induced hearing loss. <i>B-ENT</i> , 7(4), 245-249.	Excluded – little relevance to this study.
Delaney, Frances M. (1979). Low-Cost Rural Health Care and Health Manpower Training. An Annotated Bibliography with Special Emphasis on Developing Countries. Volume 4 (pp. 187): UNIPUB, Box 433, Murray Hill Station, New York, NY 10016.	Excluded – little relevance to this study.
Delisle, B. (2006). Teenage pregnancy First love counseling - A model project for the prevention of unwanted teenage pregnancies. <i>Sexuologie</i> , 12(3-4), 153-157.	Excluded – little relevance to this study.
Dewi, F. D., Gundavarapu, K. C., & Cugati, N. (2013). Importance-performance analysis of dental satisfaction among three ethnic groups in malaysia. <i>Oral Health Prev Dent</i> , 11(2), 131-139. doi: 10.3290/j.ohpd.a29735	Excluded – little relevance to this study.
Dib, J. E., Naderi, S., Sheridan, I. A., & Alagappan, K. (2006). Analysis and applicability of the Dutch EMS system into countries developing EMS systems. <i>Journal of Emergency Medicine</i> , 30(1), 111-115.	Excluded – little relevance to this study.
Dobbins, J. G., & Else, J. G. (1975). Knowledge, attitudes, and practices related to control of Dengue haemorrhagic fever in an urban Malay kampung. <i>Southeast Asian J Trop Med Public Health</i> , 6(1), 120-126.	Excluded – little relevance to this study.
Duan, H., Huang, X., & Cheng, L. (2013). Emergency blood transfusion services during lushan earthquake rescue, China, 2013. <i>Vox Sanguinis</i> , 105, 49-50.	Excluded – little relevance to this study.
Duke, T. (2005). Neonatal pneumonia in developing countries. <i>Archives of Disease in Childhood Fetal & Neonatal Edition</i> , 90(3), F211-F219.	Excluded – little relevance to this study.
Dyke, T., & Keake, G. (1996). The St John Ambulance Service in Port Moresby: a ten-year review, 1984-1993. <i>P N G Med J</i> , 39(2), 105-110.	Excluded – little relevance to this study.
Erich, J. (2001). Hearts out, hands up to the helpless of Honduras.	Excluded – little relevance to this study.

<i>Emergency medical services, 30(3), 78-83.</i>	this study.
Exadaktylos, A. K., Erasmus, P., Zellweger, R., & Smith, W. (2004). The Single Engine PC-12 Ambulance Aircraft in South of Africa: An Interim Result. <i>Notarzt, 20(2), 64-67.</i>	Excluded – little relevance to this study.
Fadhli, Y., Norlen, M., Ilhamah, O., Adi, O., & Lotfi, H. (2010). Development of emergency response model for ambulance services. <i>Medical Journal of Malaysia, 65, 100.</i>	Some elements of this publication considered.
Faris, R., & Shouman, A. (1994). Study of the knowledge, attitude of Egyptian health care workers towards occupational HIV infection. <i>The Journal of the Egyptian Public Health Association, 69(1-2), 115-128.</i>	Excluded – little relevance to this study.
Farooq, M. U., Bhatt, A., Safdar, A., Kassab, M. Y., & Majid, A. (2010). Stroke symptoms and risk factor awareness amongst high school children in Pakistan. <i>Stroke, 41(4), e291.</i>	Excluded – little relevance to this study.
Fauzi, M. H., Idrose, A. M., Abdullah, A. H. A., Zul, J., & Nordin, N. H. M. (2014). The pattern of injuries or medical emergencies during high- rise evacuation drill. <i>Journal of Pioneering Medical Sciences, 4(2), 81-84.</i>	Excluded – little relevance to this study.
Gish, O. (1983). Choice of health service transport. <i>WHO offset publication, 72, 73-84.</i>	Some elements of this publication considered.
Gish, O., & Walker, G. (1977). Transport and communication systems in health services. <i>Tropical Doctor, 7(3), 119-122.</i>	Excluded – little relevance to this study.
Glatstein, M., Halevy, J., Atzmon, Y., Kot, R. J., & Scolnik, D. (2011). International medical evacuation in children: A primary care pediatric clinic's 3-year experience. <i>Aviation Space and Environmental Medicine, 82(2), 133-136.</i>	Excluded – little relevance to this study.
Goh, K. L., Parasakthi, N., & Ong, K. K. (1996). Prevalence of Helicobacter pylori infection in endoscopy and non-endoscopy personnel: results of field survey with serology and 14C-urea breath test. <i>Am J Gastroenterol, 91(2), 268-270.</i>	Excluded – little relevance to this study.
Goldstein, M. D., & Donaldson, R. I. (2013). Peruvian community member's knowledge, attitude and practice of emergency medical care. <i>Journal of Investigative Medicine, 61(1), 182.</i>	Excluded – little relevance to this study.
Guha, S. K., & Anand, S. (1989). A new stretcher design for easy manoeuvrability on narrow staircases and rough ground for developing countries. <i>Proceedings of the Institution of Mechanical Engineers. Part H,</i>	Excluded – little relevance to this study.

<i>Journal of engineering in medicine</i> , 203(1), 55-60.	
Hafis, M. S., Johar, M. J., Mahathar, A. W., & Saiboon, I. M. (2014). A cross sectional study on the acceptance of pre-hospital continuous positive airway pressure ventilation among ambulance paramedic in an urban emergency medical service system in a developing country. <i>Saudi Med J</i> , 35(8), 855-860.	Excluded – little relevance to this study.
Hardcastle, T. C., Finlayson, M., van Heerden, M., Johnson, B., Samuel, C., & Muckart, D. J. (2013). The prehospital burden of disease due to trauma in KwaZulu-Natal: the need for Afrocentric trauma systems. <i>World journal of surgery</i> , 37(7), 1513-1525.	Excluded – little relevance to this study.
Hauswald, M., & Yeoh, E. (1997). Designing a prehospital system for a developing country: Estimated cost and benefits. <i>American Journal of Emergency Medicine</i> , 15(6), 600-603.	Some elements of this publication considered.
Heggenhougen, H. K. (1978). Hospital assistants in Malaysian rural health care. <i>Med J Malaysia</i> , 33(2), 165-177.	Excluded – little relevance to this study.
Heggenhougen, H. K. (1980). Rural health care: Malaysian physicians' opinions about traditional Malay medicine and hospital assistants--a pilot study. <i>Med J Malaysia</i> , 34(3), 238-247.	Excluded – little relevance to this study.
Henry, J. A., & Reingold, A. L. (2012). Prehospital trauma systems reduce mortality in developing countries: A systematic review and meta-analysis. <i>Journal of Trauma and Acute Care Surgery</i> , 73(1), 261-268.	Excluded – little relevance to this study.
Hesham, R., Tajunisah, M. E., & Ilina, I. (2008). Risk of blood-borne infection among health care workers in two Kuala Lumpur hospitals. <i>Med J Malaysia</i> , 63(3), 222-223.	Excluded – little relevance to this study.
Hesham, R., Zamberi, S., Tajunisah, M. E., Ariza, A., & Ilina, I. (2005). Hepatitis B immunisation status among health care workers in two Kuala Lumpur hospitals. <i>Med J Malaysia</i> , 60(4), 407-410.	Excluded – little relevance to this study.
Hii, J. L., Chee, K. C., Vun, Y. S., Awang, J., Chin, K. H., & Kan, S. K. (1996). Sustainability of a successful malaria surveillance and treatment program in a Runggus community in Sabah, east Malaysia. <i>Southeast Asian J Trop Med Public Health</i> , 27(3), 512-521.	Excluded – little relevance to this study.
Hisamuddin, N. A., Hamzah, M. S., & Holliman, C. J. (2007). Prehospital emergency medical services in Malaysia. <i>J Emerg Med</i> , 32(4), 415-421. doi: 10.1016/j.jemermed.2006.08.021	Some elements of this publication considered. Article is descriptive and appears incomplete in-so-far-as it describes only a

