

UNIT 5

Delivering post-crash care

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Overview

Preventing road traffic injuries from occurring should be the main goal to be pursued, but the reality is that crashes continue to occur. Society therefore has to be prepared to mitigate the consequences of crashes and enhance the quality of life of people who are injured. The aim of post-crash care is to avoid preventable death and disability, limit the severity of the injury and the suffering caused by it, and ensure the crash survivor's best possible recovery and reintegration into society. The way in which persons injured in road traffic crashes are dealt with following a crash determines their chances and the quality of survival. In this unit, we discuss the chain of help for people injured in road traffic collisions. The unit discusses three components of post-crash care: pre-hospital, hospital and rehabilitation.

Objectives

By the end of this unit, the trainee should be able to:

- describe the main actions that need to be taken soon after a road traffic collision has occurred;
- discuss the key resources and organization needed for hospital care;
- discuss ways of providing rehabilitation services to injured persons;
- examine the quality of post-crash care in the trainee's own setting.

Pre-hospital care

Core components

An effective pre-hospital care system must have certain core administrative and programmatic elements (Box 5.1). When available, the existing emergency medical services of the country or region should be used and strengthened, with input from community leaders and members of the population that they serve. Various structural models of pre-hospital care systems exist. The one

chosen for a particular setting should take into account local factors and resources. At the national level, a lead agency should be designated to promote pre-hospital trauma care. In some countries, this role may be played by the ministry of health, while in others it may rest with the ministry of the interior, the ministry of transport or elsewhere. Because pre-hospital trauma care involves public safety as well as public health, intersectoral cooperation is essential.

Regardless of how simple or sophisticated a given pre-hospital trauma care system might be, certain elements are essential in order to decrease preventable morbidity and mortality (1). These elements include, at a minimum, prompt communication and activation of the system, the prompt response of the system, and the assessment, treatment and transport of injured people to formal health-care facilities when necessary. Whenever and wherever possible, existing clinics, hospitals and health services should be used to ensure efficient mobilization of health-care resources. This is true for both rural and urban areas.

First responders

The first and most basic tier of a system can be established by teaching interested community members basic first aid techniques. These first responders can be taught to recognize an emergency, call for help and provide treatment until formally trained health-care personnel arrive to give additional care (Box 5.2). There are many publications that provide information on good practices to be followed by lay persons when providing first responder care (1–3).

It may be possible to identify particularly motivated or well-placed workers, such as public servants, taxi drivers, or community leaders, and train them to provide a more comprehensive level of pre-hospital care. In addition to learning a more extensive range of first-aid skills, this group could be taught the basic principles of safe rescue and transport. With this level of training, a kit of simple equipment and supplies (Box 5.3) and access to a suitable vehicle, these individuals can provide an acceptable level of trauma care.

BOX 5.1**Key elements in administering a pre-hospital trauma care system**

- *Lead national agency.* Designate a lead national agency to govern the system. This agency's responsibilities should include legislative development, regulatory supervision, and organization and financing of the system.
- *Support.* Ensure that there is regional and local support, and involvement that includes members of the local community.
- *Local administration.* Develop local administration and supervision, taking into account the local context and resources.
- *Medical direction.* Ensure that the medical director is providing the essential coordination of care, training and education, and quality improvement initiatives.
- *Political support.* Develop political and legislative support. These are essential for ensuring the operational and financial viability of the system.

Source: reference 1.

BOX 5.2**Role of lay bystanders**

Those who are present or who arrive first at the scene of a crash can play an important role in various ways, including by:

- contacting the emergency services, and calling for help;
- taking action to secure the scene — such as preventing further crashes, preventing harm to rescuers and bystanders, and controlling the crowd gathered at the scene;
- organizing people and resources, keeping bystanders away from the injured so that helpers can get on with rescue operations, and organizing people into groups (one group for comforting the victims, their friends and their relatives, another group for transporting the patients, and another group for actually administering the first aid);
- helping to put out any fire;
- applying first aid;
- transporting the injured persons to a hospital if no ambulance is available.

Source: reference 1.

Taking an injured person to hospital

If you have to take injured patients to hospitals you have to make sure that during shifting the patients are not hurt more. You have to move the patients from where they are lying to carry boards or stretchers and then to vehicles in which they are going to be carried to hospitals. Any firm board can

be used for this. If a ready-made stretcher is available, it should be used, but it is not essential. What is important is a rigid flat surface which keeps the spine stable and which allows resuscitation to be carried out. A stretcher can be improvised from:

- any wooden board or ladder;
- two or three boards tied together;
- bus, van or other flat seats that are long enough.

