स्वास्थ्य एवं
परिवार कल्याण मंत्रालय
MINISTRY OF
HEALTH AND
FAMILY WELFARE

सत्यमेव जयते

National Guidelines on

Fire and Life Safety in Healthcare Facilities

(2026)

National Guidelines on Fire and Life Safety in Healthcare Facilities (2026)

Ministry of Health and Family Welfare
Government of India

पुण्य सलिला श्रीवास्तव, भा.प्र.से.
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सत्यमेव जयते

भारत सरकार
स्वास्थ्य एवं परिवार कल्याण विभाग
स्वास्थ्य एवं परिवार कल्याण मंत्रालय
Government of India
Department of Health and Family Welfare
Ministry of Health and Family Welfare

MESSAGE

One of our focus areas while improving health care delivery is ensuring that healthcare establishments maintain the highest standards of safety for patients, caregivers and staff. Fire and life safety, in particular, is an essential component that directly influences the resilience and reliability of health service delivery.

Healthcare facilities, owing to their complex structure and high occupancy, require a comprehensive and well-integrated approach to fire prevention, detection, mitigation, and emergency response. Recognizing this need, this Ministry has been supporting States and Union Territories in strengthening fire safety infrastructure, reinforcing regulatory compliance, and improving fire safety preparedness.

As a significant step forward, the **National Guidelines on Fire and Life Safety in Healthcare Facilities** have been developed to provide guidance on fire safety preparedness and ensure life safety by effective planning and implementation. These guidelines provide detailed information on fire prevention measures, fire detection and suppression systems, building safety requirements, evacuation procedures, and the operational responsibilities of hospital personnel. They also encourage periodic audits, inspections, reporting mechanisms, and training programmes to promote a culture of preparedness and accountability.

I am confident that stakeholders across the States and Union Territories will adapt and adopt these guidelines, and ensure their effective implementation to strengthen fire and life safety practices in healthcare facilities.

Punya Salila

(Punya Salila Srivastava)

Date : 10.04.2026
Place : New Delhi

#StopObesity
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GOVERNMENT OF INDIA
MINISTRY OF HEALTH & FAMILY WELFARE
KARTAVYA BHAWAN-1, NEW DELHI-110001

Message

Ensuring safe, resilient, and patient-centric healthcare systems remains a key priority of the Ministry of Health & Family Welfare. Strengthening public health infrastructure requires not only improved service delivery but also robust safety mechanisms that protect patients, healthcare workers, and visitors within healthcare establishments. Fire and life safety is a critical component of health system preparedness, directly contributing to continuity of essential health services during emergencies.

Healthcare facilities operate round the clock and accommodate vulnerable populations, advanced medical equipment, and complex infrastructure systems. This necessitates a structured and proactive approach towards fire risk assessment, prevention, early detection, and coordinated emergency response. The Ministry, through sustained engagement with States and Union Territories, has been supporting efforts to enhance fire safety compliance, build institutional capacities, and promote standardized safety practices across public health facilities.

The **National Guidelines on Fire and Life Safety in Healthcare Facilities** provide a comprehensive framework to strengthen preparedness and operational readiness. The guidelines outline key measures related to infrastructure safety, fire detection and suppression systems, evacuation planning, roles and responsibilities of healthcare personnel, and mechanisms for audits, inspections, and capacity-building initiatives. Their implementation will help institutionalize a culture of safety, accountability, and risk reduction within healthcare settings.

I encourage all States and Union Territories to contextualize and implement these guidelines in alignment with their respective regulatory frameworks and local requirements. Collective commitment and coordinated action will be essential to ensuring safer healthcare environments and strengthening public health system resilience across the country.

(Dr. Rakesh Gupta)

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Acknowledgement

Fire and life safety is a foundational pillar of healthcare facility management, directly influencing the protection of patients, healthcare workers, and critical infrastructure. Ensuring robust fire safety systems is not merely a regulatory requirement but a core responsibility that safeguards lives and sustains uninterrupted delivery of essential health services. Any lapse in fire safety preparedness whether in electrical fire safety, equipment maintenance, staff training, or emergency planning can result in catastrophic consequences, including avoidable loss of life, service disruptions, and significant financial and operational damage. Establishing standardized procedures and best practices in fire and life safety is therefore essential to prevent such incidents and reinforce a culture of safety across all healthcare settings.

The Ministry of Health & Family Welfare's revised **National Guidelines on Fire and Life Safety in Healthcare Facilities, 2025** underscore the importance of effective fire safety management including technical knowledge, thorough understanding of safety protocols, regulatory norms, evacuation procedures, and coordinated emergency response. The current guidelines serve as a comprehensive reference for fire safety infrastructure, risk assessments, regulatory compliance, audits, reporting systems, and capacity-building processes. By aligning with National Building Code (NBC) 2016 and other relevant documents by Bureau of Indian Standards (BIS), they aim to further strengthen fire safety preparedness and response capabilities.

We express our sincere gratitude to **Ms.Punya Salila Srivastava, Secretary (Health)**, for her continued support and strategic guidance.Our humble appreciation for the contributions of **Mrs. Vandana Jain, former Joint Secretary (Public Health),** whose leadership was instrumental in shaping this document. Further, we acknowledge the valuable guidance of **Dr. Rakesh Gupta, AS (PH) & DG (NACO)**, in finalizing and advancing this critical work..

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We are deeply appreciative of the collaborative efforts of engineers, architects, hospital administrators, clinicians, and fire safety experts. Their practical experiences, feedback, and expertise have been instrumental in addressing the multifaceted challenges of fire and life safety in healthcare facilities. By implementing recommendations and practical guidance, healthcare institutions are expected to be better equipped to prevent fire hazards, respond effectively to emergencies, and protect the lives entrusted to their care.

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Table of Content

List of Abbreviations

AMBU	Artificial Manual Breathing Unit
AMC	Annual Maintenance Contract
ARDS	Acute Respiratory Distress Syndrome
ATS	Automatic Transfer Switches
BLS	Basic Life Support
BMS	Building Management System
BVM	Bag-valve-mask
CEO	Chief Executive Officer
CODE RED	Hospital Fire Emergency Code
CPAP	Continuous Positive Airway Pressure
CPR	Cardiopulmonary Resuscitation
CRRT	Continuous Renal Replacement Therapy
DG Set	Diesel Generator Set
ECG	Electrocardiogram
ECMO	Extracorporeal Membrane Oxygenation
ELBW	Extremely Low Birth Weight
EOP	Emergency Operation Plan
EPS	Emergency Power Supply
ETT	Endotracheal Tube
FiO_2	Fraction of Inspired Oxygen
FSO	Fire Safety Officer
HA	Health Assistant
HFFR	Halogen free and flame retardant
HFNC	High-Flow Nasal Cannula
HICS	Hospital Incident Command System
HVAC	Heating, ventilation, and air conditioning
IBMS	Integrated Building Management System
IBP	Invasive Blood Pressure
ICU	Intensive Care Unit
IEC	International Electrotechnical Commission
IFLS	Insulation fault location system
IS	Indian Standard
LMA	Laryngeal Mask Airway
LPG	Liquefied Petroleum Gas
MCB	Miniature Circuit Breaker
MCP	Manual Call Point
ME	Medical Electrical Equipment
MED-IMD	Medical Insulation Monitoring Device
MES	Medical Electrical System
MGPS	Medical Gas Pipeline System
MICU	Medical Intensive Care Unit
MoHFW	Ministry of Health & Family Welfare

MTS	Multi-Tasking Staff
NABH	National Accreditation Board for Hospitals
NBC	National Building Code (India)
NDMA	National Disaster Management Authority
NEC	National Electrical Code (India)
NIBP	Non-Invasive Blood Pressure
NICU	Neonatal Intensive Care Unit
NIPPV	Non-Invasive Positive Pressure Ventilation
NRBM	Non-Rebreather Mask
NS	Normal Saline
OPD	Outpatient Department
OT	Operation Theatre
PA System	Public Address System
PAT	Portable Appliance Test
PECM	Protective Earth Conductor Monitoring
PEEP	Positive End-Expiratory Pressure
PELV	Protective Extra Low Voltage
PESO	Petroleum and Explosives Safety Organisation
PICC	Peripherally Inserted Central Catheter
PIP	Peak Inspiratory Pressure
PNG	Piped Natural Gas
RACE	Rescue, Alarm, Contain, Extinguish
RCA	Root Cause Analysis
RCB	Residual Current Breaker
RCCB	Residual Current Circuit Breaker
RCD	Residual Current Device
SBAR	Situation, Background, Assessment, and Recommendation
SELV	Safety Extra Low Voltage
SPD	Surge Protective Device
SpO_2	Peripheral Oxygen Saturation
TN-C System	Terre-Neutral-Combined System
TN-S System	Terre-Neutral-Separate System
UAC	Umbilical Artery Catheter
UPS	Uninterruptible Power Supply
UVC	Umbilical Venous Catheter
VAV	Variable Air Volume

Section – 1
Introduction

1.1 Background

1.2 Purpose

1.3 Scope

Section 1: Introduction

1.1. Background

Healthcare facilities are uniquely vulnerable to fire hazards due to the high concentration of patients with limited mobility, widespread use of oxygen and other medical gases, complex electrical systems, and storage of combustible materials.

Past incidents in India have demonstrated that even small lapses can lead to catastrophic consequences for patients, staff, and infrastructure. Recent studies have consistently identified electrical faults as the predominant cause of hospital fires in the country, especially short circuits and malfunctioning air conditioners or medical equipment. Smaller proportions of such incidents are linked to flammable chemicals, poor storage of combustibles, battery storage devices, and unsafe storage and renovation practices.

Recognizing these challenges, the Ministry of Health & Family Welfare (MoHFW) had issued the Guidelines for Fire and Life Safety in Healthcare Facilities (2020), which provided a healthcare facility specific framework supplementing the general provisions of the National Building Code of India (NBC) 2016, Part 4 – Fire and Life Safety and NDMA guidelines.

In view of recent development in the field of Fire Safety as well as availability of newer guidelines, these guidelines have been revised with upgraded information and guidance, while aligning with NBC 2016. It is pertinent to mention that while guidance provided as hereunder is advisory in nature, any updation to National guidelines (including but not limited to NBC-2016), as well as State/UT/Municipality specific rules and regulations must be adhered to by all healthcare facilities.The aim of the current guideline is to strengthen preparedness, ensure compliance, and institutionalize a safety culture across all healthcare facilities, thereby protecting the lives of patients, staff, and visitors.

1.2. Purpose

The purpose of these guidelines is to:

- Support administrators, engineers, architects, and healthcare workers in integrating fire safety measures into both infrastructure design and day-to-day operations.
- Provide a comprehensive framework to strengthen fire prevention, life safety, and fire protection in healthcare facilities.
- Reduce risks to patients, staff, and visitors through structured preparedness and response.
- Provide guidance on evacuation procedures that may be followed during fire incidents.
- Promote compliance with relevant codes, laws, rules and regulations while facilitating accreditation requirements.
- Promote a safety culture within healthcare facilities through training, drills, and continuous monitoring.

1.3. Scope

- These Fire and Life Safety Guidelines are intended to provide guidance to all healthcare facilities, especially those covered under NBC 2016 Group C, Institutional Buildings - specifically hospitals, nursing homes, maternity and child-care centres, sanatoria, rehabilitation centres, psychiatric hospitals, and any other healthcare occupancy where patients may be incapable of self-preservation in the event of a fire[1]. **More specifically the guidelines are applicable to healthcare facilities categorized as C1 and partially C3 type which includes mental hospital/ sanatoria.**

1 cl.3.1.4 of Part 4, Vol 1, NBC 2016

- Guidelines cover measures across the entire fire safety continuum, namely:
  - Fire Prevention: Design, construction, electrical safety, medical gas handling, hazardous material management etc.
  - Life Safety: Evacuation planning, means of egress, compartmentation, smoke control, drills, and staff responsibilities etc.
  - Fire Protection: Fire detection, alarms, hydrants, sprinklers, extinguishers, and firefighting systems etc.
- **While these guidelines are advisory in nature, they are intended to be adapted and adopted by States/UT, for their implementation in healthcare facilities according to their size, occupancy, risk profile, and local legal and regulatory requirements.**
- **While these guidelines refer to NBC 2016, healthcare facilities are advised to consider norms mentioned in the subsequent versions of NBC or any other specific guidelines issued by Bureau of Indian Standards (BIS) for healthcare facilities.**

Section – 2

Governance and Responsibilities

2.1 Hospital Administration

2.2 Fire Safety Committee

2.3 Fire Safety Officer

2.4 Staff Responsibilities

Section 2: Governance and Responsibilities

2.1 Hospital Administration

- The administration of the healthcare facility holds overall responsibility for ensuring compliance with all applicable fire safety laws, codes, and guidelines.
- Administration should:
  - Ensure that hospital infrastructure complies with NBC , Fire Service Rules, State Fire Prevention and Safety Acts (as applicable) and any other relevant acts or regulations, as applicable.
  - Approve and periodically review the Hospital Fire Safety Plan [as a part of broader umbrella of Hospital Disaster Management Plan]
  - Facilitate regular fire safety audits and certification from competent authorities.
  - Ensure training and capacity building of all categories of staff on fire safety and evacuation.

2.2 Fire Safety Committee

- Every healthcare facility should constitute a Fire Safety Committee to oversee planning, implementation, and monitoring of fire and electrical safety measures.
- Composition: Representatives from Hospital Administration, Engineering/Maintenance, Nursing, Security, Housekeeping, Clinical departments and any other relevant departments.
- Responsibilities:
  - Review and approval of hospital fire safety plan including fire evacuation plan
  - Oversee and periodically review fire risk assessments and preparedness measures and recommend corrective actions.
  - Establishment and maintaining coordination with local fire services, police, and disaster management authorities.
  - Review of outcomes of fire safety mock drills and implement corrective measures.

2.3 Fire Safety Officer

- A designated Fire Safety Officer (FSO) must be appointed in healthcare facilities, preferably with technical background and fire safety training. Appointment of such officer should follow State/UT Government regulations, as applicable.
- As per NBC for high-rise hospitals (above 15m), the FSO must be a qualified professional with 3 yrs of experience in fire safety[1]. Such a fire safety officer is also suggested in facilities with 250 beds and above.
- For high rise buildings, the dedicated fire safety officer should be supported by Deputy Fire Safety Officer , Fire Warden , Deputy Fire Warden etc. as applicable[2]
- Roles and duties[3]:
  a) Maintain the firefighting equipment in good working condition at all times.
  b) Prepare fire orders and fire operational plans and get them promulgated.
  c) Organize and facilitate impartation of regular training to the occupants of the buildings in the use of firefighting equipment provided on the premises and keep them informed about the fire emergency evacuation plan.
  d) Maintain proper liaison with the city fire brigade.
  e) Ensure that all fire precautionary measures are observed in all patient care areas as well as stores.
  f) Development of hospital fire action plan including fire evacuation plan
  g) Organize fire drills and patient evacuation drills.
  h) Undertake periodic inspections of fire safety measures.

1 Pg 52, Part 4, Vol 1, NBC 2016
2 Pg 82, Part 4 , Vol1, NBC 2016
3 Pg 52, , Part 4 , Vol1, NBC 2016

2.4 Staff Responsibilities

- Fire safety is the shared responsibility of all hospital staff. Each staff member must:
  - Attend mandatory fire safety orientation at induction, periodic refresher training and during inter/ intra-departmental transfers within the facility.
  - Be familiar with location and operation of firefighting equipment and electrical distribution system (eg. MCB, isolator etc) in their area.
  - Be famililar with area alarms and valves for medical gases.
  - Know the nearest evacuation route and assembly point.
  - Immediately report fire hazards or malfunctions (e.g., electrical faults, gas leaks) to the Fire Safety Officer or any authorized official appointed by the authority.
  - Support patient evacuation, especially for those who are immobile, in ICU, NICU, HDU, OT, nursery or other critical care areas catering to critical/ dependent patients; considering the medical condition.
  - Follow progressive evacuation principles as per institutional fire safety plan.
- Senior nursing officers, working as in-charge of wards/ICU/nursery and other crtical areas have special responsibility for prevention and mitigation of fire incidents as well as safe evacuation of patients under their care, with other support staff including security and housekeeping providing requisite assistance.

Table 1: Responsibility matrix of stakehoders in a healthcare facility

Activity / Responsibility	Hospital Administration	Fire Safety Committee	Fire Safety Officer (FSO)	All Staff
Develop and approve Hospital Fire Safety Plan	**A**	C	R	I
Budget allocation for fire safety infrastructure	**A**	C	C	I
Ensure compliance with NBC, State Acts, Fire Rules or any other relevant acts/rules	**A**	C	R	I
Constitute and oversee Fire Safety Committee	**A**	R	C	I
Conduct fire risk assessments (quarterly)	C	**A/R**	R	I
Maintain fire protection systems (hydrants, alarms)	C	C	**A/R**	I
Organize and monitor fire drills	C	C	**A/R**	R
Patient evacuation during fire emergency	I	C	C	**R**
Coordinate with local fire services/disaster agencies	C	R	**A/R**	I
Staff training and awareness	A	C	**R**	**R**
Hazard/incident reporting	I	I	C	**R**
Documentation & record-keeping (audits, drills, logs)	C	C	**A/R**	I
Review and update guidelines/ fire safety plan	**A**	R	C	I

- **R (Responsible):** Does the work to achieve the task.
- **A (Accountable):** Ultimately answerable for the correct completion of the task.
- **C (Consulted):** Provides input or expertise; two-way communication.
- **I (Informed):** Needs to be kept updated; one-way communication

Section – 3

Risk Assessment and Preparedness

Section 3: Risk Assessment and Preparedness

3.1 Fire Hazard Assessment

- Every healthcare facility must conduct periodic fire hazard assessments for all the buildings/ units (Quarterly or after any major structural/ functional changes).
- Healthcare facilities should maintain a Fire Hazard Register [including electrical categorization of medical locations (Annexure 1)] documenting hazards identified, corrective actions, and timelines.
- Full-scale Fire safety audit (with involvement of relevant stakeholders especially local fire services) should be carried out in all healthcare facilities atleast once in a year or as per State/UT Government norms [Ref. Section 7.1].
- Independent third-party fire safety audits are recommended and should be in accordance to State/UT Government norms. Electrical safety audit should be integral part of such audits and should be given utmost importance. It should follow recommendations made in NEC (SP 30).

3.2 Categorization of Risk Areas

Health facilities must categorize different functional zones into risk levels, enabling tailored preparedness. A suggestive categorization which may be adopted by the facilities is mentioned below :

- **High-Risk Areas**
  - Intensive Care Units (ICUs), NICUs, HDUs, Nurseries, Operation Theatres, Recovery Rooms
  - Medical gas storage and manifolds
  - Kitchens with LPG or oil-based cooking
  - Laboratories handling chemicals and flammable gases
  - Areas with combustible/flammable materials (including stores)
  - Electrical rooms, substations, and generator rooms
  - Battery storage/ server rooms
- **Moderate-Risk Areas**
  - General wards, Outpatient Departments (OPD)
  - Waiting areas and consultation rooms
  - Laundry rooms with dryers and fabric storage
  - Record rooms and storage spaces
- **Low-Risk Areas**
  - Administrative offices
  - Conference/training rooms
  - Canteens (excluding kitchens)
  - External open spaces within hospital premises

All locations categorized as Group 1 and Group 2 in Annexure 1 are to be considered as High-Risk areas.

3.3 Fire Safety Plan (FSP)

- Each healthcare facility must prepare a comprehensive Fire Safety Plan, approved by the Fire Safety Committee.
- The plan should be part of overall Disaster Management Plan of the healthcare facility.

Suggestive key components of the plan are mentioned below which may be adapted by the facility:

Key components

a. Organizational Structure

- Ro les of Hospital Administration, Fire Safety Officer, Doctor in-charge of units of each department along with nursing officers, Security, Nursing, and other support staff.

b. Fire Prevention and Mitigation Measures

- Follow fire and electrical safety practices
- Regular maintenance of electrical and gas systems.
- Strict enforcement of housekeeping protocols to avoid combustible material buildup.
- Maximise use of fire-retardant furnishings and finishes.

c. Detection and Suppression Systems

- Installation and maintenance of fire alarms, smoke detectors, sprinklers, hydrants, and extinguishers

d. Evacuation planning

- Floor wise evacuation map
- Progressive evacuation process
- Designated assembly points

e. Emergency response to fire incidents

- Response to fire
- Incident Reporting System (IRS)

f. Training and Drills

- Induction/ refresher training for all staff.
- Fire drills involving local fire services.
- Documentation of drills and lessons learned.

g. Co-ordination with External Agencies

- Co-ordination with local Fire Brigade, Police, and Disaster Management Authority
- Mutual agreements with nearby hospitals for patient transfer during major incidents.
- Coordination ambulance control rooms

h. Monitoring and Review

- Annual review of the FSP by the Fire Safety Committee
- Updates after major incidents, audits, or structural changes.

i. Directory of important contacts [Fire department, Police, nearby health facilities]

Section – 4

Infrastructure and Safety Measures

Section 4 : Infrastructure and Safety measures

4.1 Fire Prevention measures

4.1.1 Material and structural safety measures

- Material and structural safety measures for newly constructed buildings should be of as per NBC 'Fire Zones' [1], minimum requirement for construction type 1- 4 [2].
- The existing buildings in any fire zone should not be required to comply with the requirements of the Code unless these are altered, or in the opinion of the Authority, such building constitutes a hazard to the safety of the adjacent property or to the occupants of the building itself or is an unsafe building. In the event of alteration, it should be necessary to obtain permission of the Authority for such alteration consistent with fire hazard.
- All major structural elements - including columns, beams, floors, walls, and roofs - in buildings classified under Institutional occupancy must be constructed using non-combustible materials. Similarly, all internal finishes, false ceilings, and their suspension systems should also be non-combustible and designed to prevent the spread of fire within ceiling voids.
- For technical details refer to NBC 2016

4.1.2 Medical gas safety measures

- Medical gases (primarily oxygen and nitrous oxide) pose a significant fire hazard as they accelerate combustion and intensify fire growth. Their storage, distribution, and use shoud therefore be controlled to eliminate ignition sources, prevent gas leaks, and protect occupants.
- Oxidizing gases should never be stored alongside flammable liquids, gases, or combustible materials or electrical equipment/sockets/wirings. When separation by distance is impractical, automatic sprinkler protection or a fire-certified gas cabinet should be provided.
- Medical-gas pipeline systems should be constructed of oxygen-compatible materials (brass, bronze, or stainless steel) and permanently colour-coded and labelled for identification.
- Pipelines should be routed in dedicated shafts or concealed spaces away from egress routes, refuge areas, and electrical equipment rooms to avoid exposure to ignition sources. No gas pipelines should pass through exit staircase or exit passageways.
- For fire safety of users of medical oxygen equipment refer Section 2.1.11 of National Guideline on Medical Oxygen Management by Ministry of Health and Family Welfare to be refered. [https://mohfw.gov.in/sites/default/files/Oxygen%20Guideline%20finalized%202025.pdf]
- Gas Cylinders Rules 2016 (or any subsequent amendmdents to the same) should be followed for necessary compliance.
- For technical details refer to NBC 2016.

4.1.3 Electrical safety

- Key electrical safety measures to be followed for prevention of fire incidents include:
    - avoiding circuit overloading (like plugging too many devices into a single outlet or power strip), and improper protective device against over loads.
    - using proper wattage outlets (like avoiding use of 16A appliance in a 6A socket), manage cords safely (do not run cords under rugs, mats, or furniture).

1 Pg 17, Part 4, NBC 2016
2 Table 1, Pg 19, Part 4, NBC 2016

- unplugging unused appliances.
- maintaining adequate space between devices that generate heat (like refrigerators, freezers, heaters etc.) from furniture, curtains, and other flammable materials.
- regularly checking cords and plugs for signs of fraying or cracking, sparking and replacing them immediately.
- using certified products that have been tested and certified by recognized organizations (such as ISI).
- avoiding use of multi-plugs or extension cords.
- checking for warning signs like flickering lights, buzzing sounds, or burning odors, which can indicate faulty wiring and non operation of protective device.
- All bio medical devices are to be periodically tested according to IS/IEC 62353.

