



GOVERNMENT OF PAKISTAN
 MINISTRY OF COMMUNICATIONS
 MINISTRY OF NATIONAL HEALTH SERVICES
 REGULATIONS AND COORDINATION

NATIONAL GUIDELINES FOR POST-CRASH RESPONSE



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Cover photo: Rescue 1122 Punjab.

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LIST OF ABBREVIATIONS

ADB	Asian Development Bank
AHA	American Heart Association
AJK	Azad Jammu Kashmir
ALS	Advanced Life Support
ART	Ambulance Response Time
ASHICE	Age, Sex, History, Injuries, Condition, Events
ATLS	Advanced Trauma Life Support
AVPU	Alert, Verbal, Pain, Unresponsive
BSL	Basic Life Support
CAD	Computer Aided Dispatch
CAREC	Central Asia Regional Economic Cooperation
CBDRM	Community Based Disaster Risk Management
CERT	Community Emergency Response Teams
CFR	Community First Responder
CRI	Control Room In charge
DaCoTA	Directorate General for Mobility & Transport
DG	Director General
EC	European Commission
EMD	Emergency Despatch System
EMS	Emergency Medical Services
EMT	Emergency Medical Technician
EO	Emergency Officer
FPOS	First Person on Scene
GB	Gilgit-Baltistan
ICT	Islamabad Capital Territory
KPK	Khyber Pakhtunkhwa
MoC	Ministry of Communication
M/o NHR&C	Ministry of National Health Services Regulation and Coordination
NGO	Non Government Organization
NH&MP	National Highways and Motorway Police
PHECC	Pre-Hospital Emergency Care Council (Ireland)
PHTLS	Prehospital Trauma Life Support
PRF	Patient Report Form
PTA	Pakistan Telecommunications Authority
SDG	Sustainable Development Goals
TBI	Traumatic Brain Injury
UN	United Nations
VRU	Vulnerable Road Users
WHO	World Health Organization



FOREWORD

Post-crash response

The World Health Organisation (WHO) estimates that in 2016, more than 27,500 people were killed, and up to a further 500,000 people were treated in hospital/health units because of a road traffic crash in Pakistan. Road traffic crashes are the number one cause of death among those aged 15-29 years. As Pakistan's road network and vehicle fleet expand, the number of road traffic crashes is increasing. Reducing the resulting social and economic burden on our country is a prime concern for all of us.

The Government of Pakistan is committed to tackling this challenge of national importance. On 15th November 2018, the Honourable Murad Saeed, Federal Minister for Communications launched Pakistan's *National Road Safety Strategy, 2018-2030* which sets out a comprehensive set of strategies based on the globally endorsed *Safe System* approach.

One of the key pillars of this *Safe System* approach is to provide high quality, well-managed emergency medical services to mitigate and minimize the impact of road traffic crashes once they occur. These national *Guidelines for Post-Crash Response* document best practice for all phases of the emergency trauma care system and set out actions to achieve minimum emergency trauma care standards across Pakistan. They are intended for use by all managers responsible for developing and delivering emergency health and rescue services.

There was a strong need felt by emergency service providers and health managers for updated and comprehensive guidelines on post-crash response. Recognizing this need, the Ministry of National Health Services Regulations and Coordination (M/o NHR&C) in collaboration with Ministry of Communications (MoC) and WHO developed these guidelines with the support of the United Kingdom Department for International Development and the Asian Development Bank.

It is the responsibility of M/o NHR&C to provide leadership by establishing a regulatory and strategic framework and to ensure that the most appropriate Interventions regarding Control of Road Crashes are in place to achieve the best health outcomes with available resources. The strategic and nationally coordinated efforts of the federal and provincial governments, enforcement agencies and international development partners are critical if we are to make meaningful progress in reducing the burden of road traffic-related crashes in a long-term, sustainable way.

If anyone saves a life, it shall be as though he had saved the lives of all mankind. SURAH 5 Verse 32.

I wish to convey my sincere thanks to all the professionals who contributed in this endeavor. I sincerely look forward to the full dedication of all concerned officials and partners to enhance the standard of emergency trauma care systems throughout Pakistan.

Dr. Assad Hafeez

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Particular thanks and gratitude must be extended to the following individuals for their commitment and guidance during the process. **Mr. Hameed Akhter**, Executive Director, National Road Safety Secretariat, Ministry of Communications, and lead agency for Road Safety. **Dr. Malik Muhammad Safi**, Director Programs, Ministry of National Health Services Regulations and Coordination (M/oNHSR&C), **Dr. Samra Mazhar**, Deputy Director (Programs-II), Ministry of NHSR&C, and **Dr. Maryam Mallick**, Technical Advisor Road Safety, World Health Organisation. Finally, special thanks to **Dr. Rizwan Naseer**, Director General, Rescue 1122, Punjab, whose continuous commitment, and drive to establish post-crash response systems and more importantly an effective and efficient Emergency Medical System for the benefit of all, is indeed inspirational.

All stakeholders are now requested to continue their support to ensure the prompt and full implementation of these guidelines.



1

INTRODUCTION



Photo: Lady Reading Hospital, KP

1. INTRODUCTION

In 2016, road traffic crashes killed 1.4 million people globally, about three-quarters (74%) of whom were men and boys. They are the number one cause of death among those aged 15-29 years (1). The World Health Organisation (WHO) estimates that in Pakistan more than 27,500 people were killed because of a road traffic crash in 2016. The estimated fatality rate was 14.3 per 100,000 population (1), an increase on the 2013 estimate of 14.2 per 100,000 population (2).

1.1 Injury and Long-Term Disability

Fatality statistics do not reflect morbidity, particularly the catastrophic burden of head, spinal cord, and extremity injuries. If the WHO severity ratio guideline of 15 serious injuries (requiring hospital admission) for every road death (3) is applied, about 500,000 people in Pakistan were killed or hospitalized as a result of a road traffic crash in 2016.

Pakistan's population is growing at 2.4% per annum. It is estimated that by 2030 almost one in two Pakistanis will live in a city. This rapid urbanisation, together with economic growth, will fuel a rapid increase in vehicle ownership over the next decade. Currently, there are about 23.6 million registered motor vehicles, of which 17.5 million (74%) are motorcycles (Pakistan Economic Survey, 2018-2019). Vehicle registrations are projected to increase to about 65 million by 2030. Most of the new vehicles will be motorcycles. Motorcycle registrations have increased by about 20% annually since 2008 (Planning Commission, 2014; Pakistan Bureau of Statistics, 2017).

WHO research shows that per kilometre traveled, motorcycle drivers and passengers are 28 times more likely to be killed than drivers and passengers in four-wheeled vehicles. Road traffic crashes are the leading cause of traumatic brain injury (TBI). Motorcyclists, along with pedestrians, suffer the most severe injuries in a road traffic crash, report more continuing medical problems and require more assistance compared to other types of road user (3).

1.2 Socio Economic Cost of Road Crashes, and the Value of Prevention

Globally, road traffic crashes account for more than 85% of unplanned emergency trauma events and result in considerable economic losses to individuals, their families, and all those affected. These losses arise from treatment costs, and lost productivity for those killed or disabled by their injuries and for family members who need to take time off work or school to care for the injured. In India for example, out-of-pocket health expenses arising from road injuries are more than double those of any other condition requiring hospitalization, in many cases constituting a catastrophic financial burden to those injured or affected by crashes (4).

The economic cost of road traffic crashes in middle-income countries is estimated to be as high as 5% of gross domestic product (GDP). Pakistan's GDP is projected to increase to \$360 billion in 2020 (Ministry of Finance 2017; World Bank, 2017). If this projection is correct, based on a conservative cost of 3% of GDP, road traffic crashes could cost the Pakistan economy about USD\$11 billion in 2020.

1.3 Pakistan’s Commitments to Post-Crash Response

Pakistan is a signatory to the United Nations (UN) *Global Plan for the Decade for Action for Road Safety 2011 – 2020* which sets out priority actions around five road safety ‘pillars’(5). The goal of Pillar 5 is to reduce fatalities and injury severity through improvement in the quality and timeliness of post-crash response. *The 2030 Agenda for Sustainable Development* reiterated road safety as a priority by setting a global target for a 50% reduction in road traffic deaths and injuries by 2020.

NATIONAL ACTIVITIES

Pillar 1	Pillar 2	Pillar 3	Pillar 4	Pillar 5
Road safety management	Safer roads and mobility	Safer vehicles	Safer road users	Post-crash response

INTERNATIONAL COORDINATION OF ACTIVITIES

Figure 1. UN Road Safety Pillars

Pillar 5 activities within the Global Plan are shown below in Box 1.

Box 1. The UN Global Plan - Pillar 5: Post-Crash Response

Increase responsiveness to post-crash emergencies and improve the ability of health and other systems to provide appropriate emergency treatment and longer-term rehabilitation for crash victims.

- Activity 1: Develop pre-hospital care systems, including the extraction of a victim from a vehicle after a crash, and implementation of a single nationwide telephone number for emergencies, through the implementation of existing good practices.
- Activity 2: Develop hospital trauma care systems and evaluate the quality of care through the implementation of good practices on trauma care systems and quality assurance.
- Activity 3: Provide early rehabilitation and support to injured patients and those bereaved by road traffic crashes, to minimize both physical and psychological trauma.
- Activity 4: Encourage the establishment of appropriate road user insurance schemes to finance rehabilitation services for crash victims through: introduction of mandatory third-party liability; and international mutual recognition of insurance, e.g. green card system.
- Activity 5: Encourage a thorough investigation into the crash and the application of an effective legal response to road deaths and injuries and therefore encourage fair settlements and justice for the bereaved and injuries.
- Activity 6: Provide encouragement and incentives for employers to hire and retain people with disabilities.
- Activity 7: Encourage research and development into improving post-crash response.

Source: UNRSC, 2011



Pakistan is also a signatory to the *UN Global Road Safety Performance Targets for 2030* (6). Target 12 relates to setting and achieving national targets for time of first professional emergency medical care to road traffic crash victims.

Figure 2. UN Road Safety Performance Target for Pillar 5: Post-Crash Response

1.4 Objectives of Post-Crash Response

Prompt provision of emergency care and rapid movement of the injured from the crash scene to a health-care facility, can save lives, reduce the period of short-term disability and dramatically improve long-term outcomes (7). Effective postcrash care is characterized by efficient emergency notification, fast transport by qualified medical personnel, correct diagnosis at the scene, stabilization of the patient, prompt transport to point of treatment, quality emergency room and trauma care, and extensive rehabilitation services.

In developing and improving a post-crash system, it is important to view the system as a ‘chain of interventions’ with emergency care for injury at the core of the system. Improvement must address each link in this ‘chain’ to ensure its overall effectiveness.

The key objectives are to:

1. Avoid preventable death and disability.
2. Limit the severity and suffering caused by a road traffic injury, including both physical injury and mental health issues such as post traumatic stress disorder (PTSD) and other disabling conditions.
3. Ensure optimal functioning of the crash survivors and re-integration with the local community.

1.5 Key Principles and Components of Post-Crash Response

Globally, good practice post-crash response systems are based on the following basic key principles:

- Free at the point of delivery.
- National coordinated system.
- National integrated network.

A good practice post-crash response includes the following components:

- Research and data on crashes and injuries to inform the development of evidence - bases

strategies, policies, and programs to prevent road crashes and reduce fatalities and the severity of injuries that result from road crashes.

- Legal support and legislation for all components of a post-crash response system.
- Emergency care and rehabilitation for injury.
- Mental health care.

Figure 3 sets out the WHO key components at each stage of post-crash response: at the scene, at the treatment facility and follow up (4).

