

## PREHOSPITAL CARE

# Prehospital care in Indonesia

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**Background:** Indonesia is a huge, diverse, and developing country that until recently had no public ambulance service let alone a system of prehospital care. It commonly experiences many natural disasters, manmade conflicts, and violence as well as the daily emergencies seen worldwide.

**Current system:** Hospitals of varying standards are widespread but have no system of emergency ambulance or patient retrieval. Indonesia's only public emergency ambulance service, 118, is based in five of the biggest cities and is leading the way in paramedic training and prehospital care.

**Challenges and developments:** There are many challenges faced including the culture of acceptance, vast geographical areas, traffic, inadequate numbers of ambulances, and access to quality training resources. Recently there have been a number of encouraging developments including setting up of a disaster response brigade, better provision of ambulances, and development of paramedic training.

**Conclusions:** An integrated national regionalised hospital and prehospital system may seem fantastic but with the enthusiasm of those involved and perhaps some help from countries with access to training resources it may not be an unrealistic goal.

The Bali bomb in October 2002 brought the attention of the world on Indonesia. Nearly 200 lives were lost as a result of a bomb planted outside the Sari Night Club in Kuta, one of the most popular tourist areas in Bali. Much of the international focus was on the apparent shortcomings of the Indonesian authorities and international consuls in the immediate aftermath following the tragedy—in particular, identification and release of bodies, mortuary facilities, and organisation.<sup>1</sup> Sadly Indonesia is not new to the experience of a mass casualty situation—natural disasters and violent conflict are not uncommon. What was unusual in Bali was the high number of non-Indonesian casualties and this, not surprisingly, led to the international interest in the organisation and response to the bombing and its victims.

Prehospital care is often thought to be the preserve of the developed world but there is increasing evidence in the medical journals that this is not the case. Many articles have been published describing the prehospital care systems of less affluent countries.<sup>2–4</sup> From such reports it can be seen that although many of these systems have characteristics unique to their country of origin, worldwide there is much that prehospital care providers have in common when facing the challenge of developing and implementing such a system. Scientific research in emergency medicine in countries such as Indonesia is being carried out and beginning to be recognised and published in peer reviewed journals.<sup>5–6</sup> The concept of prehospital care in Indonesia is not a new one but has yet to be fully realised.

The aim of this article is to describe the evolution and current system of prehospital emergency care in Indonesia, concentrating on the service in Jakarta as it is the largest population centre and base for most of the organisations described. We will look at the challenges faced and how they are being overcome.

### HISTORY AND GEOGRAPHY

Indonesia declared independence in 1945 but has only recently become a democracy. The first free elections were held in 1999 following the economic crisis of 1997 and political turmoil and riots of 1998. Despite this, the country is still going through uncertain times politically and socially. There are ongoing sectarian and separatist conflicts in the

provinces of the Malukan Islands, Aceh, and West Papua. Mass gatherings and even mob violence can easily erupt, triggered by unstable politics and a struggling economy. A map of Indonesia and its location is available on line (<http://www.emjonline/supplemental>).

### Need for a prehospital care system

The commonest cause of death in Indonesia is infectious disease, followed closely by coronary heart disease. According to the 1991 Survei Kesehatan Rumah Tangga (household health survey), trauma is the fourth commonest cause of death in Indonesia but the commonest in the 15–24 age group and the second commonest (together with maternal mortality) in the 25–34 age group. In 1991 50 000 people died of injuries but only 4000 of them in hospital—raising the question “where did the rest die?” In the community, presumably.

Indonesia, being located on the Pacific rim “ring of fire”, is no stranger to the consequences of plate tectonics—there are many active volcanoes as well as regular earthquakes, floods, landslides, and tsunamis (most famously the 1883 eruption of Krakatoa that killed 36 000 people in the ensuing tsunami). More recently there have been significant floods in Flores and Jakarta, as well as the volcano Gunung Merapi that erupted in 1994 and in 2000, and the Sumatran earthquake in 2000. Then there are the manmade disasters—the all too common transport accidents as well as the mob violence or occasional terrorist attacks that can erupt as unpredictably as one of the volcanoes.

### History of prehospital care in Indonesia

Prehospital care in Indonesia could be said to have its origins as far back as 1969 when the Indonesian Surgeons' Association acknowledged that despite 70% of the country's trauma deaths resulting from traffic accidents, it had no prehospital system to deal with this. In 1972 a pilot ambulance project was established but it was difficult to develop because of financial problems and other priorities faced by the Ministry of Health (specifically, infectious diseases). During the late 1980s/early 1990s there was the realisation by the government and the profession that a system of prehospital care was

**Table 1** Geographical statistics for Indonesia

Population	215 million (fourth most populous country in world)
Number of islands	13677
Number of islands occupied	6000
Main islands	Java, Sumatra, Sulawesi, Kalimantan, West Papua
Area covered	5000 km east to west 1770 km north to south
Most densely populated island	Java (60% of population, 7% of land mass)

needed and that the existing resources, such as they existed, needed expanding.