- Electrical installation may comply National Electrical Code of India 2023 (SP-30). All bio medical equipment should comply the respective IS 13450 or IEC 60601 standards.
- Central Electricity Authority (Measures relating to Safety and Electric Supply) Regulations, 2023 should be followed scrupulously for safe usage of electricity (https://cea.nic.in/regulations-category/measures-relating-to-safety-and-electric-supply/?lang=en)
- As short circuit is often considered to be the major cause in majority of fire incidents in health care facilities, special care for electrical installation which includes wiring, protective devices and earthing (for protection from electric shock and electrical fire) should be taken in the health-care facilities in general and sensitive areas like ICUs, NICUs, OT and recovery rooms etc. in particular.
- For appropriate managment, medical locations should be categorized as Group 0, Group 1 and Group 2. Group 0 is a location where no parts of bio medical equipment are intended to be used. Group 1 are locations where bio medical equipment are intended to be used externally or invasively on any part of the patient. Example of group 1 locations are delivery room, urology room, physiotherapy room etc. Group 2 are locations where bio medical equipment are intended to be used intrusively, externally or invasively to any part of the patient and where discontinuity of the electrical supply, represents a risk to the safety of the patient. Example of group 2 locations are Anesthetic rooms, operation theaters, ICU etc. (Annexure -1)
- For technical details refer Annexure 1

4.2 Construction and Design considerations

- Construction and design considerations should be as per norms of NBC
- High rise buildings (15 m and above in height) should receive special attention with respect to fire and life safety particularly with regard to planning, design, execution, maintenance and training so that the intended provisions of this Code and these guidelines are well implemented.
- Compartmentation limits the spread of fire, smoke, and fumes, protects means of egress, and restricts property damage by subdividing each floor into fire-resistant zones. Adequate measures should be taken to create provisions for compartments to prevent spread of fire. All shafts should be sealed at each floor level.
- Means of Egress are crucial as they ensure safe, quick, and unobstructed evacuation of occupants during emergencies, minimizing risk to life and enabling efficient emergency response.
- Necessary provisions of refuge areas are essential as they provide a safe, temporary space for occupants - especially those unable to evacuate quickly - during emergencies until rescue or further evacuation is possible.
- Fire doors and windows are critical passive protection features that help contain fire and smoke, maintain compartmentation, and ensure safe evacuation by limiting the spread of hazards.
- Fireman's lifts provide firefighters with a protected and efficient means to access upper floors and conduct rescue and firefighting operations during emergencies.

- Penetration sealing helps maintain fire compartmentation by blocking fire and smoke spread through service openings.
- Clear signage and dependable emergency lighting ensure safe evacuation by supporting visibility and wayfinding.
- Proper storage and disposal practices reduce fire load and hazards, ensuring safer building operations and preventing ignition or rapid fire spread.
- Construction and design considerations for institutional buildings, high rise institutional buildings, Compartmentation, Means of Egress, Refuge area, Fire doors & windows, Penetration Sealing, Signage & Emergency lighting, Fireman's Lifts, Storage and disposal considerations to be refered in NBC 2016.

4.3 Fire detection and alarm system

- The fire detection and alarm system is designed to provide early warning of fire conditions, thereby enabling timely fire suppression, prompt evacuation, and effective coordination of emergency responses.
- The system should incorporate automatic detectors - such as smoke, heat, and flame sensors - strategically placed to ensure complete coverage of all occupied and concealed areas.
- Manual call points should be installed along all egress routes and in areas where the likelihood of fire incidents and risk of injury/death is higher, allowing occupants to activate the alarm manually.
- Notification appliances, including sounders, strobe lights, and voice communication devices, should be provided to deliver clear and distinct signals throughout the facility.
- A central control panel should be made available to monitor the system, record events, and indicate the specific zones affected by a fire.
- All aspects of the design, installation, and maintenance of the fire detection and alarm system should comply with the requirements of IS 2189. Users are directed to refer to IS 2189 for comprehensive details regarding system performance, installation practices, testing procedures, and maintenance protocols.The system should be integrated with other fire protection measures such as emergency lighting, sprinkler systems, fire alarm, air dampers and building management controls to ensure a coordinated response during emergencies.
- Regular testing, inspection, and maintenance activities should be carried out in accordance with IS 2189, and records of these activities should be maintained for a minimum of three years.
- Clear, durable signage indicating the locations of manual call points and providing simple operating instructions should be prominently displayed throughout the facility to ensure that occupants can quickly activate the system if necessary.

4.4 Fire Suppression system

4.4.1 Sprinkler Systems

- The sprinkler system is intended to automatically control or suppress a fire at an early stage, thereby reducing heat release, slowing fire spread, and providing occupants with increased time for safe evacuation and for firefighting personnel to respond.
- All aspects of the design, installation, testing, and maintenance of the sprinkler system should comply with the comprehensive requirements set forth in IS 15105. (please refer to IS 15105 for detailed technical specifications, performance criteria, system layout, water supply and backup provisions, as well as inspection and maintenance protocols).
- The sprinkler system should be integrated with other fire protection measures, including fire detection and alarm systems, to ensure coordinated emergency response.
- Regular testing and inspection activities should be conducted as specified in IS 15105, with all records maintained for audit purposes.

4.4.2 Fire Hydrant System and Hose Reels

- The fire hydrant system, comprising both wet and dry hydrants together with hose reels, is intended to supply firefighters and in-building personnel with an immediate and reliable water supply for fire suppression. This system is especially critical in large or high-rise healthcare facilities where accessing external water sources may be delayed.
- All aspects of the fire hydrant system and hose reels including design, installation, testing, and maintenance should be carried out in accordance with the comprehensive requirements set forth in IS 13039. (please refer to IS 13039 for detailed technical guidelines, including specifications for pipe diameters, system layout, outlet placement, signage, and performance criteria).
- The system should be designed to maintain continuous water pressure sufficient to deliver the required water density for effective fire suppression. For dry hydrant systems, appropriate inlet connections and non-return valves should be provided to ensure prompt charging from external water sources during emergencies.
- Regular inspections and testing of the fire hydrant system and hose reels should be conducted as specified in IS 13039.
- Comprehensive records of all inspections, tests, and any corrective actions should be maintained for audit and verification purposes.
- The fire hydrant system and hose reels should be integrated with the facility's fire detection and alarm systems.
- Activation of any component should automatically notify the Fire Command Centre, ensuring a coordinated and timely emergency response.

4.4.3 Portable Fire Extinguishers

- Portable fire extinguishers are essential for the rapid suppression of small fires at their incipient stage, thereby reducing the likelihood of fire spread and enabling safe evacuation until fixed suppression systems and fire services can respond.
- The selection, installation, and maintenance of portable fire extinguishers should follow the guidelines provided in IS 2190. This standard outlines the appropriate types of extinguishers for various fire hazard classifications within healthcare facilities, including water, foam, dry chemical, clean agent, and CO_2 extinguishers. It also provides detailed criteria for the proper placement, coverage, and installation of extinguishers based on the specific hazards present in different areas of the facility.
- According to IS 15683: 2018, there are five classes of fires for which different types of portable fire extinguishers required.

Type (Fire Type / Extinguisher Type)	Class A Organic Materials (e.g Paper & Coal)	Class B Flammable Liquids (e.g Petrol & Paint)	Class C Flammable Gases (e.g Butane & Methane)	Class D Combustible Metals (e.g Lithium & Magnesium)	Electrical Electrical Equipment (e.g Computers & Servers)	Class F Cooking Oils (e.g Olive Oil & Fat)
Water	✓	✗	✗	✗	✗	✗
Foam	✓	✓	✗	✗	✗	✗
Dry Powder	✓	✓	✓	✓	✓	✗
CO2	✗	✓	✗	✗	✓	✗
Wet Chemical	✓	✗	✗	✗	✗	✓

Figure 1 : Types of Fire and Suitable Fire Extinguishers

4.4.4 Smoke exhaust system

- The smoke exhaust system is designed to remove smoke from fire-affected areas, thereby reducing smoke accumulation, minimizing toxic gas concentrations, and maintaining tenable conditions for occupants during an emergency.
- The system should be engineered to extract smoke at a rate sufficient to keep egress routes clear and control the rise in temperature within fire-affected compartments.
- Extraction rates should be determined based on anticipated fire loads and room geometry, ensuring effective smoke removal without creating excessive negative pressure in adjacent areas.
- The design should accommodate variable operating conditions, with systems capable of adjusting extraction rates in response to real-time smoke density measurements.
- Smoke exhaust fans, equipped with variable speed controls, should be installed to provide the necessary airflow for effective smoke removal.
- Ductwork and air handling components should be constructed from noncombustible materials and designed to minimize air leakage under fire conditions.
- Integrated control systems, including smoke sensors and automatic dampers, should be used to coordinate the operation of the fans and adjust airflow to maintain performance under changing conditions.
- The smoke exhaust system should be fully integrated with the fire detection and alarm systems to ensure automatic activation upon detection of smoke.
- Coordination with exit pressurization and emergency lighting systems is essential to ensure that the operation of the smoke exhaust system does not compromise the safety or functionality of egress routes during an emergency.

4.4.5 Heating, ventilation, and air conditioning (HVAC) Integration

- HVAC integration ensures that heating, ventilation, and air-conditioning systems work in harmony with fire and smoke control measures. This integration helps to limit smoke migration, preserve tenable egress routes, and support the overall fire safety strategy during an emergency.
- The HVAC system should be designed to operate independently during normal conditions and to automatically integrate with smoke control systems upon fire alarm activation.
- Upon detection of smoke or fire, the system should transition to a mode that minimizes air recirculation from fire-affected zones and maximizes fresh air supply to egress routes.
- Automatic dampers and variable air volume (VAV) controls should be incorporated to isolate fire-affected zones, thereby preventing smoke spread to adjacent areas.
- The system should include override features that allow manual adjustment from the Fire Command Centre, enabling dynamic control of airflow, pressurization, and exhaust rates during emergencies.
- The HVAC system should be synchronized with the smoke control system so that any adjustments in airflow or pressure are coordinated to maintain clear and safe egress routes.

Section – 5

Emergency Response

Section 5 : Emergency response

5.1 Response to fire incident

In the event of a fire incident, the following actions should be taken to ensure an effective emergency response:

5.1.1 Immediate Detection and Alarm Activation

- Any person discovering fire, unusual heat, visible smoke, or the smell of smoke, even if uncertain of the cause, must immediately report the condition to the fire control room and facility in-charge present in the area at the time.
- Immediately activate the nearest manual pull station or alarm-initiating device.
- Initiate **"Code Red" (Fire Emergency)** announcement through the hospital communication system
- All employees and staff, particularly those at or near the compartment where the fire originated, should follow the R.A.C.E. procedure:
  - **R**escue anyone endangered by the fire to a safe area.
  - **A**ctivate the alarm.
  - **C**onfine the fire by closing all windows and doors.
  - **E**vacuate/Extinguish the fire.
- Dial 101 or 112 (Unified Emergency Number) to alert the Fire Service.

5.1.2 Fire Command centre/ Fire Control Room Response

- The Fire Command Centre (FCC) serves as the central monitoring and control hub for all active fire protection systems within the healthcare facility. It is designed to coordinate emergency responses, promptly disseminate critical information, and enable rapid activation of fire-safety measures.
- The FCC should be located in a secure, centrally accessible area that remains operational even under adverse conditions.
- The room should be constructed of noncombustible materials with a minimum fire resistance rating of 120 minutes.
- It should be equipped with dedicated, redundant communication systems to ensure uninterrupted contact with internal fire-safety systems and external emergency services.
- The FCC should receive real-time data from fire detection and alarm systems, sprinkler systems, hydrant systems, and portable fire extinguisher activations.
- It should integrate video surveillance and electronic floor plan displays to enable visual monitoring of fire events and building occupancy status.
- The centre should also monitor the status of emergency power supplies, ensuring continuous functionality of all critical fire-protection systems.
- The FCC should operate 24 hours a day and be manned by trained personnel capable of managing fire emergencies.
- The health facility will develop its own specific Standard Operating Procedures (SOPs) for alarm verification, emergency communication, and system control.
- The FCC should have the ability to override and control connected fire-safety systems, such as adjusting smoke control settings and activating emergency lighting.
- A dedicated public address system, integrated into the FCC, should be used to issue evacuation orders and emergency instructions throughout the facility.
- The FCC should maintain direct communication with local fire departments, police, and medical services, ensuring coordinated response efforts.

- Regular drills and testing of communication protocols are mandatory to confirm that all FCC operators are proficient in emergency procedures.
- The FCC should be powered by an independent, uninterruptible power supply (UPS) and a backup generator to ensure continuous operation during mains failure.
- The FCC and its integrated systems should be inspected and maintained on a quarterly basis to ensure operational integrity.
- Detailed logs of fire events, system activations, drills, maintenance activities, and test results should be maintained and reviewed periodically to facilitate continuous improvement in emergency preparedness.
- Upon activation, visible and audible alarms will be signalled throughout the affected building.
- The Control Room will announce specific messages. In the compartment of fire origin, near compartments, and on floors directly above and below, staff will be instructed to initiate the Fire Response Plan (FRP). In all other areas, staff will be advised to await further instructions.
- A designated person in the Control Room will assess the fire threat based on reports and decide whether to invoke partial or complete evacuation protocols.
- The Control Room should coordinate with nearby health facilities to mobilize assistance and support if required.

5.1.3 General Staff Actions

- Do not panic and remain alert.
- If one hears the fire alarm or sees flashing lights, all fire doors in the area should be closed to help confine the fire and smoke after evacuation
- Do not use elevators; always use staircases for evacuation.
- If smoke starts building up, stay low to the ground to avoid inhaling fumes.
- Keep patients and visitors in rooms if possible until directed otherwise, and be ready to evacuate if instructed.
- Comply with all fire safety protocols and procedures
- Be familiar with the hospital's Fire Safety Plan, including evacuation routes, emergency exits, and the location of fire-related equipment.

5.1.4 Fire fighting Actions

- Use appropriate fire extinguishers on incipient fires, following the **P.A.S.S. procedure** (Pull, Aim, Squeeze, Sweep).
- The fire fighting team, based at the fire control room, will respond immediately, ascertain location of the fire, and use specialized equipment.
- In cases of minor fires, trained staff should immediately control them with available optimal extinguishers. If necessary, electrical connections should be cut and windows should be broken to exhaust smoke, and consider use of portable smoke extractors.
- If a fire involves equipment connected to oxygen, oxygen zone valves should be turned off for that area to prevent the fire from accelerating.
- Once the Fire Department arrives, their ranking officer will assume authority at the fire scene.

5.1.5 Evacuation

- The primary aim of a healthcare facility is not to evacuate patients unless absolutely necessary. Special attention must focus on proper fire prevention and suppression techniques to avoid this worst-case scenario.
- Evacuation training and preparedness are of paramount importance to minimise loss of life.

- For patients lacking self-preservation, the principle of progressive horizontal evacuation is essential. This involves moving occupants from a fire-affected area to an adjoining area at the same level through a fire-resistant wall, using adjacent compartments as temporary refuge away from both fire and smoke.

Table 2: Types of Evacuation

Types of Evacuation	
Horizontal	This is the primary mode, involving moving patients in immediate danger to an adjacent compartment on the same floor, away from the fire and smoke
Vertical	If the situation demands, patients may be moved to another floor, typically the floor below, utilizing stairwells
Shelter in place	Staff may be instructed to remain in their units and wait further instructions, especially in critical areas where movement could jeopardise patient life

- Evacuation Decision-Making and Triggers
  - Upon fire alarm activation, designated personnel must investigate the alarm (including the possibility of false alarms), identify the level of the threat, and determine if the fire can be suppressed or if evacuation is necessary.
  - The designated responsible person in the Command Centre determines the type of evacuation (horizontal, vertical, or shelter-in-place) based on the hazard, nature of patient criticality, and available facility resources.
  - Designated personnel must inform staff of the required evacuation sequence. The Command Centre is responsible for notifying concerned personnel and invoking egress protocols.
- Special Considerations for ICUs/OTs/Infants:
  - Trained personnel should try to extinguish the fire at its source using extinguishers and remove all inflammable liquids in the vicinity of fire.
  - Discontinue air conditioning gases and the system, manually activate ventilation or exhaust fans to evacuate smoke.
  - Stabilize patients before movement, if time permits.
  - Patients, particularly critical ones and infants, must always be moved under the supervision of a doctor or nurse and should not be left unattended.
  - Evacuate patients with their mobile ventilators, crash cart and medical records to the nearest safe area with medical gas supply.
  - After patient evacuation, shut off electrical equipment and medical gases, and close all ICU doors.
  - Ensure patients' medical records and essential medical supplies are secured and accompany patients during evacuation. Digital backups are preferred.
  - In case of fire, the oxygen supply may need to be shut off. Portable oxygen must be made available to patients in all patient-care areas.
- Patient Prioritization in Different Evacuation Scenarios

  Prioritizing patients with respect to the limited physical resources available for evacuation (e.g., personnel, elevators, stairwells, transport sleds) is among the most logistically and ethically challenging tasks involved in the evacuation of a hospital.There is no single priority model that will function equally well in all hospitals and all circumstances.

Table 3 : Listed below are some general potential evacuation priorities in selected scenarios.

Evacuation Scenario	Consideration
Immediate	• In an immediate evacuation that is severely time sensitive and involves immediate and broad threats to life safety, the priority must be to get as many patients out as possible. Therefore, the patients needing the most assistance to be moved last, may be adopted in these situations. • If time is critical, ICU patients may be moved after all of the general care units have been evacuated. In addition, to maximize the number of patients evacuated in the least amount of time, this model ensures that critical care patients have access to medical gases, suction, and monitoring for as long as possible.
Rapid	• In a rapid evacuation, the default transport plan should be based on an orderly, rapid process in which entire patient care units are moved sequentially. Simultaneous evacuation may also take place; that is, a general medical/surgical unit and an ICU may be evacuated in parallel when possible to avoid uneven demand on Emergency Medical Service (EMS) resources.
Gradual	• In a gradual evacuation, hospitals may not require the use of assembly points; rather, they may choose to send patients directly from their units to waiting EMS assets in the staging area. In such a circumstance, communication between the staging area and the hospital floors is critical to ensure that the flow of patients out of the units anticipates available EMS units and prevents congestion of ambulances waiting to transport arriving patients.

In an immediate evacuation that is severely time sensitive and involves immediate and broad threats to life safety, the priority must be to get as many patients out as possible. Therefore, the acuity model (wherein the patients needing the most assistance are the last to be moved) may be adopted in these situations. Default priorities in such situations are indicated in Figure 2.

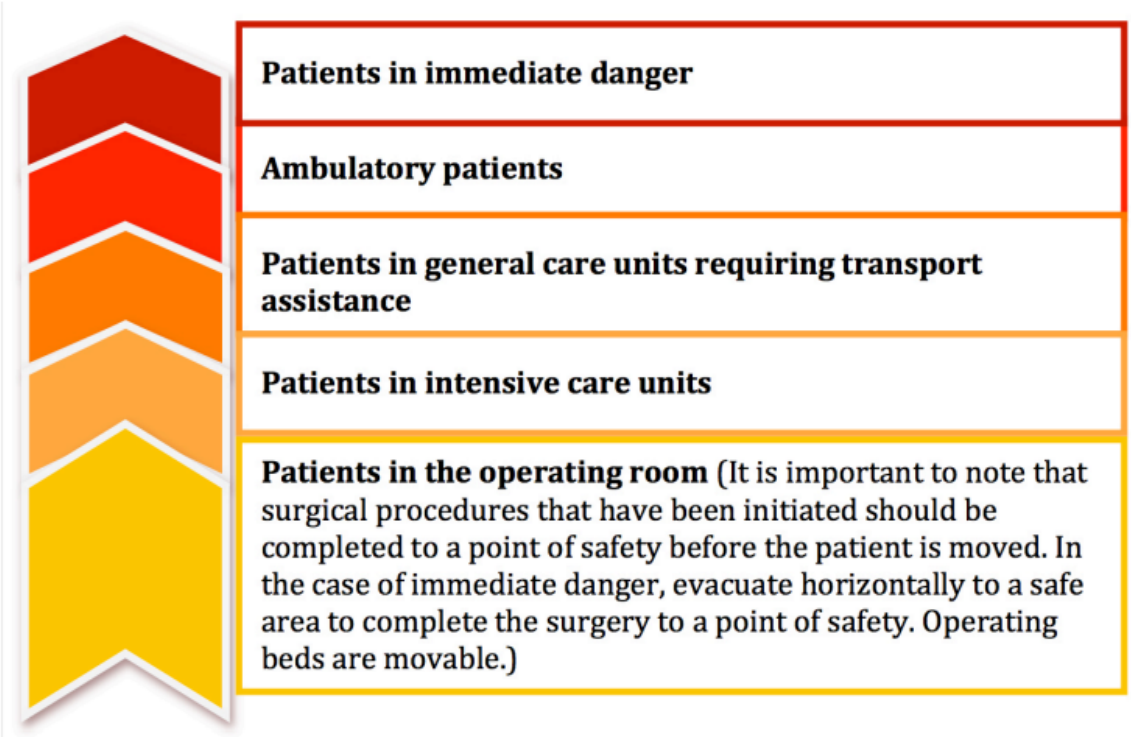


Figure 2 : Priority Ratings for Immediate Evacuation of Patients

- Staff training and responsibilities for prioritization
  - Each department is required to develop specific evacuation processes and incorporate them into the Fire Response Plan, including those for non-ambulatory patients. Specific roles related to fire response must be assigned.
  - Staff should be trained on how to lift and move patients using various methods: 2 and 4 handed lifts, Fireman's lift, human crutch, blanket removal, wheelchair, pick-a-back, fore and aft method, removal downstairs, and stretcher removal.
  - Training must include the location and proper use of equipment for transporting patients between fire compartments.
  - Every shift should have trained and knowledgeable wardens on-site to direct patients and visitors during evacuation.
- Special Patient Considerations
  - ICU patients
    - They must be moved only after stabilization, along with life-saving equipment.
    - Specific evacuation plans should involve horizontal movement to a comparatively safer place on the same floor where medical gases and other life-saving equipment are available.
    - When wall oxygen is turned off, switch ventilator to room air and/or obtain portable oxygen bank.
    - If there is no power, staff must bag these patients using an ambu-bag.
    - During the evacuation transport, staff must bag the patient.
    - The "defend-in-place" strategy should be used for ICU patients, and those in operating suites, as they often cannot be moved without risk of jeopardising their life. This requires fire-resisting and smoke-preventing enclosures, along with uninterrupted medical support services (electrical, medical gases, fresh air).
  - Operating Theatre (OT) Patients: Surgical procedures already initiated should be completed to a stage of safety before moving the patient. Considerations for evacuation of OT patients is placed at Annexure 6.
  - Babies/Critical Patients**:** These patients must always be moved under the supervision of doctors/ nurses and never left unattended. Considerations for evacuation of NICU, PICU and ICU patients is placed at Annexure 4,5 & 7.
  - Patients with Disabilities**:** Identify and provide special accommodations for patients who cannot hear, see, or are under anaesthetics, as they may require visual cues or gestures.
- Essential resource/infrastructure for evacuation
  - All egress corridors, staircases, and ramps must be clearly established, remain unobstructed, and maintained in working order to allow movement of patients and equipment.
  - Clearly identify and mark multiple assembly points (preferably on all floors) within the health facility premises for use in case of emergency
  - Departments must identify locations for horizontal movement to adjoining compartments considered safe from smoke and fire. These areas should have additional power supply points and medical gases to support patients for limited periods.
  - Ensure sufficient evacuation transport equipment (blankets, wheelchairs, beds, canvas stretchers/ litters/gurneys, backboards, and skid stretchers) is available and easily accessible for each floor. This equipment must be part of the facility's regular planned preventative maintenance program.
  - Medical records of patients must be taken along during evacuation to ensure continuity of care.
  - Staff must know the location of oxygen shut-off valves. Provisions for portable oxygen must be available in all patient-care areas at all times.

- Adequate emergency lighting, clearly identified exit routes, and exit signs must be ensured
- The Command Centre, operational 24x7, especially in larger health facilities with in-patient care, is crucial for managing contingencies and invoking necessary actions for disaster management. It must coordinate with nearby health facilities to mobilise help and support.

• Use of evacuation technique and equipment

- In the event of an evacuation, it is essential to have transportation equipment available for patients. Details of evacuation equipment is available at Annexure 8.
- Smoke escape hoods or canisters help personnel safely evacuate smoke filled areas and allow designated staff to remain in fire - affected zones longer to facilitate the rescue of patients and bystanders. Most provide about 15 minutes of clean air, which is typically sufficient time for emergency evacuation from a building.
- Some of the equipments might not be available with healthcare facilities, these may be supported by fire services for evacuation. There are important practical notes to consider when using transportation equipment in a health facility evacuation:
  a) A sufficient amount of equipment should be available to evacuate each floor of the facility.
  b) Equipment should be stored in areas that are easily accessible at all times; it should not be stored in locked closets.
  c) All transportation equipment should be part of the facility's regular planned preventative maintenance program.