BOX 5.3**First aid and first aid kit**

Conventionally, first aid to an injured person includes resuscitation, dressing of wounds and splintage. In principle, resuscitation at the crash site is similar to what takes place at the hospital. The “ABC” of resuscitation includes:

- maintenance of a clear *airway*;
- establishment of *breathing*;
- establishment or assessment of *circulation*.

Experience has shown that most of the medicines, antiseptics, bandages and implements usually found in first aid kits are not necessary for first aid. In fact, if you do not use bandages and dressings promptly, they usually gather dust containing all kinds of bacterial spores and, if the air is damp, they will even grow fungi. Some bandages and dressings are sold in sterile bags. These, too, may grow harmful organisms if they are not checked regularly for damage and for expiry dates. A clean cloth would be safer and better. The following items could be useful while you are administering first aid:

- a set of large safety pins to make slings and splints;
- a pair of tweezers to take out splinters and thorns;
- a pair of scissors to cut cloth bandages and dressings;
- soap to wash wounds, to remove grease and dirt, and to wash your hands after you have administered first aid.

While shifting, the patient’s back, neck and airway have to be protected from further injury. If the patient is unconscious, gently place a large folded cloth or towel under the neck so that the neck does not sag against the ground.

Ambulances are specifically designed for carrying patients to hospital. However, the type of vehicle is not as important as whether it can carry a patient comfortably and safely. The vehicle should have enough space to keep the patient’s back straight, and the person accompanying the patient should be able to care for and resuscitate the patient if necessary. Though rapid transport is important, it is not possible to go above a certain speed in towns and cities without endangering the lives of patients and those outside the vehicle. Speeding could even cause yet another collision.

At all times during transport, it is important to keep watch to ensure that the patient’s airway is clear, the patient is breathing (a clear airway does not necessarily mean that the patient is breathing), and that the patient’s pulse can be felt. Being able to feel the pulse means that the heart is beating. A crash victim may look fine and appear to be

uninjured and it may take some time before signs and symptoms of injury become obvious.

When the patient is fully conscious and you are sure that he or she has only a limb injury, then he or she can be safely taken to hospital in a sitting position. Take care to splint or protect limb injuries or stop bleeding. While in the vehicle, try to keep the injured limb from touching the floor of the vehicle. Vehicle bumps are easily transmitted from the floor, and this hurts the patient more. If the patient has to be carried down a flight of stairs then the chair-lift can be used.

Basic pre-hospital trauma care

The second tier of care can be provided at the community level by those who have been trained in the principles of basic pre-hospital trauma care, also known as basic life support. These providers should have formal training in pre-hospital care, scene management, rescue, stabilization and the transport of injured people. Those who provide this basic care form the backbone of formal pre-hospital trauma care systems.

Advanced pre-hospital trauma care

The third-tier care interventions include the establishment of complex regional call management centres and highly integrated communication networks. On a system level, advanced pre-hospital interventions include call management centres, the development of integrated wireless communication networks, and the purchase and maintenance of a fleet of ground ambulances or air ambulances. Broadly termed “advanced life support”, clinical services like these generally require the skills of a professional pre-hospital care provider – either a physician or a non-physician paramedic with professional training.

Recent scientific reviews have questioned the effectiveness of many medical techniques at the crash site such as intravenous fluid administration and endotracheal intubation (4). Even the efficacy of advanced trauma life support training in the pre-hospital setting for ambulance crews has been questioned by researchers (5). If adopted without regard for cost, advanced life support programme techniques can inadvertently harm pre-hospital systems by diverting precious resources from less glamorous but clearly effective interventions that benefit far more people. For this reason, planners should exercise caution when considering whether or not to adopt advanced life support options and to base their decisions on a clear understanding of the costs of implementation versus the anticipated benefits. WHO has recently published a document on pre-hospital trauma care systems that provides guidance on these issues (1).

Core administrative elements

In addition to implementing basic systems of care, certain administrative elements must be in place to ensure that a pre-hospital care system is both effective and sustainable. For example, each episode of care should be documented, not only because it is important to monitor the processes and outcomes of care, but also because incident records provide important insights into the nature and location of community hazards and how injuries might be prevented.

Legal and ethical considerations

Finally, for pre-hospital trauma care systems to function effectively, certain ethical and legal principles must be established and followed. Bystanders must feel both protected to act and confident that they will not suffer adverse consequences, such as through legal liability, as a result of aiding someone who has been injured. Most of the legal and ethical concepts that underlie the provision of pre-hospital care are universally respected, regardless of a country’s religious, ethical and cultural traditions.