What was developed was the 118 Emergency Ambulance Service, a foundation set up by the Indonesian Surgeons' Association. They worked with the municipal offices of five of the biggest cities in Indonesia—Jakarta, Palembang, Yogyakarta, Surabaya, and Makassar (and now also Malang and Denpasar)—to develop a public system of paramedic manned ambulances.

### CURRENT PREHOSPITAL SYSTEM

There are about 104 civilian hospitals in Jakarta with emergency departments of varying standards and size. These comprise a mix of government and private hospitals. There are also five military hospitals that receive civilian casualties. The hospitals often have their own ambulances, which are generally tied to that hospital and are predominantly used for inter-hospital transfers.

118 Emergency Ambulance Service is the only public ambulance service in Indonesia. It is based in the five cities mentioned above. It is not government funded but charges those who can afford to pay. Access is achieved by dialling the toll free number 118. The call centre in Jakarta receives about 50 to 75 calls per day. In a city of 10–12 million this shows how far the service still has to go to become universally used.

The phones are manned by a trained paramedic who takes details from the caller, will give advice after obtaining clinical information, and then will dispatch the nearest ambulance to the incident. The 118 service uses the criteria based dispatch system and if necessary will triage calls. In theory the service covers all of Jakarta (an area of 661 square km and population of 10–12 million), but with only 26 functioning ambulances, they cannot cover such an area. The ambulances are located at 10 strategic points around the north and centre of the city. Not surprisingly response times are poor because of lack of vehicles, the sheer volume of traffic on the roads in Jakarta, and the large areas covered. Yogyakarta, in central Java, has far better response times often averaging about 10 minutes, but it has a population of 425 000 and a fraction of the traffic.

The paramedic attending the call administers treatment along ABC guidelines and then takes the patient to the nearest suitable hospital, determined by an algorithm containing the characteristics of the local hospitals. It is usually a government or teaching hospital where treatment is free. The paramedic keeps a record of treatment given, the revised trauma score, response time, and which hospital was used. New record sheets are being planned—they will be reduced to one page and there will be a record of primary and secondary survey (using pictorial representations) as well as administrative details. On the back of the sheet there will be aide memoires for the trauma score.

Currently 118 Jakarta has 26 functioning ambulances and 12 motorcycles. These are based either at the 118 station or at

strategic points around the city. This number is clearly nowhere near the projected 100 ambulances required adequately to cover this huge city. To staff these vehicles there are 150 paramedics (either still in training or fully trained) who work on 24 hour shifts. The ambulances contain equipment including oxygen, defibrillator, ventilator, spinal boards and splints, and are manned by two paramedics each. Not enough of the paramedics are motorcycle trained to deploy them all the time so the motorcycles are only used during the rush hour in North Jakarta. They contain basic resuscitation equipment, and their role is to stabilise the patient before the ambulance arrives.

The 118 service often designs and produces their own equipment as it is cheaper than importing foreign kit and can be made to their own specific requirements. They have made their own spinal boards, traction splints, wheelchair/stretcher, neck collars, and even ambulances. Jakarta does not have many pavements so stretchers need to be able to cope with soft and uneven surfaces—a stretcher is being designed that can vary its width of wheel to cope with the different surfaces. Pictures of the ambulances and motorbikes used by the paramedics are available on line (<http://www.emjonline/supplemental>).

Most ambulances in Indonesia tend to be little more than white vans with a stretcher inside. Ambulances bought from abroad tend to be very expensive and may not always be ideally suited to the road conditions with surfaces of varied quality, narrow lanes, or the frequent floods. In the past the service has bought a number of ambulances from foreign groups or had them donated. This has resulted in a disparate fleet of vehicles of varying suitability, age, and function. Recently two prototype ambulances have been built by 118. These are made of fibreglass—easy to clean, cheaper, lighter, and cool. They have a long stable wheelbase and are slightly raised, so remaining reliant in floods. These prototypes are still to be marketed but are expected to be used by 118 and other ambulance providers in Indonesia and hopefully South East Asia.