	limited portion of the EMS system.
Hodkinson, P. W., & Wallis, L. A. (2010). Emergency medicine in the developing world: A Delphi study. <i>Academic Emergency Medicine, 17</i> (7), 765-774.	Some elements of this publication considered. Background information from a descriptive article.
Hsia, R. Y., Ozgediz, D., Mutto, M., Jayaraman, S., Kyamanywa, P., & Kobusingye, O. C. (2010). Epidemiology of injuries presenting to the national hospital in Kampala, Uganda: Implications for research and policy. <i>International Journal of Emergency Medicine, 3</i> (3), 165-172.	Excluded – little relevance to this study.
Huang, C. H., Chen, W. J., Ma, M. H. M., Lai, C. L., Lin, F. Y., & Lee, Y. T. (2001). Ambulance utilization in metropolitan and rural areas in Taiwan. <i>Journal of the Formosan Medical Association, 100</i> (9), 581-586.	Excluded – little relevance to this study.
Idrose, A. M., Adnan, W. A., Villa, G. F., & Abdullah, A. H. (2007). The use of classroom training and simulation in the training of medical responders for airport disaster. <i>Emerg Med J, 24</i> (1), 7-11. doi: 10.1136/emj.2006.036202	Excluded – little relevance to this study.
Ismail, A. K., Abdul Ghafar, M. A., Shamsuddin, N. S. A., Roslan, N. A., Kaharuddin, H., & Nik Muhamad, N. A. (2015). The Assessment of Acute Pain in Pre-Hospital Care Using Verbal Numerical Rating and Visual Analogue Scales. <i>Journal of Emergency Medicine.</i>	Excluded – little relevance to this study.
Ismail, Ahmad Khaldun, Mohd Salleh, Nina Ilani, Hamdan, Nur Aslina, Mohd Jawi, Masmuna Idayu, Abdul Razak, Siti Nailah, Md Jamal, Shamsuriani, & Shah, Shamsul Azhar. (2012). The use of warning lights and siren by the ambulance crew in the Universiti Kebangsaan Malaysia Medical Centre. <i>Eur J Emerg Med, 19</i> (6), 408-409.	Excluded – little relevance to this study.
Ismail, M. N., Isa, M., & Janudin, A. (1996). Energy requirements of Malaysian soldiers in a base camp. <i>Malays J Nutr, 2</i> (2), 168-174.	Excluded – little relevance to this study.
Ismail, M. S., Hasinah, A. B., Syaiful, M. N., Murshidah, H. B., Thong, T. J., Zairi, Z., . . . Das, S. (2012). Study on advanced life support devices in the ambulances for emergency cases in Klang Valley, Malaysia. <i>Clin Ter, 163</i> (2), 115-122.	Excluded – little relevance to this study.
Jamali, A. R. (2008). Trauma care in Pakistan. <i>Journal of the Pakistan Medical Association, 58</i> (3), 102-103.	Excluded – little relevance to this study.
Janda, J., & Škovránková, J. (2003). What has resulted from campaigns against vaccination of children in developed countries. <i>Casopis Lekarů Ceskych, 142</i> (7), 437-441.	Excluded – little relevance to this study.
Jansen, J. (2006). My night in a Russian hospital. <i>South African Medical</i>	Excluded – little relevance to

<i>Journal</i> , 96(10), 1040-1042.	this study.
Jenkin, A., Abelson-Mitchell, N., & Cooper, S. (2007). Patient handover: Time for a change? <i>Accid Emerg Nurs</i> , 15(3), 141-147.	Some elements of this publication considered.
Joseph, J. P., & Rafia, H. (2014). Sudden death in demyelinating disorders. <i>Multiple Sclerosis</i> , 20(7), 954-955.	Excluded – little relevance to this study.
K. S. Chew, B, Kamarul Aryffin, M. N, Abu Yazid, & T. K, Tuan Hairul Nizam. (2008). TRANSLATING KNOWLEDGE TO ATTITUDE: A SURVEY ON THE PERCEPTION OF BYSTANDER CARDIOPULMONARY RESUSCITATION AMONG DENTAL STUDENTS AND SCHOOL TEACHERS IN KOTA BHARU, KELANTAN. <i>Malaysian Journal of Medical Sciences</i> , 47-47.	Excluded – little relevance to this study.
Kadithi, A., Jena, B., Srinivasa Rao, J., & Ramana Rao, G. V. (2012). Strategies for strengthening of EMS survival value chain: Does it help in analyzing survival rate in case of cardiac emergencies in India? <i>Circulation</i> , 125(19), e803.	Excluded – little relevance to this study.
Kampikaho, A., & Irwig, L. M. (1991). Incidence and causes of maternal mortality in five Kampala hospitals, 1980-1986. <i>East African medical journal</i> , 68(8), 624-631.	Excluded – little relevance to this study.
Kasim, M. S., & Abraham, S. (1982). Child-to-Child programme in Malaysia. <i>Southeast Asian J Trop Med Public Health</i> , 13(3), 459-463.	Excluded – little relevance to this study.
Keeny, S. M. (1974). East Asia Review, 1973. To sum up. <i>Stud Fam Plann</i> , 5(5), 174-176.	Excluded – little relevance to this study.
Keikhosrokiani, P., Mustaffa, N., Zakaria, N., & Sarwar, M. I. (2012). A proposal to design a Location-based Mobile Cardiac Emergency System (LMCES). <i>Stud Health Technol Inform</i> , 182, 83-92.	Excluded – little relevance to this study.
Khurana, D., Jaura, V., Thakur, J. S., & Prabhakar, S. (2010). Factors causing delay in arrival of acute stroke to the emergency in a tertiary care hospital in north India. <i>Stroke</i> , 41(4), e347.	Excluded – little relevance to this study.
Khurana, D., Jaura, V., Thakur, J. S., & Prabhakar, S. (2010). Factors causing delay in arrival of acute stroke patients to a stroke center in North India. <i>Cerebrovascular Diseases</i> , 29, 208.	Excluded – little relevance to this study.
Kivast, B. E., & Koblinsky, M. A. (1995). Starting maternity care programmes in developing countries to reduce maternal mortality. <i>Contemporary Reviews in Obstetrics and Gynaecology</i> , 7(4), 220-225.	Excluded – little relevance to this study.
Krasovec, K. (2004). Auxiliary technologies related to transport and communication for obstetric emergencies. <i>International Journal of Gynecology and Obstetrics</i> , 85(1 SUPPL.), S14-S23.	Excluded – little relevance to this study.

Krstevska-Konstantinova, M., Jancevska, A., Kicova, M., & Gucev, Z. (2009). Weight, height and puberty in a cohort of Macedonian girls. <i>Medicinski arhiv</i> , 63(2), 80-81.	Excluded – little relevance to this study.
Kwa Siew, Kim, Arshat, H., Abdul Jalil, A. H., Ang Eng, Suan, & Suhaimi, A. (1987). Paramedic insertion of intrauterine device in a Malaysian family planning clinic. <i>Malays J Reprod Health</i> , 5(1), 11-16.	Excluded – little relevance to this study.
Latha, A. B. S., Anandakumar, Asad, S. A., & Rishya, M. (2012). Mouth to mouth: Would you do it? <i>Critical Care and Shock</i> , 15(3), 87.	Excluded – little relevance to this study.
Leatherman, G. H. (1969). Survey of auxiliary dental personnel. <i>Int Dent J</i> , 19(1), 49-54.	Excluded – little relevance to this study.
Low, A., & Vadera, B. (2011). Air medical evacuations from a developing world conflict zone. <i>Air Medical Journal</i> , 30(6), 313-316.	Excluded – little relevance to this study.
Martel, J., Oteng, R., Mould-Millman, N. K., Bell, S. A., Zakariah, A., Oduro, G., . . . Donkor, P. (2014). The development of sustainable emergency care in Ghana: Physician, nursing and prehospital care training initiatives. <i>Journal of Emergency Medicine</i> , 47(4), 462-468.	Some elements of this publication considered.
Mason, S, Wardrope, J, & Perrin, J. (2003). Developing a community paramedic practitioner intermediate care support scheme for older people with minor conditions. <i>Emergency Medicine Journal</i> , 20(2), 196-198. doi: 10.1136/emj.20.2.196	Some elements of this publication considered.
Mathu-Muju, K. R., Friedman, J. W., & Nash, D. A. (2013). Oral health care for children in countries using dental therapists in public, school-based programs, contrasted with that of the United States, using dentists in a private practice model. <i>Am J Public Health</i> , 103(9), e7-e13. doi: 10.2105/ajph.2013.301251	Excluded – little relevance to this study.
McCall, C. (2014). East Timor striving for universal access to health care. <i>The Lancet</i> , 384(9953), 1491-1492.	Excluded – little relevance to this study.
McConnell, K. J. (2007). Trauma Care and Limited Resources. <i>Annals of Emergency Medicine</i> , 49(1), 62-63.	Excluded – little relevance to this study. Discusses medical care, rather than Paramedic care.
Mehta, S., Reynbakh, O., Kostela, J. C., Botelho, R., Rodriguez, D., Fernandez, F. J., . . . Oliveros, E. (2014). Building population-based AMI management systems using telemedicine as a foundation pillar. <i>European Heart Journal</i> ,	Excluded – little relevance to this study.

