strengthening structures to reduce damage when a hazard occurs. In addition to these physical measures, mitigation should also aim at reducing the economic and social vulnerabilities of potential disasters

Disaster risk reduction:

Disaster risk reduction is defined as the concept and practice of reducing disaster risks through systematic efforts to analyse and manage the causal factors of disasters, including reduced exposure to hazards, lessened vulnerability of people and property, wise management of land and the environment, and improved preparedness for adverse effects. Disaster reduction strategies include, primarily, vulnerability and risk assessment, as well as a number of institutional capacities and operational abilities. The assessment of the vulnerability of critical facilities, social and economic infrastructure, the use of effective early warning systems, and the application of many different types of scientific, technical, and other skilled abilities are essential features of disaster risk reduction.

$$\text{Disaster risk (R)} = \frac{\text{Vulnerability (V) x Hazard (H)}}{\text{Capacity (C)}}$$

OR

Disaster risk = function of H and V/C

Mass casualty Management (or) mass casualty incident

Definition: A mass casualty incident is defined as an event which generates more patients at one time than locally available resources can manage using routine procedures. It requires exceptional emergency arrangements and additional or extraordinary assistance

A mass casualty incident (often shortened to MCI and sometimes called a multiple-casualty incident or multiple-casualty situation) is any incident in which emergency medical services resources, such as personnel and equipment, are overwhelmed by the number and severity of casualties. For example, an incident where a two-person crew is responding to a motor vehicle collision with three severely injured people could be considered a mass casualty incident. The general public more commonly recognizes events such as building collapses, train and bus collisions, earthquakes and other large-scale emergencies as mass casualty incidents. September 11 attacks in 2001 are well-publicized examples of mass casualty incidents.

Agencies involved in mass casualty management

A mass casualty incident can involve a variety of responders and agencies. The most common are listed below.

1. Emergency medical services

- Certified first responders or emergency medical responders may arrive as part of local emergency medical services, or may arrive on their own. They will assist with all aspects of patient care, including triage and treatment at the scene, and transport from the scene to the hospital.
- Paramedic and emergency medical technician (EMT) personnel may arrive in ambulances, in their personal vehicles, or from another agency. They will have control of all aspects of patient care, as assigned by the medical officer or incident commander.
- Ground ambulances will be assigned to the transport sector to transport patients and personnel to and from the incident scene, emergency departments of hospitals, and a designated helipad. These ambulances may be municipal services, volunteer services, or from private corporations.
- Air ambulances will transport patients from the scene or from designated helipads to receiving hospitals.

2. Fire and rescue

Fire-fighters will perform all initial rescue-related operations, as well as fire suppression and prevention. They may also provide medical care if they are trained and assigned to do so. They may arrive on a fire truck, in their personal vehicles, or from another agency. Many areas near airports will have automatic mutual aid agreements with airport fire departments in the event of a plane crash outside of the airport boundaries.

3. Public safety

- Police officers will secure and control access to the scene, to ensure safety and smooth operations.
- Utility Services will ensure that utilities in the area are turned off as necessary, in order to prevent further injury or damage at the scene.

4. Specialized teams

- Specialized rescue teams may be part of the local fire department; they may be associated with the state, provincial, or federal governments; or they may be privately operated teams. These teams are specialists in specific types of rescue, such as Urban search and rescue (USAR) or Confined Space Rescue.

- HazMat teams are responsible for cleaning up and neutralizing any hazardous materials at the scene. Sometimes these will be specialized CBRNE (chemical, biological, radiological, nuclear and high-yield explosives) teams.
- National Guard Units have medics specifically trained in mass-casualty triage who may be called in to respond to a disaster-related incident.

5. Public services

- Railways and transportation agencies will be notified if an incident involves their tracks or right-of-way, or if they are required to cease operations in and through affected areas. Transportation agencies will provide buses to transport lightly injured people to the hospital. Buses can also provide shelter at the scene (for example, "warming buses") if required.
- The media play an important role in keeping the general public informed about the incident and in keeping them away from the incident area. However, a Public Information Officer should be assigned as the only designated responder who communicates with the media, to prevent the spread of misinformation.
  - Non-governmental organizations such as St. John Ambulance, the Order of Malta, the Red Cross, the Red Crescent, the Medical Reserve Corps, and the Salvation Army will provide assistance with all aspects of a mass casualty incident, including trained medical staff, vehicles, individual registration and tracking, temporary shelter, food service, and many other important services.