WHO Best Practice Framework for Post-Crash Response

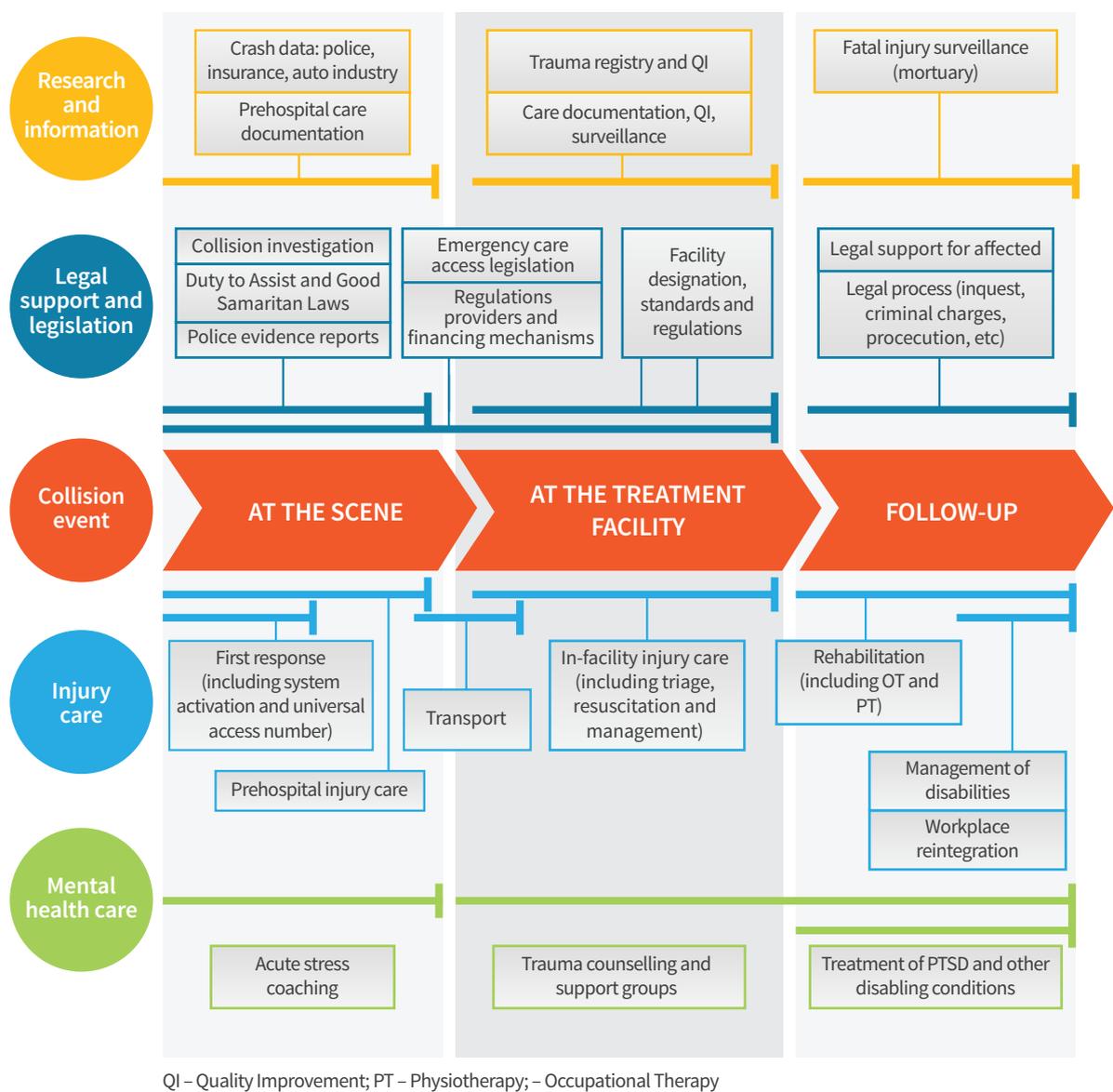


Figure 3. Key components of the post-crash response

1.6 Strategic Framework for Post-Crash Response in Pakistan

The need to ensure that the emergency health needs of all members of the community are met are set out within Pakistan's national strategies and in the regional and global strategies to which Pakistan is a signatory.

Table 1. Strategic Framework for Post-Crash Response in Pakistan

Strategy	Summary
Pakistan 2025. One Nation, One Vision.	Sets out Pakistan's strategy and roadmap to reach national development aspiration and goals to 2025. to meet the targets set within United Nations (UN) resolutions relating to the Millennium Development Goals for 2020 and Sustainable Development Goals (SDGs) both of which include targets related to road safety and health.
National Health Vision Pakistan, 2016-2025	To improve the health of all Pakistanis, particularly women and children, through universal access to affordable quality essential health services, and delivered through resilient and responsive health system, ready to attain Sustainable Development Goals and fulfil its other global health responsibilities.
National Road Safety Strategy, 2018-2030	Sets out Pakistan's road safety vision and performance targets for 2030. The Strategy is based on the <i>Safe System</i> approach and structured around UN 'road safety pillars.' It includes strategies and actions for Post-Crash Response.
Global Plan for the Decade of Action for Road Safety, 2011-2020	The Global Plan provides an overall framework for activities which may take place in the context of the decade. Actions are structured around five 'road safety pillars': road safety management; safe roads, roadsides and speeds; safe vehicles; safe road users; and improving post-crash response.
UN Global Road Safety Performance Targets for 2030	Target 12: By 2030, all countries to establish and achieve national targets in order to minimize the time interval between road traffic crash and the provision of first professional emergency care
A Regional Road Safety Strategy for CAREC Countries 2017-2030.	The CAREC Road Safety Strategy sets an overall target to reduce the fatalities on the CAREC road corridors by 50% by 2030 (compared to 2010).

Pakistan’s *National Road Safety Strategy, 2018-2030* which was launched by the Honourable Murad Saeed, Federal Minister for Communications on 15th November 2018 reflects global best practice. It is based on the *Safe System* approach, with strategies grouped around the road safety pillars.

1.7 Current Status of Post-Crash Response

Until 2004, most ambulance and fire services in Pakistan were provided through a hybrid system which combined hospital-based, for-profit, non-government organizations (NGO) and government (military, municipal) delivery models. The main NGO providers include the EDHI Foundation which was established in 1951 and which continues to provide basic transport to hospitals throughout Pakistan, including from emergency scenes; CHHIPA, an NGO established in 2007 which provides basic emergency and medical transport in Karachi and the Aman Foundation NGO which was established in 2008 to provide a high quality ambulance service in Karachi.

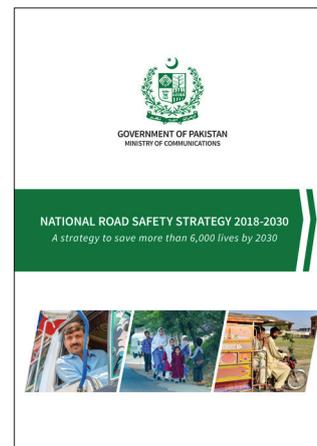


Figure 4. National Road Safety Strategy, 2018-2030

Government Managed EMS in northern Pakistan

The provision of government funded, managed, and strategically coordinated post-crash response commenced in 2004, when the Government of Punjab launched the first trained and equipped emergency rescue medical service in Pakistan. An independent directorate, Rescue 1122 was established which quickly developed into a comprehensive, high-quality, coordinated system of ambulance, fire, and rescue services. It has been progressively extended from Lahore across all 36 districts of Punjab. The model has been successfully replicated and established within neighbouring provinces and territories.

Within 14 years, approximately 70% of the population in northern Pakistan has gained access to high-quality, government managed and operated emergency services. The Rescue 1122 model currently operates across the following areas:

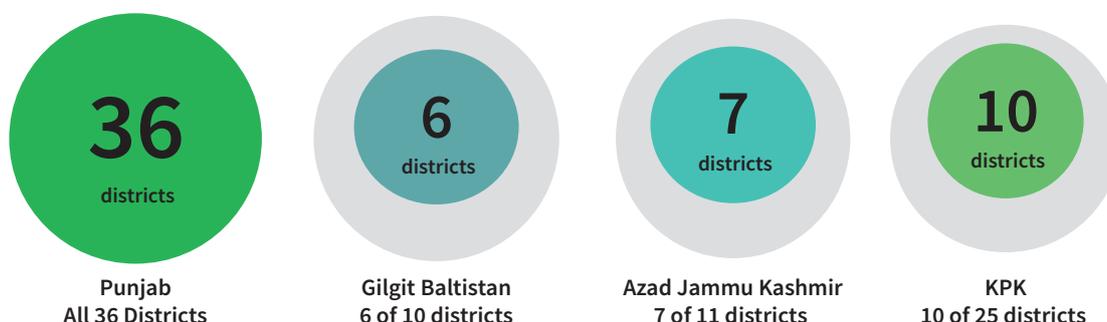


Figure 5. Rescue 1122 post-crash response coverage in northern Pakistan

Government Managed EMS in southern Pakistan

The Constitution of Pakistan that ensures quality, freedom, justice, and dignity of all individual implicitly mandates an inclusive society for all. However, in terms of post-crash response, until recently there has been a clear north/south divide. To address this, the Government of Balochistan is establishing the Rescue 1122 model on major national highway routes and the Sindh Government has entered a Memorandum of Understanding with the Aman Foundation to provide EMS in Sindh, initially in the Thatta and Sajawal districts in rural Sindh.

Box 2: Case Study – Establishment of Medical Emergency Response Centers on highways of Balochistan

The Government of Balochistan has approved the establishment of Emergency Response Centers on all major highways of the Province to enhance its post-crash response system. In this regard, the Medical Emergency Response Centers (MERC) project was approved by the provisional Cabinet in February, 2019. The project will establish 25 medical emergency response centers over a period of three years. Under the Peoples Primary Healthcare Initiative (PPHI), the centers will be established at different locations on highways. The PPHI will manage the establishment and safe operation of the new emergency response system.

The project will set up about 15 medical emergency response centers on the Quetta-Karachi, Quetta-Zhob and Quetta-Chaman sections of the National Highway Network in Balochistan since the majority of serious road traffic crashes occur on these highways. The project will expand its services to other highways in subsequent phases.

Each center will operate 24/7 with trained staff who provide first aid and patient transfer services. The centers will also be equipped with fire and rescue vehicles. A central control room has been established in the Quetta Head Office. The emergency call number 1122 is being established. Technical training of the first cadre of emergency medical technicians and ambulance drivers is underway at the Punjab Emergency Services Academy in Lahore.

The project aims to launch its field operations from October 2019.

EMS Licensing and Accreditation

Pakistan does not yet have a system of licensing and accreditation for emergency medical service (EMS) providers. However, Rescue 1122 in Punjab has gained international accreditation for its emergency medical technician (EMT) training program from the Pre-hospital Emergency Care Council of Ireland.

The medium-term goal is to establish EMS which demonstrate compliance with minimum international EMS standards in all districts of Pakistan and ensure that only these services attend emergencies such as road crashes.

1.8 Development of these Guidelines

These Guidelines have been developed through a range of activities including a review of international best practice guidelines and research; field visits to rescue and ambulance services in ICT, Punjab, Sindh and KPK; discussions with the Secretary, Specialised Health Care and Medical Education (SH&ME), Government of Punjab, Minister for Health and Additional Chief Secretary for Health, Government of Sindh, health executive managers within the Ministry of NHR&C, Rescue 1122 representatives in all provinces and federal territories, hospital directors of Aga Khan Hospital Karachi and Lady Reading Hospital Peshawar and key NGO providers. In January 2019 the Ministry of Communications (MoC) and M/oNHR&C jointly held 2-day national post-crash response workshop in Islamabad.

Five international good practice publications on post-crash response have greatly informed the content of these Guidelines. These are:

1. *Post-impact care 2018*, European Commission Road Safety Observatory, 2018.
2. *Minimum Technical Standards and Recommendation for Rehabilitation* Geneva, World Health Organization, 2017
3. *Post-crash response: Supporting those affected by road traffic crashes*. Switzerland, World Health Organization, 2016.
4. *Pre-hospital trauma care systems*. Geneva, World Health Organization, 2005.
5. *Guidelines for essential trauma care*. Geneva, World Health Organization, 2004.



Figure 6. Publications on best practice standards for post-crash care

2

CONSTITUTIONAL AND LEGISLATIVE FRAMEWORK



Photo provided by: Pakistan Institute of Medical Sciences (PIMS)

2. CONSTITUTIONAL AND LEGISLATIVE FRAMEWORK FOR POST-CRASH RESPONSE

The Pakistan Constitution (18th Amendment) Act, 2010 enacted the devolution of responsibilities to the provinces. As a result of the Devolution and political transition in June 2011, high priority preventative programs formerly managed by the federal government, including primary health care, family planning, and immunization are now managed at provincial level. On 1st July, 2011 health related functions in the revised federal legislative lists were assigned to different federal ministries as a result of devolution in the health department. Most areas of health regulation and management, including pre-hospital services and all levels of trauma care facilities are also managed at provincial level.

On 4th May 2013, the Ministry of National Health Services Regulations & Coordination (M/oNHSR&C) was created and authorised to deliver a collective Strategic National Health vision. This vision is the provision of a health system that:

- Provides efficient, equitable, accessible & affordable health services with the objective to support people and communities to improve their health status.
- National and international coordination in the field of public health.
- Oversight for regulatory bodies in health sector.
- Population welfare coordination.
- Enforcement of Drugs Laws and Regulations.
- Coordination of all preventive programs, funded by GAVI/GFATM.