35, 1172.	
Mirzaei, M., Mirzadeh, F., & Andishmand, A. (2014). Sudden cardiac death and its determinants in an isolated population. <i>Global Heart</i> , 9(1), e269.	Excluded – little relevance to this study.
Mock, C., Kobusingye, O., Joshipura, M., Nguyen, S., & Arreola-Risa, C. (2005). Strengthening trauma and critical care globally. <i>Current Opinion in Critical Care</i> , 11(6), 568-575.	Excluded – little relevance to this study.
Mock, C. N. (2001). Editorial comment. <i>Journal of Trauma - Injury, Infection and Critical Care</i> , 50(5), 920-921.	Excluded – little relevance to this study.
Mohd Shaharudin Shah Che, Hamzah, Ahmad, Rashidi, Nik Hisamuddin Nik Abdul, Rahman, Kasmah Wati, Pardi, Naimah, Jaafar, Wan Aasim Wan, Adnan, . . . Syed Mohsin Sahil, Jamalullail. (2005). AMBULANCE SERVICES AT HOSPITAL UNIVERSITI SAINS MALAYSIA AND HOSPITAL KOTA BHARU: A RETROSPECTIVE STUDY OF CALLS. <i>Malaysian Journal of Medical Sciences</i> , 12(2), 34-42.	Excluded – little relevance to this study.
Monga, D., & Achanna, S. (1999). Is there a role for the obstetric flying squad in Peninsula Malaysia? <i>Singapore Med J</i> , 40(2), 78-80.	Excluded – little relevance to this study.
Moonesar, R., Sammy, I., Nunes, P., & Paul, J. (2015). Social support in older people: lessons from a developing country. <i>Quality of Life Research</i> .	Excluded – little relevance to this study.
Moriwaki, Y., Tahara, Y., Toyoda, H., Kosuge, T., Iwashita, M., Arata, S., . . . Suzuki, N. (2010). Effect of telephone CPR on the rate of bystander CPR for out-of-hospital cardiac arrest in a typical urban city in Japan. <i>Critical Care</i> , 14, S104.	Excluded – little relevance to this study.
Mustaffa, A. A., & Kazunori, H. (2012). The Effectiveness of Emergency Response System's Service Providers for Road Accidents in Johor Bahru, Malaysia. <i>Civil Engineering Dimension</i> , 14(2), 77-83.	Excluded – little relevance to this study.
Nakahara, S., Saint, S., Sann, S., Ichikawa, M., Kimura, A., Eng, L., & Yoshida, K. (2010). Exploring referral systems for injured patients in low-income countries: a case study from Cambodia. <i>Health policy and planning</i> , 25(4), 319-327.	Excluded – little relevance to this study.
Nash, D. A., Friedman, J. W., Kardos, T. B., Kardos, R. L., Schwarz, E., Satur, J., . . . Nagel, R. (2008). Dental therapists: a global perspective. <i>Int Dent J</i> , 58(2), 61-70.	Excluded – little relevance to this study.
Newton, J. H. (1970). Group practice in the Far East. <i>Practitioner</i> , 205(230), 811-814.	Excluded – little relevance to this study.

Nguyen, T. H., Nguyen, L. K., Ngo, T. K. T., Ho, T. H., & Le, T. V. (2010). Preliminary experience with recombinant tissue plasminogen activator in vietnam. <i>International Journal of Stroke</i> , 5, 3.	Excluded – little relevance to this study.
Nguyen, T. H., Nguyen, L. K., Ngo, T. K. T., Ho, T. H., & Le, T. V. (2010). Preliminary experience with recombinant tissue plasminogen activator in Vietnam. <i>International Journal of Stroke</i> , 5, 2.	Excluded – little relevance to this study.
Nor, N. A., Murat, N. A., Yusof, Z. Y., & Gamboa, A. B. (2013). Senior dentists' perceptions of dental therapists' roles and education needs in Malaysia. <i>Int J Dent Hyg</i> , 11(4), 280-286. doi: 10.1111/idh.12038	Excluded – little relevance to this study.
Norzila, M. Z., Hasanah, I., Deng, C. T., & Azizi, B. H. (2000). Asthma education: how much does it improve knowledge of childhood asthma amongst medical students and paramedics? <i>Med J Malaysia</i> , 55(3), 324-330.	Excluded – little relevance to this study.
Ogungbo, B., Ogun, A., Ushewokunze, S., Mendelow, A., Walker, R., & Rodgers, H. (2005). How can we improve the management of stroke in Nigeria, Africa? <i>African Journal of Neurological Sciences</i> , 24(2), 9-19.	Excluded – little relevance to this study.
Ong, Marcus E. H., Cho, Jungheum, Ma, Matthew Huei-Ming, Tanaka, Hideharu, Nishiuchi, Tatsuya, Al Sakaf, Omer, . . . Investigators, Paros. (2013). Comparison of emergency medical services systems in the pan-Asian resuscitation outcomes study countries: Report from a literature review and survey. <i>Emerg Med Australas</i> , 25(1), 55-63.	Some elements of this publication considered. This publication and the two below are similar, but do contain slightly different perspectives or updates. For the purpose of this review they were considered separate publications.
Ong, M. E. H., Cho, J., Ma, M. H. M., Tanaka, H., Nishiuchi, T., Alsakaf, O., . . . Shin, S. D. (2012). Comparison of EMS systems in the pan-Asian resuscitation outcomes study countries: Report from a literature review and survey. <i>Resuscitation</i> , 83, e29.	Some elements of this publication considered.
Ong, M. E. H., Shin, S. D., Tanaka, H., Ma, M. H. M., Khruerkarnchana, P., Hisamuddin, N., . . . Khan, M. N. (2011). Pan-Asian Resuscitation Outcomes Study (PAROS): Rationale, methodology, and implementation. <i>Academic Emergency Medicine</i> , 18(8), 890-897.	Some elements of this publication considered.
Pahlavan, P. S., & Frøbert, O. (2004). Clinical findings and educational status in chest pain patients admitted to an emergency department. Report from a three-month survey at Be'sat hospital, Teheran, Iran. <i>Italian Heart Journal</i> , 5(10), 762-766.	Excluded – little relevance to this study.
Pandian, J. D. (2010). Organisation of stroke care services: An Indian	Excluded – little relevance to

perspective. <i>International Journal of Stroke</i> , 5, 2.	this study.
Pandian, J. D., Khurana, D., Kaul, S., Sylaja, P. N., Padma, V., Arora, D., . . . Singhal, A. (2015). Intravenous thrombolysis in India: The Indo-US stroke project. <i>Stroke</i> , 46.	Excluded – little relevance to this study.
Paramedics Australasia. (2015). Registration. https://www.paramedics.org/?s=registration+	Some elements of this publication considered. Professional body site explaining the progress towards registration of Paramedics in Australia. Not peer reviewed. Background information.
Patel, S., Awoonor-Williams, J. K., Asuru, R., & Schmitt, M. L. (2014). Lessons learned from a community-engaged emergency referral systems-strengthening initiative in a remote, impoverished setting of northern Ghana. <i>Annals of Global Health</i> , 80(3), 191.	Excluded – little relevance to this study.
Paxman, J. M. (1979). Law, policy and the use of non-physicians in family planning service delivery. <i>IGCC News</i> , 4(4), 1-3.	Excluded – little relevance to this study.
Peng, J. Y. (1977). Village midwives deliver. <i>IDRC Rep</i> , 6(2), 8.	Excluded – little relevance to this study.
Peng, J. Y., Laily, N., Bakar, A., & Bin Marzuki, A. (1972). Village midwives in Malaysia. <i>Stud Fam Plann</i> , 3(2), 25-28.	Excluded – little relevance to this study.
Pichugina, I., Vetchinnikova, O., Kulibaba, S., & Vatazin, A. (2012). Intradialytic nutrition treatment in peritoneal patients. <i>Peritoneal Dialysis International</i> , 32, S48.	Excluded – little relevance to this study.
Pitt, E., & Pusponogoro, A. (2005). Prehospital care in Indonesia. <i>Emergency Medicine Journal</i> , 22(2), 144-147.	Excluded – little relevance to this study.
Potharaju, N. R. (2014). Who's failure? encephalitis kills! <i>Indian journal of public health</i> , 58(3), 147-155.	Excluded – little relevance to this study.
Prophet, A. S. (1968). Dental health problems in Malaysia, Singapore and Nigeria. <i>Dent Health (London)</i> , 7(4), 65-70.	Excluded – little relevance to this study.
Rahman, S. (1985). Role of village practitioners in family planning service delivery system. <i>Malays J Reprod Health</i> , 3(2), 133-137.	Excluded – little relevance to this study.

Rajah Salim, H., Suresh Kumar, G., Vellayan, S., Mak, J. W., Khairul Anuar, A., Init, I., . . . Ramakrishnan, K. (1999). Blastocystis in animal handlers. <i>Parasitol Res</i> , 85(12), 1032-1033.	Excluded – little relevance to this study.
Ramanujam, P., & Aschkenasy, M. (2007). Identifying the need for pre-hospital and emergency care in the developing world: A case study in Chennai, India. <i>Journal of Association of Physicians of India</i> , 55(JULY), 491-495.	Some elements of this publication considered. Review and descriptive article.
Rampanjato, R., Claude, N., & Paulin, B. (2012). Descriptive study of a capacity assessment tool to emergency medical care service delivery at the district health level. <i>British Journal of Anaesthesia</i> , 108, ii99.	Excluded – little relevance to this study.
Rathore, M. F. A., Hanif, S., Farooq, F., Ahmad, N., & Mansoor, S. N. (2008). Traumatic spinal cord injuries at a tertiary care rehabilitation institute in Pakistan. <i>Journal of the Pakistan Medical Association</i> , 58(2), 53-57.	Excluded – little relevance to this study.
Rauff, S., Ramklass, S., Esterhuizen, T., & Cassim, B. (2010). Availability, accessibility and appropriateness of health care to persons aged 60 years and over in the Inanda, Ntuzuma and KwaMashu (INK) area in South Africa. <i>European Geriatric Medicine</i> , 1, S123.	Excluded – little relevance to this study.
Ravindran, J., & Parampalam, S. D. (2000). Revisiting the obstetric flying squad. <i>Med J Malaysia</i> , 55(2), 280-282.	Excluded – little relevance to this study. Previously published.
Razak, I. A., & Lind, O. P. (1994). Dentists' attitudes toward auxiliaries in Malaysia. <i>Community Dent Health</i> , 11(1), 24-28.	Excluded – little relevance to this study.
Razzak, J. A., Cone, D. C., & Rehmani, R. (2001). Emergency medical services and cultural determinants of an emergency in Karachi, Pakistan. <i>Prehospital Emergency Care</i> , 5(3), 312-316.	Excluded – little relevance to this study.
Razzak, J. A., & Luby, S. P. (1998). Estimating deaths and injuries due to road traffic accidents in Karachi, Pakistan, through the capture-recapture method. <i>Int J Epidemiol</i> , 27(5), 866-870.	Excluded – little relevance to this study.
Reerink, E., & Nafisah bte, Alihussein. (1990). Teaching quality assurance in Malaysia: a report on six workshops on quality assurance in patient care services for health care providers in government service. <i>Med Educ</i> , 24(4), 359-365.	Excluded – little relevance to this study.
Roemer, R. (1970). The legal scope of dental hygienists in the United States and other countries. <i>Public Health Rep</i> , 85(11), 941-948.	Excluded – little relevance to this study.