Figure 3: Types of evacuation equipments

5.2 Post-Incident

Once the situation is resolved, the Fire Authority or Hospital Incident Commander will verify the resolution and declare an **"All Clear"** announcement over the public address system.

5.3 Evacuation Plan

- Each healthcare facility must prepare a written evacuation plan. It should be displayed for every floor and critical unit.
- Plans should clearly mark:
  - Exit routes, staircases, ramps, and alternate exits.
  - Fire alarm points, extinguishers, hydrants, and sprinkler zones.
  - Evacuation routes must remain unobstructed and illuminated at all times
- The evacuation plan should follow the principle of progressive horizontal evacuation in hospitals: patients are first moved to a safe adjoining compartment on the same floor, and then vertically evacuated if required
- Plans must be reviewed annually, updated after renovations, and tested during mock drills

5.4 Safe Assembly Points

- Healthcare facilities should designate safe assembly zones outside the facility where patients, staff, and visitors can gather during emergencies.
- Criteria for assembly zones:
  - Designate outdoor assembly points at least 30 m from the building perimeter, clear of fire lanes, hydrants, and vehicular routes.
  - Clearly signposted and communicated to staff and patients.
  - Sufficient space to accommodate maximum occupancy of the facility.
- Staff should ensure orderly movement of patients and visitors to these zones during evacuation

5.5 Incident Reporting

5.5.1 Incident Reporting system

- Hospitals should establish a standardized fire and near-miss incident reporting system.
- Any staff member noticing a fire hazard, small fire, or malfunction of equipment must immediately report to the Fire Safety Officer.
- Reports should capture:
  - Date, time, and location of the incident.
  - Type of hazard/fire and immediate response taken.
  - Patients/staff affected and evacuation measures.
  - Root cause analysis (short-circuit, oxygen leak, negligence, etc.).
- All incidents (including minor fires and false alarms) must be documented and reviewed during Fire Safety Committee meetings

5.5.2 Documentation of Corrective Actions

- For each audit finding or reported incident, a Corrective and Preventive Action record must be maintained.
- Corrective actions: immediate measures to eliminate hazards (e.g., replacing faulty wiring, repairing fire doors etc.).
- Preventive actions: long-term measures to avoid recurrence (e.g., upgrading electrical load handling capacity, staff retraining, policy revision etc.).
- Records must include:
  - Action taken, responsible person, and completion timeline.
  - Verification of effectiveness by the Fire Safety Officer.
- Documentation should be available for regulatory inspections, accreditation audits (e.g., NABH), and internal reviews

Section – 6

Training, Compliance and Awarness Building

6.1 Fire Safety Induction Training

6.2 Special Training for ICU/OT/ Security Staff on Patient Evacuation

6.3 Mock Drills

7.1 Fire Safety Audit

7.2 Fire Safety Certificate

8.1 Display Fire Safety Instructions

8.2 Patient/ Visitor orientation

A. Training

6.1 Fire Safety Induction Training

- All new employees, including medical, nursing, technical, housekeeping, and administrative staff, must undergo mandatory fire safety induction training at the time of joining.
- Training should cover:
  - Basic principles of fire prevention and common causes of hospital fires.
  - Operation of fire extinguishers, fire alarm systems, and evacuation routes.
  - Refuge and assembly point procedures
  - Procedures for medical-gas handling, leak response, and emergency evacuation. Personnel should be trained in cylinder handling, system shutoff, and first-aid oxygen therapy.
  - Location of nearest fire exits, hydrants, and assembly zones in their area of posting.
  - Roles and responsibilities during an emergency.
- Healthcare facilities should maintain a training attendance register and issue certificates of participation.
- Refresher orientation sessions must be conducted periodically or upon major changes in fire safety infrastructure or inter – departmental transfer of healthcare worker

6.2 Special Training for ICU/OT/Security Staff on Patient Evacuation

- Certain departments require specialized evacuation training due to the critical nature of patients:
  - ICU & HDU staff: techniques for evacuating ventilated or bed-bound patients; use of portable oxygen cylinders, rescue sheets, and stretchers.
  - OT staff: handling patients under anesthesia or immediately post-surgery; prioritizing safe transfer to recovery zones.
  - Neonatal & Pediatric units: evacuation using incubator evacuation trolleys, baby cots, and safe cradles.
  - Security staff: crowd management, controlling panic, guiding visitors to assembly zones, assisting fire brigades with building access.
- Training should be practical and hands-on, not just theoretical, with regular refresher courses

6.3 Mock Drills

- Hospitals must conduct mock fire drills periodically for each campus/building.
- Drills should simulate realistic scenarios involving fire response and/or patient evacuation such as:
  - Fire in ICU/OT/Nursery with immobile patients.
  - Fire in OPD with large crowds.
  - Fire in laboratory or oxygen storage room.
- Planning for mock drill
  - Pre-Drill Preparation
    - Develop a scenario (e.g., fire in ICU, OT, kitchen, or medical gas store).
    - Inform staff in advance (unless it is a surprise drill).
    - Ensure availability of evacuation equipment (stretchers, wheelchairs, rescue sheets).
    - Brief observers to record performance.
  - Conducting the Drill
    - Trigger alarm system as per protocol.

        - Staff respond by raising alarm, using nearest extinguishers, and beginning evacuation.
        - Fire Safety Officer coordinates the exercise, monitors evacuation flow, and ensures safety of patients.
        - Security manages crowd control and directs visitors to assembly points.
        - Communication team uses public address system to guide staff and visitors.
    - Post-Drill Evaluation
        - Conduct a debriefing session with staff, fire safety committee, and observers.
        - Record:
            - Time taken for evacuation
            - Functionality of alarms and equipment
            - Staff responsiveness and coordination
            - Bottlenecks in evacuation routes.
- Every drill should include:
    - Activation of fire alarm and emergency communication system.
    - Staff response and use of firefighting equipment.
    - Evacuation of patients (including use of evacuation aids).
    - Coordination with security and facility management.
- Post-drill evaluation reports must be prepared, identifying gaps and recommending corrective actions
- Hospitals must conduct joint fire drills with the local fire brigade, police, and disaster management authority at least once a year with the objective of
    - Testing external agency response time and coordination with hospital staff.
    - Familiarizing fire services with hospital layout, hydrant locations, and high-risk zones (ICU, OT, oxygen storage).
    - Evaluate communication protocols during emergencies.
- Results of mock drills should be reviewed by the Fire Safety Committee.
- Hospitals should maintain formal liaison with local fire authorities, including sharing updated fire safety plans and contact details of the Fire Safety Officer.

B. Audits/ inspections and Compliance

7.1 Fire Safety Audit

- Every healthcare facility must undergo a comprehensive fire safety audit as per state rules and regulations.
- Such audits should preferably be conducted by in house Fire safety Officer or a third-party auditor having requisite experience in fire and life safety inspections or as per state rules and regulations. Frequency of such audits should be once in a year or as per prevailing State/UT Government rules.
- The audit should cover:
  - Building layout, exits, and compartmentation as per state building regulations or as per NBC .
  - Fire detection and suppression systems (hydrants, sprinklers, alarms, extinguishers etc.).
  - Electrical installations and medical gas systems as per latest NEC (SP 30)
  - Availability and condition of evacuation aids.
  - Training and mock drill records.
- Audit findings must be presented to the Hospital Fire Safety Committee, which will develop a corrective action plan with timelines
- Internal audits should also be conducted periodically by the Fire Safety Officer

7.2 Fire Safety Certificate

- All healthcare facilities must obtain a valid Fire Safety Certificate from the local authority as per state fire safety regulations .
- Certificates must be renewed before expiry of the validity
- Requirements include:
  - Compliance with NBC state fire prevention rules, and hospital-specific fire safety norms.
  - Functional fire detection, alarm, and suppression systems.
  - Adequate means of egress, evacuation signage, and assembly zones.
  - Record of training, drills, and audits.
- The Fire Safety Officer must ensure timely application for renewal and maintain a copy of the current certificate in hospital records

C. Community and Patient Awareness

8.1 Display Fire Safety Instructions

- Hospitals must prominently display fire safety instructions in multiple locations, including:
  - Entrances, OPD waiting areas, wards, ICUs, OTs, lifts, staircases, and near fire exits.
  - Instructions should include "Do's and Don'ts in case of fire", emergency contact numbers, and assembly zone locations.
  - Floor-wise evacuation maps with clear arrows showing escape routes must be displayed at nursing stations, lift lobbies, and corridors
  - Signage should be:
    - Bilingual (local language + English/Hindi).
    - Illuminated and fire-resistant for visibility during power outages.
    - Supported by universal pictograms for non-literate visitors.
- Fire extinguishers, hydrants, and manual alarm call points must carry clear usage instructions with pictorial guidance

8.2 Patient/ Visitor orientation

- Orientation at Admission / Entry
  - All patients and their attendants should receive a basic orientation on fire safety protocols during admission or registration.
  - This may be through:
    - A short verbal briefing by the ward/registration staff.
    - Information leaflets or brochures (in English, Hindi, and local language).
    - Digital displays or short videos in waiting areas.
- Key Information to be shared
  - Location of nearest exits and staircases for their ward/floor.
  - Assembly points designated outside the hospital premises.
  - Instructions to follow staff guidance and not to panic if an alarm sounds.
  - Prohibition on using lifts during fire emergencies.
  - Simple Do's & Don'ts (e.g., not to block exits, avoid using personal electric heaters, use of multiplugs or tampering with firefighting equipment).
- Special instructions for patient attendants
  - Attendants in ICUs, NICUs, and high-dependency areas should be informed about progressive horizontal evacuation (patients moved first to adjoining safe zones, then vertically if required).
  - Families of long-term care patients (dialysis, oncology, rehabilitation) should be included in periodic awareness sessions conducted.
- Communication tools
  - Posters and signage with universal symbols should be displayed at entry points, wards, and lift lobbies.
  - Public address systems should be used to broadcast instructions during drills or real emergencies.
  - Hospitals may use QR codes on admission slips linking to evacuation maps and safety instructions.
- Reinforcement during stay
  - Security and ward nurses should periodically remind visitors about evacuation routes.
  - Orientation should be re-emphasized when patients are shifted between wards or to critical care areas.
- Mock drill Inclusion
  - Wherever feasible, patients' attendants may be included in mock evacuation drills to familiarize them with procedures.

Annexures

Annexure 1

Suggestive Fire Safety Requirements in Electrical Installations of Hospitals

Medical Electrical Equipment (ME) are electrical equipment having an applied part or transferring energy to or from the patient or detecting such energy transfer to or from the patient and which is provided with not more than one connection to particular supply mains and intended by its manufacturer to be used in the diagnosis, treatment, or monitoring of a patient, or for compensation or alleviation of disease, injury or disability.

Medical Electrical System (MES) are combination of items of equipment, at least one of which is an ME equipment inter-connected by functional connection or use of a multiple socket- outlet.

Applied parts are components of medical electrical (ME) equipment that, during normal use, necessarily come into physical contact with the patient to perform their intended function.

Medical locations are classified into Group 0, Group 1 and Group 2.

- Group 0 locations, where no applied parts are intended to be used.
- Group 1 medical locations, where ME equipment or MES are intended to be used externally or invasively on any part of the patient and where discontinuity of the electrical supply, does not represent a risk to the safety of the patient.
- Group 2 medical location, where ME equipment or ME systems are intended to be used intrusively, externally or invasively to any part of the patient and where discontinuity of the electrical supply, such as protection against electric shock, represents a risk to the safety of the patient.

A1: Responsibilities and Management of Electrical Risk

The management, in conjunction with medical staff and the person(s) responsible for medical safety, should consider the effects of discontinuity of the electric supply influences the ME equipment or ME systems. A comprehensive assessment should be performed to identify the proper electrical supply requirements for the ME equipment, ME systems and supporting electrical equipment intended to be used.

Having identified these requirements, the appropriate classification for the medical location should be determined. In order to determine the extent of a medical location, all possible patient positions should be considered. Where assessment shows any given location that falls into both group 1 or group 2 categories, the location should be classified as group 2.

Table A1_1: Allocation of Group Numbers of Medical Locations

Medical location	Group		
	0	1	2
1. Massage room	x	X	
2. Bedrooms		X	
3. Delivery room		X	
4. ECG, EEG, EHG room		X	
5. Endoscopic room (not being an operation theatre)		X	
6. Examination or treatment room		X	
7. Urology room (not being an operation theatre)		X	
8. Radiological diagnostic and therapy room, other than mentioned under 21		X	

Medical location	Group		
	0	1	2
9. Hydrotherapy room		X	
10. Physiotherapy room		X	
11. Anesthetic room			X
12. Operating theatre			X
13. Operating preparation room		X	X
14. Operating plaster room		X	X
15. Operating recovery room		X	X
16. Heart catheterization room			X
17. Intensive care room			X
18. Angiographic examination room			X
19. Hemodialysis room		X	
20. Magnetic resonance imaging (MRI) room		X	
21. Nuclear medicine		X	
22. Premature baby room			X

A2: Safety Measures for group 1 and group 2 medical locations

A2.1 Medical IT System for Group 2 locations

Medical IT systems are to ensure continuity of supply under single fault condition. Refer IS 17512 for more information. Medical IT system consists of the following

- Isolating transformers with extremely low leakage current not exceeding 0.5 mA al no load condition with monitoring of overload and over temperature;
- Medical Insulation monitoring device;
- Insulation fault location system (IFLS); and
- PE conductor monitoring system.

The maximum capacity is 10 kVA, 230 volts and are to be placed with in 25 meters of the location the supply is necessary. UPS with isolation transformers are not considered as Medical IT.

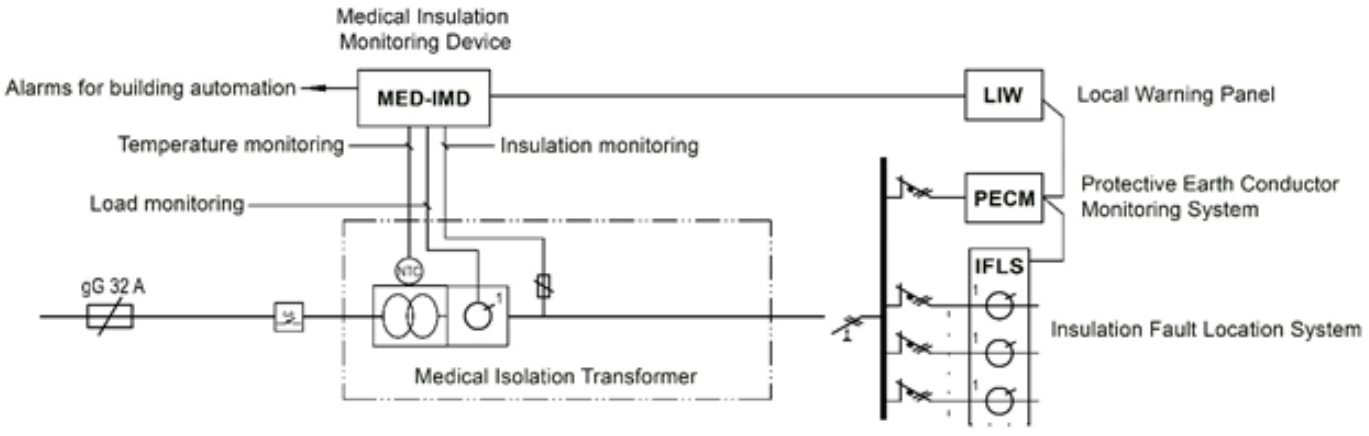


Figure A1_1 : Architecture of Medical IT System in Operation Theatre

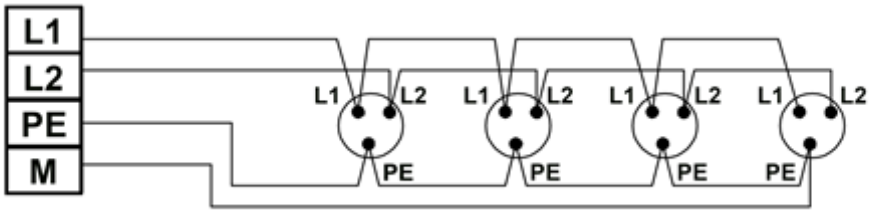
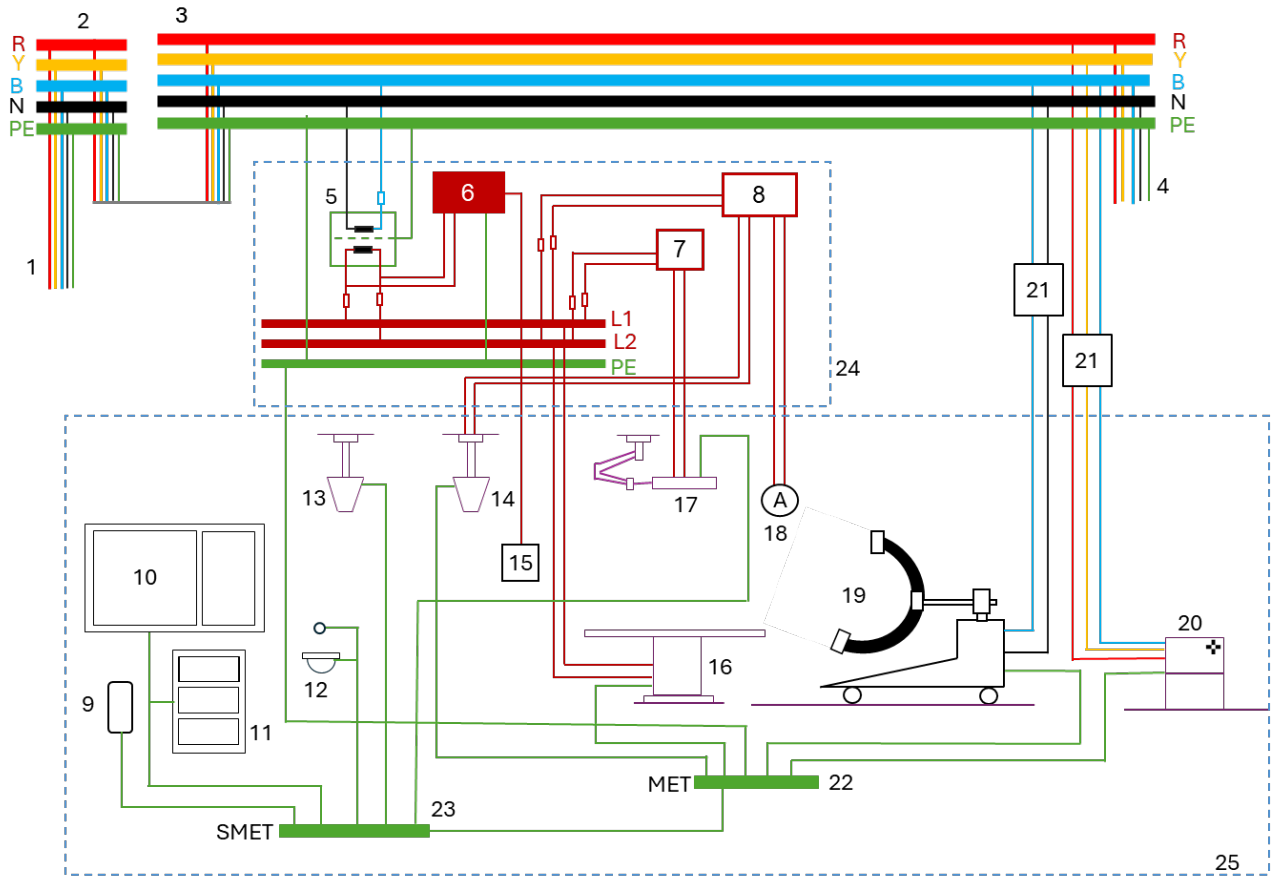
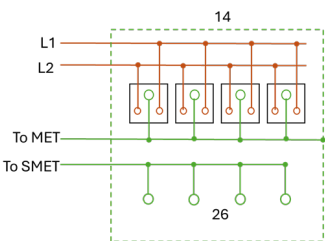


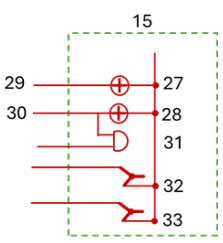
Figure A1_2 : Typical Connection of Protective Earth Conductor Monitoring (PECM) System

A2.2 Supplementary equipotential bonding

In each Group1 and Group2 medical loations, supplementary equipotential bonding should be installed for the purpose of equalizing potential differences between various conductive parts located within the patient environment. All ME equipment and MES should be bonded to the equipotential bonding including extraneous conductive parts, screens against electrical interference fields, connection to conductive floor grids, mesh and tapes, including those for static protection, metal screens of isolating transformers, cable shields, etc., via the direct path to the protective earthing conductor.







18 Ampere meter for special safety
19 X-ray equipment
20 Sterilizer
21 Residual-current protective device
22 MET: Main Earthing Terminal of the location
23 SMET: Sub earthing terminal of the location
24 Medical IT system

1. Feeder from the main service entrance
2. Distribution of the area
3. Operating theatre distribution panel
4. Safety supply system
5. Medical isolating transformer
6. Insulation Monitoring Device
7. Special safety supply system E1
8. Special safety supply system E2
9. Central heating
10. Metal window-frame
11. Metal cabinet for instruments
12. Meal washing-basin and water supply
13. Ceiling stand with outlets for gas supply
14. Ceiling stand with mains socket outlets
15 Alarm device for the insulation monitoring device
16 Operating table (electrically driven)
17 Operating lamp
25 Group 2 medical location
26 Terminals for equipotential bonding
27 Operation (button)
28 Warning (button)
29 Green
30 Red
31 Buzzer
32 Stop button for buzzer
33 Test button

PE = Protective Earth conductor/bar

MET: Main Earth Terminal (e.g. for bonding of exposed conductive parts)

SMET = Sub MET (e.g. for bonding of extraneous conductive parts

L1, L2, L3 = phase conductors

N = neutral conductor

Figure A1_3 : Schematic Presentation of Protective Conductors and Equipotential Bonding in Operating Theatres

A3 Verification of electrical installation (Electrical Safety Audits)

Every new installation or addition or changes to an existing installation should be verified during erection, as far as reasonably practicable, and on completion, before being put into service by the user. Verification consists of Inspection and Testing. Verification should be carried out by a competent person other than the electrical consultant and the electrical contractor. For details on Periodic verification and more information, refer National Electrical Code of India 2023 Part 1 section 17 and part 3 section 9. The verification includes following subjects.

A3.1 Inspection

The inspections mentioned are mandatory for all locations (e.g. Unclassified, Group 0, Group 1 and Group 2 locations). More details of each of the subject of inspection explained hereunder can be found in IS732, NEC 2023 and IS17512.

1. Protection against electric shock (as per clause 4.2 of IS 732): e.g. Inspect whether the protective equipotential bonding is carried out in all locations. For Group 1 and Group 2 medical locations inspect the availability of supplementary equipotential bonding.
2. Presence of fire barriers(as per clause 4.3 of IS 732): e.g. Inspect the openings in wall, floors and sealing where cables are travelling from one electrical area to the other (e.g electrical room to a safe room, all floors in case of a vertical shaft, vertical shaft to a safe area etc), find out the status of fire sealants in each area. If the openings are sealed, the make, type, the test report of the manufacturer and method of installation need to be recorded.
3. Precautions against propagation of fire (as per clause 4.3 of IS 732): e.g. Inspect battery rooms and record the type of ventilation provided, and ensure that fuel is not stored in close proximity to electrical installations.
4. Protection against thermal effects(as per clause 4.3 and 5.2.10 of IS 732): e.g. Inspect the location where electrical panels and major electrical equipment such as UPS, air conditioners etc) are installed and ensure that an increase in temperature in these equipment (e.g. air conditioner wall mounted with a stabilizer) does not ignite fire to materials below them (e.g. curtains, beds, an unintended appliance, etc).
5. Usage of protective devices, coordination of Protective device and conductors (as per clause 4.4, 5.2.6 and

5.2.8, 5.3 of IS 732): e.g. Check the coordination of protective device and conductors for current-carrying capacity, voltage drop and fault loop impedance including choice and setting of protective and monitoring devices. (This needs to be either calculated or simulated after conducting a test).