Although 118 is a public ambulance service it has no regular funding from the government. Occasionally the municipal council contributes. About 50% of the service's funding comes from patients that can afford to pay (200 000 Rupiah a callout, roughly £13) and the other 50% is raised from courses that members of 118 teach. This pays for equipment, staff wages, and training.

Paramedics are a new profession in Indonesia, so 118 recruit nurses and then train them. These nurses (almost exclusively women) have completed three years of training at the nursing college (after nine years of general schooling) before entering training as paramedics.

There are three levels of paramedic (see table 2) and all are trained drivers. The paramedics are taught at the Jakarta 118 centre by doctors and other professionals experienced in these fields. Currently the paramedics are accredited as nurses but it is hoped that the 118 Jakarta centre soon will be recognised and accredited as a paramedic college.

### CURRENT DEVELOPMENTS

#### Provision of ambulances

Most patients use any kind of public or private transport to get to hospital. As has been described the provision of ambulances in the capital is woefully inadequate. One particular tragic incident in 2000 may have inadvertently heralded good news for the ambulance service. There was a bombing in the centre of Jakarta. Two passers by were tragically killed and a number injured one of whom was a prominent diplomatic figure. Fortunately one of the ambulances was nearby and was immediately dispatched to the scene, arriving within minutes. The paramedic crew dealt with the most serious

**Table 2** Three levels of paramedic at 118 Emergency Ambulance Service

Level 1	Level 2	Level 3
Three years On the job and classroom	One year Rotate between 118 and hospital departments	One year On the job and classroom
Anatomy and physiology Basic life support skills Cannulation Administration of drugs	Intensive therapy unit Coronary care unit Paediatric and neonatal ICU Burns unit	Prehospital trauma life support Prehospital cardiac life support Prehospital neurology Paediatric and neonatal emergency transport
Basic life support	Haemodialysis unit	Urban and rural emergencies (including psychiatry and toxicology) Major incidents Search and rescue techniques Survival skills
Ambulance driving Medical first responder Basic trauma life support Basic cardiac life support Basic paediatric life support Basic neurology	Emergency department Operating theatres	

casualties and rushed them to the teaching hospital nearby. The injured diplomat was shouting for help so the crew assessed that he had an adequate airway, breathing and circulation—leaving him to the next ambulance. The second ambulance, however, took 30 minutes to arrive so the casualty was taken to hospital in the nearest available form of transport—a rubbish truck. Later the governor of Jakarta grilled the head of the ambulance service as to “why the ambassador had been taken to hospital in a rubbish truck?” The answer was of course, “Because I do not have enough ambulances”.

As a result of this the government formed a committee with 118 and municipal office staff and estimated that about 100 ambulances (along with the paramedics to staff them) are needed for Jakarta to reduce the response times. The 118 service currently has 26 ambulances but this will increase to 40–50 by August 2004 mostly provided by the municipal office. Concurrent to that is a drive to recruit more paramedics. The aim is to deploy the ambulances at 20 (instead of the current 10) points around the city.

### Disaster response brigade

Indonesia is no stranger to major incidents both natural and manmade. It is a common cry that any medical response to such events always comes too late because of lack of organisation and coordination. Accordingly the Ministry of Health has set up a new organisation, the Disaster Response Brigade, initially in five cities across Indonesia. The brigade comprises doctors (mostly fairly young doctors but up to 30% have experience in areas of conflict such as Ambon and Aceh) and nurses who have an interest in this area of medicine. The Jakarta Brigade based at the national centre has 150 staff including 30 doctors, of whom 21 are emergency physicians. They undergo a three week training programme including trauma and resuscitation courses, paediatric and obstetric emergencies, team building skills, triage, disaster planning, and major incident exercises. They are routinely deployed to the 118 ambulance service and the University of Indonesia teaching hospital's emergency department until mobilised. They are expected to deal with all sorts of incidents from earthquakes to riots. They can be said to be Indonesia's “first prehospital emergency care doctors”.

Members of the brigade from Jakarta and Surabaya were deployed to Bali after the bomb there but they arrived at 10 am the morning after the incident. By this time the incident was past the prehospital phase and there was little they could do to help as the hospital management for the patients was already well underway. After Bali it was generally recognised that there was little management of the

whole incident leading to the chaos that ensued and that there was a need for increased responsiveness and more centres, which have subsequently been formed. There are now medical disaster relief teams in 13 teaching hospitals, in 13 cities across Sumatra, Java, Bali, and Sulawesi. It is also felt that having structured training in major incident management such as provided by Major Incident Medical Management and Support (MIMMS) Course would help.