Rosenfield, A. G. (1973). Effective family planning programs. <i>Med Today</i> , 7(3-4), 80-94.	Excluded – little relevance to this study.
Roudsari, B. S., Nathens, A. B., Arreola-Risa, C., Cameron, P., Civil, I., Grigoriou, G., . . . Rivara, F. P. (2007). Emergency Medical Service (EMS) systems in developed and developing countries. <i>Injury</i> , 38(9), 1001-1013. doi: 10.1016/j.injury.2007.04.008	Some elements of this publication considered. Descriptive article.
Sesso, H., Buring, J., Rifai, N., Blake, G., Gaziano, M., & Ridker, P. (2003). C-Reactive Protein and the Risk of Developing Hypertension. <i>JAMA</i> , 290(22), 2945-2951.	Excluded – little relevance to this study.
Sethi, Dinesh, Aljunid, Syed, Saperi, Sulong B., Clemens, Felicity, Hardy, Pollyanna, Elbourne, Diana, . . . Research Steering, Committee. (2007). Comparison of the effectiveness of trauma services provided by secondary and tertiary hospitals in Malaysia. <i>Annals of Emergency Medicine</i> , 49(1), 52-61.e51.	Excluded – little relevance to this study.
Sethi, D., Aljunid, S., Saperi, S. B., Zwi, A. B., Hamid, H., Mustafa, A. N. B., & Abu Hassan, A. A. (2002). Comparison of the effectiveness of major trauma services provided by tertiary and secondary hospitals in Malaysia. <i>Journal of Trauma - Injury, Infection and Critical Care</i> , 53(3), 508-516.	Excluded – little relevance to this study.
Shah, C. H., Ismail, I. M., & Mohsin, S. S. (2008). Ambulance response time and emergency medical dispatcher program: a study in Kelantan, Malaysia. <i>Southeast Asian J Trop Med Public Health</i> , 39(6), 1150-1154.	Some elements of this publication considered. Quantitative research with small sample size.
Shah Che Hamzah, M. S., Ahmad, R., Nik Abdul Rahman, N. H., Pardi, K. W., Jaafar, N., Wan Adnan, W. A., . . . Sahil Jamalullail, S. M. (2005). Ambulance services at hospital universiti sains malaysia and hospital kota bharu: a retrospective study of calls. <i>Malays J Med Sci</i> , 12(2), 34-42.	Some elements of this publication considered. Quantitative research with small sample size.
Shaharudin Shah, C. H. M., Ismail, I. M., & Syed Mohsin, S. S. J. (2008). Ambulance response time and Emergency Medical Dispatcher program: A study in Kelantan, Malaysia. <i>Southeast Asian Journal of Tropical Medicine and Public Health</i> , 39(6), 1150-1154.	Excluded - Previously published (above)
Sharma, M., & Brandler, E. S. (2014). Emergency medical services in India: the present and future. <i>Prehospital and Disaster Medicine</i> , 29(3), 307-310.	Some elements of this publication considered. Descriptive article.
Sheng, C. K., Zakaria, M. I., Rahman, N. H. N. A., Jaalam, K., & Adnan, W. A. W. (2008). Cardiopulmonary resuscitation: The short comings in Malaysia.	Some elements of this publication considered.

<i>Malaysian Journal of Medical Sciences</i> , 15(1), 49-51.	Review article.
Shugg, D. (2007). 4th Asian conference on emergency medicine holistic and quality care... "The emergency medicine brand" Kuala Lumpur, Malaysia 23rd to 25th March 2007. <i>Journal of Emergency Primary Health Care</i> , 5(2).	Excluded – little relevance to this study.
Simons, J. (1975). The indigenous midwife in Asia--supporter or opponent of family planning? <i>IPPF Med Bull</i> , 9(5), 1-3.	Excluded – little relevance to this study.
Singh, H. S., Yiing, W. W., & Nurani, H. N. (1996). Prevalence of childhood sexual abuse among Malaysian paramedical students. <i>Child Abuse Negl</i> , 20(6), 487-492.	Excluded – little relevance to this study.
Sinha, V. D., & Kataria, R. (2012). Pre-hospital challenges in neurosurgical emergencies in developing countries. <i>Journal of Neurotrauma</i> , 29(10), A137-A138.	Some elements of this publication considered. Review article.
Smith, W. P., Tuffin, H., Stratton, S. J., & Wallis, L. A. (2013). Validation of a modified medical resource model for mass gatherings. <i>Prehospital and Disaster Medicine</i> , 28(1), 16-22.	Excluded – little relevance to this study.
Sokrab, O., Sokrab, A., & Hassan, E. F. (2014). Awareness of stroke and knowledge of its warning signs and risk factors in a developing country. <i>Neurology</i> , 82(10).	Excluded – little relevance to this study.
Solagberu, B. A., Osuoji, R. I., Ibrahim, N. A., Oludara, M. A., Balogun, R. A., Ajani, A. O., . . . Sanni, F. O. (2014). Child pedestrian injury and fatality in a developing country. <i>Pediatric Surgery International</i> , 30(6), 625-632.	Excluded – little relevance to this study.
Son, N. T., Thu, N. H., Tu, N. T. H., & Mock, C. (2007). Assessment of the status of resources for essential trauma care in Hanoi and Khanh Hoa, Vietnam. <i>Injury</i> , 38(9), 1014-1022.	Excluded – little relevance to this study.
Sreedharan, S. E., & Ravindran, J. (2011). Barriers to thrombolysis in acute ischemic stroke: Experience from a level 1 hospital in South Australia. <i>Neurology Asia</i> , 16(1), 17-23.	Excluded – little relevance to this study.
St George, J. (1976). Two wheel collapsible stretcher trolley for bush track roads. <i>Tropical Doctor</i> , 6(4), 191-192.	Excluded – little relevance to this study.
St John Ambulance of Malaysia. (2014). St John Ambulance of Malaysia, State of Penang, Annual Report. Penang, Malaysia: St John Ambulance of Malaysia, State of Penang.	Some elements of this publication considered. Organisation Annual Report. Not peer reviewed.
Sun, J., & Twomey, M. (2013). A strategy to implement and support pre-hospital emergency medical systems in developing, resource-constrained areas of South Africa. <i>African Journal of Emergency Medicine</i> , 3(4), S9.	Some elements of this publication considered. Describes the implementation of a system

	which differs greatly to the one considered by this study.
Sundram, C. J. (1965). The education of dental nurses and dental technicians, Malaya, Malaysia. <i>J Dent Aux</i> , 3(1), 28-36.	Excluded – little relevance to this study.
Sundram, C. J. (1967). The education of dental nurses in Malaya, Malaysia. <i>Dent Delin</i> , 18(2), 5-8.	Excluded – little relevance to this study.
Sundram, C. J. (1969). The operative dental auxiliary, the dental profession and changing world attitudes. <i>Dent J Malaysia Singapore</i> , 9(2), 11-17.	Excluded – little relevance to this study.
Tay, H. L., Raja Latifah, R. J., & Razak, I. A. (2006). Clinical pathways in primary dental care in Malaysia: clinicians' knowledge, perceptions and barriers faced. <i>Asia Pac J Public Health</i> , 18(2), 33-41.	Excluded – little relevance to this study.
Teong, T. S. (1975). Media selection for education in the allied health sciences. <i>Med J Malaysia</i> , 29(4), 240-245.	Excluded – little relevance to this study.
Tiwari, Lokesh Kumar D. N. B., Muralindharan, Jayashree M. D., & Singhi, Sunit M. D. (2012). Risk factors for cerebral edema in diabetic ketoacidosis in a developing country: Role of fluid refractory shock*. <i>Pediatric Critical Care Medicine</i> , 13(2), e91-e96.	Excluded – little relevance to this study.
Trede, F., McEwen, C., Kenny, A., & O'Meara, P. (2014). Supervisors' experiences of workplace supervision of nursing and paramedic students in rural settings: a scoping review. <i>Nurse Educ Today</i> , 34(5), 783-788. doi: 10.1016/j.nedt.2013.10.003	Some elements of this publication considered.
Tuhkanen, S., Maijala, H., & Kernohan, W. G. (2008). A disaster preparedness and response project in Afghanistan: Participants' perceptions. <i>J Adv Nurs</i> , 64(3), 287-297.	Excluded – little relevance to this study.
Turner, T. J. (2009). Developing evidence-based clinical practice guidelines in hospitals in Australia, Indonesia, Malaysia, the Philippines and Thailand: values, requirements and barriers. <i>BMC Health Serv Res</i> , 9, 235. doi: 10.1186/1472-6963-9-235	Some elements of this publication considered.
Ünlüoğlu, I., Ekşi, P. A., & Turgut, A. (2001). New equipments and technics for prehospital management of emergency care. <i>SENDROM</i> , 13(3), 20-30.	Excluded – little relevance to this study.
Veerasingam, C., Sambasivan, M., & Kumar, N. (2013). Individual Skills Based Volunteerism and Life Satisfaction among Healthcare Volunteers in Malaysia: Role of Employer Encouragement, Self-Esteem and Job	Excluded – little relevance to this study.