The function of the M/oNHSR&C is to provide provision of medical services, frame health policies and enforce the same at national level. Effective post-crash response requires a nationally coordinated response which includes legislation and policy to:

- Protect the injured, their families, and bystanders who deliver first aid.
- Facilitate legal and financial accountability and ensure compensation.
- Promote post-injury recovery and reintegration into work and family life.

These may include laws that enable access to timely care; laws that ensure adequate crash investigation; laws that mandate adequate liability insurance for drivers; legal protections to facilitate civil and criminal justice processes, including reparations, and legal protections for those with disability resulting from injury. The M/oNHSR&C has a key role in coordinating and regulating national EMS standards.

The *Punjab Emergency Service Act 2006*, *Government of Khyber Pakhtunkhwa Emergency Service Act 2006*, and the *Gilgit-Baltistan Emergency Services Act 2012* mandate Emergency Services of Rescue 1122 as responsible for the delivery of state funded emergency medical, fire and rescue services. The Government of AJK Emergency Services Bill is currently awaiting final ratification and enactment.

This existing provincial legislation lays the foundation for the development of enhanced model national legislation. The aim of model national legislation is to provide for the establishment of a national peak EMS body and enhance the quality and delivery of post-crash services by ensuring free access to emergency care, mandating standards for vehicles, care providers and facility-based care and establishing compliance regimes and mandatory reporting requirements.

Box 3: Establishing a legislative framework for EMS in Romania – a case study

In 2006 the Romania Health System Reform Law was introduced which defined emergency care as a duty of the state, distinguishing it from other aspects of health care, with the state providing free emergency care for all. The Ministry of Health was assisted by an expert Consultative Committee for Emergency and Disaster Medicine, which addressed both pre-hospital and hospital-based components of EMS.

Under this legislation, the criteria, and definitions for different levels of hospital emergency departments in terms of staffing, physical resources and financing were outlined. The Consultative Committee also established standards for ambulances, and criteria for ambulance vehicles, ranging from first response vehicles to mobile intensive care unit vehicles. The Committee defined competencies of ambulance personnel and what each level of personnel could do in the field. Logistical and safety regulations were created, and a partnership established with the police force responsible for enforcing these standards through spot checks. Standards were also established for different levels of hospital critical care capabilities (including intensive care units) and hospital emergency departments (including human resources, equipment, drugs, and infrastructure).

In 2007, the Ministry of Health created a Ministerial position – the Under-Secretary of State for Emergency and Disaster Medicines - specifically responsible for EMS administration and for implementation of the EMS section of the Health System Reform Law. This position has autonomous decision-making power and has enabled documented advances in the organisation, administration, enforcement, monitoring and performance of Romania's emergency medical system.

Source: WHO, 2012

Most of the legal and ethical concepts that underlie the provision of pre-hospital care are universally respected, regardless of a country's religious beliefs or cultural practice. It is important that legislation expressly indemnify persons from liability if they unintentionally cause harmful consequences when assisting traffic victims. Without such indemnity, bystanders may be hesitant to render assistance for fear of being held liable should the victims suffer further injury due to such assistance.

Box 4: Caring for injured people: legal immunity for bystanders in India

On March 30th, 2016 the Supreme Court of India gave “force of law” to the guidelines for the protection of Good Samaritans issued by the Ministry of Road Transport and Highways (MoRTH). The purpose of a Good Samaritan law is to provide legal protection to bystanders who come to the aid and rescue of victims of road crashes.

Good Samaritan – ‘a person who is a bystander or a passer-by, who chooses to assist an injured person or a person in distress on the road.’

In this regard, the Honourable Supreme Court of India in its order dated 29th October 2014 had directed the Central Government to issue necessary directions with regard to the protection of Good Samaritans. The Ministry of Road Transport and Highways (MoRTH) issued guidelines on 12th May 2015. Along with this, a Standard Operating Procedure (SOP) was also issued to police personnel and the hospitals / emergency trauma care centers. The Ministry of Health and Family Welfare (MoHFW) also issued guidelines to protect good Samaritans to registered hospitals in August 2015.

Source: MoRTH

3

CRITICAL PERIODS IN EMERGENCY RESPONSE



Photo: Rescue 1122, Punjab

3. CRITICAL PERIODS IN EMERGENCY RESPONSE

The WHO has identified three phases of deaths from severe injury.

Box 5. Three phases of deaths from severe injury

- Phase 1:** Deaths occur immediately or occurs quickly as a result of overwhelming injury;
- Phase 2:** Deaths occur during the intermediate or sub-acute phase. These deaths occur within several hours of the event and are frequently the result of treatable conditions;
- Phase 3:** Deaths are delayed. Deaths during this phase often occur days or weeks after the initial injury and are the result of infection, multisystem failure or other late complications of trauma.

Source: Sasser et al., 2005 (7)

Effective care of those injured in a road traffic crash requires a series of time-sensitive actions within two critical time periods which significantly impact on patient outcomes.

3.1 Platinum ten minutes

The first 10 minutes of 'On Scene Time' are called the 'Platinum ten'. These first 10 minutes are critical in determining patient outcome by actively managing the airway, controlling severe bleeding, and stabilising multiple fractures.

3.2 Golden hour

The 'Golden Hour' represents the time-frame in which to deliver the best possible clinical outcome for patients and emphasises the importance of moving an injured person to hospital as quickly as possible. The chance of survival for a critically injured person is greater if they arrive at the hospital for definitive diagnostics and treatment within an hour following the crash (8).



Figure 7. The Golden Hour

Table 2. The Emergency Call Cycle

Notification time	The time elapsed from occurrence of injury until the EMS system is notified.
Mobilization time	The time elapsed from notification until the ambulance is mobile to the incident.
Response time	The time elapsed from notification until arrival of an ambulance to the site of the injured person.
On scene time	The time taken by pre-hospital providers from arrival at the scene until departure from the scene.
Transport time	The time elapsed from leaving the scene until arrival at the hospital or other treatment facility

Source: Kobusingye et al., 2006 (9).

Golden hour targets are achieved through the application of control room telephone triage systems; modern IT applications such as computer aided dispatch, call connect, calling line identity, vehicle tracking, resource distribution, demand forecasting and electronic patient reporting.

Response-time indicators are used in many countries as one method of evaluating the quality of the services delivered by pre-hospital emergency care providers. Such indicators provide a valuable source of information when used in conjunction with clinical indicators that focus on patient outcomes.



Figure 8. Rescue 1122, Punjab Emergency Communications Center

4

GOOD PRACTICE IN POST-CRASH SYSTEM DESIGN AND ADMINISTRATION



Photo: Rescue 1122, Punjab

4. GOOD PRACTICE IN POST-CRASH SYSTEM DESIGN AND ADMINISTRATION

There is no single ‘best’ post-crash response model. Each trauma system must be defined by local needs and assessments of capacity and developed with due regard for a number of competing influences each of which can impact on any emerging model. Such factors include:

- Constitutional/Legislative Framework
- Economics
- Geography
- Demography and Infrastructure
- History
- Health System Capacity
- Administrative resources
- Epidemiology
- Local Culture
- Medical Tradition

Many of these factors are relevant in Pakistan. Differences in geography, infrastructure, and demographics within and across provinces and federal territories have resulted in the current significant inequalities in the provision of emergency response services.

Emergency medical services (EMS) lie at the heart of post-crash response. The WHO warns against middle-income countries such as Pakistan trying to replicate the advanced pre-hospital systems of high-income countries before a satisfactory standard of basic pre-hospital care is available to and can easily be accessed by all citizens (10). It also highlights that provision of EMS should not be dependent on ability to pay. Cost recovery schemes may be necessary for non-emergency healthcare, but incapacity to pay should not preclude the provision of initial emergency care nor of critical elements of definitive care.

The key consideration for the system design should be ‘*What are the evidence-based elements that make a difference for the patient?*’ It is important to remember that ‘*people bleed to death the same way all over the world*’, and therefore, what makes a difference in terms of survivability and improved clinical outcome, is the quality of the EMS system that is available.

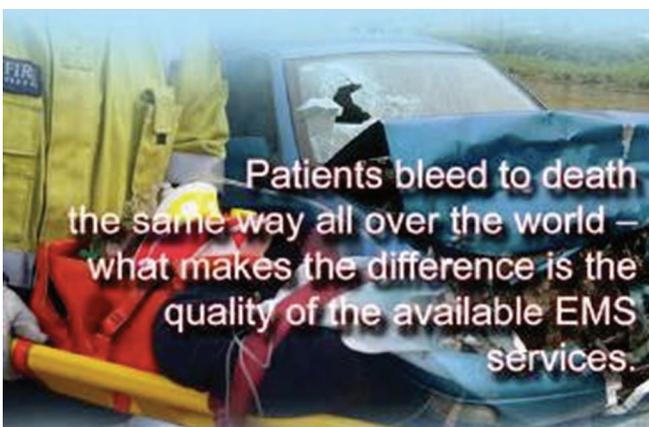


Figure 9. Quality of the available EMS services

The essential requirement of an effective post-crash response system is based on the following basic key principles:

- Free at the point of delivery.
- A nationally coordinated system.
- A nationally integrated network.
- The emergency care chain provides the framework for the EMS system.
- The 'Golden Hour' represents the time frame in which to deliver the best possible clinical outcome for patients.

Over time the EMS service should be extended to all medical and trauma emergencies and underpinned by:

- A 'stepped' and 'managed' approach from a basic system through to an advanced EMS system.
- A national access system.
- A common framework for clinical practice guidelines.
- A regulated training and qualification process.

It is important to remember that the key objectives of having an effective post-crash response system are to:

- Avoid preventable death and disability.
- Limit the severity and suffering caused by the injury, including mental health trauma.
- Ensure optimal functioning of the crash survivors and re-integration with the local community.

4.1 WHO Core Values for EMS

Emergency medical care for those injured in a crash is at the core of the post-crash response. The WHO has identified core values and components of all effective emergency medical systems (10).

WHO EMS core values:

- Simplicity
- Sustainability
- Practicality
- Efficiency
- Flexibility

WHO minimum EMS elements:

Regardless of simple or advanced a pre-hospital emergency medical system is, there are certain core elements that are essential to decrease preventable morbidity and mortality. These are:

- Prompt communication and activation of the system.
- Prompt response of the system.
- Assessment, treatment, and transport of people to formal health-care facilities as required.

WHO minimum core administrative components:

- Documentation
- Quality assurance

4.2 Emergency Care Chain in North Pakistan

Across north Pakistan, emergency care commences with the activation of the Rescue 1122 emergency number and continues through a ‘chain’ of EMS actions and care providers.

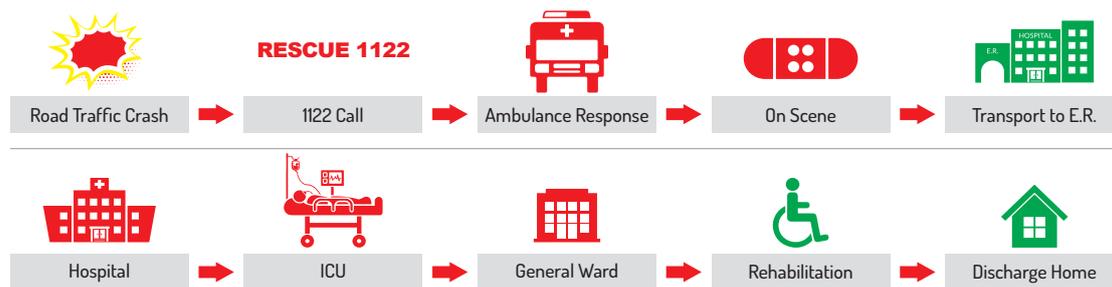


Figure 10. The Emergency Care Chain

Within this chain, it is useful to consider coordinated emergency medical action within three key phases. The following chapters identify good practice during each of these phases.

Phase 1: Pre-hospital (at the scene and transport to an appropriate facility).

Phase 2: Emergency trauma care within the facility/hospital.

Phase 3: Rehabilitation and discharge into the community.

