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## **Definition of burns**

A burn is an injury to the skin or other organic tissue primarily caused by thermal or other acute trauma. It occurs when some or all of the cells in the skin or other tissues are destroyed by hot liquids (scalds), hot solids (contact burns), or flames (flame burns). Injuries to the skin or other organic tissues due to radiation, radioactivity, electricity, friction, or contact with chemicals are also identified as burns.

## Haddon matrix categorizes risk factors

Burn injuries result from an interaction of the human host, the agent of energy transfer, and the physical and social environment in which the event occurs. Use of the Haddon matrix<sup>1</sup> describes the factors responsible for burns in terms of the time sequence of events (Table 2.1).

- Factors in the pre-event phase can be avoided using primary prevention techniques that prevent the burn from occurring
- Factors in the event phase can be ameliorated using secondary prevention techniques that minimize the damage caused by the energy transfer
- Factors in the post-event phase can be amended using tertiary prevention techniques that improve survival, functional, and cosmetic outcomes from the burn injury

**Table 2.1** Haddon matrix applied to risk factors for residential fire burns and death

Factors→ Phases↓	Host (person)	Agent	Physical environment	Socioeconomic environment
Pre-event	Smoking in bed Chronic alcoholism Debilitated elderly	Flammable substances stored in house Young children with access to matches or lighters	Frayed electrical wiring Overcrowding Absence of functional smoke alarms	Lack of or poorly enforced building codes Poverty, unemployment, illiteracy
Event	Lack of escape plan Inappropriate response to alarms	Absence of sprinkler systems or fire extinguishers Absence of fire retardants in clothing and household materials	Bars on windows No ladder for upper story rooms	Insufficient legislation or enforcement for smoke alarm or sprinkler installation Inadequate community infrastructure for requesting emergency services
Post event	Ignorance of appropriate first aid		Shortage of emergency medical transportation	Inadequate access to burn centres for treatment and rehabilitation Paucity of community support for recovery

## **Categories of burn prevention countermeasures**

These strategies represent the ways in which the transfer of energy can be controlled, modified, or interrupted:

- Prevent the creation of the hazard
  - Ban manufacture and sale of unsafe products
  - Prohibit unsafe practices
- Reduce the amount of energy in the hazard
- Prevent the release of a hazard that already exists
- Modify the rate or spatial distribution of the hazard
- Separate the hazard from those to be protected, in space or time
- Separate the hazard by a material barrier
- Modify relevant basic qualities of the hazard
- Make what is to be protected more resistant to damage from the hazard
- Counter the damage done by the hazard
- Stabilize, repair, and rehabilitate the one damaged by the hazard

## **Third dimension of Haddon matrix**

Decision-making for selection of burn prevention intervention strategies can be facilitated by the use of value criteria:

- Effectiveness
- Cost
- Freedom
- Equity
- Stigmatization
- Preferences
- Feasibility

In general, implementation of burn prevention programmes takes place through the three Es:

- Enforcement of legislation or regulations
- Education
- Engineering and design modification

## Monitoring and evaluation

Ongoing appraisal of the process and outcomes is critical to the success of any burn prevention programme.

- Understanding of scope and magnitude of burn problem
  - Epidemiological pattern
  - Major causes
  - Risk factors
- Documentation of effectiveness of programmes
  - Cost–benefit ratio
  - Modification vs. discontinuation of unsuccessful programmes
- Future directions
  - Continuation and expansion of successful programmes
  - Resource allocation