6. Presence and correct location of isolating and switching devices in each panel/location (as per clause 5.3 of IS 732).
7. Location and usage of equipment appropriate to external influences such as temperature, humidity, altitude, water, dust, corrosive substance, mechanical shock, vibration, flora (mould growth), fauna etc (as per clause 4.3.2, 5.1.2.2 and 5.2.5 of IS 732).
8. Neutral and protective conductors correctly identified (including easy measures for identification) in each circuit (as per clause 5.1.4.3 of IS 732).
9. Single pole switching devices connected in the line conductors,
10. Presence of diagrams, warning notices or other similar information,
11. Identification of circuits, overcurrent protective devices, switches, terminals, etc,
12. Adequacy of connection of conductors (where possible with a continuity measurement test with an instrument of minimum 10 Amps),
13. Accessibility of equipment for convenience of operation, identification and maintenance.
14. Avoidance and protection from electromagnetic, electrostatic and ionizing influences, which includes shielding, screening and bonding of cables and wires, usage of protective measures against electrostatic effects,
15. Inspect whether SPDs are installed, the location of SPD's, type and connecting wire length of SPD's and backup protection such as usage of GL/GG fuses, preference for continuity of supply or continuity of protection and make a conclusion whether they satisfy installation category requirements,
16. Verification of the integrity of the facilities for the electric supply system for safety services See clause 8,
17. Mathematical/software verification of the compliance of the selectivity of the electric supply system for safety services regarding planning documents and calculation, in new installations.
18. Mathematical/software verification of the applied protective measures for compliance with the requirements for medical locations of group 1 and group 2 with attention to the requirements of selectivity between overcurrent protective devices in new installations.
19. Visual verification including the verification of test reports, isolating transformer and Medical IT systems comply with the requirements of IT system classified as "Medical IT". (e.g. Medical IT system is made of Isolating transformers in accordance with IEC 61558-2-15, Medical Insulation Monitoring Device (MED-IMD) in accordance with IEC 61557-8, insulation fault location system in accordance with IEC 61557-9 and protective earth conductor monitoring).

A3.2 Testing

The following tests should be carried out and should be made in the following sequence. In case of failure of any tests, the result should be informed to the user, fault to be rectified, failed test and remaining tests are to be carried out after rectification of the fault. Tests from Sl. No 1 to 4 are made in mains "OFF" and isolated condition. Tests in Sl. no 5 to 10 need the power supply and are to be carried out in supply ON condition. Test in Sl. No. 15 is carried out in portable and pluggable equipment including medical equipment. More details of each of the subject of testing explained hereunder can be found in IS732, NEC 2023 and IS17512.

Efficiency of Automatic disconnection of supply should be carried out for all sources in all possible combinations (e.g. with each supply transformer connected, with each DG connected, with UPS etc).

1. Continuity of conductors,
2. Insulation resistance of the electrical installation,
3. Protection by SELV, PELV or by electrical separation,
4. Floor and wall resistance/impedance,

5. Automatic disconnection of supply,
6. Additional protection,
7. Polarity test,
8. Test of the order of the phases,
9. Functional and operational tests,
10. Voltage drop,
11. Functional test of change-over devices,
12. Functional test of MED-IMD and the overload monitoring systems of medical IT systems and acoustical/visual alarm systems,
13. Measurements to verify that the supplementary equipotential bonding.
14. Integrity of the electric supply system for safety services.
15. Portable Appliance Test (PAT).
16. Functional testing of changeover devices: in accordance with the manufacturer's instructions and at least every 12 months;
17. Functional testing of the medical insulating monitoring devices (MED-IMD) and overload monitoring system of medical IT systems and acoustical/visual alarm systems: 12 months;
18. Measurement verifying the supplementary equipotential bonding: 36months;
19. Verifying integrity of facilities required for equipotential bonding: 36months;
20. Monthly functional testing of electric supply system for safety services in accordance with the manufacturer's instructions:
    - Batteries: a minimum of 15min capacity test
    - UPS and combustion engines: at least 80 % of the rated power;
    - Combustion engines: 60min;
21. Annual functional testing of the electric supply system for safety services in accordance with the manufacturer's instructions:
    - For a UPS and combustion engines: at least 80 % of the rated power;
    - Batteries: capacity test for a minimum of 15 min;
    - Combustion engines, until rated running temperature is achieved: endurance run for a minimum of 120 min;
    - Generators black start testing: at least once every 12 months;
22. Checking the tripping of RCDs at IΔn: according to the manufacturer's instructions and at least every 12 months;
23. Visual inspection, functional tests and measurements of the electrical installation, especially to verify the protection against electric shock, including the settings of adjustable protective devices: at least 12 months;
24. Functional test of the lighting of exit signs, escape routes, locations for switchgear and control gear: 12 months.
25. Measurement of leakage currents of IT transformers: 36months;
26. Functional test of oxygen monitoring devices

A4: Classification of buildings based on conditions of evacuation in an emergency

Evacuation during fire conditions is critical in every building. Electrical installation not only avoids spreading of fire but supports safety services for evacuation during fire conditions. Buildings are classified into four types based on evacuation.

BD1 - Low density occupation, easy conditions of evacuation. E.g. Buildings of normal or low height used for habitation.

BD2 - Low density occupation, difficult conditions of evacuation E.g. High-rise buildings

BD3 - High density occupation, easy conditions of evacuation E.g. Locations open to the public (theatres, cinemas, departments stores, etc.)

BD4 - High density occupation, difficult conditions of evacuation. E.g. High-rise buildings open to the public (hotels, hospitals, etc.)

Each category of these buildings needs various additional safety measures in electrical installation. The additional safety measures are included in IS 732.

Source :

- **National Electrical Code of India (SP30)**
- **IS 732: code of practice for electrical wiring**
- **IS 17512: Electrical Installations in Medical Locations**

Annexure - 2

Suggestive Minimum requirements of Fire Fighting Installations

(Table 7 of Part 4,Vol 1, NBC 2016)

Sl No.	Type of Building Occupancy	Type of Installation								Water Supply (litre)		Pump Capacity (litre/min)	
		Fire Exting-uisher	First Aid Hose Reel	Wet Riser	Down Comer	Yard Hydrant	Automatic Sprinkler System	Manually Operated Electronic Fire Alarm Systems (*see* Note 1)	Automatic Detection and Alarm System (*see* Note 2)	Under-ground Static Water Storage Tank Combined Capacity for Wet Riser, Yard Hydrant and Sprinklers per Set of Pumps	Terrace Tank over Respective Tower Terrace	Pump Near Underground Static Water Storage Tank (Fire Pump) with Minimum Pressure of 3.5 kg/cm^2 at Remotest Location	At the Terrace Tank Level with Minimum Pressure of 3.5 kg/cm^2
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
INSTITUTIONAL BUILDINGS (C) (*see* Note 16)													
a)	**Hospitals, Sanatoria and Nursing Homes (C-1)**												
1)	Less than 15 m in height with plot area up to 1 000 m^2												
	i) Up to ground plus one storey, with no beds	R	NR	NR	NR	NR	R (*see* Note 4)	R	NR	NR	(5 000) (*see* Note 6)	NR	(450) (*see* Note 6)
	ii) Up to ground plus one storey with beds	R	R	NR	NR	NR	R (*see* Note 4)	R	NR	NR	5 000 (5 000) (*see* Note 6)	NR	450 (450) (*see* Note 6)
	iii) Ground plus two or more storeys, with no beds	R	R	NR	R	NR	R (*see* Note 4)	R	R	NR	10 000 (5 000) (*see* Note 6)	NR	900 (450) (*see* Note 6)
	iv) Ground plus two or more storeys, with beds	R	R	R	NR	NR	R	R (*see* Note 1)	R	75 000	10 000	(*see* Note 14)	NR
2)	Less than 15 m in height with plot area more than 1 000 m^2	R	R	R	NR	R	R	R (*see* Note 1)	R	1 00 000	10 000	(*see* Note 14)	NR
3)	15 m and above but not exceeding 24 m in height	R	R	R	NR	R	R	R	R	150 000	20 000	(*see* Note 10)	NR
4)	Above 24 m and not exceeding 45 m in height	R	R	R	NR	R	R	R	R	200 000	20 000	(*see* Note 11)	NR
b)	**Custodial (C-2), and Penal and Mental (C-3)**												
1)	Less than 10 m in height												
	i) Up to 300 persons	R	R	NR	NR	NR	R (*see* Note 4)	R	NR	NR	10 000 (5 000) (*see* Note 6)	NR	450 (450) (*see* Note 6)
	ii) More than 300 persons	R	R	NR	R	NR	R (*see* Note 4)	R	NR	NR	15 000 (5 000)	NR	900 (450)
2)	10 m and above but not exceeding 15 m in height	R	R	R	NR	R	R (*see* Note 4)	R	R	100 000	5 000 (5 000) (*see* Note 6)	(*see* Note 10)	NR
3)	15 m and above but not exceeding 24 m in height	R	R	R	NR	R	R	R	R	150 000	10 000	(*see* Note 11)	NR
4)	24 m and above but not exceeding 30 m in height	R	R	R	NR	R	R	R	R	200 000	20 000	(*see* Note 11)	NR

Note: Refer to the above table

1. MOEFA System shall also include talk-back system and public address system for the occupancies given in the table for (d) (I) (iii) under A-5, (a) (I) (iv) and (a) (2) under C-I, and (a) (2) under D-I to D-5, in all buildings 15 m and above in height, except for A-3 and A-4 occupancies where these shall be provided for buildings of height 24 m and above. These shall also be provided in car parking areas more than 300 m2 and in multi-level car parking irrespective of their areas.

4. Required to be installed in basement, if area of basement exceeds 200 m^2

6. Additional value given in parenthesis shall be added if basement area exceeds 200 m^2.

10 Provide required number of sets of pumps each consisting of one electric and one diesel pump (stand by) of capacity 2 280 l/min and two electric pump of capacity 180 l/min[1] (See also notes 22 and 23).

11 Provide required number of sets of pumps each consisting of two electric and one diesel pump (stand by) of capacity 2 280 l/min and two electric pump of capacity 180 l/min[2] (See also notes 22 and 23).

14 Provide required number of sets of pumps each consisting of one electric and one diesel pump (stand by) of capacity 1 620 l/min and one electric pump of capacity 180 l/min[3] (See also notes 22 and 23).

22 One set of pumps shall be provided for each 100 hydrants or part thereof, with a maximum of two sets. In case of more than one pump set installation, both pump sets shall be interconnected at their delivery headers.

23 Alternative to provisions of additional set of pumps, the objective can be met by providing additional diesel pump of the same capacity and doubling the water tank capacity as required for one set of pumps.

Source: Table 7 of Part 4, 'Fire and Life Safety' of NBC

1 See Fig. 11 of Part 4 of NBC 2016
2 See Fig. 12 of Part 4 of NBC 2016
3 See Fig. 11 of Part 4 of NBC 2016

Annexure -3

Suggestive Guidelines For Fire Drill and Evacuation Procedures For High Rise Buildings[4]

D-1 INTRODUCTION

In case of fire in a high rise building, safe evacuation of its occupants may present serious problems unless a plan for orderly and systematic evacuation is prepared in advance and all occupants are well drilled in the operation of such plan. These guidelines are intended to assist them in this task.

D-2 ALARMS

Any person discovering fire, heat or smoke should immediately report such condition to the fire brigade, unless he has personal knowledge that such a report has been made. No person should make, issue, post or maintain any regulation or order, written or verbal, that would require any person to take any unnecessary delaying action prior to reporting such condition to the fire brigade.

D-3 DRILLS

D-3.1

Fire drills should be conducted, in accordance with the Fire Safety Plan, at least once every three months for buildings during the first two years. Thereafter, fire drills should be conducted at least once every six months.

D-3.2

All occupants of the building should participate in the fire drill. However, occupants of the building, other than building service employees, are not required to leave the floor or use the exits during the drill.

D-3.3

A written record of such drills should be kept on the premises for a three years period and should be readily available for fire brigade inspection.

D-4 SIGNS AND PLANS

D-4.1 Signs at Lift Landings

A sign should be posted and maintained in a conspicuous place on every floor at or near the lift landing in accordance with the requirements, indicating that in case of fire, occupants should use the stairs unless instructed otherwise. The sign should contain a diagram showing the location of the stairways except that such diagram may be omitted, provided signs containing such diagram are posted in conspicuous places on the respective floor. A sign should read 'IN CASE OF FIRE, USE STAIRS UNLESS INSTRUCTED OTHERWISE'. The lettering should be at least 12.5 mm block letters in red and white background. Such lettering should be properly spaced to provide good legibility. The sign should be at least 250 mm × 300 mm, where the diagram is also incorporated in it and 62.5 mm × 250 mm where the diagram is omitted. In the latter case, the diagram sign should be at least 200 mm × 300 mm. The sign should be located directly above the call-button and squarely attached to the wall or partition. The top of the sign should not be above 2 m from the floor level.

D-4.2 Floor Numbering Signs

A sign should be posted and maintained within each stair enclosure on every floor, indicating the number of the floor, in accordance with the requirements given below. The numerals should be of bold type and at least 75 mm

4 Refer Page 81, Annex D, Part 4, 'Fire and Life Safety', NBC

high. The numerals and background should be in contrasting colours. The sign should be securely attached to the stair side of the door.

D-4.3 Stair and Lifts Identification Signs

Each stairway and each lift bank should be identified by an alphabetical letter. A sign indicating the letter of identification should be posted and maintained at each lift landing and on the side of the stairway door from which egress is to be made, in accordance with the requirements given in 4.4.2.4.3.2(h)(9).

D-4.4 Stair Re-entry Signs

A sign should be posted and maintained on each floor within each stairway and on the occupancy side of the stairway where required, indicating whether re-entry is provided into the building and the floor where such re-entry is provided, in accordance with the requirements given below. The lettering and numerals of the signs should be at least 12.5 mm high of bold type. The lettering and background should be of contrasting colours and the signs should be securely attached approximately 1.5 m above the floor level.

D-5 FIRE SAFETY PLAN

D-5.1 A format for the Fire Safety Plan should be as given in D-9.10.

D-5.2 The applicable parts of the approved Fire Safety Plan should be distributed to all tenants of the building by the building management when the Fire Safety Plan has been approved by the Fire Authority

D-5.3 The applicable parts of the approved Fire Safety Plan should then be distributed by the tenants to all their employees and by the building management to all their building employees.

D-5.4 In the event there are changes from conditions existing at the time the Fire Safety Plan for the building was approved, and the changes are such so as to require amending the Fire Safety Plan, within 30 days after such changes, an amended Fire Safety Plan should be submitted to the fire brigade for approval.

D-6 FIRE COMMAND CENTRE

A Fire Command Centre should be established in the building (see 3.4.12).

D-7 COMMUNICATIONS AND FIRE ALARM

A means of communication and fire alarm for use during fire emergencies should be provided and maintained by the owner or person in charge of the building.

D-8 FIRE SAFETY PLAN FORMAT

D-8.1 Building Address Street and Pin Code Number..... Telephone Number.....

D-8.2 Purpose and Objective

D-8.2.1 Purpose

To establish method of systematic, safe and orderly evacuation of an area or building by and of its occupants in case of fire or other emergency, in the least possible time, to a safe area by the nearest safe means of egress; also the use of such available fire appliances (including sounding of alarms) as may have been provided for controlling or extinguishing fire and safeguarding of human life.

D-8.2.2 Objective

To provide proper education as a part of continuing employee indoctrination and through a continuing written programme for all occupants, to ensure prompt reporting of fire, the response of fire alarms as designated, and the immediate initiation of fire safety procedures to safeguard life and contain fire until the arrival of the fire brigade.

D-8.3 Fire Safety Director/ MS /Additional MS [adopted as per requirement of healthcare facilities]

a) Name

b) Regularly assigned employment — Title

c) Regularly assigned location

d) How is he notified when at regular location?

e) How is he notified when not at regular location?

f) Normal working hours

g) Duties of Fire Safety Director (see D-9.1)

D-8.4 Deputy Fire Safety Director (To be nominated by Fire Safety Director) [adopted as per requirement of healthcare facilities]

a) Name

b) Regularly assigned employment — Title

c) Regularly assigned location

d) How is he notified when at regular location?

e) How is he notified when not at regular location?

f) Normal working hours

g) Duties of Deputy Fire Safety Director (see D-9.2)

D-8.5 Fire Wardens and Deputy Fire Wardens (Fire Safety Officer and Deputy Fire Safety Officers) **[adopted as per requirement of healthcare facilities]**

a) Are their names on organization charts for each floor and/or tenancy?

b) Submit typical completed organization chart for Fire Drill and Evacuation Assignment.

c) Duties of Fire Wardens and Deputy Fire Wardens (see D-9.3).

D-8.6 **Fire Marshals** (Nurses/ House keeping supervisor/ Sanitary Supervisor etc.) **[adopted as per requirement of healthcare facilities]**

a) Name

b) Regularly assigned employment — Title

c) Regularly assigned location

d) How is he notified when at regular location ?

e) How is he notified when not at regular location?

f) Normal working hours

g) Duties of Building Evacuation Supervisor (see D-9.4).

D-8.7 Fire Technicians/ Fire Party

a) Submit a completed organization chart for Fire Parties naming person in charge, and his title in the building.

b) Indicate standards of selection from building employees based on background and availability.

c) How are they notified?

d) How are they notified when they are not at their regular locations?

e) Means of responding

f) Duties of each member of Fire Party (see D-9.5).

D-8.8 Occupants Instructions

Distribution of instructions of all tenants, tenants' employees and building employees (see D-9.6).

D-8.9 Evacuation Drills

a) Frequency of drills

b) How conducted?

c) Participation? Who participated? How?

d) Controls and supervision

e) Recording of details of drills

D-8.10 Fire Command Station

a) Location

b) Requirements:

1) Adequate illumination

2) Adequate communication to mechanical equipment room and lifts control room on each floor

3) Copy of Fire Safety Plan

4) Copy of Building Information Form

5) Representative floor plans showing location of signs, floor remote station, communications, etc.

D-8.11 Signs

a) Signs at lifts landings, Floor diagrams

b) Floor numbering

c) Stairway identification

d) Lifts identification

e) Stair re-entry D-8.12 Fire Prevention and Fire Protection Programme See D-9.7.

D-8.13 Building Information Form

see D-9.8

D-8.14 Representative Floor Plan

See D-9.9

D-8.15 Fire Safety Plan Prepared by

See D-9.10

a) Date when prepared, and

b) Date when revised

D-9 DUTIES

D-9.1 Fire Safety Director's Duties

D-9.1.1

Be familiar with the written Fire Safety Plan providing for fire drill and evacuation procedure in accordance with orders on the subject.

D-9.1.2

Select qualified building service employees for a Fire Party and organize, train and supervise such fire brigade

D-9.1.3 Be responsible for the availability and state of readiness of the Fire Party.

D-9.1.4 Conduct fire and evacuation drills.

D-9.1.5 Be responsible for the designation and training of a Fire Warden for each floor, and sufficient Deputy Fire Wardens for each tenancy in accordance with orders on the subject.

D-9.1.6 Be responsible for a daily check for the availability of the Fire Wardens, and see that up-to date organization charts are posted.

NOTE — If the number of Fire Wardens and Deputy Fire Wardens in the building is such that it is impractical to individually contact each one daily, a suggested method to satisfy the requirements is to make provisions for the Fire Warden, or a Deputy Fire Warden in the absence of the Fire Warden, to notify the Fire Safety Director when the Fire Warden or required number of Deputy Fire Wardens are not available. In order to determine the compliance by the Fire Warden and Deputy Fire Wardens, when this method is used, the Fire Safety Director should make a spot check of several different floors each day.

D-9.1.7 Notify the owner or some other person having charge of the building when any designated individual is neglecting his responsibilities contained in Fire Safety Plan. The owner or the other person in-charge of the building should bring the matter to the attention of the firm employing the individual. If the firm fails to correct the condition, the fire department should be notified by the owner/person in charge of the building.

D-9.1.8 In the event of fire, should report to the fire command centre to supervise, provide for and coordinate with respect to the following:

a) Ensuring that the fire department has been notified of any fire or fire alarm.

b) Manning of the fire command station.

c) Direction of evacuating procedures as provided in the Fire Safety Plan. d) Report on conditions on fire floor for information of fire department on their arrival.

e) Advising the fire department officer in-charge in the operation of the Fire Command Centre.

D-9.1.9 Be responsible for the training and activities of the Building Evacuation Supervisor.

D-9.2 Deputy Fire Safety Director's Duties

a) He is the subordinate to the Fire Safety Director.

b) He should perform duties of Fire Safety Director in his absence.

D-9.3 Fire Warden's and Deputy Fire Warden's Duties The tenant or tenants of each floor should, upon request of the owner or person in charge of buildings, make responsible and dependable employees available for designation by the Fire Safety Director as Fire Warden and Deputy Fire Wardens.

D-9.3.1 Each floor of a building should be under the direction of a designated Fire Warden for the evacuation of occupants in the event of fire. He should be assisted in his duties by the Deputy Fire Wardens. A Deputy Fire Warden should be provided for each tenancy. When the floor area of a tenancy exceeds 700 m^2 of occupiable space, a Deputy Fire Warden should be assigned for each 700 m^2 or part thereof.

D-9.3.2 Each Fire Warden and Deputy Fire Warden should be familiar with the fire safety plan, the location of exits and the location and operation of any available fire alarm system.

D-9.3.3 In the event of fire, or fire alarm the Fire Warden should ascertain the location of the fire, and direct evacuation of the floor in accordance with directions received and the following guidelines:

a) The most critical areas for immediate evacuation are the fire floor and floors immediately above. Evacuation from the other floors should be instituted when instructions from the fire Command Centre or conditions indicate such

action. Evacuation should be via uncontaminated stairs. The Fire Warden should try to avoid stairs being used by the Fire department. If this is not possible, he should try to attract the attention of the Fire department personnel before such personnel open the door to the fire floor. b) Evacuation to two or more levels below the fire floor is generally adequate. He should keep the fire command station informed regarding his location.

c) Fire Wardens and their deputies should see that all occupants are notified of the fire, and that they proceed immediately to execute the Fire Safety Plan.

d) The Fire Warden on the fire floor should, as soon as practicable, notify the Fire Command Centre of the particulars.

e) Fire Wardens on floors above the fire should, after executing the Fire Safety Plan, notify the Fire command station of the means being used for evacuation and any other particulars.

f) In the event that stairways serving fire floor and/or floors above are unusable due to contamination or cut-off by fire and/or smoke or that several floors above fire involve large numbers of occupants who must be evacuated, consideration may be given to using lifts in accordance with the following:

1) If the lifts servicing his floor also service the fire floor, they should not be used. However, lifts may be used if there is more than one bank of lifts, and he is informed from the Fire Command Centre that one bank is unaffected by the fire.

2) If lifts do not service the fire floor and their shafts have no openings on the fire floor, they may be used, unless directed otherwise.

3) Lifts manned by trained building personnel or firemen may also be used.

4) In the absence of a serviceable lift, the Fire Warden should select the safest stairway to use for evacuation on the basis of the location of the fire and any information received from the Fire Command Centre. The Fire Warden should check the environment in the stairs prior to entry for evacuation. If it is affected by smoke, alternative stair should be selected, and the Fire Command Centre notified.

5) The Fire Warden should keep the Fire Command Centre informed of the means being employed for evacuation by the occupants of his floor.

g) Ensure that an alarm has been transmitted.

D-9.3.4 Organization Chart for Fire Drill and Evacuation Assignment

A chart designating employees and their assignments should be prepared and posted in a conspicuous place in each tenancy and on each floor of a tenancy that occupies more than one floor and a copy should be in the possession of the Fire Safety Director.

D-9.3.5 Keep available an updated listing of all personnel with physical disabilities who cannot use stairs unaided. Make arrangements to have these occupants assisted in moving down the stairs to two or more levels below fire floor. If it is necessary to move such occupants to a still lower level during the fire, move them down the stairs to the uppermost floor served by an uninvolved lifts bank and then evacuate them to the street floor by lifts. Where assistance is required for such evacuation, notify Fire Safety Director.

D-9.3.6 Provide for Fire Warden identification during fire drills and fires, such as using armband, etc.

D-9.3.7 Ensure that all persons on the floor are notified of fire and all are evacuated to safe areas. A search must be conducted in the lavatories to ensure all are out. Personnel assigned as searchers can promptly and efficiently perform this duty.

D-9.3.8 Check availability of applicable personnel on organization chart and provide for a substitute when the position on a chart is not covered.

D-9.3.9 After evacuation, perform a head count to ensure that all regular occupants known to have occupied the floor have been evacuated.

D-9.3.10 When alarm is received, the Fire Warden should remain at a selected position in the vicinity of the communication station on the floor, in order to maintain communication with the Fire Command Centre and to receive and give instructions.