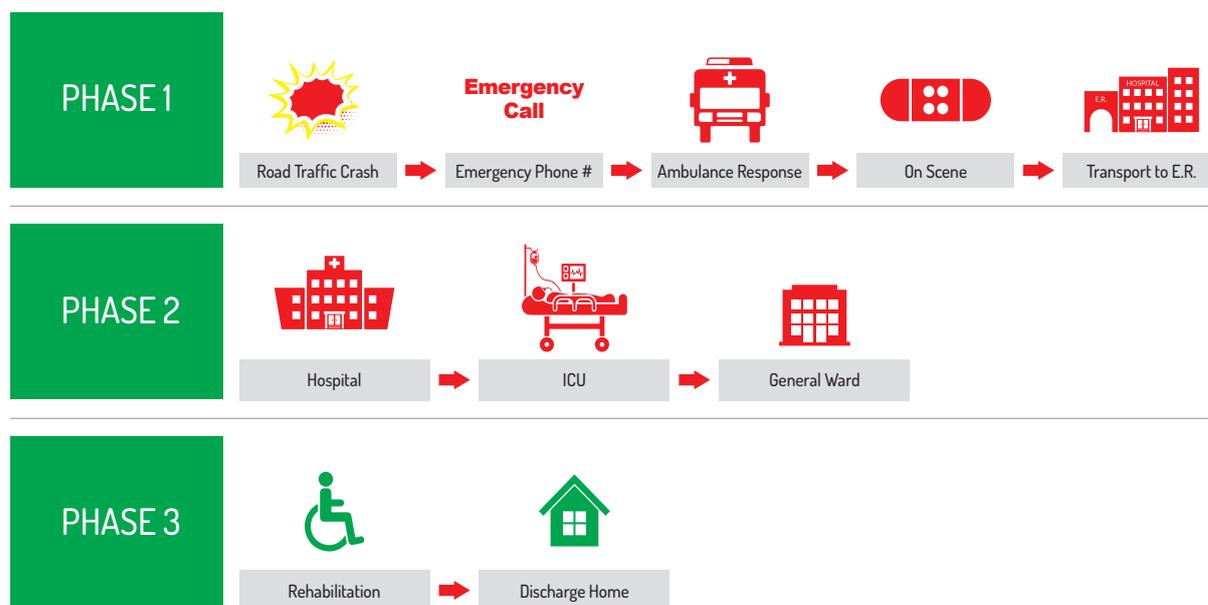


Figure 11. Phases of the Emergency Care Chain

4.3 WHO Emergency Care System Framework and Emergency Care System Assessment

The WHO describes EMS care in terms of being a continuum, where action in the different ‘phases’ of crash scene, transport and health care facility overlap.

The WHO *Emergency Care System Framework* in figure 12, sets out the essential functions of an emergency care system and the associated assessment tool allows policy-makers to identify gaps and create relevant priority actions plans for system development.

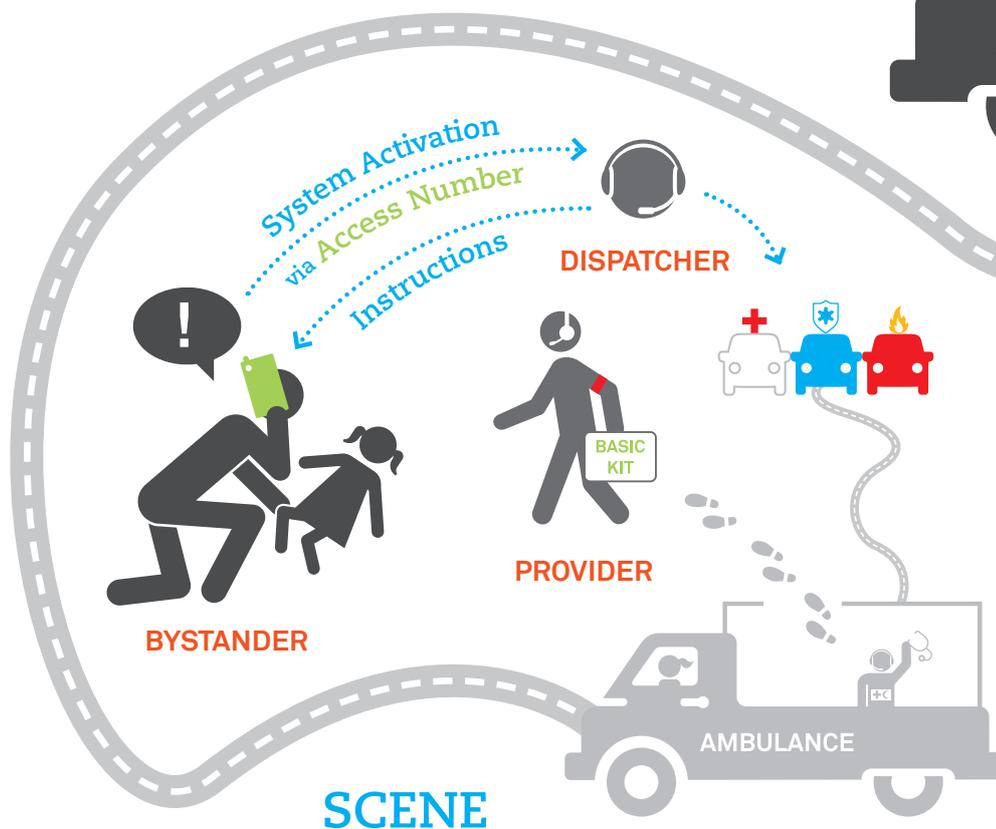
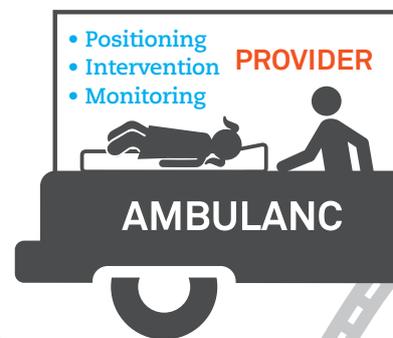
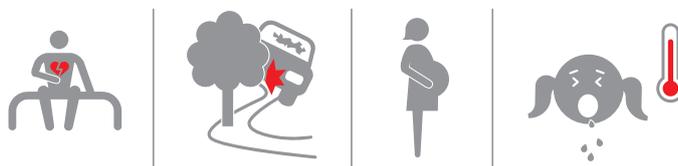
WHO Emergency Care System Framework



EMERGENCY CARE SYSTEM FRAMEWORK

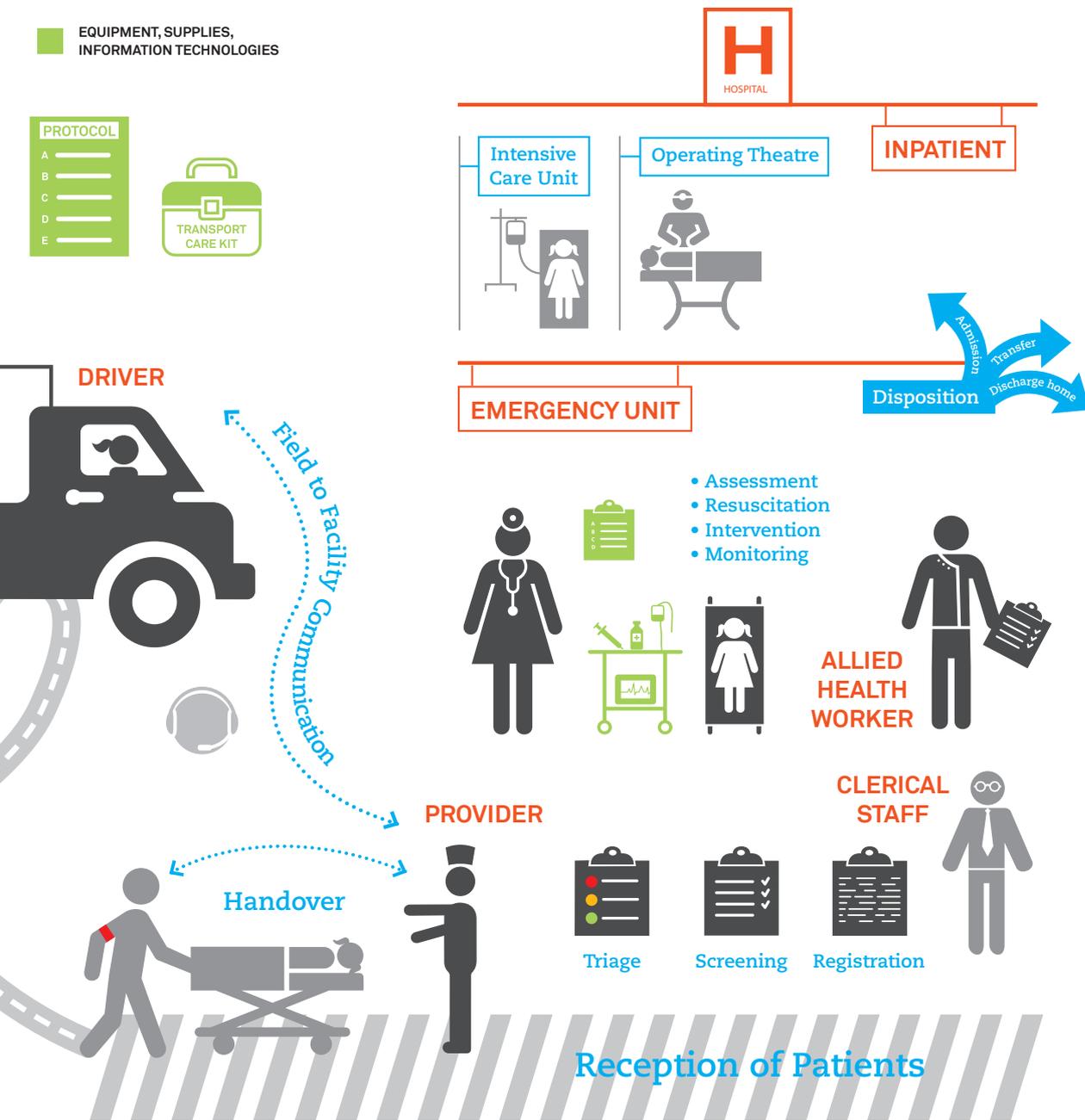
All around the world, acutely ill and injured people seek care every day. Frontline providers manage children and adults with injuries and infections, heart attacks and strokes, asthma and acute complications of pregnancy. An integrated approach to early recognition and management reduces the impact of all of these conditions. Emergency care could address over half of the deaths in low- and middle-income countries.

■ HUMAN RESOURCES ■ FUNCTIONS



- BYSTANDER RESPONSE
- DISPATCH
- PROVIDER RESPONSE

Figure 12. WHO Emergency Care System Framework



TRANSPORT

- PATIENT TRANSPORT
- TRANSPORT CARE

FACILITY

- RECEPTION
- EMERGENCY UNIT CARE
- DISPOSITION

5

PRE-HOSPITAL EMERGENCY CARE



Photo: Rescue 1122, Punjab

5. PRE-HOSPITAL EMERGENCY CARE

Pre-hospital emergency care is the medical care provided to a patient before transfer to a hospital or appropriate healthcare facility.



Figure 13. Phase 1 of the Emergency Care Chain

In low-and middle-income countries the proportion of injured patients who die before reaching hospital is more than double that in high-income countries (2). A recent review of eight studies on the impact of pre-hospital care in six low and-middle -income countries (Afghanistan, Brazil, Islamic Republic of Iran, Iraq, Mexico, Trinidad, and Tobago) suggested that implementation of pre-hospital care can reduce the risk of death in injured patients by 25% (11). The aim of pre-hospital emergency care is to provide a comprehensive and coordinated approach to patient care management, thus providing each patient with the most appropriate care in the most efficient time frame.

For road traffic crashes which result in critical injury, three factors improve the chance of survival.

1. Fast activation of the emergency response and fast service response.
2. High quality emergency medical care from highly qualified ambulance personnel.
3. Being taken to a hospital that is appropriately skilled and equipped to deal with their emergency.

In most crashes, the chain of help begins with the injured person/s or members of the public ('lay bystanders') who witness the road traffic crash or who first arrive at the crash scene. They can play an important role in minimising preventable death and injury until trained responders arrive. Their first action must be to activate emergency system response.

5.1 Fast Activation of the Emergency Response

A national emergency telephone number speeds up access to the emergency system and ensures that all relevant agencies (fire, police, emergency rescue and ambulance) are warned and involved. The number should be valid throughout the country, available as a free call from every telephone (mobile or landline), easy to remember and dial (3-4 digits) linked to a dispatch centre and able to guarantee confidentiality of the caller.



Currently the 1122 emergency number that applies across northern Pakistan meets all of these good practice attributes. Although it is not a national notification number, the Pakistan Telecommunications Authority (PTA) confirms it can be utilized by any future pre-hospital services. With the rapid expansion of communication systems, all provinces in Pakistan have the resources to implement this number.