The hospital setting

The key components of the hospital setting are outlined below.

Human resources

Not all hospitals have the same level of expertise for managing trauma patients. Unnecessary shifting from one hospital to another hospital can be avoided if proper triaging is carried out. Fortunately, most bystanders make their own assessment of the injury depending on bleeding and other subjective judgements, and may decide to transport patients to hospitals.

There are three categories for triaging trauma patients:

- Category 1: most seriously injured, based on physiological or anatomical criteria;
- Category 2: less injured, including the patient at risk of significant injury based on the mechanism of injury;
- Other: those not meeting the criteria for Categories 1 or 2; these patients are handled as consultations without a trauma alert.

For hospital care to be effective, police officers and primary care providers must have a good knowledge of the locations and levels of expertise of different hospitals in their regions. The link between primary, secondary and tertiary centres is essential. The most appropriate communication technology should be developed for this purpose, and its availability publicized.

With regard to training, the following needs to be kept in mind:

- Training for teams managing trauma care is vital (Box 5.4);
- Short in-service training should be conducted to strengthen the available human resources;
- There should also be more formal, in-depth training. This includes improving the trauma-related training received by doctors, nurses and other professionals, both in their basic education and in postgraduate training.

Physical resources

In addition to human resources, physical resources are necessary. Many hospitals in low-income and middle-income countries lack important trauma-related equipment, vital for treating life-threatening chest injuries and airway obstruction — major preventable causes of death in trauma patients. Part of the problem, in some countries, is lack of organization and planning, rather than restricted resources. There is a need to address this problem, including by conducting research on the matter.

Organization of trauma care

A prerequisite for high quality trauma care in hospital emergency departments is the existence of

a strategy for the planning, organization and provision of a national trauma system. There is considerable potential worldwide to upgrade arrangements for trauma care and improve training in trauma care at the primary health care level, in district hospitals, and in tertiary care hospitals.

The Essential Trauma Care Project, a collaborative effort between WHO and the International Society of Surgery, aims to improve the planning and organization of trauma care worldwide (6). The project seeks to help individual countries in developing their own trauma services, to:

- define a core of essential injury treatment services;
- define the human and physical resources necessary to assure such services in the best possible way, given the particular economic and geographic settings;
- develop administrative mechanisms to promote these and related resources on a national and international basis, such mechanisms to include specific training programmes, programmes to improve quality, and hospital inspections.

While the goals of the Essential Trauma Care Project extend beyond the field of road safety, the success of the project can only be beneficial for crash-related trauma care.

BOX 5.4

Trauma team training for rural needs in Uganda

The trauma team training course in Uganda was jointly developed by the Injury Control Center in Kampala, and the Canadian Network for International Surgery, in response to the needs of rural hospitals in Uganda. The course is designed to create trauma teams that can function with personnel found in under-resourced health centres in Africa. The team normally consists of a clinical officer, an anaesthetic officer, an orthopaedic technician, a registered nurse and an aid. The course lasts three days and is delivered through lectures, skill stations and team exercises. The purpose of the lectures is to ensure that all team members have a common understanding of key issues in clinical trauma care, and of the importance of working together as a team. The skill stations assure that all participants can proficiently perform their role in the skills necessary for the initial care of the injured patient and the preparation of the patient for definitive care. At the end of the course, the institution gains a cohesive team. Since its inception in 1998, the trauma team training course has trained over 200 people from rural hospitals in Uganda, and plans are in place for its translation into Portuguese and Arabic for wider use in Africa.

Rehabilitation

For every person who dies in a road traffic crash, many more are left with permanent disabilities (7). Rehabilitation services are an essential component of the comprehensive package of initial and post-hospital care of the injured. They help to minimize future functional disabilities and to restore the injured person to an active life within society. Most countries need to increase the capacity of their health-care systems to provide adequate rehabilitation to survivors of road traffic crashes.

High-quality treatment and interventions for rehabilitation in the period of hospitalization immediately following an injury are of utmost importance, in order to prevent life-threatening complications related to immobilization. However, despite the best management, many people still become disabled as a consequence of road traffic crashes. In low-income and middle-income countries, efforts should focus on capacity building and personnel training so as to improve the management of survivors of road traffic crashes in the acute phase, and thus minimise the development of permanent disability.