Performance, A Cross-Sectional Study. <i>PLoS One</i> , 8(10).	
Veerasamy, Chanthiran, Sambasivan, Murali, & Kumar, Naresh. (2015). Life Satisfaction Among Healthcare Volunteers in Malaysia: Role of Personality Factors, Volunteering Motives, and Spiritual Capital. <i>Voluntas: International Journal of Voluntary & Nonprofit Organizations</i> , 26(2), 531-552. doi: 10.1007/s11266-014-9437-2	Excluded – little relevance to this study.
Vetchinnikova, O., Pronina, V., Agaltsov, M., Kantariya, R., & Siniutin, A. (2012). Left ventricular hypertrophy in peritoneal dialysis patients. <i>Peritoneal Dialysis International</i> , 32, S38.	Excluded – little relevance to this study.
Villar, J., Purwar, M., Merialdi, M., Zavaleta, N., thi Nhu Ngoc, N., Anthony, J., . . . Vitamin, E. trial group. (2009). World Health Organisation multicentre randomised trial of supplementation with vitamins C and E among pregnant women at high risk for pre-eclampsia in populations of low nutritional status from developing countries. <i>BJOG: An International Journal of Obstetrics & Gynaecology</i> , 116(6), 780-788. doi: 10.1111/j.1471-0528.2009.02158.x	Excluded – little relevance to this study.
Wall, L. L. (2012). Overcoming phase 1 delays: The critical component of obstetric fistula prevention programs in resource-poor countries. <i>BMC Pregnancy and Childbirth</i> , 12.	Excluded – little relevance to this study.
Ward, C. L., Lombard, C. J., & Gwebushe, N. (2006). Critical incident exposure in South African emergency services personnel: Prevalence and associated mental health issues. <i>Emergency Medicine Journal</i> , 23(3), 226-231.	Excluded – little relevance to this study.
Waseem, H., Naseer, R., & Razzak, J. A. (2011). Establishing a successful pre-hospital emergency service in a developing country: Experience from Rescue 1122 service in Pakistan. <i>Emergency Medicine Journal</i> , 28(6), 513-515.	Some elements of this publication considered. Descriptive and review article.
Webb, A. H. (1973). The delivery of a total tuberculosis service in a scattered rural community with poor communications. <i>N Z Med J</i> , 78(502), 412-414.	Excluded – little relevance to this study.
Wen, L. S., & Char, D. (2011). Existing infrastructure for the delivery of emergency care in post-conflict Rwanda: An initial descriptive study. <i>Academic Emergency Medicine</i> , 18(5), S243.	Excluded – little relevance to this study.
Wilde, H., Roselieb, M., Hanvesakul, R., Phaosavasdi, S., & Pruksapong, C. (2003). Expatriate Clinics and Medical Evacuation Companies are a Growth Industry Worldwide. <i>Journal of Travel Medicine</i> , 10(6), 315-317.	Excluded – little relevance to this study.

Wilkinson, I. E. (1992). The future of the GP. <i>Br J Gen Pract</i> , 42(355), 84.	Excluded – little relevance to this study.
Williams, B., Sadasivan, S., & Kadirvelu, A. (2015). Malaysian Medical Students' self-reported Empathy: A cross-sectional Comparative Study. <i>Med J Malaysia</i> , 70(2), 76-80.	Excluded – little relevance to this study.
Williams, B., Sadasivan, S., Kadirvelu, A., & Olaussen, A. (2014). Empathy levels among first year Malaysian medical students: an observational study. <i>Adv Med Educ Pract</i> , 5, 149-156. doi: 10.2147/amep.s58094	Excluded – little relevance to this study.
Wilson, K., Von Tigerstrom, B., & McDougall, C. (2008). Protecting global health security through the International Health Regulations: Requirements and challenges. <i>CMAJ</i> , 179(1), 44-48.	Excluded – little relevance to this study.
Woollard, M. (2003). Miracles take a little longer: The challenges of the uncompensated major incident. <i>Trauma</i> , 5(1), 71-76.	Excluded – little relevance to this study.
Wylie, K., Crilly, J., Toloo, G., Fitzgerald, G., Burke, J., Williams, G., & Bell, A. (2015). Review article: Emergency department models of care in the context of care quality and cost: A systematic review. <i>EMA - Emergency Medicine Australasia</i> , 27(2), 95-101.	Excluded – little relevance to this study.
Zafar, H., Jawad, A., Shahzad Shamim, M., Memon, A. A., Hameed, A., Shahrukh Effendi, M., & Qureshi, S. (2011). Terrorist bombings: Medical response in a developing country. <i>Journal of the Pakistan Medical Association</i> , 61(6), 561-566.	Excluded – little relevance to this study.
Zafar, H., Rehmani, R., Raja, A. J., Ali, A., & Ahmed, M. (2002). Registry based trauma outcome: Perspective of a developing country. <i>Emergency Medicine Journal</i> , 19(5), 391-394.	Excluded – little relevance to this study.
Zakaria, Mohd Idzwan, Isa, Ridzuan Mohd, Shah Che Hamzah, Mohd Shahrudin, & Ayob, Noor Azleen. (2006). MEDICAL STANDBY: AN EXPERIENCE AT THE 4TH NATIONAL YOUTH CAMPING AND MOTIVATION PROGRAM ORGANIZED BY MAKSAM MALAYSIA. <i>Malaysian Journal of Medical Sciences</i> , 13(1), 43-51.	Excluded – little relevance to this study.
Zimmerman, J. R., Bertermann, K. M., Bollinger, P. J., & Woodyard, D. R. (2013). Prehospital system development in Jaffna, Sri Lanka. <i>Prehospital and Disaster Medicine</i> , 28(5), 509-516.	Excluded – little relevance to this study.

Appendix 3: S.A. Ambulance Paramedic Scope of Practice



216 Greenhill Road
Eastwood SA 5063
PO Box 3,
Adelaide SA 5001
Tel 1300 13 62 72
Fax 08 8271 4844
ABN 42 875 540 856
www.saambulance.com.au

2 July 2015

To Whom It May Concern

Re: **Full Name**

I am writing to confirm that **Full Name** is employed with SA Ambulance Service as an emergency paramedic. **First Name** has full unrestricted paramedic authority to practice with SAAS.

The scope of practice undertaken by **First Name** as an emergency paramedic includes:

Airway:

Oropharyngeal airway
Laryngeal Mask airway
Nasopharyngeal airway
Laryngoscopy
Forcep removal of upper airway foreign body

Drug Administration Routes:

Intramuscular injection
Intravenous injection
Intravenous cannulation
Intranasal atomisation

Drug administration:

Aspirin (for AMI)
Adrenaline (IM for anaphylaxis)
Adrenaline (IV for cardiac arrest)
Adrenaline (Nebulised for croup)
Adrenaline (IM for asthma)
Benzylpenicillin (for meningococcal septicaemia)
Dextrose 10% for hypoglycaemia
Dextrose 50% for hypoglycaemia
Fentanyl (IN for analgesia)
Fexofenadine (Oral antihistamine)
Glucagon
Glyceryl trinitrate (for chest pain)
Glyceryl trinitrate (for APO)
Ipratropium
Metoclopramide
Methoxyflurane
Midazolam (for seizures)



Morphine (IV for analgesia)
Naloxone
Ondansetron (for nausea and vomiting IM or IV)
Salbutamol (Nebulised and MDI for asthma)
Saline 0.9% (for IV infusion)

Other:

Comprehensive physical, social and psychological patient assessment
ECG monitoring
12 Lead ECG acquisition
Semi-automatic and manual defibrillation
Vacuum mattress
Pulse oximetry
Decompression of tension pneumothorax

Should you require any further information regarding the authority to practice under which First Name is currently practicing in their employment within SA Ambulance Service please do not hesitate to contact me

Yours sincerely

SAMPLE

Appendix 4: Ambulance Attendance in Penang (HPP Statistics)

HPP Emergency Department Presentation Statistics From 2013

KOD	MECC (2013)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
A-1	Jumlah Panggilan untuk Ambulan Kecemasan Daripada 999 Total Emergency Ambulance Requests From 999	467	641	742	728	715		694	655	744	723	743	704	8213
A-2	Jumlah Panggilan untuk Ambulan Kecemasan BUKAN Daripada 999 Total Emergency Ambulance Requests NOT From 999	722	458	504	493	458		515	519	480	578	390	429	6026
A-3	Jumlah Panggilan Ambulan Kecemasan Total Emergency Ambulance Requests	1189	1099	1246	1221	1173	1137	1209	1174	1224	1301	1133	1133	14239
A-4	Jumlah Permohonan Ambulans untuk Patient Transfer Total Ambulance Requests for Patient Transfer	3	5	12	13	7			5	8	8	2	6	71
A-5	Jumlah Panggilan Ambulan Total Ambulance Requests	1192	1104	1258	1234	1180	1139	1209	1179	1232	1309	1135	1139	14310
A-6	Jumlah Dispatch Ambulan Kepada Ambulan Sendiri Ambulance Dispatch from Own Hospital	900	818	949	1021	957		947	898	1078	1194	1022	966	11675