An emergency number is only effective if it is known by everyone and is activated when required. Education Departments of Punjab, KPK, G-B, ICT and AJK (and other provinces as the 1122 number is adopted) should mandate teaching of the 1122 number to all students at all levels in all primary schools to ensure they know how and when to activate the emergency number and that misuse can kill.

Information Ministries of Punjab, KP, G-B, AJK and relevant authorities in ICT can publicise this number by mandating the inclusion of 1122 as the official telephone number emergency services in all publications produced by government, industry, and private sector agencies such as hotels, guest houses, offices, factories etc. This will help to ensure that lay bystanders have the knowledge to promptly activate the system.

5.2 The Role of the Bystander

As well as activating emergency services, bystanders can also deliver basic first actions until trained and equipped rescuers arrive. In the European Union, EU Directive 2000/56 provides for Member States to take measures to ensure that applicants for driving licences know how to behave in the event of a crash. Over 50% of EU member countries require first aid training for drivers before issuance of driver licenses. Drivers are obliged by law to provide first aid when arriving at a crash scene.

The current medical consensus at present is that the general public should be aware of the very few actions they should do (call the emergency number and provide accurate information about the crash location and number of injured people, prevent further crashes, clear airways and stop bleeding) and other actions they should not do (move the patient – unless necessary e.g. in a fire) and that they are not expected to provide medical treatment.

Highway Code Handbooks should include this information. Learner and driver licence tests should include questions on emergency services telephone number/s and what to do at a crash scene.

5.3 Current Recommendations for Basic First Aid Training

The WHO does not recommend requiring or providing basic first aid training for all drivers or members of the public in general in developing countries as there is no strong evidence that such training would decrease pre-hospital mortality. It could adversely impact on outcomes as it consumes valuable resources that can be better spent on professional prehospital services that have demonstrated benefits. There is also a concern that more harm than good might be done by lay bystanders who do not have in-depth knowledge of basic life support techniques (12).

The WHO does recommend basic first aid training (voluntary or mandatory) for identified motivated volunteers from occupational groups such as professional drivers, soldiers, teachers, or students living/operating in regional and remote areas (12). A good example of their use in Pakistan would be the Karakoram Highway (N-35) that is 1,300 km long and passes through very remote and sparsely populated areas of Gilgit-Baltistan, where ambulance response times (ART) will be compromised. It could also improve pre-hospital care in areas in Balochistan and northern Sindh which lack services or where ART are compromised.

EU Directive 2000/56 provides for the requirement for first aid training and refresher courses for professional drivers. However, research conducted for the 2012 *DaCoTA* report found that *'it has not been scientifically established whether such a measure would decrease pre-hospital mortality'* (12).

In light of this lack of strong evidence, where provincial governments or NGOs implement basic first aid training it should be focused to those districts or provinces that do not have a formal (government operated or managed) EMS system, target specific groups and be implemented as a strategy until formal pre-hospital systems are fully implemented and used to support the system thereafter.

Government EMS providers should negotiate with transport and logistics industry providers for provision of basic first aid training and refresher courses for professional drivers, prioritising those drivers who travel on major national and/or regional transport routes in remote areas such as the Karakoram Highway and CAREC routes through sparsely populated areas.

5.4 Rescue 1122 Punjab Community Emergency Response Teams (CERTS)

Rescue 1122 Punjab is establishing a Community Emergency Response Teams (CERTs) program to help citizens make their localities safer communities. CERT members are sensitized on their responsibilities to work for prevention of emergencies in their areas and enhance their capacity to respond to emergencies as First Responders.

The Punjab CERTs have also been trained in Community Based Disaster Risk Management (CBDRM) so that in a disaster, community responders can work for the mitigation of the disastrous circumstances of the situation.



Figure 14. Rescue 1122 Punjab Training Course for CERTs

5.5 EMS Communications and Medical Dispatch

An efficient call receiving system is essential. Calls may be answered by the ambulance services or the emergency medical services, by other emergency services - police and fire service – and then appropriate calls are transferred to the emergency medical system.

The process of dispatching the appropriate ambulance vehicle and team depending on the perceived nature and urgency of the emergency is termed 'emergency medical dispatch' (EMD).

The functions of the EMD system are:

- Prioritization by level of urgency (triage) to determine the speed of response.
- Prioritization by level of need to determine type of response.
- Provision of pre-ambulance arrival instructions in first aid and scene management.
- Communication with those on the scene and in the receiving hospital.

In a good practice dispatch system, all calls to the Emergency System are transferred as soon as possible to a trained dispatcher who has been trained to make a layered response using an appropriate EMD system (13). A computerised aided dispatch (CAD) system promotes the call taker, records responses, supports decision-making and provides information for audit and quality assurance is considered essential (13). There are various ways of operating emergency medical dispatch systems: the essential elements which have been identified are (13):

- The use of a standard protocol.
- Medical supervision.
- Audit of operations.
- Training of dispatchers.

In Pakistan good practice in emergency services communications and medical dispatch is exemplified by the Aman Foundation Communication Centre in Karachi.



Figure 15. Aman Foundation Emergency Communications Centre in Karachi

5.6 Ambulance Response Time

The second factor which improves the chance of survival is the quality of emergency medical care to the injured at the scene and during transfer to a medical facility or transfer between facilities.

The faster injured people can gain access to professional first aid, the greater the chance of survival and full recovery (14). This has two components – the quality of the ambulance vehicle and equipment and the quality of the ambulance personnel. Ambulances operated by Rescue 1122, CARES ICT, and the AMAN Foundation are well-equipped and have trained staff.

Short pre-hospital times are considered an important parameter of the quality of pre-hospital care. Response time depends on many factors such as distance to the nearest hospital, availability of ambulances and trained personnel, road traffic and weather conditions, and detailed and accurate information on the crash location.

Target 12 of the *UN 2030 Global Road Safety Performance Targets* relates to setting and achieving national targets for time of first professional emergency medical care to road traffic crash victims. This is a key target for Pakistan which is the most rapidly urbanising country in South Asia.

Box 6: Improving Ambulance Response Times in Punjab Province – Case Study of Motorcycle Ambulances

Congested cities, particularly mega-cities present a significant challenge for EMS. To address this challenge, the Government of Punjab launched Pakistan's first modern Motorbike Ambulance Service on 10th October, 2017 in order to provide timely emergency response, immediate rescue and first aid in congested areas and narrow streets in Lahore. The staff of this Service currently operate a fleet of 900 motorcycles within nine Divisional Headquarters of Punjab. It is planned to progressively extend this Service to all districts of Punjab. The Motorbike Ambulance Service average response time is 4 minutes compared to an average conventional ambulance response time of 7 minutes. This is an achievement, even on an international level.

Source: Rescue 1122, Punjab



Figure 16. Rescue 1122 Punjab Motorcycle Ambulance Service

5.7 Emergency Services Coordination at the Scene

Timely rescue of road crash victims requires effective coordination of police, ambulance and (in the case of patient entrapment) fire & rescue services. Police or fire services may arrive first. It is important that each agency has a clear understanding of their respective roles and responsibilities and works cooperatively at the scene. Regular agency meetings and joint training in road traffic crashes, particularly in response to multiple casualty crash scenarios, results in more effective co-ordination and higher operational standards at the scene.

Evaluation has shown that conducting a 3-day cross-sectoral training course can reduce the extrication and on-scene time by as much as 40-50% (12).



Figure 17. Govt of KP Rescue 1122 fire brigade and ambulance vehicles

5.8 Responding to Multiple Casualty Crashes

Every year in Pakistan, major road crashes result in multiple casualties. These ‘catastrophic crash’ events result from a number of factors and most frequently involve oil and gas tankers, heavy vehicles carrying explosives, hazardous materials, or inflammable chemical products, and passenger buses. Multi-vehicle crashes often result in a large number of seriously injured persons of all ages.

Pakistanis travel nearly 400 billion passenger kilometres (pkm) each year – almost all by road – and this is expected to rise to 1,000 billion pkm by 2030 (estimates based on the Pakistan Economic Survey, 2017).

The burden on prehospital and emergency trauma care facilities will increase significantly in the next decade.

Regionalisation of care to specialist trauma centres reduces mortality by 25% and length of stay by four days (12). A disaster plan strengthens the capacity of local and provincially based governments, health care providers, and public health agencies to react to such events (7). Best practice indicates that a region-wide trauma team is the optimal means of dealing

with such crashes, utilizing the disaster plan (12). Care for the injured should be controlled by hospital based medical teams who are trained in disaster management and in collaboration with the ambulance, fire and rescue and police services. Efficient rescue involves on-site triage and immediate care, evacuation to the appropriate hospital and hospital admission (12).

12 killed as speeding wagon rams into toll plaza

ISLAMABAD: At least 12 people were killed and six others injured in a road accident at Islamabad Toll Plaza on Monday.

The National Highways and Motorway Police (NHMP) said the injured were in critical condition and kept in the burns unit of Pakistan Institute of Medical Sciences (Pims).

A crowded Rawalpindi-bound passenger wagon coming from Sargodha rammed into a booth of the toll plaza and overturned due to speeding, said the police.

The fuel tank of the wagon exploded and the vehicle caught fire. The passengers and driver got trapped inside.

Rescue personnel reached the spot and extinguished the flames and retrieved the victims.

Eight of the passengers were found dead while the others were taken to hospital where four of them died later.

Some of the deceased were identified as [REDACTED]

The injured were: [REDACTED]

Deputy Inspector General of NHMP Ashfaq Ahmed in a statement said 17 passengers, including women and children, were traveling in the wagon.

Apparently, the driver fell asleep due to which the vehicle rammed into the toll booth.

He said the condition of the injured was critical as they had suffered serious burn injuries and fractures.

Deputy Commissioner Islamabad Hamza Shafqaat visited Pims where the bodies and the injured had been brought.

He said six injured were kept in the intensive care unit (ICU) and were in an extremely critical condition.

“Unfortunately, 12 people have lost their lives in the accident,” he added.

He said there were 18 passengers in the vehicle. The driver identified as [REDACTED] was shifted to the Combined Military Hospital (CMH), Rawalpindi.

The DC said the cause of the accident was yet to be established but the speed of the vehicle was 130 kilometres per hour when it met with the accident.

The DC said a request would be made to the NHMP to hold an inquiry into the accident. — Munawer Azeem

Figure 18. Media report on a multi casualty crash in Islamabad, May 2019

5.9 Air Ambulance Rescue

Research shows that using helicopters to transport patients does not greatly influence their probability of survival they are costly and not without significant crash risk (12).

Given this lack of evidence base, where resources are limited, the establishment of a helicopter rescue service should be assessed against initiatives that have proven outcomes such as improving pre-hospital training and establishing hospital ‘hotline’ communication systems to ensure hospitals receive advance warning and are prepared to receive injured patients.

5.10 EMS Treatment at the Crash Scene

The WHO distinguishes between basic and advanced systems of pre-hospital care (7).

Basic Life Support (BLS): Consists of emergency medical care to restore or sustain vital functions (airway, respiration, circulation) without specialized medical equipment and to limit further damage in the period preceding the arrival of specialized, advanced emergency medical care.

Currently, the clear medical consensus is that only essential treatment should be given at the crash scene so there is no unnecessary waste of time. The most important essential treatments at the crash scene are (13):

- Measures to protect the victim from further injury.
- Basic life support measures such as providing a free airway and techniques used to aid breathing, such as mouth to mouth resuscitation and bag valve mask ventilation and decompression.
- Measures to reduce circulatory failure (such as early defibrillation for victims of cardiac arrest).
- Manoeuvres started for immobilizing possible fractures to prevent further damage.

Advanced Life Support (ALS): Medical care given by medical doctors, paramedics and nurses trained in critical care medicine with the use of specialized technical equipment, infusion of fluids and drugs aimed to stabilize or restore vital functions. Advanced life support is an integral part of a system of emergency medical services that needs adequate medical supervision.

While advanced systems undoubtedly benefit some patients, the WHO states that, with few exceptions (such as early defibrillation for victims of cardiac arrest), there is little evidence that they are inherently superior to systems that offer basic pre-hospital care. In contrast, improved outcomes have been documented after bystanders and health-care providers have been educated to provide the fundamental elements of trauma care (7).

Given this lack of scientific knowledge, **if the provision of advanced systems leads system planners to divert scarce resources from basic interventions that benefit large numbers of patients to interventions that benefit fewer patients, advanced systems may hinder the overall provision of pre-hospital care (7).**

5.11 Pre-hospital Care Providers

Providers of basic pre-hospital trauma care must receive formal training in pre-hospital care, scene management, rescue, stabilization, and transport (10). Essential basic pre-hospital care techniques can be delivered by emergency medical technicians (EMTs) staffing ambulances.