### Paramedic and other training

The Department of Health is soon to recognise the 118 training school as an academy for paramedics. As a result of this they will be able to directly recruit high school graduates, ensuring larger numbers of professionals. This will also raise the profile of paramedic training and the ambulance service as well as hopefully increasing the standard of training they receive.

Courses such as ATLS and ACLS are well established in Indonesia. A proposed step in terms of prehospital care is to introduce the MIMMS course to give training in organising medical resources at such incidents. After all this is a country that has more than its fair share of major incidents. As was highlighted at a Disaster Response Brigade's major incident exercise in 2000, the system could easily be implemented into their procedures—in fact they have already embraced the system of triage sieve and sort.

### CHALLENGES

There are many challenges to this large, diverse, and developing nation, not least the difficulties presented by an unstable political situation and unsteady economy. Organising a prehospital care system in the major cities is hard enough but when you look at the vast area of Indonesia it seems almost impossible. The government has promised some prehospital resources in the future but given the current political/economical situation it is difficult to say how much of that can be expected to happen in the near future.

There is a culture of accepting accidents as fate in Indonesia and often there is no real impetus to improve the state of prehospital emergency care. Linked to this can be the attitude and ignorance of the public about the role of the paramedic, the ambulance service, as well as other emergency services. There is rarely any effort by traffic to pull over or give way to ambulances (possibly because ambulances were previously used mainly to transport those already dead!). Add to this the huge volume and chaotic nature of Jakarta traffic as well as the massive area to be covered by only a few ambulances and it is no wonder the response times are so poor.

Other challenges are more familiar to those involved in prehospital care worldwide. There is massive abuse of the 118 phone number. During school breaks there can be up to 200 hoax calls per hour. It is estimated that up to 50% of all calls to 118 in Jakarta are hoaxes. It is postulated that this may be improved if a nominal fee of 100 Rupiah (less than one penny) were introduced, even temporarily, but currently the calls are not charged. In addition there are only five telephone lines into call centre limiting access to the call centre.

While there are experienced and well qualified trainers in Jakarta, there is a limit to their geographical distribution, access to quality training resources, and teaching materials. In the current economic situation this is unlikely to improve. There is a real thirst for knowledge and improvement of skills that is evident on any postgraduate medical education course. Many such internationally recognised courses are run both internally and with international help but more are needed to help bring the standard of prehospital care up to international standards.

The above may seem overwhelming but what is astounding is that despite the many limitations in Indonesia there are solutions that are being sought and implemented by those who have a drive to improve prehospital care in Indonesia.

## CONCLUSION

The ultimate aim of the prehospital professionals in Indonesia is to form a national regionalised trauma and ambulance system with a coordinated and effective community based emergency system. Those involved in the development of prehospital care see this being brought about by coordination of the current resources and experience available, and developing training on internationally recognised courses to raise the overall standards of prehospital care in Indonesia.

Indonesia is keen to bring internationally agreed standards and training into its system of prehospital care. Despite political, social, financial, and geographical limitations there is a real enthusiasm to develop this area of medicine and to raise standards of care. In addition there is much that we in the developed world can learn from this evolving system—for

example, they have a wealth of experience in dealing with natural disasters that we are less exposed to, as a rule.

With the enthusiasm and experience of the current providers and perhaps some assistance from professionals from other countries, prehospital care and an integrated emergency medical service may become a reality for Indonesians not just in the major centres but in the more rural areas of this vast and diverse country.



A map of Indonesia and pictures of the emergency vehicles used by 118 Emergency Ambulance Service are available on line (<http://www.emjonline/supplemental>).

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## REFERENCES

- 1 **Watts J**. Bali Bombing offers lesson for disaster relief. *Lancet* 2002;**360**:1401.
- 2 **Araujo R**, Gomes E, Machado H, *et al*. Pre-hospital care in Portugal. *Pre-hospital Immediate Care* 1997;**1**:14–17.
- 3 **Christopher LD**. Pre-hospital care in Gauteng Province, South Africa. *Pre-hospital Immediate Care* 1998;**2**:213–15.
- 4 **Garrett P**. Pre-hospital immediate care during a civil war. *Pre-hospital Immediate Care* 1998;**2**:136–40.
- 5 **Joose P**, Soedarmo S, Luitse JS, *et al*. Trauma outcome analysis of a Jakarta University Hospital using the TRISS method: validation and limitation in comparison with the major trauma outcome study. *J Trauma* 2001;**51**:134–40.
- 6 **Conrad P**, Bradshaw YS, Lamsudin R, *et al*. Helmets, injuries and cultural definitions: motorcycle injuries in urban Indonesia. *Accid Anal Prev* 1996;**28**:193–200.