D-9.4 Building Evacuation Supervisor's Duties - A Building Evacuation Supervisor is required at all times other than normal working or business hours when there are occupants in the building and there is no Fire Safety Director on duty in the building.

D-9.4.1 He should be capable of directing the evacuation of the occupants as provided by the Fire Safety Plan.

D-9.4.2 During fire emergencies, the primary responsibility of the Building Evacuation Supervisor should be to man the Fire Command Centre, and the direction and execution of the evacuation as provided in the Fire Safety Plan. The Building Evacuation Supervisor's training and related activities should be under the direction of the Fire Safety Director in accordance with these rules, and the Fire Safety Plan. Such activities should be subject to fire department control.

D-9.5 Fire Party Duties On receipt of an alarm for fire, the Fire Party should, a) report to the floor below the fire to assist in evacuation and provide information to the Fire Command Centre.

b) after evacuations of fire floor, endeavor to control spread of fire by closing doors, etc.

c) attempt to control the fire until arrival of the fire department, if the fire is small and conditions do not pose a personal threat.

d) leave one member on the floor below the fire to direct the fire department to the fire location and to inform them of conditions.

e) on arrival of the fire department, the Fire Party should report to the Fire Command Centre for additional instructions.

f) have a member designated as runner, who should know the location of the nearest telephone, and be instructed in its use. Such member should immediately upon receipt of information that there is a fire or evidence of fire, go to the telephone, transmit an alarm and await the arrival of the fire department and direct them to the location of the fire

NOTE — A chart designating employees and their assignments should be prepared.

D-9.6 Occupant's Instructions

a) The applicable parts of the approved Fire Safety Plan should be distributed to all tenants of the building by the building management when the Fire Safety Plan has been approved by the Fire Commissioner.

b) The applicable parts of the approved Fire Safety Plan should then be distributed by the tenants to all their employees and by the building management to all their building employees.

c) All occupants of the building should participate and cooperate in carrying out the provisions of the Fire Safety Plan.

D-9.7 Fire Prevention and Fire Protection Programme

a) A plan for periodic formal inspections of each floor area, including exit facilities, fire extinguishers and housekeeping should be developed. A copy of such plan be submitted.

b) Provision should be made for the monthly testing of communication and alarm systems.

D-9.8 Building Information Form

It should include the following information:

a) Building address.....Pin Code.....

b) Owner or person in-charge of building — Name, Address and Telephone Number.

c) Fire Safety Director and Deputy Fire Safety Director's Name and Telephone Number.

d) Certificate of occupancy. Location where posted, or duplicate attached.

e) Height, area, class of construction.

f) Number type and location of fire stairs and/ or firefighting shaft.

g) Number, type and location of horizontal exits or other areas of refuge.

h) Number, type, location and operation of lifts and escalators.

j) Interior fire alarms, or alarms to central stations.

k) Communications systems and/or walkie talkie, telephones, etc.

m) Standpipe system; size and location of risers, gravity or pressure tank, fire pump, location of Siamese connections, name of employee with certificate of qualification and number of certificate.

n) Sprinkler system; name of employee with Certificate of Fitness and certificate number. Primary and secondary water supply, fire pump and areas protected.

p) Special extinguishing system, if any, components and operation.

q) Average number of persons normally employed in building (Daytime and night time).

r) Average number of persons with disabilities in building and their location (Daytime and night time).

s) Number of persons normally visiting the building (Daytime and night time).

t) Service equipment such as:

1) Electric power, primary, auxiliary;

2) Lighting, normal, emergency, type and location;

3) Heating, type, fuel, location of heating unit;

4) Ventilation — with fixed windows, emergency means of exhausting heat and smoke;

5) Air conditioning systems — Brief description of the system, including ducts and floors serviced;

6) Refuse storage and disposal;

7) Firefighting equipment and appliances, other than standpipe and sprinkler system; and

8) Other pertinent building equipment.

u) Alternations and repair operations, if any, and the protective and preventive measures necessary to safeguard such operations with attention to torch operations.

w) Storage and use of flammable solids, liquids and/or gases.

y) Special occupancies in the building and the proper protection and maintenance thereof. Places of public assembly, studios, and theatrical occupancies.

D-9.9 Representative Floor Plan

A floor plan, representative of the majority or the floor designs of the entire building, should be at the Command Post, in the main lobby, under the authority of the Fire Safety Director. One copy of a representative floor plan should be submitted to the Fire department with the Fire Safety Plan.

D-9.10 Fire Safety Plan In planning, evaluate the individual floor layouts, the population of floors, the number and kinds of exits, the zoning of the floor by area and occupants. Determine the movement of traffic by the most expeditious route to an appropriate exit and alternative route for each zone, since under fire conditions one or more exits may not be usable. This format should be used in the preparation of the Fire Safety Plan. Nothing contained in this Fire Safety Plan format should be construed as all inclusive. All rules and other requirements should be fully complied with.

D-9.11 Personal Fire Instruction Card All the occupants of the building should be given a Personal Fire Instruction Card giving the details of the floor plan and exit routes along with the instruction to be followed in the event of fire. A typical Personal Fire Instruction Card should be as follows:

PERSONAL FIRE INSTRUCTION CARD SEAL NAME OF THE ORGANIZATION ADDRESS OF THE ORGANIZATION NA

ME:_____ DESIGNATION:_____ FLOOR NO. :

_____ DATE : _____ FIRE WARDEN

INSTRUCTIONS FOR YOUR OWN SAFETY YOU SHOULD KNOW

1. Two push button fire alarm boxes are provided per floor. You should read the operating instructions.
2. You should read the operating instructions on the body of the fire extinguishers provided on your floor.
3. The nearest exit from your table.
4. Your assembly point on ground floor (check with your Fire/Deputy Fire Warden).
5. **FOR YOUR OWN PROTECTION YOU SHOULD REPORT TO YOUR FIRE/ DEPUTY FIRE WARDEN**

   a) If any exit door/route is obstructed by loose materials, goods, boxes, etc.
   b) If any staircase door, lift lobby door does not close automatically, or does not close completely.
   c) If any push button fire alarm point, or fire extinguisher is obstructed, damaged or apparently out of order

IF YOU DISCOVER A FIRE

1) Break the glass of the nearest push button fire alarm and push the button.

2) Attack the fire with extinguishers provided on your floor. Take guidance from your Wardens.

3) Evacuate, if your Warden asks you to do so.

IF YOU HEAR EVACUATION INSTRUCTIONS

1) Leave the floor immediately by the nearest staircase as directed

2) Report to your Warden, at your predetermined assembly point outside the building.

3) Do not try to use lifts.

4) Do not go to cloakroom.

5) Do not run or shout.

6) Do not stop to collect personal belongings.

7) Keep the lift lobby and staircase doors shut.

YOUR ASSEMBLY POINT IS .....

Source: Pg. 81 -86, Annex D, PART 4 Fire and Life Safety, NBC 2016

Annexure -4

Suggestive NICU evacuation considerations

1. Objective

The objectives of this NICU Fire Safety and Evacuation Guideline are to establish a comprehensive, unit specific framework that ensures the highest level of safety, preparedness, and coordinated response during any fire emergency. The specific objectives are:

A. Safety & Prevention

- To prevent fire incidents through systematic hazard identification, safe electrical practices, oxygen safety, and strict adherence to fire-prevention protocols.
- To ensure the NICU environment complies with institutional and national fire safety standards.
- To minimize ignition risks associated with electrical load, oxygen-rich zones, and flammable materials.

B. Detection & Immediate Response

- To enable rapid recognition of fire, smoke, or electrical hazards through functional detection and alarm systems.
- To ensure prompt activation of CODE RED, timely communication with the Hospital Incident Command System (HICS), and immediate initiation of RACE protocols.

C. Evacuation & Continuity of Care

- To guide safe, coordinated, and efficient evacuation of neonates during fire or smoke incidents.
- To ensure uninterrupted airway support, oxygen delivery, thermoregulation, and monitoring during evacuation.
- To maintain accurate patient identification, documentation, and tracking throughout the evacuation process.
- To enable smooth transition of neonatal care to pre designated safe zones with adequate clinical support.

D. Roles, Coordination & Operation

- To define clear roles and responsibilities for consultants, residents, nursing officers and support staff during fire emergencies.
- To ensure smooth communication, teamwork, and decision making through an established NICU command structure.

E. Training, Audit & Quality Improvement

- To ensure all NICU staff are trained and competent in extinguisher use, evacuation techniques, and neonatal resuscitation during emergencies.
- To conduct periodic fire drills, simulations, and audits to ensure continuous preparedness.
- To identify gaps, implement corrective measures, and regularly update the fire safety plan based on drill outcomes and incident reviews.

2. Fire prevention measures

2.1 Structural Safety Measures

1. Maintain fire-resistant construction elements including walls, ceilings, doors, and partitions to ensure proper compartmentalization of the NICU.

2. Ensure all fire-rated doors remain functional, unblocked, self-closing, and never propped open.
3. Provide adequate spacing between incubators, warmers, and equipment to allow heat dissipation and unobstructed movement during emergencies.
4. Maintain proper ventilation in electrical rooms, UPS/battery areas, and medical gas stores.
5. Install and routinely test smoke and heat detectors in all NICU rooms, corridors, feed preparation areas, and adjacent spaces.
6. Ensure that fire extinguishers, hydrants, and hose reels are appropriately located within 10-15 metre, easily accessible, and clearly marked.
7. Prohibit heating appliances (hot plates, ovens, immersion heaters) within NICU premises.

2.2 Electrical Safety

1. Conduct scheduled electrical load assessments to prevent overload on circuits used for critical devices.
2. Ensure preventive maintenance of incubators, warmers, ventilators, monitors, and phototherapy units as per biomedical engineering protocols.
3. Use only certified, surge protected power strips and avoid extension boards.
4. Immediately replace damaged wires, loose sockets, burnt adapters, or overheated connectors.
5. Prohibit personal or unauthorized electrical appliances inside NICU.
6. Ensure all equipment is connected to properly rated MCB/RCCB circuits for safety.

2.3 Oxygen and Medical Gas Safety

1. Clearly mark and secure all oxygen and air outlets, ensuring color coded labeling.
2. Store portable cylinders in approved stands with chain/strap restraints to prevent tipping.
3. Maintain only the minimum required number of cylinders inside NICU; excess cylinders must be stored in designated fire safe storage.
4. Perform periodic leak testing and pressure checks of cylinders and pipelines.
5. Prevent ignition sources (sparks, flames, static discharge) around oxygen rich zones.
6. Ensure quick access to shut off valves are clearly identified and staff are trained in their location and use.

2.4 Chemical and Material Safety

1. Store flammable disinfectants (alcohol, spirit, acetone) in closed, ventilated cabinets away from heat sources.
2. Allow adequate drying time for alcohol-based hand rubs and cleaning solutions before initiating procedures.
3. Avoid accumulation of combustible packaging materials; dispose of cardboard, plastics, and paper waste promptly.
4. Maintain availability of spill-control kits for safe handling of chemical spills.

2.5 Administrative Prevention Measures

1. Ensure prompt reporting of hazards such as burning smell, sparking, smoke, or unusual equipment heating.
2. Enforce strict No Smoking policy in and around NICU and its adjoining areas.
3. Keep evacuation pathways, staircases, electrical ducts, and exits unobstructed at all times.
4. Conduct annual fire safety inspections and rectify deficiencies without delay.
5. Display safety signage for electrical hazards, oxygen safety, fire extinguisher use, and emergency exits prominently, using glow-in-the-dark material for visibility.

3. Fire mitigation & Detection

3.1 Fire Detection Systems

1. Install addressable smoke detectors in all NICU zones including patient bays, corridors, procedure rooms, and milk-preparation areas.
2. Use heat detectors in utility areas where smoke detectors may give false alerts.
3. Ensure all detectors are linked to the central fire alarm panel with audible and visual alerts.
4. Conduct weekly function checks and quarterly calibration by biomedical/engineering teams.
5. Maintain loud, distinct alarm signals that are easily recognized by staff.

3.2 Alarm and Notification Systems

1. Provide clearly marked alarm points at entrances, exits, and internal NICU locations.
2. Staff must activate the nearest alarm immediately upon noticing smoke or fire.
3. Ensure alarms automatically notify the Fire Control Room & Command Centre.
4. Display emergency contact numbers prominently at nurse stations and near alarms.
5. Conduct periodic simulations to ensure staff recognize and respond promptly to alarm cues.

3.3 Fire Suppression and Extinguishing Equipment

1. Install CO_2 extinguishers for electrical/oxygen rich areas and ABC dry powder extinguishers elsewhere.
2. Mount extinguishers visibly on walls and ensure they remain unobstructed at all times.
3. Perform monthly visual checks and annual refilling/pressure testing.
4. Place fire blankets in locations prone to localized equipment fires.
5. Ensure hose reels or hydrants are accessible in adjacent corridors.
6. Train all staff in correct extinguisher use using the PASS technique. **(Pull–Aim–Squeeze–Sweep)**

3.4 Ventilation, Smoke Control & Containment

1. Maintain self-closing fire doors with functional smoke seals to prevent smoke migration.
2. Ensure proper compartmentalization to isolate NICU from high risk areas.
3. Allow HVAC systems to be isolated during fire events to stop smoke recirculation.
4. Close doors and windows promptly during a fire to contain smoke.
5. Ensure engineering staff know the locations of AHU controls and emergency shut off switches.

3.5 Fire Mitigation Protocols

1. Implement the RACE protocol (Rescue–Alarm–Contain–Extinguish/Evacuate) for all incidents.
2. Train staff to switch off non-essential electrical equipment when sparking/smoke is observed.
3. Keep flammable materials such as spirit/alcohol containers away from heat sources.
4. Maintain a clear safety buffer around incubators, warmers, and electrical panels.
5. Move babies away from early smoke detection zones even before visible fire spreads.

3.6 System Testing and Maintenance

1. Conduct daily checks to ensure alarm indicators are functional.
2. Perform weekly audible alarm tests.
3. Carry out quarterly preventive maintenance of detection and suppression systems.
4. Ensure annual fire system audits are completed as per institutional policy.
5. Replace faulty detectors, expired extinguishers, or malfunctioning alarm components immediately.

4. Preparedness

4.1 Emergency Operation Plan (EOP) Readiness

1. Ensure the NICU specific EOP is displayed prominently at the nurse station and duty room.
2. Review and update the EOP annually or after any fire-related event.
3. Ensure all staff are oriented to EOP activation criteria and response sequences.
4. Maintain clearly displayed evacuation maps showing **primary** and **secondary routes**, fire extinguisher points, and assembly zones.
5. Keep printed copies of the EOP and job cards in a clearly visible and accessible folder.

4.2 Staff Roles and Response Structure

1. Designate a **Leader/Physician on Duty** to oversee emergency decision-making during each shift.
2. Identify an Area Leader, Evacuation Team members, and Support Teams.
3. Ensure job cards for all roles (Leader/Physician on Duty, Resident/Doctor, Nurse, ward boy) are updated and accessible.
4. Conduct routine orientation sessions so staff understand their assigned responsibilities.
5. Maintain an updated duty roster ensuring adequate distribution of trained personnel.
6. Assign one staff member per shift to liaise with the Hospital Command System.

4.3 Bedside Fire Evacuation Kit

Each cot must have a ready to use kit.

Contents	Quantity	Contents	Quantity	Contents	Quantity
Self-inflating bag	**1**	Diapers	**4**	Saline wipes	**4**
Full-term mask	**1**	Diaper wipes package	**1**	Alcohol wipes	**4**
Premature mask	**1**	Flashlight	**1**	Adhesive tape	**1 roll**
Bulb syringe	**1**	Notepad and pen	**1**	Whistle	**1**
Stethoscope	**1**	Watch	**1**		
Thermal blankets	**2**	Hand sanitizer	**1**		
Hats	**1**	Sterile gloves, size 6.5	**1**		
Formula Feed packet	**1**	Sterile gloves, size 7.0	**1**		
Feeding Cup	**1**	Sterile gloves, size 7.5	**1**		
Feeding syringes	**4**	Sterile gloves, size 8.0	**1**		

4.4 Emergency / Evacuation Trolley

Contents	Quantity	Contents	Quantity	Contents	Quantity
Laryngoscope	**1**	Nasal aspirators	**2**	4 × 4 gauze sponges	**2**
Blades for laryngoscope 0,00,1	**2**	IV catheters	**4**	Nonsterile 2 × 2s	**10**
Stylettes	**2**	T-connectors	**2**	Transparent dressing	**2**

Contents	Quantity	Contents	Quantity	Contents	Quantity
Endotracheal tubes, 2.5 mm	**2**	Chlorhexidine	**2**	Adhesive tape roll	**1**
Endotracheal tubes, 3 mm	**2**	Saline wipes -pack	**2**	Scissors	**1**
Endotracheal tubes, 3.5 mm	**2**	Alcohol wipes	**4**	Calculators	**1**
Endotracheal tubes, 4.0 mm	**2**	0.9 normal salin	**2**		
Inline suction	**2**	e vials	**3**		
Suction tubing	**3**	3 mL syringes	**3**		
6 Fr suction catheters	**2**	18 g needles	**2**		
8 Fr suction catheters	**2**	Microtubing	**2**		
10 Fr suction catheters	**2**	IV tubing	**2**		
		DW bags	**2**		

4.5 Communication and Coordination Preparedness

1. Display emergency number (Fire Control Room)
2. Test phones/intercom systems at every day
3. Identify an alternate communication method (e.g., runners/ward boy) for system failures.
4. Ensure all NICU rooms have clearly audible alarms.
5. Train staff in giving concise updates using SBAR (S-Situation, B-Background , A- Assessment , R-Recommendation) format.

4.6 Infrastructure and Environmental Readiness

1. Keep evacuation pathways free of equipment, cylinders, or furniture.
2. Ensure exits, staircases, and corridors remain unobstructed.
3. Maintain glow in dark exit signage.
4. Keep extinguishers, hydrants, and hose reels accessible.
5. Ensure emergency lighting and UPS backup are functional.

4.7 Training and Competency Development

1. Provide fire safety induction to all newly joining staff.
2. Conduct hands-on extinguisher training for all team members.
3. Hold quarterly drills on T piece ventilation during evacuation.
4. Conduct **biannual mock evacuation drills** with participation from all shifts.
5. Maintain training logs and competency assessments.
6. Analyse drill feedback and implement improvements.

5. Emergency response

Effective fire response in the NICU requires rapid recognition, immediate activation of alarms, clear communication, and coordinated actions directed by the Leader/Physician on Duty.

5.1 Activation of Fire Emergency

1. Any staff member who notices smoke, burning smell, sparks, or visible fire must initiate the response immediately.
2. Activate the **nearest manual call point (MCP)** without waiting for approval.
3. Inform the **Leader/Physician on Duty** and the Area Leader immediately.
4. Notify the Fire Control Room, Security, and Engineering departments through intercom or emergency numbers.

5. Announce "CODE RED – NICU" clearly within the unit to alert staff.

5.2 Roles During Initial Response

1. Leader/Physician on Duty

- Takes charge of decision-making.
- Assesses risk and announces whether evacuation is needed.
- Coordinates communication with the Hospital Incident Command System (HICS).

2. Area Leader

- Supervises team mobilization.
- Ensures staff proceed sequentially with RACE actions.
- Begins preparing neonates for possible evacuation.

3. Nursing Team

- Starts bedside rescue and containment measures.
- Prepares evacuation kits and secures babies.

4. MTS / Support Staff

- Assists with moving babies, clearing pathways, and bringing extinguishers.

5. Engineering & Security Teams

- Engineering isolates affected circuits or AHU if needed.
- Security ensures corridor clearance and guides fire personnel.

5.3 RACE Protocol

R – Rescue

1. Move infants away from the fire/smoke source immediately.
2. Transfer babies to the closest safe zone inside the NICU if evacuation is not yet announced.
3. Prioritize babies located nearest to the hazard.
4. Maintain thermal protection (wraps/blankets) during movement.

A – Alarm

1. Activate the manual call point.
2. Call the Fire Control Room and inform: "NICU – CODE RED."
3. Alert the **Leader/Physician on Duty**.
4. Ensure internal alarm announcements are made audibly across the NICU.
5. Document the time of alarm activation if possible.

C – Contain

1. Close doors and windows to restrict smoke entry.
2. Switch off non-essential electrical devices (warmers, phototherapy units, pumps).
3. Do not switch off the main electrical supply unless advised by Engineering department.
4. Move flammable materials (alcohol, spirit, packaging) away from heat sources.
5. Keep fire doors closed to maintain compartmentalization.

E – Extinguish / Evacuate

1. Attempt extinguishing only if:
    - the fire is small,
    - staff safety is assured, and
    - the correct extinguisher is available.
2. Use CO_2 extinguishers for electrical fires and ABC extinguishers for general fires.
3. If the fire spreads or smoke increases, stop extinguishing attempts and proceed to evacuation.
4. The **Leader/Physician on Duty** announces:
    - partial evacuation,
    - horizontal evacuation or vertical evacuation depending upon infrastructure
    - or full evacuation.
5. Evacuate per NICU evacuation protocols in Section 6.

5.4 Communication During Emergency

1. Maintain continuous updates between Area Leader and the Leader/Physician on Duty.
2. Use intercom/phone as primary communication; use ward boy as runners if systems fail.
3. Inform adjacent units (Labour Room, Paediatric ward, PNC ward) if preparing for evacuation.
4. Maintain calm, firm communication to prevent panic.

5.5 Safety Principles During Response

1. Staff must not enter smoke filled or fire affected rooms unless safe.
2. Avoid opening doors to burning rooms - may worsen fire spread.
3. Never leave a baby unattended on a warmer/incubator during response.
4. Ensure PPE (gloves, masks) is used if smoke exposure risk exists.
5. Protect staff and babies first - equipment is secondary.

6. Evacuation protocol

Evacuation of neonates during a fire incident requires coordinated, timely, and safe actions. Decisions are guided by the **Leader/Physician on Duty**, with the Area Leader supervising operational steps.

6.1 Indications for Evacuation

1. Visible flames or smoke entering NICU patient areas.
2. Burning smell or sparking that risks rapid fire spread.
3. Alarms from fire detection systems with confirmed source.
4. Loss of electrical power affecting life-support equipment.
5. Instruction from Hospital Command.
6. Decision by the **Leader/Physician on Duty** based on situational risk.

6.2 Types of Evacuation depending upon available infrastructure and situation

- **Localized Evacuation:** Moving babies within the same room to a safer corner or adjacent bay.
- **Complete NICU Evacuation:** Evacuating all babies to predetermined safe zones when the entire unit is compromised.
- **Horizontal Evacuation (Preferred):** Moving babies to an adjacent smoke-free unit on the same floor.
- **Vertical Evacuation:** Moving babies to another floor (used only if horizontal movement is unsafe or blocked).

6.3 Evacuation Prioritization (Triage Order)

- Babies closest to the fire or smoke.
- Stable babies who can be moved quickly.
- Critical babies requiring airway/ventilation support (transferred with dedicated team).
- Babies on invasive ventilation moved last **only if they are not in immediate danger**, but always with a fully equipped team.

6.4 Preparation Before Moving Babies

- Apply an ID label on wrist or leg.
- Wrap the baby in thermal sheets/plastic wraps/blankets.
- Transition ventilated infants to T-piece resuscitator/self-inflating bag by a trained doctor.
- Secure IV lines, syringes, and infusions safely.
- Take only **essential** equipment:
    1. bag/T-piece resuscitator
    2. portable oxygen
    3. suction if available
    4. minimal monitoring
- Do **not** waste time in dismantling incubators, warmers, or non-essential devices.

6.5 Methods of Transferring Babies

- **Hand Carry:** For stable babies with proper thermal protection.
- **Transport in Bassinets/Trolleys:** For infants needing more stability.
- **Ventilated Baby Transfer:**
    1. Doctor handles airway and ventilation with bag/T-piece resuscitator.
    2. Nurse secures lines and medications.
    3. Ward boy supports in carrying and oxygen.
        - Maintain continuous monitoring of colour, heart rate ,tone, and breathing.

6.6 Evacuation Team Structure

1. **Leader/Physician on Duty** – authorizes evacuation, supervises overall movement.
2. **Area Leader** – coordinates baby preparation and assigns responsibilities.
3. **Airway Doctor** – handles ventilation of critical babies.
4. **Nursing Officer** – secures lines, thermal care, prepares evacuation kits.
5. **Ward Boy/Porter** – carries infants/equipment and clears pathways.
6. **Security Personnel** – keeps corridors open and guides fire responders.
7. **Engineering Staff** – isolates circuits or AHU if needed.