Globally, advanced techniques can only be provided by:

- Paramedics (emergency medical technicians who have received further training) e.g. in the UK.
- Nurses specialized in critical care e.g. in the Netherlands.
- Physicians in mobile intensive care units which is a system widely used in Europe e.g. in Belgium, Germany, France, Italy.

In order to make the best use of resources, a two-tier system has been set up in some countries comprising emergency medical technicians as the first tier and mobile intensive care units as a second tier (12).

5.12 Transfer to a Trauma Care Hospital

The third factor which improves the chance of survival is being taken to a hospital that has the equipment and skilled medical teams required to deal with the emergency. When injured patients are seen in and transferred through lower-level clinics and hospitals before arriving at an appropriately equipped hospital, care is delayed resulting in worse outcomes and avoidable deaths.

Factors which should influence the decision about the appropriate facility or hospital for a road crash victim include:

- Type of injuries.
- Services available at the hospital.
- Comparative distances and times to reach hospitals.
- Regulations concerning the transport of injured people.

Triage is the process of classifying patients according to the severity of their injuries to determine how quickly they need care.

At crash scenes, careful triage is needed to ensure that available resources are properly matched to each victim's needs. **Lack of pre-hospital protocols or failure to adhere to these protocols leads to problems of under-triage and over-triage** (10).

Over-triage occurs when non-critical patients are sent to facilities offering the highest level of care.

Under-triage occurs when critically injured patients are treated at the local level or sent to facilities that are not properly equipped to meet their needs. This may result in increased morbidity and mortality among patients with otherwise treatable injuries (7).

The WHO highlights the need to develop and implement formal protocols that direct pre-hospital providers to take seriously injured patients directly to higher-level hospitals while those with minor injuries are taken to a lower-level facility for treatment.

Matching injury severity to facilities in this way allows more efficient and cost-effective use of limited health resources, reduces delays in life-saving treatments for those who need them, and has been shown to improve patient outcomes (4). However, this may be difficult in areas where the only/main trusted facility is the major emergency hospital in the province. Improving the quality and operational standards of district level health facilities and public education are both essential to effective utilization of health facilities.

The WHO (14) emphasises the importance of a **system** for trauma management, then a network of Hospitals responsible for the ongoing care and treatment of the trauma patient arising from a road traffic collision, hospitals should be classified in line with the international definitions of trauma centres (15).

Level I Trauma Centers

A Level I Trauma Center is a comprehensive regional resource that is a tertiary care facility central to the trauma system capable of providing total care for every aspect of injury – from prevention through rehabilitation. Elements of a Level I Trauma Center include:

- 24-hour in-house coverage by general surgeons, and prompt availability of care in specialties such as orthopaedic surgery, neurosurgery, anaesthesiology, emergency medicine, radiology, internal medicine, plastic surgery, oral and maxillofacial, paediatric and critical care.
- Referral resource for communities in nearby regions.
- Provides leadership in prevention, public education to surrounding communities.
- Provides continuing education of the trauma team members.
- Incorporates a comprehensive quality assessment program.
- Operates an organized teaching and research effort to help direct new innovations in trauma care.
- Program for substance abuse screening and patient intervention.
- Meets minimum requirement for annual volume of severely injured patients.

Level II Trauma Centers

A Level II Trauma Center is able to initiate definitive care for all injured patients. Elements of a Level II Trauma Center include:

- 24-hour immediate coverage by general surgeons, as well as coverage by the specialties of orthopaedic surgery, neurosurgery, anaesthesiology, emergency medicine, radiology and critical care.
- Tertiary care needs such as cardiac surgery, haemodialysis and microvascular surgery may be referred to a Level I Trauma Centre.
- Provides trauma prevention and continuing education programs for staff.
- Incorporates a comprehensive quality assessment program.



Level III Trauma Centers

A Level III Trauma Center has demonstrated an ability to provide prompt assessment, resuscitation, surgery, intensive care and stabilization of injured patients and emergency operations. Elements of a Level III Trauma Center include:

- 24-hour immediate coverage by emergency medicine physicians and the prompt availability of general surgeons and anaesthesiologists.
- Incorporates a comprehensive quality assessment program.
- Has developed transfer agreements for patients requiring more comprehensive care at a Level I or Level II Trauma Centre.
- Provides back-up care for rural and community hospitals.
- Offers continued education of the nursing and allied health personnel or the trauma team.
- Involved with prevention efforts and must have an active outreach program for its referring communities.

Level IV Trauma Centers

A Level IV Trauma Center has demonstrated an ability to provide advanced trauma life support (ATLS) prior to transfer of patients to a higher level trauma center. It provides evaluation, stabilization, and diagnostic capabilities for injured patients. Elements of a Level IV Trauma Center include:

- Basic emergency department facilities to implement ATLS protocols and 24-hour laboratory coverage. Available trauma nurse(s) and physicians available upon patient arrival.
- May provide surgery and critical-care services if available.
- Has developed transfer agreements for patients requiring more comprehensive care at a Level I or Level II Trauma Centre.
- Incorporates a comprehensive quality assessment program.
- Involved with prevention efforts and must have an active outreach program for its referring communities.

Level V Trauma Centers

A Level V Trauma Center provides initial evaluation, stabilization and diagnostic capabilities and prepares patients for transfer to higher levels of care. Elements of a Level V Trauma Centers include:

- Basic emergency department facilities to implement ATLS protocols.
- Available trauma nurse(s) and physicians available upon patient arrival.

- After-hours activation protocols if facility is not open 24-hours a day.
- May provide surgery and critical-care services if available.
- Has developed transfer agreements for patients requiring more comprehensive care at a Level I through III Trauma Centres.

This implies that the more severely injured patients would be taken to the nearest suitable hospital and not necessarily the geographically nearest hospital. Hence, this involves bypassing nearby, but less well-equipped hospitals with the more severely injured patients, assuming that the transport time to the better equipped hospital is not inordinate. This is based on training EMS personnel in various triage criteria, including the use of scoring algorithms such as the trauma score. This also implies detailed, pre-existing arrangements with the EMS and the hospitals in a given city or area (14).

5.13 Medical Control and Direction of Pre-Hospital Care

Medical control and direction of pre-hospital care is essential, knowledgeable and committed health-care professionals should be identified to serve as the medical director.

In urban areas, an experienced and committed hospital-based physician trained in accident and emergency medicine, anaesthesiology or critical care, or trauma surgery, and ideally trained or experienced in pre-hospital care, may be best suited to this role.

In rural communities where a physician may not be available, the most experienced nurse or paramedical professional should fill this role. It is important that qualified individuals be assigned responsibility for assuring the availability and quality of pre-hospital care in their community (7). Many proprietary training courses are available from renowned International bodies such as; The Royal College of Surgeons, Edinburgh, Faculty of Pre-Hospital Care and The American College of Surgeons, examples would be Pre-Hospital Trauma Life Support (PHTLS) and Advanced trauma Life Support (ATLS) courses.

6 HOSPITAL TRAUMA CARE



Photo: Lady Reading Hospital, KP

6. HOSPITAL TRAUMA CARE

The WHO has developed guidelines for provision of essential services by emergency medical facilities to meet patient needs and prevent death and disability in injured patients (14). The Guidelines categorize these services into three broad sets of needs:

1. Life-threatening injuries are appropriately treated, promptly and in accordance with appropriate priorities, to maximize the likelihood of survival.
2. Potentially disabling injuries are treated appropriately, to minimize functional impairment and to maximize the return to independence and to participation in community life.
3. Pain and psychological suffering are minimized.

Global research has shown that in order to achieve improved clinical outcomes for the patient, a time interval of 60 minutes the 'Golden Hour' (8) from time of crash to arrival at the appropriate hospital for on-going treatment should be achieved. Hospitals should be classified in line with the international definitions of Trauma centres, as previously detailed above.

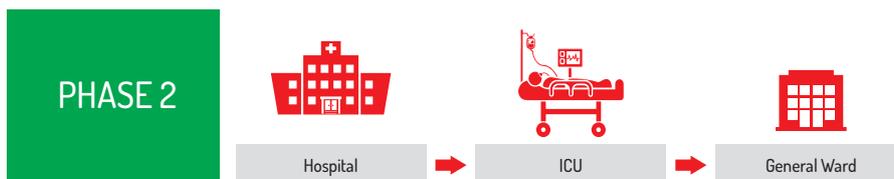


Figure 19. Phase 2 of the Emergency Care Chain

The WHO has set out the following requirements for effective emergency care at hospitals:

- A dedicated area or unit within the hospital.
- A core of non-rotating providers who are assigned to the unit and trained in the care of injuries, protocols, and checklists to ensure a systematic approach to every injured patient.
- Essential equipment for diagnosis and treatment of injuries.
- [For any facility certified to care for the seriously injured] Operative care with 24-hour access to surgical, anaesthesia and critical care services.

6.1 WHO Emergency Trauma Care Goals

Within the three broad categories, the WHO has set several specific trauma care goals that are 'eminently achievable within the resources available in most countries' (14) and which are listed below. All emergency trauma facilities throughout Pakistan should meet the goals set out below.

- Obstructed airways are opened and maintained before hypoxia leads to death or permanent disability.

- Impaired breathing is supported until the injured person can breathe adequately without assistance.
- Pneumothorax and haemothorax are promptly recognized and relieved.
- Bleeding (external or internal) is promptly stopped.
- Shock is recognized and treated with intravenous (IV) fluid replacement before irreversible consequences occur.
- The consequences of traumatic brain injury are lessened by timely decompression of space occupying lesions and by prevention of secondary brain injury.
- Intestinal and other abdominal injuries are promptly recognized and repaired.
- Potentially disabling extremity injuries are corrected.
- Potentially unstable spinal cord injuries are recognized and managed appropriately, including early immobilization.
- The consequences to the individual of injuries that result in physical impairment are minimized by appropriate rehabilitative services.
- Medications for the above services and for the minimization of pain are readily available when needed.

The WHO Trauma Care Checklist (www.who.int/emergencycare) is a simple tool, appropriate for use in any setting delivering emergency care for the injured and easily adapted to local needs. It reviews actions at two critical points to ensure that no life-threatening conditions are missed, and that timely, life-saving interventions are performed to assist in achieving the trauma goals.



World Health Organization

Trauma Care Checklist

Immediately after primary & secondary surveys:

IS FURTHER AIRWAY INTERVENTION NEEDED? May be needed if: <ul style="list-style-type: none"> • GCS 8 or below • Hypoxaemia or hypercarbia • Face, neck, chest or any severe trauma 	<input type="checkbox"/> YES, DONE <input type="checkbox"/> NO
IS THERE A TENSION PNEUMO-HAEMOTHORAX?	<input type="checkbox"/> YES, CHEST DRAIN PLACED <input type="checkbox"/> NO
IS THE PULSE OXIMETER PLACED AND FUNCTIONING?	<input type="checkbox"/> YES <input type="checkbox"/> NOT AVAILABLE
LARGE-BORE IV PLACED AND FLUIDS STARTED?	<input type="checkbox"/> YES <input type="checkbox"/> NOT INDICATED <input type="checkbox"/> NOT AVAILABLE
FULL SURVEY FOR (AND CONTROL OF) EXTERNAL BLEEDING, INCLUDING:	<input type="checkbox"/> SCALP <input type="checkbox"/> PERINEUM <input type="checkbox"/> BACK
ASSESSED FOR PELVIC FRACTURE BY:	<input type="checkbox"/> EXAM <input type="checkbox"/> X-RAY <input type="checkbox"/> CT
ASSESSED FOR INTERNAL BLEEDING BY:	<input type="checkbox"/> EXAM <input type="checkbox"/> ULTRASOUND <input type="checkbox"/> CT <input type="checkbox"/> DIAGNOSTIC PERITONEAL LAVAGE
IS SPINAL IMMOBILIZATION NEEDED?	<input type="checkbox"/> YES, DONE <input type="checkbox"/> NOT INDICATED
NEUROVASCULAR STATUS OF ALL 4 LIMBS CHECKED?	<input type="checkbox"/> YES
IS THE PATIENT HYPOTHERMIC?	<input type="checkbox"/> YES, WARMING <input type="checkbox"/> NO
DOES THE PATIENT NEED (IF NO CONTRAINDICATION):	<input type="checkbox"/> URINARY CATHETER <input type="checkbox"/> NASOGASTRIC TUBE <input type="checkbox"/> CHEST DRAIN <input type="checkbox"/> NONE INDICATED

Before team leaves patient:

HAS THE PATIENT BEEN GIVEN:	<input type="checkbox"/> TETANUS VACCINE <input type="checkbox"/> ANALGESICS <input type="checkbox"/> ANTIBIOTICS <input type="checkbox"/> NONE INDICATED
HAVE ALL TESTS AND IMAGING BEEN REVIEWED?	<input type="checkbox"/> YES <input type="checkbox"/> NO, FOLLOW-UP PLAN IN PLACE
WHICH SERIAL EXAMINATIONS ARE NEEDED?	<input type="checkbox"/> NEUROLOGICAL <input type="checkbox"/> ABDOMINAL <input type="checkbox"/> VASCULAR <input type="checkbox"/> NONE
PLAN OF CARE DISCUSSED WITH:	<input type="checkbox"/> PATIENT/FAMILY <input type="checkbox"/> RECEIVING UNIT <input type="checkbox"/> PRIMARY TEAM <input type="checkbox"/> OTHER SPECIALISTS
RELEVANT TRAUMA CHART OR FORM COMPLETED?	<input type="checkbox"/> YES <input type="checkbox"/> NOT AVAILABLE

WWW.WHO.INT/EMERGENCYCARE

Figure 20. WHO Trauma Care Checklist

6.2 Medical Control and Direction of Hospital Care

Medical control and direction of hospital care is essential, the appointment of a medical director to oversee care delivery is recommended. In urban areas, an experienced and committed hospital-based physician trained in accident and emergency medicine, anaesthesiology or critical care, or trauma surgery, and ideally trained or experienced in pre-hospital care, may be best suited to this role (7).