A-7	Jumlah Dispatch Ambulan Kepada Ambulan Hospital Lain Ambulance Dispatch from Other Hospital	7	8	8	7	9		7	10	2	6	2	5	74
A-8	Jumlah Dispatch Ambulan Kepada Klinik Kesehatan Ambulance Dispatch from Govt Health Clinics	11	11	6	7	2		7	9	9	2	4	1	75
A-9	Jumlah Dispatch Ambulan Kepada JPAM Ambulance Dispatch from JPAM	201	127	199	103	142			138	90	65	60	107	1383
A-10	Jumlah Dispatch Ambulan Kepada SJAM / MRCS Ambulance Dispatch from MRCS / SJAM	49	121	68	69	53			102	30	32	32	52	658
A-11	Jumlah Dispatch Ambulan Kepada Agensi Lain Ambulance Dispatch from Other Agencies	24	19	28	27	17			22	15	10	13	8	187
A-12	Jumlah Dispatch Ambulan (Total Ambulance Dispatch)	1192	1104	1258	1234	1180	1139	961	1179	1224	1309	1133	1139	14052
A-13	Jumlah Ambulan Dispatch Priority 1 - CPR* Total Dispatched Calls for Priority 1 - CPR*	12	6	10	8	13		8	10	13	12	13	12	130
A-14	Jumlah Ambulan Dispatch Priority 1 - Tidak Sedar Diri Total Dispatched Calls for Priority 1 - Unconscious / Altered Mental State	112	92	108	112	104			110	154	121	142	122	1304

A-15	Jumlah Ambulan Dispatch Priority 1 - Sesak Nafas / Sakit Dada Total Dispatched Calls for Priority 1 - Difficulty in Breathing / Chest Pain	127	114	142	127	131		141	172	203	182	170	1663
A-16	Jumlah Ambulan Dispatch Priority 1 - MVA / Trauma Total Dispatched Calls for Priority 1 - MVA / Trauma	337	208	215	322	294		246	294	322	341	283	3147
A-17	Jumlah Ambulan Dispatch Priority 1 - Maternity Total Dispatched Calls for Priority 1 - Maternity	41	42	44	58	41		37	51	46	32	31	460
A-18	Jumlah Ambulan Dispatch Priority 1 - Lain-lain Total Dispatched Calls for Priority 1 - Others	30	26	47	33	27		31	38	37	27	28	361
A-19	Jumlah Ambulan Dispatch Priority 2 - Kes Medikal Biasa Total Dispatched Calls for Priority 2 - Normal Medical Cases	207	248	275	246	288		230	287	387	263	277	2877
A-20	Jumlah Ambulan Dispatch Priority 2 - Kes Trauma Biasa Total Dispatched Calls for Priority 2 - Normal Trauma Cases	30	76	94	102	48		85	57	54	19	38	702
A-21	Jumlah Ambulan Dispatch Priority 3 - Kes Transfer Biasa Total Dispatched Calls for Priority 3 - Normal	3	5	12	13	7		5	8	8	2	5	70

	Transfer Cases													
A-22	Jumlah Ambulan Dispatch Priority 3 - Tiada Indikasi yang Jelas Total Dispatched Calls for Priority 3 - No Clear Emergency Indication	1	1	2	0	4		3	4	4	1	0	22	
A-23	Jumlah Panggilan Triage (Total Triage Calls)	900	818	949	1021	957	925	8	898	1078	1194	1022	966	10736

HPP Emergency Department Presentation Statistics From 2014

KOD	MECC (2014)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
A-1	Jumlah Panggilan untuk Ambulan Kecemasan Daripada 999 Total Emergency Ambulance Requests From 999	713	704	742	772	739		709	796	884	1020	944	998	9773
A-2	Jumlah Panggilan untuk Ambulan Kecemasan BUKAN Daripada 999 Total Emergency Ambulance Requests NOT From 999		356	363	361	365		368	321	202	102	65	96	3352
A-3	Jumlah Panggilan Ambulan Kecemasan Total Emergency Ambulance Requests	1136	1060	1105	1133	1104	1082	1077	1117	1086	1122	1009	1094	13125
A-4	Jumlah Permohonan Ambulans untuk Patient Transfer Total Ambulance Requests for Patient	5	1	0	0	0		0	1	4	12	5	22	50

	Transfer														
A-5	Jumlah Panggilan Ambulan Total Ambulance Requests	1141	1061	1105	1133	1104	1082	1077	1118	1090	1134	1014	1116	13175	
A-6	Jumlah Dispatch Ambulan Kepada Ambulan Sendiri Ambulance Dispatch from Own Hospital	1009	999	1036	1069	1039	1009	974	1058	1051	1102	978	1058	12382	
A-7	Jumlah Dispatch Ambulan Kepada Ambulan Hospital Lain Ambulance Dispatch from Other Hospital	2	2	1	1	2		0	1	2	0	0	0	14	
A-8	Jumlah Dispatch Ambulan Kepada Klinik Kesehatan Ambulance Dispatch from Govt Health Clinics	7	6	1	3	2		3	3	0	2	2	1	34	
A-9	Jumlah Dispatch Ambulan Kepada JPAM Ambulance Dispatch from JPAM	41	13	29	26	23		25	25	9	5	10	6	244	
A-10	Jumlah Dispatch Ambulan Kepada SJAM / MRCS Ambulance Dispatch from MRCS / SJAM	72	32	30	19	23		51	18	13	7	9	22	323	
A-11	Jumlah Dispatch Ambulan Kepada Agensi Lain Ambulance Dispatch from Other Agencies	10	8	8	15	15		24	12	11	6	10	7	133	
A-12	Jumlah Dispatch Ambulan (Total Ambulance Dispatch)	1141	1060	1105	1133	1104	1082	1077	1117	1086	1122	1009	1094	13130	

A-13	Jumlah Ambulan Dispatch Priority 1 - CPR* Total Dispatched Calls for Priority 1 - CPR*	7	9	9	8	8	11	8	12	21	5	5	117
A-14	Jumlah Ambulan Dispatch Priority 1 - Tidak Sedar Diri Total Dispatched Calls for Priority 1 - Unconscious / Altered Mental State	139	148	170	179	168	146	168	160	157	149	158	1905
A-15	Jumlah Ambulan Dispatch Priority 1 - Sesak Nafas / Sakit Dada Total Dispatched Calls for Priority 1 - Difficulty in Breathing / Chest Pain	178	169	158	161	166	138	166	180	187	164	155	1982
A-16	Jumlah Ambulan Dispatch Priority 1 - MVA / Trauma Total Dispatched Calls for Priority 1 - MVA / Trauma	322	296	289	335	344	332	337	287	285	274	216	3664
A-17	Jumlah Ambulan Dispatch Priority 1 - Maternity Total Dispatched Calls for Priority 1 - Maternity	36	38	38	36	35	49	57	44	40	33	47	482
A-18	Jumlah Ambulan Dispatch Priority 1 - Lain-lain Total Dispatched Calls for Priority 1 - Others	29	32	47	32	29	24	36	29	35	26	112	462
A-19	Jumlah Ambulan Dispatch Priority 2 - Kes Medikal Biasa Total Dispatched Calls for Priority 2 - Normal	244	265	280	277	262	251	262	314	339	310	282	3320

	Medical Cases													
A-20	Jumlah Ambulan Dispatch Priority 2 - Kes Trauma Biasa Total Dispatched Calls for Priority 2 - Normal Trauma Cases	50	38	44	36	23		21	23	19	26	12	58	378
A-21	Jumlah Ambulan Dispatch Priority 3 - Kes Transfer Biasa Total Dispatched Calls for Priority 3 - Normal Transfer Cases	5	1	0	0	0		0	1	4	12	5	22	50
A-22	Jumlah Ambulan Dispatch Priority 3 - Tiada Indikasi yang Jelas Total Dispatched Calls for Priority 3 - No Clear Emergency Indication	0	3	1	5	4		2	0	2	0	0	3	23
A-23	Jumlah Panggilan Triage (Total Triage Calls)	1010	999	1036	1069	1039	1009	974	1058	1051	1102	978	1058	12383

Source: HPP Emergency Department, raw data (unpublished) used with permission.

Appendix 5: Application of the Verification Criteria by Morse et al. (2008)

Criteria	Strategy	Comment
Methodological coherence.	Consider the methodology most relevant to the questions being asked of the research.	Within this research the central question was around how improved education might impact on the development of a profession. As professionalism is a constructed concept, the methodology best suited should allow for constructed realities. Thus, ethnography is well suited.
Appropriate sampling.	The choice of sampling strategy should be consistent with the methodology and explicit.	Within this study purposive sampling was utilised to gather the most appropriate data. An end point was identified within the process and made explicit within the thesis.
Collecting and analysing data concurrently.	Data analysis should occur during collection.	Analysis of each interview was conducted shortly following that interview by the researcher. A thematic analysis was ongoing during the interview process and aided the identification of data saturation.
Theoretical thinking and theory development.	Within the study a theoretical basis must exist	Within this study there is limited theory to draw from. 'Grey' literature has formed a large part of this, however the author has linked available theory closely with the process and outcomes of the study.