Medical rehabilitation services involve professionals from a range of disciplines. These include specialists in physical medicine and rehabilitation, as well as in other medical or para-medical fields, such as orthopaedics, neurosurgery and general surgery, physical and occupational therapy, prosthetics and orthotics, psychology, neuropsychology, speech therapy and nursing. In every case, the recovery of the patient's physical and mental health is paramount, as well as the patient's ability to become independent again and reintegrate into daily life.

Medical rehabilitation services also play a vital part in the independence and quality of life of people living with disabilities. Among other things, these services can provide mechanical aids that greatly assist affected individuals to be reintegrated into and participate in ordinary daily activities, including their work. Such aids, delivered through outpatient departments or outreach services to the home, are often essential in preventing further deterioration. In many countries, once acute management has been accomplished and mechanical aids provided, community-based rehabili-

tation remains the only realistic means of reintegrating the individual into society.

Activity

Task

Based on the information provided in this unit, prepare a brief summary on the status of the post-crash care system in your setting.

Expected results

This exercise is meant to help trainees conduct a rapid assessment of the post-crash care system in their settings. They can do this for the entire system or selected components.

Key points

- Society has to be prepared not only to prevent road traffic injuries but also to mitigate their consequences and enhance the quality of life of people who are injured.
- Essential elements in pre-hospital care include prompt communication, treatment and transport of injured people to formal health-care facilities.
- Existing clinics, hospitals and health services should be used to ensure efficient mobilization of health-care resources.
- Human resources, physical resources and organization are essential aspects in hospital settings.
- Rehabilitation services are an essential component of the comprehensive package of initial and post-hospital care of the injured.
- The three components of care – pre-hospital, hospital and rehabilitation – are interrelated and form a continuum of care.

Questions to think about

- a) How adequately is your country or city prepared to respond to post-crash needs of persons injured in road traffic collisions?
- b) How can you improve post-crash care in your country?

References

1. Sasser S et al. *Prehospital trauma care systems*. Geneva, World Health Organization, 2005.
2. Varghese M, Mohan P. *When someone is hurt ... a first aid guide for laypersons and community workers*. New Delhi, Transportation Research and Injury Prevention Programme, Indian Institute of Technology, Delhi, 1998.
3. Werner D. *Where there is no doctor*. Palo Alto, Hesperian Foundation, 1977.
4. Bunn F et al. *Effectiveness of pre-hospital trauma care*. On behalf of the WHO Pre-hospital Trauma Care Steering Committee. Cochrane Reviews, Chichester, UK: John Wiley & Sons, Ltd., 2001.
5. Sethi D et al. *Advanced trauma life support training for ambulance crews*. On behalf of the WHO Pre-Hospital Trauma Care Steering Committee. The Cochrane Database of Systematic Reviews 2006, Issue 1. Chichester, UK, John Wiley & Sons, Ltd., 2006.
6. Mock C et al. *Guidelines for essential trauma care*. Geneva, World Health Organization, 2004.

Further reading

- Peden M et al. *World report on road traffic injury prevention*. Geneva, World Health Organization, 2004.
- Pan American Health Organization. *Establishing a mass casualty management system*. Washington, D.C., Pan American Health Organization and World Health Organization, 2001.

Notes

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Trainee's evaluation of Unit 5: Delivering post-crash care

This form is to be completed by the trainee at the end of this unit to assess the content and approach used. This evaluation is helpful to the trainee, trainer and developer of this manual.

1. To what extent did you achieve the objectives set for this unit? (Please check once using "X" for each objective)

Objectives	Completely successful	Generally successful	Completely unsuccessful
Describe the main actions that need to be taken soon after a road traffic collision has occurred.			
Discuss the key resources and organization needed for hospital care.			
Discuss ways of providing rehabilitation services to injured persons.			
Examine the quality of post-crash care in your setting.			

2. What is your overall rating of the content presented in this unit? (Please check one using "X")

Scale	Excellent	Better than expected	Satisfactory	Below average
Rating				

3. How do you rate the balance between theoretical and practical content in this unit? (Please check one using "X")

Scale	Good balance	Too theoretical	Too practical
Rating			

4. a) Did you find the activities presented in the unit helpful? (Please check one)

Yes _____ No _____

- b) If yes, in what ways were they helpful? What improvements do you suggest?

- c) If no, what were the shortcomings? What suggestions do you have to make them helpful?

5. What did you like most about the unit?

6. What did you like least about the unit?

7. What did you learn most from this unit?

8. Explain how your organization, community, city and country, and other interested parties will benefit from your having read this unit.

9. What do you think should be added to this unit?

10. What do you think should be dropped from this unit?