6.7 Evacuation Pathways

- Use **primary route** as marked on evacuation maps.
- If blocked, switch immediately to **secondary route**.
- Ensure corridors are cleared of cylinders, trolleys, and equipment.
- Staircases should be used only under guidance of the **Leader/Physician on Duty**.

6.8 Patient Identification and Tracking

- Label each neonate clearly before movement.
- Complete the **Evacuation Tracking Form**.
- Record:
    1. baby name/ID
    2. original bed number
    3. time of evacuation
    4. staff involved
    5. destination
- Area Leader maintains a master list to ensure no baby is missed.

6.9 Safe Zone Reception

- Place babies in pre-allocated areas based on acuity.
- Reconnect to oxygen, CPAP, or ventilator support as per requirement.
- Re-initiate monitoring (SpO_2, HR, temperature).

- Ensure warmth using blankets, incubators, or radiant warmers.
- Document condition on arrival and any adverse events.

6.10 Communication During Evacuation

- Area Leader provides updates to the **Leader/Physician on Duty** at regular interval.
- Ward boy may carry messages if phones/intercoms fail.
- Adjacent units must be informed in advance of receiving babies.
- Families are informed only by designated staff to avoid crowding and panic.

6.11 Safety Rules During Evacuation

- Do not leave any baby unattended at any point.
- Do not run—move swiftly but safely.
- Avoid taking large equipment that can block pathways.
- Keep babies warm at all times.
- Never use lifts if fire/smoke is present in building or stairwells.

6.12 Completion of Evacuation

1. Area Leader cross-checks the tracking list against evacuated babies.
2. Confirm no baby, staff member, or caregiver remains inside the NICU.
3. The **Leader/Physician on Duty** updates Fire Control Room and HICS once evacuation is complete.
4. Document timelines and actions taken.

7. Post-evacuation stabilization

7.1 Immediate Reassessment of Each Baby

1. Check airway patency, breathing pattern, and chest movements.
2. Assess heart rate, perfusion, and colour.
3. Measure SpO_2 and ensure oxygen delivery is adequate.
4. Evaluate temperature and initiate warming if needed.
5. Inspect IV lines, UVC/UAC, drains, and medication infusions for dislodgement.

7.2 Re-Establishing Respiratory Support

1. Reconnect babies to oxygen/air supply using wall outlets or portable cylinders.
2. For ventilated infants, reconnect to transport ventilator or stand by ventilator immediately.
3. Resume CPAP, HFNC, or NIPPV as per pre-evacuation settings.
4. Confirm correct pressure/flow settings to avoid accidental hypo/hyperventilation.
5. Ensure suction equipment is accessible and functional.

7.3 Thermal Stabilization

1. Place babies in incubators or under radiant warmers available in the safe zone.
2. Use thermal blankets, hats, and wraps until device-based warming is re-established.

3. Monitor temperature every 10–15 minutes until stable.
4. Avoid over-wrapping or overheating during rewarming.

7.4 Stabilizing IV Lines, Medications, and Fluids

1. Verify patency of IV lines and ensure no air entry occurred during transfer.
2. Restart infusions at pre-fire rates unless clinical condition requires adjustment.
3. Ensure emergency medications are immediately available.
4. Replace dislodged or contaminated lines using aseptic techniques.

7.5 Monitoring and Documentation

1. Record baseline vital signs after arrival to the safe zone.
2. Document any deterioration noted during evacuation.
3. Update medication charts, infusion rates, and ventilator settings.
4. Complete the **Evacuation Tracking Form** for each neonate.
5. Maintain a rostered nurse at the registration desk to log all arrivals and transfers.

7.6 Prioritizing High-Risk Babies

1. **Immediately stabilize:**
   - extremely premature infants
   - ventilated babies
   - babies with hemodynamic instability
2. Assign a senior nurse/doctor to each critical baby until stabilization is confirmed.
3. Ensure additional thermal support (gel mattresses, servo modes) for Extremly Low Birth Weight (ELBW) infants.

7.7 Parent Communication

1. Designate one staff member to communicate with parents in a controlled manner.
2. Provide concise updates on the baby's condition and location.
3. Prevent unauthorized entry to avoid crowding and safety risks.
4. Reassure families and explain the stabilization process.

7.8 Safety and Infection Control

1. Maintain hand hygiene and aseptic precautions despite the emergency setting.
2. Avoid clustering babies too closely to prevent cross-infection if possible.
3. Ensure clean linens, sterile supplies, and appropriate waste disposal.
4. Confirm the safe zone environment is temperature-controlled and clean.

7.9 Coordination with Support Departments

1. Biomedical Engineering: assist in reconnecting and troubleshooting equipment.
2. Nursing Supervisor: coordinate allocation of staff to babies based on acuity.
3. Pharmacy: supply urgent medications or infusion sets.
4. Transport Team: prepare for onward transfer if relocation to another unit is needed.

7.10 Completion of Stabilization Phase

1. The **Leader/Physician on Duty** confirms when all babies are clinically stable.
2. Document the time stabilization was achieved for each neonate.
3. Prepare for continued care in the safe zone or plan re-entry (based on safety clearance).
4. Begin early preparations for recovery and demobilization.

8. Recovery and demobilization

Recovery and demobilization begin once all neonates are safely evacuated and stabilized.

8.1 Safety Clearance and Re-entry Assessment

1. The **Engineering Team**, along with Fire Department personnel, must inspect the NICU for structural safety.
2. Assess electrical panels, wiring, sockets, UPS systems, and biomedical equipment for fire or water damage.
3. Evaluate oxygen pipelines, gas outlets, and shut-off valves for leaks or heat exposure.
4. Check HVAC systems and air-handling units for smoke contamination.
5. The NICU must **remain closed** until written clearance is provided by Engineering and Fire Safety authorities.
6. The **Leader/Physician on Duty** must not allow re-entry until official clearance is obtained.

8.2 Equipment and Supply Assessment

1. Identify all damaged, unsafe, or contaminated equipment and remove them from service.
2. Clean and disinfect all salvaged equipment as per biomedical guidelines.
3. Replace consumables such as tubing, circuits, lines, linens, and thermal aids exposed to smoke or fire.
4. Assess incubators, warmers, ventilators, and monitors for functionality before reuse.
5. Update inventory logs noting losses, replacements needed, and estimated recovery timelines.
6. Coordinate with Biomedical Engineering for rapid repair or replacement.

8.3 Restoration of Clinical Services

1. Prepare an interim NICU setup (or continue in the safe zone) until the main unit is ready for reoccupation.
2. Assign beds based on acuity and ensure sufficient spacing for infection control and equipment access.
3. Reconnect babies to standard NICU equipment once safety and functionality are confirmed.
4. Re-establish routine monitoring, medication schedules, feeding protocols, and documentation.
5. Ensure adequate staffing to resume normal NICU operations without compromising care.

8.4 Staff Debriefing and Psychological Support

1. Conduct a structured debriefing session within **24 hours** of the incident.
2. Include all staff involved—doctors, nurses, MTS, engineering, and security personnel.
3. Discuss:
    - what worked well
    - challenges faced
    - delays or communication gaps
    - equipment or infrastructure issues

4. Encourage open, blame-free discussion to enhance learning.
5. Provide psychological support or counselling for staff affected by the event.
6. Ensure rest periods for staff who participated in evacuation to prevent fatigue-related errors.

8.5 Parent and Family Communication

1. Provide clear information to families regarding the incident and current status of their babies.
2. Avoid overcrowding and ensure communication takes place in a controlled space.
3. Reassure parents about safety measures and steps taken to protect their infants.
4. Document all communication in the nursing/medical notes.

8.6 Incident Documentation

1. Complete the **Fire Incident Report** including timeline, actions taken, and personnel involved.
2. Attach the Evacuation Tracking Forms for every baby.
3. Document any complications or adverse events during evacuation or stabilization.
4. Record equipment lost or damaged, and actions taken for repair/replacement.
5. Submit the full report to:

- Hospital Fire Safety Committee
- Nursing Superintendent
- Medical Superintendent
- Quality and Safety Department

8.7 Root Cause Analysis and Corrective Actions

1. Conduct a formal **Root Cause Analysis (RCA)** within 72 hours, if feasible.
2. Identify sources of ignition, system failures, communication gaps, or human factors.
3. Develop a **Corrective Action Plan** with clear timelines and responsible persons.
4. Update training needs based on identified gaps.
5. Review and revise SOPs or guideline sections if required.

8.8 Replenishment and Readiness Restoration

1. Restock bedside fire kits, evacuation trolleys, emergency medications, and disposables.
2. Replace used or expired oxygen cylinders, suction jars, and monitoring probes.
3. Ensure all fire extinguishers are refilled and functional.
4. Reinstate daily/weekly fire safety checks and readiness protocols.
5. Revalidate evacuation routes and ensure pathways are fully cleared.

8.9 Declaration of Resumption of Normal Operations

1. The NICU may resume full operations only after:

- structural and electrical clearance,
- biomedical equipment validation,
- environmental cleanliness and infection control clearance.

2. The **Leader/Physician on Duty** formally informs the team about NICU reopening.
3. Documentation of reopening is signed by Engineering, Nursing, and Medical leadership.

8.10 Post-Incident Quality Improvement

1. Incorporate lessons learned into future fire drills.

2. Update checklists, annexures, and training materials.
3. Reinforce staff competency through refresher sessions.
4. Present incident analysis in Fire Safety Committee meetings for institutional learning.

9. Training and drills

9.1 Orientation and Induction Training

1. All new staff (doctors, nurses, MTS, housekeeping, security assigned to NICU) must undergo fire safety orientation within their **first week** of joining.
2. Orientation must include:
   - basics of fire safety
   - RACE protocol
   - alarm activation
   - evacuation pathways
   - extinguisher types and usage
   - NICU-specific hazards (oxygen, electrical load, equipment density)
3. Conduct practical demonstrations of manual call point (MCP) use, fire extinguisher handling, and safe evacuation techniques.
4. Document completion of induction training in the NICU training register.

9.2 Skill-Based Training

1. Provide hands-on training for:
   - T-piece resuscitator use during evacuation
   - bag-mask ventilation for neonates
   - safe transfer techniques for ventilated and critical babies
   - securing IV lines and thermal protection during movement
2. Train staff in rapid preparation of evacuation kits.
3. Conduct competency checks every **six months** for all clinical staff.
4. Maintain individual competency sheets for audit and accreditation.

9.3 Fire Safety and Equipment Training

1. Conduct regular training on correct use of CO_2, ABC, and clean-agent extinguishers.
2. Ensure staff know extinguisher locations and which type to use for:
   - electrical fires
   - oxygen-enriched environments
   - general combustible fires
3. Demonstrate safe switching-off of non-essential electrical equipment.
4. Provide refresher training in identifying electrical hazards (sparking, overheating cables, overloaded sockets).

9.4 Evacuation Drill Protocols

1. Conduct **biannual full-scale evacuation drills** involving all shifts.
2. Include simulated scenarios such as:
   - smoke in a patient area
   - fire near warmers or incubators

- electrical panel malfunction
- oxygen-leak–related near-miss

3. Practice evacuation of:
   - stable babies
   - ventilated/critical neonates
   - twins and multiple births
4. Test accuracy and speed of patient tracking and documentation.
5. Evaluate corridor clearance, communication flow, and teamwork during the drill.

9.5 Frequency of Routine Drills

1. **Monthly:** Mini-drill (tabletop or limited simulation) focusing on 1–2 components (e.g., alarm activation, extinguisher use).
2. **Quarterly:** Functional drill to test the RACE sequence and role allocation.
3. **Biannual:** Full evacuation drill with multidisciplinary participation.
4. **Annual:** Combined structural and functional drill involving Engineering, Fire Department, Security, and Nursing Administration.

10. Documentation requirements

All documentation during and after a fire incident must be standardized and maintained as per hospital policy.

10.1 Documentation During Fire Response

1. Record the exact **time of alarm activation** and person who activated it.
2. Note the **source of smoke/fire** if identifiable (equipment, room, panel, etc.).
3. Document actions taken under the RACE protocol (Rescue, Alarm, Contain, Extinguish/Evacuate).
4. Maintain a log of communication with:
   - Fire Control Room
   - Engineering
   - Security
   - Hospital Command
5. The **Leader/Physician on Duty** must document the decision for partial or complete evacuation.
6. Nursing staff must record which babies were moved first and why (triage rationale).

10.2 Evacuation Documentation

1. Use the **Evacuation Tracking Form** (Pt.11 below) for each neonate.
2. Record:
   - baby's name/ID
   - original bed/cot number
   - time of evacuation
   - method of transfer
   - staff accompanying the baby
   - destination safe zone
3. Area Leader maintains a **Master Evacuation List** ensuring no baby is missed.
4. Document any issues during transport (desaturation, line dislodgement, ventilation difficulty).
5. Record the exact time when evacuation was completed.

10.3 Stabilization Documentation in Safe Zone

1. Record vital signs and clinical status immediately on arrival.
2. Document re-connection to oxygen, ventilator, CPAP, or monitors.
3. Note any intervention performed during stabilization.
4. Record complications such as:
    - hypothermia
    - apnea
    - line dislodgement
    - equipment failure
5. Update medication charts, ventilator settings, and fluid orders.
6. Ensure continuous nursing notes document changes during the stabilization phase.

10.4 Post-Incident Reporting

1. Complete the **Fire Incident Report** within **24 hours** of the event.
2. Include:
    - sequence of events
    - probable cause (if known)
    - response taken
    - staff involved
    - equipment affected
    - timeline summary
3. Attach evacuation forms, master lists, and safe zone stabilization sheets.
4. Submit the compiled report to:
    - Hospital Fire Safety Committee
    - Medical Superintendent
    - Nursing Superintendent
    - Quality and Patient Safety Department
5. The Leader/Physician on Duty must add a summary note in the unit logbook.
6. Document all communications made to parents/guardians.

11. Important templates/SOPs

1. Job Card – Leader / Physician on Duty
2. Job Card – Area / Room Leader
3. Job Card – Duty Doctor
4. Job Card – Bedside Nursing Officer
5. Job Card – Multi-Tasking Staff (MTS)
6. Job Card – Ward Attendant
7. Fire Evacuation – Patient Tracking Form (NICU)
8. Step-by-Step Evacuation Guide for Critical Patients (Team of 4: A–Doctor, B–Nurse, C/D–MTS)
9. Team Assignment Template for Critical Patient Evacuation (A/B/C/D)

1. Job card- Leader/ Physician on duty	
1	Retriew Disaster documentation kit- Job cards/ Incident form / Patient tracking evacuation forms
2	Direct staff to notify incident command centre
3	Alert labor and delivery in-charge to the situation and request that a hold be placed on nonemergent deliveries
4	Establish communication on radio/phone once "CODE RED" activated
5	Assign each area/room leader- distribute job cards/ patient evacuation tracking form
6	Distribute remaining job cards to duty doctors, nursing officers and multi tasking staff
7	Review patients and determine order of potential evacuation based on level of acuity and nature of event. DO NOT EVACUATE WITHOUT AN ORDER FROM THE HOSPITAL COMMAND CENTRE
8	Direct support persons/multi tasking staff to assist area/room leaders in gathering and carrying supplies.
9.	If ordered to evacuate by command centre- follow EOP as per type of evacuation.
10.	Establish helpline for relatives for communicating baby status.

2. Job card- Area/Room Leader	
1	Coordinate with the team leader for evacuation updates and guidance.
2	Prepare a list of NICU staff on duty and patients present in the unit.
3	Ensure all patients have identification bands for easy identification.
4	Take updates from the leader about evacuation preparation progress and next steps.
5	Assign staff to evacuate patients in the order of nearest, stable, and critically ill.
6	Confirm patient evacuation by cross-checking with the patient list.
7	Organize the transfer of essential supplies and resources during evacuation.
8	Mark the area as evacuated (X) with red tape after confirming all patients and resources are shifted.

3. Job card – Duty Doctor	
1	Document ongoing medications, vital signs, and respiratory support details for assigned patients.
2	Assess the patient's condition and prioritize care based on stability and urgency for evacuation.
3	Coordinate with the bedside nursing officer to ensure patient readiness and equipment detachment.
4	Communicate with multi-tasking staff (MTS) to organize resources and assist with patient transfer.
5	Detach or delegate task to detach wall-mounted medical equipment while ensuring uninterrupted patient support.
6	Set up and attach portable respiratory devices like self-inflating bags.
7	Inform the evacuation leader about the patient's condition and readiness for transfer.
8	Oversee the safe transfer of the patient to the evacuation team while maintaining critical care.
9	Reattach essential equipment and stabilize the patient upon reaching the evacuation zone.

10	Provide updates to the room or team leader and ensure smooth coordination with MTS and nursing staff.
11	Return to assist with the evacuation of other patients or support the team as required.

4. Job card – Bedside Nursing Officer	
1	Receive the job card and understand your assigned tasks.
2	Monitor the patient's condition to ensure stability and readiness for evacuation.
3	Collaborate with the room leader, duty doctor, and MTS staff for smooth coordination.
4	Prepare the patient for evacuation, ensuring all equipment (e.g., oxygen, monitors) is ready for transfer.
5	Communicate with MTS staff to arrange supplies and assist in moving the patient.
6	Double-check the patient's identification band and evacuation file before transfer.
7	Safely evacuate the patient with the identification band, file, and necessary medical supplies (stable → critical).
8	Continuously update the room leader and coordinate with MTS staff for additional support.
9	Follow the Emergency Operation Plan (EOP) as directed by the leader.
10	Help leader in preparing evacuated list and establishing communication with relatives

5. Job card- Multi Tasking Staff (MTS)	
1	Receive the job card and understand assigned duties during the evacuation.
2	Assist the bedside nursing officer and duty doctor in preparing the patient for evacuation.
3	Ensure all required supplies and equipment (e.g., oxygen cylinders, evacuation kits) are ready and available.
4	Help move the patient safely, prioritizing stable patients first and critically ill last.
5	Support in detaching equipment and securing portable devices during the transfer.
6	Follow instructions from the room leader, nursing officer, and duty doctor for smooth coordination.
7	Ensure that all supplies and patient belongings are transported to the safe zone.
8	Return promptly to assist with other patients or tasks as directed.
9	Communicate with the team regularly about the progress and any resource needs.
10	Follow the Emergency Operation Plan (EOP) and report to the room leader upon task completion.

6. Job card – Ward Attendant	
1	Receive the job card and understand all tasks assigned during evacuation.
2	Assist the bedside Nursing Officer and Duty Doctor in preparing the patient for evacuation.
3	Ensure all required items and equipment (such as oxygen cylinder and evacuation kit) are ready and available.
4	Help in safely transporting the patient, prioritizing stable patients first and critical patients afterwards
5	Assist in disconnecting equipment and securing portable devices during transfer
6	Follow instructions given by the Room Leader, Nursing Officer, and Duty Doctor
7	Safely transport all patient belongings and required items to the designated safe location.
8	Return promptly to assist with other patients or tasks
9	Communicate regularly with the team regarding progress and any resource requirements
10	Follow the Emergency Operation Plan (EOP) and report to the Room Leader once the task is completed.

7. FIRE EVACUATION-PATIENT TRACKING FORM (NICU)		
1. DATE:	2. UNIT/ ADMITTING NEONATOLOGIST :	
3. PATIENT NAME(LABEL) :	4. AGE/DAYS:	5.CR NO.# :
6. FAMILY NOTIFIED YES NO CONTACT NUMBER:		
7. Accompanying Equipment (Check Those That Apply):		

□ Incubator	□ Oxygen	□ Peripheral line	□ Feeding tube
□ Monitor	□ Ventilator	□ PICC	□ Chest tube
□ Warmer	□ CPAP/HFNC	□ UVC	□ IV pumps
□ Bassinette	□ Other:	□ UAC	□ Breast milk
□ Evacuation vest/bag/sled	□ T piece resuscitator	□ Arterial line	□ Formula milk
□ FIRE EVACUATION PACKAGE		Isolation: □ YES □ NO	
8. DEPARTING LOCATION /ROOM :		9. ARRIVING LOCATION	
Room #: _____Time: _____ ID Band Confirmed: □ Yes □ No (By: _____) Medical Record Sent: □ Yes □ No Patient Labels Sent: □ Yes □ No Belongings: □ With Patient □ Left in Room □ None Medications: □ With Patient □ Left on Unit □ To Pharmacy		Room #: _____Time: _____ ID Band Confirmed: □ Yes □ No (By: _____) Medical Record Received: □ Yes □ No Patient Labels Received: □ Yes □ No Belongings Received: □ Yes □ No Medications Received: □ Yes □ No	
10. Transporting to another facility/ Name- Time: _____ Destination: _____ Transportation: □ Ambulance □ Other: _____ ID Band Confirmed: □ Yes □ No (By: _____) Departure Time: _____		**11. DOCUMENT VERIFICATION** NAME: DESIGNATION: SIGNATURE: TIME:	

8. Step by step evacuation guide for critical patient: Tick yes in checklist after completing task:

1. Assign baby to the Evacuation team of 4 (1- Doctor:A, 1 Nurse:B, Ward boy :C/D)
2. A:Document on going medication and vitals/respiratory support
3. B:Check infusion pump status/detach wall mount cables/Place "fire evacuation bag" to warmer trolley
4. C:Arrange T-Piece neonatal resuscitator/self inflating bag with o2 cylinder
5. A:Set and attachT-Piece neonatal resuscitator (PIP/PEEP) as per baby's condition
6. D: Detach ventilator connections from wall-mount
7. A: maintain respiratory support via T-Piece neonatal resuscitator
8. B: Mobilise warmer trolley
9. C: handle O2 cylinder
10. D: Mobilise ventilator with tubings
11. Upon Reaching designated area

12. A: Maintain respiratory support
13. B:Position warmer- Check infusion/attach cables
14. D: Attach ventilator connections
15. B:Take charge of T-Piece neonatal resuscitator
16. A: Check and set ventilator
17. A: Attach ventilator to baby
18. C and D : Goes back to support evacuation efforts
19. A: Check and record vitals of baby
20. B: Remains with baby- Use fire evacuation package for ongoing care
21. A: Goes back to support evacuation efforts

9. Team Assignment Template for Critial Patient Evacuation (A/B/C/D)

Assign Team of 4:	
A	DOCTOR
B	NURSE
C/D	ATTENDANT/Ward boy

1	A: Document ongoing medication and respiratory support.
2	B: Check infusion pump status and detach wall-mounted cables.
3	B: Place the “fire evacuation bag” onto the warmer trolley.
4	C: Arrange T-Piece neonatal resuscitator /self-inflating bag with oxygen cylinder.
5	A: Set and attach the T-Piece neonatal resuscitator according to the baby’s condition.
6	D: Detach ventilator connections from the wall-mount.
7	A: Maintain respiratory support using T-Piece neonatal resuscitator during transfer.
8	B: Mobilize the warmer trolley safely.
9	C: Handle the oxygen cylinder securely.
10	D: Mobilize the ventilator with tubing to the safe zone.
11	A/B/C/D: Ensure the baby and equipment are safely placed at the designated area.

Annexure -5

Suggestive considerations for Evacuation of Patients during Fire for Pediatric Intensive care units (PICU)

1. Introduction:

Ensuring fire safety in the Pediatric Intensive Care Unit (PICU) is crucial due to the extreme vulnerability of critically ill children, who cannot evacuate on their own, rely on life-support systems, and are in a complex setting with oxygen-rich environments and numerous electrical devices. This document aims to create a comprehensive, structured and action-oriented fire safety framework that can be adapted for any PICU setting. As pediatric patients often require more staff-to-patient handling, fire preparedness must be meticulous, well-rehearsed, and designed to ensure the safest possible environment for both patients and healthcare providers.

2. Objectives

The objectives of this Pediatric ICU Fire Safety & Evacuation Guideline are:

A. Detection & Early Response

- Enable rapid detection of smoke/fire via functional alarm systems
- Ensure immediate activation of **CODE RED**
- Promote early communication with fire safety officer and the administration.
- Immediate initiation of **RACE** principles

B. Evacuation & Continuity of Critical Care

- Guide safe, systematic, and prioritized evacuation
- Ensure accurate patient identification (pink and yellow bands- used for children), documentation and tracking
- Maintain airway, breathing, circulation during movement
- Prevent accidental extubation, line pulls, ventilator disconnection
- Ensure continuous oxygenation using transport ventilators, AMBU bags
- Maintain sedation, analgesia, and hemodynamic support during transition

C. Roles, Coordination & Operation

- Define clear responsibilities for all staff categories
- Establish a command structure within the PICU for decision-making and communication
- Ensure smooth communication, assistance, backup, and teamwork

D. Training, Drills and Quality improvement

- Ensure all PICU staff are trained in fire safety extinguisher use and evacuation techniques during emergency
- Conduct regular fire drills and simulations to maintain readiness
- Incorporate fire safety training as an institutional policy
- Continuously audit and update the fire action plan based on drill outcomes and incident reviews.