In terms of trauma management and rehabilitation facilities in provincial public hospitals, Lady Reading Hospital, Peshawar provides an example of the importance of leadership in driving significant advances towards internationally recognised standards .

Box 7: Case Study - Trauma care improvement in Lady Reading Hospital, Peshawar.

Lady Reading Hospital (LRH) is the major referral hospital for all districts of Khyber Pakhtunkhwa including merged districts. Its closeness to the main road and location at the entrance of Peshawar city, makes it the first point of emergency care for all residents. In 2017 the LRH emergency department (ED), received 719,681 patients, with a daily average of 1,971 patients.

Patients are accompanied by 2-4 family members. Due to low community awareness, many of those arriving into the ED are low-acuity non-urgent patients. Until recently, their arrival into the ED was unregulated. Lack of functional referral mechanisms and protocols for prioritising patients resulted in crowded waiting areas and treatment rooms, increased stress levels, and potential delays in treatment of high-acuity emergency patients.

To improve this situation, between 2017 – 2018 a number of improvements were implemented in the ED, including introduction of protocols for processing patients, triage to prioritize treatment and low-cost strategies, including use of painted directional lines on the floor to assist patients in navigating through different areas of the ED at various stages of the treatment process. Evidence-based guidelines were developed and tools like Canadian Triage Acuity Scale (CTAS) and Modified Early Warning Score Charts (MEWS) are being used to categorize the patients and assign them with the treatment priority. Staff have been trained in triaging processes and tools. Separate triaging areas for walk-in patients and patients arriving through ambulances have been established.

These system improvements have reduced the non-emergency patient case load, improved the overall efficiency and effectiveness of critically ill patient management, and saved already scarce resources for the real emergency patients who are treated free at the ED during the first 24 hours of admission. In 2018, 553,621 patients were managed at LRH ED, and a further 85,000 – 95,000 non-urgent patients deflected to the Outpatient department after undergoing triaging at the ED.

Recently, a 60-bedded acute medical unit has been established which reduced the ED stay and enables quicker decision making and better management. LRH is also considering extending OPD/GP services hours until 10:00 pm to reduce the non-urgent patient load of triaging clinics in the evening and night shifts which is almost double (39-40%) that in morning shift (20%).



Figure 21. Lady Reading Hospital

6.3 Trauma Care for Injured Children

Road traffic injuries are the leading killer of children aged 5 years and over, signalling a need for a shift in the current child and adolescent health agenda which, to date, has largely neglected road safety (1). Due to their extraordinary capacity for recovery, children benefit from timely high-quality injury care more than any other group.

Key, low-cost strategies which improve the care of children injured in a road traffic crash are:

- Providing caregiver and teacher education on safe, immediate stabilization of injuries.
- Establishing advance plans for activating formal or informal paediatric transportation systems.
- Educating pre-hospital and facility-based providers about the specific treatment needs of children.
- Equipping emergency vehicles and hospitals with child-sized medical equipment and supplies.
- Making healthcare facilities as 'child-friendly' as possible to minimize additional trauma for injured children.

7

REHABILITATION AND REINTEGRATION



Photo: Lady Reading Hospital, KP

7. REHABILITATION AND REINTEGRATION

The final link in the emergency care chain is the discharge of the injured patient to his or her place in the community.



Figure 22. Phase 3 of the Emergency Care Chain

This involves the integration of initial ‘high tech’ medicine and rehabilitation services and attention to the psychological needs of the patient. Training is required for staff caring for patients as well as those supporting relatives. Long lasting psychological and social suffering of relatives may result from the way they are approached by emergency care givers (16).

Patients who have sustained Traumatic Brain Injury (TBI) will require additional specialized attention on the part of neuropsychologists and psychologists. Research shows that even relatively ‘mild TBI’ is followed by prolonged disability in a high percentage of cases. In hospital trauma care a neuropsychologist should take part in the acute rehabilitation phase.

Psychologists should be involved in the ‘discharge planning’ of all patients with TBI and be consulted whenever there is concern about the re-integration of a patient into the community. Post-traumatic stress disorder is recognized as a major obstacle to full recovery after injury. It is probable that early assessment and early referral for rehabilitation will improve long-term outcome and speed up the recovery process.

Other injuries e.g. of the spine and the upper and lower limbs can also be debilitating and rehabilitation of these patients should receive the necessary attention.

Long after a crash, survivors and their families can suffer persistent physical and psychological conditions that, when not appropriately treated, restrict their ability to function normally in their work and personal lives. Adjusting to long-term physical impairment and associated disability or disfigurement can also put individuals at increased risk of developing psychological disability. Rehabilitation can help to alleviate suffering, prevent further risk of harm, and optimise functioning, allowing for restoration of independence and reintegration into society. Rehabilitation involves professionals from a wide range of medical and paramedical disciplines working together to help achieve treatment goals. Where no services are available, family members may provide basic rehabilitation care.

8

QUALITY ASSURANCE PROCESSES AND TOOLS



Photo provided by: Pakistan Institute of Medical Sciences (PIMS)

8. QUALITY ASSURANCE PROCESSES AND TOOLS

Pre-hospital care is now becoming recognized as a medical specialty in its own right (15). To effectively perform its significant role in the overall emergency and trauma care system, EMS providers must develop the clinical care professionalism of their organizations.

A centralized regulating body is needed to ensure national minimum operational and clinical delivery standards, policies, and protocols for pre-hospital care. The establishment of a Pre-Hospital Emergency Care Council (PHECC) as a peak body, reporting directly to Ministry of National Health Services, Regulation and Coordination (M/oNHSR&C), would ensure the ongoing development of the profession for the benefit of all Pakistanis. Its key functions would include provision of professional coordination, data analysis, expert advice and guidance, standards and registration, and protection for the public.

Medical directors and emergency services field supervisors are best placed to deliver ongoing quality improvement as they have several simple but effective ways of ensuring the quality of trauma care. The WHO *Guidelines for Trauma Quality Improvement Programmes* identify the following activities to ensure ongoing improvement of EMS standards (10).

- **Listening in on radio or other communications:** This gives a medical director insight into the knowledge, thinking and actions of those who are providing prehospital care. Listening in also allows the medical director to interrupt communications to order a change in management if it is necessary to safeguard the patient's health or safety.
- **Direct observation:** Periodically, a supervisor may work alongside a prehospital care team to observe their actions and medical directors may observe real emergency events. Although it is likely that teams behave differently when they know they are being observed, this technique enables managers to determine whether a post-crash response teams coordinate effectively and whether the EMS team is capable of taking appropriate action.
- **Panel reviews of preventable deaths:** Preventable deaths are classified as those which occur despite having a high statistical probability of survival. Such deaths could be avoided if optimal care has been delivered. Panel reviews of pre-hospital and hospital charts are conducted by a medical experts. In recent years, population-based research has replaced panel reviews as these provide the strongest evidence regarding the effectiveness of trauma systems and trauma centers on patient outcomes.
- **Medical Record audits:** Supervisors should regularly review documents written by prehospital providers and ambulance crews to assess whether they responded in a timely manner, whether the appropriate physical findings were documented, and whether the care given was appropriate. Poor documentation often indicates a lack of belief in protocols and poor care. If and when record reviews reveal a problem, feedback and additional training should be given.

- **Critical incident review:** Much can be learnt by analysing mistakes, poor outcomes, and near-misses. Post-crash response morbidity and mortality reviews should identify the root causes and contributing conditions, actions, and policies. Once known, these factors can be systematically addressed to reduce the risk of such events in the future.
- **Outcome studies:** One of the most useful approaches to quality assurance involves selecting one or more clinical conditions of interest (for example, a pedestrian being struck by a motor vehicle, use of a seatbelt) and obtaining follow up information on these to determine patient outcome. Outcome studies, coupled with an analysis of data on injury incidence and the process of care, can help supervisors determine whether their prehospital system is accomplishing its goal: saving lives and decreasing long-term disability.
- **Targeted monitoring:** For complications and errors.

All of the above ideally lead to identification of quality gaps and subsequent implementation of *corrective strategies*. Examples of corrective strategies include the implementation of management guidelines and protocols, targeted provider education, and improvement of infrastructure and communication. When monitoring hospital trauma care, Trauma Registries are used and provide an important tool to change legislation, to promote trauma prevention, to assess the management of patient care, and to evaluate trauma system effectiveness. They contain detailed information on trauma care.

Box 8: Trauma registries to improve care

In Khon Khaen, Thailand, a quality improvement programme was instituted and used a trauma registry to identify correctable problems, including insufficient resuscitation of patients in shock and prolonged time to reach emergency surgery.

The hospital administration set up a trauma review committee and gave it the power to make changes. Corrective action included increasing senior staffing levels in the emergency department at peak times, and a radio system in the hospital to alert specialists when they were needed. Preventable deaths and overall trauma mortality decreased.

For more information, see <http://who.int/emergencycare/trauma/success-stories/en/>

Source: WHO, 2016

9

EMERGENCY PROVIDER TRAINING



Photo: Rescue 1122, Punjab

9. EMERGENCY PROVIDER TRAINING

To save lives and limit disability, emergency medical technicians (EMTs) who staff an ambulance must carry out basic pre-hospital care techniques. However, the level of training and the degree of professionalism involved varies significantly across Pakistan. The important status of the EMT is often not well recognized.

As set out in Section 4.10, the WHO distinguishes between basic (BLS) and advanced (ALS) systems of prehospital care. Each level requires involved personnel to receive initial and on-going ('continuous') training as appropriate.

9.1 Initial Training

Throughout Pakistan, all personnel attending emergency medical scenes such as road traffic crashes, should be trained and accredited to internationally accepted minimum professional standards. The EMS training course developed by Rescue 1122 Punjab (see Box 9) is internationally accredited and should be the model for EMS training throughout Pakistan.

Box 9: Rescue 1122 EMS Training Course

Since its launch in 2004, Rescue 1122, Punjab has established the Emergency Service Academy and developed an internationally accredited training programme for Emergency Medical Technicians, validated by the Prehospital Emergency Care Council of Ireland. The training curriculum includes modules on rescue, triage, and basic life support skills. Accredited trainers deliver the course.

Source: Rescue 1122, Government of Punjab

9.2 Continuing Education

Continuing education is essential in maintaining the knowledge and skills of EMS providers. There is no widely accepted standard that indicates how often continuing education should be offered. However, skills that are used less frequently should be reviewed at least annually.

Continuing education may include:

- Periodically retraining personnel in the basics of emergency medical and trauma care.
- Introducing new treatment strategies or modifying old ones.
- Orienting staff to the use of new equipment or medicines, giving feedback from the auditing of radio traffic, directly observing performance in the field, or retrospectively reviewing care reports.

WHO Basic Emergency Care Course

In addition to face to face ongoing training by providers such as Rescue 1122 Punjab, the on-line WHO Basic Emergency Care (BEC) Course may be suitable for front line pre-hospital, clinic and hospital staff, including paramedics, nurses, and general doctors who work in limited resource settings. The course introduces a systematic approach to management of acute and life-threatening conditions, and the package includes a participant workbook and facilitator guide, as well as a full set of presentation slides.