Appendix 6: Ethics Approval



RESEARCH BRANCH
OFFICE OF RESEARCH ETHICS, COMPLIANCE
AND INTEGRITY

LEVEL 7, 115 GRENFELL STREET
THE UNIVERSITY OF ADELAIDE
SA 5005 AUSTRALIA

TELEPHONE +61 8 8313 5137
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EMAIL hrec@adelaide.edu.au

CRICOS Provider Number 00123M

17 December 2014

Professor J Karnon
School of Population Health

Dear Professor Karnon

ETHICS APPROVAL No: H-2014-276

PROJECT TITLE: Setting basic standards in a developing ambulance service: The impact of the intermediate ambulance care course on pre-hospital care practice in Penang, Malaysia

The ethics application for the above project has been reviewed by the Low Risk Human Research Ethics Review Group (Faculty of Health Sciences) and is deemed to meet the requirements of the *National Statement on Ethical Conduct in Human Research (2007)* involving no more than low risk for research participants. You are authorised to commence your research on **17 Dec 2014**.

Ethics approval is granted for three years and is subject to satisfactory annual reporting. The form titled *Project Status Report* is to be used when reporting annual progress and project completion and can be downloaded at <http://www.adelaide.edu.au/ethics/human/guidelines/reporting>. Prior to expiry, ethics approval may be extended for a further period.

Participants in the study are to be given a copy of the Information Sheet and the signed Consent Form to retain. It is also a condition of approval that you **immediately report** anything which might warrant review of ethical approval including:

- serious or unexpected adverse effects on participants,
- previously unforeseen events which might affect continued ethical acceptability of the project,
- proposed changes to the protocol; and
- the project is discontinued before the expected date of completion.

Please refer to the following ethics approval document for any additional conditions that may apply to this project.

Yours sincerely,

Sabine Schreiber
Secretary, Human Research Ethics Committee
Office of Research Ethics, Compliance and Integrity

Appendix 7: Interview Guide

Topic Guide for Interviews

Topic	Example Question	Alternate Example
Knowledge of the Intermediate Ambulance Care Course	What do you know about the IAC? How would you summarise the IAC if you had to explain it to someone unfamiliar with it?	What have you been told about the IAC?
Knowledge of prehospital care in Penang	Can you describe for me the prehospital care system in Penang?	What are the agencies involved in prehospital care in Penang?
Professionalism	Would you describe prehospital care in Penang as a profession? Why/Why not?	What would be needed to move prehospital care from what it is now to a profession?
Development of prehospital care	How would you envision prehospital care services being delivered in the future? If you could change the prehospital care system in Penang, how would you change it? Are services heading in that direction now? Please explain. How do you think prehospital care services will develop over the next 10-20 years?	Are you aware of any other models of prehospital care services? Would they suit Penang - Why / Why not?
Perceived effect of IAC	Have you seen any changes in practice since the IAC ran last year? What have you noticed? Why do you think things have / have not changed? Given what you have said, what do you think about the IAC?	What do you think the effect of the IAC has been? What do you think the effect will be in the future?

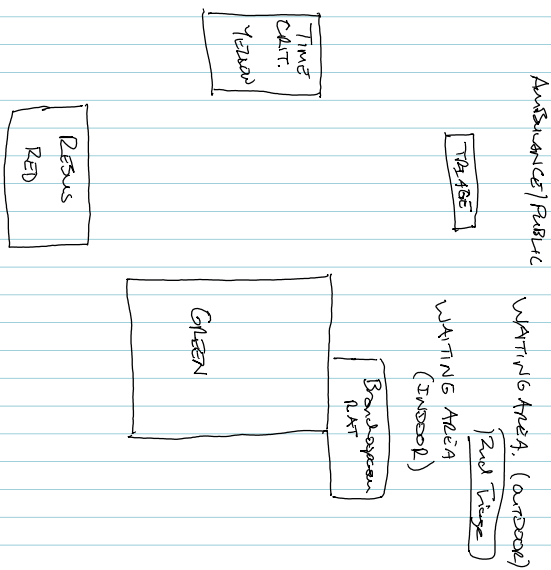
<p>Creating a specific body of knowledge</p>	<p>In many places prehospital care is distinct from medical and nursing practice. Is this a model that you would like to see develop in Penang?</p> <p>What would it take, in your opinion, for this to develop?</p>	<p>Some people say that prehospital care practitioners should only operate under the direct supervision of a medical practitioner. What do you think about that?</p>
<p>Future of education</p>	<p>What do you think is important to include in an education course for prehospital care providers?</p>	<p>Given your views above - what do you think about a course that aims to allow a level of independent practice in ambulance settings?</p>

Appendix 8: An Example of Field Notes

Overall observations	Observation notes Joc RTSE RTSE TANGUMB BUNGU
VAs operate as a group distinct from NGOs in:	Usually staffed with volunteers
Ability to skip triage	clinical level varies depending on availability only. no minimum level required. lowest level of
medical treatment	ambulance education is BSc or AA
However - essentially they are hands over to colleagues within the same workplace. They also continue care of pt. in hospital.	Usually respond to 3-4 cases/night operating from 1800 - 0700 was in delayed answer @ base 1930. Ambulance base shared with W. Police (community police, ambulance taken from ST Jan HQ
NGOs + privates vary in interactions	Response part of 999 system.
	U. Limited facilities available. no computer or internet available.
	Ambulance care variable. Crew had limited experience but willingness to learn.

26/1/15

Observer HPP. ED.



Public and ambulance present to same triage. No separate areas for Ambulance arrivals

Not focus on number of pt. Seizure & Limited medical intervention.

Recovery of seizure during handover.

IAE IMPACT

Observations HPP. 26/1/15

Handover RC BAE Traced
→ Limited discussion re pt
Descriptive only discussion
re diagnosis. Limited descriptors
of clinical signs
No paperwork in handover.
Handover to MA.

Handover SJAM BAE
→ Limited notes given
restricted to basic story of
pt. Paperwork reflected verbal.

Handover SJAM IAE
→ ~~structured~~ structured medical
handover with paperwork given
Paperwork reflected verbal
Handover

Handover RC BAE Traced.
→ Limited discussion. No
paperwork. Pt not recognised
as critical despite SOBTT RR > 3
transferred to green zone.
Post handover 1 interviewed
Pt → Recus. → chest infection

Several other transfers incl.
from private hospitals also
occurred today. Handovers
from these were very limited
however they refused medical
responsibility for pt.

Handover MCCD BAE
→ approx 5 words spoken
vs limited handover Nil
paperwork.

Handover MILD BAE
→ No handover given

Appendix 9: Letters of Approval to Conduct Research



Perkhidmatan Bagi Manusia

ST. JOHN AMBULANS MALAYSIA NEGERI PULAU PINANG

Penaung: T.Y.T. Yang di-Pertua Negeri Pulau Pinang
Tun Dato' Seri Utama (Dr.) Haji Abdul Rahman bin Haji Abbas,
SMN, DUPN, SPDK, DP, DMPN, DJN

Presiden: Y.B. Senator Tan Sri Dr. Koh Tsu Koon, PSM

Pengerusi/Pemerintah Negeri: Dato' Dr. Yee Thiam Sun, DMPN, DSPN, KMN, DJN, PKT, PJM,
MBBS (Agra), MCGP (Mal), FAFP (Mal), FACSM (USA), MSpCard (Rome), LFOM (Ire),
No. Tel: 04-2619924/04-2610701 (Pejabat); 012-4383363 (Bimbit)
E-mail: yeethiamsun@gmail.com



EN ISO 9001:2000
QA 04100 0806

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sebagai K.G.O. yang pertama di Malaysia
memperolehi pensijilan ISO 9002 dalam skop
"Lathan Pertolongan Cemas untuk Orang Awam"

Setiausaha Kehormat Negeri: Dr. Liew Yueah Cin, PJM
BSSA (HPU), MBA (HPU), DBA (UniSA), MMIM
No. Tel: 012-4836011 (Bimbit)
E-mail: liew_yc@hotmail.com

8th February 2014

To:
Mr. Matt Perry
26 Rogerson Circuit
Craigburn Farm
S.A. 5051
Australia

Dear Matt,

RE: Masters of Philosophy in Public Health

With reference to your letter dated 23rd Jan 2014, I congratulate you for being accepted to pursue the Masters of Philosophy in Public Health offered by University of Adelaide.

I am glad to hear that you will be doing a research on the effectiveness of the Pre-Hospital Care training model currently offered by St. John Ambulance of Malaysia, State of Penang. This research will be beneficial to further improve the standards of pre-hospital care practices in our organisation. On behalf of the organisation, we will certainly support and agree to provide all the support you require as stated in your letter. In particular we are happy to provide:

- i) access to patients' data for the purpose of research
- ii) permission to conduct interviews amongst staff for research data collection
- iii) providing financial information related to patient care expenditure for research purpose

We agree to guarantee this co-operation for the duration of your studies.

Wishing you success in your endeavour.

For the **Service of Mankind**,

DATO' Dr. YEE THIAM SUN, DMPN, DSPN, KMN, DJN, PKT, PJM,
MBBS (Agra), MCGP (Mal), FAFP (Mal), FACSM (USA),
Msp Card (Rome), LFOM (Ire)
State Commander/Chairman,
St. John Ambulance of Malaysia,
State of Penang.