3. Preparedness Protocol for Pediatric ICU Fire Safety:

i) Emergency Operation Plan (EOP) Readiness

- Display the Pediatric ICU-specific Fire Safety EOP at the nursing station, doctor duty room, and near PICU entrance.
- Review the EOP annually, after any major fire incident, or following full-scale drills.
- PICU team including doctors, nurses, Health Assistant (HA) and Multi-task staff (MTS) and should be well versed EOP activation criteria and response sequences.
- Display evacuation maps showing primary and secondary routes, fire extinguisher locations, safe zones, and oxygen shutoff valves.
- Store hard copies of Job Cards, Evacuation Tracking Forms, and Fire Incident Report Forms in the Disaster Documentation Kit at the nursing station.

ii) Staff Roles & Command Structure

Role	Responsibilities	Accountability/Reporting
Pediatric ICU Incident Leader (Senior Consultant/ Doctor on duty)	Overall command, liaison with fire safety officers/administration, evacuation decisions	Leads fire emergency response
Shift-In-Charge Nurse (Area Leader)	Supervises patient preparation, allocates nurses and HA/MTS personnel, tracks evacuation completion	Reports to Incident Leader
Duty Doctors (Residents/ Interns)	Manage airway/ventilation, disconnect/ reconnect equipment, manage sedation and infusions	Coordinate with nursing and biomedical teams
Nursing Officers	Prepare patients for transfer, secure lines/ catheters/drains, manage medication pumps, assist ventilated patients	Support patient safety during evacuation
HA/MTS / Support Staff	Move beds, wheelchairs, stretchers; assist with heavy lifting; clear evacuation paths	Follow Shift-In-Charge Nurse instructions
Biomedical Engineer (or designated staff)	Standby for ventilator, monitor, pump issues; isolate faulty equipment; assist transport ventilator setup	Liaise with Duty Doctors and nursing staff
Security	Control electrical circuits; manage fire doors, HVAC shutdown; clear corridors; escort fire teams; control crowd and communicate with relatives	Coordinate with Incident Leader and administration

iii) Pediatric ICU Bedside Fire Evacuation Kit

Ideally each PICU bed should have a **Bedside Evacuation Kit** or at-least 1 kit should be shared between the two beds. The contents of the kit as suggested should include the following material however this may be modified by individual PICU depending on the type of patients which are admitted and the maximum patient load as recorded by the unit in the previous 1 year.

Contents (per PICU bed):

Sr. No	Item	Specification (Pediatric-appropriate)	Quantity
1	AMBU bag with PEEP valve	Infant (250 ml/500 ml), Child (750ml/1000 ml), Adolescent/Adult (1000 ml/1500 ml)	1 each
2.	Face mask	Size – 0-5	1 each

Sr. No	Item	Specification (Pediatric-appropriate)	Quantity
2	Oxygen mask – NRBM	Child, Adult sizes	1 each
3	Nasal cannula	Infant, Child, Adult sizes	1 each
4	Spare ventilator tubing	Pediatric/adult circuit (if applicable)	1 each
5	Suction catheter set	6–8 Fr (infant), 8–10 Fr (child), 12–14 Fr (adolescent)	1 set
6	Laryngoscope handle with blade	Mac and Miller – 0,1,2,3	1 set
7	ET Tube	3-7 mm (Cuffed/ Uncuffed)	1 each
8	Medications (Emergency drugs)	Adrenaline, Nor-adrenaline, Midazolam, Atropine (weight-based dosing as per Pediatric ALS protocol)	As per policy
9	IV fluids	Normal Saline 100 ml / 500 ml, 25 % D 100ml	2
8	Syringes	2ml, 5ml, 10ml, 20ml,50 ml	2/5/10- 5 each 20/50 – 3 each
10	IV extension sets / Pressure lines	Compatible with infusion pumps	2 each
11	IV cannula	26G, 24G, 22G, 20G, 18G	2 each
12	Tape rolls	Micropore + adhesive (pediatric skin-friendly)	1
13	Scissors	Blunt-ended	1
14	Gloves	Sterile and non-sterile	2 pairs
15	Thermal blanket	Pediatric-sized, water-resistant (disposable)	1
16	Patient ID wristband		1
17	Patient monitoring sheet		1
18	Portable torch	For pupil and airway assessment	1

iv) PICU Evacuation Equipment List (Per 10-Bed PICU)

Each PICU should be equipped with equipments required to evacuate the patients. The exact number and the type of the equipments required would depend on the level of ICU, occupancy and bed strength of the PICU. However, a rough estimate for a 10 bedded PICU with almost 100 % occupancy would be as mentioned below:

Sr. No	Equipment	Suggested quantity
1	Portable Ventilators	2
2	Transport Monitors	5
3	AMBU Bags 250ml/500ml/750ml/1000ml	10
4	Portable Suction Machines	2
5	Oxygen Cylinders (B-type)	10
6	Evacuation Stretchers	3
7	Spine Boards	3
8	Evacuation Sheets (drag sheets)	5
9	Wheelchairs	2
10	Defibrillator (Portable)	2

Sr. No	Equipment	Suggested quantity
11	CPR Boards	5
12	IV Stands (portable)	10
13	Fire Blankets	5
14	Flashlights	3
15	Power extension reels (heavy-duty)	2

v) Communication & Coordination Preparedness

- **Preferred Channels**
  - Announce CODE Red / use intercom as per hospital policy
  - Wireless telephones
  - Security hotline
  - Fire control room direct line
- **Backup Channels**
  - MTS runners (manual communication)
  - Portable walkie-talkies
- **Communication Standard – SBAR**
  - **S**ituation – What is happening?
  - **B**ackground – Where is the fire? What equipment involved?
  - **As**sessment – Smoke spread? Patient danger level?
  - **Recommendation** – Evacuate? Contain? Shut down power?

vi) Pathway & Infrastructure Readiness

- All exits must be free from obstruction
- Fire doors must not be propped open
- Staircases must be kept empty
- Cylinders must not block corridors
- All safe zones should be pre-marked and updated annually

vii) Training & Staff Competency

- Fire safety induction for all new staff
- Quarterly extinguisher handling drills
- Biannual full-scale evacuation drill
- Annual mock multi-casualty scenario drill

Competency assessment includes:

- RACE protocol
- PASS technique for extinguisher use
- Ventilated patient evacuation
- Evacuation using drag sheets and spine boards

4. Activation of Fire Emergency and Evacuation protocol:

A. Any staff member who notices:

- Smoke
- Fire
- Burning smell
- Electrical sparking
- Overheating of equipment
- Sudden power fluctuation accompanied by odor must **IMMEDIATELY** initiate emergency actions **without waiting for senior permission**.

B. Roles During Initial Response

Role	Designation	Key Responsibilities
Incident leader	ICU Consultant / Doctor on Duty	• Rapid situational assessment • Allocate roles and evacuation teams Decide zone-wise oxygen shut-off Decide partial vs full PICU evacuation Liaise with Fire Safety Officer & administration Supervise RACE protocol execution
Area leader	Shift-In-Charge Nurse	• Alert PICU nurses, residents, HA/MTS • Activate PICU fire emergency kits • Initiate pediatric evacuation triage • Track evacuation status of each child
Airway & Transport Lead	Duty Doctors (Residents)	• Prioritize airway-dependent children • Prepare ventilated / HFNC children • Manage airway using AMBU / transport ventilator • Ensure ET tube security during transfer
Patient Care Lead	Nursing Officers	• Secure IV lines, drains, catheters • Stop non-essential infusions • Stabilize monitors & pumps • Ensure child ID bands & evacuation files
Evacuation Support	MTS / Support Staff	• Arrange pediatric stretchers, wheelchairs, cribs • Clear corridors & exits • Assist safe lifting and shifting • Support vertical evacuation if required
Access Control & Crowd Management	Security	• Restrict unauthorized entry • Keep evacuation routes clear • Guide fire response teams • Manage parent/visitor movement
Equipment & Electrical Safety	Biomedical Engineering	• Safely shut down non-essential equipment • Assist transport ventilator setup • Isolate faulty electrical circuits • Support oxygen & power safety decisions

C. Evacuation must be initiated when:

- Flames or smoke visible inside PICU and is likely to spread fast or is not controllable by local measures.
- Smoke entering patient rooms from adjacent areas
- Persistent burning smell with electrical failure
- Alarm activation by fire detection system
- Fire in UPS room/electrical panel near PICU
- Loss of power supply with risk to ventilated patients
- As instructed by:
    - Command centre or Fire Control Room
    - Engineering
    - PICU Consultant
    - Fire safety officer

D. Evacuation plan:

Evacuation should be initiated after proper instruction, the type of evacuation should be decided (shelter-in/horizontal/vertical) and the team should evacuate as per priority (triage order)

1) Stable ambulatory children – Send with 1 HA/MTS
2) Infants and non-ambulatory stable children – Send with 1 Nurse and 1 HA/MTS
3) Ventilated children- 1 Nurse (lines & infusions) + 1 Junior doctor (airway and ventilation) + 2 MTS (stretcher movement & oxygen cylinder)

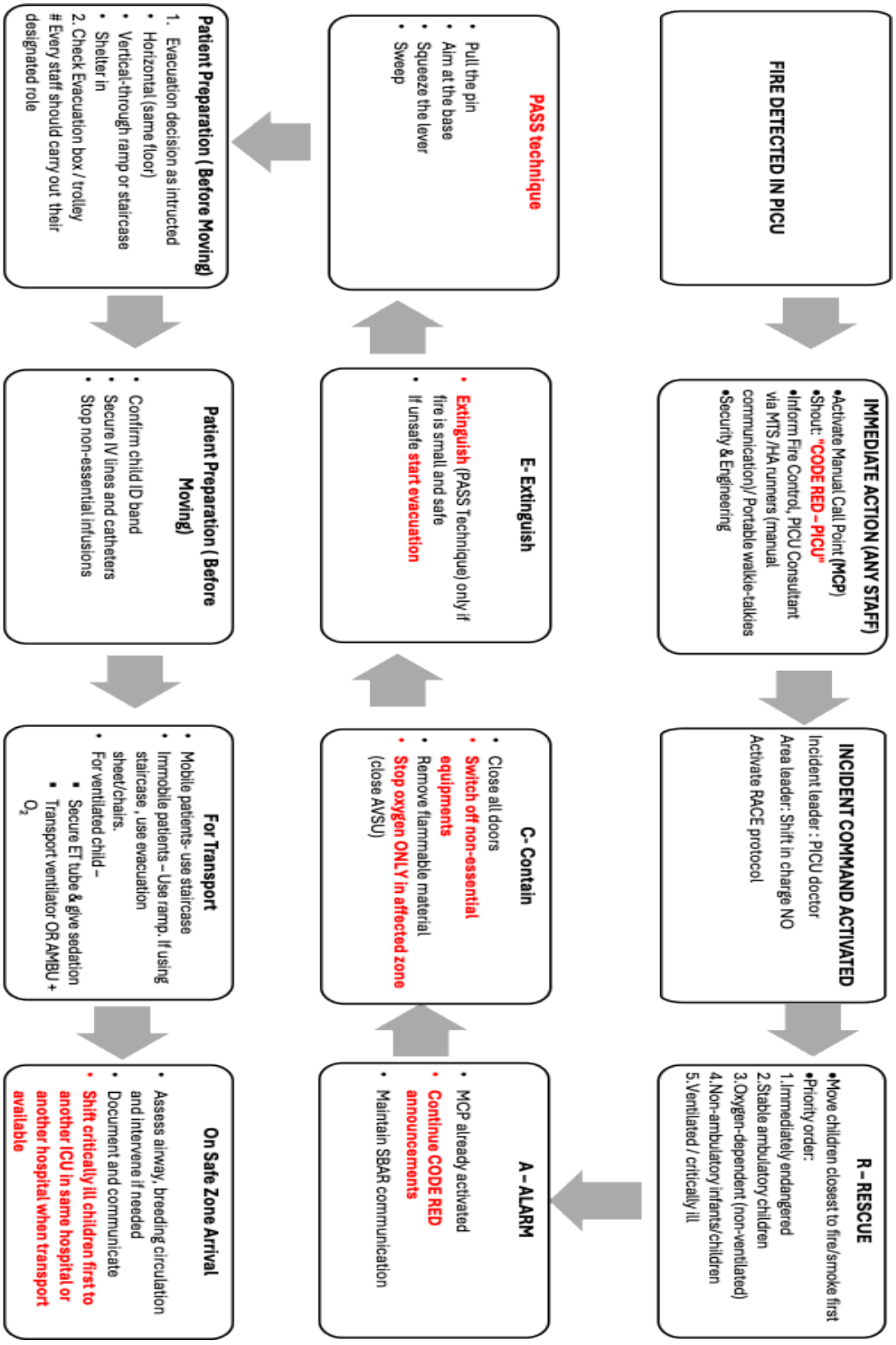


Fig A5_1 Showing Activation of Fire Emergency and Evacuation Protocol

Source : AIIMS Nagpur

Annexure - 6

Suggestive Considerations for OperationTheaters (OT) for fire prevention and evacuation

1. OT Fire Dynamics

Fire risk in OTs is a direct interaction between surgical technique, anaesthetic modulation, and material handling.

Clinical Fire Triangle:

- Ignition (Doctor-controlled): electrocautery, lasers, defibrillators.
- Fuel (Nursing + surgical decisions): drapes, spirit, gauze, disposables.
- Oxidizer (Anaesthesia-team controlled): oxygen, N_2O.

High-Risk Scenarios Using cautery shortly after alcohol-based skin prep.

- Using cautery near high-flow oxygen drapes (ENT, head-neck surgeries).
- Laser procedures near airway.
- Emergency surgeries with compromised ventilation systems.

2. Doctor-Specific Responsibilities

Surgeon Responsibilities:

- Ensure prep agents dry fully before incision.
- Communicate clearly before activating cautery/laser.
- Ensure drapes are positioned fire-safe.
- Direct the team during fire emergency.

Anaesthesiologist Responsibilities:

- Control oxygen concentration and minimize FiO□ when safe.
- Manage Medical Gas Pipeline System (MGPS) emergency shut-off knowledge.
- Prepare portable oxygen for possible evacuation.
- Lead airway management during fires.

OT Leadership:

- Ensure complete orientation of junior doctors.
- Conduct monthly safety walkthroughs.
- Maintain readiness of evacuation equipment.

3. Electrical, Biomedical, and Surgical Equipment Safety

Clinical Takeaways:

- Report any spark, smoke, or temperature rise from equipment.
- Use bipolar cautery in oxygen-rich surgical fields.
- Avoid makeshift connections, extenders, and overloaded boards.
- Confirm biomedical checks for new or shifted devices.

Flowchart: Doctor Response to Equipment Fault

Smoke/Spark Noticed → Stop Use Immediately → Inform OT Nursing + Anaesthesia → Switch to Backup Device → Engineering Notified → Incident Logged

4. Anaesthesia & MGPS Safety: Clinical Fire-Safe Practices

- Reduce oxygen concentration during airway or laser surgery whenever clinically safe.
- Ensure airway circuits have minimal leak.
- Keep MGPS shut-off locations memorized.
- Never allow flammable materials over oxygen outlets.

Flowchart: MGPS Emergency Clinical Response

Suspected Gas Leak → Switch to Portable O_2 → Close Area Valve (Doctor/Nurse) → Stop Surgery → Ventilate OT → Resume Only After Clearance

Flowchart: Clinical Response to Fire Alarm

Alarm → Doctor Confirms Threat → Declare CODE RED → Stop Surgery → Anaesthesia Secures Airway → Begin Evacuation → Move to Rescue Area

5. Emergency Activation Protocol

R.A.C.E. Applied Clinically

- Rescue: Priority to anaesthetized patients.
- Alarm: Doctor authorizes CODE RED.
- Contain: Close OT doors to prevent smoke spread.
- Extinguish: Only small fires; airway/drape fires prioritized.

Airway Fire (Doctor-Primary Emergency)

- Stop gas flow immediately.
- Remove burning endotracheal tube.
- Irrigate airway with saline.
- Ventilate with room air initially, then 100% O_2 once fire source removed.

6. Clinician-Centred Evacuation Strategy & Procedures

Evacuation must occur under doctor supervision, prioritizing patient physiological safety.

Evacuation Priorities (Clinical):

1. Intubated/sedated patients.
2. Patients under active surgery.
3. Patients requiring oxygen/monitoring.
4. Ambulatory patients.

Evacuation Flowchart:

Fire Confirmed → Surgeon Stops Procedure → Anaesthetist Secures Airway & Switches to Portable O_2 → Lines Disconnected → Transfer to Evacuation Trolley → Shift to Rescue Area → Stabilize

Stepwise Doctor-Led Evacuation:

1. Surgeon stops procedure and protects wound.
2. Anaesthesiologist secures airway and reduces oxygen flow.
3. Nursing staff disconnects non critical tubing.
4. Patient transferred using "log-roll and secure" technique.
5. Doctor leads route to Rescue Area.
6. Reconnect monitoring & O_2 in safe zone.
7. Reassess vitals & airway.

7. Rescue Area (Safe Holding Zone): Clinical Stabilization Workflow

This is a clinically equipped stabilization bay.

Clinical Requirements:

- Separate oxygen supply (portable cylinders).
- Airway management tools.
- Emergency drugs + suction.
- Space for 4–6 stretchers.

Doctor Workflow in Rescue Area:

1. Reassess vitals, airway, haemodynamics.
2. Continue ventilation/infusions.
3. Reverse anaesthesia only if safe.
4. Prepare for transfer to ICU or alternate OT.

Source : AIIMS Nagpur

Annexure - 7

Suggestive considerations for Evacuation of patients during fire from adult Intensive Care Units (ICU)

1. Introduction:

Fire emergencies in Medical Intensive Care Units (MICUs) represent one of the most dangerous and disastrous situations in a hospital due to the unique vulnerabilities of adult critically ill patients. These units contain a high concentration of:

- Life-support equipment
- High-flow oxygen systems
- Invasive ventilation setups
- Dialysis, CRRT, and ECMO machines
- Multiple electrical devices running 24/7
- Combustible materials (linens, disposables, packaging)
- High-risk infrastructure (UPS rooms, electrical panels)

Adult ICU patients are often:

- Sedated
- Mechanically ventilated
- Hemodynamically unstable
- On multiple infusions
- Unable to ambulate or protect themselves

Therefore, even brief exposure to smoke, heat, or interruption of oxygen/ventilation can be fatal.Several hospital fire incidents have highlighted the need for unit-specific fire safety protocols. Adult MICUs must have a robust Emergency Operation Plan (EOP) to ensure:

- Fire prevention through continual hazard assessment
- Early detection & alarm activation
- Immediate and coordinated emergency response
- Safe and rapid evacuation of adult ICU patients
- Continuity of critical care during evacuation
- Systematic stabilization, recovery, and demobilization
- Adult airway management
- Ventilator transport methods
- Heavy-weight patient evacuation procedures
- Use of spine boards, evacuation sheets, trolleys
- Management of sedation, vasopressors, infusions

The objective is to prepare every staff member - doctors, nurses, technicians, MTS, security, biomedical, engineering - for a coordinated, safe, and efficient response during any fire emergency.

2. Objectives

The objectives of this Medical ICU Fire Safety & Evacuation Guideline are:

A. Detection & Early Response

- Enable rapid detection of smoke/fire via functional alarm systems
- Ensure immediate activation of CODE RED
- Promote early communication with fire safety officer and the administration.
- Immediate initiation of RACE principles

B. Evacuation & Continuity of Adult Critical Care

- Guide safe, systematic, and prioritized evacuation
- Maintain airway, breathing, circulation during movement
- Prevent accidental extubation, line pulls, ventilator disconnection
- Ensure continuous oxygenation using transport ventilators, AMBU bags
- Maintain sedation, analgesia, and hemodynamic support during transition

C. Roles, Coordination & Operation

- Define clear responsibilities for all staff categories
- Ensure smooth communication, assistance, backup, and teamwork

3. Preparedness

Preparedness ensures that the Medical ICU can respond immediately and effectively to any fire emergency. Preparedness includes infrastructure readiness, staff allocation, equipment availability, communication plans, and team training.

3.1 Emergency Operation Plan (EOP) Readiness

- The Medical ICU - specific Fire Safety EOP must be displayed at: Nursing station / Doctor duty room / Near ICU entrance
- The EOP must be reviewed Annually / After any significant fire incident / After every full-scale drill
- Evacuation maps must be displayed with: Primary evacuation route / Secondary route / Fire extinguisher points / Safe zones / Oxygen shutoff valve location
- Hard copies of: Job Cards / Evacuation Tracking Forms /Fire Incident Report Forms must be stored in the Disaster Documentation Kit at the nursing station.

3.2 Staff Roles & Command Structure

Each shift must have pre-assigned roles:

A. Medical ICU Incident Leader (ICU Consultant / Senior Faculty / Doctor on duty)

- Overall command
- Liaison with Fire safety officer or the administration
- Decision-making on evacuation type and priority

B. Shift-In-Charge Nurse (Area Leader)

- Supervises patient preparation
- Allocation of nurses and MTS personnel
- Tracks completion of evacuation

C. Duty Doctors (Residents / Interns)

- Manage airway and ventilation
- Disconnect and reconnect equipment
- Manage sedation and infusions

D. Nursing Officers

- Prepare patient for transfer
- Secure all lines, catheters, drains
- Manage medication pumps
- Assist ventilated patient movement

E. MTS / Support Staff

- Move beds, wheelchairs, stretchers
- Assist in heavy lifting
- Clear evacuation paths

F. Biomedical Engineer (if available or else this responsibility is taken up by the resident doctor or nursing officer)

- Standby for ventilator, monitor, pump issues
- Isolate faulty equipment
- Assist in transport ventilator setup

G. Security

- Control electrical circuits
- Manage fire doors, Heating Ventilation and AC shutdown
- Clear corridors and escort fire team
- Controls the crowd and communicate with relatives of the patients

3.3 Adult ICU Bedside Fire Evacuation Kit

Each ICU bed should have a **Bedside Evacuation Kit** or at-least 1 kit should be shared between the two beds. The contents of the kit as suggested should include the following material however this may be modified by individual ICU depending on the type of patients which are admitted and the maximum patient load as recorded by the unit in the previous 1 year.

Contents (per adult ICU bed):

Sr. No	Item	Quantity
1	Adult AMBU Bag with PEEP Valve	1
2	Adult oxygen mask (NRBM)	1
3	Nasal cannula	1
4	Spare ventilator tubing (Optional)	1
5	Suction catheter set (14–16 Fr)	1
6	Medications: Nor-adrenaline (3), Midazolam (1vial), Dopamine (1), Adrenaline (3-4) and Atropine (2-3), NS 100ml (2)	As per hospital MOM policy
7	IV extension sets or Pressure lines for Infusion pumps	2 each
8	IV cannula (18G, 20G)	2 each
9	Tape roll (micropore + adhesive)	1
10	Scissors	1
11	Gloves	2 pairs
12	Water resistant Thermal blanket (Disposable)	1
13	Patient ID wristband	1
14	Patient Monitoring sheet	1
15	Portable torch	1

3.4 Emergency / Evacuation Trolley (Adult ICU)

Alternatively each ICU may have an evacuation Trolley which must always be **sealed, tagged, and kept ready**. However, having a separate Evacuation bags is preferred. The contents of the trolley may include:

Drawer 1 – Airway & Breathing

- AMBU bags (adult) × 4
- Transport ventilator × 1 (if space permits)
- Suction machine portable × 1
- Oropharyngeal airways – sizes 2, 3, 4
- Laryngoscope (Mac & Miller)
- ET Tubes 6.5–8.5 mm (2 each)
- Bougie
- End-tidal CO_2 detector

Drawer 2 – Circulation

- IV cannulas (18G, 20G)
- 50 ml syringes
- 10 ml syringes
- Pressure infuser bag
- Pre-filled emergency drugs
    - Adrenaline 1 mg
    - Noradrenaline
    - Dopamine
    - Vasopressin
    - Atropine
    - Amiodarone

Drawer 3 – Securing & Transport

- Multipara transport monitor
- Batteries for monitor
- ECG electrodes
- Transport straps
- Spine board straps
- Evacuation sheet (with handles)

Drawer 4 – Miscellaneous

- Torch
- Scissors
- Thermal sheets
- Gloves
- Fire blanket
- N95 masks
- Alcohol hand rub

3.5 Adult ICU Evacuation Equipment List (Per 20-Bed MICU)

Each ICU should be equipped with equipments required to evacuate the patients. The exact number and the type of the equipments required would depend on the level of ICU, ccupancy and bed strength of the ICU. However, a rough estimate for a 20 bedded Medical ICU with almost 100 % occupancy would be as mentioned below:

Sr. No	Equipment	Suggested quantity
1	Portable Ventilators	5
2	Transport Monitors	5
3	AMBU Bags (Adult)	20
4	Portable Suction Machines	2
5	Oxygen Cylinders (B-type)	10
6	Evacuation Stretchers	6
7	Spine Boards	4
8	Evacuation Sheets (drag sheets)	10
9	Wheelchairs	2
10	Defibrillator (Portable)	2
11	CPR Boards	4
12	IV Stands (portable)	6
13	Fire Blankets	6
14	Flashlights	4
15	Power extension reels (heavy-duty)	2

3.6 Communication & Coordination Preparedness

Preferred Channels

- Announce CODE Red / use intercom as per hospital policy
- Wireless telephones
- Security hotline
- Fire control room direct line

Backup Channels

- MTS runners (manual communication)
- Portable walkie-talkies
- **Communication Standard – SBAR**
- **S**ituation – What is happening?
- **B**ackground – Where is the fire? What equipment involved?
- **As**sessment – Smoke spread? Patient danger level?
- **Recommendation** – Evacuate? Contain? Shut down power?