6. Hospitals

Hospitals with emergency departments will have a mass casualty incident protocol which they initiate as soon as they are notified of an MCI in their community. They will have preparations in place to receive a massive number of casualties, like calling in more staff, pulling extra and spare equipment out of storage, and clearing non-acute patients out of the hospital. Some hospitals will send doctors to the scene of the incident to assist with triage, treatment, and transport of injured persons to the hospital.

This is not an exhaustive list, and many other agencies and groups of people could be involved in a mass casualty incident.

Flow of an MCI

Ideally, once an MCI has been declared, a well-coordinated flow of events will occur, using three separate phases: triage, treatment, and transportation

1.Triage

Simple triage and rapid treatment (START) is a triage method used by first responders to quickly classify victims during a mass casualty incident (MCI) based on the severity of their injury. The first-arriving crew will conduct triage. Pre-hospital emergency triage generally consists of a check for immediate life-threatening concerns, usually lasting no more than one minute per patient. It is the most common and is considered the easiest to use. Using START, the medical responder assigns each patient to one of four color-coded triage levels, based on their breathing, circulation, and mental status. The triage levels are:

- **Immediate**: Patients who have major life-threatening injuries, but are salvageable given the resources available
- **Delayed**: Patients who have non-life-threatening injuries, but are unable to walk or exhibit an altered mental status
- **"Walking Wounded"**: Patients who are able to ambulate out of the incident area to a treatment area
- **Deceased or Expectant**: Used for victims who are dead, or whose injuries make survival unlikely.

When responding to a chemical, biological, or radiological incident, the first-arriving crew must establish safety zones prior to entering the scene. Safety zones include:

The hot zone: The contaminated area

The warm zone: The area where specialists will decontaminate patients and fellow responders

The cold zone: The safe zone, where any personnel who are not specially trained in HazMat and do not have chemical or biological protection gear must remain at all times. Depending on the contaminant, the cold zone should be roughly 200–300 yards from the incident, uphill and upwind. It should also be at least 50 yards uphill and upwind from the warm zone.

2. Treatment

Once casualties have been triaged, they can be moved to appropriate treatment areas. Unless a patient is Green Tagged and ambulatory, litter bearers will have to transport patients from the incident scene to safer treatment areas located nearby. These treatment areas must always be within walking distance, and will be staffed by appropriate numbers of properly certified medical personnel and support people. The litter bearers do not have to be advanced medical personnel; their role is to simply place casualties onto carrying devices and transport them to the appropriate treatment area. Casualties should be transported in

order of treatment priority: Red-Tagged patients first, followed by Yellow-Tagged, then Green-Tagged, and finally Black-Tagged.

Each colored triage category will have its own treatment area. Treatment areas are often defined by coloured tarpaulins, flagging tape, signs, or tents. Upon arrival in the treatment area, the casualties are re-assessed and they are treated with the goal of stabilizing them until they can be transported to hospitals; transported to the morgue or medical examiner's office; or released.

3. Transport

The final stage in the pre-hospital management of a mass-casualty incident is the transport of casualties to hospitals for more definitive care. If an insufficient number of ambulances is available, other vehicles may transport patients, such as police cars, fire trucks, air ambulances, transit buses, or personal vehicles. As with treatment, transport priority is decided based on the severity of the patient's injuries. Usually, the most seriously injured are transported first, with the least serious transported only after all the critical patients have been transported**.**

MASS CASUALTY MANAGEMENT OF NATIONAL EMERGENCY SYSTEMS

Definition: The Emergency Management Plan for Mass Casualty Incidents (MCI) is for events occurring inside and outside the hospital requiring additional staff, resources, communication, and preparation**.**

The national government is the ultimate authority in emergency management as part of its overall responsibilities for the safety and security. Depending on the size and seriousness of the incident the government is responsible for implementing national coordination structures, approving extraordinary resources, calling up the military, assuming extraordinary powers, and for activating international systems of cooperation and aid.