JABATAN KECEMASAN & TRAUMA

HOSPITAL PULAU PINANG

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26 April 2014

Mr Matt Perry
South Australia Ambulance Service
Flinders University, Adelaide

Dear Mr Perry,

PERMISSION TO CONDUCT INTERVIEW SESSIONS WITH STAFF OF THE EMERGENCY DEPARTMENT HOSPITAL PULAU PINANG

With reference to the above, a study is to be conducted conjointly between yourself, St John Ambulance of Penang and the Intermediate Ambulance Care Training Group for the purposes of determining the outcomes of IAC Training.

2. The Emergency Department has no objections to the study being conducted as a questionnaire of involved staff during the months of December 2014 and January 2015, during which time you will have access to the staff of the Emergency Department to conduct the study.
3. Standard protocols require that the findings of the study be reported to the Heads of Organization, which in this case will be the Head of the Emergency Department, Hospital Pulau Pinang.
3. Kindly do provide further details of schedules of interviews and detailed requirements when the study period commences.

Warmest regards.

“BERKHIDMAT UNTUK NEGARA”

Saya yang Menurut Perintah,

(**Dr Teo Aik Howe**)
Consultant Emergency Physician,
on behalf of the Head of Emergency and Trauma Dept,
Jabatan Kecemasan dan Trauma
Hospital Pulau Pinang.

PENYAYANG, BEKERJA BERPASUKAN DAN PROFESIONALISMA ADALAH BUDAYA KERJA KITA

PDP



**BAHAGIAN PERANCANGAN DASAR & PENYELARASAN
JABATAN PERTAHANAN AWAM MALAYSIA**

MINIT CERAIAN

Rujukan : PA.BDP.800.1/1/5 Jld 6 (53)

Tarikh : 12 Februari 2015

YAS Dato' Ketua Pengarah,

**KELULUSAN BAGI TUGAS ATTACHMENT MENJALANKAN KAJIAN
PERKHIDMATAN *PRE-HOSPITAL CARE* DI JPAM**

1. Bahagian Pengurusan Bencana dan Operasi (BBO) IPPA menerima permohonan melalui emel daripada Matthew Perry, pelajar *Master of Philosophy (Public Health)* University of Adelaide, Australia untuk mengadakan kajian perkhidmatan '*pre-hospital care*' dengan Jabatan Pertahanan Awam Malaysia (JPAM).
2. Pihak BBO telah memanjangkan permohonan ini termasuk surat perakuan pihak University of Adelaide kepada Bahagian Perancangan Dasar dan Penyelarasan (BDP) IPPA untuk mendapatkan ulasan dasar memandangkan pemohon merupakan warga asing dan memohon untuk menjalankan kajian sistem perkhidmatan dalam JPAM.

3. Pihak BDP berpandangan bahawa permohonan ini boleh diluluskan dengan syarat-syarat seperti berikut:-

- i) Pemohon melengkapkan butiran diri beserta salinan passport dan dokumen pengajian serta insurans perlindungan diri berkaitan dalam borang khas yang akan dikeluarkan oleh Cawangan Perhubungan Antarabangsa BDP;
- ii) Pemohon menandatangani perakuan Surat Setuju Terima dengan syarat-syarat penempatan seperti berikut:-
 - a) Tempoh kajian dan penempatan tidak melebihi empat belas hari (14) hari termasuk hujung minggu;
 - b) Pemohon hendaklah bersetuju untuk menyerahkan kepada JPAM hasil dapatan melibatkan kajian perkhidmatan JPAM;
 - c) Pemohon melapor dan memaklumkan cadangan jadual dan hari bertugas kepada pegawai tanggungjawab di mana pemohon bertugas;
 - d) Pemohon hanya dibenarkan akses dalam ruang penugasan MERS999 JPAM sahaja termasuk kenderaan operasi terlibat;
 - e) Pemohon boleh mengakses, membaca dan menganalisa dokumen dan rekod MERS999 JPAM bagi PNPA/PKOD penempatan ditetapkan sahaja. Salinan '*hardcopy*' dokumen sebagai lampiran kajian hanya dibenarkan untuk dibawa keluar atau disimpan oleh pemohon bagi dokumen kategori Tidak Terperingkat sahaja;

f) Pemohon hendaklah menandatangani Surat Pelepasan Tanggungan (*Letter of Indemnity*) sebagai jaminan tiada akauntabiliti terhadap JPAM akibat sebarang kecederaan, kehilangan, kerosakan dan kematian yang mungkin terbit sepanjang penempatan pemohon bersama JPAM; dan

g) Semua perbelanjaan kajian dan sara hidup adalah atas tanggungan pemohon sendiri. JPAM tidak membayar atau menanggung sebarang tuntutan kewangan, perbelanjaan, elaun, ganti rugi dan kos-kos yang dikeluarkan oleh pemohon sepanjang tempoh penempatan pemohon.

iii) Pegawai tanggungjawab JPAM di penempatan pemohon hendaklah memantau dan menyelia penugasan pemohon serta memastikan aspek keselamatan diri pemohon dititikberatkan.

4. Diangkat minit ceraihan ini untuk pertimbangan dan kelulusan YAS Dato' Ketua Pengarah seperti syor di para 3 di atas.

DIPERAKUKAN OLEH :

(PPj.(PA) HJ. NORHAFIFI BIN HJ. ISMAIL)

Pengarah Perancangan Dasar dan Penyelarasan

Tarikh: 12/2/2015

ULASAN TIMBALAN KETUA PENGARAH (OPERASI)

Saya menyokong syor di para 3 di atas.

Saya menyokong syor di atas dengan cadangan pindaan dibuat seperti berikut :-

Kebenaran penempatan ini sebagai
salah satu medium pendedahan
ruang dan penerangan yang kepada
menyediakan antara bangsa disamping
untuk mendapat maklumat kelas
manakala kerah penambahbaikan perkhidmatan

(TPj.(PA) HJ. SELAMAT BIN HJ. DAHALAN)

Timbalan Ketua Pengarah (Operasi)
Jabatan Pertahanan Awam Malaysia

Tarikh : 13/2/15.

KEPUTUSAN YAS DATO' KETUA PENGARAH

Saya bersetuju dengan syor di para 3 di atas.

Saya bersetuju dengan syor di atas dengan cadangan pindaan dibuat seperti berikut :-

(D~~A~~TO' ZAITUN AB SAMUD)
Ketua Pengarah Pertahanan Awam
Malaysia

Tarikh : 16/2/2015

Appendix 10: Consent Form Template



Human Research Ethics Committee (HREC)

CONSENT FORM

1. I have read the attached Information Sheet and agree to take part in the following research project:

Title:	Setting Basic Standards in a Developing Ambulance Service: A qualitative description of the impact of the Intermediate Ambulance Care course on prehospital care practice in Penang, Malaysia.
Ethics Approval Number:	H-2014-276

2. I have had the project, so far as it affects me, fully explained to my satisfaction by the research worker. My consent is given freely.
3. Although I understand the purpose of the research project it has also been explained that involvement may not be of any benefit to me.
4. I have been informed that information gained during the study may be published and while efforts will be made to de-identify my responses there may be some responses that can be identified as mine. I have been informed that I am able to withdraw identifiable information at any stage up until the analysis stage and will be given the opportunity to do so following my interview.
5. I understand that I am free to withdraw from the project at any time up to the point where the information I give is prepared for publication.
6. I agree to the interview being audio/video recorded. Yes No
7. I am aware that I should keep a copy of this Consent Form, when completed, and the attached Information Sheet.

Participant to complete:

Name: _____ Signature: _____ Date: _____

Researcher/Witness to complete:

I have described the nature of the research to _____
(print name of participant)

and in my opinion she/he understood the explanation.

Signature: _____ Position: _____ Date: _____

Appendix 11: BAC & IAC Scope of Practice - SJAM Penang

The Following descriptors were supplied by SJAM Penang for the purpose of this study:

Basic Ambulance Care (BAC) – BLS and limited to essentially non-invasive procedures

Airway:

Oropharyngeal airway

Laryngeal Mask airway

Nasopharyngeal airway

Drug Administration:

Non-prescribed drug such as oxygen (for respiratory distress); and

Oral glucose (for hypoglycemia)

Assist patients with administration of prescribed GTN (for chest pain); and

Administration of MDI such as salbutamol (for asthma)

Other:

Basic medical assessment skills

CPR

AED

Mechanical ventilation using a bag-valve mask

Pulse oximetry

Glucose testing using a glucometer

Splinting (including spinal immobilization and traction splints)

Suctioning

Intermediate Ambulance Care (IAC) – Includes more invasive procedures than are covered at BAC level, including IV and IM therapy, use of certain drugs, and provides for advanced assessment skills

Airway:

Oropharyngeal airway

Laryngeal Mask airway

Nasopharyngeal airway

Drug Administration:

Aspirin (for AMI)

Adrenaline (IM for anaphylaxis)

Adrenaline (IV for cardiac arrest)

Dextrose 10% for hypoglycaemia

Glyceryl trinitrate (for chest pain)

Glyceryl trinitrate (for APO)

Methoxyflurane

Midazolam (for seizures)

Salbutamol (nebulized and MDI for asthma)

Saline 0.9% (for IV infusion)

Saline 0.9% for hypovolemia secondary to trauma

Other:

Advanced assessment skills

ECG monitoring

12 Lead ECG acquisition

Semi-automatic and manual defibrillation

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