3.7 Pathway & Infrastructure Readiness

- All exits must be free from obstruction
- Fire doors must not be propped open
- Staircases must be kept empty
- Cylinders must not block corridors
- All safe zones should be pre-marked and updated annually

3.8 Training & Staff Competency

- Fire safety induction for all new staff
- Quarterly extinguisher handling drills
- Biannual full-scale evacuation drill
- Annual mock multi-casualty scenario drill

Competency assessment includes:

- RACE protocol
- PASS technique for extinguisher use
- Ventilated patient evacuation
- Evacuation using drag sheets and spine boards

4. Emergency response

Effective fire response in the Medical ICU requires **rapid detection**, **clear communication**, and **coordinated action** using scientifically recognized frameworks such as **RACE** and **PASS**. Due to the critical nature of adult ICU patients, every second matters.

4.1 Activation of Fire Emergency

Any staff member who notices:

- Smoke
- Fire
- Burning smell
- Electrical sparking
- Overheating of equipment
- Sudden power fluctuation accompanied by odor must **IMMEDIATELY** initiate emergency actions **without waiting for senior permission**.

Steps involved:

1. Activate nearest Manual Call Point (MCP)
2. Announce loudly:

"CODE RED – MEDICAL ICU!"

3. **Inform:**
    - Fire Control Room or Fire safety officer
    - ICU Faculty/Team Leader
    - Engineering Department
    - Security Department

4.2 Roles During Initial Response

A. Medical ICU Consultant / Doctor on duty (Incident Leader)

- Assesses situation rapidly and allocate roles and responsibilities
- Decides about the need to shut down oxygen cut off valve
- Decides whether to initiate partial or full evacuation
- Communicates with Fire safety officer
- Monitors execution of RACE protocol

B. Shift-In-Charge Nurse (Area Leader)

- Alerts all nurses and MTS
- Oversees activation of emergency kits
- Begins patient triage preparation
- Tracks evacuation progress

C. Duty Doctors (Residents)

- Perform immediate rescue of high-risk patients
- Disconnect and prepare ventilated patients for evacuation
- Manage airway/ventilation using AMBU or transport ventilator
- Assist staff in extinguishing attempts if safe

D. Nursing Officers

- Secure IV lines, drains, catheters
- Detach or stabilize monitors
- Prepare evacuation files
- Ensure correct patient ID labeling

E. MTS / Support Staff

- Bring stretchers, wheelchairs
- Clear corridors
- Assist in lifting and moving patients
- Retrieve fire extinguishers if required

F. Security

- Block unauthorized entry
- Clear hallways
- Guide fire response teams to ICU
- Maintain crowd control

G. Biomedical Engineering

- Shut down equipment safely
- Assist in ventilator disconnection or transport ventilator setup
- Shut off faulty circuits
- Assess electrical panels

4.3 RACE PROTOCOL (Standard Fire Response)

RACE stands for:

- **R – Rescue**
- **A – Alarm**
- **C – Contain**
- **E – Extinguish / Evacuate**

R – RESCUE

- Remove patients closest to fire/smoke
- Move them to safe adjacent zone

- Prioritize:
  1. Immediately endangered
  2. Ambulatory/stable with highest likelihood to survive
  3. Oxygen-dependent patients but non ventilated
  4. Non-ambulatory
  5. Ventilated/critical care as they are less likely to survive and would require the maximum resources.

A – ALARM

- Activate Manual Call point (Needs to be the first step on noticing the fire). All Manual call points must have Laminated cards with steps to execute in case of fire and the details of roles and responsibilities. These cards ensure that the process is executed as per protocol even in case of a panic situation.
- Call Fire Control Room
- Announce:

"CODE RED – MICU"

- Alert shift-in-charge and consultant

C – CONTAIN

- Close all doors to isolate smoke
- Turn off non-essential electrical devices
- Do NOT switch off main power unless instructed
- Remove flammable materials
- Oxygen may be discontinued only in the area where the fire is present.

E – EXTINGUISH / EVACUATE

Only extinguish if**:**

- Fire is small
- Safe to approach
- Correct extinguisher is available

If not safe → begin evacuation immediately.

4.4 PASS Technique (Fire Extinguisher Use)

- **P – Pull** the pin
- **A – Aim** nozzle at base of fire
- **S – Squeeze** the handle
- **S – Sweep** side-to-side

4.5 Communication During Emergency

Primary Message Format → SBAR

- **S:** What is happening?
- **B:** What is known?
- **A:** Risk of spread?
- **R:** Required action?

4.6 Safety Principles During Response

- No staff enters a smoke-filled room without assessment. Only if the environment is safe, attempt to save the patients should be executed.

- Never open a door showing heat/smoke signs
- Do not leave critical patients unattended during fire
- Protect staff and patients first—equipment later
- Avoid panic; move swiftly but safely

5. Evacuation protocol

Evacuating adult ICU patients only if there is a danger of significant harm or the fire cannot be controlled with the local available measures. Early evacuation endangers the life of the patients due to compromised treatment where as a late evacuation decision may compromise the life of the individual due to fire. Evacuation of these patients is difficult due to larger body weight, presence of multiple tubes/lines, ventilators, sedation, immobility, and high oxygen dependency.

5.1 Indications for evacuation

Evacuation must be initiated when:

- Flames or smoke visible inside ICU and is likely to spread fast or is not controllable by local measures.
- Smoke entering patient rooms from adjacent areas
- Persistent burning smell with electrical failure
- Alarm activation by fire detection system
- Fire in UPS room/electrical panel near ICU
- Loss of power supply with risk to ventilated patients
- As instructed by:
  - Fire Control Room
  - Engineering
  - ICU Consultant
  - Fire safety officer

5.2 Types of evacuation

1. Localized Evacuation

Move patients away from a specific room or bed area to another safe room **within the ICU**.

2. Horizontal Evacuation (PREFERRED)

Move patients to another unit on the **same floor**, ideally into:

- Adjacent ICU if on the same floor
- Step-down ICU if on the same floor
- Operation Theatre recovery area if on the same floor
- Procedure room if on the same floor
- Isolation area if on the same floor. This avoids using stairs / fire lifts and is safest for ventilated patients.

3. Vertical Evacuation

Move patients to **another floor** when smoke blocks horizontal evacuation routes.

Priority:

- Downward movement is safer
- Use only staircases (NO LIFTS during fire unless dedicated fire lifts are available)

Vertical evacuation requires:

- Spine boards
- Evacuation chairs
- Drag sheets

4. Complete ICU Evacuation

All patients are removed when the fire threatens the entire ICU block.

5.3 Evacuation prioritization (adult ICU triage order)

Priority 1: IMMEDIATE DANGER

- Beds closest to fire/smoke
- Patients in direct danger
- Patients with high oxygen requirements (HFNC, NRBM)

Priority 2: AMBULATORY / STABLE PATIENTS

- If awake and stable
- Move independently or with minimal support
- If safe, send them with MTS to safe zone

Priority 3: DEPENDENT BUT NON-VENTILATED PATIENTS

- On oxygen via nasal cannula/face mask
- Bedridden due to illness
- Require stretcher or wheelchair

Priority 4: CRITICALLY ILL NON-INTUBATED PATIENTS

- Shock
- Severe respiratory distress
- Active arrhythmias

Priority 5: VENTILATED / CRITICAL CARE PATIENTS

- Highest resource requirement
- Require team of 4–6
- Moved last **IF they are not in immediate fire impact zone**
- If fire directly threatens them → move first

5.4 Patient preparation before movement

Every patient must have:

- Identification band
- Evacuation file
- Essential medications secured, stop or disconnect non-essential medications
- IV lines taped securely
- Catheters/drains stabilized
- Oxygen supply ensured

Ventilated patients must have:

- Shift to portable ventilator with O2 cylinder and if not available AMBU bag connected to oxygen is used.
- Sedation as required
- ET tube secured
- Basic monitoring during movement
- Patient may be shifted using the same bed if feasible and the bed is unlikely to get stuck throughout the evacuation route.

Do NOT take unnecessary equipment:

- Bedside ventilator
- Syringe pump stands
- Full monitors
- Heavy beds

5.5 Methods of transferring adult patients

1. **Ambulatory With Support**
   If patient can walk → guided by nurse/MTS.
2. **Wheelchair Evacuation**
   For stable but non-ambulatory adults.
3. **Stretcher Evacuation**
   For semi-critical patients with multiple infusions.
4. **Spine Board**

   Used when:
   - Neck/back injury
   - Unstable spine
   - Heavy unconscious patients
   - Vertical evacuation required
5. **Evacuation Drag Sheet**

   Used when:
   - Staff shortage
   - Heavy patient
   - Tight spaces
   - Rapid horizontal transfer required
6. **Ventilated Patient Transfer**
   Requires **Team of ideally (4–5) but may be shifted with Nurse and MTS staff**:
   - **Doctor** – airway and ventilation
   - **Nurse** – lines, infusions
   - **MTS 1** – stretcher movement
   - **MTS 2** – oxygen cylinder carrier

5.6 Evacuation team structure

Team A – Ventilated Patients

- 1 Doctor (airway lead)
- 1 Nurse (lines & infusions)
- 2 MTS (movement & oxygen)

Team B – Moderate Dependency

- 1 Nurse
- 2 MTS

Team C – Ambulatory / Stable

- 1 Nurse
- 1 MTS

Team D – Corridor Clearance

- 1 MTS
- Security personnel

Team E – Safe Zone Reception

- 1 Senior Doctor
- 2 Residents doctors
- 2-3 Nurses

(**Please Note:** The Team composition would depend on the type of hospital, the number of beds, Occupancy status of the ICU, Place of evacuation and available staff and infrastructure. This is just a general guideline of an ICU with 10-20 Beds)

5.7 Safe transport of ventilated patients

Airway Management

- Use AMBU bag with oxygen cylinder attached
- Monitor chest rise
- Secure ET tube

Ventilator Use

- Prefer transport ventilator
- Set same parameters
- Check battery

Infusions

- Keep only essential infusions running:
  - Vasopressors
  - Sedation
  - IV fluids
  - Antiarrhythmics

Monitoring

- Attach portable monitor
- Check SpO_2 and HR every 30 seconds

5.8 Patient identification & tracking

Each patient must be documented on:

- Adult ICU Fire Evacuation Tracking Form
- Master Evacuation List

Tracking must include:

- Patient name
- Hospital number
- Bed number

- Triage category
- Time moved
- Destination
- Transported by (names)

5.9 Rules during evacuation

- Never run
- Avoid panic
- Keep exits clear
- Do not return to danger zone without clearance
- Avoid using elevators unless dedicated fire elevators are available
- Every patient accounted for before evacuation complete

5.9 Completion of evacuation

Evacuation ends when:

- All patients are physically in safe zone
- Master list confirms zero missing patients
- Fire team confirms area is cleared

6. Post-evacuation stabilization

Once patients reach the **safe zone**, rapid stabilization is critical to avoid secondary complications such as hypoxia, hypotension, cardiac arrest, accidental extubation, or hypothermia.

This phase lasts anywhere from **15 minutes to 2 hours**, depending on the severity and number of patients.

6.1 Immediate reassessment of each patient

Upon arrival at the safe zone, the receiving team must perform a full **ABCDE Reassessment**.

Airway

- Confirm airway patency
- Check ET tube position
- Ensure no tube kinking
- Check cuff pressure
- Reconnect ventilator or AMBU

Breathing

- Assess SpO_2
- Respiratory rate
- Breath sounds
- Adequacy of ventilation

Circulation

- Check pulse
- Blood pressure
- Perfusion
- Check IV line patency
- Restart infusions

Disability

- Level of consciousness
- Pupil reaction
- Sedation level

Exposure

- Temperature
- Remove wet/damp clothes
- Provide thermal blanket

6.2 Re-establishing respiratory support

Ventilated Patients

- Connect to:
  - Transport ventilator OR
  - ICU ventilator already stationed in safe zone
- Confirm settings match original
- Check:
  - PIP
  - PEEP
  - FiO_2
  - Tidal volume
  - Alarms

Non-Ventilated Patients

- Provide oxygen:
  - Nasal cannula
  - Face mask
  - NRBM
  - HFNC (if equipment available)

Suctioning

- Ensure suction machine functional
- Clear secretions
- Avoid deep suction unless required

6.3 Hemodynamic and IV support

Restart essential medications:

- Vasopressors
- Sedation
- Antiarrhythmics
- Insulin infusion
- Electrolyte correction

Ensure:

- Syringe pumps connected
- Lines not kinked
- Drains re-secured
- No bleeding or accidental removal

6.4 Monitoring and documentation

Each patient must be connected to:

- Multipara monitor
- Pulse oximeter
- NIBP or IBP

Documentation includes:

- Time of arrival
- Clinical assessment
- Any adverse events during transfer
- Signatures of receiving staff
- Update in the **Master Evacuation List**

6.5 Prioritizing high-risk patients

Patients needing immediate stabilization:

- Ventilated
- On vasopressor support
- Multiple organ dysfunction
- ARDS
- Post CPR
- Severe shock
- Dialysis-dependent / CRRT patients

Assign a dedicated nurse for:

- Every ventilated patient
- Every unstable patient

6.6 Parent / relative communication

In adult ICUs, relatives must be handled carefully to avoid panic.

- Appoint **one staff member** as communication officer
- Provide concise updates
- Prevent overcrowding of safe zone
- Guide relatives to designated waiting area
- Avoid speculation about cause or severity of fire

All communication must be documented.

Source : AIIMS Nagpur

Annexure -8

Suggestive Fire Evacuation Equipments

The list mentioned below is suggestive in natute. The type of equipment and quantity will depend on the level of the facility.

Categorisation of equipments for General Wards & OPD

1. List of essential Fire & Safety equipments

- Fire extinguishers (CO2, ABC type)
- Manual Call Point (MCP) / Fire Alarm access
- Emergency exit signage (illuminated)
- Emergency lighting / torches
- Fire buckets (sand + water, as per location requirements)
- Fire alarm system audible in all patient areas

Evacuation Aids

- Wheelchairs for non-ambulatory patients
- Stretcher (minimum 1 per ward/OPD block)
- Evacuation staircase access (unobstructed)
- Evacuation drag sheet (minimum one per floor)
- Patient ID bands / identification system

Basic Medical Support

- First-aid kit (complete and accessible)
- Basic life support kit (BLS)
- Oxygen cylinder (B-type) with functional flowmeter
- Bag-valve-mask (BVM) for adult

2. List of desirable equipment for Safety & Efficiency

(Expected for smooth evacuation but not strictly mandatory.)

Evacuation & Rescue

- Additional wheelchairs and stretchers
- Folding evacuation chair (for stairs)
- Evacuation slide sheet (per major ward)
- Fireproof blanket for patient protection
- Reflective jackets for evacuation team
- Walkie-talkies for staff communication

Medical Equipment

- Portable pulse oximeter
- Basic emergency drug kit (adrenaline, atropine, etc.)
- Manual suction pump
- Pediatric BVM
- Glucometer (for OPD emergencies)

Documentation & Administration

- Evacuation register
- Laminated floor-wise exit route maps
- Departmental Code Red response chart
- Staff duty roster for fire response (displayed)

3. Optional or additional equipments

(Useful in large hospitals, high-footfall OPDs, or high-dependency wards.)

Advanced Support

- Portable AED available at OPD entrance / major ward
- Portable emergency trolleys with IV fluids
- Evacuation signage with color coding (Red/Green arrows)
- Additional oxygen cylinders for surge response

Comfort & Logistics

- Battery-powered headlamps for staff
- Extra blankets for patient warmth
- Automated attendance system for staff accountability

Enhanced Communication

- Portable public-address microphone
- Megaphone for crowd control in OPD waiting areas

Categorisation of equipments for ICU Evacuation

1. List of essential equpments

These items are **required** for safe evacuation of critically ill patients.

Critical Care & Life Support

- Bag-Valve-Mask (Adult/Pediatric/Neonate)
- Portable oxygen cylinders (B-type) with functional flowmeter
- Portable suction machine (battery/manual)
- Transport ventilator with charged battery
- Portable multi-parameter monitor (ECG + SpO□ + NIBP)
- Emergency resuscitation drugs tray (sealed)
- IV cannulas, giving sets, NS/RL
- Syringe pumps & infusion pumps with battery backup
- Endotracheal tubes, laryngoscope with spare batteries

Fire & Safety

- Fire extinguishers (CO_2 + ABC)
- Fire alarm access + Manual Call Point (MCP)
- Emergency lighting / torches
- Accessible fire exits (unobstructed)

Evacuation Tools

- ICU stretcher with belts

- Wheelchair
- Evacuation drag sheet / spine board
- Patient identification band / tag

2. List of desirable equipment (Operationally Required / Strongly Recommended)

These items improve efficiency and reduce risk during evacuation.

Evacuation & Transport

- Additional stretchers and wheelchairs
- Folding evacuation chair for staircases
- Evacuation slide sheets
- Fireproof patient-protection blankets
- Neonatal transport cot/warmer (NICU)

Monitoring & Airway Support

- Spare ventilator circuits + HME filters
- Portable pulse oximeter
- Portable $EtCO_2$ monitor (if available)
- Manual suction pump (backup)

Communication

- Walkie-talkies (ICU team – Fire Officer – Control Room)
- Public Address system access
- Backup extension boards with surge protection

Documentation

- Evacuation register
- Bed-to-bed transfer forms
- Laminated ICU exit route maps

3. Optional / Additional equipments

Useful in complex evacuations, tertiary hospitals, or high-acuity ICUs.

Advanced Equipment

- Portable ABG machine (Point-of-care)
- Sepsis kit / Massive transfusion kit
- Extra oxygen cylinders beyond minimum requirement
- Emergency tracheostomy set
- PEEP valve for AMBU

Enhanced Safety & Utility

- Battery-powered headlamps
- Reflective jackets for evacuation officers
- Smoke hoods for staff protection
- Color-coded evacuation tags (Red–Yellow–Green)

Additional Support

- Warming blankets
- Spare battery packs for monitors/pumps
- Portable PA microphone

Categorisation of equipment for Operation Theatre (OT) Evacuation

1. Essential equipments (NABH & NBC Required)

Minimum equipment that **must** be available in every OT to ensure safe evacuation.

Fire & Electrical Safety

- CO_2 fire extinguishers (for electrical & equipment fires)
- ABC dry chemical extinguishers
- Fire alarm system + Manual Call Point (MCP) at OT entrance
- Emergency exit signage (illuminated)
- Emergency lighting/torches
- Smoke detectors and fire suppression system (as per NBC 2016)
- Unobstructed fire exit with clear route

Patient Evacuation & Life Support

- OT stretcher/trolley with belts
- Wheelchair (for post-op ambulatory cases)
- Evacuation drag sheet or spine board
- Oxygen cylinders (B-type) with flowmeter
- Bag-Valve-Mask (adult & pediatric)
- Portable suction machine (battery/manual)
- Portable monitor (SpO_2 + ECG + NIBP)
- Emergency drug tray + crash cart near exit
- IV cannulas, IV sets, and crystalloids (NS/RL)
- ET tubes, laryngoscope with spare batteries

Electrical Safety & Gas Control

- Shut-off valves for medical gas pipeline system (MGPS)
- Circuit breakers clearly marked for OT complex

2. Desirable equipments (Operationally Expected / NABH Good Practices)

Recommended items that enhance safety and efficiency during OT evacuation.

Evacuation Tools

- Additional stretchers and wheelchairs
- Fireproof blankets (to wrap sedated/anaesthetized patients)
- Evacuation slide sheets
- Evacuation chair for staircases (in multi-level complexes)

Monitoring & Airway Support

- Spare ventilator circuits + HME filters
- Portable $EtCO_2$ monitor
- Manual suction devices (as backup)
- Pediatric airway kit (LMA, ETT)

Communication & Coordination

- Walkie-talkies for OT–Security–Fire Officer communication
- Public Address (PA) system
- Designated Fire Safety Officer for OT complex

Documentation

- OT evacuation register
- Fire drill feedback & corrective action record
- Laminated OT-specific fire exit and evacuation maps

3. Additionalequipments (For Advanced OT Complexes)

Useful additions that improve response in high-dependency or hybrid OT environments.

Advanced Clinical Support

- Portable ABG analyzer
- Additional portable ventilator
- Massive transfusion kit
- Difficult airway cart (portable form)
- PEEP valve for AMBU

Enhanced Safety

- Smoke hoods for staff (during corridor evacuation)
- Battery-powered headlamps
- Reflective jackets for evacuation team
- Color-coded evacuation triage tags (Red–Yellow–Green)

Additional Utility

- Extra portable oxygen cylinders
- Backup battery packs for OT equipment
- Portable communication microphone/megaphone
- Additional insulated fire blankets

Source : AIIMS Nagpur

Further Reading

Further Reading

1. Online course : Fire Safety in Healthcare Facilities, SAKSHAM (https://lmis.nihfw.ac.in/local/course/view.php?id=748)
2. Online course: Fire Safety in Healthcare Facilities , iGoT (https://portal.igotkarmayogi.gov.in/public/toc/do_1143052789530787841562/overview)
3. Fire Safety Advisory for Healthcare Organizations (HCOs), NABH (https://portal.nabh.co/Announcement/Notification%20-%20Fire%20Safety%20Advisory%20for%20Healthcare%20Organizations%20(HCOs).pdf)
4. HOSPITALS DON'T BURN! Hospital Fire Prevention and Evacuation Guide, PAHO (https://dipecholac.net/docs/files/224-hospitals-dont-burn-hospital-fire-prevention-and-evacuation-guide.pdf)
5. Fire Safety Audit Checklist Advisory for Hospitals / Nursing Homes, Directorate General Fire Services, Civil Defence & Home Guards , Ministry of Home Affairs (https://mahafireservice.gov.in/firestation/Fire%20Safety%20Audit%20Checklist%20for%20Hoospital%20issued%20by%20DGCD.pdf)
6. National Building Code, 2016 (Vol1) ; Bureau of Indian Standards (https://archive.org/details/nationalbuilding01/in.gov.nbc.2016.vol1.digital/)
7. National Electrical Code of India (SP30), Bureau of Indian Standards (https://archive.org/details/gov.in.is.sp.30.2023/mode/2up)
8. Hospital Buildings: A basic guide for Fire Prevention, Life Safety & Fire Protection requirements for the Hospital Buildings, Gujarat Institute of Disaster Management (https://gidm.gujarat.gov.in/sites/default/files/Handbook-Hospital-Building-6.pdf)
9. Fire safety Manual , 2021; AIIMS New Delhi (https://www.aiims.edu/images/pdf/notice/Fire%20Safety%20manual%20-27-10-21.pdf)
10. A Study of Fire Safety Knowledge among Health-care Professionals in a Tertiary Care Teaching Hospital (https://journals.lww.com/aoha/fulltext/2024/01000/a_study_of_fire_safety_knowledge_among_health_care.2.aspx)
11. Hospital Fire Incidents: Challenges and Solutions in a Developing Nation (https://pmc.ncbi.nlm.nih.gov/articles/PMC11994838/)

Notes

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