The WHO Emergency, Trauma and Acute Care programme is dedicated to strengthening the emergency care systems that serve as the first point of contact with the health system for so much of the world, and to supporting the development of quality, timely emergency care accessible to all.



Figure 23. Resuscitation training at the Emergency Services Academy, Punjab

10

DATA COLLECTION AND RESEARCH



Photo: Pakistan Institute of Medical Sciences (PIMS)

10. DATA COLLECTION AND RESEARCH

In order to establish a sustainable, high-quality post-crash response system, which is continuously improved, it is essential to collect and analyse data and other information on each incident during the pre-hospital, hospital and rehabilitation and release phases.

Patient care records should be based on the *International Classification of External Causes of Injury and the WHO Injury Surveillance Guidelines*. The formatting and coding of data should be consistent with national and international standards. Nationally standardised methods for formatting and coding data allow district, provincial and national data to be aggregated.

At a minimum, sufficient information should be collected at the pre-hospital stage to answer the following questions:

Table 3. EMS Data Collection

Basic information	Expanded dataset
Who was injured	Assign a unique number at time of ambulance dispatch (incident report) and a patient record number. Record ambulance number and staff
What caused the injury and what was done to treat it	Record use of the safety equipment eg seatbelt & helmets and suspected use of drugs or alcohol. Include a clinical description of the injury.
When did the injury occur	Time of incident, time of EMS arrival and time of patient arrival to a health care facility or hospital.
Where did the injury occur	GPS location of where the incident occurred.
How does the patient respond to treatment (outcome)	Status on arrival at the facility and condition on discharge

Even basic information can assist:

- Clinical supervisors to monitor the performance of personnel and procedures and take corrective action as required.
- Planners and agency heads to assess the performance of their pre-hospital or hospital system.
- Health policy makers to define the public health impact of road traffic injuries and provide the evidence for legislation, policy and large-scale road safety strategies and prevention programs targeting, for example, helmets, seat belts, and child restraint programs etc. and evaluate their effectiveness.

11

RECOMMENDATIONS



Photo: Pakistan Institute of Medical Sciences (PIMS)

11. RECOMMENDATIONS

The next stage is to implement a program of rapid expansion, commencing in the most populous districts in each province and currently un-serviced areas and in successive years roll out the Rescue 1122 model of services across all districts, thereby creating a national service delivery model that is specific to the needs of the Pakistan environment and population, measurable, achievable, realistic in terms of the ambition and timely - a SMART objective.

Pre-hospital care is now becoming recognized as a medical specialty in its own right (15) and as such pre-hospital care providers need to recognize this and develop the professionalism of their organizations in the aspect of clinical care and to become a significant player in the overall emergency and trauma care system. To achieve these goals, a centralized regulating body is needed to ensure national minimum operational and clinical delivery standards, policies, and protocols for pre-hospital care. The development of a Pre-Hospital Emergency Care Council, as a peak body, reporting directly to the M/oNHSR&C, would provide professional guidance, registration of practitioners, protection for the public and ensure the ongoing development of the profession for the benefit of the general public, in line with other medical disciplines.

Emergency Medicine is the medical specialty with the principal mission of evaluating, managing, treating, and preventing unexpected illness and injury. Anyone may unexpectedly require medical care at any time. Emergency medical care must therefore be available 24 hours a day as an essential component of a health care delivery system. Emergency Medicine is a specialty of depth and breadth. It addresses a spectrum of clinical and social problems in a fashion and environment quite apart from that of any other medical discipline. Emergency Medicine encompasses many domains, each of which contribute to the body of knowledge and skills, which identify the specialty. They include: provision of clinical emergency care, teaching, research, pre-hospital and disaster medicine, resuscitative medicine, toxicology, environmental medicine, trauma, and administration (15).

Having visualised the emergency care chain, the phases involved and the influencing factors that impact upon any design, and the timeframe involved, the activities contained within these guidelines are intended to supplement or enhance the existing provision and thereby create a National Post-Crash Response system.

11.1 The Legislative Framework

Strategic Outcome: EMS in Pakistan is underpinned by a national legislative framework

The lack of EMS legislation has been cited as a major barrier to the development of EMS systems in middle-income countries such as Pakistan. Model national legislation for post-crash response standards and their compliance forms the basis of any national emergency medical system.

Objective: Develop and implement model EMS legislation for Pakistan

The foundations of a national legislative model are in place. These are the *Punjab Emergency Service Act 2006*, the *Khyber Pakhtunkhwa Emergency Service Act 2006*, and the *Gilgit-Baltistan Emergency Services Act 2012*. This legislation is the starting point for the development of model national law.

Activities:

1. Develop model legislation which addresses all aspect of the post-crash response system.
2. Develop legislation to establish a Pre-hospital Emergency Care Council as a peak body reporting to the M/oNHSR&C.
3. Revise Medico-Legal systems to ensure they adequately protect by-standers who provide First Responder intervention.

11.2 The Role of the Bystander

Strategic Outcome: Define the Role of the Bystander

The medical consensus at present is that the general public should be aware of very few actions they should do and other actions that they should not do, and that they are not expected to provide medical treatment.

Objective: Introduce a 3 Tier approach to Public Intervention

Bystanders can be grouped into 3 categories:

- General population
- Occupational groups
- Community volunteer responders

The WHO holds the view that training of specially selected community volunteers and other lay professionals could be valuable.

Activities:

1. Establish a standardised, 3 tier-based training regime and training materials for bystanders which includes:
 - General Population Awareness Program. Knowledge of 1122 telephone number, Do's and Don'ts at the crash scene.
 - First Aid Training Program to be delivered to occupational groups i.e. Traffic Police and commercial transport drivers.
 - First Person on Scene Training Program for Community Volunteers who form Community Response Teams stationed along highway networks and in remote villages/locations.
2. Conduct First Aid Training Program for Traffic Police, prioritising training in rural and remote districts in all provinces and territories.
3. Encourage major commercial transport and logistic employers to ensure all drivers within their workforce successfully complete a First Aid Training Program.
4. Implement the Community Awareness Program through media and social media information campaigns, schools and tertiary education institutions, mosques, and major employers.

11.3 Quick and Easy Access to the EMS Service

Strategic Outcome: Improve Access to EMS

A national emergency number speeds up the process of accessing help. In high-income countries, access to the emergency medical system is almost always made by telephone, but the coverage and reliability of the telephone link varies between countries. The growth in the use of mobile telephones is assisting to improve crash notification.

Objective: Implement a Single National Emergency Access Number

Agreement has now been reached with Pakistan Telecommunications Authority (PTA), that all future pre-hospital care providers will be accessed using the telephone number 1122. Unfortunately, EMS services are not yet available nationally to allow for national coverage. However, where government managed EMS systems are in place, all members of the community should know the 1122 emergency number to call. This will ensure that an accredited, professionally trained and equipped ambulance service attends the emergency scene.

Activities:

1. Increase awareness of the 1122 emergency number, including via driver licensing, social media and information campaigns and primary school education to ensure all road users know that 1122 is the emergency contact number for ambulance, fire, and rescue services.
2. In all provinces and federal territories serviced by a government managed system, mandate 1122 as the single contact number for emergency ambulance, fire, and rescue services in all public information materials.
3. Actively engage with community groups i.e. mosques, schools, colleges, employers to publicise the 1122 emergency number.

11.4 Emergency Rescue Systems

Strategic Outcome: Reduce Response time for first professional assistance

Emergency rescue requires effective coordination between all the emergency services. The objective is to ensure speedy first aid and transport to an appropriate treatment centre. There needs to be close professional cooperation at the scene between fire-fighters and police (who may arrive first at the scene) and the emergency medical service personnel.

Objective: Implement standardised service systems

Improve the interoperability and co-ordination amongst the emergency services through improved communication systems.

Activities:

1. Develop TORs for the introduction of Computer Aided Dispatch (CAD) systems in North Pakistan that are nationally integrated with all government funded agency despatch systems.
2. Implement a CAD pilot in at least one province in North and South Pakistan and evaluate.
3. Improve field communications and pre-alert systems between mobile units and hospitals.
4. Review Despatch Data Collection Forms and revise as required to standardised data fields to enable data analysis and reporting on achievements against targets.
5. Improve the interoperability and co-ordination amongst the emergency services.
6. Conduct an annual road traffic crash joint training exercise between emergency services (police, fire and ambulance), and assess capacity, interoperability, and operational effectiveness.

11.5 Pre-hospital Medical Care

Strategic Outcome: Enhancing Operating Standards

Transfer of the injured, either from the scene of an injury to a facility, or between facilities, has two distinct components: transport, and care during transport. Well-equipped ambulances with trained staff are ideal: they best allow the delivery of uninterrupted, lifesaving care before reaching hospital.

Objective: Standardising and improving quality of care

Ensure the minimum requirements/standards for Ambulance vehicles and motorcycles, equipment levels for ambulance vehicles and motorcycles, training requirements for all staff who will be required to attend emergency incidents.

Activities:

1. Progressively roll-out the Rescue 1122 Service Delivery model in all provinces and districts throughout Pakistan.
2. Establish a National Pre-hospital Emergency Care Council as a peak body reporting to the M/oNHSR&C.
3. All EMS agencies and hospitals to appoint a Clinic Lead responsible for clinical leadership.
4. Ensure international (best practice) accreditation of EMS Training Program content and provision.
5. Ensure a minimum requirement of certificated EMT training for all ambulance staff who crew emergency ambulances.
6. All EMS agencies and hospitals to conduct Clinical Audits to inform training strategies.
7. Introduce minimum continuing professional development training for all EMS staff.
8. Ensure effective Infection Control practice is addressed as a key component within all training programs.
9. Implement policy & training programmes to improve the use of personal hand sanitizers and hand washing to improve Infection Prevention and Control practices by all medical and EMS personnel.
10. Standardize the definition of a reduced level of consciousness by the utilization of the acronym A.V.P.U. (alert, verbal, pain, unresponsive).
11. Standardize the procedure for Pre-alert and Handover of casualties by the utilization of the acronym A.S.H.I.C.E. (age, sex, history, injuries, condition, events).

11.6 Trauma Care

Strategic Outcome: Enhancing Operating Standards

Clinical evidence supports taking life threatened patients to a specialist centre for their on-going definitive care - in respect of trauma incidents, such as road traffic collisions, the development of regional trauma networks with specialist trauma centres affording 24/7 availability of specialist staff and diagnostic equipment ensures the maximum opportunity for survivability.

Objective: Implement standardised service systems

Standardized trauma training for pre-hospital and hospital health care providers with standardized treatment protocols.

Activities:

1. Include trauma training as a component in the standard curriculum for all trainee healthcare professionals.
2. Introduce hospital inspection programs to verify trauma service compliance with mandated standards.
3. Conduct human resource reviews to ensure professional staffing levels provide adequate services.
4. Produce and enact a program of works to upgrade hospital emergency departments.

11.7 Rehabilitation and Discharge

Strategic Outcome: Enhancing Operating Standards

High-quality treatment and interventions for rehabilitation during the period of hospitalization immediately following an injury are of utmost importance, in order to prevent life-threatening complications related to immobilization.

Objective: Standardising and improving quality of care

Each rehabilitation program is tailored to the individual patient's needs and can include one or more types of therapy.

Activities:

1. Emergency trauma hospital staff to include social workers to provide counselling services to patients and relatives.
2. Conduct human resource reviews to ensure professional staffing levels provide adequate services.
3. Work with NGOs to develop transport options to facilitate transport for patients returning home and/or attending outpatient and rehabilitation appointments.

11.8 Data Collection and Analysis

Strategic Outcome: Enhancing Operating Standards

The collection and documentation of data on road traffic injury consequences and the different phases of post-crash response are essential to identify priority areas.

Objective: Integrating EMS Information, Communication and Technology Systems

High quality pre-hospital care systems cannot be created and sustained without ongoing assessment and review and without making improvements in prevention and treatment programmes. Treatment records are thus needed for quality assurance reviews.

Activities:

1. Review Despatch Data collection forms and revise as required to standardised data fields to enable data analysis and reporting on achievements against targets.
2. Design and implement a standardized pre-hospital Patient Report Form (PRF) to enable analysis and reporting at provincial and national levels.
3. Review EMS Ambulance Patient Report Form (PRF) and revise as required to ensure that all required data fields are included and completed for data analysis and reporting and standardise the PRF throughout Pakistan.
4. Collect, analyse, and disseminate morbidity data relating to road traffic crashes and use this data to inform policy and technical standards for safety equipment and to advocate for public health prevention programs.
5. Develop data sharing systems and public information systems for surveillance.
6. Improve the interoperability and co-ordination amongst the emergency services to ensure effective data sharing.

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