A variety of Ministries, agencies and other organizations have roles to play in emergencies, with the Ministry of Health taking on a major one. the various branches of the military; Civil Defence agencies; Red Cross/Red Crescent, the private sector, and so on Emergency Management Council or Cabinet Emergency Committee (comprising the head of state and key ministers); National Interdepartmental Emergency Committee (top-level

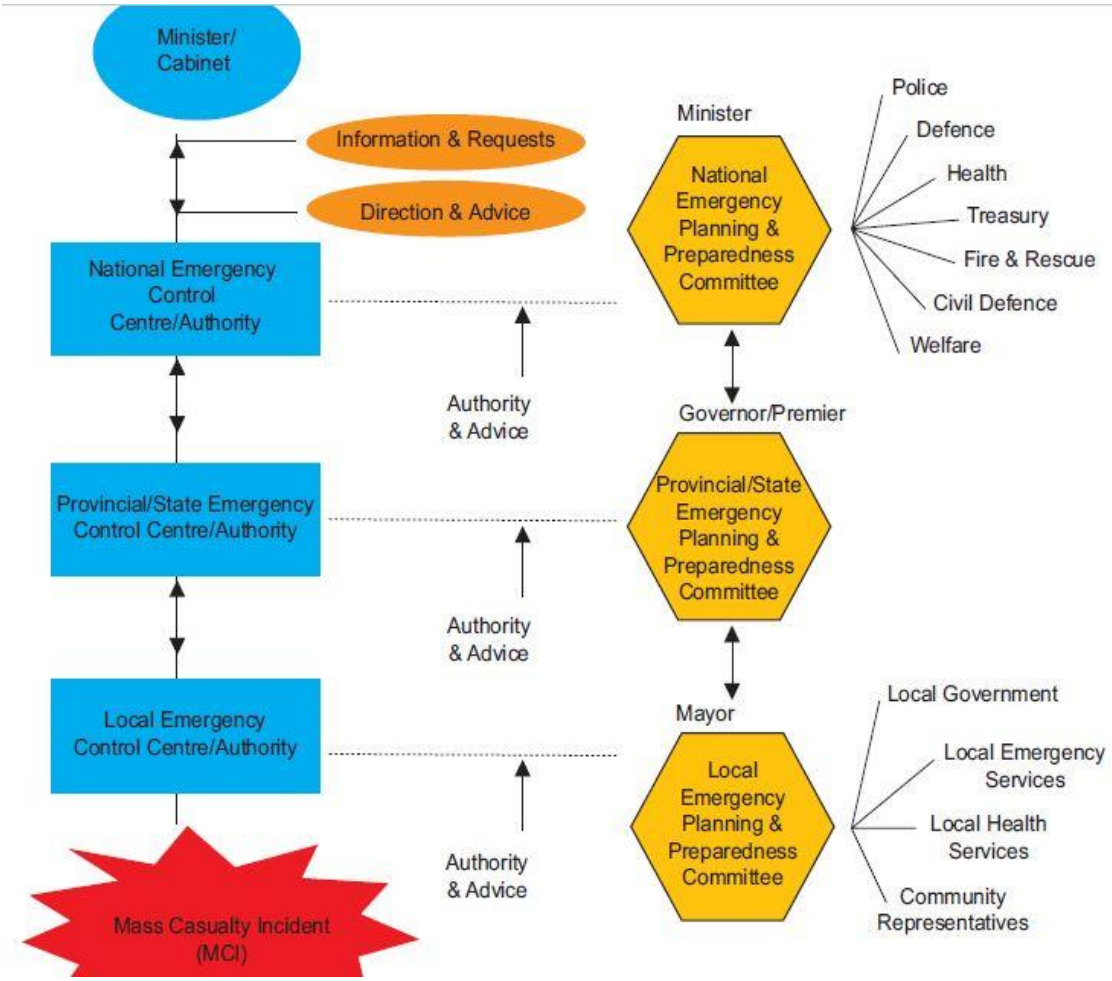
civil servants); and National Disaster Recovery Committee (a wider grouping which may include non-governmental as well as government.

The government and public administration take, national emergency management systems should include:

- Identification of lines of authority, from the national to the local level
- Financial arrangements for funding emergency work
- Arrangements to ensure that government and community activities are maintained (for Example, creation of parallel or "hardened" communications systems to take over if normal Voice or data transfer systems are affected)
- National stockpiling of appropriate resources (including provincial or state and local prepositioning of stockpiles)
- Database of national experts for advice on specifi c problems
- Protocols and formal arrangements for coordinated efforts with other countries, or between Provincial/state governments within the country.

Planning for mass casualty management at national level

1. Establishing a baseline
2. Hazard analysis and risk assessment
3. Developing a National Mass Casualty Management Plan
4. Training guidelines and standards
5. Monitoring, surveillance and early warning
6. Financial and material resources
7. Community and local government level
8. Communications planning
9. Health care facility level
10. Training and exercises



National Emergency Operational and Preparedness Structure